



REPUBLIC OF TURKEY
MINISTRY OF AGRICULTURE AND FORESTRY
GENERAL DIRECTORATE OF AGRICULTURAL RESEARCH AND POLICIES
International Center for Livestock Research and Training

TAGEM
R & D - INNOVATION

1st International Livestock Science Congress

Congress Topics

- Animal Biotechnology
- Animal Breeding and Genetics
- Domestic Animal Genetic Resources and Sustainable Conservation
- Animal Nutrition, Feed and Feed Additives
- Livestock Behaviour, Welfare, Herd Management and Health
- Reproduction, Obstetrics and Udder Health in Livestock
- Livestock Economy
- Sustainable Animal Production and Environment

MINISTRY OF AGRICULTURE AND FORESTRY - International Center for Livestock Research and Training

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INTERNATIONAL LIVESTOCK SCIENCE CONGRESS

International Center For Livestock Research and Training was established to study on Angora goat breeding and improvement of mohair quality in 1931. The Institute started to research and development studies in livestock study field in 1951 within the Ministry and continues its studies in Breeding, Genetics, Animal Husbandry, Herd Management, Animal Production, Animal Nutrition, Animal Biotechnology, Embryo Production and Transfer, Frozen Semen Production and Artificial Insemination. International Center for Livestock Research Training continues to serve with new scientific studies focused on problem-solving for the livestock sector With its strong technological and personnel infrastructure. It is a great pleasure and honor to invite you to I. International Livestock Science Congress will be held in Antalya/ Turkey, between 31.10.2019 and 02.11.2019. The meeting is where professionals meet to share ideas and advance scientific and technical knowledge. As this conference deals with the basics concepts, students, delegates, academicians and business people can attend the conference to root up the knowledge and excel in this field.

Conference Topics

Animal Biotechnology

Animal Breeding and Genetics

Domestic Animal Genetic Resources and Sustainable Conservation

Animal Nutrition, Feed and Feed Additives

Livestock Behaviour, Welfare, Herd Management Health

Reproduction, Obstetrics and Udder Health in Livestock

Livestock Economy

Sustainable Animal Production and Environment

Invited Speakers

Prof. Dr. Charles James NEWBOLD

Prof. Dr. Calogero STELLETTA

Prof. Dr. Hayrettin OKUT

Prof. Dr. Abdul CHAUDHRY

Doç. Dr. Illias GIANNENAS

Doç. Dr. Dairusz PIWCZYNSKI

Dr. Joanne CONINGTON

Dr. Michael ROSE

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Prof. Dr. Mustafa SÖNMEZ

Prof. Dr. Calegero STELLETTA

Prof. Dr. Adnan ŞEHU

Prof. Dr. Çiğdem TAKMA

Prof. Dr. Umut TAŞDEMİR

Prof. Dr. Mustafa TEKERLİ

Prof. Dr. Pürhan Barbaros TUNCER

Prof. Dr. İsmet TÜRKMEN

Prof. Dr. Hamdi UYSAL

Prof. Dr. Necmettin ÜNAL

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Doç. Dr. Tugay AYAŞAN

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Dr. Serdar YAĞCI

Dr. Yalçın YAMAN

Dr. Sadrettin YÜKSEL

1st

**International Livestock
Science Congress**

31 Oct - 3 Nov 2019

Antalya / TURKEY

Congress Programme

REPUBLIC OF TURKEY

MINISTRY OF AGRICULTURE AND FORESTRY

GENERAL DIRECTORATE OF AGRICULTURAL AND RESEARCH POLICIES

INTERNATIONAL CENTER for LIVESTOCK RESEARCH and TRAINING

01.11.2019 SALON A

09:00	09:15	Kayıt/Registration
Açılış	09:15	Dr. Ali AYAR
	09:30	Doç. Dr. İrfan DAŞKIRAN / The General View of Turkish Livestock Production
	09:40	Dr. Sezer ÖZ / Conservation and Sustainable Utilization of Animal Genetic Resources Project
	09:50	Dr. Serdar KAMANLI / Türkiye'de Tavukçuluk Sektörünün Durumu ve Tavukçuluk Konusunda Yapılan Islah Çalışmaları
	10:00	Gökhan AKDENİZ / Türkiye Arıcılığının Uluslararası Rekabet Gücü
	10:10	Yusuf ZENGİN / Geçmişten Günümüze İpekböceği Yetiştiriciliği ve Anadolu'daki Varlığı
10:20	10:30	Kahve Molası/ Coffee Break
10:30	11:00	Dr. Michael ROSE / Effect of Johne's Disease And Neospora in Dams on The Growth Rate and Health of Their Calves
11:00	11:10	M. Akköse / The Effect of Pregnancy Stage and Housing Conditions on Hoof Health in Dairy Heifers
11:10	11:20	E. Alarşlan / Live Weight After Shearing and Greasy Fleece Weight of Yalova Kıvrık Ewes
11:20	11:30	İ.S. Köse / Hatay İlinde Sığır İç Hastalıkları Açısından Son Durak: Veteriner Fakültesi
11:30	12:00	Dr. Michael ROSE / Low Somatic Cell Counts in Ewes in Early Lactation Predisposes to Increased Rates of Mastitis
12:00	12:10	G.G. Ateş / Effect of Acetyl-L-Carnitine on in vitro Produced Bovine Embryos
12:10		Öğle Yemeği/Lunch
14:00	14:30	Prof. Dr. Calogero STELLETTA / Parameters For The Optimization of in Vivo And in Vitro Embryo
14:30	14:40	F. Korkmaz / The Effect of Toll Like Receptor 4 (TLR4) Inhibitor on Cryopreserved Bovine Semen Kinematics
14:40	14:50	S.Yırtıcı / Effects of Endocrine-disrupting Chemicals Bisphenol A on Body Weights, Blood Values and Liver Enzymes in Neonatal Ankara Goats
14:50	15:00	E. Say / Embriyo Transferi Taşıyıcı İneklerinde Korpus Luteum Büyüklüğünün Gebe Kalma Üzerine Etkisi
15:00	15:10	D. Şahin / Effects of Semen Concentration on Motility During Collection of Bull Semen
15:10	15:20	Kahve Molası/ Coffee Break
15:20	15:50	Prof. Dr. Calogera STELLETTA / Production Protocols - Proposals For Scheduled Monitoring System
15:50	16:00	D.A. Dinç / Invitro Embriyo Üretimiyle (IVEP) Damızlık Elit Süt İneği Sürüsü Oluşturulması
16:00	16:10	A.M. Köse / Keçilerde Gebeliğin Erken Teşhisinde Hızlı Görsel Gebelik Test Kiti Kullanılabilir mi?
16:10	16:20	E.Ş. Demirtaş / Enstitü Koşullarında Yetiştirilen Beyaz Yumurtacı Saf Hat Horozlarda Sperma Özellikleri ve Testesteron Seviyelerinin Belirlenmesi
İklim Değişikliği Paneli	16:30	Prof. Dr. Gürsel DELLAL / Climate Change and Dairy Sector in Turkey
	16:50	Dr. Mesut YILDIRIR / Estimation of Enteric Methane Emission from Sheep Production in Turkey
	17:10	Prof. Dr. Calogero STELLETTA / Heat-Stressed Cows and Strategies Based on Assisted Reproductive Technologies
	17:30	Dr. Selim ÖZKÖK / Dairesel (Sıfır Emisyon) Çiftlikler

01.11.2019 SALON B		
09:00	09:15	Kayıt/Registration
Açılış	09:15	Dr. Ali AYAR
	09:30	Doç. Dr. İrfan DAŞKIRAN / The General View of Turkish Livestock Production
	09:40	Dr. Sezer ÖZ / Conservation and Sustainable Utilization of Animal Genetic Resources Project
	09:50	Dr. Serdar KAMANLI / Türkiye'de Tavukçuluk Sektörünün Durumu ve Tavukçuluk Konusunda Yapılan Islah Çalışmaları
	10:00	Gökhan AKDENİZ / Türkiye Arıcılığının Uluslararası Rekabet Gücü
	10:10	Yusuf ZENGİN / Geçmişten Günümüze İpekböceği Yetiştiriciliği ve Anadolu'daki Varlığı
10:20	10:30	Kahve Molası/ Coffee Break
10:30	10:40	O. Ağyar / Muş İli Halk Elinde Anadolu Mandasının Islahı Projesi: Doğan Malakların Cinsiyet, Doğum Ve Canlı Ağırlık Artışları
10:40	10:50	Y.Z. Oğrak / Sivas İlinde Halk Elinde Yetiştirilen Kangal Akkaraman Irkı Koyunlarda Dölverimi Özellikleri
10:50	11:00	F. Yıldırım / Akkaraman Ve İvesi Irkı Kuzuların Farklı Karkas Bölgelerindeki Yağların Yağ Asidi Kompozisyonunun Belirlenmesi
11:00	11:30	Prof. Dr. Hayrettin OKUT / Predicting Complex Quantitative Traits with Bayesian Neural Networks: A Case Study with Jersey Cows and Wheat
11:30	12:00	R. Yakışan / Growth And Development Characteristics of Karakaş Lamb Produced in Diyarbakir Rural Area
12:00	12:10	B. Keskin / The Growth And Development Characteristics of Zom Lambs Breeding in Public Hands in Diyarbakir Province Until The Weaning Period
12:10	ÖĞLE YEMEĞİ/LUNCH	
14:00		
14:00	14:10	M. Tekerli / Pırlak Kuzuların Büyüme Özellikleri Üzerine Bir Araştırma
14:10	14:20	T. Sezenler / Estimation of Live Weight Using Some Body Measurements in Karacabey Merino Ewes
14:20	14:30	H.H. Şenyüz / Investigation of Fertility, Live Weight, Survival Rate, Mohair Yield and Quality Traits of Angora Goats Reared in Ankara Province
14:30	15:00	Dr. Dariusz PIWCZYNSKI / Conventional Versus Automatic Milking Systems - Comparison of Yield, Composition And Quality Of Milk Of Polish Holstein-Friesian Cows
15:00	15:10	N. Ata / Estimation of Genetic Parameter of Ultrasonic Measurements of Musculus Longissimus Dorsi Muscle in Karya lambs at the Weaning Period
15:10	15:20	Kahve Molası/ Coffee Break
15:20	15:30	M. Güney / Effect of The Dietary Supplementation with Rosemary Oil on Rumen Methanogenic Bacteria Density of Fattening Lambs
15:30	15:40	A. Karataş / Lactation Characteristics of Mahalli Goat Raised in Farmer Conditions
15:40	15:50	A. Karataş / Pre- And Post-Weaning Growth of Karakaş Sheep Raised in Farmer Conditions
15:50	16:20	Dr. Dariusz PIWCZYNSKI / Heritabilities And Genetic Correlation Among Somatic Cell Score and Some Milking Traits in Holstein-Friesian Primiparous Cows Milked by an Automated Milking System
İklim Değişikliği Paneli	16:30	Prof. Dr. Gürsel DELLAL / Climate Change and Dairy Sector in Turkey
	16:50	Dr. Mesut YILDIRIR / Estimation of Enteric Methane Emission from Sheep Production in Turkey
	17:10	Prof. Dr. Calogero STELLETTA / Heat-Stressed Cows and Strategies Based on Assisted Reproductive Technologies
	17:30	Dr. Selim ÖZKÖK / Dairesel (Sıfır Emisyon) Çiftlikler

02.11.2019 Salon A		
09:00	09:30	Dr. Abdul Shakoor Chaudhry / Novel Feed Additives to Replace Antibiotics for Sustainable Animal Production
09:30	10:00	Prof. Dr. Jamie Newbold / Manipulating The Rumen Microbiome
10:00	10:20	Kahve Molası/ Coffee Break
10:20	10:30	I.K. Hacıoğlu / A Study on The Enteropathogenic Viruses Threatening Economical Livestock Production First Detection of Picobirnavirus
10:30	10:40	O. Sızmaz / Koçlarda Borik Asit Kullanılabilirliğinin Araştırılması
10:40	10:50	E.S. Polat / Metabolic Profiles of Fat-Tail Akkaraman Breed Sheep
10:50	11:20	Prof. Dr. Ilias Giannenas / The Use of Aromatic Plants, Extracts and Essential Oils as Feed Additives
11:20	11:30	S. Mavi / The Use of Conjugated Linoleic Acid as Feed Additive in Order to Promote Improve Meat Quality in Beef Cattle
11:30	11:40	M. Kutlu / The Effect of GnRH Injections on Reproductive Parameters Following Short Term Progesterone Administration in Awassi Ewes
11:40	11:50	A.E. Tunç / Tam Yağlı Soya Ve Soya Küspesinin In Situ Ve In Vitro Rumen Protein Parçalanabilirlikleri Arasındaki İlişkiler
11:50	12:00	A. Akçay /Effect of Saponin and Stevia Extracts on Methane Production, Metabolic Body Weight and Nutrient Digestibility in Sheep
12:00	14:00	Öğle Yemeği/Lunch
14:00	14:10	N.I. İçil / Effect of Ration Protein and Energy Levels on Serum Biochemical Profile of Fatty Tailed Sheep
14:10	14:20	E. Danyer / Effects of Whey Used As Drinking Water on Immune, Oxidant and Antioxidant Parameters of Weaning Lambs
14:20	14:30	B. Bölükbaş / The Effect of Different Levels of Fumaric Acid and Malic Acid on In Vitro True Digestibility of Vetch (Vicia Sativa L.) Hay
14:30	14:40	E.A. Tüzün / The Effect of Reduction of Vitamin and Trace Mineral Mixture in Diet on Intestinal Morphology in Growing Quails
14:40	14:50	U. Yıldırım / Yağı Alınmış Un Kurdu (Tenebrio Molitor) Larvasının Yumurta Tavuklarının Performans Özelliklerine Etkisi
14:50	15:00	M. Gültekin / Yumurta Tavuğu Yemlerine İlave Edilen Aspir Yağı ile Bazı Bitkisel Yağların Kan Parametreleri ve Yumurta Kalite Özellikleri Üzerine Etkilerinin Karşılaştırılması
15:00	15:10	Kahve Molası/ Coffee Break
15:10	15:20	B. Koçer / Serbest Gezinmeli Sistemde Yetiştirilen Etlik Piliçlerde Yem Formu ve Yeşil Ot Tüketiminin Performans Üzerine Etkileri
15:20	15:30	Ş. Dursun / Konya İlinde Halk Elinde Orta Anadolu Merinosu Koyununun Islahı Alt Projesinin Döl Verimindeki Artışın Türkiye Koyuncululuğuna Katkısı
15:30	15:40	E. Odabaş / Ankara İli Nallıhan ve Beypazarı İlçelerinde Üretilen İpekböceği Kozalarında Kalitenin Belirlenmesi
15:40	15:50	S. Demir / Farklı Materyallerle Zenginleştirilen Damızlık Horoz Kümeslerinin Performans ve Refah Parametreleri Üzerine Etkisi
15:50	16:00	A. Erişek / Çimlenmiş Yeşil Yem Toplam Karışım Rasyonun (Tmr) Kuru Madde Tüketimi, Serum Biyokimyasal Parametreler, Serum Mineral Maddeler, Süt Verimi Ve Bileşenlerine Etkisi
16:00	16:10	M. Demirci - H. H. Şenyüz / Effects Of Free Capric And Lauric Acid Supplementation On Performance Parameters Of Broiler Chicks
16:10	16:20	R. Bulut - H. H. Şenyüz / Sorgum Sudan Otu Hasılına Değişen Oranlarda Katılan Üzüm Cibresinin Silaj Kalitesi Üzerine Etkilerinin Belirlenmesi
16:20	16:50	Prof. Dr. Hayrettin OKUT / Predicting Expected Progeny Difference for Marbling Score in Angus Cattle Using Artificial Neural Networks and Bayesian Regression Models
16:50	17:00	Ş. Tez / Genetic Evaluation of Pre- and Post-Weaning Growth of Zom Sheep Raised in Farmer Conditions
17:00	17:10	Y. Yaman / Association of Toll-like Receptor 4 (TLR4) Exon 3 Variants with Ovine Johne's Disease (OJD) Serostatus
17:10	17:20	S.E. Selçuk / Olgu Sunumu: Damızlık Bir Boğada Görülen Kimerizm
17:20	17:30	Y. Han / Diyarbakır İlinde Halk Elinde Yetiştirilen Anadolu Mandalarının Bazı Verim Özellikleri
17:30	17:40	M. Kırbaş / Karaman İlinde Yetiştirilen Orta Anadolu Merinosu Kuzuların Büyüme ve Yaşama Gücü Özellikleri
17:40	17:50	S.D. Daştan - Yusuf Ziya Oğrak / DNA Barkodlama Yöntemi ile Kangal Köpeklerinin Genetik Çeşitliliklerinin Araştırılması

		02.11.2019 SALON B
09:00	09:10	M. Saatçi / Birth and 120-day Weights of Feral Goats Reared Under The Extensive Breeder Condition
09:10	09:20	S.H. Abacı / Comparison of Different Regression Tree Methods (CART and CHAID) for Determination of Some Environmental Effective Factors on Lactation Milk Yield in Anatolian Buffaloes
09:20	09:30	M. Soydaner / Determination of the Lactation Curve Parameters Using Different Equations in Holstein Cattle
09:30	09:40	Y. Arzık / Effect of Inbreeding on Milk Traits, Lactation Length and First Calving Age in Dutch Holstein Dairy Cattle
09:40	09:50	A.A. Akbaş / Evaluation of Growth Traits of Hair Goat Kids and Milk Yield of Does Reared Under Breeder Condition in Burdur Province
09:50	10:00	E. Kul / Factors Affecting Birth, 6-Month and 12-Month Weight in Anatolian Buffalo Calves
10:00	10:20	Kahve Molası/ Coffee Break
10:20	10:50	Dr. Dariusz PIWCZYNSKI / The Overview of The Results From Automatic Milking System In Selected Countries In Europe And The U.S
10:50	11:00	S. Gül / Gaziantep İlinde Halk Elinde Yetiştirilen İvesi Koyunlarında Bazı Döl ve Süt Verim Özellikleri
11:10	11:20	M. Keskin / Relationship Between Forest with Goat Breeding in Turkey and The Effects of This Relationship on Goat Breeding
11:20	11:30	M.İ. Soysal / The Effects of Some Environmental Factors Affecting on The Growth Traits in Karacabey Merino Lambs Raised in Tekirdag for Community Based Sheep Improvement Project
11:30	12:00	Dr. Dariusz PIWCZYNSKI / The Milking Frequency of Primiparous Cows in Their Early Stage of Lactation and its Impact on Milking Performance
12:00	14:00	Öğle Yemeği / Lunch
14:00	14:30	Dr. Joanne CONINGTON / Breeding For Disease Resistance in Sheep
14:30	14:40	H. Erduran / Some Production Characteristic of Hair Goat in the Farm Condition in Konya
14:40	14:50	A. Şekeroğlu / Niğde İli Merkez İlçede Halk Elinde Akkaraman Koyunlarının Bazı Performans Özelliklerinin Belirlenmesi ve Geliştirilmesi
14:50	15:00	O. Karaca / Phenotypic and Genetic Parameters Estimation for Litter Size in Eşme Sheep
15:00	15:10	Kahve Molası/ Coffee Break
15:10	15:20	S. Koncagül / Pre- and Post-Weaning Growth of Akkaraman Sheep in Kırşehir Province
15:20	15:30	İ. Cemal / Lamb Birth Weight and Sheep Live Weights at Birth in Eşme sheep
15:30	15:40	O. Yılmaz / Growth Characteristics and Survival Rates for in Eşme Lambs at Weaning
15:40	15:50	M.İ. Soysal / İstanbul İlinde Halk Elinde Yetiştirilen Anadolu Mandalarının Bazı Verim Özellikleri
15:50	16:00	K. Kırıkçı / Karadeniz Bölgesi Bazı Yerel Koyun Genotiplerinde Kuyruk Yağı Yağ Asitleri Profiline Belirlenmesi
16:20	16:30	H. Özkan / The Relationship Between Cox-2, Nrf2, Tlr2 Genes Expression Levels And Somatic Cell Count In Goat Milk Somatic Cells
16:30	16:40	E. Oğuz / The Evaluation of The Kıvrıkcık Lambs Concerning Growing and Neonatal Loss Parameters Reared on Upland and Lowland Region in Bilecik Province of Turkey Pertaining to Climatic and Altitude Factors
16:40	16:50	N. Özdoğan / The Growth Performance of Denizli and Gerze Native Chicken Breeds
16:50	17:00	G.Y. Öz / Genetic Polymorphism of Some Domestic Sheep Breeds in Turkey
17:00	17:10	M.E. Vural / Molecular Phylogenetic Analysis of Mahalli Goats in Diyarbakır Region
17:10	17:20	O. Ağyar / Türkiye Koyun (Ovis Aries) Irklarından Morkaraman Koyunlarının Genetik Çeşitliliğinin mtdna Belirteçleri Kullanılarak Belirlenmesi
17:20	17:30	E. Hatipoğlu / A Genome-Wide Association Study to Identify Candidate Genes Associated with Dag Score in a Commercial Sheep Breeding Population
17:30	17:40	Ö.B. Çoban / Farklı Yaşlarda Karayaka Koyunlarının Bazı Morfolojik Özellikleri

OPENING SPEECHES

ILSC 2019

The General View Of Turkish Livestock Production

İrfan Daşkıran¹ Serdar Yağcı¹ Ali Ayar¹ Önder Sözen¹
İrfan Güngör¹ Kürşat Alkoyak¹ Yusuf Kaplan¹

¹General Directorate of Agricultural Research and Policies, Ministry of Agriculture and Forestry, Turkey

Turkey is located in the eastern Mediterranean and an important bridge is between the continents of Europe and Asia and livestock production an important role in Anatolian cultural and social life for centuries. Total land area is 785.347 km² and population is estimated as 80,8 million. Not only geographical differences but also animal diversities, different livestock breeds and production systems are being breeding under very different breeding systems whole of Turkey.

Turkey is rich in terms of the presence of animals and Livestock population consist of 17 million head Cattle, 178 thousand head Water buffalo, 35,1 million head Sheep, 10,8 million head Goat and 353 million number poultry.

Over years Turkey human population is increasing and need to red meat is also increasing dramatically. Of course, meat production can not be increased in parallel with the human population increasing.

Livestock production is distributed to whole of Turkey but sheep and goat production is high intensity especially at mountainous region of Mediterranean, South-East Anatolia. Sheep production is differ from goat production and it is localized central Anatolia and East and South east Anatolia as extensive systems. Cattle production is also localized intensive and modern farms are in the west part of Turkey and its capacity is medium and big size. In addition out of the west part Turkey, different size cattle farms well distributed in different regions of Turkey lands. All type of livestock production has nomadic systems and family farming type farms localized in east and south east Anatolia. South-East Anatolia region production systems are characterized as basically extensive and semi-extensive systems. On the other hand last ten years private sector investment has been getting increase especially west part of Turkey.

Conservation And Sustainable Utilisation Of Animal Genetic Resources Project

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Anatolia is the one of the most wealthy regions in the world in terms of genetic diversity involving three of the large biogeographic regions; Mediterranean, Euro-Siberian, and Irano-Turanian. These biogeographic regions hosting numerous species, families, genera etc. Additionally, recent findings have shown that sheep and goats were first domesticated near the Anatolia. Apart from these types, various domestic animal types have been rearing in Turkey for food and agriculture.

Conservation and Sustainable Utilisation of Animal Genetic Resources Project was initiated to conserve native animal breeds at risk of extinction. 26 breeds belongs to cattle, sheep, goat and bee type has been conserving in situ and ex situ-in vivo, whereas a total of 88.484 biological material belongs to 18 small ruminant, 7 large ruminant and 5 horse breeds have been conserving ex situ-in vitro.

National activities regarding to Conservation of Animal Genetic Resources will be explained elaborately in this presentation.

Poultry Industry Situation And Poultry Breeding Studies Carried Out In Turkey

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The poultry sector has taken into account the strategic importance of Turkey's young population structure that is gaining more importance. Approximately 80% of the white meat and eggs produced in our country are realized in modern facilities and most of the facilities are 20 years younger than their counterparts in developed countries. The latest developments in the sector are closely monitored and the reflection of this on production is very fast. The egg sector has demonstrated progress in recent years in Turkey attract the world's attention and maintain their position in the world egg production. As of 2018, the egg sector is on the path of continuous development and growth with 2 715 facility number, 5 066 henhouse number, 22 300 billion egg production and 5 780 billion export. The share of exports in production reached 25.92% in 2018. Turkey ranks 8th in world production of chicken eggs. These figures indicate that the sector is in good condition in terms of production potential. Egg consumption per person in Turkey, 214 in 2017, while in 2018 this figure was realized an average around 256. In 2018, per person consumption of poultry meat was 21.86 kilograms. However, per person consumption of poultry meat has not yet reached the desired number. The United States, Argentina and Brazil are by far the leading producer of broiler meat in the world. Turkey is located in the 10th row. Poultry meat consumption per person in the first three countries mentioned above is around 40-49 kg. Turkey could not catch half of that amount.

Poultry breeding activities started with the establishment of Poultry Research Institute. The Poultry Research Institute was established in 1930. Main purpose of "carrying out technical, economical and technologic studies to improve the poultry research services throughout the country, to evaluate the results obtained and the submit them to the distribution organization of the provinces and to the benefit of the farmers". The use of hybrid materials becoming popular throughout the world after 1950s, the Institute made it its duty to produce the hybrid parents with its own possibilities after 1965, and accelerated these works after 1970. After 1995 however, pure lines were imported from Canada, The three hybrids (ATAK, ATAK-S and ATABEY) obtained from these pure lines. These hybrids have been registered by the National Race Registration Committee and by the Turkish Patent Institute. ATAK and ATAK-S hybrids allow gender discrimination according to feather colour at daily age. Studies have been shifted towards the development of autosex parent lines for ATABEY that allow gender discrimination based on wing feathering rate. A new white layer named Akbay has been submitted for hybrid registration.

International Competitiveness of Turkish Beekeeping

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According to the data of United Nations Food and Agriculture Organization (FAO) in 2017, 90,999,730 colonies and 1 million 860 thousand tons of honey were produced by 137 countries worldwide. On a continental basis Asian continent ranks first with a production of 913,178 tons of honey with a share of 48.6 %.

In terms of world colony existence as India ranks first with total colonies of 12,763,684, China follows with 9,156,882 colonies, Turkey with 7,796,666 colonies, Iran with 7,271,825 colonies and Ethiopia with 6.13999 million colonies. China supplies 29.5 % of world honey production with its 551,476 tons of honey production. China is followed by Turkey with 114.471 tonnes (6.1%), by Argentina with 76.379 tonnes (4.1%) and by Iran with 69.699 tonnes (3.7%) of production volumes.

Within the year of 2018, 6.413 tons of honey were exported by Turkey to 45 countries particularly to Germany (39.69 %) and the USA (29.61%). Approximately 26 million dollars of foreign exchange inflow has been achieved from honey foreign trade into our economy (FAO, 2019).

Starting with Citrus, nectar flow in our country continues with highland honey and pine honey. With the advantage provided by geographical structure and climate properties of Turkey, monofloral and polyfloral honey productions are achieved by beekeepers almost all of the year. Approximately 95% of the world's honey is produced in Turkey and pine honey constitutes a large part of honey export of Turkey.

Turkey is an important beekeeping country with its wealth of flora, favorable climatic conditions for beekeeping, honey bee genetic diversity and geographical location. Scientific studies on our monofloral and polyfloral bee products produced in our country should be concentrated on, promotion activities in national and international markets should be focused and the reliability of sector in the domestic and foreign market should be increased by creating quality standards and providing traceability of bee products from hive to table.

Sericulture From Past To Present And The Presence İn Anatolia

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Sericulture is cultivated from centuries. This agricultural activity began in China and spread to the world from here. Silkworm has short life, which is 35-45 days, from larva to butterfly. It has an important role in terms of social, cultural and economic developments in the regions where it is cultivated. Silkworm came firstly to Anatolia in the 550s during the Byzantine Empire. This agricultural activity started to cultivate in the Marmara region and accelerated with the Ottoman Empire making Bursa the capital city. 16th century is the golden age for Anatolia in terms of silk and silk products. In 1888, during the reign of Sultan Abdulhamid Khan, one of the 8 students, Kevork Tarkomyon, sent to France for education purposes. He said that a silk school should be opened Silk School. Harir Dar-ül Talimi was opened. However, Turkish Silkworm-Breeding had a negative effect due to various reasons as follows: 1) the closure of Sericulture Research Institute in Bursa in 2004, 2) damping on silk prices by China, and 3) breeder dissatisfaction and decreases on the rural population. The amount of produced silkworm cocoons decreased by around %97 and the number of households in sericulture reduced by approximately %95 in the period between 1991 and 2001 in Turkey. On the other hand, significant increases in key outputs have been currently experienced in Turkish silkworm-breeding. For example, in the last five years (i.e. 2014 - 2018), the number of villages, the number of households in sericulture, the number of opened boxes and the amount of silkworm cocoon increased by %103.82, %25.57, %66.84 and %17.04, respectively. Since the beginning of cultivating, every effort for silkworm breeding, which has made significant contributions to the political, cultural and economic conditions of the countries, will undoubtedly be one of the most important legacies left to future generations.

ORAL PRESENTATION

ELSC 2019

Predicting Complex Quantitative Traits With Bayesian Artificial Neural Networks: Genomic Vs Additive Relationships Matrix

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Challenges in the study of associations between molecular markers and complex phenotypes include the possible existence of cryptic relationships that may not be amenable to parametric statistical modeling. These associations have been investigated primarily using naïve single marker regressions and with Bayesian linear regression models of various types. But that assumes additive inheritance almost invariably, while typically ignoring interactions and non-linearity. To-date, machine learning methods have been applied in high dimensionality of the data such as Genome-Wide Association Studies (GWAS) for identification of candidate genes, epistasis detection, gene network pathway analyses and genomic prediction of phenotypic values. The aim for this talk is Investigating the performance of several artificial neural network (ANN) architectures using Bayesian regularization (a method for coping with the “small n , large p ” problem that arises in statistical models including a massive number of explanatory variables). The architectures considered here, differed in terms of number of neurons and activation functions used. Results revealed that Bayesian neural network with at least 2 neurons suggesting that linear models based on pedigree or on genomic relationships may not provide an adequate approximation to genetic signals resulting from complex genetic systems. Further, our results suggest that the neural networks may be useful for predicting complex traits using high-dimensional genomic information, a situation where the number of coefficients that need to be estimated exceeds sample size. Bayesian Regularization allowed estimation of all connection strengths even when $n \ll p$, and the effective number of parameters was much smaller than the corresponding nominal number. Conclusions were that neural networks have the ability of capturing nonlinearities, and do so adaptively, which may be useful in the study of quantitative traits under complex gene action, and particularly when prediction of outcomes is crucial, such as in genomic selection as well as personalized medicine.

Predicting Expected Progeny Difference For Marbling Score In Angus Cattle Using Artificial Neural Networks And Bayesian Regression Models

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The availability of genome-wide dense marker panels plants and animals has opened horizons for incorporating genomic info into practical animal and plant practical breeding programs and association between complex traits and genomic. The huge databases after genomic era pose challenges in computational capacity, data analysis and interpretation of results for genomic selection. Reduction of dimensionality and feature extraction arguably play pivotal roles in current genomic studies. The intensive computation inherent in these problems has altered the course of methodological developments and the same is true for genomic selection. Artificial neural networks (ANN), also known as neuro-computational models, provide an appealing alternative for genome-enabled prediction of quantitative traits. The aim this presentation is to investigate the accuracy of ANN for predicting expected progeny differences (EPD) for marbling score in Various ANNs with two different training algorithms, activation functions, and from 1 to 4 neurons. For comparison, BayesC π models were used to select a subset of optimal markers under the assumption of additive inheritance. As data, 3079 registered Angus bulls, genotyped with the Illumina BovineSNP50 BeadChip, After data quality control, total 2,421 polymorphic SNP markers were retained. The target variable to be predicted was EPD for marbling score EPD had been computed by the American Angus Association using BLUP based upon their pedigree data and progeny carcass and ultrasound data. Our results support the idea that ANN with Bayesian regularization can act as universal approximators of linear or non-linear functions of interest in breeding contexts. Bayesian artificial neural network (BRANN) consistently yielded better predictions than Scaled Conjugate Gradient artificial neural networks (SCGANN). BRANN training updates the weights and biases using Levenberg-Marquardt optimization, time increase drastically with the number of SNPs included in the model. BRANN can perform as well as linear Bayesian regression models in predicting additive genetic values. ANN may be useful for predicting complex traits using high-dimensional genomic information and capture nonlinearities, and do so adaptively. While the selection of models of varying dimensions may be an issue worth exploring, it brings tremendous computing challenges, particularly when the data set is large.

Effect of Johne's Disease and Neospora in Dams on the Growth Rate and Health of Their Calves

Michael Rose

Tasmanian Institute of Agriculture, Australia

Introduction: The incidence of Johne's disease is widespread in the European dairy industry. It is caused by a bacteria, *M. paratuberculosis*, which embeds itself into and leads to thickening of the wall of the lower part of the small intestine. This prevents the absorption of nutrients, leading to wasting in the cow. Many animals have the disease without demonstrating symptoms; it can be passed to the calf through milk, saliva and faeces. Neospora is caused by a protozoa, *Neospora caninum*, and infection is also widespread in the European dairy industry; the disease is spread through connection with faeces and saliva. It is thought that ~10% of cattle abortions in the UK are caused by neospora.

Aim of project: To determine the effect of Johne's disease or Neospora in the dam on the health and growth performance of their calves.

Methods: Calves from dairy cattle giving birth between March and April 2019 (n=61) on a commercial dairy farm in Wales were blood sampled at 48 hours of age and again at 4 weeks of age. The weight of the calves was determined at 48h, 2 weeks and at 4 weeks of age, and their health status on each weigh day was determined according to the Wisconsin Calf Health Scoring system. The blood samples were analysed for the percent of total white blood cells as well as lymphocytes. Calves were grouped based on their dam's Johne's disease or neospora health status.

Results: The early growth rate of the calves was not affected by the incidence of neospora or Johne's disease. The average growth rate of the calves was 0.55 kg/d over the first four weeks of life. The calves of dams carrying neospora had worse ear scores according to the Wisconsin Calf Health Scoring system, and tended to have worse overall health scores (sum of cough, ear, eye and nasal scores). The calves from the dams carrying Johne's disease had higher levels of total white blood cells and lymphocytes.

Discussion: This preliminary study has shown that while there was no effect on the growth rate of the calves between dams that were free of neospora or Johne's disease, and those with the conditions, there was some evidence that the calves from dams with neospora fared worse in terms of health score. The calves from the dams with Johne's disease had elevated levels of white blood cells and lymphocytes, suggesting that these were carrying an infection. Further evidence will be presented at the symposium on differences between groups of calves in their metabolic chemistry. Overall, this study suggests that Johne's disease and neospora in the dam impairs the health of calves. This underlines advice that the dams of heifer calves selected as dairy replacements should be negative for both conditions.

Conventional Versus Automatic Milking Systems - Comparison of Yield, Composition and Quality of Milk of Polish Holstein-Friesian cows

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The purpose of the study was to evaluate the changes in selected production and functional traits of Polish Holstein-Friesian (PHF) cows after conversion from conventional (CMS) to automatic milking system (AMS). The study consisted of 3 398 PHF dairy cows, from 16 herds in which CMS was changed to AMS. The data consisted of somatic cell score [SCS], milk yield [MY, kg], fat content [FC, %], protein content [PC, %], dry matter [DM, %], lactose content [LC, %], urea content [MU, mg/l]. Data was collected for first and second full lactations. The change in milking system from conventional to automatic statistically improved the hygienic quality of milk. Multifactor analysis of variance confirms statistical effect ($P < 0.0001$) of herd, season, interaction herd x milking system SCS in milk on most tested parameters. Milking system had a statistical impact on milk yield, fat, lactose, dry matter and urea content. Regardless of lactation number, milk derived from CMS was characterized by a higher value for SCS (3.51 in CMS vs 3.20 in AMS), fat (4.06% vs 3.95%), protein (3.39% vs 3.37%) and dry matter contents (12.99% vs 12.86%), while milk from AMS had higher MY (25.89 kg in CMS vs 29.74 kg in AMS), lactose (4.86% vs 4.90%) and urea contents (223.59 mg/l vs 245.34 mg/l). Not all 16 herds reacted to the change of milking system similarly. The conversion from CMS to AMS resulted in the decrease of SCS in milk of multiparas in 12 herds, FC in 14, PC in 10 and DM in 14 herds. The change caused the increase of MY in 14 herds, LC in 12 and MU in 14 herds. We believe that AMS may positively affect milking yield and quality, however, the change of milking system should be also accompanied by the change in herd management.

Low Somatic Cell Counts In Ewes In Early Lactation Predisposes To Increased Rates Of Mastitis

Michael Rose

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Introduction and Aim: Research in dairy cattle has shown that low somatic cell count (SCC) can increase the chances of a case of clinical mastitis in a later stage of lactation. In this study, the effect of very low SCC in early lactation on the odds of a case of clinical mastitis or other udder abnormality in ewes was determined.

Methods: The SCC and milk composition (fat%, protein %, lactose %) of 53 (in 2012), 89 (in 2014) and 78 (in 2016) Texel and Texel cross ewes were measured post lambing in a series of three experiments done over a 5-year period. Ewes were grouped according to the levels of SCC in their milk on the second day after parturition: 'Low' (<150 000 cells/ml), 'Medium' (150 000 – 299 000), 'High' (300 000 – 999 000 cells/ml) and 'Very High' (> 1 000 000 cells/ml). Ewes with clinical signs of mastitis on day 2 of lactation were excluded from the study. Ewes were monitored for signs of clinical mastitis and other udder irregularities throughout lactation; udder checks were carried out on weeks 3, 8 and 13. Ewes with clinical signs of mastitis (hardening, discharge, loss of udder function) were regarded as clinical mastitis cases, while additionally the presence of lumps and sores with or without clinical mastitis symptoms were classified as udder abnormalities. Lactation ended when the lambs were weaned at 13 weeks of age. Lambs were weighed at birth, at 8 weeks and at 13 weeks of age.

Results: Ewes with a Low SCC on day 2 of lactation had 3.15 times greater odds of having clinical mastitis later in lactation compared to ewes with a Medium SCC; this difference tended towards significance ($P=0.081$). Further, these ewes had odds 3.47 times greater of suffering from all udder abnormalities combined ($P=0.033$). Ewes with a High, or Very High SCC had odds 2.30, and 4.61 times greater of having clinical mastitis later in lactation, respectively, compared to ewes with a Medium SCC; the latter value was significant ($P=0.170$ and $P=0.032$, respectively). The ewes with High or Very High SCC on the second day of lactation had odds of 3.87, and 3.09 times greater, respectively, of having an udder abnormality later in lactation compared to ewes with a medium SCC ($P=0.026$ and $P=0.058$, respectively). Milk composition had no significant effect on the likelihood of clinical mastitis, or all udder abnormalities combined (all $P>0.05$).

The SCC of the ewes on the second day of lactation had no significant effect on the weight of the lambs at weaning, though there was a tendency for the lambs in the Very High SCC group to have a

lower weight at 8 weeks of age relative to the Medium SCC group. The Very High SCC group lambs had a significantly slower daily live weight gain to 8 weeks of age. Ewes with a High milk fat % post lambing had lambs that were significantly heavier at weaning ($P < 0.05$). Lambs from ewes with a High milk protein %, and with a High milk lactose % post lambing were significantly heavier at 8 weeks and had a significantly higher DLWG to 8 weeks ($P < 0.05$).

Discussion: This study has demonstrated that there was a significantly increased level of udder abnormalities in sheep with Low SCC in early lactation relative to those of Medium SCC. The literature suggests that this may be due to the higher levels of leukocytes in the udder of the medium SCC group relative to the Low SCC group, which may cause increased levels of pathogen elimination and immune system activation. The literature also suggests that slightly increased SCC may also be caused by minor pathogens such as coagulase-negative *staphylococci*, which directly inhibit major mastitis pathogens. The increased odds of mastitis or udder abnormalities seen in ewes with a high or very high SCC is thought to be because of the presence of major pathogens in the udder prior to clinical mastitis symptoms.

**Usable Parameters For The Optimization Of In Vivo And In Vitro Embryo Production
Protocols - Proposals For Scheduled Monitoring System**

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Embryo production represents the essential aspect of greater pressure imposed to the selection when the females are considered. During the development of protocols numerous aspects has been analyzed and at the present time some of them can be used routinely. Considering that all the aspects of follicular development have been described in cows, it is possible to create scheduled monitoring systems (SMS) to optimize the existing protocols. Usually the classical protocols consider the absence of a dominant follicle at the start of repeated pFSH administrations and eventually the aspiration of it. The number of inseminations are usually considered 2-3 times after 36 h after the end of stimulation treatment. Obviously, the efficacy and efficiency of the treatment depend by individual animal's answer and by the expertise of the operators. Single or double administrations of pFSH instead of 8-10 times represents the best option to decrease stress level of cows. A finely SMS based on ovarian ultrasonography checking the homogeneity of the follicular development can be considered to optimize the *in vivo* embryo production. Ratio between number of transferable embryos and number of follicles at the insemination time or number of corpora lutea at uterine flushing can give the possibility to calculate the successful rates of multiple ovulation, artificial insemination and recovery of transferable formations. SMS for *in vitro* embryo production is based on quality of aspirated follicles and relative collected oocytes before IVM, quality and quantity of sperms/inseminating dose at IVF and biochemical/hormonal composition of the used IVC mediums. A lot of efforts considers as essential the identification of compounds in the natural fluids to increase the successful rates for each of IVP phases. Embryo production is depending on the possibility to equalize the embryo's production cost to the artificial insemination using sexed semen in a long-term genetic selection plan.

Heritabilities And Genetic Correlation Among Somatic Cell Score And Some Milking Traits In Holstein-Friesian Primiparous Cows Milked By An Automated Milking System

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The aim of this study was to estimate heritabilities and genetic correlation among somatic cell score and selected milking traits for 1899 primiparous Polish Holstein-Friesian cows from 25 farms equipped with an automatic milking systems (Lely Astronaut A4) in Poland. The following data from AMS were chosen for analysis: daily milk yield, frequency, time and speed of milking, attachment time, milk conductivity and temperature. Test day somatic cell counts (SCC) in milk of studied cows were obtained from SYMLEK system. Data from AMS were restricted to those related to test days with SCC available. Before analysis SCC was log-transformed to obtain normally distributed somatic cell score using formula: $SCS = \log_2(SCC/100000)+3$. Finally 13,401 records were used for estimation

of (co)variance components. Heritabilities and genetic correlations for all analyzed traits in each test day (from day 5 to 305) were estimated using Bayesian method via Gibbs sampling (Misztal, 2008) and the two-traits random regression animal model. The Misztal's GIBBS1F90 program was used to estimate (co)variance components for all combinations of two traits: somatic cells score (SCS) and one from the rest of studied traits. Heritabilities from the test-day model (mean from day 5 to 305) for analysed traits were, respectively: SCS – 0.254, milk yield – 0.257, milking frequency – 0.267, milking time – 0.251, milk speed – 0.408, attachment time – 0.170, milk conductivity – 0.361 and milk temperature – 0.224. The genetic correlation was positive between test-day SCS and milk yield (0.038), milking time (0.150), milk speed (0.381), attachment time (0.112), milk temperature (0.501) and protein yields, and negative between SCS and milking frequency (-0.105) and milk conductivity (-0.148).

The Overview Of The Results From Automatic Milking System In Selected Countries In Europe And The U.S.

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The purpose of the study was to compare selected milking parameters recorded by the automatic milking in the Czech Republic, France, Germany, Italy, Latvia, Lithuania, Netherlands, Poland and the US in 2014-2017: the average number of robots per herd (n), the number of cows per robot (n), the daily milk yield per robot (kg), the daily milking frequency (n), the daily number of refusals (n), the milking speed (kg/min.), the daily milk yield per cow (kg), the fat and protein content (%) and the consumption of concentrated fodder per 100 kg of milk (kg). A two-factor analysis of variance indicated a highly significant impact of the country and the country × milking year interaction on all of the controlled features related to automatic milking. The study indicated that, among others, most daily milk yield was obtained from the robot in the US (1862 kg) and then in Italy (1575 kg). In these countries, the highest milking speed was recorded, respectively: 2.74 and 2.79 kg/min, or the daily number of milkings, respectively: 2.79 and 2.74. The lowest values of the discussed features were observed in Lithuania and in Latvia. Furthermore, it was observed that, in 2014-2017, the number of robots per farm was increased (from 1.91 to 2.06), together with the daily milk yield per robot (from 1464 to 1504 kg) and per cow (from 27.30 to 28.61 kg), the number of milkings a day (from 2.68 to 2.71) and the milking speed (from 2.44 to 2.51 kg/min.). The proven, statistical differences between the level of milking parameters in the studied countries can probably result from the differentiated genetic potential of the milked cows and the diversity of the fodder base.

The Milking Frequency Of Primiparous Cows In Their Early Stage Of Lactation And Its Impact On Milking Performance

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The purpose of the study was to indicate the relationship between the milking frequency of primiparous cows during the first month of lactation and their subsequent milk performance. Material of this study consisted of 25 Polish herds of Holstein-Friesian dairy cattle. All farms had similar housing and feeding conditions and were equipped with AMS (Astronaut IV milking robots by Lely). Including data from SYMLEK system the total of 13 992 results of test milkings and 723 695 milkings of primiparous cows were collected. Depending on the milking frequency in the first month after calving (MFF) animals were divided into 5 categories: MFF1 – less than 2 milkings per day; MFF2 between 2 and 2.5 milkings per day; MFF3 – more than 2.5 but less than 3 milkings per day; MFF4 – between 3 and 3.5 milkings per day; MFF5 – between 3.5 and 4 milkings per day. The collected data was statistically processed using the multifactorial analysis of variance. Based on the result of this study, the most important indicators for farmers in relation to cows that may gain higher milking frequency in AMS and thus improve milk yield and its hygienic quality are: the age at first calving and calving season. The best milk and milking parameters characterized primiparous cows, for which the average number of milkings per day was at the level of 3-3.5 or above. The highest culling percentage (57.77 %) was noted within the group of primiparous with the lowest milking frequency during the first month of lactation (MFF1). Older animals, that calved after the 28th month of life, and those that calved during warmer seasons showed the tendency to have a lower milking frequency and poorer milk and milking parameters.

Novel Feed Additives to Replace Antibiotics for Sustainable Animal Production
An invited keynote

Abdul Shakoor Chaudhry

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Farm animals are crucial to supply high quality food for ever growing human population worldwide. However, overuse of antibiotics to maintain animal health and production has caused public concerns. These concerns are attributed to the possible links between antibiotic use and antimicrobial resistance (AMR) in both animals and human beings. Although the preventive use of antibiotics for food producing animals has been banned in many countries, their therapeutic use may be unavoidable to comply with animal welfare guidelines. This of course creates a great challenge for the animal and feed industry. Therefore, it is essential to investigate alternative ways to maintain animal health in order to obtain high quality protein food items for human population. The objective of this paper is to evaluate relevant information regarding the potentials and problems associated with antibiotic use for both livestock and human beings. The paper will discuss some simple strategies that could replace the need to use antibiotics in animal diets to mitigate not only the chances of AMR but also optimise animal health and food quality. Using novel feed additives may be a desirable options which will be evaluated alongside suitable examples to enhance animal wellbeing and sustainable animal production. This approach may ultimately be helpful in promoting animal product quality and food security around the globe.

Keywords: Novel additives, Antimicrobial resistance, Animal feeding, Sustainable, Food security

Manipulating The Rumen Microbiome

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The rumen plays a central role in the ability of ruminants to produce human edible food from resources that are otherwise not available for consumption by mankind. Fermentation in the rumen also has the potential to influence the health and wellbeing of both the host and man through the nutritional quality and safety of meat and milk and through potential deleterious environmental consequences due to emission of greenhouse gases and N excretion in faeces and urine. Given the importance of the rumen fermentation, it is perhaps not surprising that a great deal of effort has been devoted to investigating methods for manipulating this complex ecosystem. The ban of antimicrobial growth promoters in animal production systems has led to an increasing interest in the use of probiotics and plant extracts to manipulate the rumen. The use of microbial feed additives (probiotics or direct fed microbials, DFM) in ruminant diets is not new. However, it is only in the last 2 decades that a clear consensus has started to develop on how addition of such additives to the diet might stimulate productivity in ruminants. We have shown that not all additives have the same effect in the rumen with different strains of the same species differing in their effect and with effects being influenced by the host diet. Plant extracts have shown potential to decrease methane emissions and improve the efficiency of nitrogen utilization; however inconsistent, transient and adverse effects have limited their use as feed additives. As with probiotics we have shown that the biological activity of extracts differs between plants and even the same plant grown under different conditions. Our recent data has shown that relatively minor changes in the chemical composition of extracts can have large effects on the biological effect in the rumen.

The Use Of Aromatic Plants, Extracts And Essential Oils As Feed Additives

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The poultry industry depends on feed efficiency to sustain growth and profitability. Sustainability of poultry sector should be further regarded as a crucial factor to match worldwide increased food demands and reservation of feed sources. Several feed additives have been used in animal nutrition in order to increase sustainability of the Agrofood sector, in both organic and conventional livestock. The aim of the current report is to provide a comprehensive description on the use of aromatic plants, extracts and essential oils as feed additives alone or in combination with feed additives of different categories in our most recent research studies. Combinations of phytochemicals with synbiotics and acidifiers have been investigated in terms of efficacious replacement of antimicrobial growth promoters in broiler chickens or turkeys. These feed additives may further support animals to overcome long-standing health problems including bacterial challenges, as well as promote welfare especially for layer hens. This report will finally explore the potential of the aforementioned feed additives to tackle with environmental problems. Examples include use of local feed additives together with enzymes, which can enhance the use of local feedstuffs, especially in cases where high fibre content is the main constraint. Emphasis will be placed on the consequences of using local feed sources versus imported feedstuffs on global warming potential, primary energy use, nutrient excretion and the feed additive influence on lessening the pollution from animal operations. *In vitro* testing of antioxidant and antimicrobial bioactive herbal compounds and novel tools, such as life cycle assessment and genomic microbiota analysis, are necessary to verify effectiveness of aromatic plants, extracts and essential oils as feed additives in supporting livestock health, performance and sustainability. Further, practical examples and solutions for the production of broiler or turkey meat or eggs with functional properties and minimal environmental impact are provided. The sustainability of poultry industry is based on health, environmental protection and steady farmer income.

Keywords: aromatic plants, feed additives, poultry production, health, environmental impact

Climate Change and Dairy Sector in Turkey

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Abstract

Recently, significant changes have occurred in the mutual relations between the livestock sector and climate change depending on many factors. There are two main relationships between the livestock sector and climate change. The first is the impact of the livestock sector on climate change, and the other is the impact of climate change on the livestock sector. Greenhouse gas (GHG) emissions from all processes of the animal production sector play an important role in the emissions from total agricultural activities and these emissions have significant impacts on climate change. Aggregated GHG emission of Turkey showed to important increase in 1990-2017 period and increased from 219.20 Mt CO₂ eq to 526.25 Mt CO₂ eq. The share of energy, agriculture, industrial processes and product use and waste in total emissions in 2017 were 379.90, 66.45, 62.54 and 17.36 CO₂ eq, respectively. GHG emission from agricultural increased from 45.7 % in 1990 to 62.5% in 2017. According to TURKSTAT 2017 data, the most important sources contributing to total agricultural GHG emissions are enteric fermentation (48.04%), agricultural lands (36.96 %), manure/fertilizer management (12.05 %), urea application (2.32%), rice cultivation (0.37%) and agricultural waste and stubble burning (0.26%), respectively. TURKSTAT carried out the main emission estimation studies after 2009 but studies are mainly at farm level. Compared to other agriculture and animal husbandry sectors, especially milk processing sector is the most working sector for greenhouse gas reduction. Also the number of research studies with the impact of climate change on dairy sector in Turkey is not enough. In this paper, it was aimed to analyze the previously performed and current ongoing studies with solving the problems and determining the interactions between climate change and dairy sector in recent years in Turkey.

Estimation Of Enteric Methane Emission From Sheep Production In Turkey

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Concern over the negative impacts of livestock farming on climate change is growing. The Intergovernmental Panel on Climate Change (IPCC, 2019) recommends methodologies and default emission factors for methane (CH₄) emissions from enteric fermentation for each livestock species for regions. Sheep production display an important role in Turkey. Accordingly, the aim of this study was to predict of enteric CH₄ emissions from sheep production by using IPCC Tier 2 methology in Turkey. The methodology need to collect a detailed activity data (e.g., population, performance, production systems etc.) for the development of emission factors in country or region. The published data on animal performance including; average live weight, weaning weight, yearling weight, milk yield, growth rate, birth rates, lambing performance and wool yield were used. And, the default values IPCC for methane conversion factor, digestibility and coefficients for maintenance were used. Population data for the sheep breeds were extracted from Ministry of Agriculture and Forestry records and results from the national projects of ‘*Conservation and Sustainable Utilization of AnGR*’. According to population data eight sheep breeds (Akkaraman, Morkaraman, İvesi, Pırlak, Hemşin, Sakız, Kıvırcık and Merino) were included in total enteric CH₄ emission estimation. Sub-populations and local breeds ignored or aggregated with the main populations. Emission rates were highly variable among sheep breeds ranged from 6.82 to 10.06 kg CH₄ head yr⁻¹ and averaged 8.31 kg CH₄ head yr⁻¹. Total of 35 million sheep population enteric CH₄ emission was estimated as 7 748 Gg CO₂ eq CH₄ yr⁻¹ in Turkey.. The enteric methane emission is highly dependent on the breeds performance, management strategies, production systems and feeding conditions. Further research will be required to address on production system, genetics and nutrition to provide perspective on the contribution of enteric methane emission from sheep production.

Key words: emission, enteric methane, sheep

Heat-Stressed Cows And Strategies Based On Assisted Reproductive Technologies

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Heat stress (HS) is the most important concern of professionals because its influence is detrimental to maintain high the reproductive efficiency. When cows have to adapt their self to high THI (>70) is evident a decrease of all the reproductive indices. General efforts to limit HS effects are based on management changes. Assisted reproductive technologies (AI and ET - ARTs) are strongly influenced by HS because the hypothalamic-gonadal axis is disrupted. Other than the effects due to low levels of peripheral feed-back (low E2 and P4) and central feed-forward (low LH) resulting in old/incompetent oocytes population, HS strongly decrease the probability of embryo development during the first 6 days of life. Only when the objective is to improve genetically it in few time can be considered different methodologies based on ARTs. In vitro experiences gave information about the cultures of maturing oocytes that in mediums containing follicular fluid or follicular exosomes can exert in a reduced negative effect of elevated temperature on oocytes competence for cleavage and blastocysts developments. Genomic identification for HS tolerance and the ET of fresh embryos (morula and blastocysts are more resistant than 2-4 cells embryos) represent the main long-term solutions proposed. Strategies took in consideration to reduce HS effects are not easy because of their negative point of view. Embryo transfer is effective to minimize the fertility decrease during HS but it may not be economically sustainable. Other constrains are the long-term consequences of the conceived cows during HS which can result older at first calving, with longer intervals from calving to first breeding and conception and with lower milk yield. Therefore, in some cases, seasonal calving can be the most profitable strategy other than the best objective of genetic strategies following the thermo-tolerance selection because their effects are permanent and extended to offspring.

Circular (Zero Emission) Farming

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Abstract

It is expected that by 2050, the world's population will reach 9.6 billion and almost all of this population will grow in developing countries. With the rapid growth of the population, the demand for food is increased. As the present, our food production and consumption habits and behaviours as can not be sustained. Thus, the update on sustainable applications is compulsory owing to inadequate usage of food production resources, environmental effects, high rate wastage on food production, distribution, and consumption systems throughout all processes.

Food production methods bear the loss of environmental and economically on various critical points. According to United Nations, Food and Agriculture Organization (FAO) reports, inefficient global food production leads to 1 trillion dollars of economic loss while added to the social and environmental losses, the cost are increased up to 2 trillion dollars annually. Many countries are calculated that they need to produce or import 2 or 3 fold food to cope with their future national needs. Global food demand will be estimated to increase by 1.1% for meat products and by 1.3% for milk and dairy products per annum, up to 2050. On the basis of 2005, the demands will be increased by more than approximately 75% for meat and 60% for milk production.

Limited animal husbandry operations are considered very critical in terms of sustainability performances. Sustainable livestock can be acquired with circular farming models. Integrated biosystems are ecological applications which are established by at the center of the circular farming model that follow the laws of nature in which plants, animals, microorganisms and the environment communicated and related to each other. Accompanied by these operations, waste, and by-products after the usage of main products are used as input for the production of another product.

As the basic, it is formed by a two-layer configuration. In the upper layer, biomimetic applications are active which are organized according to animal welfare for the production of animal products, and the lower layer is the technological layer in which high data is processed using high technologies.

Key words: Circular, livestock, biomimetic, integrated biosystems, biosecurity

The Effect Of Pregnancy Stage And Housing Conditions On Hoof Health In Dairy Heifers

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Abstract

Lameness is one of the most important welfare, health, and productivity problems in modern dairy production and causes significant economic losses. The aim of this study is to investigate the effects of pregnancy stage and housing conditions on hoof health in dairy heifers. In this study, 36 advanced pregnant (AP, 4 weeks before expected calving date) and 36 early pregnant (EP, from 3 to 5 month of pregnancy) Holstein heifers were moved to either a straw yard (SY) or into mattress based freestall housing (MATR). Thus all heifers divided equally 4 treatment groups (AP-MATR, AP-SY, EP-MATR, EP-SY). The heifers that had been housed AP-MATR and AP-SY moved to lactating group 3 days after calving and housed mattress based freestall barn. The heifers that had been housed EP-MATR and EP-SY moved to mattress based freestall barn 4 weeks after treatment to mimic the post-calving housing conditions of AP-MATR and AP-SY. Thus the trial period took 4 weeks and hoof lesions were examined monthly through 12 weeks after the trial period (monitoring period). The prevalence and severity of sole hemorrhages (SH) and white line hemorrhages (WLH) were influenced by stage of pregnancy and significantly higher in the AP-MATR and AP-SY. However, it was found that the effect of housing conditions on hoof health was changed according to the stage of pregnancy. Severity of SH was significantly higher in AP-MATR than AP-SY. There was no difference in EP-MATR and EP-SY in terms of prevalence and severity of SH and WLH. In conclusion, hoof health was affected by pregnancy stage in dairy heifers and the effects of housing conditions on hoof health become prominent in the advanced pregnancy.

Keywords: calving, dairy heifer, mattress, sole hemorrhages, straw yard, white line hemorrhages.

Live Weight After Shearing and Greasy Fleece Weight of Yalova Kıvrıcık EwesE. Alarslan¹, T. Aygün², N. Kaçar³¹Sheep Breeding Research Institute, Bandırma, Balıkesir, Turkey²Faculty of Agriculture, Department of Animal Science, University of Van Yüzüncü Yıl, Van³Sheep and Goat Breeders' Association of Yalova**Abstract**

In this study, the live weight after shearing, the greasy wool weight and, the clean fleece percentage of Yalova Kıvrıcık ewes in different breeding conditions were investigated. The animal material consisted of a total of 100 head of Yalova Kıvrıcık ewes at the different 2 flocks in Yalova city. Ewes were sheared using shearing machine in June and July and ewes were weighed electronic bascule. The sampling for clean fleece percentage were performed from area of the last rib on the right shoulder. Least squares means for live weight after shearing, greasy wool weight and fleece yield value were 51.20 kg, 0.98 kg and 52.47% respectively. The effect of age on the live weight after shearing was statistically significant ($p < 0.01$). The effect of flock on the fleece yield value was statistically significant ($p < 0.05$).

Yalova Kıvrıcık sheep breed is different from other Kıvrıcık breed sheep. Yalova Kıvrıcık sheep has lower distribution of fleece on the dorsal and dorsolateral, bare chest and abdomen, short tail with low fleece or no woolless tail. This is the first study that Yalova Kıvrıcık sheep is identified of fleece.

Acknowledgements

The data of this research was obtained from “National Animal Breeding Program-Kıvrıcık Sheep Project-Yalova” sub project within the scope of “National Animal Breeding Program” which is conducted by TAGEM.

Keywords: Clean fleece percentage, Ewe, Greasy fleece yield, Live weight, Yalova Kıvrıcık.

The Last Station for Cattle Internal Medicine in Hatay Province: Veterinary Faculty

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Abstract

The aim of this study was to make a general analysis of cattle presented to the Internal Medicine Clinics of Hatay Mustafa Kemal University Veterinary Health Application and Research Hospital between July 2016 and September 2019. In this study, the number, age, sex and reasons of presentation of the animals were determined by examining the examination book and hospital software records. The total number of animals presented to the clinic between the years 2016-2019 were 27, 69, 91, 39, respectively. It was detected that 121 (53.5%) of the patients were female and the others (n:105, 46.5%) were male. There was no statistically difference about sex between the presented animals in terms of months and years ($P > 0.05$). When the total cases were evaluated seasonally, it was seen that the most presentation was in autumn (73/226, 32.30%) and spring (68/226, 30.08%). While respiratory diseases (33/68) were 48.52% and digestive diseases (26/68) were 33.23% of presented cases in spring months, digestive diseases (37/73) were 50.68% and respiratory diseases (27/73) were 36.99% of presented cases in autumn. The reasons for the presentation of animals were the gastrointestinal system (101/226, 44.7%), respiratory system (93/226, 41.2%), metabolism (24/226, 10.6%), blood-circulatory system (6/226, 2.7%) and urinary system (2/26, 0.9%). It was detected that the complete blood count was needed in 36.73% of the cases (83/226), and the majority of the cases were determined as gastrointestinal system (38/83, 45.78%), respiratory system (31/83, 37.35%) and metabolic diseases (11/83, 13.25%). There was not statistically difference ($P > 0.05$) between the blood sampling cases in terms of blood leukocyte, lymphocyte, monocyte, granulocyte, erythrocyte, hemoglobin, hematocrit and platelet values.

In conclusion, it was thought that the most common problems in terms of cattle internal medicine were digestive and respiratory system and metabolic diseases in spring and autumn months in Hatay. Besides, it was also concluded that the low number of sick cattle presentation to the clinic was related to the experienced veterinary practitioners in this field and the faculty was preferred in cases which no recovery was done.

Keywords: Cattle, Faculty of Veterinary Medicine, Internal Medicine, Retrospective Study

Effect Of Acetyl-L-Carnitine On In Vitro Produced Bovine Embryos

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Abstract

A number of lipid regulators have been investigated in the context of enhancing mammalian pre-implantation embryo development. One such regulator is L-Carnitine (LC). Some studies report that LC increases embryo quality as indicated by improved cleavage and the proportion that attain transferable quality and/or survive cryopreservation. However, the optimal concentration and form of LC for use in mammalian embryo culture is still to be established. LC is involved in the tricarboxylic acid cycle as acetyl L-carnitine (ALC). However, few studies have investigated the effects of this bioactive form for of LC. The current study represents the first of a series of studies to identify the optimal timing of incorporation and concentration of ALA for use in mammalian in vitro embryo production. Abattoir-derived bovine oocytes were matured (IVM) in TCM 199 maturation media with ALC at 0, 10, 100 and 1000 μM during 22 hours in CO₂ incubator (5% CO₂, 38°C and maximum humidity), fertilized (IVF) in ALC free fertilization TALP medium over the night in CO₂ incubator and zygotes cultured (IVC) in the presence of ALC at the same concentrations as IVM in SOF based media in O₂ incubator (5% CO₂, 5% O₂, 38°C and maximum humidity) for 8 days in an experiment replicated 10 times. Cleavage and Day 8 stage morphological data were collected and cell number and allocation to either the inner cell mass (ICM) or trophectoderm (TE) assessed by immunocytochemistry for the first six replicates. Oocytes and blastocysts from the remaining four replicates were frozen for future fatty acid and gene expression analyses. There was no effect of ALC on proportion cleaved of inseminated (0.715 ± 0.0148), proportion blastocysts of inseminated (0.378 ± 0.0134) or of cleaved (0.528 ± 0.0167). However, blastocyst cell number decreased ($P = 0.011$) with doses of ALC $> 10 \mu\text{M}$ (130.3 ± 6.29 , 123.5 ± 8.89 , 100.8 ± 7.96 and 101.8 ± 8.39 cells for 0, 10, 100 and 1000 μM respectively). Subsequent investigations will compare ALC and LC to understand better which form and dose most effectively promotes lipolysis and ATP production during IVM and IVC.

The Effect of Toll Like Receptor 4 (TLR4) Inhibitor (TAK-242) on Cryopreserved Bovine Semen Kinematics

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Abstract

TLR4 proteins are presented as a respond to sperm cells during fertilization luminal and glandular epithelia of bovine endometrium. However, the effects of a TLR4 blocker on kinematic parameters, viability and other in vitro quality tests was not known on cryopreserved bovine semen at the present. The aim of this study was to examine effects of blocker Resatorvid (TAK-242) on possible TLR4 presence on cryopreserved bovine spermatozoa. For this purpose, ejaculates were collected from five Swiss Brown AI bulls. Samples were diluted by using a commercial extender with or without increasing levels (1 nm, 10 nm and 100 nm) of TAK-242 which is the TLR-4 inhibitor. All diluted samples were equilibrated for 3 hours before freezing. Afterwards, freezing process were performed. Cryopreserved semen samples were thawed and examined after thawing (0h) and after 3h incubation at 37 C for sperm Kinematic parameters (Total motility, Progressive motility, VAP, VCL etc.) by subjective and using CASA (IVOS-1, Hamilton Thorne Inc., Beverly, USA). TAK-242 dose and incubation time effects were determined for VAP, VSL, VCL, ALH and STR ($p < 0.05$). However, no statistical significant difference was found on total and progressive motility ($p > 0.05$). On the basis of these preliminary results, TLR4 which plays role during capacitation and fertilization as a signal transducer, has an effect on also cryopreserved semen which should be clarified with more detailed analysis.

Keywords: TAK-242, Bull, Sperm, Fertilization, Motility

Effects of Endocrine-disrupting Chemicals Bisphenol A on Body Weights, Some Blood Values and Liver Enzymes in Neonatal Ankara Goats

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Abstract

Bisphenol-A (BPA) is an estrogen-mimicking endocrine-disrupting chemical (EDC) that is found in the environment in various forms such as the monomer to manufacture polycarbonate plastic, the resin that is used as linings for most food and beverage cans, as dental sealants. Some studies indicated that the goat is particularly vulnerable to estrogenic EDC exposures during fetal and neonatal periods. To investigate the effects of BPA on adipose tissue, liver enzymes and blood values, we exposed newborn male goats to 5 µg/kg/day, 5000 µg/kg/day, and 25000 µg/kg/day BPA from postnatal day (PND) 3-PND 93. We monitored body weight increases weekly and also we examined blood values and liver enzymes. Exposures to 5000 µg/kg/day, and 25000 µg/kg/day BPA significantly advanced the body weight (days; mean ± SEM; Control, 9.14 ± 0.08; 5000 µg/kg/day BPA, 10.21 ± 0,1; 25000 µg/kg/day 11.08 ± 0,2) but exposures to 5 µg/kg/day BPA did not (9.05±1.06). We then examined blood values (glucose, T-protein, T-bilirubin, D-bilirubin, cholesterol, triglyceride, LDH, CK) and liver enzymes including ALP, ALT, AST and GGT. Although there was no significant effect on liver enzymes, glucose level significantly increased in the 25000 µg/kg/day BPA comparing the control (Control, 76.02; and 25000 µg/kg/day BPA, 99.46; $p \leq 0.05$). Overall, the results show that developmental exposure to estrogenic BPA effect on body weights and some blood values.

Key words: Environment, endocrine-disrupting chemicals, EDCs; bisphenol A, BPA; adipose tissue, blood values, liver enzymes.

The Influence of Corpus Luteum Size on the Conception in Embryo Transfer Recipient Cows

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Abstract

The aim of this study was to investigate the effect of corpus luteums size that detected before embryo transfer on conception in recipient Holstein cows. The recipient cows utilized in this study had at least one birth and aged 3-8 years old. For this purpose, PGF2 α was injected 2 times space 14 day apart to cows which could use in study and 87 cows which show second estrous syptoms were determined as recipient. Embryos were transfered after estrous had been detected in 6th-8th days. Ovaries were examined by ultrasound before transfer and corpus luteum sizes were measured. A scale of '++++' were set as a result of measurements. Recipient cows were divided randomly into 3 groups. The first group was named as CL2+ (n=25) and consisted of cows with '++' (15-20 mm) size CL. The second group was named as CL3+ (n=52) and consisted of cows with '+++ (20-25 mm) size CL. The third group was named as CL4+ (n=10) and consisted of cows with '++++' (>25 mm) size CL. Fresh embryo transfer were carried out recipient cows. The embryos were transferred to the uterine horn on the side of the corpus luteum (ipsilateral). After the transfer, pregnancy rate was 36% in the CL2+ group, 46.2% in the CL3+ group and 40% in the CL4+ group. In this study, no statistically significant difference was found between the groups in terms of the effect of corpus luteum on conception (p>0,05).

Keywords: Embryo Transfer, Corpus Luteum, Recipient Cow

Effects of Semen Concentration on Motility During Collection of Bull Semen

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Abstract

Conventional semen analysis includes basic values such as volume, pH, concentration and motility. Aim of the present work was to determine the correlation among sperm concentrations during collection of ejaculates, motility and produced straw counts. A total of 300 ejaculates belonging to 20 AI bulls from 3 different breeds (Simmental, Brown Swiss and Holstein) were used. Ejaculates were collected with artificial vagina, diluted with commercial extender (Andromed®) and frozen by using an automatized freezer. Thereafter, the straws were plugged and stored in liquid nitrogen. For the study, sperm concentrations, fresh and post-thaw motility values were evaluated. Concentration, motility values and straw counts were showed and analyzed by linear regression and correlation respectively. It was found a correlation between concentration and straw counts ($r = 0.16$, $P < 0.0001$) but no statistically significant correlation was found between other values. As conclusion, it was determined that increasing concentration had a positive effect on the straw counts as expected. However, the same positive effect could not be obtained between concentration and motility values.

Keywords: Bull, Sperm, Concentration, Semen, Motility

Generated Of Elite Dairy Cattle Herd By In-Vitro Embryo Production (IVEP)

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Abstract

In this study, a preliminary assessment of TAGEM-18/ARGE-59 project supported by TAGEM was presented. The project aimed to create the first herd by using OPU/IVEP technique which will provide rapid genetic return in animal production in our country, increase selection density and accuracy, shorten generation interval and improve genetic gain. In addition, the project aimed to widespread and sustainable this method, to facilitate the transition to the next stage in biotechnological methods, to share the infrastructure and to disseminate the outputs. OPU is a noninvasive and repeatable technique use for collecting a large number of immature oocytes from antral follicles of the live animals. OPU is a method developed to solve infertility in human medicine. Ultrasound-guided transvaginal OPU was first tested by Dutch researchers and is now the most common technique used to obtain oocytes from animals. In 2017, using OPU, 3,731,725 oocytes from 225,926 donors and 980,524 embryos were produced in cow. 492,848 of these embryos were freshly transferred and 256,766 of them were frozen. In the last years, around 65% of the 1,2 million transferred embryos are produced with OPU/IVF. This method has several advantages, such as not to change the normal reproductive cycle of the donors, not regardless of reproductive status of the donor (pregnant, non-cycling, infections of genital organs and insensitivation to superstimulation), not to require the use of hormones and can be obtained more embryo from each donor. In the preliminary study of the project, OPU was applied to 8 Holstein heifers with superior yield characteristics. In parallel with this application, oocyte aspiration was performed from ovaries obtained from slaughterhouse from 7 Holstein heifers. Nine oocytes were collected by OPU applications and 84 oocytes were collected by ovarian aspiration. The resulting oocytes were incubated in 5% carbon dioxide and 38.8 ° C incubator for 22 hours in maturation medium and then for 21 hours in semen-added fertilization medium. Then, the cumulus of the oocytes was cleaned and incubated in the culture medium for 7 days. From the collected oocytes, 35 embryos that reached various stages were produced. According to the results of this preliminary study, it has been concluded that the use of this new biotechnological method in our country can lead to the proliferation of the female genetic resources of superior genetic characteristics and the widespread use of this method.

Can be used Visual Pregnancy Test Kit in early diagnosis of pregnancy in goats?

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Abstract

The aim of this study was to determine the availability of rapid visual pregnancy test kit based on the principle of pregnancy-related glycoprotein detection (PAGs) in early pregnancy diagnosis in goats. In the study, 150 Aleppo goats were used. The intravaginal sponges containing 60 mg Medroxyprogesterone acetate were applied to the goats for 11 days. All of the goats were intramuscularly received 500 IU PMSG and 125 µg d-cloprostenol at the day of sponge removal. The oestrus was observed in all goats after removal of the sponges. Goats in oestrus were mated with natural mating. Blood samples were taken from the vena jugularis to serum tubes on the 28th day after mating of the goats. Serum was extracted from blood samples and was stored at -20° C until analysis. Pregnancy detection from serum samples was performed by the commercial kit (IDEXX Rapid Visual Pregnancy Test Kit, Liebefeld-Bern, Switzerland) according to the manufacturer's instructions. For control of pregnancies, the transabdominal ultrasonography was applied to the goats on the 50th day after mating by real-time ultrasound device with 6-8 MHz probes.

The results of rapid visual pregnancy test were determined according to the colour change in microplate wells. Samples observed to be more blue than the negative control in the sample well were accepted as positive (pregnant). If the coloration in the sample well was like the negative control (colorless), it was accepted as negative (not pregnant). Sensitivity, specificity, positive predictive value, negative predictive value and accuracy rate of visual pregnancy test kit were detected as 94.12%, 80.49%, 80%, 94.29% and 86.67%, respectively. As a result, it was thought that rapid visual pregnancy test kit could be an alternative to other examination methods in early pregnancy detection in goats. And, it was concluded that the test can be used routinely in the field conditions for early pregnancy diagnosis in goats.

Keywords: Visual pregnancy test kit, early pregnancy diagnosis, goat.

Determination Of Some Spermatological Characteristics And Testosterone Levels İn Pure Line White Leghorn Cockerels At Ankara Poultry Research Institute Conditions

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Abstract

This project was carried out to investigate some semen characteristics and testosterone hormone content of seminal and blood plasma of four white layer pure line cockerels and their effect on hatching traits at Poultry Research Institute of Ankara. The use of superior sire after determining their performance for future generations has a crucial importance for the success of program on genetic improvement in the Institute. In this Project, some semen characteristics were found out in breeder cockerels before the use for artificial insemination in corresponding hens from same lines. A total of 117 cockerels, 1019 hens and 16310 eggs were used during three-year of the project. The effect of genotype was found significant on volume of ejaculate, egg fertility, hatchability, semen and blood plasma testosterone concentration ($P < 0.05$). Hatchability of Blue and Brown Lines were higher than that of Black and Maroon Lines ($P < 0.05$). The heritability coefficients of fertility (sire + dam) were estimated for Black, Blue, Brown and Maroon lines as 0.29 ± 0.18 , 0.59 ± 0.18 , 0.11 ± 0.07 and 0.11 ± 0.06 respectively.

Key words: white layer cockerel, semen characteristics, fertility, hatchability

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**Breeding Of The Anatolian Water Buffalo In The Hands Of The Public Of Muş Province:
Gender, Birth Weight And Live Weight Increases Of Born Buffalo Calves***

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* In this study, the data in the buffalo breeding Project (TAGEM/49MANDA2012-01) conducted by TAGEM was used.

Abstract

In our country, the project of Breeding the Anatolian Water Buffalo in the hands of the public started in 2011. The project of Breeding the Anatolian Water Buffalo in the hands of the public of Muş province started in 2012. In this study, the animal materials included in the project consisted of Anatolian Water Buffalo calves (malak) breeds in the project between 2012-2017 in Hasköy, Korkut and Merkez counties. Animal material was followed for a period of five years, the number of animals is 346, 509, 630, 767 and 841 respectively. As of the end of 2017, the total number of animal materials monitored was 3093. During the project period, 3093 malak births occurred, of which 1585 were female and 1508 were male. Firstly, the ANOVA test was performed to examine the birth weight and live weight average of buffalo calves by years. In cases where ANOVA test was found to be significant, Tukey significance analysis test was used to determine which group or groups the difference was between. In addition, independent groups t-test was used to investigate buffalo calves birth weight and live weight averages according to gender. As a result of the analyzes, it was found that the average of buffalo calves birth weight and live weight differ significantly according to years and gender. This research is the first scientific resource in the field of buffalo breeding in the province of Muş.

Keywords: Buffalo Calves, Anatolian Water Buffalo Breeding Project, Birth Weight, Live Weight.

Fertility Traits Of Kangal Akkaraman Sheep Reared In Breeder Conditions In Sivas ProvinceYusuf Ziya Oğrak¹¹Sivas Cumhuriyet University, Faculty of Veterinary Medicine, Department of Animal Breeding and Husbandry
58140 Sivas, TÜRKİYE**Abstract**

The first condition of successful animal breeding is the fertility, which can be expressed as the number or proportion of offspring obtained from the flocks. The aim of the study was to determine the fertility traits of the Kangal Akkaraman sheep in Yıldızeli and Central districts of Sivas. In this study, six years data between 2013 and 2018 were used obtained from breeders included in National Animal Improvement Project coordinated by the Turkish Ministry of Agriculture and Forestry. In the first year of the study, 70 enterprises in 48 villages from both districts included in the projects were reduced to 57 enterprises in 33 villages in the sixth year. During the six-year period, 86116 lamb records obtained from a total of 76383 head ewes in all enterprises in the improvement projects were evaluated. According to all the data, the average birth rate was 92.7%, while the differences between years were statistically significant ($P<0.001$), while differences between districts were found to be insignificant. ($P>0,05$). In the study, triplet births were also observed together with many variables but they were not evaluated separately because of a very low rate (0.1%) on average, so were included in twins. According to all dates, while the average twin birth rate was 22% differences between years, districts and mating periods (five months between August and December) were found to be important. ($P<0,001$). While the general average for the weaning lamb rate or the survival rate of the weaning period was 91.3%, differences according to years, districts and lambing periods (five months between January and May) were statistically important. ($P<0,05$). According to the values obtained from 5147 lamb records that were born from 4242 head sheep of known age in a sub-project of 2013; the ages (1-10) of sheep were found to have an effect on the birth type ($P<0.05$), while were found to be statistically insignificant on the survival rate ($P>0,05$). According to the results of the research, it would be useful to take into account factors that increase fertility in order to maximize profitability in the study area and enterprises with similar conditions.

Keywords: Kangal Akkaraman, Sheep, Lamb, Fertility, Improvement**Thanks to:** In this study, the data obtained from Kangal Akkaraman Sheep Improvement in Sivas within the scope of the National Animal Improvement Project coordinated by the Turkish Ministry of Agriculture and Forestry were used.

Determination Of Fatty Acid Composition In Different Carcass Parts Of White Karaman And Awassi Lambs

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Abstract

In this study, the White Karaman and Awassi lamb breeds, which are fed widespread in Turkey were investigated. The aim of the study was to determine the composition of fatty acids and the content of Conjugated Linoleic Acid (CLA) in the different regions of the lamb carcasses.

In the study as animal material; White Karaman and Awassi breed male lambs were used in weaning age, average 20 kg live weight and 2,5 months of age. The lambs were fed in individual compartments and under the same environmental conditions. A total of 10 White Karaman and 10 Awassi lambs were studied. In 70 days, the sheep were fed 150 grams dry clover and concentrated feed ad-libitum.

After the period of feeding, the lamb were slaughtered, and the carcasses were kept for 24 hours at a temperature of +4 / 0 C in a freezing storehouse. The samples for examination were taken from the tail, omentum and perirenal regions. In total, samples from 3 different regions of approximately 100 grams each, were taken for studying.

The samples of fat were then analysed. The analyses of the tail, omental and perirenal regions of the White Karaman male lamb revealed that SFA, MUFA, PUFA, TFA, CLA, ω 3, ω 6, ω 3/ ω 6, ω 6/ ω 3 and TVA were (%) 55.562, 35.469, 2.800, 4.326, 1.383, 0.490, 2.311, 2.311, 4.804 and 4.935; 66.970, 25.080, 0.665, 5.979, 0.939, 0.285, 0.380, 0.805, 1.377 and 5.198; 62.726, 27.899, 3.958, 3.821, 2.659, 0.405, 3.553, 0.123, 9.155 and 2.043, respectively. For the Awassi male lamb, the tail, omental and perirenal regions revealed SFA, MUFA, PUFA, TFA, CLA, ω 3, ω 6, ω 3/ ω 6, ω 6/ ω 3 and TVA to be (%) 52.438, 37.005, 5.688, 3.876, 0.726, 1.364, 4.324, 0.328, 3.556 and 4.935; 69.566, 22.842, 0.591, 5.904, 0.863, 0.255, 0.336, 0.788, 1.327 and 4.944; 64.324, 26.501, 4.153, 3.921 and 0.823, 0.352, 3.801, 0.097, 11.110 and 4.532, respectively.

Keywords: Awassi, CLA, Fatty Acid Composition, Konya, White Karaman

Growth And Development Characteristics Of Karakaş Lamb Produced In Diyarbakır Rural Area*

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* This Project was supported by General Directorate of Agricultural Research and Policies and carried out by GAP International Agricultural Research and Training Center

Abstract

This study includes data on lambs born between 2018-2019 in rural farms of Karakaş Sheep in Diyarbakır Province. Data on the growth and development characteristics of lambs from birth to weaning are presented.

Birth, 30, 60 and 90 day weights were determined as $3,96 \pm 0,019b$, $10,3 \pm 0,05a$, $16,8 \pm 0,11a$, $23,3 \pm 0,20a$ kg respectively also daily live weight increases were determined as $209,7 \pm 1,37a$, $214,6 \pm 1,68a$ ve $214,5 \pm 2,19a$ respectively in 2018. Birth, 30, 60 and 90 day weights were determined as $4,00 \pm 0,018a$, $9,7 \pm 0,05b$, $15,6 \pm 0,10b$, $21,5 \pm 0,20b$ kg respectively also daily live weight increases were determined as $189,1 \pm 1,33b$, $193,4 \pm 1,65b$ and $194,2 \pm 2,13b$ respectively in 2019. When the datas of 2018 and 2019 are evaluated together, birth, 30, 60 and 90 day live weight averages of female sheeps were $3,84 \pm 0,018b$, $9,5 \pm 0,05b$, $15,3 \pm 0,10b$ and $20,9 \pm 0,20b$ kg respectively while those of male sheeps were $4,12 \pm 0,019a$, $10,4 \pm 0,05a$, $17,1 \pm 0,10a$ and $23,8 \pm 0,20a$ respectively. 30, 60 and 90 day live weight increases of females were determined as $189,6 \pm 1,35b$, $191,5 \pm 1,66b$ and $190,0 \pm 2,16b$ gr respectively while those of males were determined as $209,2 \pm 1,35a$, $216,5 \pm 1,67a$ ve $218,7 \pm 2,16a$ gr respectively. It was determined as 30, 60 and 90 day weights and daily live weight increases of singleton lambs were $10,5 \pm 0,03a$, $17,0 \pm 0,09a$, $23,3 \pm 0,18a$ kg and $205,7 \pm 1,02a$, $210,4 \pm 1,40a$, $210,3 \pm 1,94a$ gr respectively also those of twin lambs were $9,4 \pm 0,07b$, $15,4 \pm 0,14b$, $21,4 \pm 0,24b$ kg and $193,1 \pm 1,95b$, $197,6 \pm 2,20b$, $198,4 \pm 2,64b$ gr respectively.

Key Words: Karakaş, Vitality, Lamb, Female, Twin

The Growth And Development Characteristics Of Zom Lambs Breeding In Public Hands In Diyarbakır Province Until The Weaning Period

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This Project was supported by General Directorate of Agricultural Research and Policies and carried out by GAP International Agricultural Research and Training Center ¹GAP international agricultural research and training center, Diyarbakır, Turkey

Abstract

This study includes the activities carried out between 2018 and 2019 years of I. Sub Project of breeding Zom sheep in public hands of which purpose is increasing the yields of breeding, growth and development characteristics of Zom sheep in public hands in Diyarbakır province within the national breeding in public hands Project coordinated by General Directorate of Agricultural Research and Policies (GDARP). This Project is applied on total 6000 heads female and 300 heads male sheep in Diyarbakır province and its districts. It is carried out in the coordination of both Diyarbakır Breeding Sheep Goat Breeders Association and Diyarbakır Provincial Directorate of Agriculture and Forestry.

In the study, it is determined as the lambs number for each giving a birth sheep in 2018 and 2019 years, and vitality are 1.06 and 1.04, 95% and 91% , respectively.

Birth, 30, 60 and 90 day weights were determined as 3.38, 10.8, 18.2, 24.4 kg respectively also daily live weight increases were determined as 248.8, 246.3, 233.8 respectively in 2018. Birth, 30, 60 and 90 day weights were determined as 3.45, 10.1, 16.6, 22.1 kg respectively also daily live weight increases were determined as 221.2, 218.5, 207 respectively in 2019. When the datas of 2018 and 2019 are evaluated together, birth, 30, 60 and 90 day live weight averages of female sheep were 3.32, 10.2, 16.8 and 22.3 kg respectively while those of male sheep were 3.51, 10.7, 17.9 and 24.2 kg respectively. 30, 60 and 90 day live weight increases of females were determined as 230.4, 224.7 and 211 gr respectively while those of males were determined as 239.6, 240.1 and 229.7 gr respectively. It was determined as 30, 60 and 90 day weights and daily live weight increases of singleton lambs were 10.7, 17.6, 23.7 kg and 234, 232.1, 222.3 gr respectively also those of twin lambs were 10.2, 17.1, 22.8 kg and 236, 232.6, 218.5 gr respectively.

Key Words: Zom, Vitality, Lamb, Female, Twin

A Research on Growth Characteristics of Pırlak Lambs

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Abstract

In this research, it was aimed to increase meat production by selection on growth characteristics of Pırlak. The study was carried out on 6577 female and 204 male animals from 50 farms in the Altıntaş, Aslanapa, Dumlupınar and central districts of Kütahya province. In the analysis of variance, the effects of factors such as herd, year of birth, birth season, gender, type of birth on growth characteristics were found to be significant ($P < 0.01$). Weights of birth, 90th day, weaning, 180th day and 360th-day weights were 3.42 ± 0.04 kg, 19.620 ± 0.333 kg, 25.690 ± 0.29 kg, 31.449 ± 0.650 kg and 38.092 ± 0.794 respectively. The daily weight gain from birth to weaning was found as 170.20 ± 0.04 g. As a result, a significant increase was observed in these characteristics affected by the environmental factors throughout the years. It is useful to consider these findings in selection programs in terms of growth characteristics.

Keywords: Sheep, lamb, Pırlak, growth characteristics

Estimation of Live Weight Using Some Body Measurements in Karacabey Merino Ewes

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Abstract

The purpose of the present study was to compare several linear and non-linear regression equations in terms of ability to estimate live body weight (BW) of Karacabey Merino ewes using some body measurements. The research was carried out on total of 363 ewes with different ages (1.5 to 4.5 years old) in four Karacabey Merino sheep flocks. Besides measuring the live body weights, wither height (WH), ramp height (RH), body length (BL), chest girth (CG), chest width (CW) and chest depth (CD) were also measured. In addition, two index values (S and P) were formed by different combinations of BL, CW and CD.

The highest correlation (0.829) was obtained between BW with S, followed by with P, CG, CW, CD, BL, RH and WH (0.825, 0.823, 0.654, 0.649, 0.549, 0.511 and 0.499, respectively). Linear regression model including S, P and CG as predictor variables resulted in determination coefficient (R^2) of 0.78, but the sequential inclusion of the other variables to the model did not improve the goodness-of-fit. The cubic model with S fitted best ($R^2=0.70$) followed by P and CG (0.69 and 0.68, respectively) but the models including the other body measurements resulted in small R^2 values (less than 0.44). The allometric model produced high and similar R^2 values regardless of including any single predictor variables, however the use of S or P with CG together resulted in the highest correlation (r) between the actual and the estimated BW (0.88 and 0.87, respectively).

It was concluded that live body weight (BW) of Karacabey Merino ewes can accurately be estimated by the allometric model with the combination of BL, CG, CD and CW without considering the differences in ages or flocks.

Key words: Karacabey Merino sheep, Live weight, Body measurement, Estimation

Investigation of Fertility, Live Weight, Survival Rate, Mohair Yield and Quality Traits of Angora Goats Reared in Ankara Province

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Abstract

This study aimed to investigate the fertility, live weight, survival rate, mohair yield and quality traits of Ankara Goat herds, which were included the breeding program in the breeder conditions in Ankara region. The animal materials in the study were received from the Public Hand Breeding Project, which was conducted by GDARP, in Ankara Province. The research was performed 25,917 goats in the Ayaş, Beypazarı, Güdül, Kızılcahamam, Nallıhan and Polatlı districts of Ankara Province in 2018. The average birth rate in goats and number of kids in birth; 87.5% and 1.05%, respectively. The 90th-day survival rate was calculated by 78.48% for kids. While the birth weight of male kids was 2.45 ± 0.057 kg and this value was 2.32 ± 0.055 kg for females. Also, BW in the 90th day was found 12.37 ± 3.33 kg in males and 10.94 ± 4.79 kg in females. While the mohair yield of Ankara goats was measured respectively in Ayaş, Beypazarı, Güdül, Kızılcahamam, Nallıhan and Polatlı districts; 1.77 ± 0.62 , 1.64 ± 0.83 , 1.73 ± 0.57 , 2.06 ± 0.84 , 1.78 ± 0.55 , 2.00 ± 0.58 kg, the mohair fineness of these goats was respectively; 33.53 ± 4.95 , 31.68 ± 4.50 , 33.12 ± 5.18 , 31.25 ± 4.11 , 31.99 ± 4.50 , and 32.39 ± 4.17 μ for these districts. As a result of this study; it was determined that the district, mother age, birth type and gender had an effect on kid birth weight ($p < 0.001$); the district and age on goat mohair yield; the district, age and mohair yield ($p < 0.001$) on the fineness; and the district, mother age, type of birth and gender on the 90th day BW. The district, mother age, type of birth ($p < 0.05$) had great importance on kid's mohair yield. As a result of these data; it is foreseen that the mohair yield, fineness and birth weight to form breeder value index will yield positive results in improvement of the flocks.

Keywords: Ankara Goat, mohair, breeding, kid

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Sütten Kesim Döneminde Karya Kuzularda Musculus Longissimus Dorsi Kasının Ultrasonik Ölçümlerine Yönelik Genetik Parametre Tahminleri

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Özet

Çalışmada sütten kesim döneminde Karya kuzularda Musculus longissimus dorsi (MLD) kasının ultrasonik ölçümlerine yönelik genetik parametrelerin elde edilmesi amaçlanmıştır. Araştırmanın hayvan materyalini Denizli ilinde yer alan 4 elit sürüde yetiştirilen toplam 995 Karya kuzu oluşturmuştur. Karya kuzularda ortalama 104.03 günlük yaşta kabuk yağı kalınlığı, deri+kabuk yağı kalınlığı, kas derinliği, sütten kesim ağırlığı ve günlük canlı ağırlık artışlarına yönelik en küçük kareler ortalamaları sırasıyla 0.40 cm, 0.63 cm, 1.93 cm, 36.29 kg ve 311.74 g olarak elde edilmiştir. İstatistik modelde kullanılan ana yaşı dışındaki tüm sabit faktörlerin kas özellikleri üzerine etkileri istatistik olarak önemli bulunmuştur ($P<0.001$). Kabuk yağı kalınlığı ve kas derinliği için kalıtım dereceleri sırasıyla 0.07 ve 0.15 olarak tahmin edilmiştir. Canlı ağırlık, günlük canlı ağırlık artışı ve MLD kas özellikleri arasındaki fenotipik korelasyon katsayıları pozitif ve istatistik olarak önemli olmuştur.

Anahtar Kelimeler: Ultrasonik ölçümler, MLD, canlı ağırlık, günlük canlı ağırlık artışı, kalıtım derecesi, Karya

Estimation of Genetic Parameter of Ultrasonic Measurements of Musculus Longissimus Dorsi Muscle in Karya lambs at the Weaning Period

Abstract

The experiment was conducted to determine the ultrasonic measurements of *Musculus longissimus dorsi thoracis et lumborum* (MLD) characteristics of Karya lamb at weaning and to estimate genetic parameters for recorded traits. Animal material for the study consisted of 995 Karya lambs raised in 4 elite flocks located in Denizli province. Least square means for backfat thickness, skin+fat thickness, muscle depth, weaning weight and average daily gain at the mean age of 104.03 days, were 0.40 cm, 0.63 cm, 1.93 cm, 36.29 kg and 311.74 g, respectively. All of the fixed factors used in the statistical model, except for the ewe age, had a statistically significant effect on muscle properties ($P<0.001$). The heritability estimations for backfat thickness and muscle depth were 0.07 and 0.15, respectively. Phenotypic correlation coefficient between live weight, average daily gain and MLD properties were positive and statistically significant.

Keywords: Ultrasonic measurement, MLD, live weight, average daily gain, heritability, Karya

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Giriş

Kuzu eti kompozisyonunun tüketici istekleri doğrultusunda geliştirilmesi için bir çok ülkede, ırklar içi ve ırklar arası varyasyona dayalı ıslah çalışmaları yapılagelmiştir (Simm ve Murphy, 1996; Simm ve ark., 2002; Stanford ve ark., 1998). Son 30-40 yıllık süreç değerlendirildiğinde, başlıca kuzu ihraç eden ülkeler (Yeni Zelanda ve Avustralya) ve kimi Orta Doğu ülkeleri hariç kuzu eti tüketiminde bir azalmadan bahsedilebilir. Etin, lezzetini etkilemeyecek düzeyde olabildiğince yağsız olması tüketicilerin en önemli istekleri arasındadır (Cemal ve ark., 2007; Cemal ve ark., 2009; Yaralı ve ark., 2006; Yılmaz ve ark., 2011; Yılmaz ve ark., 2014; Yaralı ve Yılmaz 2014). Bu nedenle pazara sevk edilecek hayvanlarda karkasın durumunu, bir başka deyişle karkas kompozisyonunu ve kalitesini saptamak için birçok yöntem geliştirilmiştir. Bunlar arasında, kesim sonrası gövde parçalama ile fiziksel ve kimyasal analizlere dayalı yöntem şüphesiz ki en iyi sonucu vermektedir. Ancak bu işlemlerin pahalı olması ve yüksek işgücü gereksinimi yaratması gibi dezavantajlara sahip olması nedeniyle, karkas kompozisyonu tahmininde genellikle bazı objektif ve sübjektif ölçütler kullanılmaktadır.

Bu yöntemlerde genel olarak, düşük maliyete, kolay uygulanabilirliğe, kesinlik ve yüksek güvenilirliğe sahip olması gerektiği üzerinde durulmuştur (Cemal ve ark., 2007; Yaralı ve ark., 2006; Kor ve Ertuğrul, 2000). İlk defa Wild (1950) tarafından biyolojik olarak dokuların ölçülmesi ve dokulardaki değişikliklerin tespit edilmesi amacıyla kullanılan ultrason teknolojisi daha sonra Temple ve ark., (1956) tarafından canlı hayvanlarda karkas özelliklerinin tahmin edilmesinde kullanılmıştır. Bu teknoloji zaman ve emek açısından büyük tasarruf sağlaması ve yüksek güvenilirliğe sahip olması nedeniyle günümüzde et kalitesini hedef alan ıslah programlarında yaygın olarak kullanılmakta, et kalitesinin tanımlanmasında ve tahmin parametrelerinin elde edilmesinde gittikçe önem kazanmaktadır.

Ultrason ölçümleri için daha çok 12-13. kaburgalar arasına denk gelen sırt bölgesinden yararlanılmaktadır. Canlı hayvanda, *Musculus Longissimus Dorsi* (MLD, bel gözü kası) kasının özelliklerinin ve örtü yağı kalınlığının belirlenmesi anlamında yapılan ultrasonik ölçümler ile kesim sonrası karkastan yapılan objektif ölçüm değerleri arasında oldukça yüksek korelasyonlar bildirilmiştir (Cemal ve ark., 2007; Yılmaz ve ark., 2011; Yılmaz ve ark., 2014; Yaralı ve Yılmaz 2014; Russel, 1995; Fernandez ve ark., 1997; Fernandez ve ark., 1998). Bu yüksek ilişkiler karkas kalitesine yönelik seleksiyon programları anlamında ultrasonun etkin olarak kullanılabilme olanağını ortaya koymaktadır.

Materyal ve Yöntem

Hayvan Materyali

Çalışmanın hayvan materyalini Halk Elinde Hayvan Islahı Ülkesel projeleri kapsamında Denizli Karya Koyunu I ıslahı projesinde yer alan 4 Araelit işletmede bulunan toplam 995 baş Karya kuzu oluşturmuştur.

Musculus Longissimus Dorsi (MLD-Göz Kası) Kası Ultrason Ölçümleri

Ultrasonik ölçümler için pazarlama yaşına kadar kuzular takip edilerek, pazarlama döneminde (ortalama 103 günlük yaşta) 50 g hassasiyete sahip elektronik baskül ile canlı ağırlıkları tespit edilmiş ve aynı zamanda kuzularda 12. ve 13. kaburgalar arası bölgede yer alan bel gözü kasında (*M. Longissimus dorsi*) kas derinliği, bu kası örten yağ tabakasının kalınlığı ve yağ+deri kalınlığı ultrason cihazı (Esaote MyLabFive) kullanılarak linear prob ile belirlenmiştir (Şekil 1).



Şekil 1. Ölçülen özellikler ve ultrason görüntüsü

(A: kas derinliği kabuk yağı kalınlığı, B: kabuk yağı kalınlığı, B+C:deri+ kabuk yağı kalınlığı)

İstatistik Analizler

Sistematik çevre etmenlerinin etkilerinin ortaya konabilmesi için verilere varyans analizi uygulanmıştır. Özelliklere ait varyans analizlerinin yapılması, en küçük kareler ortalamaları ve fenotipik korelasyon katsayılarının elde edilmesi için SAS (SAS,1999) istatistik paket programında bulunan GLM ve CORR prosedürleri kullanılmıştır. Kuzuların süttan kesim dönemindeki yaşama gücü değerlerinin hesaplanmasında ki-kare testi kullanılmıştır.

Ele alınan özelliklere ait varyans unsurları ve genetik parametreler, REML (Restricted Maximum Likelihood, Kısıtlanmış Maksimum Olabilirlik) tekniğine dayalı olarak MTDFREML programında yer alan bireysel hayvan modeli (Animal Model) esas alınarak tahmin edilmiştir (Boldman ver ark.,1993).

Bulgular ve Tartışma

Karya kuzularda ortalama 104 günlük yaşta gerçekleştirilen göz kası ultrason ölçümlerine ait basit istatistikler Çizelge 1’de verilmiştir.

Çizelge 1. Karya kuzularda MLD ölçümlerine ait basit istatistikler

Değişken	N	$\bar{x} \pm s_x$	Minimum	Maksimum	VK (%)
Yağ kalınlığı (cm)	995	0.39±0.110	0.11	0.84	28.04
Deri+ Yağ kalınlığı (cm)	995	0.60±0.124	0.25	1.10	20.56
Kas Derinliği (cm)	995	2.09±0.323	1.17	3.20	15.47
Canlı Ağırlık (kg)	995	37.30±6.705	15.70	61.10	17.98
OGCAA (gr)	995	316.45±56.19	130.85	511.93	17.76
Yaş	995	104.03±10.74	60	135	10.33

Kuzuların canlı ağırlık ve göz kası (MLD, Musculus longissimus dorsi) özelliklerinin çok değişken olduğu tanımlayıcı istatistiklerle ortaya konmuştur. Kuzuların süttten kesilerek pazarlandığı ve dolayısıyla göz kası ultrason ölçümlerinin yapıldığı döneme ait ortalama kuzu yaşı 104 gün (~3.5 ay) olmuştur.

Karya kuzuların süttten kesim dönemi canlı ağırlıkları ile MLD özelliklerinin ultrasonik ölçümleri için elde edilen en küçük kareler ortalama ve standart hataları Çizelge 2’de verilmiştir.

Çizelge 2. Karya kuzularda MLD kası ve kabuk yağı kalınlığı ultrason ölçümlerine ilişkin en küçük kareler ortalamaları

Faktörler	N	YK (cm)	DYK (cm)	KD (cm)	CA	OGCAA
Yıl		P=0.003	P=0.000	P=0.000	P=0.000	P=0.000
2015	730	0.39±0.005	0.60±0.006	2.16±0.012	35.26±0.333	300.38±3.149
2016	265	0.42±0.009	0.66±0.011	1.81±0.021	37.32±0.567	323.11±5.096
İşletme		P=0.000	P=0.000	P=0.000	P=0.001	P=0.007
1	413	0.39±0.006	0.58±0.007	2.15±0.014	36.39±0.391	310.25±3.572
2	142	0.43±0.010	0.66±0.011	2.25±0.022	37.58±0.597	322.44±5.575
3	221	0.38±0.008	0.63±0.010	1.78±0.019	35.7±0.513	310.05±4.657
4	219	0.42±0.008	0.64±0.010	1.77±0.019	35.49±0.521	304.23±4.684
Ana Yaşı					P=0.000	P=0.042
2	42	-	-	-	34.72±0.868	302.14±8.061
3	126	-	-	-	35.13±0.559	304.48±5.211
4	138	-	-	-	36.76±0.544	316.16±5.079
5	168	-	-	-	37.57±0.516	320.79±4.879
6	180	-	-	-	37.22±0.497	317.71±4.682
7	129	-	-	-	36.26±0.545	308.99±5.153
≥8	212	-	-	-	36.35±0.473	311.94±4.432
Doğum Tipi		P=0.318	P=0.876	P=0.426	P=0.000	P=0.000
1	491	0.41±0.005	0.63±0.006	1.99±0.012	39.52±0.328	337.63±2.892
2	464	0.40±0.005	0.63±0.006	2.00±0.012	35.60±0.320	305.02±2.958
≥3	40	0.40±0.014	0.63±0.017	1.96±0.033	33.75±0.846	292.59±8.003
Cinsiyet		P=0.000	P=0.000	P=0.000	P=0.000	P=0.000
Erkek	520	0.37±0.006	0.59±0.008	1.93±0.015	38.73±0.404	334.32±3.735
Dişi	475	0.44±0.007	0.67±0.008	2.04±0.016	33.84±0.400	289.17±3.741
Reg (Linear)		P=0.000	P=0.000	P=0.000	P=0.000	
Canlı Ağırlık		0.010±0.000	0.012±0.001	0.021±0.001		
Yaş					0.267±0.017	
Genel	995	0.40±0.006	0.63±0.007	1.99±0.014	36.29±0.368	311.74±3.408

YK: Yağ kalınlığı, DYK: Deri+yağ kalınlığı, KD: Kas derinliği, CA: Canlı Ağırlık, OGCAA: Ortalama günlük canlı ağırlık artışı

Ultrason uygulamalarının gerçekleştirildiği pazarlama döneminde (ortalama 104 günlük yaşta) kuzu canlı ağırlığı genel ortalaması 36.29 kg olarak tespit edilmiştir. MLD kasına yönelik ultrason

ölçümlerinden yağ kalınlığı, deri+yağ kalınlığı ve kas derinliği için elde edilen genel ortalamalar sırasıyla 0.40, 0.63 ve 1.99 cm olarak bulunmuştur.

Analiz sonucunda pazarlama ağırlığı, ortalama günlük canlı ağırlık artışı ve değerlendirilen tüm ultrason ölçütleri (yağ kalınlığı, deri+yağ kalınlığı ve kas derinliği) bakımından işletme ve cinsiyetler arası ayırım istatistiki olarak çok önemli ($P<0.001$) bulunmuştur. Doğum tipleri arası fark ultrasonik ölçümler dışında canlı ağırlıklar ve ortalama günlük canlı ağırlık artışları bakımından önemli ($P<0.001$) bulunmuştur. Sürekli etmen olarak ele alınan pazarlama dönemi kuzu yaşının kuzu canlı ağırlık üzerine etkisi (regresyon) ile kuzu canlı ağırlığının üç farklı ultrason ölçüm parametresi üzerine etkisi istatistiki olarak çok önemli ($P<0.001$) bulunmuştur. MLD kasını kaplayan örtü veya kabuk yağı kalınlığı için elde edilen genel ortalamalar farklı ırk ve genotiplerde gerçekleştirilen bazı çalışmalarda elde edilen değerlerden yüksek (Cemal ve ark., 2007; Esquivelzeta ve ark., 2012; Cemal ve ark., 2009; Slosarz ve ark., 2011; Ripoll ve ark., 2009; Fernandez ve ark., 1997; Yaralı ve Yılmaz, 2014; Yılmaz ve ark., 2014), bazılarında ise (Emenheiser ve ark., 2010; Leeds ve ark., 2008; Theriault ve ark., 2009; Santos ve ark., 2014) yüksek bulunmuştur. Bu farklılıklar gerçekleştirilen çalışmalardaki ırk ve canlı ağırlık farklılığının doğal bir sonucu olarak karşımıza çıkmaktadır.

Kas derinliği için elde edilen bulgular özellikle dünyada et verim yönlü yetiştirilen Suffolk, Dorset, Rambouillet vb. ırklardan elde edilen bulgulardan (Leeds ve ark., 2008; Slosarz ve ark., 2011; Theriault ve ark., 2009) düşük çıkmıştır. Bu farklılığın temel sebebi bu ırkların etçi özellik göstermesi ve ölçümün daha geç yaşlarda gerçekleştirilmesidir.

Ultrason ölçümlerinin gerçekleştirildiği yaşlar bakımından ıslah programları arasında farklılıklar bulunmaktadır. Daha geç yaşta yapılan ultrason ölçümlerinde elde edilen görüntülerde dokuların ayırımı ve özellikle yağ tabakasının sınırları daha belirgin olduğu için ölçümler daha duyarlı yapılabilmektedir. Ancak, Batı Anadolu'da kuzuların süttten kesimde hemen pazarlanması daha geç yaşlarda ultrason ölçümü gerçekleştirilmesini olanaksız hale getirmektedir. Erken yaş olarak değerlendirilebilecek olan 104 günlük yaşta, bel gözü kası üzerindeki kabuk yağının sınırlarının ultrasonla belirlenmesinin zor olmasından dolayı ölçülmesine karar verilen deri+yağ kalınlığı ölçütünün yağ kalınlığı ile ortaya koyduğu yüksek korelasyon bu ölçütün de bireysel tanımlamalarda destekleyici olarak kullanılabileceğine işaret etmektedir. Çalışmada deri+yağ kalınlığı için elde edilen değerler yerli ırklarımızdan Karya, Karacabey Merinosu ve Aydın'da yetiştirilen yöresel Kıvırcık için elde edilen değerlere benzer bulunmuştur (Cemal ve ark., 2007; Cemal ve ark., 2009; Yılmaz ve ark., 2014).

MLD kasına ait ultrason ölçüm değerleri ve canlı ağırlık arasında bulunan fenotipik korelasyonlar Çizelge 3'te verilmiştir.

Çizelge 3. Canlı ağırlık ve MLD ölçümleri arası fenotipik korelasyonlar

	CA	YK	DKY
YK	0.527***		
DKY	0.492***	0.898***	
KD	0.527***	0.387***	0.326***

***: P<0.001, YK: Yağ kalınlığı, DYK: Deri+yağ kalınlığı, KD: Kas derinliği, CA: Canlı Ağırlık

Kuzularda etlenme ve yağlanma derecesinin tahmininde kullanılan göz kası ultrason ölçüm parametreleri, ve canlı ağırlık arasındaki fenotipik korelasyonlar pozitif yönlü ve çok önemli (P<0.001) bulunmuştur. Beklenildiği üzere, en yüksek korelasyon katsayıları yağ kalınlığı ile deri+yağ kalınlığı arasında gözlemlenmiştir.

MLD kasında tanımlanan kabuk yağı kalınlığı ve kas derinliğine ilişkin kalıtım derecesi (h^2) tahminleri Çizelge 4'te verilmiştir.

Çizelge 4. Yağ kalınlığı ve kas derinliği ultrason ölçümlerine ait kalıtım derecesi (h^2) tahminleri

Özellikler	Koç Sayısı	Gözlem Sayısı	h^2	Modeldeki kesikli etmenler
Yağ Kalınlığı			0,07	
Kas Derinliği	77	995	0,15	İşletme, Yıl, Doğum Tipi, Cinsiyet

Scottish Blackface ırkında 4 aylık yaşta 0.23 (Conington et al. 1995), Dala Cross ırkında ise 5 aylık yaşta 0.32 (Larsgard and Olesen 1998) olarak bildirilen kalıtım derecesi tahminleri Karya ırkında 0.15 olarak ortaya çıkmıştır. Elde edilen bu kalıtım derecesi orta düzeyde bir görünüm sergilemektedir. Diğer ülkeler ile karşılaştırıldığında, Karya kuzuların erken yaşta (ortalama 3-3.5 aylık yaş) pazarlanması sonucunda ultrason ölçümleri erken yaşta gerçekleştirilmektedir. Bu durum, incelenen bu özelliklere ait genetik parametrelerin daha düşük çıkmasına öncülük etmektedir.

Sonuç olarak, Karya koyunlar için oluşturulan soy kütüğü ve performans veri tabanı ile bu veri tabanına dayalı elde edilen genetik parametreler kullanılarak isabetli damızlık değer tahminleri yapılmakta ve damızlık seçiminde kullanılmaktadır.

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Kaynaklar

Boldman, KG., Kriese LA., Van Vleck LD., Van Tassel, CP.,Kachman SD., 1993. A manual for use of MTDFREML. A set of programs to obtain estimates of variances and covariances. U.S. Department of Agriculture, Agricultural Research Service. 114 pp.

Cemal, İ., Karaca, O., Altın, T., Gökdal, Ö., Yılmaz, M., Yılmaz, O., 2007. Ultrasound measurements of eye muscle properties and backfat thickness in Kivircik Lambs. J Biol Sci, 7:89-94.

- Cemal, İ., Karaca, O., Yılmaz, O., Yılmaz, M., 2009. Karya kuzularda pazarlama dönemi canlı ağırlığı ile göz kası özelliklerine ait ultrason ölçüm parametreleri. 6. Ulusal Zootekni Bilim Kongresi, 24-26 Haziran 2009, Erzurum, Türkiye, pp. 63-69, 2009.
- Conington, J., Bishop, S.C., Waterhouse, A., Simm, G., 1995. A genetic analysis of early growth and ultrasonic measurements in hill sheep. *Animal Science* 61, 85-93. Davis GH, Morris CA, Dodds KG (1998). Genetic studies of prolificacy in New Zealand sheep. *Animal Science* 67, 289-297.
- Emenheiser, J.C., Greiner, S.P., Lewis, R.M., Notter, D.R., 2010. Validation of live animal ultrasonic measurements of body composition in market lambs. *Journal of Animal Science*, 88(9):2932-2939.
- Esquivelzeta, C., Casellas, J., Fina, M., Piedrafita, J., 2012. Back fat thickness and longissimus dorsi real-time ultrasound measurements in light lambs. *Journal of Animal Science*, 90:5047-5055.
- Fernandez, C., Gallego, L., Quintallia, A., 1997. Lamb fat thickness and longissimus muscle area measured by A computerized ultrasonic system. *Small Ruminant Res*, 26:277-282.
- Fernandez, C., Garcia, A., Vergara, H., Gallego, L., 1998. Using ultrasound to determine fat thickness and longissimus dorsi area on Manchego lambs different live weight. *Small Ruminant Res*, 27:159-165.
- Kor, A., Ertuğrul, M., 2000. Canlı hayvanlarda karkas kompozisyonu tahmin yöntemleri. *Hayvansal Üretim*, 41:91-101.
- Larsgard A.G., Olesen, I., 1998. Genetic parameters for direct and maternal effects on weights and ultrasonic muscle and fat depth of lambs. *Livestock Production Science* 55, 273-278.
- Leeds, T.D., Mousel, M.R., Notter, D.R., Zerby, H.N., Moffet, C.A., Lewis, G.S., 2008. B-mode, real-time ultrasound for estimating carcass measures in lives sheep: Accuracy of ultrasound measures and their relationships with carcass yield and value. *Journal of Animal Science* 86, 3203-3214
- Ripoll, G., Joy, M., Alvarez-Rodriguez, J., Sanz, A., Teixeira, A., 2009. Estimation of light lamb carcass composition by in vivo real-time ultrasonography at four anatomical locations. *Journal of Animal Science* 87: 1455-1463.
- Russel, A.J.F., 1995. Ultrasonography and body composition in sheep. In: *Veterinary Ultrasonography*. In: Goddard, P.J. (Ed.). CAB International, UK, 1995.
- Santos, N.P.S., Neto, C.B.O., Sarmiento, J.L.R., Bezerra, L.R., Oliveira, R.L., dos Santos, G.V., Neto, A.A.R., Biagiotti, D., 2014. Carcass traits and growth curve parameters in SantaInês Sheep. *Journal of Agricultural Science* 6, 180-187.
- SAS, (1999). *The SAS System*. Version 8. Copyright (c) 1999 by SAS Institute Inc., Cary, NC, USA.
- Simm, G., Murphy, S.V., 1996. The Effect of selection for lean growth in Suffolk sires on the saleable meat yield of their crossbred progeny. *Anim Sci*, 62: 255-263, 1996.
- Simm, G., Lewis, R.M., Grundy, B., Dingwall, W.S., 2002. Responses to selection for lean growth in sheep. *Anim Sci*, 74: 39-50, 2002.
- Slosarz, P., Stanisł, M., Boniecki, P., Przybylak, A., Lisiak, D., Ludwiczak, A., 2011. Artificial neural network analysis of ultrasound image for the estimation of intramuscular fat content in lamb muscle. *African Journal of Biotechnology* 10, 11792-11796.
- Stanford, K., Jones, S.D.M., Price, M.A., 1998. Methods of predicting lamb carcass composition: A Review. *Small Ruminant Res*, 29: 241-254, 1998.
- Temple, R.S., Stonaket, H.H., Howry, D., Pasakony, C., Hazeleus, M.H., 1956. Ultrasonic and conductivity methods for estimating fat thickness in live cattle. *Proc West Sec Am Soc An Prod*, 7:477.

- Therriault, M., Pomar, C., Castonguay, F.W. 2009. Accuracy of real-time ultrasound measurements of total tissue, fat, and muscle depths at different measuring sites in lamb. *Journal of Animal Science* 87, 1801-1813.
- Wild, J.J. ,1950. The use of ultrasonic pulses for the measurement of biological tissue and the detection of tissue density changes. *Surgery*, 27:183, 1950.
- Yaralı, E., Karaca, O., Yılmaz, O., 2006. Çiftlik hayvanlarında karkas kompozisyonu tahmininde görüntüleme sistemlerinin kullanımı. *Hasad Hayvancılık Dergisi*, 253: 58-64, 2006.
- Yaralı, E., Yılmaz, O., 2014. Marketing weights and ultrasonic measurements of loin eye muscle in Karya lambs. *Indian Journal of Animal Sciences*, 84 (9): 1016–1020.
- Yılmaz, O., Cemal, İ., Yılmaz, M., Karaca, O., Taşkın, T. 2011. Eşme Kıvırcık melezi kuzularda pazarlama canlı ağırlığı ve bel gözü kası ultrason ölçümleri. 7. Ulusal Zootekni Bilim Kongresi, 14-16 Eylül 2011; Çukurova Üniversitesi, Adana, Türkiye, pp. 157, 2011.
- Yılmaz, O., Sezenler, T., Alarşlan, E., Ata, N., Karaca, O., Cemal, İ., 2014. Karacabey Merinosu, Karya ve Kıvırcık kuzularda süttten kesim döneminde kabuk yağı kalınlığı ve *Musculus longissimus dorsi thoracis et lumborum* (MLD) derinliğinin ultrason ölçümleri. *Kafkas Üniversitesi Veteriner Fakültesi Dergisi*. 20 (6): 829-834

Effect Of The Dietary Supplementation With Rosemary Oil On Rumen Methanogenic Bacteria Of Fattening Lambs

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Abstract

In this study, it was aimed to determine the effects of the use of rosemary (*Rosmarinus officinalis*) essential oil in lamb fattening on rumen methanogenic bacteria density. For this purpose, two different rosemary essential oil doses (250 mg/kg, 500 mg/kg) were added to lamb fattening ration. The animal material of the study consisted of 30 Norduz male lambs weaned at 4 months of age. Lambs were divided into 3 groups as follows; R0: fed with no rosemary (control) to ration, R250: fed with 250 mg/kg DM rosemary oil added ration, R500: fed with 500 mg/kg DM rosemary oil added ration, fed for 70 days. Each group was housed in a total of 6 separate paddock, with 2 replications/repetitions (2 paddock/groups; 5 lambs/paddock). The rumen fluid was taken from lambs at the beginning (day 0) of the training period and at the end (day 70) of the study. In the study, bacterial DNA isolation was performed with Mericon bacterial DNA kit (Qiagen) in the investigation of bacterial load changes in rumen. Total DNA loads were measured nanospectrophotometrically. Positive sigmoidal curves were obtained by Real-Time PCR using the specific primers 27F-1492R with the obtained DNAs. In conclusion, rosemary oil used in lamb fattening did not change the total rumen bacterial load compared to the control group, and the density of methane producing bacteria in the rumen fluid did not make difference between the application groups.

Key words: Rosemary oil, lamb fattening, methanogenic bacteria, DNA isolation

Lactation Characteristics of Mahalli Goat Raised in Farmer Conditions

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Abstract

This study was aimed to determine lactation performances of Mahalli goat in farmer condition in Diyarbakir, Turkey. Data were collected and analysed on the lactation characteristics of 257 ewes owned by 3 households in 2015. The projects was supported by the General Directorate of Agricultural Researches and Politics (TAGEM).

Lactation lengths (LL), lactation milk yields (LMY) and average daily milk yield (ADMY) were 165 days, 149 kg and 905 g, respectively. LMY and ADMY were significantly affected by the age of goat: older goats have longer lactation, higher ADMY and produced higher LMY ($P<0.05$). The effects of flock on LMY and ADMY, and of birth month on LL and LMY were significant ($P<0.05$). On the other hands, birth type has no effect on any of the traits in question in this study.

Analyses showed that there is a large variance for LMY (36% CV) and ADMY (33% CV), and more research should be conducted on Mahalli goat in future.

Keywords: Mahalli goat, Lactation characteristics, Environment

Pre- and Post-Weaning Growth of Karakaş Sheep Raised in Farmer Conditions

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Abstract

The purpose of this study was to investigate the growth performances of Karakaş sheep under smallholder production systems in Diyarbakır, Turkey. Data were collected and analysed on the growth of 27716 lambs owned by 39 households in four villages from 2012 to 2016. The projects have been supported by the General Directorate of Agricultural Researches and Politics (TAGEM) in the scope of National Small Ruminant Improvement Project under Farmer Conditions.

Average weights (kg) of Karakaş lambs at birth (BW0), 1 (BW30), 2 (BW60), 3 (BW90), 4 (BW120) and 5 (BW150) months of age were 4.08 ± 0.004 , 9.83 ± 0.021 , 15.30 ± 0.026 , 20.82 ± 0.037 , 26.52 ± 0.056 and 32.93 ± 0.147 kg, respectively. Weights in all ages were increased from 2012 to 2016: 3.91 to 4.16, 9.35 to 10.48, 13.96 to 15.21, 18.91 to 21.46, 23.62 to 28.49 and 28.04 to 33.75 for BW0-BW150, respectively ($P < 0.05$). In addition, single born lambs and male lambs were heavier than twin borns and females in all ages in terms of all weight traits ($P < 0.05$).

Upward selection for weaning weight was effective in Karakaş sheep and should be continued while applying constrains for birth weight to prevent from encountering birth difficulties on later generations.

Keywords: Karakaş sheep, Growth traits, Environment, Selection

A Study On The Enteropathogenic Viruses Threatening Economical Livestock Production: First Detection Of Picobirnavirus

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Abstract

Diarrhea is a commonly reported disease in young animals, and still one of the major cause of low productivity and economic loss to livestock producers worldwide. Diarrhea is a multifactorial disease caused by both infectious and non-infectious factors. It is known that several pathogens cause or contribute to diarrhea development. Viruses are one of the leading infectious agents that cause diarrhea in newborns. Most of the known enteric viruses are rotavirus (RV), coronavirus (CoV). According to recent reports, noroviruses (NoV), Nebovirus, Kobuvirus (KoV), etc. have been identified as potential causes of diarrhea. However, the etiology of most diarrheic cases remains unknown. In this presentation, we aimed to report the first detection of Picobirnavirus in fecal samples of diarrheic a calf and lambs, which were also tested for some other enteropathogens, as well as to summarize the data of possible different enteropathogens causing or contributing diarrhea in calves and lambs in Turkey. Briefly, a total of 42 fecal samples of diarrheic animals, including 15 calves, 19 sheep and 8 goats, were examined for the investigation of different enteric viruses by RT-PCR in this study. Each enteric viruses investigated in this study were detected at different rates. Also, a total of 3 samples including a calf and two sheep (one of them is lamb) were found positive for picobirnavirus. The lamb and the calf also infected with rotavirus.

In conclusion, considering the detection of picobirnaviruses from sheep and cattle with diarrhea, we believe that further epidemiological studies on a large population and detailed molecular investigations will provide a better understanding of the epidemiology of viral enteropathogens such as picobirnavirus and others in Turkey.

Koçlarda Borik Asit Kullanılabilirliğinin Araştırılması

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Özet

Bu çalışma farklı bor düzeylerinin koçlarda rumen fermentasyon parametreleri (pH, NH₃_N, kısa ve orta zincirli yağ asitleri ile protozoa sayısı) üzerine etkilerini araştırmak amacıyla gerçekleştirilmiştir. Bunun için 4 adet Merinos ırkı koçlarda 4 x 4 Latin kare düzeninde yemleme düzeneği kurularak 0, 200, 300 ve 400 mg/kg borik asit düzeyleri kullanılmıştır. Her bir deneme dönemi 12 gün adaptasyon ve 2 gün numune toplama olmak üzere toplam 14 gün sürmüştür. Rumen sıvısı örneği sonda yardımıyla yemlemeden sonra 0 ve 3. saatlerde alınmıştır. Deneme sonunda elde edilen verilere göre asetik asit konsantrasyonu deneme gruplarında artış gösterirken (P<0.005), propiyonik asit konsantrasyonu azalma göstermiştir (P<0.001). Toplam uçucu yağ asidi miktarı ise 300 ve 400 mg/kg borik asit kullanılan gruplarda artmıştır (P<0.005). Toplam protozoa sayılarına baktığımızda da deneme gruplarında kontrol grubuna göre önemli bir artış olduğu gözlemlenmişti (P<0.05). Ayrıca kan serumu, rumen sıvısı ve dışkı bor düzeyleri rasyonlardaki bor düzeyinin artmasına lineer olarak artmıştır (P<0.001). KM ve OM sindirilebilirlik değerlerinin istatistiki anlamda değişmediği gözlemlenmiştir. Sonuç olarak; farklı bor konsantrasyonlarının rumen fermentasyonunda değişikliklere sebep olduğu tespit edilmiştir.

Anahtar Kelimeler: bor, uçucu yağ asitleri, sindirilebilirlik

Abstract

This study was carried out to investigate the effects of different boron levels on rumen fermentation parameters (pH, NH₃_N, short and medium chain fatty acids and protozoa numbers) in rams. For this purpose, 4 Merino rams were fed with 4 x 4 Latin square feeding system and 0, 200, 300 and 400 mg / kg boric acid levels were used. Each trial period lasted 14 days, 12 days of adaptation and 2 days of sample collection. Rumen fluid sample was taken at 0 and 3 hours after feeding with the help of catheter. According to the data obtained at the end of the experiment, acetic acid concentration increased in experimental groups (P <0.005), propionic acid concentration decreased (P <0.001). Total volatile fatty acid content was increased in 300 and 400 mg / kg boric acid groups (P <0.005). When the total number of protozoa were examined, it was observed that there was a significant increase in the experimental groups compared to the control group (P <0.05). In addition, blood serum, rumen fluid and feces boron levels increased linearly with increasing boron levels in diets (P <0.001). It was

observed that the digestibility values of KM and OM did not change statistically. As a result; It was determined that different boron concentrations cause changes in rumen fermentation.

Key Words: boron, digestibility, volatile fatty acids

Giriş

Selenyum, çinko ve kobalt gibi iz mineraller, hayvanlarda çeşitli fizyolojik fonksiyonlar için önem taşımaktadır ve eksikliklerinde bazı metabolik hastalıklar ortaya çıkmaktadır (Fisher, 1975; Ulrey ve ark. 1977). Bu iz elementlerden Bor minerali de canlı organizmalarda önemli olmasının yanı sıra mineral metabolizmasında, enzimlerde ve bazı hormonların yapısında rol oynamaktadır (Nielsen ve Shulter, 1992; WHO, 1998). Ülkemizde oldukça fazla rezervlere sahip olan bor ayrıca önem taşımakta ve yapılan araştırmalarla hayvanların rasyonlarında kullanılabilirliği ortaya konmuştur (Koksal ve ark., 2012; Yıldız ve ark., 2013; Kabu ve Uyarlar, 2015; Bhardi ve ark., 2008); bununla birlikte, borun rumen fermentasyonu üzerindeki etkileri ile ilgili bilgi yoktur. Bu nedenle, farklı bor konsantrasyonlarının rumen fermentasyonu üzerindeki etkisini belirlemek amacıyla bu çalışma gerçekleştirilmiştir.

Materyal ve Metot

Çalışma Ankara Üniversitesi Veteriner Fakültesi Deneme Ünitesinde gerçekleştirilmiş olup, bu amaç için 4 adet Merinos toklu hayvan (12 aylık yaşta, yaklaşık 60 kg CA) kullanılmıştır. Denemede 4 farklı grup oluşturulmuş olup 4 x4 latin kare düzeni oluşturulmuştur. Kontrol grubuna herhangi bir katkı ilavesi gerçekleştirilmemiştir, B1 grubuna 200 ppm, B2 grubuna 300 ppm ve B3 grubuna da 400 ppm borik ilavesi gerçekleştirilmiştir. Kaba yem olarak yonca ve saman verilmiştir ve 2 öğün şeklinde beslenmişlerdir. Her bir deneme periyodu 12 gün alıştırma dönemi ve 2 gün numune toplama olmak üzere 14 gün sürmüştür. Yemlerin besin madde analizleri AOAC (2000)'de belirtilen yöntemlere yapılmıştır (Tablo 1). Bor analizleri ICS kullanılarak kromatografik yöntemle belirlenmiştir.

Her bir deneme döneminin son 2 gününde kan ve dışkı örnekleri ile rumen sıvısı sonda yardımıyla alınmıştır. Daha sonra bor analizleri ICS'de belirlenmiştir. Rumen sıvısında pH, amonyak azotu, protozoa sayıları ve UYA konsantrasyonları belirlenmiştir.

Denemenin sonunda hayvanlar kesilmiş ve karaciğer, böbrek, dalak, kalp ve testislerinden örnekler alınmıştır. Ayrıca yapağı, deri ve but kası örnekleri de alınarak bor birikim düzeyleri tespit edilmiştir.

Elde edilen dışkı örneklerinde kuru madde ve organik madde düzeyleri belirlenmiş ve sindirilebilirlikleri tespit edilmiştir.

İstatistik analizler SPSS 14.1 programı kullanılarak gerçekleştirilmiştir.

Bulgular ve Tartışma

Araştırmada kullanılan yemlerin analizleri Tablo 1.'de verilmiştir.

Table 1. Denemede kullanılan yemlerin besin madde içerikleri

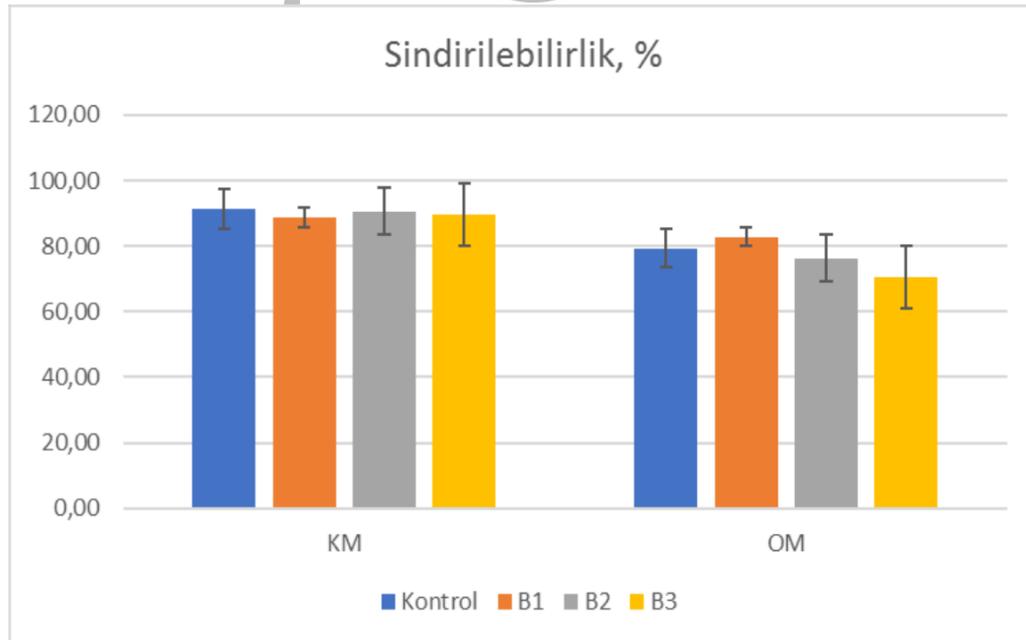
	Kaba yem		Deneme Rasyonu ¹			
	Yonca	Saman	Kontrol	B1	B2	B3
Kuru Madde (%)	92.8	89.0	90.8	90.7	91.1	92.0
Organik Madde (%)	84.6	83.7	82.5	81.9	82.1	81.1
Ham protein (%)	9.5	2.7	15.0	15.9	15.7	16.5
ADF (%)	46.0	51.0	ND	ND	ND	ND
Ham yağ (%)	1.10	2.18	4.20	4.16	4.01	3.96
ME (kcal kg ⁻¹)	1495	1168	2647	2616	2637	2595
Bor (mg kg ⁻¹)	39.1 ²	23.9 ²	10.2	42.5	61.7	80.1

¹ Basal diet contained 25% corn, 24% barley, 3% soybean meal, 12% sunflower meal, 25% rasmol, 2% full fat soy, 4% molasses, 3% CaCO₃, 1% salt, and 1% mineral-vitamin supplement (3,000 mg kg⁻¹ retinol, 75,000 mg kg⁻¹ cholecalciferol, 30,000 mg kg⁻¹ tocopherol, 980 mg kg⁻¹ thiamine, 99,500 mg kg⁻¹ niacin, 20 mg kg⁻¹ biotin, 50,000 mg kg⁻¹ manganese, 50,000 mg kg⁻¹ zinc, 50,000 mg kg⁻¹ iron, 10,000 mg kg⁻¹ copper, 800 mg kg⁻¹ iodine, 200 mg kg⁻¹ cobalt, 300 mg kg⁻¹ selenium, and 250 mg kg⁻¹ magnesium). Control, basal diet with 0 mg kg⁻¹ boron; B1, basal diet with 35 mg kg⁻¹ boron; B2, basal diet with 52.5 mg kg⁻¹ boron; and B3, basal diet with 70 mg kg⁻¹ boron.

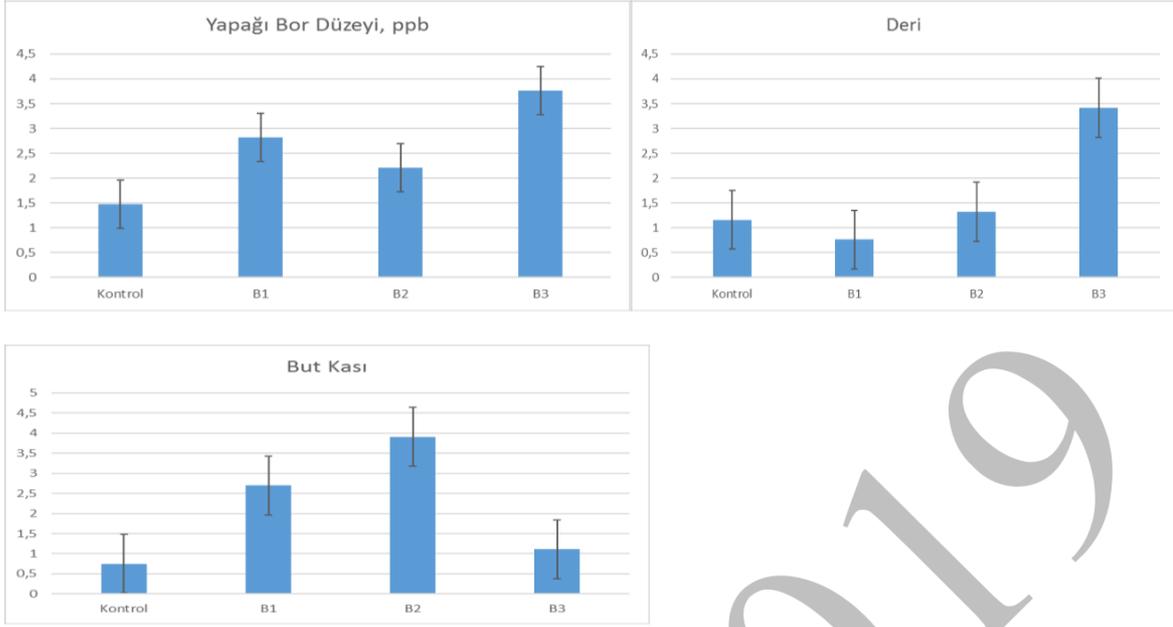
² Values were reported by Serbest (2013).

Deneme sonunda elde edilen verilere göre rumen pH ve amonyak değerlerinde önemli bir değişiklik oluşmamıştır ancak asetik asit, propiyonik asit ve toplam uçucu yağ asidi konsantrasyonlarına bakıldığında deneme gruplarında artış olduğu gözlemlenmektedir. Protozoa sayıları da kontrol grubuna göre önemli artış göstermiştir (P<0.05).

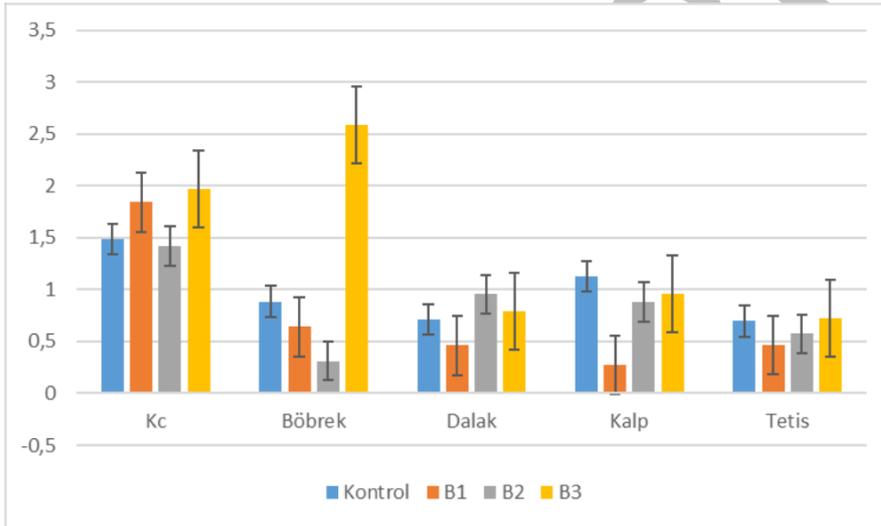
Koçların tüketmiş olduğu tam yem rasyonunu sindirilebilirlik düzeyleri ise Şekil 1'de gösterilmektedir. Ayrıca Doku ve organlarındaki birikim düzeyleri de Şekil 2 ve Şekil 3'de gösterilmektedir.



Şekil 1. Farklı bor düzeyleri ile beslenen koçların yemlerin sindirilebilirlik değerleri



Şekil 2. Farklı bor düzeyleri ile beslenen koçların yapağı, deri ve but kası bor düzeyleri



Şekil 3. Farklı bor düzeyleri ile beslenen koçların bazı organlarındaki bor düzeyleri

Sonuç

Sonuç olarak koçlarda borik asit kullanımının herhangi bir olumsuz etki yaratmadığı, buna ilaveten rumen fermentasyonunda modifikasyona sebep olduğu tespit edilmiştir. Bazı doku ve organlardaki bor birikim düzeylerinin de hayvanın sağlığına bir sorun teşkil etmeyece düzeyde olduğu görülmüştü. Koçlarda borik asit kullanımının net olarak ortaya konabilmesi için daha çok in vivo çalışmalara ihtiyaç olduğu kanısına varılmıştır.

Kaynaklar

- AOAC., 1994. Official Methods of Analysis. 16th ed. Assoc. Off. Anal. Chem., Washington, DC.
- Bharti V.K., Gupta M., Lall D., 2008. Effect of boron as an antidote on dry matter intake, nutrient utilization and fluorine balance in buffalo (*Bubalus bubalis*) exposed to high fluoride ration. *Biol. Trace Elem. Res.* 126 (Suppl. 1), 31–43.
- Fisher G.L., 1975. Function and homeostasis of copper and zinc in mammals. *Sci. Total Environ.* 4, 373-421.
- Kabu M., Uyarlar C., 2015. The effects of borax on milk yield and selected metabolic parameters in Austrian Simmental (Fleckvieh) cows. *Vet. Med.* 60(4), 175–180.
- Koksal B.H., Yildiz G., Sizmaz O., 2012. effects of boric acid and humate supplementation on performance and egg quality parameters of laying hens. *Braz. J. Poultry Sci.* 14(4), 283-289.
- Nielsen F.H., Shuler T.R., 1992. Studies of the interaction between boron and calcium, and its modification by magnesium and potassium, in rats. *Biol. Trace Elem. Res.* 35, 225-237.
- Ullrey P.S., Brady P.S., Whetter P.A., Ku P.K., Magee W.T., 1997. Selenium supplementation of diets for sheep and beef cattle. *J. Anim. Sci.* 46, 559-565.
- WHO., 1998. World Health Organization. International programme on chemical safety. Boron: Environmental Health Criteria, 1–201.
- Yildiz G., Koksal B.H., Sizmaz O., 2013. Influence of dietary boric acid and liquid humate inclusion on growth performance, carcass traits and bone characteristics in broiler chickens. *Arch. Geflug.* 77(4), 260-265.

Metabolic Profiles of Fat-Tail Akkaraman Breed Sheep

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Abstract

This study was carried out on the sheep herds involved in the NATIONAL COUNTRYSIDE SMALL RUMINANT ANIMAL BREEDING PROJECT on Sivas Kangal Akkaraman sheep. Metabolic profiles of Akkaraman sheep and changes according to different physiological periods were determined. For this purpose, intact, fertile 120 sheep from different breeders were monitored for 15 months in different physiological periods; 1- 45-35 days prior to mating, 2-Just before mating, 3- 115-125 days of pregnancy, 4-Partition period, 5-Early Lactation 15-20 days, 6-Lactation 55-65 days, 7-Lactation Between 115-125 days. Animals were bled via V. Jugularis and serum was obtained; glucose, total protein, globulin, albumin, blood urea nitrogen, total cholesterol, calcium, phosphorus, magnesium, AST and GGT biochemical parameters were measured. . The differences between the physiological periods of all metabolites were statistically significant ($P = 0.000$). The metabolic profile of sheep was determined by considering the physiological periods and the rations they consume.

The Use Of Conjugated Linoleic Acid As Feed Additive In Order To Promote Improve Meat Quality In Beef Cattle

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Abstract

In this study, as a natural method, conjugated linoleic acid, which is an organic acid, was applied in the last phase of the feeding as a feed additive for meat cattle under intensive feeding conditions for 30 days. Conjugated linoleic acid was given as a feed additive with amount of 25 g per flesh cattle in order to to promote the development of animals and / or to improve the quality characteristics of carcass or meat. A total of 20 male simental cross-bred beef cows aged 17 months were used in the experiment. Experiment was carried out with 10 animals in each groups with two sub-goups containg 5 animals. Live weight gains, feed efficiency, hot carcass yield, rib eye area, back fat thickness were not significantly different between two groups. In terms of quality characteristics, the percentage of cooking loss compared to those not used in the CLA group was statistically significantly different ($p < 0.05$). Accordingly, the mean loss of cooking in the group using CLA was calculated as 39% without using 36%. In terms of pH values, the difference between experimental ($\bar{x} = 5.75$) and control ($\bar{x} = 5.86$) groups was statistically significant ($p < 0.05$). Although there was no statistically significant difference between the experimental group (average=7814) and control group (average=5795) in the thoughness of red meat ($p > 0.05$), the average value of experimental group was numerically higher. While there was no significant difference between two groups in terms of color parameters, L^* , a^* , b^* , C (Chroma) and HA (Hue Angle) ($p > 0.05$), the avegarge values of experimental and control subgroups were 37.25, 37.51; 18.63, 17.28; 9.44, 8.56; 19.99, 19.29; 27.98, 26.11 respectively. According to the results of the correlation analysis, the correlation between the a^* value and the thoughness was +0.55, between the thickness of the back fat and marbles - 0.50, between the pH value a^* +0.60, a^* value between the loss of cooking +0.52, between the b^* value and the stickiness between +0.60, between the HA value and adhesiveness +0.70, between the loss of cooking value and the thoughness +0.45 were found statistically significant ($p < 0.05$). By oven cooking method the rib eye area of the beef cattles in the experimental and control groups were subjected to sensory analysis by 8 expert panelists who completed their panelist training. Each panelist evaluated the appearance, color, smell, flavor, juiciness, texture, connective tissue, fat ratio and general appreciation of the meats as experimental and control groups. In terms of general appreciation, the difference of mean between Experimental ($\bar{x} = 6.63$) and Control ($\bar{x} = 5.80$) groups was statistically significant ($p < 0.05$). Although there was no statistically significant difference between the experimental and control groups in terms of other

parameters, the parameter means of the experimental group were higher than the parameter means of control group. As a result, in this study, it was observed that CLA as feed additive in beef cattle can provide some benefit to the quality characteristics of meat. It was also concluded that more studies are needed with usage of not less than the dose level in the study, to determine the degree to which CLA can be preferred.

Key Words: Conjugated linoleic acid, Meat Quality, Fed Additives, Fatty Acid.

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The Effect Of GnRH Injections On Reproductive Parameters Following Short Term Progesterone Administration In Awassi Ewes

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Abstract

The present study was aimed to investigate the effects of double-dose GnRH application on the stimulation of oestrus and ovulation, pregnancy rate, late embryonic-early fetal loss rate and litter size performance in Awassi Ewes out of season.

In the study, 100 adult Awassi Ewes were treated with vaginal sponge containing 60 mg medroxyprogesterone acetate for 7 days before the breeding season (May-June) (day-0) (Espanjavet-HIPRA). PMSG 500 IU im (Oviser-HIPRA) and 250 µg cloprostenol sodium im (PGS-ALKE) were performed on the day of removal of the sponge (day-7). In Group-1 (n=31) ewes were not subjected to any hormonal treatment. In Group-2 (n=31) ewes were given 50 µg GnRH (gonodarelin diacetate-Ovarelin, CEVA) 48 hours after removal of the sponge. In Group-3 (n=33) ewes were given 50 µg GnRH 48 hours after the removal of the sponge and 50 µg GnRH im 12 days after ram introduction. Ten rams were used for mated.

There were no statistical differences between the groups 1, 2 and 3 in terms of oestrus stimulation rate (82.8%; 68.9%; 72.7%), pregnancy rate in ewes showing oestrus (66.7%, 55.0%, 54.2%), multiple pregnancy rate (28.5%; 50.0%; 30.7%) parameters. It was found that in Group-2 (1.50) in which single-dose GnRH treatment was applied in low-prolific Awassi Ewes litter size was greater compared to Group-1 (1.28) and Group-3 (1.31). In order to prevent early embryonic deaths, no increases in P4 concentration (Day-12, 4.05±0.43; Day-14, 3.91 ± 0.31; Day-17, 4.15 ± 0.42) were observed in Group-3 which was treated with GnRH 12th day after mated. However, late embryonic-early fetal death rate was lower in Group-3 (0%) than in Group-1 (12.5%) and Group-2 (9.1%).

In conclusion, after short-term progesterone administration out of season, double-dose GnRH administration had no positive effects on other reproductive performance parameters except late embryonic-early fetal death rate.

Key Words: Embryonic Death, GnRH, Awassi Ewes, Litter Size, Progesterone.

Relationship Between *In Situ* And *In Vitro* Rumen Protein Degradability Of Full Fat Soybean And Soybean Meal

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Abstract

This research was conducted to determine rumen protein degradability of full fat soybean (FFSB) and soybean meal (SBM) using *in situ* and *in vitro* methods and then to develop regression equations to estimate *in situ* protein degradability from the *in vitro*. The feeds were provided from feed mills and feed suppliers. In the study, after determining *in situ* effective protein degradability (INSE) of FFSB and SBM by *in situ* method, relations between INSE and *in vitro* values obtained after 1 and 24 hours incubations (INV₁ and INV₂₄) were determined. *In situ* protein degradability of the TYS was measured (0, 2, 4, 8, 16, 24 and 48 h incubations) while that of SBM was measured (0, 2, 4, 8, 16, 24, 48 and 72 hours incubations) in the rumen of 3 mature Holstein cows. *In vitro* protein degradabilities of feeds were measured by using bacterial protease purified from *Streptomyces griseus* (Sigma Type XIV). According to the results of the study; INSE, INV₁ and INV₂₄ for FFSB were 0.81, 0.60 and 0.76; same values for SBM were determined as 0.59, 0.19 and 0.52 respectively. For FFSB, there was no correlations found between INSE and INV₁ (P>0.05) while the correlations between INSE and INV₂₄ were significant (P<0.05). Although the correlations between *in situ* and *in vitro* protein degradability of SBM were found significant (P<0.05). Despite there were differences between *in-situ* and *in vitro* protein degradability values of FFSB and SBM, the regression equations estimating *in situ* from *in vitro* were significant and the correlations between *in situ* and *in vitro* protein degradability were high.

Keywords: Enzymatic method, *in situ*, *in vitro*, protein degradability, *Streptomyces griseus*

Effect of Saponin and Stevia Extracts on Methane Production, Metabolic Body Weight and Nutrient Digestibility in Sheep

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Abstract

Many studies have reported the effect of saponins on ruminants both *in vivo* and *in vitro* such as removal of protozoa from the rumen microbial system, manipulation of the end products of fermentation and the methane mitigation. Engulfment and degradation of bacteria by protozoa in the rumen significantly reduce microbial protein flow from the rumen by causing rapid intra-rumen nitrogen cycling and then excreting excess ammonia in the urine. Saponins kill or damage protozoa via forming complexes with sterols in the protozoal membrane surface which cause impaired membrane. Saponins are safe, economical, and effective strategy which may decrease methane and eliminate loss of ingested feed energy for productive purposes.

The experiment focused on the use of a saponin containing diet (Ivy; 10g/animal/day) to improve nitrogen utilization and mitigation of the methane production by targeting protozoa and combining in the diet with a glucosidase inhibitor (Stevia; 20g/animal/day) which subsequently, protects the saponins from degradation in the rumen flora. For this purpose eight cannulated sheep have been treated for 21 days -for four periods- with ivy(10g/d), stevia(20g/d) or ivy+stevia(10+20g/d) extracts combination.

The results have not shown any significant changes ($P>0.05$) -for eight cannulated sheep- based on the apparent digestibility of nutrients, metabolic weight, N balance and methane production in Ivy, Stevia nor Ivy+Stevia extract diets comparing to the control group. Further investigations should be done to show the obvious effect of saponins on protozoa for different dosage, saponin contained plants with additional substrates/feeds(stevia).

Key words: Methane, Protozoa, Saponin, Stevia, Rumen

Effect of Ration Protein and Energy Levels on Serum Biochemical Profile of Fatty Tailed Sheep

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Abstract

This study was carried out on the sheep herds involved in the NATIONAL COUNTRYSIDE SMALL RUMINANT ANIMAL BREEDING PROJECT on Sivas Kangal Akkaraman sheep. The aim of this study was to determine relationship between metabolic profile with diet in fat tailed sheep breeds. With this aim, twenty Akkaraman sheep out of six flocks, as a sum of 120, clinically healthy, which gave birth a year ago were chosen. Chosen sheep were bled from V jugulars during periods of: peri-partum and on post-partum, serums were analyzed for glucose, t. protein, globulin, albumin, BUN, t. cholesterol, AST and GGT. Analytes were compared using Z test and for concerned metabolite, unlike statistically averages values, and different flocks were determined. While Different flocks were coded as DA, the ones, which are not different were coded as IA. The relationships between diet compounds and metabolic profile were determined through regression analysis. According the F value which is handled with variance analysis interactions between diet compounds in DA group and serum biochemical profile were detected more meaningful than the group IA which was created as a different group. While cholesterol has strongest relationship with diet energy, BUN was the best reflector of diet crude protein level.

Key words: Metabolic Profile Test, Akkaraman, Serum Biochemical Parameters

Effects Of Whey Used As Drinking Water On Immune, Oxidant And Antioxidant Parameters Of Weaning Lambs

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Abstract

Whey, which is a by-product of cheese making process, is a heterogeneous and polymorphic group of proteins consisting of five main protein fractions ranging from 8% to 35%. In this study, the effects of whey to be consumed by weaned lambs as ad libitum drinking water on selected immune, oxidant, antioxidant and whole blood count parameters were investigated. In this study, 24 three-months old weaned Merino lambs were divided into two equal groups, each containing 12 lambs. The control group received ad libitum drinking water and the experimental group received ad libitum whey. Each animal has received clover as roughage and lamb grower feed as concentrate daily. The duration of the study was 30 days and blood were collected before the experiment (T1), on the 15th (T2) and 30th (T3) days of the experiment. After hemogram analysis, serum was obtained appropriately and stored at -80°C until the analysis performed. From serum samples, tumor necrosis factor- α , interleukin-1 β , superoxide dismutase, malondialdehyde, complement component-4 were determined by ELISA and C-reactive protein, glutathione peroxidase, inorganic phosphorus, calcium, magnesium levels were determined by colorimetric method with auto analyzer. Homogeneity of the variances controlled with Leven's test and univariate general linear model or Friedman test used as non-parametric alternative to evaluate time and group differences ($p < 0.05$). Treatment group mean red blood cell values ($10.74 \pm 1.01 \cdot 10^{12}/L$) were determined higher than control group mean red blood cell values ($10.23 \pm 0.83 \cdot 10^{12}/L$) ($p = 0.02$). In T1, T2 and T3 mean hematocrit values (%) were as 46.30 ± 5.35 , 25.23 ± 2.18 , 43.18 ± 9.85 respectively ($X^2: 29.26$; $p < 0.001$) Significant differences did not observed in tumor necrosis factor- α (ng/L), Superoxide dismutase (ng/ml), Malondialdehyde (nmol/L), Interleukin-1 β (ng/ml), Complement component 4 (ng/ml), C-Reactive Protein (mg/dl) means in groups and time interval ($p > 0.05$). Further analysis should be performed to replace whey instead of water in weaning lambs.

Keywords: Whey, sheep, tumor necrosis factor- α , red blood cell, immune system

The Effect Of Reduction Of Vitamin And Trace Mineral Mixture In Diet On Intestinal Morphology In Growing Quails

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Abstract

A total of 80 quail chicks, one day old, were randomly distributed into 4 treatment groups with 4 replicates pens of 10 birds. The quails were fed for 5 weeks on a four-trial diet consisting of a reduction of vitamin and trace mineral mixture of 0 (control), 20, 40 and 60 % of the recommended level. The high coefficient of variation values obtained indicated that there is an important variation among the intestinal morphological characteristics. General means for villus height (VH), villus width (VW), crypt depths (CD), villus height/ crypt depths (VH/CD), villus surface area (VSA) were 384.71, 76.89, 69.19, 5.73 and 0.09. The effects of different vitamin and mineral levels on intestinal morphological properties were statistically significant differences. All the phenotypic correlation coefficients between studied properties were statistically significant except correlation coefficient between CD with VW and VH/CD with VW.

As a result, reducing vitamin and trace mineral mixture in the diet negatively affected the intestinal morphology of growing quails.

Keywords: Quails, vitamin, mineral, villus, crypt

Yağı Alınmış Un Kurdu (*tenebrio molitor*) Larvasının Yumurta Tavuklarının Performans Özelliklerine Etkisi

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Abstract

This research was conducted to determine the effects of the supplementation of defatted mealworm larvae meal to laying hens' diets on performance, egg quality characteristics and histopathological characteristics of some tissues. In this experiment, a total of 48 ATABEY white hybrid laying hens obtained from Ankara Poultry Research Institute were used and four experimental groups were assigned. The experimental diets were prepared as; 1: Control group (without *Tenebrio molitor* larvae meal); 2: 2 % defatted *Tenebrio molitor* larvae meal; 3: 4 % defatted *Tenebrio molitor* larvae meal; and 4: 6 % defatted *Tenebrio molitor* larvae meal. The experimental period lasted for 17 weeks. No significant differences were found among treatment groups in terms of body weight, egg weight, feed consumption and egg quality characteristics. The addition of 2% and 4% of the mealworm increased the egg production significantly compared to the control group. The addition of 4% of the mealworm increased egg mass and the addition of 2% of the mealworm improved feed conversion ratio. Histopathologically, any cell infiltration was not observed indicating with tumoral properties in proventriculus, liver, lung, kidney and heart muscle tissues.

Key words: Mealworm (*Tenebrio molitor*), laying hen, performance, histopathological characteristics

Comparison the Effects of Dietary Safflower Oil and Some Vegetable Oils on Blood Parameters and Egg Quality Characteristics in Laying Hens

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Abstract

This research was conducted to determine the effects of safflower oil and some different vegetable oils in laying hens diets on some blood parameters and egg quality characteristics. A total of 216 ATABEY white hybrid laying hens at 24-week-old were used in Poultry Research Institute. Laying hens were randomly distributed to 6 replicates in each group and 9 hens in each replicate. The experimental was lasted between 24-56 weeks of age. Diets of four experimental groups were formed that include different oil supplements (safflower oil, soybean oil, canola oil and palm oil) at 2% concentration. At the end of the study, no significant differences among the treatments were determined for egg quality characteristics (eggshell thickness, eggshell breaking strength, albumen height, haugh unit, egg yolk colour, egg yolk cholesterol) and blood parameters (serum Alanin aminotransferaz, Aspartat Transaminaz ve Gama-glutamil transpeptidaz values). Safflower and canola oil decreased serum triglycerides and canola oil decreased serum total cholesterol level compared to palm oil ($P<0.05$). Safflower oil increased egg yellow weight compared to other oils ($P<0.05$). With the addition of safflower oil, egg yolk α -linolenic and omega 3 fatty acids increased with respect to canola and palm oil, and by adding canola oil, the level of linoleic and omega-6 fatty acids increased compared to palm oil ($P<0.05$). As a result, safflower oil can be used as a source of vegetable oil in laying hen diets without any negative effects and has positive effects on egg quality.

Key words: Safflower oil, laying hen, egg yolk cholesterol, egg yolk fatty acid profile, blood parameters

Effect of Feed Form and Herbage İntake on Performance of Broilers Reared in Free Range System

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Abstract

The aim of this study was to identify a feeding regimen that encourages good pasture use in slow growing broiler genotypes (Hubbard Red-JA 87) under free-range management. Birds fed either on mash or pelleted feed were given free outdoor access with or without fresh alfalfa from day 24 to 72. Eight hundred birds were included in a 2x2 factorial design using groups of 40 birds replicated 5 times.

Fresh alfalfa consumption did not improve growth performance between days 24 to 48, whereas the feed form had significant implications. When compared to their mash-fed counterparts, pellet-fed birds showed a significantly higher body weight gain (BWG) at a considerably lower feed consumption rate ($P < 0.01$), leading to a more favourable ($P < 0.01$) feed conversion ratio (FCR). The interactions of the feed form and alfalfa consumption were significant ($P < 0.05$) for BWG and FCR from days 49 and 72 and 24 to 72 without no significant change in feed consumption. Fresh alfalfa consumption increased BWG and decreased FCR in birds fed on mash feed, whereas these performance features were not affected by alfalfa consumption when chickens were on pellet regimen. Mortality was low and not related to dietary treatments ($P > 0.05$). Pelleting the feed and fresh alfalfa consumption promoted ($P < 0.05$) the frequency of outdoor access of birds compared to regimens of mash feed and unavailability of vegetation, respectively.

There was no treatment-related effect on carcass yield and carcass cut-up parts after 48 days feeding period. The only exception is the percentage neck weight which was heavier ($P < 0.01$) in pellet and alfalfa treatment groups. Small intestine length ($P < 0.05$) and spleen weight of pellet-fed birds ($P < 0.01$) were lower than those mash-fed counterparts. However, marked increase ($P > 0.01$) in abdominal fat weight as a response to pellet feeding is noticeable. Results from the experiment indicated that pellet feeding, irrespective of fresh alfalfa consumption, may provide a viable method to improve BWG and FCR in slow growing chickens under free-range conditions. However; the beneficial effect of fresh alfalfa consumption on performance is only evident in case of feeding birds on mash feed.

Key Words: Broiler, feed form, fresh alfalfa, free range system, performance, slaughtering characteristics.

Contribution Of Increased Reproduction Of Central Anatolian Merino Sheep Of Family Type Farms in Konya Province To Sheep Husbandry Of Turkey

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Abstract

This study evaluated the contribution of the Project entitled as the breeding improvement of central Anatolia merino sheep in family type farms of Karapınar town of Konya to livestock sector through determination of reproductive performans comprising of rate of parturition, rate of twin birth, survival and live weight gain at the 90. day of life between 2012 and 2018.

The rates of parturition, twin birth and viability between year 2012 and 2018 were 84-90%, 16.4-29.2% and 90.2-95.65, respectively Live weight gain on day 90 of life was 34 kg/bw for male and 30.3 kg/bw for female in 2018 and 28.9 kg/bw for male and 26.7 kg/bw for female sheep in 2012 Birth rate increased by 12% by 2018 compared to 2012 toatling up 702.5 per head of lamb and icresed twin rate totalled number of lambs as 749.3 per head. Increased viability by 5.4% lead to increase of 316.1 per head lambs. These rises lead to 6000 central Anatolia merino ram and 1767.9 lambs per head

A total amount of 1 111 508 TL worth production was attained from the strat of the first birth in 2012 to 2018 Corrected live weight gain at 90.day in male and female lambs was 5.1kg and 3.6 kg respectively. The increas in weight gain in 2018 compared to that of 2012 was 13 775.1 kg in male and 9 381.6 kg in female lambs and totalled up to 23 157.7kg of live weight gain. This summed up to 463 134 TL by the price of 2018.

Reproductive performans, viability and live weight gain resulted in 1 574 642 TL of financial gain. All parameters of concerns were significantly differed between the years studied ($p < 0.05$)

In conclusion, the subproject of main Project of National Sheep Breeding in Family Type Farms contributed to improvement in sheep production and sector locally in Karapınar and generally in Turkey when year 2018 and 2012 were compared.

Keywords: birth rate, twin birth, survival, live weight gain, central Anatolia merino

Ankara İli Nallıhan ve Beypazarı İlçelerinde Üretilen İpekböceği Kozalarında Kalite Özelliklerinin Belirlenmesi*

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Özet:

Araştırma materyalini, Bursa Koza Tarım Satış Kooperatifleri Birliğine (Kozabirlik) bağlı kayıtlı yetiştiricilerden Ankara ili Nallıhan ilçesi Ozan Köyünde bulunan 16 işletme ve Beypazarı ilçesi Sekli köyünde bulunan 3 işletme olmak üzere toplam 19 işletmeden alınan örnekler oluşturmaktadır. Araştırmada örnek toplama işlemi koza örümünün 10. günü gerçekleşmiştir. Her bir yetiştiricinin ipekhanesinden tesadüfi seçime göre seçimi yapılan 100'er adet hibrit koza örnekleri alınmış ve Ankara ilinde yetiştirilen kozalara ait; litrede koza adeti, ipek zenginliği(yaş koza kabuk oranı) ,filament uzunluğu ve denyesi saptanmıştır.

Araştırma sonucunda elde edilen veriler incelendiğinde litrede koza adedinin Nallıhan ilçesinde $58,3 \pm 2,600$; Beypazarı ilçesinde ise $66,6 \pm 3,040$, adet olduğu tespit edilmiş litrede koza adedi bakımından ilçeler arasındaki fark istatistik olarak önemsiz($P > 0.05$) bulunmuştur. Beypazarı ilçesinde $118,7 \pm 2,100$ g/adet Nallıhan ilçesinde ise $111,6 \pm 5,190$ g/adet olarak litrede koza ağırlığı değeri bulunmuş ,ilçeler arasında fark önemsiz olarak tespit edilmiştir($P > 0.05$). Yaş koza kabuk ağırlığı(ipek zenginliği) Beypazarı ilçesinde $23,9 \pm 0,661$ g, Nallıhan ilçesindeki işletmelerde ise ortalama $23,7 \pm 0,667$ g olarak bulunmuş olup ilçeler arası fark önemsiz bulunmuştur($P > 0.05$). Filament uzunluğu Beypazarısında ortalama $1228,9 \pm 31,800$ m, Nallıhan ilçesindeki işletmelerde ise ortalama $1167,7 \pm 83,300$ m olarak tespit edilmiş; denyesi ise Beypazarısındaki işletmelerde ortalama $2,9 \pm 0,080$, Nallıhan ilçesindeki işletmelerde ortalama $3,2 \pm 0,117$ olarak bulunmuştur. Filament uzunluğu ve denyesi özelliklerinin ilçeler arasındaki değerlerinde fark önemsiz bulunmuştur($P > 0.05$). Bu proje yerli bir değer olan ipekböceğinin; Ankara ilindeki koza kalite değerlerinden filament uzunluğu, litrede koza adeti, filament denyesi ve ipek zenginliği değerleri ortaya koymuş farklar istatistik olarak önemsiz bulunmuştur.

Anahtar Kelimeler: İpek zenginliği, ipekböceği, koza, yaş koza, kuru koza ağırlığı, kuru koza gömlek ağırlığı, denye, filament uzunluğu, litrede koza adedi.

Determination of Quality Properties of Silkworm Cocoons Produced in Nallıhan and Beypazarı Districts of Ankara

ABSTRACT:

The research materials are gathered from 19 affiliated businesses to the Ankara Koza Agricultural Sales Cooperatives Union (Kozabirlik). 16 of them are located in Ozan village of Nallıhan/ANKARA and 3 of them are located in Sekli village of Beypazarı/ANKARA.. The sample collection process took place on the 10th day of the cocoon. 100 hybrid cocoon samples grown in Ankara were selected from each grower's silk house according to the random selection and the number of cocoons, silk richness (wet cocoon shell ratio), filament length and denier were determined.

When the data obtained from the research were examined, the difference between the number of cocoons per liter was $66,6 \pm 3,040$ in Beypazarı and $58,3 \pm 2,600$ in Nallıhan. The difference between districts was statistically insignificant in terms of the number of cocoons per liter ($P > 0.05$). The value of cocoon weight per liter was found to be $118.7 \pm 2,100$ g / pc in Beypazarı, $111.6 \pm 5,190$ g / pc in Nallıhan and the difference between the districts was not significant ($P > 0.05$). Wet cocoon shell weight (silk richness) was found to be $23.9 \pm 0,661$ g in Beypazarı and $23.7 \pm 0,667$ g in Nallıhan businesses and the difference between districts was insignificant ($P > 0.05$). The average length of filament was $1228,9 \pm 31,800$ m in Beypazarı and $1167,7 \pm 83,300$ m in Nallıhan district; denier was found to be 2.9 ± 0.080 in the businesses in Beypazarı and 3.2 ± 0.117 in the businesses in Nallıhan district. The difference for filament length and denier properties between districts was insignificant ($P > 0.05$). In this project the cocoon –produced in Ankara- quality values: filament length, cocoon quantity per liter, denier filament and silk richness has been measured and differences were statistically insignificant.

Keywords: Silk richness, cocoon, silk worm, fresh cocoon, dry cocoon weight, the shell weight of dry cocoon, denier, length of filament, the number of cocoon per liter

1. GİRİŞ

Batı dünyası için Uzak Doğu'dan gelen ipek ülkeler arası ilişkilerde önemli bir yol oynamış ve İpek endüstrisi, eski çağlardan beri Mısırlılar, Romalılar gibi birçok milletin hayatında çok önemli bir yer tutmuştur. Çin'den başlayarak Avrupa'ya kadar uzanan dünyaca ünlü ticaret yoluna ipek yolu adı verilir. Bu yol; ipek ve ürünlerinin taşınması ile Doğu kültürünün Batı tarafından tanınmasında aracı olmuştur. Kervanlarla Doğudan gelen ipek batıya taşınarak Çin-Avrupa arasında ticaret yollarını oluşturmuştur. Ulaşım ise kervanlar aracılığı ile yapılmıştır. İpek yolu geçmişte Türk milleti için büyük bir öneme sahiptir.

Bombyx morinin “Dut ipek böceği” ismini alması bu canlıların tek besin kaynağının dut yaprağı olduğundan dolayıdır. İpek böceği gelişim evrelerini tamamlayarak ergin hale geldikten sonra, yemeği bırakarak kozasını örmeye başlamaktadır. Koza, ipek böceğinin başkalaşım sürecini geçirebileceği bir barınak tasarımıdır(Braun, A.L., 1999). İpekböceği (Bombyx Mori), bir çeşit kelebeğin ipek üreten tırtılına verilen genel isimdir. Bu ipekböceği dut yapra tüketerek kozasını örür ve bu kozanın içine kendini hapseder.Kozayı oluşturan ipliklerin çeşitli yöntemlerle çekilmesi ile pürüzsüz görünümlü, yumuşak, dayanıklı ve parlak bir yapıya sahip olup kolaylıkla boyanabilen, emici, hayvansal kaynaklı bir lif olan ‘ipek’ elde edilmektedir. İpek liflerin kraliçesi olarak da bilinmektedir.(Anonim 1).

İnsanların ekonomik hayatında önemli bir rol oynayan bu böceklerin salgı bezlerinden salınan serisin ve fibroinin birleşmesi ile oluşan ipek, ilk olarak Çinliler tarafından 4000 yıl önce keşfedilmiş olup, ardından Çinli prenseslerin eşlerine düğün hediyesi olarak saçlarının içlerinde saklayarak getirmesi ile Anadolu’da daha sonra da Çin, Hindistan, Taşkent, Bağdat, Şam ve İstanbul’dan geçen ipek yolunu takiben Avrupa’da yayılmaya başlamıştır. 1500 yıldan beri Anadolu’da ipekböceği yetiştiriciliği yapılmaktadır. İklimi ve coğrafi konumu bakımından dut ağacı yetişmesine uygun ortama sahip olan Anadolu’da geleneksel olarak yapılan ve tarım sektörüne katkıda bulunan bir ek gelir kaynağıdır. Ancak suni elyafın bulunması, arz-talep arasındaki dengesizlikler ve sosyo ekonomik krizler ipekböcekçiliğinin önemli ölçüde değerini gün be gün kaybetmesine sebep olmuştur. Fakat dünya nüfusundaki artış ve insanların doğal liflerden yapılan tekstil maddelerine doğru yönelmesi ile de tüketim artarak, ipek ve ipek ürünlerine olan talep de doğru oranlı olarak artmıştır. Bu nedenle yüksek koza kalitesi ve yüksek koza veriminin tespiti önemlidir.

Türkiye’de yaş koza üretimi yıllık 130-140 ton civarında olup, bundan da yaklaşık 60 ton kuru koza elde edilmektedir. Elde edilen kuru kozadan da 20-30 ton civarında ham ipek ipliği üretilmektedir. Oysa Türkiye ipek tüketim miktarı 200 ton civarında olup ihtiyacı olan 180 tonu ithalat yoluyla karşılamaktadır(Anonim2). 2015 verilerine göre Dünyada 30 ülkede toplamda 202.072,83 ton ipek üretilmekte ve ISC (International Sericultural Commission) verilerine göre 170 bin ton ile Çin birinci sırada yer alırken 30 ton ile Türkiye ise 11. Sırada yer almaktadır(Kozabirlik İpekböcekçiliği Raporu,2013).

Bu bakımdan projemizin; Ankara ilindeki mevcut koza kalite durumunu ortaya koyarak, yapılabilecek çalışmalar için bir alt yapı oluşturacağı düşünülmüş bunun yanısıra önem arz eden yüksek koza kalitesi ve mevcut durumun da Ankara ili için ortaya konması amaçlanmıştır.

Tablo 1: Dünyada ipek üretimi (International Sericultural Commission (ISC), Kozabirlik),2013

ÜLKE	Yıllara Göre Üretim (ton)					
	2010	2011	2012	2013	2014	2015
Çin	115000	104000	126000	13000	146000	170000
Hindistan	21005	23060	23679	26480	28708	28523
Özbekistan	940	940	940	980	1100	1200
Tayland	655	655	655	680	692	698
Brezilya	770	558	614	550	560	600
Vietnam	550	500	450	475	420	450
Kuzey Kore	-	300	300	300	320	350
İran	75	120	123	123	110	120
Bangladeş	40	39	42.50	43	44.5	44
Japonya	54	42	30	30	30	30
Türkiye	18	22	22	25	32	30
Endonezya	20	20	20	16	10	8
Bulgaristan	9.4	6	8.5	8.5	8	8
Madagaskar	16	16	18	18	15	5
Tunus	0.12	3	3.95	4	4	3
Filipin	1	1	0.89	1	1.1	1.2
Güney Kore	3	3	1.5	1.6	1.2	1
Kolombiya	0.6	0.6	0.6	0.6	0.5	0.5
Mısır	0.6	0.7	0.7	0.7	0.82	0.83
Suriye	0.6	0.5	0.5	0.7	0.5	0.3
TOPLAM	139100.02	129661.80	152845.64	159737.10	178057.62	202072.83

2. LİTERATÜR ÖZETİ

İpek dediğimiz ürün bilim dilinde Bombyx mori olarak bilinen ve dut yaprağı ile beslenen tırtıl böceğinin yaşamının krizalit evresini geçirmek üzere örmüş olduğu kozadan, bazı işlemler sonunda uygun şartlarda çekilerek elde edilen bir tekstil lif ürünüdür. İpek lifi, çok eski zamanlardan bu yana sağlamlığı, parlaklığı, yumuşaklığı ve güzelliği ile bilinmesi nedeniyle tekstil maddeleri arasındaki güncelliğini ve değerini her zaman korumuştur(Gülümser, G.,1983).

Dünyada yaklaşık 30 ülkede İpekböcekçiliği faaliyeti yürütülmektedir. Dünya yaş koza üretiminde Çin yıllık ortalama 600-700 bin ton arasında değişen bir üretim miktarıyla ilk sırayı almakta, Hindistan ise 130 bin ton civarında bir üretimle ikinci sırada yer almaktadır. Bu üretim miktarlarıyla Çin ve Hindistan, dünya yaş koza üretiminin büyük bir kısmını karşılamaktadırlar. En büyük üçüncü üretici ülke ise 2008 ve 2009 yılları arasında 25 bin ton üretimle Özbekistan olmuştur. Ülkemizde ise yaş koza üretimi 130-140 ton arasındadır(Kozabirlik İpekböcekçiliği Raporu,2013).



Şekil1. Türkiye'de İpekböcekçiliği (Yaş Koza Üretimi) – 2016 (Anonim 3).

Atav, 2011 yılında yaptıkları İpek Liflerinin dünü ve bugünü isimli çalışmada, ipek liflerinin tarihçesinin yanısıra Dünya’da ve Türkiye’de ipek üretimi durumu hakkında bilgiler verilmiş ve İpek liflerinin dünyadaki lif üretimi içerisinde küçük bir paya sahip olduğu ancak önem arz ettiği vurgulanmış, katma değer olarak da önemli bir lif kaynağı olduğuna değinmiştir.

Bombyx Mandarina, ‘Yabani İpek Böceği’ nin Japon hattına ‘Japanese Bombyx Mandarina’ denilmekte, Çin hattına ise ‘Chinese Bombyx Mandarina’ olarak isimlendirilmektedir. Evcil ipek böceği ise Bombyx Mori(dut ipekböceği) olarak isimlendirilmekte ve bu hattın Lie., 2010 da yaptığı çalışma sonucunda Japon hattından köken aldığı bildirilmiştir. Birçok ülke zaman içinde kendi Ülkesine uygun hibrit hatlar şekillendirmişlerdir. Bunlardan Japon hibriti Shunrei x Shogetsu, Bulgaristan hibriti Vratza 35 x Merefı 2, Ukrayna hibriti Ukr. 27 x Ukr. 15 olarak bilinmekte, yerli hibritimiz ise NxM ve MxN olarak adlandırılmaktadır(Tsenov,P. ve ark.,2008). Kullandığımız bu hibrit; hastalıklara karşı dayanıklılığı yüksek olan "Japon ırkı(N)" ile ipek verimi fazla olan "Çin ırkı(M)" ipek böceğinin çiftleştirilmesiyle oluşturulmuştur. Bu hat Kozabirlik tarafından Türkiye'nin hibrit yumurta ihtiyacının tamamını karşılamak için üretilerek yetiştiricilere ücretsiz olarak dağıtılmakta, bunun yanısıra az miktarda da olsa Yunanistan ve İtalya'daki üreticilerden de talep görmektedir(Anonim 2).

Koza kabuk oranı ile ilgili yapılan bir çalışmada; çekilebilme kabiliyetinin ve larva kalış süresinin ırk etkisi ile ilgili oluşunun kalıtsal değer bakımında düşük olduğu bildirilmiştir(Bağcı Y. ve ark.,1994). Yapılan bir başka çalışmada ise ipek kozasının yapısal özellikleri üzerindeki etkisi incelenmiş olup ipekböceği çeşidine göre; renk, elyaf çapı gibi kozanın yapısal özelliklerinin farklılaştığı ortaya konmuştur(Chung D.A. ve ark.,2015).

Bir başka çalışmada Madagaskar'da ipek üretimi için kullanılan endemik bir tür olan ‘Antherina suraka (Saturniidae, Lepidoptera)’ kozası ile ‘Bombyx mori L.’ (Bombycidae, Lepidoptera) kozası

yapısal ve mekanik özellikleri bakımında karşılaştırılmış, çevresel tarama elektron mikroskopisi ve mekanik testlerin sonuçlarına göre, Madagaskar kozasının ipek tabakasının daha az kalınlık ve daha düşük gerilme mukavemeti ve sertliğe sahip olduğu, B. morininde daha az elastikiyete sahip olduğu sonucuna varılmıştır. Bu sonuçlar doğrultusunda; sertlik ve iplik yoğunluğunun kalınlık ile negatif korelasyon gösterdiği, hücre ve iplik hacimlerinin kalınlık ile pozitif korelasyon gösterdiği saptanmıştır(Randrianandrasana, M. ve ark.,2017). 2009 yılında Akalın tarafından yapılan bir çalışmada da koza örmenin larva büyüklüğü ile doğru orantılı olduğu görülmüş ve larva gelişimi sırasında, kritik ağırlık denilen ağırlığı ulaşıncaya başkalaşım geçirerek koza örmeye başladıkları sonucuna varılmıştır. Bu bağlamda koza boyutundaki farklılıkların ipek miktarında etkili olduğu açıklanmıştır. Chen ve ark., 2013 yılında yaptığı bir çalışma sonunda, farklı ipekböceği kozaları farklı çevre şartlarına uyum sağlamak için farklı yapısal, fiziksel ve kimyasal özelliklere sahip olduğunu bildirmişlerdir. Yine buna benzer Akbay 1986 yılında yapılan çalışmada da ipekböcekçiliğinde ticari anlamda dikkate alınacak birçok özelliğin, genotipin yanı sıra çevre şartlarına göre de değiştiği vurgulanarak, bu çevre faktörlerinin başında sıcaklık, nem, dut yaprağı kalitesi ve miktarının geldiği bildirilmiştir(Akbay, R.,1986).

Bölgeye göre yılda bir ya da iki sezon yapılabilen ipekböcekçiliğinde, ipek böceklerinin tek besin kaynağı dut yapraklarıdır. Koza örümünden sonra böcek kozaiçersinde krizalit hal alır ve kozanın bazı işlemlerden geçirilerek ipeğin çekilmesi ile üretim işlemi son bulur. Koza kalitesinde böcek besleme yataklarının temiz oluşu ve besleme sayısı önem teşkil eder. Ticari koza üretiminde iyi kalitede koza elde edebilmenin yanısıra buna bağlı olarak iyi kalitede ipek çekebilmek için uygun genotip ve optimum çevre koşulları önemlidir. Besleme şekli, nem ve sıcaklık en önemli çevre faktörlerinin başında gelmektedir(Akbay, R.,1986).

1989 yılında Bursa İpekböceği Araştırma Enstitüsü'nde beslemede kullanılan yaprak kalitesinin koza veriminin ve koza kalitesinin üzerine etkisinin araştırıldığı bir çalışmada yaş koza kabuk oranının(ipek zenginliği) en yüksek elde edildiği çeşit yerli çeşit olan Ereke me dutundan beslenen böcek kozalarında olduğu sonucuna varılmıştır. Yine aynı Enstitüde yapılan bir başka çalışmada da dut yaprağı ile beslenen ipekböceklerinin kalıtsal kantitatif özelliklere ait kalıtım dereceleri yüksek ve orta seviyelerde bulunurken, ekonomik değer için öneme sahip kalıtsal özelliklerden denye, filament uzunluğu ve ham ipek ağırlığının genotipe bağlı olarak değişen yüksek kalıtım derecesine sahip olduğu vurgulanmıştır. Ayrıca bu özelliklerden düzgünlük ve koza kabuk oranının kalıtım derecesinin ise çok düşük seviyelerde olduğu sonucuna da varılmıştır(Beşkaya, S.,1995).

Beşkaya'nın Çin ve Japon saf hatları ile bunların melezi ipekböceklerinin koza özellikleri araştırılması üzerine yaptığı bir çalışmada; Ichinose ve Ereke me dut yaprakları ile beslenen ipekböceklerinin analiz sonuçlarında dut çeşidinin koza ağırlığını etkilediği ve farklı dut yaprakları ile beslenen ipek böceklerinin; kuru koza gömlek ağırlığı, ham lif ağırlığı, kuru koza ağırlığı, pişmiş lif ağırlığı, pişmiş

lif denyesi ve serisin oranında da istatistiki farkların önemli olduğunu bildirmiştir(Beşkaya, S.,1995). Bu durum genotipe göre koza ve ipeğin ticari özelliklerinin farklılaştığını doğrulamaktadır.

2014 yılında yapılan başka bir çalışmada Afrika yabani ipekböceği olan 'Gonometa postica Walker (Lepidoptera: Lasiocampidae)' ipekböceğinde koza kabuk oranı ve ipek liflerin yapısal özelliklerini incelemek amacıyla, iç ve dış alanda yetiştirilmiştir. Sonuç olarak iç alanda yetiştirilen böcek kozaları, dış alanlarda yetiştirilen kozalarla karşılaştırıldığında filament uzunluğu, ipek kalınlığı, koza ağırlığı ve koza kabuk oranında düşük kaliteyi gösterirken, koza kabuğunda ve lif yüzeyleri ile kesitsel yapılar arasında herhangi bir farkın olmadığı tespit edilmiştir(Teshome, A. ve ark.,2014).

İpek lifleri, memeli liflerinin aksine bir salgı lifidir. Bu salgı lifi Bombycidae familyasına giren İpekböceği (*Bombyx mori*) tarafından üretilmektedir. İpeğin çapı yaklaşık 10–13 μ 'dur(Anonim4). İpekböceği, salgı bezinden gelen serisin ve fibroin yapılı 2 farklı salgıyı, alt dudağının uç kısmında bulunan delikte tek tel haline getirip birleştirerek ipek lifini oluşturmaktadır(Duran, K., ve ark.,2007; Tarakçıoğlu,I.,1996).

İpekböceği tırtılı ipeği ağızlarından 2 filament halinde (fibroin proteini, serisin ise yapışmayı sağlayan madde) çıkarır. 4. uykusunu tamamlayan ipekböceği tırtılı koza örmeye başladığı sırada kafasını 8 şeklinde hareket ettirerek bu ipliği salgılamaya başlar ve pupa haline döner. Pupa halindeyken tırtılın boğma işlemi için sıcak hava veya buhar uygulaması yapılmaktadır. Sarılan iplik 1200 metre uzunluğa kadar ulaşabilir. Yapılan bir çalışma sonucuna göre; krizalitli koza (yaş koza) ağırlığının 1.5-2.5 g arasında olduğu, krizalitsiz koza (kuru koza) ağırlığının ise 350-550 mg arasında olduğu tespit edilmiştir(Mikhailov, E. N.,1950). İpek lifi keşfinin çok eski yıllara dayandığı bilinmektedir. Yıllarca seleksiyon yapılarak ipek uzunluğu arttırılmıştır. Günümüzde bir kozadan elde edilen ipek lifi uzunluğu 1600 metreye kadar ulaşmaktadır(Süpüren Mengüç G.ve ark.,2014).

3 MATERYAL VE METOT

3.1 MATERYAL

3.1.1 Hayvan Materyali

Çalışma materyalini, Kozabirlik' e kayıtlı Ankara ili Nallıhan ilçesi Ozan Köyünde 16 işletme ve Beypazarı ilçesi Sekli köyünde bulunan 3 işletme olmak üzere toplam 19 işletmeden alınan koza örnekleri oluşturmuştur. Kozabirlik'e kayıtlı yetiştiricilerden temin edilen her işletmeye ait 100 er adet koza örnekleri, farklı tablalardan tesadüfi seçime göre seçilmiş ve ayrı ayrı olacak şekilde %100 pamuklu bez torbalarda paketlenerek muhafaza edilmiştir.

3.1.2 Bez Torbalar

Araştırmada muhafaza için kullanılan bez torbaların boyutları 30x30cm olup, %100 pamuk kumaştan yapılmıştır. (Ankom R510).

3.1.3 Mezur

Araştırmada litrede koza adetinin bulunması için kullanılan mezurlar cam form olup, 1000=10ml lik olanı kullanılmıştır.

3.1.4. Bistru

Çalışmada her yetiştiriciden toplanan kozalardan 40'ar adetinin baş kısmından 5 cm olacak şekilde kesilmesi işleminde kullanılmıştır.

3.2 METOT

3.2.1 Kozaların Toplanması

Kozalar, Ankara ili Nallıhan ilçesi Ozan Köyünde 16 işletmeden ve Beypazarı ilçesi Sekli köyünde bulunan 3 işletmeden olmak üzere toplam 19 işletmeden temin edilmiştir. Bu işletmeler Kozabirlik' e kayıtlı ipekböcekçiliği yapan işletmelerden seçilmiş ve işletme sahipleri ile iletişime geçilerek numune alımı için, koza örümünün 10. günü olarak planlanmıştır. Planlanan alım tarihi geldiğinde işletmelere gidilerek koza örnekleri tesadüfi seçime göre farklı tablalardan örnekleme yolu ile 100 er adet yaş koza olacak şekilde alınıp, ayrı ayrı pamuklu torbalarda muhafaza edilmiştir.

3.2.2 Litrede Koza Adeti

Farklı tablalardan örnekleme yolu ile alınan yaş kozalar, her bir yetiştiriciden alınan kozalar için ayrı ayrı olmak şartıyla 1 litrelik mezür kaba doldurularak içerisindeki koza adeti sayılarak litrede koza adetleri belirlenmiştir. Ayrıca gram bazında da tartımları yapılmıştır.

Çizelge 1. Litrede Koza Adeti

Örnek	Litrede Koza Adeti	Örnek	Litrede Koza Adeti
1	114,8 gr(59 adet)	11	116,9 gr(62 adet)
2	121,2 gr (65 adet)	12	120,7 gr(62 adet)
3	105,7 gr(58 adet)	13	111,8 gr(90 adet)
4	118,2 gr(78 adet)	14	101,2 gr(58 adet)
5	117 gr(54 adet)	15	123,1 gr(72 adet)
6	121,8 gr(90 adet)	16	106,6 gr(45 adet)
7	116,7 gr(74 adet)	17	132,6 gr(67 adet)
8	120,6 gr(69 adet)	18	125,7 gr(55 adet)
9	135,2 gr(64 adet)	19	108 gr(56 adet)
10	116,5 gr(63 adet)		

3.2.3 Koza Kabuk Oranı (İpek Zenginliği)

İpek zenginliğini belirlemek için ilk önce yaş koza ağırlıkları ve yaş koza gömlek ağırlıklarını belirlemek gerekmektedir. Bu bağlamda her bir işletmeden alınan 100'er adet koza örneklerinden 40'ar adedi ayrılarak önce krizalitli olarak tartımı yapılmış, daha sonra da krizalit bistrü yardımı ile kozanın baş kısmından 5 cm olacak şekilde kesilerek çıkarılmış ve krizalitsiz olarak tartım yapılmıştır. Bu iki değer bulunduktan sonra oranlanarak koza kabuğu oranı % de ifade ile ipek zenginliği bulunmuştur. Tartımlar için Enstitümüzde mevcut olan hassas terazi kullanılmıştır.

Çizelge 2. Koza Kabuk Oranı (İpek Zenginliği)

Örnek	İpek Zenginliği (Yaş Koza Kabuk Oranı)(%)	Örnek	İpek Zenginliği (Yaş Koza Kabuk Oranı)(%)
1	25	11	24
2	23	12	23
3	26	13	22
4	23	14	25
5	23	15	22
6	18	16	28
7	26	17	22
8	22	18	27
9	24	19	28
10	23		

3.2.4 Koza Boğma İşlemi

Her bir işletmeden alınan 100'er adet kozanın 40'ar adeti ipek zenginliğini bulmak için kullanılmış ve kalan 60'ar kozaya etüvde 85°C de 15 dakika boğma işlemi uygulanmıştır. Delinen kozadan iplik çekilememektedir. İpekböceğinin kozayı delerek çıkmaması için etüvde boğma işlemi uygulanmıştır. Çünkü delinen kozadan ipek çekimi kopma gerçekleştiği için mümkün değildir. Bu işlem için de kullanılan etüv Enstitümüzden temin edilmiştir. Daha sonra 3 ay boyunca belirlenen parametreleri bulabilmek için kozalar oda sıcaklığında (18-24 °C), %100 pamuklu bez torbalarda içerisine bir parça naftalin konularak kurumaya bırakılmıştır.

3.2.5. Hatalı Koza ve Koza Pamuğu Ayıklama

3 aylık süre sonunda kuruyan kozalardan ipek çekimine elverişli olmayan hatalı kozalar (ezik, lekeli, şekilsiz, çifte) elle seçim yapılarak ayıklanmış ve her gruptan şansa bağlı olarak seçilen 20'şer kozanın filament uzunluğu ve filament denyesi için analiz yapılmak üzere Bursa Kozabirlik laboratuvarına götürülmüştür. Burada koza pamukları elle alınarak, kozaların filament uzunluğunun bulunması aşamasına geçme hazırlığı tamamlanmıştır.

3.2.6. Filament uzunluđu

Filament uzunluđunu bulmak için Bursa Kozabirlik Laboratuvarında bulunan tek ipek çekim makinesi kullanılmıştır. Bu makine; basit bir çekim aleti olup 3 kısımdan oluşmaktadır. Birincisi kozaların kaynatılıp yumuşamasının sağlandığı kaynama haznesi(yumuşatma kazanı), ikincisi ipeğin sarıldığı ayak pedalı ile çevrilen çıkırık sistemi ve üçüncüsü ise tur sayısını gösteren göstergedir. Yumuşatma kazanı (tava) elektrikli olup rezistans sistemi bulunmaktadır. Kazanda kaynamakta olan suyun içerisine ilk başta zeytinyađlı sabun rendelenip kozanın daha çabuk yumuşaması sağlanarak ipeğin çekimi kolaylaştırılmıştır. Daha sonra koza pamuđu alınan her gruptan şansa bađlı olarak seçilen 20 şer kozanın, filament uzunluđunu belirlemek için kazana kozalar tek tek atılarak, her bir koza tek tek olmak şartıyla bu suda 10 dakika bekletilmiş ve çalı çubuk ile karıştırmıştır. Koza ucu (kamçıbaşı) çubuğun üstüne tutunduğunda tek ipek çekim makinası kenarındaki bir çengelden geçirilip, pedalın üzerine basarak çıkırık döndürülmüş ve çıkırığa ipek sarılmıştır. Bu makinede ki çıkırığın çevresi 112,5cm dir. Çıkırığa sarılan ipek miktarının metre cinsinden bulunabilmesi; tur sayısı ile çıkırık çevresi (112,5cm) çarpılarak hesaplanmıştır. Çıkan her bir deđer her bir koza ipliğinin metre cinsinden filament uzunluđunu vermektedir.

Çizelge 3. Filament Uzunluđu

Örnek	Filament Uzunluđu(Metre)	Örnek	Filament Uzunluđu(Metre)
1	1292	11	1321
2	1287	12	1327
3	1175	13	1107
4	1117	14	1092
5	1334	15	1170
6	1076	16	1486
7	1017	17	1247
8	1227	18	1439
9	1160	19	1214
10	1077		

3.2.7. Filament denyesi

Filament uzunluđu bulunan kozaların denyesinin saptanabilmesi için 1 gün boyunca kuruması beklenmiştir. Ardından her çiftçiye ait koza örneklerinden ayrı ayrı filament uzunlukları bulunan her bir koza için filament denyesini saptayabilmek adına 0,01 lik hassas terazide tartım işlemi yapılarak koza ipliklerinin gram bazında sonuçları elde edilmiştir. Gram bazında elde edilen sonuçlar;

Denye= $\frac{\text{Ağırlık(gr)} \times 9000}{\text{sabit kat sayısı}}$

Uzunluk(metre)

formülü ile hesaplanarak *filamet denyesi* belirlenmiştir.

Çizelge 4. Filament Denyesi

Örnek	Filament Denyesi	Örnek	Filament Denyesi
1	3,37	11	3,2
2	2,63	12	2,9
3	3,15	13	2,53
4	2,5	14	3,32
5	2,95	15	3,07
6	2,21	16	3,14
7	2,7	17	3
8	2,85	18	3,04
9	3,22	19	3,14
10	3,28		

4 İSTATİSTİKİ ANALİZLER

Çalışma kapsamında işletmelerden elde edilen veriler, toplanan koza örneklerinde yapılan analizler neticesinde elde edilen verilerde tanımlayıcı istatistikler (normalite testi, ortalama, standart hata, standart sapma, minimum ve maksimum değerleri) hesaplanmıştır. İşletmeler arasında koza analizleri arasında ortalamalar arasında fark olup olmadığı varyans analizi ile belirlenmiş, ortalamalar arasındaki farkın önem derecesi t testi ile analiz edilmiştir. İstatistik hesaplamalar Minitab 16 paket programı yardımı ile yapılmıştır.

5 BULGULAR

İşletmelerden elde edilen kozalarda yapılan analiz sonuçları ve ilçeler arası t testi analiz sonuçları çizelge 5 de verilmiştir.

Çizelge 5. İlçelere göre koza analizi sonuçları

Analiz	İlçe	n (Adet)	Ort±Shat a	Std Sapma	Minim um	Maxim um
LİTREDE KOZA ADETİ	Beypazarı	16	66,6±3,0 40	12,14	45,0	90,0
	Nallıhan	3	58,3±2,6 00	4,51	54,0	63,0
P değeri			0,072			
Litrede Koza Ağırlığı (g)	Beypazarı	16	118,7±2, 100	8,40	105,7	135,2
	Nallıhan	3	111,6±5, 00	8,98	101,2	117,0

	n		190			
P değeri			0,329			
Koza Ağırlığı (g/Adet)	Beypazarı	16	1,8±0,076	0,31	1,2	2,4
	Nallıhan	3	1,9±0,127	0,22	1,7	2,2
P değeri			0,586			
İPEK ZENGİNLİĞİ(YAŞ KOZA KABUK ORANI)(%)	Beypazarı	16	23,9±0,661	2,65	18,0	28,0
	Nallıhan	3	23,7±0,667	1,16	23,0	25,0
P değeri			0,783			
FİLAMENT UZUNLUĞU(metre)	Beypazarı	16	1229±32	127,30	1017,0	1486,0
	Nallıhan	3	1168±83	144,20	1077,0	1334,0
P değeri			0,563			
FİLAMENT DENYESİ	Beypazarı	16	2,92±0,080	0,32	2,2	3,4
	Nallıhan	3	3,18±0,120	0,20	3,0	3,3
P değeri			0,132			

6 TARTIŞMA VE SONUÇ

Araştırma sonucunda elde edilen veriler (çizelge 5) incelendiğinde litrede koza adedinin Beypazarı ilçesinde 66,6±3,040, Nallıhan ilçesinde ise 58,3±2,600 adet olduğu bulunmuştur. Ancak iki ilçe arasında litrede koza adedi arasında fark istatistiki olarak önemsiz bulunmuştur(P>0.05). Litrede koza ağırlığı değerinin Beypazarı ilçesinde 118,7±2,100 g/adet Nallıhan ilçesinde ise 111,6±5,190 g/adet olarak bulunmuş olup ilçeler arasında fark önemsiz bulunmuştur(P>0.05). Yaş koza kabuk ağırlığı(ipek zenginliği) Beypazarı ilçesinde 23,9±0,661 g, Nallıhan ilçesindeki işletmelerde ise ortalama 23,7±0,667 g olarak bulunmuş olup ilçeler arası fark önemsizdir(P>0.05). Filament uzunluğu Beypazarında ortalama 1228,9±31,800 m, Nallıhan ilçesindeki işletmelerde ise ortalama 1167,7±83,300 m olarak bulunmuştur. Filament denyesi Beypazarındaki işletmelerde ortalama 2,9±0,080, Nallıhan ilçesindeki işletmelerde ortalama 3,2±0,117 olarak bulunmuştur. Filament uzunluğu ve denyesi özelliklerinin ilçeler arasındaki değerleri istatistiki olarak önemsizdir(P>0.05).

Genel anlamda literatür verileri ile karşılaştırıldığında filament uzunluğu, denye, ipek zenginliği ve litre başına koza adedi bakımında sonuçlar uyumlu bulunmuştur.

* **Teşekkür:** Bu çalışmada, Tarımsal Araştırmalar ve Politikalar Genel Müdürlüğü' nün, TAGEM/HAYDÜD/B/18/H/01/001 numaralı projesinden elde edilmiş veriler sunulmuştur.

KAYNAKÇA

- AKALIN, M., ÖBER, A., İZZETOĞLU G.T. (2009) *Bombyx mori* (Lepidoptera; Bombycidae)'de Besin Stresine Bağlı Gelişim. *Biyoloji Bilimleri Araştırma Dergisi* 2 ,p: 1-5.
- AKBAŞ, E., ÇELİK, P.,(2016). İpek/Pamuk Karışımının Open-End Rotor İplik Eğirme Sisteminde Eğrilmesi Üzerine Bir Araştırma, *Tekstil ve Konfeksiyon Dergisi* Apr-Jun2016, Cilt. 26 Sayı 2, p: 221-229.
- AKBAY, R. (1986). Arı ve İpekböceği Yetiştirme. A.Ü.Ziraat Fakültesi Yayınları. Ders Kitabı Yay. No:956. p:276-308.
- ANONİM 1: <https://tekstilsayfasi.blogspot.com.tr/2012/11/ipek-ve-ipekbocekligi.html>, Erişim tarihi: 24.11.2015
- ANONİM 2: <http://www.radikal.com.tr/bursa-haber/turkiye-ipek-bocegi-yumurtasi-uretiminde-iddiali-1390243/>, Türkiye İpek Böceği Yumurtası Üretiminde İddialı. Erişim tarihi: 14.10.2018
- ANONİM 3: <https://www.cografyaci.gen.tr/turkiyede-ipek-bocekligi/>, Erişim tarihi: 16.10.2018
- ANONİM4: https://acikders.ankara.edu.tr/pluginfile.php/33852/mod_resource/content/0/1_Hafta.pdf. Erişim tarihi:28.12.2018
- ANONİM 5: <http://www.mipackofarrela.com/aboutmicrofiber.htm>, Erişim Tarihi:15.06.2018
- ATAV, R. ve NAMIRTI, O. (2011). İpek Liflerinin Dünü ve Bugünü, *Mühendislik Bilimleri ve Tasarım Dergisi* Cilt:1 Sayı:3 s.112-119.
- BAĞCI Y., ÖZELER A.H., GÜLSEREN C., AKSOY.V.(1994). Saf hatların verimliliğinin yükseltilmesi ve gayeye uygun hibritlerin elde edilmesi İpekböceği Araştırma Enstitü Dergisi, Bursa.
- BEŞKAYA, S. (1995). Ichinose ve Erekele Dut Yaprakları ile Beslenen İpekböceklerinin Koza Özellikleri. Yüksek lisans tezi.
- BRAUN, A.L., (1999). Cashmere and Mohair Quality and Value Adding Potential by SMME's, Workshop, Commercialization of South African Goats, Witwatersrand Agriculture Show, p:4
- CHEN, F., PORTER, D., VOLLRATH, F. (2012), *Kraliyet Topluluğu Arabirimi Dergisi*, Volume 9 Issue 74, Structure And Physical Properties Of Silkworm Cocoons.
- CHUNG D.A., E. , KİM, H.H. , KİM, M.K. , LEE, K.H. , PARK, Y.H., UM, I.C.(2015). Effects of different *Bombyx mori* silkworm varieties on the structural characteristics and properties of silk. *Int J Biol Macromol*. Aug;79:943-51. doi: 10.1016/j.ijbiomac.2015.06.012. Epub Jun 11
- DURAN, K., ÖZDEMİR, D. ve NAMLIGÖZ, E.S., (2007). İpek Liflerindeki Serisinin Enzimatik Olarak Uzaklaştırılması, *Tekstil ve Konfeksiyon*, p:182-186.
- GÜLÜMSER, G., (1983). Türkiye'de İlkbahar ve Güz Üretimi Yapılan Bölgelerde Elde Edilen İpek Koza ve Liflerinin Bazı Önemli Teknolojik Özellikleri Üzerinde Bir Araştırma, Doktora Tezi, Ege Üniversitesi Fen Bilimleri Enstitüsü, Tekstil Mühendisliği Anabilim Dalı, İzmir.
- İPEK MAKARASI VE TEST KILAVUZU, 1999, Birleşmiş Milletler Roma Gıda ve Tarım Örgütü 1999, Kozanın Fiziksel Özellikleri.
- KOOPERATİFÇİLİK GENEL MÜDÜRLÜĞÜ İPEKBÖCEKCİLİĞİ RAPORU, (2013). p:3-4.
- LİE, Y., SONG, W., SHİ, S., LİU, Y., PAN, M., DAİ, F., LU, C., XIANG, Z. (2010). Mitochondrial Genome Nucleotide Substitution Pattern Between Domesticated Silkworm, *Bombyx mori*, and Its Wild Ancestors, Chinese *Bombyx mandarina* And Japanese *Bombyx mandarina*. *Genetics and Molecular Biology*, 33, 1, p:186-189 Brazil.
- MİKHAİLOV, E. N. *Shelkovodstvo*. Moscow, 1950. Silkworm Cocoon, Büyük Sovyet Ansiklopedisi (1979).
- MUKHOPADHYAY, S. and RAMAKRISHNAN, G., (2008), *Microfibres*, *Textile Progress*, p:1-86.
- MUKHOPADHYAY, S., (2002), *Indian Journal of Fibres & Textile Research*, 27, p:307-314.
- RANDRIANANDRASANA, M., WU, W.Y., CARNEY, D.A., WAGONER JOHNSON, A.J., BERENBAUM, M.R., (2017). Structural and Mechanical Properties of Cocoons of *Antherina suraka* (Saturniidae, Lepidoptera), an Endemic Species Used for Silk Production in Madagascar. *J Insect Sci*. 2017 Jan 27;17(1). p: 17. doi: 10.1093/jisesa/iew112. Print 2017 Jan.
- SÜPÜREN MENGÜÇ G., ÖZDİL, N.(2014). Özel Hayvansal Lifler, *Tekstil Teknolojileri Elektronik Dergisi* Cilt: 8, No: 2, p:30-47
- TARAKÇIOĞLU, I. (1996). *Tekstil Terbiyesi ve Makineleri*, Bornova-İzmir, Cilt: 2, p:102.
- TEKSTİL TEKNOLOJİ İPLİK NUMARALANDIRMA KİTABI, MEB, Ankara 2014, p:23.
- TESHOME, A., RAİNA, S.K., VOLLRATH, F.(2014). Structure and properties of silk from the African wild silkworm *Gonometa postica* reared indoors. *J Insect Sci*. Mar 7; . doi: 10.1093/jis/14.1.36,p:14-36
- TSENOV, P., VASİLEVA, J., ARKOVA- PANTALEEVA, D. (2008). International Testing Of Different Silkworm Hybrids In Bulgaria. II. Technological characteristics

Enriched With Different Materials Rooster Poultry Breeding Houses Effects On Of Performance and Welfare Parameters On Cocks

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Abstract:

In last years, it has been documented scientifically that the hens housed convantional cages could not meet their social and behavioural needs. Ensuring welfare of hens is under responsibility of farmer and it is included consideration for all aspects of animal well-being, including proper housing, management, nutrition and disease prevention and care. Alternative housing systems for laying hens are designed to provide needs and well being of the hens, with the demands like as economic efficiency of producers. Hens are able to perform of several type of their natural behaviours and sufficient excersices in alternative systems but the mainly complicatons are foot problems, feather pecking, social stres and dirty ant cruiked eggs in this environmentsThis experiment investigated the effects of perch structures and sharp sand on leg score, physiology,sperm quality and production performance of layer breeder cockerels. Housing systems significantly influenced BW and H/L but not mortality,sperm quality, leg score ,plumage score or beak, comb length.While it was found that body live weight is the higgest at thegroup with dust bath as 2664,7±21,4, H/L was the higgest as % 0.58±0.07 at the control group

Key Words: Welfare, Perch, Performance, Cocker

Germination Green Feed Total Mixture Ration (TMR) Dry Matter Consumption, Serum Biochemical Parameters, Serum Mineral Substances, Effect of Milk Components in Dairy Cows

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Abstract

The aim of this study was to determine the effect of total mixture ration (TMR) germinated with hydroponics technique on dry matter consumption, serum biochemical parameters, mineral substances, milk yield and components in dairy cows. The study was planned as 2 groups of 6 animals, the first group was the control group and the second group was fed with 40% Wheat, 20% Barley, 25% Pea, 13% Linen, 2% Safflower Mixed Green Feed Group. The feeds constituting the green feed mixture were analyzed separately and as mixtures. In the study, raw nutrient analysis, *in situ* rumen degradability and blood samples were taken from the animal material at the beginning and end of the experiment and serum biochemical analyzes were performed. At the beginning and at the end of the study, milk samples were taken and milk lactose, protein and fat contents were analyzed.

Based on the results of the study, it was determined that the green feed mixture had a high percentage of crude protein (25.89%). In the same study, the amount of NDF (42.74%) was found to be sufficient but below the recommended minimum rate of ADF (17%). The mixture was calculated as 2.69 Mcal / kg KM ME. KM and HP *in situ* rumen degradability of the green feed mixture for the measurements of 24th and 72nd hours were found to be 67.42% and 86.86% for dry matter, while 81.94% and 94.64% for protein degradability, respectively. When the blood analysis results were examined, it was found that the NEFA value was different between the control and green feed groups at the beginning of the experiment. At the end of the experiment, NEFA and blood urea nitrogen were found different. According to the results of the analysis of serum mineral matter, calcium phosphorus balance was found to be better in green feed group. According to the results of milk analysis, 0.98% decrease in milk protein ratio and 1.12% increase in fat level were observed at the end of the experiment. It was determined that the dry matter content also contained significantly more dry matter than the green feed group.

In general, it is seen that the use of Green Feed mixture ration instead of TMR in dairy cattle can be recommended in dairy cattle farms because of its more balanced and homogeneous mixture. The increase in the milk fat and dry matter of the normal table in the blood parameter values increases the positive effect.

Keywords: green feed, *in situ*, hydroponics, milk component, serum mineral, serum blood

Effects of Free Capric and Lauric Acid Supplementation on Performance Parameters of Broiler Chicks

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Abstract

In this study, it was aimed to investigate the effects of the addition of capric (C10:0) and lauric (C12:0) acids (as a free fatty acid forms) on the broiler performance parameters. A total of 96 daily-old male broiler chicks (Ross 308) were used in the study, and three main groups were formed with four subgroups containing equal number of chicks. The control (K) group was fed with basal diet without any supplementation, the experimental groups were created with 0.4% free capric (C) and lauric (L) acid supplementation into basal diets and feeding was continued for 42 days. At the end of the process, the total average live weights (LW) of K, C and L groups reached 3048.63, 3009.88 and 3052.13 g, respectively. Also, average live weight gains (LWG) of groups were 3004.34, 2965.53 and 3007.84 g; average feed consumptions (FC) were 4427.34, 4405.15 and 4353.89 g and feed conversion rates (FCR) were 1.47, 1.48 and 1.45. According to the total results obtained, it was determined that there was no statistical difference between the groups for these parameters ($P>0.05$). However, when examined within the framework of weekly periods, it was found out that there were significant differences between the groups in terms of LWG at the 6th week and in terms of FCR at the 1st and 6th weeks ($p<0.05$). In the 6th week, L group LWG data were found to be high (K, C and L were found 510.63, 477.63 and 566.81 g, respectively). At the end of the first week, K group FCR data were found to be good (K, C and L were found 0.96, 1.01 and 1.05, respectively) and in the last week, it has been determined that there was an improvement in L group, but C group performance decreased considerably (2.22, 2.37 and 1.99, respectively). As a result, it can be stated that the use of free lauric acid at the rate of 0.4% may have improved the LWG and FCR values of broilers especially in the last weeks of breeding, while the use of free capric acid at the same rate did not cause noticeable changes in the first weeks of breeding in general, but especially decreased the feed conversions towards the end of the growing period.

Keywords: Broiler, Free fatty acids, Capric acid, Lauric acid, Performance

Determining the Silage Quality of Sorghum Sudan Grass Containing Grape Pomace at Varying Levels

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Abstract

The aim of this study was to determine the silage quality and digestibilities of silages prepared with addition of grape pomace into Sorghum-sudan grass as rapid fermentable carbohydrate source. Grape pomace obtained at the region was ensiled with Sorghum-sudan grass grown at Keskin Yem Bitkileri Üretim ve İşleme Tesisi at same period at the levels of 0, 10, 20 and 40%. Glass jars (1L) were used for ensiling of silages. Four silage samples were prepared for each treatment groups. After 45 days of ensiling, silage samples were opened and physical evaluation based on color, appearance and odor, fleig score, pH, organic acid, nutrient contents, and in situ degradation levels were determined.

Among silage fermentation parameters, pH and volatile fatty acid concentrations did not differ among silage prepared from different Sorghum-sudan grass varieties ($P>0.05$), grape pomace significantly increased the pH of Sorghum-sudan grass silages and decreased lactic acid concentrations of Sorghum-sudan grass silages ($P<0.05$). Nutrient contents, except CP content, significantly differed between Sorghum-sudan grass varieties, addition of grape pomace into Sorghum-sudan grass significantly alter the nutrient contents of silages ($P<0.05$). While in situ OM, NDF and ADF degradabilities were similar between Sorghum-sudan grass varieties, addition of grape pomace significantly decreased OM degradability in both Sorghum-sudan grass varieties ($P<0.05$).

In conclusion, addition of grape pomace into Sorghum-sudan grass up to 40% had some negative effects on silage quality, but it was taught that grape pomace can be utilized as alternative feedstuffs for ruminants by adding Sorghum-sudan grass up to 20%.

Keyword: Silage, Sorghum-sudan grass, Alfalfa, Grape pomace, In situ degradation.

Genetic Evaluation of *Pre-* and *Post-*Weaning Growth of Zom Sheep Raised in Farmer Conditions

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Abstract

This study was conducted to evaluate growth performances of Zom sheep under smallholder production systems in Diyarbakir, Turkey. Data were collected and analysed on the growth of 51628 lambs owned by 132 households (86 and 46 flocks from Project 1 and 2, respectively) from 2012 to 2016. The projects have been supported by the General Directorate of Agricultural Researches and Politics (TAGEM).

Weights (kg) of Zom lambs at birth (BW0), 1 (BW30), 2 (BW60), 3 (BW90), 4 (BW120) and 5 (BW150) months of age were 2.82 ± 0.004 , 9.49 ± 0.017 , 14.40 ± 0.020 , 20.11 ± 0.026 , 24.98 ± 0.033 and 30.28 ± 0.065 kg, respectively. Weights in all ages were significantly ($P < 0.05$) affected by project, flock, year and season of birth, birth type and sex of lamb. Direct heritability estimates were ranged from 0.01 to 0.02, 0.09 to 0.27, 0.10 to 0.10, 0.05 to 0.09, 0.07 to 0.22 and 0.16 to 0.24 for BW0-BW150, respectively, based on the other trait in bivariate analysis. Corresponding estimates for the maternal heritability were ranged from 0.06 to 0.07, 0.05 to 0.17, 0.10 to 0.11, 0.11 to 0.17, 0.15 to 0.21 and 0.19 to 0.32, respectively. Estimates of the direct-maternal genetic correlation were ranged from -0.07 to 0.05, -0.30 to 0.18, -0.43 to -0.05, -0.57 to 0.18, -0.57 to -0.07 and -0.43 to 0.05 for BW0-BW150, respectively. Due to the large negative correlations between the direct and maternal additive genetic effect, the total heritability estimates were low for all growth traits. Analyses showed that there is a large genetic variance for all *pre-* and *post-*weaning growth traits in Zom sheep and the growth rate before and after weaning can be improved by continuous upward selection while applying a constrain to BW0 for keeping it to be unchanged.

Keywords: Zom sheep, Growth traits, Environment, Genetic parameters, Selection

Association of Toll-like Receptor 4 (*TLR4*) exon 3 variants with ovine Johne's disease (OJD) serostatus

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yalcin.yaman@tarimorman.gov.tr yalcinyaman@gmail.com**Abstract**

Ovine Johne's disease (OJD) is globally distributed in sheep flocks and causes significant production loss. Conventional eradication measures of the OJD has been reported to be ineffective or not-cost effective. Various candidate genes (*CD109*, *PCP4*, *SEMA3D*, *TLR1*, *TLR2*, *TLR4*, etc) have been proposed to be used for selective breeding for OJD as a complementary part of eradication strategies.

In this study, to test the possible effect of *TLR 4* exon variants on OJD serostatus, a retrospective cohort was conducted. OJD serostatus of sheep was determined using indirect ELISA. In order to control the breed effect, and exposure intensity and duration, 94 matched pairs (case/control) were constructed according to the breed type and age from 1750 comingled ewes under the same management. Three natives (Karacabey merino, Kivircik, and Imroz) and four composite breeds (Bandırma, Ramlic, Blackhead merino crosses, and Hampshire crosses) were involved the association study and ages of sheep were ranged from two to eight years. A part of exon 3 region of *TLR4* gene was amplified and sequenced in the matched pairs. Three synonymous (A291, N299, and L378) and twelve nonsynonymous single nucleotide polymorphisms (SNP) were detected. Amino acid positions of the detected non-synonymous SNPs were G230R, E286G, S294N, K295E, W298R, K344N, R351H, F356L, D363G, V364A, T366S, and D395Y. Minor allele frequencies (MAF) were ranged from 0.12 to 0.45. Three haplotype blocks consisting of non-synonymous SNPs were constructed.

McNemar's pairwise analysis was performed on the matched pairs for presumed risk alleles or haplotypes. Percentage of the discordant pairs was 34 to 38% for McNemar's test. Power analysis was carried out to evaluate the statistical limits of the study. As a result, within our detection limits (p-value < 0.05; CI, 95; Odds ratio > 3.3; statistical power, 0.95), there is no association between OJD serostatus and *TLR4* exon 3 variants.

Keywords: Ovine Johne's disease, *TLR4* gene, genetic resistance/susceptibility

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Case Study: Chimerism Observed In A Stud Bull

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Abstract

Chimerism is defined as the presence of two or more genetically different cell populations from more than one zygote in a single individual. In this case, the blood sample of the Holstein sire which is in Bull Test Center of Artificial Insemination Branch of ICLRT, is sent to Genetic Laboratory of ICLRT to get DNA profile which is one of the necessary information to get the permission for artificial insemination. The blood sample is subjected to fragment analysis by using 11 microsatellite markers (TGLA227, BM2113, TGLA53, ETH10, SPS115, TGLA126, TGLA122, INRA23, ETH3, ETH225 and BM1824). When the DNA profile obtained from the semen sample of the bull was compared with the DNA profile of the blood sample the profiles were different from each other. In order to eliminate all the doubts, blood, hair and semen samples from the same bull are taken at the same time. It was determined that the DNA profile of the hair and semen samples are the same however the DNA profile of blood sample is different. After the analysis, the presence of different alleles in 7 of 11 microsatellite markers confirmed the chimerism in the related bull. Since the use of the bull in artificial insemination may create some erroneous results, this bull is eliminated from stud. In some studies, it is indicated that use of microsatellites in PCR-based molecular analysis, which is rapid, sensitive, time efficient and cost efficient (mini and microsatellite DNA polymorphism), especially in parentage determination and/or confirmation analysis applied in a routine basis, is a powerful tool for determination of chimerism. In conclusion, in determination of a bull as stud, it is more appropriate to sample more than one tissue (hair, blood, semen, saliva, etc.) which will serve as a model for different cell lines and to conduct analysis with addition of microsatellite markers which provides information on sexual chromosomes. By this means, during breeding of stud cattle, the losses for time, workforce, and cost can be eliminated.

Key words: genotyping, chimerism, microsatellite, cattle.

Some Yield Features Of Anatolian Water Buffaloes Grown People's Hand in Diyarbakır Province

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Abstract

This research was conducted in Anatolian Water Buffalo herds grown in people's hand in Diyarbakır Province. Breeding of Anatolian Water Buffalo was started in 21 villages with 2000 Anatolian Water Buffalo in the end of 2011. Villages that had 80 Anatolian Water Buffaloes which are 2 years old and older were included in the Project. Milk yield, birth weight and live weight were recorded In Breeding Project of Anatolian Water Buffalo in 2018. The mean birth weights of calves of Anatolian Water Buffalo were 29,21±0,13 kg in female at 750 heads, 29,19±0,14 kg in male at 716 heads in 2018. Average of 6 th month weight calves were 91,51±0,62 kg in female at 629 heads, 93,40±0,72 kg in male at 629 heads. Average of 12 th month weight calves were 147,29±0,95 kg in female at 313 heads, 148,12±1,14 kg in male at 234 heads. The average lactation milk yield and lactation length of Anatolian Water Buffaloes was 951,88±12,66 kg, 227,89±1,57 days in 1257 heads.

Key words: Anatolian Water Buffalo, live weight, Diyarbakır, lactation milk yield

Investigation of Genetic Diversity of Kangal Shepherd Dogs by DNA Barcoding Method*

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Abstract

The most well-known Turkish shepherd dog in the world is the Sivas Kangal Dog. Kangal dogs, along with centuries, have protected the flocks of sheep from wild animal attacks in Anatolia for centuries. Turkey is a full member of the World Dog Federation (FCI, Federation Cynologique Internationale) since 2017. And Turkey, starting from Kangal dogs, has entered the process to register its unique breeds. However, since it can be misleading that these race determinations are based only on phenotypic evaluations, researching genotypes with developing genetic facilities will make more accurate decisions. DNA barcoding assays are reliable, cost-effective, easy-to-access methods that can be used to detect, protect, and improve important breeds, and perform rapid genome-wide scanning. In this study, DNA barcodes were obtained from the Cytochrome oxidase I (COI) gene region on mitochondrial DNA. Sequences in the size of 600 base pairs on the gene were compared by sequencing. Thirty Kangal dogs that show the characteristic morphological and behavioral characteristics of the Kangal dog breed were used in this study. All experimental studies were carried out in Sivas Cumhuriyet University laboratories. Spin column kits were used for total genomic DNA isolation and genetic diversity was analyzed by the Neighbour-Joining method based on Kimura-2 parameters in the MEGA 5 program. Mean genetic variations in COI gene sequences are expressed as%. The genetic distance was %1.8-2.1 in the individuals. The bootstap values of NJ trees were bigger than >%50. The sequence allignments were deposited on NCBI gene bank and were obtained Accession numbers. Haplotype and nucleotide diversities were Hd: 0.7968 (79.68%) and Pi: 0.00067 respectively. According to the results of our study, genetic diversities were very low in the population. Similarly, determination of DNA barcodes in the other Turkish dog breeds are will be useful in order to allow the discrimination of the indigenous breeds.

Keywords: DNA barcoding, Kangal shepherd dogs, Genetics diversity.

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Birth and 120-day weights of feral goats reared under the extensive breeder condition

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Abstract

A breeder who breeds feral goats was noticed in the highland border of Muğla and Denizli cities. According to personal communication, it was detected that the family is running the business under the extensive system with feral goats since 1985. Flock is fed traditionally in the mountainy area among the forest. Maquise, shrub, bush, kermes oak and branch of juniper and pine trees. They were only offered wheat and barley in very hard times of some years. Flock was studied in the last 4 years according to their birth and 120-day weights. Effects of year, sex, birth type and dam age on the studied traits were evaluated with 306 kids in the years of 2014-2018. Although influence of year has not significant on birth weight ($P > 0.05$), other factors produced significant effects ($P < 0.05$). Additionally, investigated factors were significant for 120-day weigh ($P < 0.05$). Mean values of males and females, single and tween born kids, and the mean values of kids born from the dams aged 2, 3, 4, 5, and 6 were 2.95 ± 0.08 and 2.70 ± 0.08 , 3.49 ± 0.03 and 2.90 ± 0.08 , 2.47 ± 0.10 , 2.76 ± 0.09 , 2.90 ± 0.10 , 2.98 ± 0.09 and 3.00 ± 0.09 respectively, for birth weight. Same sorting was lined up as 18.11 ± 0.60 and 14.99 ± 0.06 , 17.51 ± 0.22 and 15.79 ± 0.57 , 15.10 ± 0.74 , 15.20 ± 0.66 , 16.78 ± 0.72 , 18.33 ± 0.66 and 17.34 ± 0.61 respectively, for 120-day weight. It is the first time, this amount of data collected from feral goat kids and evaluated. Sex and birth type showed commonly known effects on the weights. Lasting effect of dam age up to 6 years especially on 120-day weight might be considered the characteristics of the studied flock. Data obtained from the flock can be used to make comparison with the domestic goat breeds of Anatolia. Further studies can be made on this flock to determine the morphologic, production, reproduction and health traits.

Keywords: Feral goat, Growth, Birth weight, 120-day weight

Introduction

Feral goats are found in various morphological and physiological types according to geography they live (1, 2). Some of them are the ancestors of domestic goats and they have transferred some characteristics to the domestic ones such as horn type and body colour (1, 2, 4)). Domestic goats also can be described according to their feral descent (1, 2). There is very limited literature on feral goats, especially those found in Anatolia (1, 2). Also, domestic or feral goats have an important role in Anatolian cultural and social life, the most of goat breeding takes place on a highland where has a natural physical connection with feral goats (3, 7, 9). In this study a feral goat flock reared in the highland border of Muğla and Denizli cities was evaluated according to birth and 120-day weights with the effecting factors on these traits.

Materials and Methods

A local breeder who rears a flock of feral goats was encountered in the mountainy border of Muğla and Denizli cities. According to personal communication with flock owner, it was spotted that the family of owner is doing the business under the hard-extensive system with feral goats since 1985. Flock is reared as natural as it can be. Feral goats are fed traditionally in the mountainy area among the forest. Maquise, shrub, bush, kermes oak and young branch of juniper and pine trees were the main foods of the goats. They were only offered wheat and barley in very hard times of winter in some years. The flock was studied in the last 4 years (2014-2018) according to their birth and 120-day weights. Total records of 306 animals were used in the study. Year, dam age, sex and birth type were used as fixed effects. A General Linear Model procedure was employed with all the fixed effects. Tukey analysis was used to control for significance of differences between subgroups. All statistical analyses were carried out by using the Minitab 16 statistical package (10).

Results

Results obtained from the General Linear Model analyses were illustrated in Table 1 for both weight traits and effecting factors on them. Effects of year, sex, birth type and dam age on the studied traits were listed with their mean values, standard errors and significance pointer letters. While effect of year has not significant on birth weight ($P > 0.05$), all the other factors formed significant effects ($P < 0.05$). Additionally, all examined fixed effects were significant for 120-day weigh ($P < 0.05$). Mean values of males and females, single and tween born kids, and the mean values of kids born from the dams aged 2, 3, 4, 5, and 6 were 2.95 ± 0.08 and 2.70 ± 0.08 , 3.49 ± 0.03 and 2.90 ± 0.08 , 2.47 ± 0.10 , 2.76 ± 0.09 , 2.90 ± 0.10 , 2.98 ± 0.09 and 3.00 ± 0.09 respectively, for birth weight. Same sorting was lined up as 18.11 ± 0.60 and 14.99 ± 0.06 , 17.51 ± 0.22 and 15.79 ± 0.57 , 15.10 ± 0.74 , 15.20 ± 0.66 , 16.78 ± 0.72 , 18.33 ± 0.66 and 17.34 ± 0.61 respectively, for 120-day weight.

Table 1. Least square means for the effects of year, sex, birth type and dam age on birth and 120th day live weights of feral goat (kg, \pm SEM)

Factors	n	Birth weight (kg)	Day 120 (kg)
		LSM \pm SEM	LSM \pm SEM
Year			
2015	87	3.18 \pm 0.06	14.69 \pm 0.43 ^b
2016	74	3.17 \pm 0.07	17.45 \pm 0.47 ^a
2017	78	3.05 \pm 0.06	18.61 \pm 0.46 ^a
2018	67	3.15 \pm 0.07	15.30 \pm 0.50 ^b
P		-	*
Sex			
Male	147	3.28 \pm 0.05	18.06 \pm 0.32
Female	159	2.99 \pm 0.05	14.96 \pm 0.35
P		*	*
Birth Type			
Single	261	3.48 \pm 0.03	17.56 \pm 0.22
Twin	45	2.80 \pm 0.08	15.46 \pm 0.55
P		*	*
Dam Age			
2	48	2.80 \pm 0.08 ^c	15.03 \pm 0.58 ^b
3	72	3.04 \pm 0.07 ^{bc}	15.08 \pm 0.51 ^d
4	51	3.23 \pm 0.06 ^{ab}	16.71 \pm 0.55 ^{ab}
5	68	3.32 \pm 0.07 ^a	18.33 \pm 0.46 ^a
6	67	3.31 \pm 0.07 ^a	17.39 \pm 0.45 ^a
P		*	*

a, b, c: Means for each factor in the same column with different superscripts differ significantly (P<0.05).
LSM: Least square means, SEM: standard error of mean. * P < 0.05, - : Non-significant (P>0.05).

Discussion and Conclusion

It is the first time, this amount of data collected from feral goat kids and evaluated. Sex and birth type showed commonly known effects on the weights as male and single born kids were heavier than female and twin ones. Lasting effect of dam age up to 6 years especially on 120-day weight might be considered the characteristics of the studied flock. To find any scientific literature about the studied material is very difficult and nearly impossible. Therefore, similar data from the Hair goats were used for comparison. According to this comparison weight traits of feral goats determined in this study were lower than those stated for Hair goats (6, 7, 8, 11,12). These lower weights of feral goats according to Hair goats for birth and weaning weight might be reflection of body characteristics of two different animal or feeding regime applied on the animals. Significant fixed effects on the weights of feral goat also existed on Hair goats (6, 7, 11, 12). Data obtained from the flock can be used to make

comparison with the domestic goat breeds of Anatolia. Further studies can be made on this flock to determine the morphologic, production, reproduction and health traits. As stated in the literature (5), this flock can also be favourable to fixed some lost adaptation and immunity traits of domestic goats.

References

- Acevedo P, Cassinello J (2009): Biology, ecology and status of Iberian ibex *Capra pyrenaica*: a critical review and research prospectus. *Mammal Review.*, 39, 17–32.
- Ahmed A, Vlasseva A, Kitanova S, Genov P (2016): Bezoar Wild Goat (*Capra Aegagrus Erxleben, 1777*) – History And Opportunities For Development Of The Species In Bulgaria. First National Conference of Reintroduction of Conservation-reliant Species, Sofia, p: 171-175.
- Akbaş Aa, Saatçı M (2016): Growth, slaughter, and carcass characteristics of Honamlı, Hair, and Honamlı × Hair (F1) male goat kids bred under extensive conditions. *Turkish Journal of Veterinary and Animal Sciences*, 40:459-467.
- Akçapınar H, Özbeyaz C (1999): *Hayvan Yetiştiriciliği Temel Prensipleri*, 1. Baskı, Kariyer Matbaacılık Limited Şirketi, Ankara, s: 12-14.
- Alasaad S, Fickel J, Rossi L, Sarasa M, Benítez-Camacho B, Granados JE, Soriguer RC (2012): Applicability of major histocompatibility complex DRB1 alleles as markers to detect vertebrate hybridization: a case study from Iberian ibex × domestic goat in southern Spain. *Acta Veterinaria Scandinavica.*, 54, 56.
- Atay O, Gökdal Ö, Eren V (2010): Some production traits of Hair goat in rural conditions. p.207-210. National Goat Congress, June, 24-26, Çanakkale.
- Cemal, I., Yılmaz, O., Karaca, O. (2013). Birth weights and growth performances of hair goat kids raised in Denizli province of Turkey. *D. Animal Science.*, Volume, LVI, 36-40.
- Elmaz Ö., Saatçı, M. (2017). Turkish Hair Goat, the Main Pillar of Goat Population in Turkey. In book: (Springers)Sustainable Goat Production in Adverse Environments: Volume II, pp.113-130.
- Koyuncu M (2005): Goat Breeding Strategy in the World and Turkey. p. 59-65. National Congress of Dairy Goat, May, 25-27, İzmir.
- Minitab (2011): *Minitab For Windows Version Release 16*, Minitab Inc.
- Şimşek ÜG, Bayraktar M, Gürses M (2006): Examination of Some Production Characteristics in Pure Hair Goat Under Farm Conditions. *Fırat Üniversitesi Sağlık Bilimleri Dergisi*, 20: 221-227.
- Tatar AM, Tekel N, Ozkan M, Barıtcı İ, Dellal G (2009): The determination of growth function young Hair goat. *Journal of Animal and Veterinary Advances*, 8(2): 213-216.

Comparison of Different Regression Tree Methods (CART and CHAID) for Determination of Some Environmental Effective Factors on Lactation Milk Yield in Anatolian Buffaloes

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ABSTRACT

Breeding studies have gained momentum in terms of yield in Anatolian buffaloes that are resistant to diseases. Therefore, it is important to determine the environmental factors affecting the yield. Since conventional methods for determining these factors are sensitive to assumptions, estimations can be made with regression tree methods that do not require assumptions with the development of data mining. The regression tree method has different methods according to the data structures and no studies have been found on which algorithm is better for the data of Anatolian buffaloes. This study was aimed to comparison of different regression tree methods (CART and CHAID) for determination of some environmental effective factors (calving year, calving season, calving month and calving age) on lactation milk yield in Anatolian buffaloes. For this aim, 1075 data of Anatolian Buffaloes reared in Amasya province of Turkey were used. The calculations were made considering the lactation milk yield. In the analysis of data, SPSS package program licensed by OMU was used. As a result, the influential predictors of the CHAID method were found as calving year, calving month and calving season. The results of the CART method showed that the calving year and calving month on milk yield were effective. The risk values of the methods (CHAID: 52005 ± 3866 and CART: 53560 ± 4068) were high and the explanatory power (R^2 : CHAID: 0.42 and CART: 0.40) was low due to the high variation in the population. As a result, it was determined that CHAID method gives more reliable predictions than CART method.

Keywords: Anatolian buffalo, Breeding, Lactation milk yield, Environmental factors

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Determination of the Lactation Curve parameters using different equations in Holstein Cattle raised in private farm condition of Kırşehir Province

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Abstract

In this investigation, different lactation curve equations were compared by using test day milk yield records of Holstein cattle reared at a private farm conditions in Kırşehir province. Data were collected in years 2014 and 2015. For this aim, Wood, Cobby and Le Du, Exponential, Parabolic exponential, Quadratic, Logarithmic Linear mathematical functions were used in all analyses. This study lactation curve parameters were determined by STATİSTİCA statistical program. The coefficient of determination (R^2) and residual standard deviation (RSD) statistics were used for detection of the best lactation curve model. Wood equation is the best model as having the highest R^2 and lowest RSD coefficients. The coefficient of determination (R^2), residual standard deviation a, b and c parameters for Wood model were determined as 91.87%, 0.123, 22.86, 0.188, 0.045 for first lactation; 93.31%, 0.166, 23.44, 0.219, 0.06 for second lactation; 91.42%, 0.099, 21.58, 0.172, 0.035 for third lactation; 95.31%, 0.065, 22.25, 0.195, 0.044 for fourth lactation; 89.66%, 0.167, 22.13, 0.202, 0.044 for fifth lactation and 99.0%, 0.468, 23.74, 0.067, 0.02 for all lactation, respectively. Consequently, the parameters are estimated by Wood model, for use in breeding programs in this herds will be made an important contribution to improve program in this area.

Key words: Lactation curves, Holstein cattle, adjusted multiple coefficient of determination and residual standard deviation

**This research was summarized from M.Sc Thesis of Mustafa SOYDANER

Effect of Inbreeding on Milk Traits, Lactation Length and First Calving Age in Dutch Holstein Dairy Cattle

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Abstract

Inbreeding is the phenomenon of offspring from the mating of parents related to each other. Genetically speaking, it is the probability of two alleles occur at a locus that are identical by descent. In the past couple of decades, the heavy use of artificial insemination and stringent genetic selection on economically important traits have increased overall inbreeding level in the dairy cattle populations. Inbreeding depression is defined as the decrease of offspring performance of traits such as milk production, weight gain, survival rate, which is caused by inbred mating. The objective of this study was to determine the effect of inbreeding on milk yield, milk fat, milk protein, lactation length and first calving age (FCA) in Dutch Holstein Cattle. The records of 2,658,936 cows on the traits were collected from 20,003 herds around the Netherlands by CRV Cattle Improvement Company. The data include adjusted 305 days milk yield, milk fat, milk protein, lactation length, inbreeding coefficients of each cow, the birth date of cows and calving date. All records gathered from the primiparous cows. The pedigree for the dataset includes 2,555,559 animals, 1,812,555 dams and 40,422 sires representing six generations. For the estimation of inbreeding effect on 305 days of milk yield, milk fat, milk protein, lactation length and FCA, an Animal Mixed Model was performed. R statistical environment was used for data cleaning step and ASReml 4.1 statistical software was used for uni-variate analyses. As a result of the analyses, inbreeding had a significant unfavorable effect (all P-values < 0.05) on the all examined traits. The effects of inbreeding were - 17.93 ±0.39 kg, -0.98 ±0.01 kg, -0.68 ±0.01 kg, and 0.41 ±0.02 day for milk, fat, protein yield and lactation length respectively. Age at calving was not changed significantly for the increase of inbreeding level.

Keywords: Dairy Cattle, Inbreeding Effect, Inbreeding Depression, Milk Traits, Lactation Length, First Calving Age

Evaluation Of Growth Traits Of Hair Goat Kids And Milk Yield Of Does Reared Under Breeder Condition In Burdur Province

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Abstract

Study was carried out in order to determine of some kids growth and milk yield of Hair goats reared in Burdur province within the scope of Nationwide small ruminant project under the breeder condition. In the study, the four flock were examined. Data for birth weights and live weights on average 90th day of totally 206 kids were investigated for the growth performance in the year of 2019. In addition to this, milk yield of the selected 116 Hair goats were detected on average 120th day of lactation period. In the study, average birth weights and live weights of male and female kids on 90th day of age were detected as 3.79 kg, 21.86 kg and 3.46 kg, 17.16 kg, respectively. Differences between male and female kids were statistically significant ($P<0.05$). While flocks had a statistically significant effect ($P<0.05$) in only the birth weights not the live weights of 90th day of age, the effect of dame age was not statistically significant ($P>0.05$) on all the examined growth periods. The milk yield of does for 120th day of lactation period were defined for four different dam ages (2, 3, 4 and ≥ 5) 0.47 l, 0.69 l, 0,78 l and 0,87 l, respectively. The differences of milk yields between dam ages were statistically significant ($P<0.05$). It was thought that the findings of this study were important in terms of exhibition of growth traits of kids and especially the milk yields of does under local breeder condition when it was considered the difficulties of obtaining actual data. In addition to this, it was thought that the animals having higher growth and milk production levels could be reared in the region with suitable management, breeding and also reliable record keeping.

Keywords: Breeding, Growth, Hair goat, Milk yield

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Introduction

Having an important place in Anatolian cultural and social life, goat breeding also takes place on land generally unsuitable for agriculture and livestock and in forestlands (10). Depending on the decreases in plant production made for food and feed purposes, it is suggested that the extensive breeding based on native breeds should not be completely abandoned. In this case, the insurance of animal breeding will be genetic resources of indigenous breeds. The Hair goat (Anatolian Black) is spreading in all the regions of Turkey (9). When considering its climate conditions, as well as abundance of natural pasture areas in high and mountainous lands, forest grasslands, and scrub-maquis shrubland, one of the most suitable regions for Hair goat breeding is the Mediterranean Region located in Turkey (7).

The efficiency of animal husbandry is related to rearing healthy offspring and their growth in a year. So, liveability and growth of kids are important determinants for productivity in goat breeding (11). Goat enterprises encounter maximum economic losses during the growth period of kids due to deaths of kids. Therefore, it is very important to determine the growth performance of kids adapted to the region (2).

Dairy and milk consumption are frequently included as important elements in a healthy and balanced diet (17). Goat milk is a valuable food product and an excellent raw material due to its high nutritive value and exquisite taste (5). In addition to this, lots of factors including dam age can be regarded as factors affecting milk production in goats (6). This study was conducted to determine the growth traits of kids and milk production of Hair goats under breeder conditions in Burdur province.

Material and Method

In the study, the data of the four flock were examined in the year 2019 of within the scope of the “Project of the improvement of Turkish Hair goat in Breeder Conditions in Burdur” within the scope of “National Sheep and Goat Breeding Project of Turkey”. Data for birth weights and live weights on average 90th day of totally 206 kids were investigated for the growth performance. In addition to this, milk yield of the selected 116 Hair goats were detected on average 120th day of lactation period.

All statistical analyses were carried out by using the Minitab 16 statistical package (12). The effects of sex, dam age and flock on growth performance were analyzed by using the analysis of variance (ANOVA) generalized linear model (GLM) procedure with birth weight as a linear covariate. Therefore, GLM was applied for milk production in order to determine the effect of dam age. Tukey analysis was used to control for significance of differences between subgroups.

Results

Table 1 shows the means of least squares according to dam age, sex and flock factors of the birth weight and weaning (90th day) weight, examined as the growth traits of Hair goat kids. In the study, average birth weights and live weights of male and female kids on 90th day of age were detected as 3.79 kg, 21.86 kg and 3.46 kg, 17.16 kg, respectively. Differences between male and female kids were

statistically significant ($P < 0.05$). While flocks had an statistically significant effect ($P < 0.05$) in only the birth weights not the live weights of 90th day of age, the effect of dam age was not statistically significant ($P > 0.05$) on all the examined growth periods.

Table 1. Least squares for the effects of dam age, sex and flock on birth and 90th day live weights

	n	Birth weight (kg)	Day 90 (kg)
		LSM ± SE	LSM ± SE
Dam age			
2	71	3.50±0.08	18.31±0.24
3	51	3.59±0.10	19.36±0.32
4	46	3.78±0.12	20.33±0.29
5+	38	3.63±0.09	19.55±0.26
P		0.248 ^{ns}	0.212 ^{ns}
Sex			
Female	45	3.46±0.01	17.16±0.23
Male	161	3.79±0.03	21.86±0.25
P		0.007**	0.000***
Flocks			
1	66	3.77 ^b ±0.07	19.21±0.30
2	32	3.41 ^d ±0.11	19.69±0.19
3	47	3.05 ^c ±0.06	18.92±0.22
4	61	4.28 ^a ±0.12	20.23±0.28
P		0.000***	0.189

a, b, c: Means for each factor in the same column with different superscripts differ significantly ($P < 0.05$).

LSM: Least square means, SE: standard error. ** $P < 0.01$, *** $P < 0.001$ ^{ns}: Non-significant ($P > 0.05$)

Table 2 shows milk yields of Hair goats for 120th day of lactation period. According to the table, the values for different dam ages (2, 3, 4 and ≥5) were 0.47 l, 0.69 l, 0.78 l and 0.87 l, respectively. The differences of milk yields between dam ages were statistically significant ($P < 0.05$).

Table 2. Least squares for the effects of dam age on milk yields of Hair goats (kg, $\bar{x} \pm s$)

Factors	n	Milk yield (l)
		LSM ± SE
Dam age		
2	39	0.47 ^c ±0.01
3	29	0.69 ^{dc} ±0.02
4	26	0.78 ^{ad} ±0.04
5+	22	0.87 ^a ±0.03
P		0.012*

a, b, c: Means for each factor in the same column with different superscripts differ significantly ($P < 0.05$).

LSM: Least square means, SE: standard error. * $P < 0.05$

Discussion and Conclusion

Various factors affect the growth performance of kids. Birth weight is one of these factors, especially in terms of increasing the survival rate of kids. However, the birth type is required to be taken into consideration when determining the birth weight (18). It was found in this study that the birth weight examined as a growth trait was 3.79 in male kids and 3.46 kg in female kids. These values were also higher than 2.58 kg reported by Oral and Altinel (14) for Hair goats, 2.63 kg reported by Şengonca et al. (19), 2.77 kg reported by Şimşek and Bayraktar (20), 2.46 kg for males reported by Oral Toplu and Altinel (15), averagely 3.17 kg reported by Tatar et al. (22), and 3.01 kg reported by Erten and Yılmaz (8).

In the study, the weaning (90th day) weight was found that this trait was higher in males (21.86 kg) than females (17.16 kg). Hence, sex had a significant effect in terms of growth ($P<0.01-0.001$), similar to some other studies (1, 4, 13, 15). In this study, dam age did not have significant effect on live weights of the kids ($P<0.05$). Similar to this study, numerous authors reported nonsignificant effects of dam age (4, 15-16).

Daily milk yield were between 0.47 and 0.87 on 120th lactation day. While there were statistically significant differences ($P<0.05$) between different dam ages, the highest milk yield was obtained from dams at more than 5 years of age. The milk yield values of this study were higher than milk yields reported in the study of Ata (3) for Hair goats. Compatible with the present study, Şengonca et al. (19) reported that the mean daily milk yield was 0.56 kg for Hair goats. Contrary to this study, Şimşek et al. (21) found the mean daily milk yield for Hair goats as 0.900 kg.

Based on the results of the study, it was thought that the findings were important in terms of exhibition of growth traits of kids and especially the milk yields of does under local breeder condition when it was considered the difficulties of obtaining actual data. In addition to this, it was thought that the animals having higher growth and milk production levels could be reared in the region with suitable management, breeding and also reliable record keeping.

References

- Akbaş AA, Çolak M, Elmaz Ö, Saatçı M (2013): Determination of growth performance of the Saanen kids reared in north-west Mediterranean condition. *Eurasian Journal of Veterinary Science*, 29: 70-75.
- Akbaş AA, Saatçı M (2016): Growth, slaughter, and carcass characteristics of Honamlı, Hair, and Honamlı × Hair (F1) male goat kids bred under extensive conditions. *Turkish Journal of Veterinary and Animal Sciences*, 40:459-467.
- Ata M (2007): Milk Yield of Hair Goats in Kahramanmaraş. MSc thesis, University of Kahramanmaraş Sütçü İmam, Institute of Natural and Applied Sciences, Kahramanmaraş.
- Atay O, Gökdal Ö, Eren V (2010): Some production traits of Hair goat in rural conditions. p.207-210. National Goat Congress, June, 24-26, Çanakkale.
- Bernecka H (2011): Health-promoting properties of goat milk. *Medycyna Weterynaryjna*, 67: 507-511.
- Bolacalı M, Küçük M (2012): Fertility and milk production characteristics of Saanen goats raised in Mus region. *Kafkas Üniversitesi Veteriner Fakültesi Dergisi*, 18: 351-358
- Dellal G, Ertuğrul M, Tekel N, Pehlivan E (2010): Goat Breeding in the Mountainous-Forestry Areas in Turkey: Current Situation and Future. p. 42. National Goat Congress, June, 24-26, Çanakkale.

- Erten Ö, Yılmaz O (2013): Investigation of survival rate and growth performances of Hair goat kids raised under extensive conditions. *Yüzüncü Yıl Üniversitesi Veteriner Fakültesi Dergisi*, 24(3): 109-112.
- General Directorate of Agricultural Research and Policies (GDARP) (2009): Domestic Animal Genetic Resources in Turkey. Ankara, Turkey.
- Koyuncu M (2005): Goat Breeding Strategy in the World and Turkey. p. 59-65. National Congress of Dairy Goat, May, 25-27, İzmir.
- Lanari MR, Taddeo H, Domingo E, Centeno MP, Gallo L (2003): Phenotypic differentiation of exterior traits in local Criollo goat population in Patagonia (Argentina). *Archiv Tierzucht*, 46: 347-356.
- Minitab (2011): Minitab For Windows Version Release 16, Minitab Inc.
- Ocak S, Güney O, Önder H, Darcan N (2006): Growth and development performances of Cukurova Saanen kids under tropical climate conditions. *Journal of Animal Veterinary Advances*, 5: 985-989.
- Oral HD, Altinel A (2006): The phenotypic correlations among some production traits of the Hair goats bred on the private farm conditions in Aydin province. *İstanbul Üniversitesi Veteriner Fakültesi Dergisi*, 32(3): 41-52.
- Oral Toplu HD, Altinel A (2008): Some production traits of indigenous Hair goats bred under extensive conditions in Turkey. 2nd communication: viability and growth performances of kids. *Archiv Tierzucht*, 51(5): 507-514.
- Özel D, Aygün T (2010): Determination of the most appropriate growth model and growth-development characteristics of Norduz kids. p.233-236. National Goat Congress, June, 24-26, Çanakkale.
- Pereira PC (2014): Milk nutritional composition and its role in human health. *Nutrition*, 30: 619-27.
- Savaş T (2007): Goat kids' growing: an evaluation of problematic points. *Hayvansal Üretim*, 48: 44-53.
- Şengonca M, Taşkın T, Koşum N (2003): Simultaneous comparison of various production traits of Saanen × Hair crossbred and pure Hair goats. *Turkish Journal Of Veterinary and Animal Sciences*, 27: 1319-1325.
- Şimşek ÜG, Bayraktar M (2006): Investigation of growth rate and survivability characteristics of pure Hair goats and Saanen × pure Hair goats crossbreeds (F₁). *Fırat Üniversitesi Sağlık Bilimleri Dergisi*, 20 (3): 229-238.
- Şimşek ÜG, Bayraktar M, Gürses M (2006): Examination of Some Production Characteristics in Pure Hair Goat Under Farm Conditions. *Fırat Üniversitesi Sağlık Bilimleri Dergisi*, 20: 221-227.
- Tatar AM, Tekel N, Ozkan M, Barıtcı İ, Dellal G (2009): The determination of growth function young Hair goat. *Journal of Animal and Veterinary Advances*, 8(2): 213-216.

Factors Affecting Birth, 6-Month and 12-Month Weight in Anatolian Buffalo Calves

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ABSTRACT

The aim of this study was to investigate factors affecting the birth, 6-month and 12-month weight. The research materials were constituted a total of 1040 head Anatolian buffalo calves born from 2016 to 2018 years raised at public hand supported by General Directorate of Agricultural Research and Policies in Amasya province of Turkey. Birth year, birth season, maternal age and sex of calf were assessed as affecting factors on these traits. The overall means of birth, 6-month and 12-month weight were 31.15 ± 0.21 , 102.11 ± 0.81 and 155.47 ± 0.85 , respectively. Effect of birth year on birth, 6-month and 12-month weight ($P < 0.05$) were statically important. The highest birth, 6-month and 12-month weight were found to be in calves born in 2016 year than in 2017 and 2018 years. Birth season was significantly affected on birth, 6-month weight and 12-month weight ($P < 0.05$). The highest birth weight was determined in calves born in winter compared to other seasons. The highest 6-month weigh in calf born winter, spring and summer was found, but the lowest in autumn. Also, calf born in summer had the highest 12-month weight. Birth weight and 12-month weight were not affected by maternal age, while effect of maternal age on 12-month weight was significant ($P < 0.05$). The calves of the younger buffaloes had the highest 6-month weight. The effect of sex of calf on birth, 6-month and 12-month weight were significant ($P < 0.05$). The highest birth, 6-month and 12-month weight were determined in male calves than female calves.

Key words: Anatolian buffalo, Birth weight, Non-genetic factors.

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Some Reproductive And Milk Yield Characteristics Of Awassi Sheep In Gaziantep Province Under Farm Conditions

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Abstract

In this study, some reproductive and milk yield characteristics of Awassi sheep were investigated in Gaziantep province under farm conditions. For this aim, 6000 heads of Awassi from 41 flocks and their lambs were investigated. As a result of the study, fertility rate, infertility rate and survival rate were calculated as 97.28 %, 2.72 % and 97.56, respectively. The average least-square means for birth weight were found as 4.2 ± 0.01 kg, weaning weight as 17.5 ± 0.03 kg. In the study, it was found that birth weight, weaning weight and marketable milk yield were affected by age in Awassi sheep.

Gaziantep ilinde halk elinde yetiştirilen İvesi koyunlarında bazı döl ve süt verim özellikleri Özet

Bu çalışmada, Gaziantep ilinde halk elinde yetiştiriciliği yapılan İvesi koyunlarının bazı döl ve süt verim özellikleri araştırılmıştır. Çalışma sonucunda, doğum oranı, kısırılık oranı ve yaşama gücü sırasıyla % 97.28, % 2.72 ve % 97.56 olarak hesaplanmıştır. En küçük kareler ortalamasına göre ortalama doğum ağırlıkları 4.2 ± 0.01 kg, süttten kesim ağırlıkları erkeklerde 17.5 ± 0.03 kg olarak tespit edilmiştir. Araştırmada, yaşın doğum ve süttten kesim ağırlığı ile süt verimi üzerine etkisi olduğu tespit edilmiştir.

Introduction

Turkey is a natural habitat for many different species of plants and animals. Agriculture is the one of the basis for economic development of Turkey. Because, the level of development of a society is evaluated by the level of protein produced and consumed. The great part of the rural population's livelihood is based on livestock production. Sheep is well adapted in the farming systems of the small farmers of Turkey due to its excellent adaptability to the hard conditions, extreme weather and low value feed acceptance and high production considering their size. The main purpose of sheep breeding is to produce milk, meat and wool for increasing population.

Sheep adapted to their breeding regions and have gained their own unique features in our country. Some of these breed have become prominent in terms of yield characteristics. The Awassi breed is one of them and came to the forefront with milk production considering the breeds raised in Turkey.

Awassi sheep is known it is high yield performance and predominant breed in southeast Anatolia and Syria. This breed has also been taken from its homeland to other cities and countries for the purpose of more milk production.

As in other provinces in Turkey, in order to improve some yield characteristics of sheep two project were carrying out supported by Republic of Turkey Ministry of Agriculture and Forestry, General Directorate of Agricultural Research and Policies in Gaziantep province too and continue successfully. In this study, the data of 2019 are evaluated within the scope of this project which is carried out in Gaziantep.

Material and Method

The study was carried out on 6000 heads of Awassi from 41 flocks and their lambs raised in Gaziantep province under farm conditions. The sheep grazed during daytime in the pasture all the year round and were fed with a mixture of wheat barley, straw, cottonseed per 500 g/head back to yards in the evenings. All lambs were weighted within 24 h to determine the birth weight, and on day 60 for weaning weight with 50 g sensitivity. The lambs were suckled their mothers twice a day until at 60 days of age. Also, these lambs received concentrate feed for 10-15 days and grazed with their mothers in the pasture after 1 month of age. The rams were kept freely in the flocks during the year and allowed to mate with the ewes showing heat. Reproductive characteristics was compared with Chi-Square test, birth weight and weaning weights of lambs were compared with one-way ANOVA. All data were evaluated with SPSS package program (SPSS, 2012).

Results and Discussion

Reproductive performance is important and one of the main factors for determine the efficiency of productivity in farms. The reproductive characteristics of Awassi sheep that obtained this study are presented in Tables 1.

Although some yield performance of Awassi sheep, especially milk yield, is sufficient, prolific characteristic is not enough. As shown in Table 2, it was observed that, fertility rate is lower at 2 and 7 aged sheep than the others.

Table 1. Reproductive performance according to age of dams

Characteristics	Ages						P	Overall
	2	3	4	5	6	7		
Number of ewes that exposed to ram	955	2031	1595	736	365	318	---	6000
Number of ewes that lambed	923	1989	1551	718	357	299	---	5837
Number of ewes that single lambed	881	1933	1487	648	291	263	---	5503
Ewes that twin lambed	42	56	64	70	66	36	---	334
Fertility rate (%)	96.65	97.93	97.24	97.55	97.81	94.03	0.124	97.28
Infertility rate (%)	3.35	2.07	2.76	2.45	2.19	5.97	0.579	2.72
Survival rate (%)	94.45	96.55	95.24	92.80	88.77	88.36	0.662	97.56

Similar situation can be seen in fertility and survival rate properties. The differences in all reproductive characteristics were found non-significant between ages ($P>0.05$).

Awassi sheep has low prolific animals and high milk yield (Abdullah et al., 2002), also Zerkawi and Al-Daker (2018) reported that, reproductive performance can be changed according to ages in Awassi sheep. Our results are within the ranges set by Üstüner and Oğan, (2013) and Keskin et al., (2005) for Awassi sheep.

The least-squares means overall birth and weaning weight of lambs are given according to ewe age in Table 2.

Table 2. Birth and weaning weights according to age groups

Age	Birth weight	Weaning weight
2	3.9±0.03 ^a (965)	17.4±0.03 ^{ab} (944)
3	4.3±0.01 ^d (2045)	17.7±0.01 ^b (2023)
4	4.2±0.02 ^{cd} (1615)	17.5±0.02 ^{ab} (1584)
5	4.2±0.02 ^c (788)	17.4±0.03 ^{ab} (766)
6	4.1±0.04 ^{bc} (423)	17.4±0.02 ^a (393)
7	4.1±0.04 ^b (335)	17.3±0.04 ^a (311)
P	0.000	0.001
Overall	4.2±0.01	17.5±0.03

As shown in Table 2, average birth weight of lambs was found as 4.2 ± 0.01 kg in the present study. When we check the birth weights according to the age, birth weights are affected by the ewe's age. Lambs of ewes at older ages were a little heavier than those of young ewes and the effect of age was significant on birth weight (P<0.01). The birth weight of lambs was higher in 3, 4 and 5 old ewes than in 2 and 6, 7 old ewes.

This situation might be arising the malnutrition of the ewes depending on age. This similar pattern observed in weaning weights. Average weaning weight was found as 17.5±0.03 kg, but influenced by age of ewes (P<0.01). The highest and lowest weaning weights were observed in 3, 4, 5, 6 age versus 2, 7 age respectively. It is seen, weaning weight decreases with age. It can be said that this is due to the decrease of milk yield depending on insufficient with age (Abdullah et al., 2002).

The least-square means of birth weight according to sex, birth type and age of the dam given in Table 3.

Table 3. Least square means for birth weight of lambs according to sex, birth type and the age of ewe

Age of ewe	Single		Twin	
	Male	Female	Male	Female
2	4.0±0.04 ^a (475)	3.9±0.03 ^a (406)	2.9±0.11 ^{ab} (38)	2.9±0.10 (46)
3	4.3±0.02 ^{cd} (903)	4.3±0.01 ^b (1030)	3.4±0.12 ^b (46)	3.0±0.12 (66)
4	4.3±0.02 ^{cd} (691)	4.3±0.02 ^b (796)	2.9±0.10 ^{ab} (62)	2.8±0.08 (66)
5	4.2±0.03 ^c (311)	4.3±0.03 ^b (337)	3.0±0.15 ^{ab} (74)	2.7±0.12 (66)
6	4.2±0.05 ^{bc} (151)	4.1±0.05 ^b (140)	2.9±0.12 ^{ab} (64)	2.9±0.12 (68)
7	4.0±0.07 ^{ab} (129)	4.2±0.04 ^b (134)	2.7±0.17 ^a (44)	2.6±0.07 (28)
P	0.000	0.000	0.015	0.649

When analysed the Table 3, weaning weight of single born male and female lambs was affected significantly by ewe's age ($P < 0.01$). However, it is observed that birth weight decreased with older maternal age. The birth weights of twin male lambs were also affected by the age of the mother ($P < 0.05$), whereas this was not observed in the twin female lambs ($P > 0.05$). As expected, male lambs were heavier than females and single born lambs were heavier than twin born. Young growing females produce lighter offspring, due to less development of reproductive organs and minor irrigation in the uterus, with possible competition between the dam and fetus for nutrients (Mohammadi et al., 2010; Din et. al., 2019; Karakuş and Atmaca, 2016).

As expectation and according to researchers, single birth lamb heavier than twin weights at birth because of an intra-uterine competition and birth weight was significantly affected by the type of birth (Synman, 2010; Karakuş and Atmaca, 2016). The significant influence of age of dam at birth weight in the present study agrees with results of previous researchers.

The least-square means of weaning weight according to sex, birth type and age of the ewe presented in Table 4.

Table 4. Least square means for weaning weight of lambs according to sex, birth type and the age of ewe

Age of ewe	Single		Twin	
	Male	Female	Male	Female
2	17.6±0.08 ^{ab} (468)	17.2±0.09 ^a (400)	15.4±0.51 (35)	15.2±0.40 (41)
3	17.9±0.07 ^d (894)	17.5±0.06 ^d (1024)	15.1±0.31 (43)	15.6±0.30 (62)
4	17.5±0.06 ^a (675)	17.6±0.05 ^b (792)	15.3±0.18 (57)	15.1±0.23 (60)
5	17.4±0.08 ^a (303)	17.6±0.08 ^d (330)	15.5±0.18 (70)	14.6±0.31 (63)
6	17.4±0.14 ^a (144)	17.5±0.13 ^d (127)	15.5±0.40 (61)	15.3±0.26 (61)
7	17.4±0.16 ^a (120)	17.4±0.12 ^{ab} (124)	14.9±0.30 (43)	14.9±0.50 (24)
P	0.000	0.004	0.152	0.513

Similarly, maternal age affected the weaning weight of single born male and female lambs ($P<0.01$). Especially 3 years old ewes have higher weaning weight in single male kids. On the other hand, 4 and 5 old mothers have higher weaning weight in born single females. Differences in weaning weights of twin male and female lambs were found as statistically insignificant. It was also found that the maternal age not affected the weaning weights of born twin male and female lambs. Single and male lambs had a heavier weight at birth and grew faster to weaning than female and twins (Mavrogenis, 1996; Mukasa-Mugerwa et al., 2000; Tabbaa et al., 2008). Our findings in terms of weaning weight in accordance with these reports and others (Üstüner and Oğan, 2013, Zarkawi and Al-Daker 2018).

Marketable milk yields and lactation period in Awassi sheep were categorized by age and are given in Table 5.

Table 5. Lactation period and marketable milk yield in Awassi sheep

Age groups	Lactation period (days)	Marketable milk yield (l)
2	157.3 ± 0.15^a (531)	124.1 ± 0.31^a
3	174.5 ± 0.24^b (1371)	138.3 ± 0.11^b
4	176.2 ± 0.54^b (783)	141.9 ± 0.24^b
5	175.4 ± 0.29^b (456)	143.6 ± 0.17^b
6	169.6 ± 0.33^b (165)	142.8 ± 0.52^b
7	173.4 ± 0.41^b (175)	143.1 ± 0.47^b
P	0.004	0.006
Overall	171.1 ± 0.66	139.0 ± 0.66

When we look at Table 5, it is seen that 2-year-old sheep have less milk than the others ($P<0.01$). This situation can explain as mammary glands continue to develop in the first births. Similar situation can be seen in lactation period of age groups ($P<0.01$). Yıldız and Yıldız (2002), reported that 2 aged sheep have lower milk yield and lactation period than 3 and up aged sheep in Awassi. Kaygısız and Dağ (2017), explained that the period of lactation varies depending on age. These findings confirm in accordance with our results and other's (Şireli et al., 2015; Biçer et al., 2019).

Conclusion

The Awassi sheep has becoming more and more recognized and increasing the importance due to high yield performance under hard environment conditions. It was observed that birth weight, weaning weight and milk yields were affected by age and it can be said that the ideal age for economic breeding is between 3-5 years old in this study. Thanks to the breeding project started in the province

of Gaziantep, the productivity level of sheep improved according to at the first time and continues to be increased.

References

- Abdullah, A.Y., Husein, M.Q., Kridli, R.T., 2002. Protocols for estrus synchronization in Awassi ewes under arid conditions. *Asian-Australasian Journal of Animal Sciences*, 15, 957–962.
- Biçer, O., Keskin, M., Gül, S., Gündüz, Z., Oflaz, N.Z., Behrem, S. 2019. Comparison of yield characteristics of brown and black headed Awassi sheep. *Mustafa Kemal University Journal of Agricultural Sciences* 24: 58-61.
- Din, I., Khan, A., Rizwan, M., Haq, R., Wazir, M.A. 2019. Study of birth weight and post weaning growth rate in lambs and kids of Damani sheep and Damani goat for fattening purpose. *Open Academic Journal of Advanced Science and Technology* 3: 1-5.
- Mavrogenis AP. 1996. Estimates of environmental and genetic parameters influencing milk and growth traits of Awassi sheep in Cyprus. *Small Rumin Res*, 20:141-146.
- Mohammadi, K., Beygi Nassiri, M.T., Fayazi, J., Roshanfekr, H. Investigation of environmental factors influence on pre-weaning growth traits in Zandi lambs. *Journal of Animal and Veterinary Advances*, 9: 1011-1014.
- Mukasa-Mugerwa E, Kassi-Lahlou A. 1995. Reproductive performance and productivity of Menz sheep on the Ethiopian highlands. *Small Rumin Res*, 17:167-177.
- Karakuş, F., Atmaca, M. 2016. The effect of ewe body condition at lambing on growth of lambs and colostral specific gravity. *Arch. Anim. Breed.*, 59: 107–112.
- Kaygısız, A., Dağ, B. 2017. Effects of udder types and some environmental factors on milk production of improved Awassi sheep. *KSU J. Nat. Sci.*, 20(4), 344-349.
- Keskin, M., Biçer, O., Gül, S., Sarı, A. 2002. A Study on improving of lamb yield by three lambing in two years in Awassi sheep. *Lalahan Hay. Arast. Enst. Derg.* 2005, 45: 33-39.
- Synman, M.A. 2010. Influence of body weight, age and management system on reproduction of South African Angora goat does. *South African Journal of Animal Science*, 40: 41-53.
- Şireli, H.D., Vural, M.E., Karataş, A., Akça, N., Koncağül, S., Tekel, N. 2015. Birth and weaning weights of Awassi lambs raised in the GAP International Agricultural Research and Training Center. *Ankara Üniv Vet Fak Derg*, 62: 139-145.
- Tabbaa, M.J., Alnimer, M.A., Shboul, M. Titi, H.H. 2008. Reproductive characteristics of Awassi ewes mated artificially or naturally to Jordanian or Syrian Awassi rams. *Anim. Reprod.*, 5: 23-29.
- Üstüner, H., Oğan, M.M. 2013. Main productive performance of Awassi sheep in the Central Anatolian Region of Turkey. *Turk J Vet Anim Sci.*, 37: 271-276.
- Yıldız, A., Yıldız, N. 2002. Ceylanpınar Tarım işletmesinde yetiştirilen İvesi koyunlarının süt verimi ve laktasyon süresi. *YYÜ. Vet. Fak. Derg.* 13: 117-121.
- Zarkawi, M., Al-Daker, M.B. 2018. Productive and reproductive parameters in high and low growing Syrian Awassi lambs. *Acta Scientiarum. Animal Sciences*, v. 40, e37983,

Relationship Between Forest With Goat Breeding In Turkey And The Effects Of This Relationship On Goat Breeding

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Abstract

Goat breeding in Turkey is carried with Hair goat. More than 97% of the total number of goats, which are approximately 11 million heads, is hair goat (www.tuik.gov.tr). Hair goat breeding, which is done in a region in stable pen or nomadic system, is generally carried out at the pastures in or around forests in mountainous regions with the extensive system. One of the problems of the goat breeders is the prohibition of grazing in these areas from time to time. First solution that came to mind by Forest authorities for the protection of forests was put forward as the removal of Hair goats from the forest or slaughtering of them. It should not be forgotten that not the goat but the person responsible for its management damages to the forest. It is easy to see the importance of human influence in the destruction of forest areas in the 21st century when industrialization, urbanization and infrastructural work are widespread. The benefits of the goat, not the damage to the forest, are no longer discussed.

The regulation published in the Official Newspaper dated 11 July 2012 has been rearranged for animal grazing in the forest areas. As a result, Hair goat breeding has started to spread again in these regions. As can be seen from this practice, it is necessity to think together goat breeding and forest in Turkey.

In this study, difficulties of goat breeding in or near forests and its effects on forest were evaluated. **Introduction**

Forest, which is an ecosystem that provides various benefits to society, includes trees, shrubs, herbaceous plants, fungi, microorganisms and various animals of a certain height and size. Goats have been part of this ecosystem for thousands of years. In the last century, the increase of housing areas due to population growth, the expansion of agricultural areas in order to feed the increasing population and the destruction of forest areas as a result of industrialization increased; the main criminal in the goat-forest-human relationship has unfortunately been declared as goat. Goat breeding in the villages in or around forest areas in Turkey in the 1990s has been discussed too much. Different policies have been developed to protect forests from goat damage without paying enough attention to the social and cultural dimensions of the issue. As a result, there has been a significant decrease in the number of goats. And, the goat population, which was around 10.7 million in 1991, decreased to 5.1 million in 2009. The number of goats once again reached 10.3 million in 2018 as a result of the recognition of the mistake.

Thus the number of goats in Turkey is closely related to the states viewpoint on goat breeding. The forest organization wants to reduce the number of goats. In a study conducted within this scope, it was stated that goat is an animal that is not reconciled with forest and it would be beneficial to prefer goat during sacrifice festival. In addition, it was stated that a goat caused more damage to the soil and vegetation than sheep because it was walking 12 kilometres a day and it was aimed to spread the sheep fattening by reducing the goat population for this purpose (Anonymus, 2015). As can be seen in this example, the issue has always been evaluated from a one-way perspective, regardless of the number of hair goat breeders, lifestyles or the benefits of the goat for the forest. In Turkey, more than 8 million people live in villages in or around forest. Although the goat has a vital importance for these villages, the main solution that comes to mind to protect the forests has put forward as the removal of the Hair goat from the forest or slaughtering of them. In this direction, economic, social, administrative and technical applications have been made and are being made. (Kaymakçı, 2008). In these villages, applications aimed at replacing the goat with other animal species are often done only in terms of forest. However, each species has its own characteristics. For example, cattle cannot be reared without roughage. Cattle breeding with purchased roughage would not be sustainable. It is also not true to suggest sheep to goat breeders regardless of the characteristics of the land.

In this study, the relationship between goat and forest and the place of human in this relationship were evaluated.

Benefits of Goats to Forest

Reducing Forest Fires

According to the General Directorate of Forests, 3 thousand 755 forest fires occurred in Turkey in 2013. In forest fires, 11 thousand 456 hectares (approximately 13000 football fields) were burned in forest area (Anonymous, 2015b). 99% of these fires are caused by carelessness, negligence or intentionally by people, only 1% is caused by lightning (Anonymous, 2015c).

Most forest fires start as cover fires. Cover fire spreads to reach the lower branches. In the forest, which is dominated by normal trees, the fire is in the form of cover fire. First of all, dry plant wastes, herbs and seedlings on the soil can be quickly; The humus layer and roots light up slowly. This is called cover fire.

As the cover fire continues, it spreads to shrubs and saplings and turns into fires that are difficult to extinguish. If the goats are allowed to graze the cover plants, it contributes significantly to the prevention of this type of fire (Keskin ve ark., 2015). In the beginning and spreading of forest fires, heaths that live as a second layer under the forest and whose leaves contain aromatic oil are the main actors. The presence of forest in these areas is possible with the control of shrubs. The goats prevent the destruction of forests by fire by eating heaths with more nutritious value than pine. Again, goat roads in the forest facilitate the fighting with fire (Gültekin, 2014).

Goats contribute to the prevention of the spread of forest fires by eating both cover plants and branches under the trees (Keskin et al., 2015).

Effect on Germination

The animals eat the fleshy parts of the cones and remove the germination barrier caused by the cones. (Gültekin ve ark., 2004). According to Gültekin et al. (2004), without goats, heaths would form a second layer under the pine forests, preventing the light from reaching the soil. and pine seeds could never germinate in this environment. This is the main reason why these forests survive without losing anything from the splendour, although a significant portion of our country's goat population is found in pine forests. Goat and red pine support the existence of each other in almost symbiotic relationship. Red pine passes the light down and allows the development of bushes, which are the main food sources of goats. The point that should be considered in terms of germination in the relationship between goat forest is that these areas do not open to grazing until the trees grow.

Fertilizer

The manure left by the goat during grazing in the forest is beneficial for feeding insects. Fertilization of the soil results in a positive effect on germination and plant growth. As a result, it is beneficial to the ecosystem.

Security

Mustafa Kemal Atatürk said that Friends! Go and look at the Taurus Mountains, if you see a single Yoruk tent there and smoke in that tent, you know very well that no power and force in this world can ever defeat us. Goat shepherds are people who are able to continue their lives by using nature even in the most adverse conditions in their familiar regions since childhood.

Damages of goats to forest

Uncontrolled Grazing

When the goats are grazing uncontrolled, they can eat new shoots and damage the forest. Sometimes, as a result of the gnawing of bark, insect damage may increase in the trees. For this reason, goat grazing is prohibited by the General Directorate of Forestry in afforestation, soil conservation and rehabilitation areas. Likewise, as a result of uncontrolled grazing of the goat in natural rejuvenation areas, the goat eats the seedlings and therefore the forest continuity policy for the future is harmed.

Cutting tree or branch

Goat breeders are harming the forest by cutting fodder leaves and leafy branches from forests in order to feed their animals in winter. The growth in the tree occurs when the water and plant nutrients are taken up by the roots and reached to the top and transformed into organic matter in the leaves under sunlight. In this respect, root and leaf condition affects growth (Anonymous, 2015d). Every year, unconscious pruning of branches and cutting off young shoots lead to partial or complete destruction of the growth organs. Thus, the increase in length and thickness is greatly reduced.

Results and Conclusion

In the light of the above, it would not be wrong to say that the main responsibility for forest destruction is human. The most striking examples of this are fires, quarries, damage to the forest by opening fields or vineyards. It should not be forgotten that the goat is grazed by the human as right or wrong in the forest.

In this context;

- Shepherds in villages in or around the forest areas should be informed about the goat-forest relationship and should be trained on how to graze the goat without damaging the forest.
- Controlled grazing should be ensured in areas where there are no new seedlings and in risk of fire, especially in maquis areas.
- Country planning should be made for goat breeding.
- Goat forest and human relations should be evaluated with a workshop attended by all the interlocutors of the subject and the inferences to be provided here should be considered as state policy.
- Each person or institution should carry out its duties for the protection of forests.

And finally, people who cannot do their duties should not place responsibility on the goats with the thought that they cannot defend themselves.

References

- Anonymous, 2015a. <http://www.manisa.gov.tr/keci-zararlarinin-azaltilmasi-eylem-plani-toplantisivalimizin-baskanliginda-yapildi>).
- Anonymous, 2015b. www.ih.com.tr/haber-il-il-orman-yanginlarinin-haritasi-414265/
- Anonymous, 2015c. www.egeorman.org.tr/ormanyanginlari.aspx). Anonim, 2015c. www.egeorman.org.tr/ormanyanginlari.aspx).
- Anonymous, 2015d. <http://ormanweb.sdu.edu.tr/dersler/scarus/hasilat/7.pdf>
- Gültekin, H.C., 2014. Keçiler ve Keçi Çobanları, //www.plantdergisi.com/yazi-hazincemal-gultekin-keciler-ve-keci-cobanlari--61.html.
- Gültekin, H. C., Gültekin, Ü. G., Divrik, A., 2004. Andız (*Arceuthos drupacea* (Labill.) Ant. et. Kotschy.) Tohumlarının Çimlenmesi, Diğer Tohum ve Fidan Özelliklerine İlişkin Bazı Tespit ve Öneriler. Kafkas Üniversitesi Artvin Orman Fakültesi Dergisi: 1-2 (48-54)
- Kaymakçı, M., 2008. <http://www.yeniadana.net/web/YaziDetay.aspx?id=2272>). Erişim tarihi 12 Mayıs 2015;
- Keskin, M., Gül, S., Karagöl, E., 2015. Türkiye’de Keçi Orman İlişkisi. 9. Ulusal Zootekni Bilim Kongresi. S, 211.

The Effects Of Some Environmental Factors Affecting On The Growth Traits In Karacabey Merino Lambs Raised In Tekirdağ For Community Based Sheep Improvement Project

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Abstract

This study was carried out to determine the influence of environmental factors affecting the variability of Karacabey Merino lambs for birth weight, 45 day's and 90 day's weight (weaning weight) and average daily gain in 2017, 2018, years.

The birth weight (BW), 45 day's weight (FFW) and weaning weight at 90th day (WW) for male and female lambs were 3.74 ± 0.011 kg and 3.65 ± 0.011 kg, 16.71 ± 0.040 and 16.84 ± 0.039 and 28.53 ± 0.054 kg, and 29.04 ± 0.053 kg, respectively. The effect of age of dam, year, birth type and sex were significant on birth weights, 45 day's weight and weaning weights of lambs. The overall average daily weight gain of lambs from birth to 45 day's was 0.290 ± 0.0008 and from 45 day's to weaning 0.272 ± 0.0011 g. The overall average daily weight gain for from birth to 45 day's age for male and female lambs were 0.288 ± 0.0009 g and 0.293 ± 0.0009 g, respectively. The overall average daily weight gain for from 45 day's to weaning for male and female lambs were 0.268 ± 0.0013 and 0.270 ± 0.0013 g. Population were managed under community based sheep improvement programs in Tekirdağ province. The data were analyzed to determine the effect of age of the dam, weight of dam, birth type, sex, year, on the birth weight, 45 day's weight, and 90 day's weight (weaning weight) of Karacabey merino lambs. Statistical analysis was performed by GLM procedure.

The overall birth weight was 3.69 ± 0.019 kg, overall 45 day's weight was 16.78 ± 0.034 kg and overall weaning weight at 90th day of age was 28.78 ± 0.046 kg, for Karacabey Merino lambs. The effects of birth year, dam's age, birth type and sex on birth weight, 45 day's weight and weaning (90th day) weights were found to be statistically significant.

Some Production Characteristic of Hair Goat in the Farm Condition in Konya

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Abstract

This study was conducted to investigate growth performances of Hair goat kids and milk yield and live weight of Hair goat flocks of Konya province in Turkey. Data were collected from 4422 head of kids and 4579 head of Hair goats in 2016.

Hair goat kids birth weights and 90th days live weights were found 3.51 kg and 17.88 kg respectively. Average marketable lactation milk yield, lactation length, and daily milk yield of Hair goats were 80.7 kg, 193 days, and 411 g respectively. Live weight of Hair goats were found 57.8 kg.

Effects of flock, maternal age, birth type and sex on the birth weight and 90th days live weights (maternal age was $P < 0.05$) were found statistically significant ($P < 0.01$). Age and farm were found significant effects on Average marketable lactation milk yield, lactation length daily milk yield and live weight ($P < 0.01$). It can be said that growth trait of Hair goat kids and live weight of Hair goats can be satisfactory under rural condition while milk traits of Hair goats might be increased by selection

Key Words: Hair, kid, lactation, extensive

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Determination and Improvement of Some Performance Characteristics of Akkaraman Sheep Under Grover Conditions in The Central District of Niğde

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Abstract

In this study, it is aimed to determine and improve some performance characteristics of Akkaraman sheep grown under grover conditions in the central district of Niğde province. Live weight gain was targeted with the selection made according to live weight under breeder conditions. In the research, elite and base herd were used. In the study, controlled mating was performed on elite herds while free mating was applied on the base herd. Birth weight and weaning weight (90th day) of elite and base herds were evaluated. The data obtained in the weighing were standardized according to birth and weaning weight. Selection was made considering the standardized live weights of the lambs in the herd and the morphological characteristics of the breed. The study was conducted in 2011-2016 for 5 years. In the first period of the project, different breeds in the herds were removed and only the morphological features of the Akkaraman were fixed. For this reason, in the first period, the breeding selection was made with emphasis on the morphological characteristics. During this period, an increase of approximately 5-6 kg was achieved in the base and elite herd. There was also an increase in the number of lambs per sheep. However, in this period, twin selection was not taken as the selection criteria. Similarly, significant improvements have been made in the viability. As a result, when we evaluate together the progress made in weaning and living strength provided in weaning; in the income of farmers; 37% increase in elite herd and 31% increase in base herd.

Keywords: Niğde, Akkaraman, Performance characteristics

Niğde İli Merkez İlçede Halk Elinde Akkaraman Koyunlarının Bazı Performans Özelliklerinin Belirlenmesi Ve Geliştirilmesi

Özet

Bu çalışma ile Niğde ili Merkez ilçede üretici elinde yetiştirilen akkaraman koyunlarının bazı performans özelliklerinin belirlenmesi ve geliştirilmesi amaçlanmıştır. Yetiştirici koşullarında canlı ağırlığa göre yapılan seleksiyonla canlı ağırlık artışı hedeflenmiştir. Araştırmada elit ve taban sürü kullanılmıştır. Çalışmada elit sürülere kontrollü aşım yapılırken taban sürüde serbest aşım

uygulanmıştır. Araştırmada elit ve taban sürülerde doğum ağırlığı ve süttten kesim ağırlığı (90.gün) değerdendirilmeye alınmıştır. Tartımda elde edilen veriler doğum ve süttten kesim ağırlığına göre standardize edilmiştir. Sürüde kuzuların standardize edilmiş canlı ağırlıkları ve ırkın morfolojik özellikleri dikkate alınarak damızlık seçimi yapılmıştır. Çalışma 2011-2016 yıllarında 5 yıl süreyle yürütülmüştür. Projenin yürütüldüğü ilk dönemde sürüler içerisinde bulunan farklı ırklar ayıklanarak sadece akkaramanın morfolojik özellikleri sabitlenmiştir. Bu nedenle ilk dönemde ırkın morfolojik özelliklerine ağırlık verilerek damızlık seçimi yapılmıştır. Bu dönemde taban ve elit sürüde yaklaşık 5-6 kg'lık bir artış sağlanmıştır. Doğuran koyun başına doğan kuzu sayısında da bir artış olmuştur. Ancak bu dönemde damızlık seçiminde ikizlik seleksiyon kriteri olarak alınmamıştır. Aynı şekilde yaşama gücünde önemli iyileşmeler sağlanmıştır. Sonuçta süttten kesimde sağlanan canlı ağırlık ve yaşama gücündeki sağlanan ilerlemeyi birlikte değerdendirdiğimizde; çiftçilerin gelirinde; elit sürüde %37' taban sürüde ise %31 artış sağlandığı hesaplanabilmektedir.

Anahtar Kelimeler: Niğde, Akkaraman, Performans özellikleri

Giriş

Türkiye'nin coğrafik yapısı, meraları ve insanların hayvancılık kültürü koyunculuğa uygun olduğu düşünülmektedir. Bu uygun ortamın son yıllara kadar yeterli olarak değerdendirildiği söylenemez. Bu durumu uygulanan tarım politikaları nedeniyle kırmızı et üretimi ve süt üretimi içerisinde koyunculuğun payları sürekli azalış göstermesinden anlayabiliriz. Ancak 2010 yılından bu yana küçükbaş hayvancılığa uygulanan politikaların etkisiyle koyun sayısındaki azalma durmuş, hatta artışların başladığı görülmektedir (Bingöl ve ark., 2013; Eştürk ve Ören, 2014; Karakuş 2011).

Türkiye'de koyun yetiştiriciliği coğrafi bölgelere ve işletme alt yapılarına bağlı olarak değışik ırk ve üretim modelleri uygulanmaktadır. Bu sistemlerin büyük bir kısmı ekstansif olarak yapılmaktadır (Yıldırım ve ark., 2006; Koyuncu ve Akgün, 2018).

Türkiye yerli koyun ırklarında olduğu gibi Akkaraman ırkının da morfolojik ve fizyolojik özelliklerini tanımlayan araştırmalar yetersizdir. Ayrıca bu ırkın adapte olduğu coğrafik dağılım ve işletmelerin yapısal özellikleri yeteri kadar bilinmemektedir. Bu işletmelerde bulunan sürünün ıslahı, yetiştiricinin bilgisine dayalı olarak seçim ve çiftleştirme şeklinde yürütülmektedir. Ancak ıslah programlarında başarı hedef popülasyonu belirleme ve uygun genotipleri tanımlamayla doğru orantılıdır. Koyunculukta ıslah hedefleri; süt ve et verimi artışı, genetik kaynakların korunması, hayvan davranışlarını ve refahını da kapsayacak şekilde düzenlenmesi gerekmektedir (Ertuğrul ve ark., 2009; Kaymakçı ve ark., 2009; Sönmez ve ark., 2009; Yavuz 2015)

Bu proje ile Niğde ili Merkez İlçede Halk elinde yetiştirilen Akkaraman koyunlarının ıslah organizasyonu yetiştiricilerin katılımıyla sağlanmıştır. Yetiştirici koşullarında yapılan seleksiyonla canlı ağırlık artışı hedeflenmiştir.

MATERYAL ve YÖNTEM

Akkaraman koyunlarının canlı ağırlığının artırılması amacıyla Niğde ili Merkez ilçede projede bulunan elit ve taban sürülerde çalışmalar yürütülmüştür. Projede elit sürülere kontrollü aşım yapılırken taban sürüde serbest aşım uygulanmıştır.

Araştırmada elit ve taban sürülerde doğum ağırlığı ve süttten kesim ağırlığı (90.gün) dikkate alınmıştır. Tartımlarda elde edilen süttten kesim ağırlığı ve 90. Gün canlı ağırlığı olacak şekilde standardize edilmiştir. Sürüde kuzuların standardize edilmiş canlı ağırlıkları ve ırkın morfolojik özellikleri dikkate alınarak damızlık seçimi yapılmıştır. Projenin ilk yıllarında daha çok ırk özelliklerine önem verilerek damızlık seçimi yapılmıştır.

Bulgular Ve Tartışma

Araştırmada; elit sürüde Çizelge 1'deki, taban sürüde ise Çizelge 2'deki sonuçlar elde edilmiştir. Elit sürüde 2012 yılı ve 2015 yılı doğum ağırlığı sırasıyla 4.30 kg'dan 4.73 kg olarak tespit edilmiştir. Ayrıca süttten kesim (90.gün) canlı ağırlığı 23.2 kg'dan 29.06 kg'a ulaşmıştır. Görüldüğü gibi projenin uygulandığı dönemde doğum canlı ağırlığında 0.43 kg, süttten kesim canlı ağırlığında ise 5.86 kg ilerleme sağlanmıştır. Aynı dönemde sürünün yaşama gücü %89.5'den %98.15'e yükselmiştir. Doğuran koyun başına doğan kuzu sayısı 1.1 baştan 1.17 başa çıkmıştır. Bu dönemde projedeki sürülerde morfolojik ırk özellikleri sabitlenmiştir. Çalışmadaki bu hızlı ilerlemeye sürülerdeki akkaraman dışındaki ırkların damızlık dışı bırakılmasının da etkisi büyük olmuş olabilir.

Taban sürüde 2012 yılı ve 2015 yılı doğum ağırlığı sırasıyla 4.4 kg'dan 4.58 kg çıkmıştır. Ayrıca süttten kesim (90.gün) canlı ağırlığı 21.1 kg'dan 26.23 kg'a çıkmıştır. Projenin uygulandığı 2011-2015 yılı dönemde doğum canlı ağırlığında 0.18 kg, süttten kesim canlı ağırlığında ise 5.13 kg ilerleme sağlanmıştır. Aynı dönemde sürünün yaşama gücü %91.66 %97.16'a yükselmiştir. Doğuran koyun başına doğan kuzu sayısı 1.06 baştan 1.13 başa çıkmıştır. Yani yüz koyunun verdiği 106 kuzu 113 kuzuya ulaşmıştır. Bu dönemde projedeki sürülerde morfolojik ırk özellikleri sabitlenmiştir.

Çizelge 1. Niğde merkez ilçede 2011-2015 yılları arasında akkaraman koyunu elit sürülerin performansı

Table 1. Performance Values of Elit Herd in Akkaraman Sheep in Central Niğde Province Between 2011 to 2015

Year/Yıl	2011	2012	2013	2014	2015	
No of ewes/Koyun Sayısı		1000	1000	1191	1191	
No of rams/ Koç Sayısı		45	45	55	53	
Number of ewes lambing/ Doğuran Koyun sayısı		891	943	1145	1154	
No of Lambs/ Kuzu Sayısı		980	1111	1305	1349	
Number of Ram selected for breeding/ Damızlığa ayrılan koç sayısı		32	34	36	141	
Number of Ewes selected for breeding/ Damızlığa ayrılan Koyun sayısı		164	179	172	212	
Birth Weight (kg)/ Doğum ağırlığı	n		980	1111	1305	1349
	Min		1	1,03	2	1,72
	Max		6,6	6,6	6,83	7,12
	X±SE		4,3±1,01	4,28±0,87	4,17±0,86	4,73±0,8
	% Variation		23	20	21	17
Weaning weight (kg)/ Sütten kesim ağırlığı	n		877	1060	1271	1324
	Min		4,8	14,61	11,07	10,36
	Max		48,1	27,06	43,71	44,72
	X±SE		23,2±0,16	21,25±0,07	25,78±0,14	29,06±0,13
	% Variation		20	11	19	16
The number of lambs born per sheep/ Koyun başına doğan kuzu sayısı		1,1	1,18	1,14	1,17	
Average Difference of ram weight Selected for Breeding than herd mean/ Damızlığa Seçilen koçların Sürüdeki koçlardan Ortalama Farkı		1,86	1,26	8,25	5,59	
Livability in Weaning - Marketing Period/ Sütten kesimde yaşama gücü		89,5	95,41	97,39	98,15	

Çizelge 2. Niğde merkez ilçede 2011-2015 yılları arasında akkaraman koyunu taban sürülerin performansı

Table 2. Performance Values of Base Herd in Akkaraman Sheep in Central Niğde Province Between 2011 to 2015

Year/Yıl	2011	2012	2013	2014	2015
No of ewes/Koyun Sayısı		5000	5000	4809	4809
No of rams/ Koç Sayısı		183	183	173	187
Number of ewes lambing/ Doğuran Koyun sayısı		4142	4757	4595	4627
No of Lambs/ Kuzu Sayısı		4401	5230	4979	5251
Number of Ram selected for breeding/ Damızlığa ayrılan koç sayısı		31	133	131	289
Number of Ewes selected for breeding/ Damızlığa ayrılan Koyun sayısı		826	842	654	850
Birth Weight (kg)/ Doğum ağırlığı	n	4401	5230	4979	5251
	Min	2	1,98	2	1,77
	Max	8	7	6,8	9,04
	X±SE	4,4±0,72	4,26±0,64	4,19±0,78	4,58±0,88
	% Variation	16	15	19	
Weaning weight (kg)/ Sütten kesim ağırlığı	n	4034	5116	4849	5102
	Min	2,3	10,91	8,89	8,33
	Max	62	54,07	49,63	43,49
	X±SE	21,1±0,12	20,80±0,04	24,01±0,08	26,23±0,07
	% Variation	35	14	18	19
The number of lambs born per sheep/ Koyun başına doğan kuzu sayısı		1,06	1,1	1,08	1,13
Average Difference of ram weight Selected for Breeding than herd mean/ Damızlığa Seçilen koçların Sürüdeki koçlardan Ortalama Farkı		2,81	0,28	6,77	6,53
Livability in Weaning - Marketing Period/ Sütten kesimde yaşama gücü		91,66	97,82	97,39	97,16

Sonuç:

Projenin yürütüldüğü ilk dönemde sürü diğer ırklarla karışmış durumdaydı. Bu nedenle ilk dönemde ırkın morfolojik özelliklerine ağırlık verilerek damızlık seçimi yapılmıştır. Buna rağmen bu dönemde yaklaşık taban ve elit sürüde 5-6 kg'lık bir artış sağlanmıştır. Doğuran koyun başına doğan kuzu sayısında da bir artış olmuştur. Ancak bu dönemde damızlık seçiminde ikizlik seleksiyon kriteri olarak dikkate alınmamıştır. Aynı şekilde yaşama gücünde önemli iyileşmeler sağlanmıştır. Sütten kesimde sağlanan canlı ağırlık ve yaşama gücündeki sağlanan ilerlemeyi birlikte değerlendirdiğimizde; elit sürüde gelirin %37, taban sürüde ise %31 artış sağlandığı hesaplanabilmektedir. Belirtilen gelişmelerin gelecek dönemde daha hızlı ve sağlıklı yürüyebilmesi için aşağıda belirtilen önlemlerin alınması gerekmektedir.

1. Projede görev alan kişilerin yetki alanları netleştirilmelidir. Bu konuda uygulamada bir takım sorunlar görülmektedir.
2. Bakanlık tarafından uygulanan aşılama programlarında, projedeki işletmelere öncelik verilmesi veya bu programların Birliklere devredilmesi gerekmektedir.
3. Proje Liderlerinin daha fazla inisiyatif alması gerekmektedir. Bu konuda verimliliği artıracak desteklerin yapılması gerekmektedir.
4. Projenin uygulandığı 1. Dönemde projeye yeterli titizliği göstermeyen yetiştiricilerin, devam etmek isteseler bile projeden çıkarılması kolaylaştırılmalı.
5. Projeye giren işletmelerde proje boyunca hayvanlarını yıllık olarak %10-15 artırma imkânı sunulması düşünülebilir.

Bu Projede 1. Dönemde genetik ilerleme ve yaşama gücünde iyileşme sağlanmıştır. Projenin uygulandığı işletmelerde “**Halk Elinde Koyun Islahı**” düşüncesi oluşmuş, ırkın morfolojik özellikleri sabitlenmeye yönelik ağırlık verilerek canlı ağırlık artışı sağlanmaya başlanmıştır. Bu dönemde çiftçilere verilen Devlet desteğinin Ulusal Ekonomiye katma değer oluşturduğu görülmektedir. Sonuç olarak; projenin 2. dönemde proje başına düşen koyun sayısı artırılmalı, bölge ve ülke koyunculğunun ıslah edilmesi, üreticide ıslah bilincinin gelişmesi, paydaşlar arasındaki iş birliklerinin artırılması, sosyoekonomik faydalarından dolayı devam etmesi zorunludur.

KAYNAKLAR

- Bingöl, M., Yılmaz, A., Daşkıran, İ., & Vural, M. E. (2013). Doğu Anadolu Bölgesinde organik koyun yetiştiriciliği ve geliştirme olanakları. *Bitlis Eren Üniversitesi Fen Bilimleri Dergisi*, 2(1), 98-108.
- Ertuğrul, M., Dellal, G., Soysal, İ., Elmacı, C., Akın, O., Arat, S., ... & Yılmaz, O. (2009). Türkiye Yerli Koyun Irklarının Korunması. *Uludağ Üniversitesi Ziraat Fakültesi Dergisi*, 23(2), 97-119.
- Eştürk, Ö., & Ören, M. N. (2014). Türkiye'de Tarım Politikaları ve Gıda Güvencesi. *YYÜ Tarım Bilimleri Dergisi*, 24(2), 193-200.
- Karakuş, K. (2011). Türkiye'nin canlı hayvan ve kırmızı et ithaline genel bir bakış. *Iğdır Üniversitesi Fen Bilimleri Enstitüsü Dergisi*, 1(1), 75-79.
- Kaymakçı, M., Özder, M., Karaca, O., Torun, O., Baş, S., & Koşum, N. (2009). Türkiye Koyun Islahı Stratejisi. *Uludağ Üniversitesi Ziraat Fakültesi Dergisi*, 23(2), 67-77.
- Koyuncu, M., & Akgün, H. (2018). Ekstansif Yetiştirme Koşullarındaki Kıvrıcık Koyunlarında Bazı Döl Verimi Özellikleri. *Hayvansal Üretim*, 59(1), 33-40.
- Sönmez, R., Kaymakçı, M., Eliçin, A., Tuncel, E., Wassmuth, R., & Taşkın, T. (2009). Türkiye Koyun Islahı Çalışmaları. *Uludağ Üniversitesi Ziraat Fakültesi Dergisi*, 23(2), 43-65.
- Yavuz, İ. H. (2015). Akkaraman kuzularında yaşama gücü, büyüme ve vücut ölçüleri/Survivability, growth and body measurements of Akkaraman lambs (Doktora tezi).
- Yıldırım, İ., Şahin, A. & Çakır, C. 2006. Van İli Tarım İşletmelerinde Ekstansif Çalışma Nedenleri. Türkiye VII. Tarım Ekonomisi Kongresi, (2006). 13-15 Eylül. Antalya.

Eşme Kıvırcık Koyunlarda Batın Genişliği Fenotipik ve Genetik Parametre TahminleriOrhan Karaca¹, Onur Yılmaz^{1†}, İbrahim Cemal¹, Nezih Ata¹¹Aydın Adnan Menderes University Faculty of Agriculture, Department of Animal Science, Aydın, Turkey**Özet**

Bu çalışmanın amacı Eşme Kıvırcık koyunlarda batın genişliğinin fenotipik ve genetik parametrelerinin tanımlanmasıdır. Batın genişliği verileri 48 taban (n=26797 baş) ve 16 tümleşik (n=7919 baş) sürülerde 6 yıllık (2011-2016) üretim döneminde yer alan toplam 34716 baş koyun (1 ve 7 ≥ yaş) çalışmanın hayvan materyalini oluşturmuştur. Koyunlar yıl boyunca zayıf mera koşullarında otlatılmıştır. Taban ve tümleşik sürülerde yer alan koyunların batın genişliğine ilişkin en küçük kareler ortalamaları sırasıyla 1.34 ve 1.45 olarak elde edilmiştir. Taban ve tümleşik sürüler arasındaki farklılık dikkat çekicidir. buna ek olarak sürü ortalamaları arasındaki farklılıklarda gözlemlenmiştir. Taban ve tümleşik sürülerde gözlemlenen en yüksek batın genişliği değerleri sırasıyla 1.78 ve 1.95 olmuştur. Batın genişliğine ilişkin tekrarlı ve kalıtım dereceleri sırasıyla 0.335 ve 0.120 olarak tahmin edilmiştir. Batın genişliği bakımından tabakalar arasındaki farklılık seleksiyon programının başarısının bir göstergesidir. elde edilen bulgular ülkemizde yetiştirilen küçükbaş hayvan ıslahı açısından önemli bir potansiyele işaret etmektedir.

Anahtar kelimeler: Batın genişliği, üreme, koyun, Eşme Kıvırcık, kalıtım derecesi, tekrarlı derecesi

Phenotypic and Genetic Parameter Estimations for Litter Size of Eşme Kıvırcık Ewes**Abstract**

The aim of this study was to estimate phenotypic and genetic parameters of litter size in Eşme Kıvırcık ewes. Litter size data (n= 34716) of ewes (1 and 7 ≥ years of age) were recorded in 48 base (n= 26797) and 16 integrated (7919) farms of Eşme Kıvırcık sheep during the 6-year period, 2011 to 2016. Sheep herds were managed on poor pastures throughout the year. Least square means for litter size of ewes were found as 1.34 and 1.45 for base and integrated farms, respectively. The difference between base and integrated farms for litter size is notable. Significant differences were also observed between herd averages. The highest litter size values in base and integrated farms were 1.78 and 1.95, respectively. The repeatability and heritability estimations for litter size were 0.335 and 0.120, respectively. Differences between tiers (integrated and base flocks) for litter size indicate the success of the applied selection program. The findings of present study indicate a significant potential in terms of small ruminant breeding in Turkey.

Keywords: Litter size, reproduction, sheep, Eşme Kıvırcık, heritability, repeatability

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Giriş

Diğer hayvansal üretim dallarında olduğu gibi koyun yetiştiriciliğinde de en önemli unsurlardan biri döl verimidir. Et, süt ve yapağı gibi koyunculuk ürünleri ancak yüksek döl verimi ile elde edilen kuşaklarla sürdürülebilir. Koyunlarda döl veriminin yüksek olması iki yönde yarar sağlar. Bunlardan birincisi yüksek döl verimli populasyonlarda daha etkin bir seleksiyonun yapılması, ikincisi ise damızlık dışı kalanların satılması ile daha yüksek gelirin elde edilmesidir (Karaca ve ark., 1992; Esenbuğa ve Dayıoğlu, 2002; Karaca ve ark., 2002; Karaca ve Cemal, 2000; Karaca ve ark., 2000; Karaca ve ark., 2009; Janssens ve ark., 2004; Olesen ve ark., 1995; Shaat ve ark., 2004).

Bir yılda doğuran koyun başına büyütülen kuzu sayısı olarak tanımlanabilen döl verim oranı, koyunlarda kuzu üretim sistemlerinin hem biyolojik hem de ekonomik etkinliğinin önemli göstergelerinden biri olarak kabul edilmektedir. Yıllık döl verim oranındaki varyasyon, batın genişliği (doğuran koyun başına doğan kuzu sayısı), kuzulama sayısı ve kuzuların yaşama gücündeki değişimi yansıtmaktadır (Hanrahan, 1989).

Üreme fizyolojisine ilişkin giderek ilerleyen bilgiler çerçevesinde, genetik esaslar ve çevresel etki mekanizmalarının daha iyi anlaşılmasıyla döl veriminin iyileştirilmesine yönelik bazı çağdaş teknikler uygulamaya girebilmektedir. Diğer verim özellikleri gibi döl verimi de poligeniktir. Fenotipik görüntünün kesikli olması yani kuzulayanlar ya da kuzulamayanlar veya tek doğuranlar ya da ikiz doğuranlar şeklindeki sınıfların ortaya çıkması kimi fizyolojik olayların yoğunluğuna dayalıdır. Koyunlarda döl verimi genel olarak, koç altı koyun başına doğan kuzu sayısı ve kuzuların yaşama gücünün sonucu olarak değerlendirilebilir. Üreme fizyolojisine ilişkin giderek artan bilgiler bağlamında, genetik esaslar ve çevresel etki mekanizmalarının berraklaşmasıyla döl veriminin iyileştirilmesine yönelik kimi çağdaş teknikler devreye girebilmektedir (Karaca ve ark. 1992; Karaca ve ark., 2009). Çevresel koşullarda çeşitli yollarla yapılacak olumlu değişiklikler döl veriminin yükselmesini sağlayabilir. Ancak kalıcı değişiklikler populasyonlarda genetik potansiyeli yükseltmekle olasıdır. Genetik iyileştirme çalışmalarının koyunlarda döl veriminin genetiği için kazandığı çağdaş boyut, genel olarak iki farklı yönde ortaya çıkmaktadır. Bunlardan birincisi seleksiyon çalışmalarında genetik ilerlemeyi arttıracak daha etkin döl verim ölçütlerinin tanımlanmasıdır. İkincisi ise major genlerin ortaya çıkarılmasıdır.

Koyunlarda döl verimi; ırk, sürü ve bireye göre farklılık göstermektedir. Ayrıca bakım, besleme, mevsim, yas, canlı ağırlık, doğum sayısı, hastalık gibi çevresel faktörler de döl verimini etkilemektedir (Aşkın, 1982). Döl verimi özelliğinin kalıtım derecesi düşük olduğu için; bu verim özelliğinin bir ırk içerisinde geliştirilmesinde çevresel faktörlerin düzenlenmesi önem taşır (Kaymakçı ve Sönmez 1992). Çevresel iyileştirme çalışmaları içerisinde ek yemleme, erken kuzulama, kuzulama aralığının kısaltılması, eksojen hormon uygulaması ve gün uzunluğu uygulamaları yer almaktadır (Sönmez ve Kaymakçı, 1987).

Batı Anadolu'da en yüksek hayvan sayısına sahip ilçe konumunda olan Eşme Batı Anadolu'da kuzu eti üretimi anlamında büyük bir pazar konumundadır. Bu bağlamda üzerinde çalışılan bu popülasyonda döl verimi oldukça önemli bir performans ölçütüdür. Daha önce üzerinde çalışmamış bir popülasyon olan Eşme Kıvrıkcık melezi koyun popülasyonunda tanımlanan döl verim özellikleri bulguları literatüre önemli katkılar sağlayacaktır.

Materyal ve Yöntem

Batın genişliği verileri 48 taban (n=26797 baş) ve 16 tümleşik (n=7919 baş) sürüde 6 yıllık (2011-2016) üretim döneminde yer alan toplam 34716 baş koyun (1 ve 7 ≥ yaş) çalışmanın hayvan materyalini oluşturmuştur (Çizelge 1).

Çizelge 1. Hayvan materyaline ilişkin bilgiler

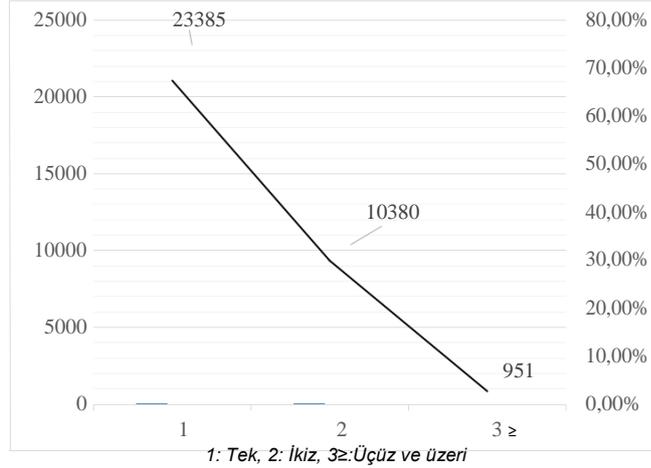
Yıl	Taban	Tümleşik
2011	4345	1312
2012	4627	1384
2013	4750	1402
2014	4692	1404
2015	4202	1422
2016	4181	995
Toplam	26797	7919
Genel Toplam	34716	

Gebelik süreci sonunda doğum döneminde tüm sürülerde ayrıntılı doğum kayıtları tutulmuş ve koyunlara ait 6 yıllık üretim dönemindeki (2011- 2016) batın genişliği gözlemi değerlendirmeye alınmıştır.

Sistemik çevre etmenlerinin etkilerinin ortaya konabilmesi için verilere varyans analizi uygulanmıştır. Özelliklere ait varyans analizlerinin yapılması, en küçük kareler ortalamalarının elde edilmesi için SAS (SAS,1999) istatistik paket programında bulunan GLM prosedürü kullanılmıştır. Ele alınan özelliklere ait varyans unsurları ve genetik parametreler REML (Restricted Maximum Likelihood, Kısıtlanmış Maksimum Olabilirlik) tekniğine dayalı olarak MTDFREML programında bireysel hayvan modeli (Animal Model) esas alınarak tahmin edilmiştir (Boldman ver ark.,1993).

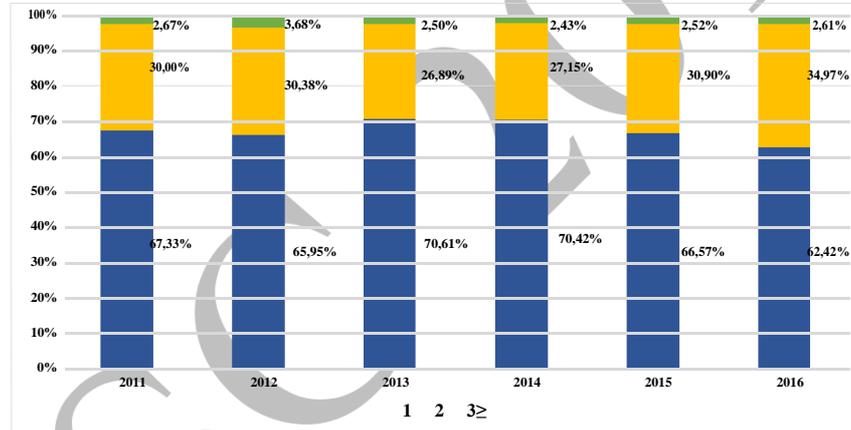
Bulgular ve Tartışma

İşletmelerde doğuran koyun başına doğan kuzu sayılarına ait gözlemlerin 6 üretim dönemindeki (2011-2016) dağılımı Şekil 1'de verilmiştir.



Şekil 1. Eşme koyunların 6 yıllık (2011-2016) batın genişliği dağılımı

İşletmelerde doğuran koyun başına doğan kuzu sayılarına ait gözlemlerin yıllara göre dağılımı Şekil 2’de verilmiştir.



Şekil 2. Eşme koyunların batın genişliğinin yıllara göre dağılımı

Şekil 1 ve 2 değerlendirildiğinde Eşme koyunların döl verimi bakımından önemli bir potansiyele sahip olduğu söylenebilir. Doğuran koyun başına doğan kuzu sayısı (batın genişliği) bakımından etkili faktörlere ait en küçük kareler ortalamaları Çizelge 2’de verilmiştir.

Çizelge 2. Eşme koyunlarında batın genişliğine ait en küçük kareler ortalamaları

Faktörler	N	Batın Genişliği	
		Taban	Tümleşik
Yıl		P=0.000	P=0.000
2011	4345	1.35±0.008	1312 1.42±0.017
2012	4627	1.35±0.008	1384 1.52±0.018
2013	4750	1.31±0.007	1402 1.39±0.017
2014	4692	1.31±0.008	1404 1.40±0.018
2015	4202	1.36±0.008	1422 1.47±0.017
2016	4181	1.38±0.008	995 1.48±0.020
Yas		P=0.000	P=0.000
1	2097	1.25±0.011	705 1.34±0.024
2	4244	1.28±0.008	1701 1.39±0.015

3	4913	1.34±0.007	1640	1.42±0.016
4	4806	1.38±0.007	1403	1.49±0.017
5	3737	1.40±0.008	1073	1.52±0.019
6	2969	1.39±0.009	745	1.55±0.023
≥7	4031	1.36±0.008	652	1.40±0.024
İşletmeler*		P=0.000		P=0.000
Taban-40	576	1.08±0.021		
Taban-45	443	1.09±0.024		
Taban-17	932	1.12±0.017		
Taban-47	877	1.12±0.017		
Taban-36	587	1.55±0.021		
Taban-10	442	1.59±0.024		
Taban-11	565	1.59±0.021		
Taban-30	215	1.78±0.034		
Tümleşik-1	-		128	1.48±0.056
Tümleşik-2	-		550	1.29±0.026
Tümleşik-3	-		86	1.36±0.067
Tümleşik-4	-		636	1.28±0.024
Tümleşik-5	-		490	1.71±0.027
Tümleşik-6	-		482	1.37±0.027
Tümleşik-7	-		552	1.50±0.025
Tümleşik-8	-		569	1.37±0.025
Tümleşik-9	-		519	1.44±0.026
Tümleşik-10	-		514	1.53±0.026
Tümleşik-11	-		622	1.51±0.024
Tümleşik-12	-		537	1.21±0.026
Tümleşik-13	-		536	1.58±0.026
Tümleşik-14	-		498	1.95±0.027
Tümleşik-15	-		624	1.31±0.024
Tümleşik-16	-		576	1.24±0.025
Genel	26797	1.34±0.003	7919	1.45±0.009

*48 taban işletme olduğu için tabloda sadece en düşük değer alan 4 en yüksek değer alan 4 olmak üzere toplam 8 taban işletme gösterilmiştir.

Çizelge 2 incelendiğinde elde edilen batın genişliği genel ortalaması taban ve tümleşik işletmeler için sırasıyla 1.34 ve 1.45 olarak karşımıza çıkmaktadır. Tabakalar arası fark önemli bulunmuştur. Bu durum sürü oluşumlarının sağlıklı bir temeli olduğunu göstermektedir. Elde edilen veriler incelendiğinde yıllara göre özellikle taban işletmelerde hissedilir düzeyde döl verimi artışı meydana geldiği dikkati çekmektedir.

Tümleşik ve taban işletmelerde elde edilen sonuçlar, batın genişliği performansı anlamında ele alınan tüm kesikli faktörlerin çok önemli varyasyon yarattığına ($P<0.01$) işaret etmektedir. Elde edilen bulgular, Eşme koyunların döl verim performanslarının önemli bir potansiyele sahip olduğunu göstermektedir. Yıllar bakımından döl veriminde sağlanan artışlar ise döl veriminin ıslahına yönelik olarak önemli bir gelişme sağlandığının en somut göstergesidir.

Elde edilen batın genişliği değerleri Kıvırcık ve Kıvırcık melezi koyunlarda belirtilen değerlerden (Ceyhan ve ark., 2007; Demir ve ark., 2002) yüksek, aynı ırk için gerçekleştirilen diğer çalışmalarda belirtilen değerlerden düşük olmuştur (Sezenler ve ark., 2011; Koyuncu, 2005). Benzer

şekilde tümleşik ve taban sürüler için Eşme Kıvrıkcık Melezi koyunlarda tespit edilen batın genişliği değerleri Karaca ve ark. (2004) tarafından Prolifik Kıvrıkcık ve Karya genotiplerinde elde edilen değerlerden düşük olmuştur. Literatür ve gerçekleştirilen çalışma arasındaki farklılıklar farklı yetiştirme sistemleri ve iklimsel farklılıklara atfedilebilir.

Yapılan analizlerde koyunların döl verim performansları 4 yaşında doğal olarak zirveye ulaşmasına karşın yaşlı koyunların (6 \geq yaş) döl verim performansları da belirgin derecede yüksek olmuştur. Bu durumun döl verim performansı yüksek hayvanların daha uzun süre damızlıkta kullanılması sonucu gerçekleştiğini akla getirmektedir. Yetiştiricilere göre bakım yönetim koşulları arasında ciddi düzeyde bir varyasyondan söz etmek mümkündür. Ancak batın genişliği bakımından yüksek bir performansın saptanmış olması, tümleşik sürünün döl verimi bakımından üstün damızlık performansı ya da yüksek genetik potansiyeline atfedilebilecek bilgiyi temellendirmektedir

Tümleşik sürülerde batın genişliğine ilişkin tekrarlar derecesi (t) ve kalıtım derecesi(h²) tahminleri Çizelge 3'te verilmiştir.

Çizelge 3. Eşme koyunlarında batın genişliğine ait tekrarlar (t) ve kalıtım derecesi (h²) REML tahminleri

Özellik	Koyun Sayısı	Gözlem sayısı	t	Modeldeki kesikli etmenler
Batın Genişliği	6836	14467	0.335	İşletme, Yıl, Yaş
Özellik	Koç sayısı	Yavru sayısı	h ²	Modeldeki kesikli etmenler
Batın Genişliği	78	19861	0.120	İşletme, Yıl, Yaş

REML tekniğine dayalı olarak gerçekleştirilen analizlerde batın genişliğine ilişkin kalıtım derecesi tahmini 0.12 tekrarlar derecesi ise 0.335 olmuştur. Elde edilen tekrarlar derecesi orta düşük bir değer olarak kabul edilebilir. Elde edilen tekrarlar derecesi Batın genişliğine ilişkin tekrarlar dereceleri literatür bildirişleri ile karşılaştırıldığında kısmi bir yüksekliğin söz konusu olduğu görülmektedir (Bindon ve Piper, 1979; Fogarty, 1995; Boujenane, 1996; Maijala, 1996). Kalıtım derecesi tahmini ise batın genişliği bakımından tüm sürüler için 0.12 düzeyinde olmuştur. Elde edilen kalıtım derecesi tahmin değerleri diğer koyun ırklarından elde edilen ortalama değerlerden yüksektir (Fogarty, 1995; Safari ve ark., 2005, Rao ve Notter, 2000). Ancak elde edilen kalıtım derecesi tahminleri Karaca ve ark., (2009) ve Cemal ve ark., (2011) tarafından Karya koyunu için bildirilen değerlerden düşük olmuştur.

Sonuç olarak tümleşik sürüye ilişkin elde edilen bilgiler, sürü oluşumu sürecinin doğru işletildiğini ve döl verimi bakımından küçümsenemeyecek bir genetik ilerlemenin sağlandığını göstermektedir. Bunun yanında, sürüler içi bireyler arası veya familyalar arası ciddi performans farklılıkları göze çarpmaktadır. Gözlenen geniş varyasyon dölverimi bakımından genetik yapının çok daha üst seviyelere çıkartılabilmesinin mümkün olduğuna işaret etmektedir. Ayrıca Eşme Kıvrıkcık melezi koyunlar için elde edilen ortalama batın genişliği değerinin çoğu yerli ırkın ortalamalarından daha yüksek olduğunu göstermektedir. Ortaya konan çalışma bulguları geleceğe yönelik önemli projeksiyonlara taban oluşturabilecek niteliktedir.

Teşekkür

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Kaynaklar

- Aşkın, Y., 1982. Akkaraman ve Anadolu Merinosu koyunlarında eksogen hormon kullanarak kızgınlığın senkronizasyonu ve döl veriminin denetimi olanakları. Ankara Üniv. Zir. Fak. (Doçentlik Tezi, basılmamış, 101s), Ankara.
- Bindon, B.M., Piper, L.R., 1979. Assesment of new and traditional techniques of selection for reproduction rate. In: Sheep Breeding., ed: G.L.Tomes, D.E.Robertson and R.J.Lightfoot. Muresk and Perth Western Australia.
- Boujenane, I., 1996. Prolific Sheep, The D'Man, Ed: M.H. Fahmy (Ed.), , CAB International Press, UK. pp:109-120.
- Boldman, K.G., Kriese, L.A., Van Vleck, L.D., Van Tassel, C.P., Kachman, S.D. 1993. A manual for use of MTDFREML. A set of programs to obtain estimates of variances and covariances. U.S. Department of Agriculture, Agricultural Research Service. 114 pp.
- Cemal, İ., Yılmaz, O., Karaca, O., 2011. Karya koyunlarda yumurtlama ve doğumda kuzu sayısına ait fenotipik ve genetik parametreler. 7. Ulusal Zootečni Bilim Kongresi, 14-16 Eylül, Adana. pp.147.
- Ceyhan, A., Erdoğan, İ., Sezenler, T., 2007. Gen kaynağı olarak korunan Kıvırcık, Gökçeada ve Sakız koyun ırklarının bazı verim özellikleri. Tekirdağ Ziraat Fakültesi Dergisi 4 (2):211-218.
- Demir, H., Ekiz, B., Yılmaz, A., Elmaz, Ö., 2002. Kıvırcık ve Sakız x Kıvırcık Melezi F₁ koyunların dölverim ve kuzularının yaşama gücü. İstanbul Üniversitesi Veteriner Fakültesi Dergisi, 28(1):155-161.
- Esenbuğa, N., Dayıoğlu, H., 2002. İvesi ve Morkaraman koyunlarının döl verim özelliklerine kimi çevre faktörlerinin etkileri. Turk J Vet Anim Sci 26: 139-143.
- Fogarty, N.M., 1995. Genetic parameters for live weight, fat and muscle measurements, wool production and reproduction in sheep: A Review. Animal Breeding Abstracts, 63(3): 101-143.
- Hanrahan, J.P., 1989. Altering reproductive rate in sheep: some genetic and non-genetic option, ed: O.R. Dyrmondsson and S. Thorgeirsson, Reproduction, Growth and Nutrition in Sheep. pp:45-55.
- Janssens, S., Vandepitte, W., Bodin, L. 2004. Genetic parameters for litter size in sheep: natural versus hormone-induced oestrus, Genetics Selection Evolution, 36 (5):543-562.
- Karaca, O., Kaymakçı, M., Vanlı, Y., 1992. Koyunlarda döl veriminin genetiği ve yeni yaklaşımlar. Y.Y.Ü. Zir. Fak. Der. 2(1):138-157.
- Karaca, O., Cemal, İ., 2000. Ovulation rate of some sheep genotypes under extensive management system in Aydın region. Book of Abstracts of the 51st Annual Meeting of the European Association of Animal Production, The Hague, The Netherlands, p.309.
- Karaca, O., Cemal, İ., Atay, O., 2000. The performance and repeatability estimation of litter size and milk yield traits in regional synthetic Cine Type sheep. Book of Abstracts of the 51st Annual Meeting of the European Association of Animal Production, The Hague, The Netherlands, p.312.
- Karaca, O., Cemal, İ., Altın, T. 2002. Çine Tipi koyunlarda batın genişliği ve kuzu yaşama gücüne ilişkin kimi parametre tahminleri. III. Ulusal Zootečni Bilim Kongresi, 14-16 Ekim 2002, Ankara Üniversitesi, Ziraat Fakültesi, Zootečni Bölümü, Ankara.
- Karaca, O., Aygün, T., Altın, T., Cemal, İ., Yıldız, S., 2004. Prolifik Kıvırcık ve Karya Tipi koyunlarda doğumda kuzu sayısı ve serum LH düzeyleri. Y.Y.Ü. Zir. Fak. Tarım Bilimleri Dergisi 14 (1): 17-21.
- Karaca, O., Cemal, İ., Altın, T., Yılmaz, O., 2009. Karya koyunlarda yumurtlama sayısı ve batın genişliği temel parametreleri. 6. Ulusal Zootečni Bilim Kongresi, 24-26 Haziran, Erzurum. pp.346-354
- Kaymakçı, M., Sönmez, R., 1992. Koyun yetiştiriciliği. Hasad Yayıncılık Hayvancılık Serisi No: 3. İstanbul.
- Kaymakçı, M. ve Sönmez, R., 1999. İleri Koyun yetiştiriciliği. E.Ü. Basımevi Bornova İzmir.
- Koyuncu, M., 2005. Reproductive performance of Kıvırcık ewes on accelerated lambing management. Pakistan Journal of Biological Science, 8(11): 1499-1502.
- Maijala, K., 1996. The Finnsheep, ed: M.H. Fahmy, Prolific Sheep, CAB International Press, UK. pp:10-46.
- Olesen I., Svendsen M., Klemetsdal G., Steine T., 1995. Application of a multipletrait animal model for genetic evaluation of maternal and lamb traits in Norwegian sheep, Anim. Sci. 60: 457-469.
- Rao, S., Notter, D.R., 2000. Genetic analysis of litter size in Targhee, Suffolk, and Polypay sheep. J. Anim. Sci. 78:2113-2120.
- SAS, 1999. The SAS System. Version 8. Copyright (c) 1999 by SAS Institute Inc., Cary, NC, USA.

- Sezenler, T., Yildirim, M., Ceyhan, A., Yüksel, M.A., Önal, A.R., Özder, M., 2011. The Effects of body condition score and age of ewes on the reproductive performance in Kivircik, Sakiz and Gokceada Sheep. *J Anim Sci. Adv.* 1(2): 94-99.
- Shaat I., Galal S., Mansour H., 2004. Genetic trends for lamb weights in flocks of Egyptian Rahmani and Ossimi sheep, *Small Rumin. Res.* 51: 23–28.

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Pre- and Post-Weaning Growth of Akkaraman Sheep in Kırşehir ProvinceSeyrani Koncagül¹ Füsün Coşkun² Erkan Pehlivan¹¹Department of Animal Science, Faculty of Agriculture, Ankara University, 06110 Ankara²Department of Animal Science, Faculty of Agriculture, Ahi Evran University, 40080 Kırşehir**Abstract**

This study was aimed to evaluate the growth performances of Akkaraman sheep under smallholder production systems in Kırşehir, Turkey. Growth data were collected and analysed on the 73480 lambs owned by 86 flocks from 2013 to 2019 in two sub-projects of Genetic Improvement of Akkaraman Sheep that have been supported by the General Directorate of Agricultural Researches and Politics (TAGEM) in the scope of *National Small Ruminant Improvement Project Under Farmer Condition*.

Overall live weights (kg) of Akkaraman lambs at birth (BW0), 2 (BW60), 4 (BW120) and 6 (BW180) months of age were 4.14 ± 0.003 , 19.47 ± 0.057 , 30.61 ± 0.036 and 41.74 ± 0.101 kg, respectively. Weights in all ages were significantly ($P < 0.05$) affected by project, flock, year and season of birth, birth type and sex of lamb except for type of birth on BW180.

Average daily weight gain (ADWG) were 255.8 ± 0.94 , 220.5 ± 0.297 and 209.1 ± 0.566 g from birth to 60, birth to 120 and birth to 180 days of age, respectively. Direct heritability estimates for corresponding ADWGs were 0.16, 0.32 and 0.04, respectively. Estimates of the additive genetic correlations ranged from 0.03 to 0.10 among ADWGs. Analyses showed that there is a large genetic variance for *pre-* and *post-weaning* growth traits in Akkaraman sheep and the growth rate before and after weaning can be improved by continuous upward selection while applying a constrain on birth weight.

Keywords: Akkaraman sheep, Growth traits, Environment, Genetic parameters, Selection

Eşme Kıvırcık Koyunlarda Kuzu Doğum Ağırlığı ve Doğumda Koyun Canlı Ağırlıkları

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Özet

Sunulan çalışmada Eşme Kıvırcık koyunlarda kuzu doğum ağırlığı ve doğumda koyun ağırlıklarının tanımlanması amaçlanmıştır. Çalışmanın veri setini 6 yıllık süre içinde (2011-2016) 48 taban (27318 kuzu ve 7214 koyun) ve 16 tümleşik sürüde (8652 kuzu ve 5995 koyun) bulunan 35790 baş kuzuya ait doğum ağırlığı ve 13209 baş koyuna ait doğumdaki ağırlıklarına ait veriler oluşturmuştur. Taban ve tümleşik sürülerde doğum ağırlığı ve koyunun doğumdaki ağırlıklarına ait ortalama değerler sırasıyla 3.85 kg, 57.58 kg ve 3.99 kg, 58.72 kg olarak elde edilmiştir. Kuzu doğum ağırlığı ve doğumda koyun ağırlığı üzerine yıl, koyun yaşı, doğum tipi ve doğum ayı gibi sabit etkilerin etkisi istatistik olarak önemli olmuştur ($P < 0.05$). Cinsiyetler bakımından doğum ağırlığı bakımından ortaya konan ayırım beklenildiği gibi istatistik olarak önemli bir farklılık sergilemiştir. Diğer yandan kuzu doğum ağırlığı üzerine sürekli etmen olarak değerlendirilen koyun ağırlığı istatistik olarak önemli olmuştur. Kuzu doğum ağırlığı ve koyunun doğumdaki ağırlık değerleri bakımından işletmeler arasındaki varyasyonun işletmelerin özgün bakım besleme koşullarından kaynaklandığı düşünülmektedir. **Anahtar Kelimeler:** Koyun, Eşme Kıvırcık, gelişme, doğum ağırlığı, koyun canlı ağırlığı

Lamb Birth Weight and Ewe Live Weights in Eşme Kıvırcık Sheep

Abstract

The present study aimed to identify the lamb birth weight and ewe live weight at birth of Eşme Kıvırcık sheep. Analyzed data consisted of 35970 lamb birth weight and 13209 ewe live weight data recorded during the 6-year period (2011 to 2016) in 48 base (27318 lambs and 7214 ewes data) and 16 integrated (8652 lambs and 5995 ewes data) farms. Overall means for lamb birth weight and ewe live weight were found as 3.85 kg, 57.58 kg and 3.99 kg, 58.72 for based and integrated farms, respectively. The effect of years, ewe ages, birth type and month of birth on lamb weight and sheep live weight at birth were significant ($P < 0.05$). As expected, the birth weight of lambs differed statistically in terms of genders. The regression of ewe live weight at birth on lamb birth weight was found to be statistically significant. The variation between farms for lamb birth weight and ewe live weight stems from unique management conditions of the farms. **Keywords:** Sheep, Eşme Kıvırcık, growth, birth weight, ewe live weight

Giriş

Kuzu doğum ağırlığı ve doğumda koyun ağırlığı kuzularda büyümeyi karakterize eden önemli özelliklerdendir. Bir canlının doğum ağırlığı ile çeşitli dönemlerindeki canlı ağırlıkları genotip ve çevresel faktörlerin etkisi ile şekillenir. Koyunlardan daha fazla kuzu üretimi, koyun başına dömlü yumurta sayısının artırılması yanında döllenmiş yumurtaların döl yatağında normal gelişip büyümesine ve bunun sonucu olarak doğum ağırlığı yüksek, sağlıklı kuzulara sahip olmaya bağlıdır (Sezenler ve ark 2008).

Kuzu doğum ağırlığı 1.5- 6 kg arasında değişebilir. Bu değişimler ana yaşı, besleme, ikizlik gibi plasental beslemeyi etkileyen faktörlerle ilgilidir. Kuzu doğum ağırlığında meydana gelen değişimler ölüm oranındaki artışlar, gelişme özelliklerinde düşüş ve karkasta yağlanma gibi olumsuzluklara neden olmaktadır. Doğum ağırlığı kuzuların yaşama gücünü büyük çapta etkiler. Doğum ağırlığının düşmesiyle ölümler de artar. Doğum ağırlığı 1.7 kg'ın altında olan kuzularda ölüm % 94 dolayında olduğu bildirilmektedir (Maud ve Duffell, 1977; Rose 1978). Doğum ağırlığını yükseltmekle yaşama gücü belli bir sınıra kadar iyileştirilebilir.

Doğumda koyun ağırlığı ise doğacak kuzuların doğum ağırlıklarının önemli bir göstergesi olarak karşımıza çıkmaktadır. Koyunların beslenmesinde en kritik dönemler asım, gebelik ve laktasyon devresi olarak sıralanabilir. Özellikle gebeliğin son dönemindeki besleme, anaların doğum sırasındaki kondüsyonunu ve erken laktasyonda süt veriminin artışı yanında, kuzuların doğum ağırlığını ve büyüme dönemindeki ağırlık artışı ile yaşama güçlerini yükselttiği bildirilmektedir (Öztürk ve ark., 1989; Treacher, 1970).

Doğum ağırlığı üzerine genotip ile birlikte cinsiyet, doğum tipi, ana yaşı, doğum mevsimi ve ananın beslenme durumunun etkili olduğu bildirilmiştir (Akçapınar ve Kadak, 1982; Demir, 1989; Kadak ve ark., 1993; Yalçın ve ark., 1975; Akcan ve ark., 1988; Yılmaz ve ark., 2009).

Gerçekleştirilen çalışmada gerek kuzu yaşama gücü gerekse gelişme özellikleri üzerine önemli etkiye sahip kuzu doğum ağırlıkları ve doğumda koyun ağırlığı gibi faktörler için durum tespiti yapılmıştır.

Materyal ve Yöntem

Hayvan Materyali

Tarımsal Araştırmalar ve Politikalar Genel Müdürlüğü tarafından desteklenen Eşme Kıvırcığı Islahı projesi kapsamında yer alan 48 taban (27318 kuzu ve 7214 koyun) ve 16 tümleşik sürüde (8652 kuzu ve 5995 koyun) 6 yıllık süre içinde (2011-2016) bulunan 35790 baş kuzuya ait doğum ağırlığı ve 13209 baş koyuna ait doğumdaki ağırlıklarına ait veriler oluşturmuştur. Doğumda koyun ağırlığı ve kuzu doğum ağırlığı elektronik kantar yardımıyla tespit edilmiştir. Tüm sürülerde doğan kuzu ağırlıkları ve doğumda koyun canlı ağırlıkları doğumu izleyen ilk 12 saat içerisinde elektronik kantarlar yardımıyla tespit edilerek kayıt altına alınmıştır.

İstatistik Analiz

Sistemantik çevre etmenlerinin etkilerinin ortaya konabilmesi için verilere varyans analizi uygulanmıştır. İstatistiksel değerlendirmeye esas oluşturan matematik modellerde doğumda koyun ağırlığı ve kuzu doğum ağırlığı için kullanılan kesikli ve sürekli etmenler Çizelge 1’de verilmiştir. Özelliklere ait varyans analizleri ve en küçük kareler ortalamaları SAS (SAS,1999) istatistik paket programında bulunan GLM prosedürü kullanılarak hesaplanmıştır. Ele alınan özelliklere ait varyans analizleri ve en küçük kareler ortalamaları için SAS (SAS, 1999) paket istatistik programında bulunan GLM prosedürü kullanılmıştır.

Çizelge 1. Analizlerde kullanılan kesikli ve sürekli etmenler

Doğumda Koyun Ağırlığı		Kuzu Doğum Ağırlığı	
Kesikli Etmenler	Kesikli Etmenler	Sürekli Etmenler	Sürekli Etmenler
Yıl	Yıl	Doğumda Koyun Ağırlığı	
Koyun Yaşı	Ana Yaşı		
İşletme	İşletme		
Doğum Tipi	Doğum Tipi		
Doğum Ayı	Doğum Ayı		
	Cinsiyet		

Bulgular ve Tartışma

Tüm sürülerdeki doğumda koyun ağırlıkları ve kuzu doğum ağırlıklarına ilişkin bulgular Çizelge 2’de verilmiştir.

Çizelge 2. Eşme Kıvırcık Melezi hayvanlarda doğumda koyun ağırlığı ve kuzu doğum ağırlıklarına ait en küçük kareler ortalama ve standart hataları

Faktörler	Doğumda Koyun Ağırlığı				Doğumda Kuzu Ağırlığı			
	N	Taban	N	Tümleşik	N	Taban	N	Tümleşik
Yıl		P=0.000		P=0.000		P=0.000		P=0.000
2011	1331	57.86±0.414	915	58.20±0.604	2492	3.93±0.041	1121	4.04±0.057
2012	1936	56.51±0.413	1232	57.46±0.603	4711	3.73±0.039	1436	3.94±0.055
2013	1892	57.49±0.416	1347	58.70±0.614	5086	3.86±0.039	1538	4.01±0.056
2014	1746	57.19±0.423	1278	59.13±0.612	5115	3.75±0.039	1660	3.92±0.055
2015	309	58.87±0.552	1223	60.10±0.613	4909	3.92±0.039	1622	4.05±0.055
2016					5005	3.89±0.039	1275	3.98±0.056
Yaş		P=0.000		P=0.000		P=0.000		P=0.000
1	537	52.54±0.489	615	55.27±0.647	1653	3.63±0.042	600	3.78±0.060
2	1226	55.85±0.426	1308	56.63±0.596	3853	3.77±0.039	1665	3.85±0.054
3	1328	58.15±0.424	1241	58.35±0.604	5054	3.87±0.039	1793	3.97±0.055
4	1249	59.20±0.426	1045	60.33±0.612	5035	3.94±0.039	1636	4.03±0.055
5	1130	59.97±0.430	836	61.03±0.619	4066	3.91±0.039	1266	4.16±0.056
6	840	59.19±0.444	536	60.44±0.648	3219	3.93±0.040	914	4.09±0.057
≥7	904	58.18±0.443	414	58.99±0.673	4438	3.89±0.039	778	4.06±0.058
İşletmeler		P=0.000		P=0.000		P=0.000		P=0.000
Taban-4	318	64.97±0.513	-	-	547	4.25±0.049	-	-
Taban-5	444	58.22±0.495	-	-	374	3.35±0.054	-	-
Taban-6	268	53.86±0.554	-	-	790	3.75±0.046	-	-
Taban-7	112	53.73±0.750	-	-	525	4.07±0.050	-	-
Taban-8	237	64.17±0.569	-	-	544	4.01±0.049	-	-
Taban-9	309	61.85±0.534	-	-	528	4.37±0.050	-	-
Taban-10	297	53.69±0.538	-	-	482	3.52±0.050	-	-
Taban-11	158	54.38±0.658	-	-	554	3.42±0.049	-	-
Taban-12	720	54.73±0.450	-	-	551	3.91±0.049	-	-

Taban-13	466	55.31±0.488	-	387	4.49±0.053			
Taban-14	506	53.01±0.482	-	401	4.06±0.053			
Taban-15	180	63.74±0.590	-	440	4.08±0.051			
Taban-16	117	63.25±0.719	-	424	4.15±0.052			
Taban-17	249	56.71±0.577	-	722	3.72±0.047			
Taban-18	444	56.65±0.501	-	717	3.52±0.047			
Taban-19	41	62.83±1.110	-	376	3.72±0.052			
Taban-20	442	59.85±0.475	-	730	4.19±0.047			
Taban-21	655	51.70±0.463	-	339	3.36±0.055			
Taban-27			-	826	3.13±0.046			
Taban-29			-	397	4.47±0.053			
Taban-30			-	223	4.68±0.062			
Taban-37			-	210	4.56±0.064			
Taban-39			-	541	3.25±0.049			
Taban-46			-	1105	3.17±0.044			
Tümleşik-1		41	57.30±1.290			34	3.70±0.133	
Tümleşik-2		362	52.79±0.683			565	3.67±0.060	
Tümleşik-3		86	58.88±0.998			87	4.16±0.094	
Tümleşik-4		497	55.12±0.658			612	3.75±0.059	
Tümleşik-5		365	64.25±0.673			653	4.32±0.059	
Tümleşik-6		341	61.93±0.681			486	4.08±0.060	
Tümleşik-7		440	54.27±0.658			656	3.93±0.058	
Tümleşik-8		467	60.56±0.657			552	4.30±0.060	
Tümleşik-9		385	59.46±0.650			621	3.97±0.059	
Tümleşik-10		417	54.83±0.660			642	4.04±0.059	
Tümleşik-11		455	62.61±0.656			718	4.33±0.058	
Tümleşik-12		435	49.76±0.666			490	3.88±0.061	
Tümleşik-13		445	66.80±0.649			637	4.40±0.058	
Tümleşik-14		351	63.83±0.667			773	4.55±0.056	
Tümleşik-15		423	62.42±0.658			619	3.27±0.058	
Tümleşik-16		485	54.71±0.661			507	3.50±0.061	
Doğum Tipi		P=0.000	P=0.047	P=0.000	P=0.000			
1	4807	58.22±0.362	3783	58.66±0.567	14472	4.55±0.037	3903	4.78±0.053
2	2211	58.38±0.380	1926	59.12±0.576	11751	3.83±0.038	3990	3.99±0.053
3≥	196	56.15±0.585	286	58.39±0.703	1095	3.16±0.043	759	3.21±0.058
Doğum Ayı		P=0.000	P=0.000	P=0.000	P=0.000			
Ocak	1634	57.42±0.245	1678	60.28±0.243	7568	4.04±0.011	2266	4.08±0.02
Şubat	1101	56.70±0.269	743	59.49±0.309	3453	3.93±0.015	910	3.94±0.026
Mart	615	56.01±0.323	562	58.80±0.341	1842	3.98±0.019	616	3.77±0.03
Nisan	529	57.42±0.358	365	59.02±0.415	902	3.88±0.026	340	3.72±0.04
Mayıs	86	58.91±0.737	69	58.66±0.882	105	3.78±0.072	58	3.76±0.095
Haziran	15	57.58±1.702	8	57.62±2.513	6	3.96±0.299	11	3.7±0.212
Temmuz	6	59.86±2.672	6	64.82±2.924				
Ağustos			2	52.74±5.008	8	3.19±0.260	2	5.04±0.493
Eylül	12	57.08±1.901	21	55.09±1.566	196	3.52±0.058	33	3.73±0.123
Ekim	85	56.55±0.742	125	57.78±0.662	787	3.93±0.028	226	4.05±0.049
Kasım	667	58.38±0.313	598	59.96±0.342	2845	4.04±0.016	1132	4±0.025
Aralık	2464	57.52±0.225	1818	60.38±0.234	9606	4.08±0.011	3058	4.11±0.018
Cinsiyet					P=0.000	P=0.000		
Erkek					13467	3.96±0.038	4246	4.11±0.053
Dişi					13851	3.74±0.038	4406	3.87±0.053
Reg. Linear					P=0.000	P=0.000		
Koy Dog. Ağ					0.025±0.001		0.018±0.001	
Genel	7214	57.58±0.388	5995	58.72±0.576	27318	3.85±0.038	8652	3.99±0.053

Kuzu doğum ağırlıkları için tümleşik ve taban işletmelerde ele alınan kesikli etmenlerin etkisi istatistik olarak çok önemli bulunmuştur ($p<0.01$). Ortaya çıkan farklılıklarda işletmelerdeki bakım ve yönetim farklılıklarının belirleyici olarak öne çıktığı kabul edilebilir. Genel doğum ağırlığı ortalaması tümleşik sürü için 3.99 kg taban sürüler için ise 3.85 kg olmuştur. En yüksek kuzu doğum ağırlığı değeri Taban-30 işletmesinde (4.68) ortaya çıkmıştır.

Ana yaşı arttıkça kuzu doğum ağırlıklarının da oransal olarak yükseldiği söylenebilir. Özellikle son yaş grubunda elde edilen 4.06 kg gibi yüksek bir kuzu doğum ağırlığı değeri ilginç bir gözlem olarak ortaya çıkmaktadır.

Özellikle her iki özellik içinde 2012 yılında meydana gelen düşüler ani iklim değişimlerinin sonucu olarak karşımıza çıkmaktadır. İlerleyen yaşla birlikte düşme eğilimine girmesi beklenen kuzu doğum ağırlıklarının yüksek görülmesinin mevcut materyalin bakım yönetim özgünlüğünden kaynaklandığı söylenebilir. Daha önceden yapılan araştırmalarda da (Sönmez ve Kızılay, 1972; Esen ve Yıldız 2000) benzeri gözlemler elde edilmiştir. Yüksek verimli hayvanların çok ileri yaşlara kadar elde tutulma eğilimi bu durumun başka bir nedeni olarak kabul edilebilir. Ayrıca yine tümleşik sürülerde elde edilen koyun ağırlığı değerlerinin nispeten yüksek olması bu işletmelerin diğerlerine göre koyun beslenmesine daha fazla özen gösterdiğine işaret etmektedir. Koyunlarda canlı ağırlığın yaş gruplarına göre dağılımı giderek artan sonra azalan bir eğilim göstermektedir. Bu değişim genel bilgilerle uygunluk içindedir.

Kuzu doğum ağırlığı sonuçları bakımından cinsiyet ayrımı erkekler lehine ve istatistiki olarak çok önemlidir. Doğum tipi bakımından üç farklı grup ayrımı yapılmıştır (Tekiz, ikiz, üçüz ve üstü). Gerçekleştirilen analizlerde her iki işletme tipi içinde tekiz doğanların diğerlerine göre üstünlük sağlaması beklenen bir bulgudur. Kuzu doğum ağırlığı üzerine ana canlı ağırlığının etkisi (doğrusal regresyon katsayısı) istatistik çok önemlidir.

Genel ortalaması tümleşik sürülerde 57.58 taban işletmelerde ise 58.72 kg olan doğumda koyun canlı ağırlıkları üzerine tüm kesikli etmenlerin etkisi istatistiki olarak önemlidir ($P<0.01$). Her iki işletme tipinde de doğumda koyun ağırlığı değerinin ilerleyen yaşla birlikte yükselme eğilimi gösterdiği dikkati çekmektedir. İşletmelere göre en düşük performans taban sürüye aittir. En yüksek koyun ağırlığı değeri ise Tümleşik-13 (66.80) işletmesinde elde edilmiştir.

Doğumda koyun ağırlığı ve kuzu doğum ağırlıkları için elde edilen değerler yerli ırklarda gerçekleştirilen çalışmalardan elde edilen değerlerden yüksek bulunmuştur (Karaca ve ark., 2011; Özbey ve Akcan 2003; Arslan ve ark., 2003; Odabaşoğlu ve ark., 1996). Kuzu doğum ağırlığı için elde edilen değer Ceyhan ve ark., (2007) tarafından Kıvrıkcık ırkında gerçekleştirilen çalışmadan elde edilen bulgularla benzerlik gösterirken bu değer konuyla ilgili bazı literatürden düşük bulunmuştur (Tekin ve Akçapınar, 1994; Özsoy ve ark., 1988; Gupta ve Reddy, 1988)

İşletmelerin özgün bakım yönetim koşullarından kaynaklı doğum ağırlığı ve doğumda koyun ağırlığında ortaya çıkan varyasyon ayrı bir değerlendirme konusudur. Ancak klasik sistematik çevre etmenleri olarak değerlendirebileceğimiz yıl, ana yaşı, cinsiyet, doğum tipi ve ana canlı ağırlığının ortaya koyduğu varyansların konuyla ilgili bir literatürle (Karaca ve Okut, 1991) uyum içinde olduğu söylenebilir.

Teşekkür

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Kaynaklar

- Akcan, A., Özbeyaz, C., Aydoğan, M., Çetin, O., Çınar, K., 1988. Antalya-Boztepe'de yetiştirilen Sakız sürüsünde bazı verim özelliklerinin incelenmesi. *Doğa Türk. Vet. ve Hay. Derg.* 12 (2), 99- 112.
- Akçapınar, H., Kadak, R., 1982. Morkaraman ve Kangal-Akkaraman kuzuların büyüme ve yasama kabiliyeti üzerinde karşılaştırmalı araştırmalar F.Ü. Veteriner Fakültesi Derg. 7(1-2), 203-212.
- Arslan, M., Yılmaz, O., Ateş, C.T., 2003. Morkaraman ve Corriedale x Morkaraman (F1) kuzularında büyüme. *YYÜ. Vet. Fak. Derg.* 2003,14 (1):46-49
- Ceyhan, A., Erdoğan, İ., Sezenler, T., 2007. Gen kaynağı olarak korunan Kıvırcık, Gökçeada ve Sakız koyun ırklarının bazı verim özellikleri. *Tekirdağ Ziraat Fakültesi Dergisi* 4 (2):211-218.
- Demir, H., 1989. Dağlıç ve Ramlıç koyunlarının önemli verim özellikleri yönünden karşılaştırılmaları. I. Büyüme, yasama gücü ve canlı ağırlık artışları. *İ.Ü. Veteriner Fakültesi Derg.* 15 (1), 23-38. (Doktora Tezi Özeti).
- Esen, F., Yıldız, N., 2000. Akkaraman. Sakız x Akkaraman melez (F1) kuzularda verim özellikleri. I. Büyüme, yaşama gücü, vücut ölçüleri. *Türk. J. Vet. Anim. Sci.* 24 223-231.
- Gupta, D.R., Reddy, K.K., 1988. Factor affecting the birth weight in Nellore and Dorset Nellore synthetic lambs. *Ind. J. Anim. Sci.*, 58, 3: 391-393.
- Kadak, R., Akçapınar, H., Tekin, M.E., Akmaz, A., Müftüoğlu, S., 1993. Alman Siyah Baslı Etçi x Akkaraman, Hampshire Down x Akkaraman, Alman Siyah Baslı Etçi x İvesi ve Hampshire Down x İvesi (F1) kuzuların büyüme, besi ve karkas özellikleri. *Hayvancılık Aras. Derg.* 3 (1), 1-7, (1993).
- Karaca, O., Okut, H., 1991. Kuzuların gelişme özelliklerinde kimi çevre etmenleri. *Y.Y.Ü. Zir. Fak. Der.* 1. 2:138-147.
- Karaca, O., Yılmaz, O., Cemal, İ., 2011. Karya kuzularda büyüme özellikleri. 7. Ulusal Zootehni Bilim Kongresi, 14-16 Eylül, Adana. s.250.
- Maud, B.A., Duffell, S.J., 1977. Lamb mortality in relation to prolificacy. *Anim. Prod.* 24: 158-159
- Odabaşoğlu, F., Küçük, M., Arslan, M., 1996. Saf ve melez (Dorset Down X Morkaraman) Morkaraman kuzularında büyüme ve yaşama gücü özellikleri. *Hay. Aras. Derg.*, 6, 1-2: 87-90.
- Özbey, O., Akcan, A., 2003. Morkaraman ve Kıvırcık x Morkaraman (F1) ve Sakız Morkaraman (F1) melez kuzularda verim özellikleri I. Büyüme, Yaşama gücü, vücut ölçüleri. *Kafkas Üniversitesi Veteriner Fakültesi Dergisi*, 9(1):15-21.
- Özsoy, M.K., Vanlı, Y., Akbulut, Ö., 1988. İvesi x Morkaraman melezlemede bazı faktörlerin koyun verimliliğine etkileri. 2. kuzu ağırlıkları. *Doğa. Turk. Vet. ve Hay. Derg.*, 12, 1: 66-67.
- Öztürk, E., Bas, S., Aksoy, A., Özsoy, M.K., Vanlı, Y., 1989. Gebeliğin son döneminde farklı düzeylerde yemlemenin koyunların canlı ağırlığı, kuzuların doğum ağırlığı, büyüme gücü ve ölüm oranlarına etkileri. *Doğa Türk. Vet. Hay. Derg.* 1989; 13: 352-371.
- Rose, M., 1978. Birth weight and survival in Merino sheep in Northwest Queensland. *Proc. Aust. Soc. Anim. Prod.* 12: 199
- SAS, 1999. The SAS System. Version 8. Copyright (c) 1999 by SAS Institute Inc., Cary, NC, USA.
- Sezenler, T., Köycü, E., Özder, M., 2008. Karacabey Merinosu koyunlarda doğum kondüsyon puanının kuzuların gelişimi üzerine etkileri. *Tekirdağ Ziraat Fakültesi Dergisi* 5(1):45-53.
- Sönmez, R., Kızılay, E., 1972. E.Ü. Ziraat Fakültesi Menemen uygulama çiftliğinde yetiştirilen İvesi. Kıvırcık. Sakız ve Ödemiş koyunlarının verimle ilgili özellikleri üzerinde mukayeseli bir araştırma. *Ege Ü. Ziraat Fak. Derg.* 9 (1): 3-51.

- Tekin, M.E., Akçapınar, H., 1994. Türk Merinosu ve Lincoln X Türk Merinosu (F1) melezi kuzuların büyüme, besi ve karkas özelliklerinin karşılaştırılması. 1. büyüme ve yasama gücü. Tr. J. of. Vet. And. Anm. Sci., 18: 181-187.
- Treacher, T.T., 1970. Effect of nutrition in late pregnancy on subsequent milk production in ewes. Anim. Prod., 12: 23-26.
- Yalçın, B.C., Ayabakan, S., Köseoğlu, H., 1975. Rambouillet x Dağlıç melezlerinin verimle ilgili özellikler yönünden karşılaştırılması. V. Bilim Kongresi. Veteriner ve Hayvancılık Araştırma Grubu. Tebliğleri. 29 Eylül-2 Ekim 1975, Ankara, 259-268.TÜBİTAK.
- Yılmaz, O., Karaca, O., Altın, T., Cemal, İ., 2009. Karya kuzularda pazarlama dönemi gelişme özellikleri ve yaşama gücü. 6. Ulusal Zootekni Bilim Kongresi, 24-26 Haziran, Erzurum. s.165-173.

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Eşme Kıvrıcık Kuzularda Gelişme Özellikleri ve Doğumdan Sütten Kesim Dönemine Kadar Yaşama Gücü

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Özet

Çalışmada Eşme Kıvrıcık kuzularda gelişme özellikleri ve doğumdan sütten kesim dönemine kadarki süreçte yaşam gücüne ilişkin bilgiler tanımlanmıştır. Sunulan çalışma taban (n=27304) ve tümleşik sürülerde (8646) doğan toplam 35950 baş kuzuda yürütülmüştür. Proje kapsamında yer alan işletmelerde doğum ayları bakımından oldukça geniş bir varyasyon olduğundan elde edilen veriler 30, 60, 90, 120 ve 150 gün olarak sınıflandırılmış ve analiz edilmiştir. 30, 60, 90, 120 ve 150. gün kuzu canlı ağırlıklarına ait en küçük kareler ortalamaları taban sürüler için sırasıyla 11.29, 17.29, 25.41, 31.58 ve 39.30 kg tümleşik sürüler için ise 11.07, 16.84, 24.28, 30.73 ve 37.53 kg olmuştur. Sütten kesim döneminde taban ve tümleşik işletmelerde kuzu yaşama gücüne ait ortalama değerler sırasıyla 97.80% ve 96.00% olarak gerçekleşmiştir. Değerlendirmelerde, 30. günde sabit etki olarak kullanılan tabakalar dışında tüm sabit faktörlerin canlı ağırlıklar üzerine etkisi diğer tüm yaş grupları için istatistiksel olarak anlamlı olmuştur (P <0.01).

Anahtar Kelimeler: Gelişme, Eşme Kıvrıcık, sütten kesim ağırlığı, kuzu yaşama gücü

Growth Performances and Survival Rates of Eşme Kıvrıcık Lambs from Birth to Weaning

Abstract

The aim of this study was to determine growth characteristics and survival rates of Eşme Kıvrıcık lambs at the period between birth and weaning. The present study was conducted on lamb data (n=35950) recorded in base (n=27304) and integrated flock (n=8646). Since there is a wide variation in terms of birth months among the farms involved in the project, the data obtained were classified and analyzed as 30, 60, 90, 120 and 150 days. Least square means of live weights at 30, 60, 90, 120 and 150 days of age were 11.29, 17.29, 25.41, 31.58 and 39.30 kg for base farms and 11.07, 16.84, 24.28, 30.73 and 37.53 kg for integrated farms, respectively. Survival rate of lambs at weaning period in base and integrated farms were 97.80% and 96.00%, respectively. In the evaluations, the effect of all fixed factors on live weights was statistically significant (P<0.01) for all age groups except for tiers as a fixed effect at 30 days of age.

Keywords: Growth, Eşme Kıvrıcık, weaning weight, lamb survival

Giriş

Türkiye’de koyunculüğün büyük miktarda (% 97) düşük verimli yerli ırklara dayalı olmasının yanında, erken kuzu kesimi ve hayvanların entansif besiyeye alınmaksızın mezbahaya sevk edilmesi büyük rol oynamaktadır (Günlü, 1996; Yalçın, 1990). Koyunculukta et üretiminin iyileştirilmesinde temel kriter olarak gelişme ve karkas özellikleri üzerinde durulmaktadır (Karaca ve ark., 1999). Hayvanlarda gelişme performansı ırk, cinsiyet, yaş, bakım ve besleme şekli, yemin miktar ve kalitesi gibi faktörlerin etkisi altındadır. Kuzularda canlı ağırlıklar ve etkili olabilecek sistematik çevre etmenlerine ilişkin araştırmalar (Karaca ve Bıyıkoglu, 1990), yaygın biçimde yapıla gelmektedir. Ülkemizde kasaplık kuzu üretimine yönelik melezleme çalışmalarının da (Gönül, 1974; Cengiz ve ark., 1989) kayda değer olduğu kolaylıkla söylenebilir.

Döl veriminin yükseltilmesine ve tanımlanmasına yönelik çalışmalar ile kuzu eti üretimine yönelik faaliyetlerde, kuzularda büyüme- gelişme özellikleri ve yaşama gücü önemli kriterler olarak karşımıza çıkmaktadır (Yılmaz ve ark., 2009; Cemal ve ark., 2009, Karaca ve ark., 2011).

Kuzularda yaşama gücüne ait kalıtım derecesi tahminleri oldukça düşük değerlere sahip olduğundan çevresel etmenlerin etkisi de oldukça yüksektir. Kuzularda yaşama gücüne ilişkin pek çok çalışmada, bu özelliklerin hayvanın yaşı, güç doğum, ana yavru ilişkileri, çevresel etmenler, çoklu doğumlar, irksal farklılıklar, doğum mevsimi ve yılı gibi bir çok faktörün etkisi altında olduğunu ortaya konmuştur (Baş, 1985; Alexander, 1987; Putu et al., 1988; Katz et al., 1988; Hanrahan, 1989; Demirören et al. 1992; Çelik, 1995; Kaymakçı ve Sönmez, 1999; Taşkın ve ark., 1996a, Taşkın ve ark., 1996b, Martin, 1999; Karaca ve ark., 2002). Dolayısıyla, çevresel faktörlerde sağlanacak iyileştirmeler kuzu yaşama gücünü ve karlılığı olumlu yönde etkileyebilecektir. Bakım ve yönetim koşullarında yapılacak düzenlemeler ile bu seviyeler daha da yükseltilebilir.

Uşak ilinde ve büyük bir koyun varlığına sahip olan Eşme İlçesi koyunculukta hem sayı hem de üretim anlamında önemli bir potansiyele sahiptir. Eşme, Batı Anadolu’da kuzu eti üretimi anlamında büyük bir pazar konumundadır. Batı Anadolu’da ince/yağsız kuyruklu koyun genotiplerinden Kıvırcık ve Kıvırcık melezi kuzu etine olan talep oldukça fazladır. Bu talep doğrultusunda Nisan-Haziran aylarını kapsayan dönemde Eşme’den başta İzmir olmak üzere Ege bölgesindeki birçok il merkezi ile ilçeye kesim amacıyla yoğun bir şekilde kuzu gönderilmektedir. Anılan dönemin dışında kurbanlık amacıyla da çevre illere önemli bir sevkiyat yapılmaktadır.

Ege bölgesi oldukça önemli bir kuzu üretim merkezi olan ancak üzerinde çalışmamış bir populasyon olan Eşme Kıvırcık melezi koyun populasyonunda bu proje ile farklı dönemlerde tanımlanan pazarlama dönemi canlı ağırlık, ortalama günlük canlı ağırlık ve sütten kesime kadarki dönemde yaşama gücü değerlerine yönelik bulgular literatüre önemli katkılar sağlayacaktır.

Materyal ve Yöntem

Projede yer alan işletmeler arasında doğum zamanları bakımından oldukça geniş bir varyasyon bulunduğundan belirli zamanlarda kuzularda yapılan canlı ağırlık denetimleri aşağıdaki şekilde günlük yaşlara göre sınıflandırılarak analiz edilmiştir.

30. gün canlı ağırlığı: 30-45 gün

60. gün canlı ağırlığı: 46-75 gün

90. gün canlı ağırlığı: 76-105 gün

120. gün canlı ağırlığı: 106-135 gün

150. gün canlı ağırlığı: 136 gün>

Ortalama günlük canlı ağırlık artışlarının hesaplanmasında aşağıdaki formülden yararlanılmıştır.

$$\text{Ortalama Günlük Canlı Ağırlık Artışı} = \frac{\text{Pazarlama Ağırlığı} - \text{Doğum Ağırlığı}}{\text{Kuzunun Günlük Yaşı}}$$

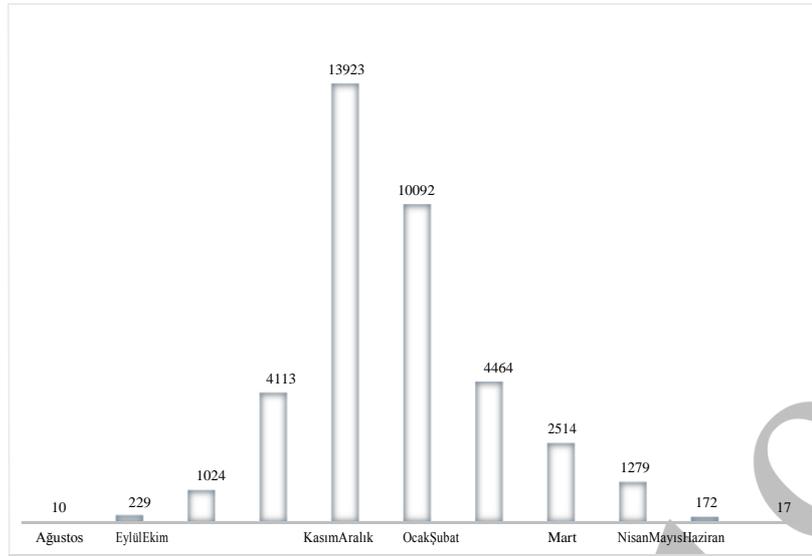
Kuzularda yaşama gücünün belirlenmesinde yörede süttten kesimle eşzamanlı olan pazarlama dönemine kadar izlenerek yaşama gücüne ilişkin kayıtlar alınmıştır. Doğum döneminde analar ve kuzular doğumu izlen ilk 24 saat içinde tartılmış ve kuzular plastik küpe ile numaralanmıştır.

İstatistik Analiz

Sistemik çevre etmenlerinin etkilerinin ortaya konabilmesi için verilere varyans analizi uygulanmıştır. Özelliklere ait varyans analizlerinin yapılması, en küçük kareler ortalamalarının elde edilmesi için SAS (SAS,1999) istatistik paket programında bulunan GLM prosedürü kullanılmıştır. Kuzuların süttten kesim dönemindeki yaşama gücü değerlerinin hesaplanmasında Khi-kare (χ^2) testi kullanılmıştır.

Bulgular ve Tartışma

Projede yer alan taban ve tümleşik işletmelerdeki doğum zamanları bakımından oldukça geniş bir varyasyon bulunmaktadır. Doğumların bu denli dağılım göstermesi (Şekil 1) işletmelerde periyodik olarak gerçekleştirilen canlı ağırlık denetimlerinin yılın farklı dönemlerinde gerçekleştirilmesine neden olmaktadır. Bu nedenle kuzularda yapılan canlı ağırlık denetimlerinde 5 farklı yaş grubu oluşturulmuştur (Çizelge 1). Yapılan canlı ağırlık denetimleri günlük yaşlara göre sınıflandırılarak analiz edilmiştir.



Şekil 1. Eşme koyunlarda doğumların dağılımı

Çizelge 1. Canlı ağırlık yaşlarına göre gerçekleştirilen sınıflandırma

Sınıflar	X (gün)	Aralık	N (Taban)	N (Tümleşik)	Toplam
30.Gün	32.59	15-45 gün	2118	756	2874
60. Gün	62.11	46-75 gün	4349	1373	5722
90. Gün	91.89	76-105 gün	11301	3228	14529
120. Gün	117.69	106-135 gün	7610	2308	9918
150.Gün	158.95	≥136 gün	1926	981	2907
				Genel Toplam	35950

Çalışmada yer alan işletmelerde 5 farklı yaş grubuna göre sınıflandırılan canlı ağırlık denetimleri sonucunda kuzu canlı ağırlığı ve ortalama günlük canlı ağırlık artışlarına ilişkin en küçük kareler ortalama ve standart hataları Çizelge 2’de verilmiştir.

Yapılan analizlerde tüm yaş gruplarında sütten kesim dönemine kadar taban işletmelerdeki hayvanların canlı ağırlık ve ortalama günlük canlı ağırlık artışlarına ait ortalamalar tümleşik sürü hayvanlarından üstün olmuştur. Yapılan canlı ağırlık denetimlerinden elde edilen sonuçlar irdelendiğinde yörede sütten kesim yaşının yaklaşık 3.5 ay olduğu görülmektedir. Analiz edilen örnek büyüklüklerine bakıldığında 4 aylık yaştan sonra kuzuların büyük kısmının pazarlandığı ve buna bağlı olarak yörede kuzu pazarlama yaşının 3 aylık yaştan sonra olduğu söylenebilir.

Yapılan deęerlendirmelerde 30. gnlk yařta tabaka ayrımı dıřındaki dięer kesikli faktrlerin canlı aęırlık ve ortalama gnlk canlı aęırlık artıřları zerine etkisi tm yař grupları bakımından istatistik nemli çıkmıřtır ($P<0.001$). Tm yař grupları bakımından gerek canlı aęırlıklar gerekse ortalama gnlk canlı aęırlık artıřları ana yařı iin giderek ykselen sonra dřen bir performans farklılıęı gstermiřtir. Stten kesim dnemindeki ($\bar{X}=91.89$ gn) en yksek deęer 4 ve 5 yařlı anaların kuzularında gzlemlenmiřtir.

Pazarlama canlı aęırlıęına iliřkin elde edilen gerek en kk kareler gerekse regresyon katsayısına ait ortalama deęerler genel literatr bulgusuyla ([Esen ve Yıldız 2000](#)) uyum gstermektedir.

İstatistik olarak nemli ayrımlar ortaya koyan yıllar arasındaki farklılık bakım besleme kořullarının deęiřimini ortaya koymaktadır. Benzer řekilde iřletmeler arasındaki farklılık hayvan yetiřtirme ve besleme pratiklerinin farklı olması ve iřletmelerin yapısal durumlarındaki farklılıęın doęal bir sonucudur. Hem canlı aęırlık hem de ortalama gnlk canlı aęırlık artıřlarının taban iřletmelerde tmleřik iřletmelerden yksek olması tmleřik srlerdeki yksek dl verimine atfedilebilir.

Tek doęanlar ve zler, ikizlerden yksek canlı aęırlık deęerine sahip olmuřtur ($P<0.001$). Beklenenin aksine z doęanların canlı aęırlık bakımından ikizlerden 3. yař grubunda yksek oluřu, deęerlendirmeye alınan z doęan hayvanların sayısının azlıęından veya zlere daha fazla zen gsterilmesinden kaynaklanmıř olabilir. Tek doęanların ikiz ve zlerden daha yksek canlı aęırlık deęerine sahip olmaları konuyla ilgili literatrle (Gilmour et al, 1994, Cemal ve ark, 2004; Yılmaz ve ark., 2014; Karaca ve ark., 2011) uyum gstermektedir.

Çizelge 2. Eşme kuzularında yaş gruplarına göre Canlı Ağırlıklar (CA- kg) ve Ortalama Günlük Canlı Ağırlık Artışları (OGCAA-gr)

Faktörler	30 gün			60 gün			90 gün			120 gün			150 gün		
	X=32,89			X=62,11			X=91,89			X=117,69			X=158,95		
	N	CA	OGCAA	N	CA	OGCAA	N	CA	OGCAA	N	CA	OGCAA	N	CA	OGCAA
Yıl		P=0.000	P=0.000		P=0.000	P=0.000		P=0.000	P=0.000		P=0.000	P=0.000		P=0.000	P=0.000
2011	614	11.34±0.141	219.36±4.308	983	17.58±0.183	212.89±2.935	1178	24.23±0.199	215.49±2.167	519	28.56±0.307	205.09±2.619	319	37.55±0.476	210.59±3.074
2012	539	10.30±0.139	187.06±4.227	888	15.30±0.189	176.21±3.025	2441	22.23±0.164	193.24±1.785	1591	28.30±0.199	204.31±1.697	689	35.67±0.341	198.50±2.200
2013	660	11.18±0.138	215.69±4.194	1122	17.58±0.174	212.95±2.792	3177	25.07±0.151	224.73±1.644	1301	32.40±0.219	239.04±1.868	361	39.92±0.447	226.39±2.884
2014	400	11.33±0.152	221.01±4.620	729	17.19±0.191	205.72±3.058	2967	25.53±0.149	229.33±1.623	1996	32.81±0.195	241.88±1.660	664	38.16±0.391	218.66±2.526
2015	319	12.04±0.163	243.30±4.968	940	17.53±0.184	211.87±2.950	2508	25.90±0.150	233.81±1.632	2325	32.34±0.176	238.45±1.500	439	36.83±0.417	206.12±2.692
2016	342	10.88±0.157	209.47±4.788	1060	17.20±0.180	204.98±2.883	2258	26.11±0.160	235.86±1.735	2186	32.53±0.187	239.78±1.591	435	42.37±0.419	242.90±2.703
Tabaka		P=0.032	P=0.056		P=0.001	P=0.003		P=0.000	P=0.000		P=0.000	P=0.000		P=0.000	P=0.000
Taban	2118	11.29±0.111	218.92±3.399	4349	17.29±0.137	207.19±2.203	11301	25.41±0.121	228.44±1.314	7610	31.58±0.145	231.49±1.232	1926	39.30±0.282	223.03±1.817
Tümleşik	756	11.07±0.125	213.04±3.808	1373	16.84±0.160	201.02±2.557	3228	24.28±0.142	215.71±1.540	2308	30.73±0.175	224.70±1.495	981	37.53±0.318	211.35±2.050
Ana Yaşı		P=0.035	P=0.011		P=0.029	P=0.023		P=0.000	P=0.000		P=0.000	P=0.000		P=0.000	P=0.000
1	483	10.96±0.147	207.09±4.477	540	17.28±0.212	208.12±3.392	754	25.11±0.233	224.75±2.533	399	31.73±0.345	233.1±2.941	73	35.89±0.853	200.05±5.503
2	737	11.03±0.132	210.40±4.013	1087	17.00±0.175	202.99±2.811	2024	24.68±0.162	220.40±1.764	1280	30.77±0.215	224.82±1.833	391	39.39±0.408	223.56±2.632
3	522	11.21±0.138	218.86±4.211	1142	17.07±0.175	204.48±2.812	2741	24.80±0.149	221.55±1.617	1860	31.05±0.191	227.28±1.631	564	38.96±0.349	220.95±2.253
4	427	11.34±0.146	220.18±4.443	1037	16.93±0.179	201.67±2.869	2804	25.15±0.149	225.20±1.617	1805	31.30±0.192	229.26±1.634	580	38.69±0.352	219.40±2.274
5	266	11.46±0.171	224.49±5.202	647	17.39±0.204	209.03±3.268	2354	25.15±0.158	225.53±1.722	1568	31.83±0.202	233.83±1.719	507	39.67±0.359	225.43±2.32
6	197	11.24±0.189	218.06±5.777	552	17.14±0.213	205.29±3.412	1753	24.84±0.173	222.00±1.876	1269	31.12±0.215	227.59±1.835	372	38.66±0.408	219.04±2.633
7≥	242	11.01±0.178	212.77±5.424	717	16.64±0.199	197.15±3.188	2099	24.20±0.169	215.11±1.832	1737	30.28±0.202	220.76±1.722	420	37.66±0.411	211.93±2.652
Doğum Ayı		P=0.153	P=0.518		P=0.000	P=0.000		P=0.000	P=0.000		P=0.000	P=0.000		P=0.000	P=0.000
Ocak	335	11.41±0.142	221.08±4.322	2117	16.92±0.129	202.59±2.075	4916	23.87±0.114	211.89±1.236	1880	29.79±0.180	216.04±1.531	586	36.10±0.356	202.83±2.295
Şubat	759	11.15±0.107	214.57±3.270	1550	16.78±0.143	199.93±2.285	1482	24.48±0.169	217.91±1.831	447	29.10±0.323	211.33±2.751	145	34.77±0.617	191.45±3.984
Mart	949	11.21±0.103	217.80±3.139	999	17.20±0.165	205.93±2.647	345	23.28±0.311	204.98±3.381	262	30.63±0.407	222.91±3.469	116	41.79±0.702	239.15±4.53
Nisan	695	11.03±0.116	212.90±3.543	364	15.90±0.237	186.11±3.805	178	23.49±0.425	207.28±4.618	650	34.56±0.276	256.47±2.354	262	41.76±0.475	239.52±3.064
May-Haz	104	11.43±0.239	219.68±7.284	66	16.48±0.521	197.01±8.345	1076	28.40±0.188	259.56±2.038	2409	33.01±0.165	244.47±1.406	572	38.28±0.348	217.09±2.243
Kasım-Ara	32	10.85±0.413	209.85±12.581	626	19.10±0.189	233.05±3.023	6532	25.56±0.098	230.84±1.061	4270	29.84±0.141	217.34±1.206	1226	37.79±0.263	213.12±1.700
DT		P=0.000	P=0.000		P=0.000	P=0.000		P=0.000	P=0.000					P=0.000	P=0.000
1	1650	11.71±0.101	231.36±3.085	3235	17.85±0.121	217.11±1.936	7315	25.64±0.116	230.52±1.261	4738	32.76±0.140	241.69±1.194	1431	39.19±0.268	222.05±1.730
2	1096	11.08±0.101	211.47±3.093	2265	16.72±0.129	199.16±2.073	6459	24.44±0.118	217.50±1.286	4632	30.87±0.139	225.36±1.185	1281	37.98±0.274	214.48±1.766
3≥	128	10.74±0.221	205.11±6.741	222	16.62±0.293	196.04±4.692	755	24.47±0.228	218.21±2.478	548	29.84±0.296	217.22±2.525	195	38.08±0.540	215.04±3.482
Cinsiyet		P=0.000	P=0.000		P=0.000	P=0.000		P=0.000	P=0.000		P=0.000	P=0.000		P=0.000	P=0.000
Erkek	1485	11.35±0.115	221.67±3.508	2977	17.36±0.143	208.81±2.292	7596	25.90±0.126	233.38±1.367	4731	32.82±0.157	242.14±1.336	911	41.04±0.316	233.78±2.037
Dişi	1389	11.01±0.116	210.28±3.526	2745	16.77±0.147	199.40±2.349	6933	23.79±0.130	210.78±1.411	5187	29.49±0.154	214.04±1.314	1996	35.8±0.287	200.6±1.853
Reg (linear)		P=0.000	P=0.000		P=0.000	P=0.001		P=0.000	P=0.000		P=0.000	P=0.000		P=0.000	P=0.000
Doğ. Ağ.		0.721±0.051	-9.379±1.560		1.276±0.066	3.702±1.062		1.928±0.057	10.028±0.619		1.906±0.082	7.789±0.701		1.760±0.156	4.740±1.005
Yaş		P=0.000	P=0.000		P=0.000	P=0.001		P=0.000	P=0.782		P=0.000	P=0.017		P=0.000	P=0.000
		0.166±0.005	-1.994±0.160		0.232±0.007	0.338±0.106		0.229±0.006	-0.018±0.064		0.214±0.008	-0.166±0.069		0.095±0.006	-0.61±0.042
GENEL	2874	11.18±0.107	215.98±3.264	5722	17.06±0.134	204.1±2.149	14529	24.85±0.119	222.08±1.291	9918	31.16±0.141	228.09±1.205	2907	38.42±0.265	217.19±1.71

Yörede 90 gün olan ve pazarlama dönemine de isabet eden süttten kesim yaşına kadar olan dönemdeki kuzuların yaşama gücüne ilişkin ki-kare test sonuçları Çizelge 5'te verilmiştir.

Çizelge. Pazarlama dönemi kuzu yaşama gücüne ilişkin ki-kare (χ^2) testleri

Yıl		Taban			Tümleşik		
		N	YG	χ^2	N	YG	χ^2
2011	Süttten Kesimdeki Kuzu Sayısı	6499	97.20% ****	5958.92	2129	97.39% ****	1963.95
	Canlı Doğan Kuzu Sayısı	6686			2186		
2012	Süttten Kesimdeki Kuzu Sayısı	6099	96.81% ****	5521.65	2069	96.55% ****	1857.22
	Canlı Doğan Kuzu Sayısı	6300			2143		
2013	Süttten Kesimdeki Kuzu Sayısı	6237	98.56% ****	5969.23	1879	94.76% ****	1588.82
	Canlı Doğan Kuzu Sayısı	6328			1983		
2014	Süttten Kesimdeki Kuzu Sayısı	6250	98.18% ****	5910.45	1909	94.69% ****	1610.72
	Canlı Doğan Kuzu Sayısı	6366			2016		
2015	Süttten Kesimdeki Kuzu Sayısı	5660	98.49% ****	5404.27	2023	96.47% ****	1811.45
	Canlı Doğan Kuzu Sayısı	5747			2097		
2016	Süttten Kesimdeki Kuzu Sayısı	5719	97.68% ****	5323.64	1431	96.17% ****	1268.73
	Canlı Doğan Kuzu Sayısı	5855			1488		
Genel		37.282	97.82%		11.913	96.00%	
Tüm Yıllar Genel Ortalama		49.195			%97.30		

YG: Yaşama gücü; ****: P<0.0001

Doğum ile pazarlama dönemi (süttten kesim) arasındaki süreçte kuzu yaşama gücü genel ortalaması yaklaşık %97.30 olmuştur. Bu değer taban işletmeler için ortalama %97.82 olarak elde edilirken tümleşik işletmeler için %96.00 olmuştur. En olumsuz görüntü tümleşik işletmelerde 2013 yılında gerçekleşmiştir.

Elde edilen yaşama gücü oranları koyunculuk bakımından kabul edilebilir değerler arasındadır. 90. gün yaşama gücü değerleri bazı literatür bildirişlerine benzer (Yılmaz ve ark.,2006; Ceyhan ve ark., 2007) tarafından bildirilen değerlere benzer bulunurken konu ile ilgili bazı literatürden (Esen ve Yıldız, 2000; Yılmaz ve ark., 2009) yüksek bulunmuştur. Kuzularda yaşama gücü bakımından elde edilen parametreler bakım yönetimi ve gösterilen duyarlılıklarla doğrudan bağlantılıdır. Bunun yanı sıra durum yıllar bazında değerlendirildiğinde yıl içerisindeki meraların uygunluğu ve bakım yönetimi

uygulamaları yaşama gücü üzerine direk etkili faktörler olarak değerlendirilebilir. Tümleşik sürülerde elde edilen yaşama gücü değerleri nispeten taban sürülerden düşük olmuştur. Bu durum tümleşik sürülerdeki çoğuz doğumların oransal yüksekliği ile açıklanabilir.

Bu alt proje ile 6300 başlık bir populasyonda işlerlik kazanan model bir ıslah organizasyonu alt yapısı şekillendirilmiştir. Araştırma sonucunda elde edilen bilimsel bulgular yanında teknolojik, deneysel altyapı ve hayvan materyali oluşumunu öngören proje gerekleri yerine getirilmiştir.

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Kaynaklar

Alexander, G., 1987. Constrains to lamb survival. In: Reproduction in Sheep. Ed. D. R. Lindsay, D. T. Pearce. Sydney, Australia.

Baş, S., 1985. Koç katımı öncesi farklı sürülerde yemlemenin koyunlarda döl verimine, kuzularda büyüme ve yaşama gücüne etkileri, (Yüksek Lisans Tezi). Atatürk Ün. Zir. Fak. Zootečni Bölümü.

Cemal, İ., Karaca, O., Yılmaz, O., Yılmaz, M., 2009. Karya kuzularda pazarlama dönemi canlı ağırlığı ile göz kasi özelliklerine ait ultrason ölçüm parametreleri. 6. Ulusal Zootečni Bilim Kongresi, 24-26 Haziran 2009, Erzurum, Türkiye, pp. 63-69, 2009.

Cemal, İ., Karaca, O., Altın, T., Gökdal, Ö., Yılmaz, M., Yılmaz, O., 2004. Kıvırcık ve Sakız × Kıvırcık melezi kuzularda göz kasi ultrasonik ölçüm parametreleri. 4. Ulusal Zootečni Bilim Kongresi, 01-03 Eylül 2004, Süleyman Demirel Üniversitesi, Isparta, Cilt 2, s.113-118.

Cengiz, F., Ertuğrul, M., Eliçin, A., 1989. Akkaraman ve Border Leicester x Akkaraman (F1) melezi erkek kuzularında besi gücü ve karkas özellikleri. A.Ü. Zir. Fak.Yıl. 1121.

Çelik, İ., 1995. Sakız, Kıvırcık ve Dağlıç Koyun Irklarının Yarı Entansif Koşullarda Başlıca Verim Performansları Üzerinde Karşılaştırmalı Bir Araştırma. Doktora Tezi. Uludağ Üniversitesi, Sağlık Bil. Enst., Bursa. 75s.

Ceyhan, A., Erdoğan, İ., Sezenler, T., 2007. Gen kaynağı olarak korunan Kıvırcık, Gökçeada ve Sakız koyun ırklarının bazı verim özellikleri. Tekirdağ Ziraat Fakültesi Dergisi 4 (2):211-218.

Demirören, E., Kızılay, E., Kaymakçı, M. Sönmez, R.,1992. Mer'a koşullarında kuzuların yaşama gücünü etkileyen fizyolojik ve davranışsal faktörler. Trakya Bölgesi 1. Hayvancılık Sempozyumu. Tekirdağ.

Esen, F., Yıldız, N., 2000. Akkaraman, Sakız X Akkaraman Melez (F1) kuzularda verim özellikleri. I. büyüme, yasama gücü, vücut ölçüleri. Turk J Vet Anim Sci, 24: 223-231.

Gilmour, A.R., Luff, A.F., Fogarty, N.M., Banks, R., 1994. Genetic Parameters for Ultrasound Fat Depth and Eye Muscle Measurements in Live Poll Dorset Sheep. Aust. J. Agric. Res., 45:1281-1291.

Gönül, T., 1974. Kasaplık kuzu üretimi için Dağlıç koyunları üzerinde melezleme denemeleri. E.Ü. Zir. Fak. Yay. 236.

Günlü, A.,1996. Hayvansal üretimde koyunculüğün yeri, Türk Vet. Hek. Derg. 8(2), 10-13.

Hanrahan, J.P., 1989. Altering reproductive rate in sheep: some genetic and non-genetic option, ed: O.R. Dyrmondsson and S. Thorgeirsson, Reproduction, Growth and Nutrition in Sheep. pp:45-55.

- KARACA, O., Yıkılmaz, H., Cemal, İ., Atay, O., (1999a). Çine Tipi, Menemen X Çine Tipi Melezi (F1) ve Çine Çaparı kuzuların kimi gelişme özellikleri. Uluslararası Hayvancılık'99 Kongresi, 21-24 Eylül 1999, İzmir. Pp. 771-776.
- Karaca, O., Bıyıkoglu, K., 1990. Tahirova, Kıvrıcık, Merinos ve Ile de France x Merinos kuzularının doğum ve süten kesim ağırlıkları ve kimi çevre etmenlerinin etkileri. Yüzüncü Yıl Üniversitesi, Ziraat Fakültesi Dergisi, 1(1), 62-70.
- Karaca, O., Cemal, İ., Altın, T., 2002. Çine Tipi koyunlarda batın genişliği ve kuzu yaşama gücüne ilişkin kimi parametre tahminleri. III. Ulusal Zootečni Bilim Kongresi, 14-16 Ekim 2002, Ankara Üniversitesi, Ziraat Fakültesi, Zootečni Bölümü, Ankara.
- Karaca, O., Yılmaz, O., Cemal, İ., 2011. Karya kuzularda büyüme özellikleri. 7. Ulusal Zootečni Bilim Kongresi, 14-16 Eylül, Adana. s.250.
- Katz, L.S., Price, E.O., Wallach, S.J.R., Zenchak, J.J., 1988. Sexual performance of ram reared without females after weaning. J. Animal. Sci. 34:1200-1208.
- Kaymakçı, M., Sönmez, R., 1999. İleri Koyun yetiştiriciliği. E.Ü. Basımevi Bornova İzmir.
- Martin, J., 1999. Care of the newborn lamb. Ontario, Ministry of Agriculture, Food and Rural Affairs, Canada.
- Putu, I.G., Poindron, P., Lindsay, D.R., 1988. Early disturbance of Merino ewes from the birth site increases lamb separation and mortality. Proc.Aust.Soc.Anim.Prod., 17: 298-301.
- SAS, 1999. The SAS System. Version 8. Copyright (c) 1999 by SAS Institute Inc., Cary, NC, USA.
- Taşkın, T., Koşum, N., Demirören, E., Kaymakçı, M., 1996a. Doğumdan sonra kuzularda yaşam gücünü sınırlayan etmenler. 1996 Hayvancılık Ulusal Kongresi, İzmir.
- Taşkın, T., Kaymakçı, M., Karaaslan, A., Başaran, D.A., 1996b. Koyun Yetiştiriciliğinde ana – yavru ilişkileri ve önemi. E.Ü. Zir. Fak. Dergisi Cilt: 33 Sayı: 2 -3.
- Yalçın, B.C., Ayabakan, S., Köseoğlu, H., 1975. Rambouillet x Dağlıç melezlerinin verimle ilgili özellikler yönünden karşılaştırılması. V. Bilim Kongresi. Veteriner ve Hayvancılık Araştırma Grubu. Tebliği. 29 Eylül-2 Ekim 1975, Ankara, 259-268.TÜBİTAK.
- Yılmaz, O., Karaca, O., Altın, T., Cemal, İ., 2009. Karya kuzularda pazarlama dönemi gelişme özellikleri ve yaşama gücü. 6. Ulusal Zootečni Bilim Kongresi, 24-26 Haziran, Erzurum. s.165-173
- Yılmaz, O., Küçük, M., Denk, H., Bolacalı, M., 2006. Norduz koyunlarında mevsim dışı koç katımının döl verimine ve kuzularda yaşama gücüne etkisi. YYU Vet Fak Derg, 17 (1-2):99-102.
- Yılmaz, O., Sezenler, T., Alarslan, E., Ata, N., Karaca, O., Cemal, İ., 2014. Karacabey Merinosu, Karya ve Kıvrıcık kuzularda süten kesim döneminde kabuk yağı kalınlığı ve Musculus longissimus dorsi thoracis et lumborum (MLD) derinliğinin ultrason ölçümleri. Kafkas Üniversitesi Veteriner Fakültesi Dergisi. 20 (6): 829-834

Some Production Traits Of Anatolian Water Buffaloes Raised In Istanbul Under The Community Based Water Buffalo Improvement Project

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Abstract

The data obtained from this study were obtained from the project of community based Anatolian water buffalo improvement program in İstanbul. In 2011, the project started with 22 villages and 1002 buffaloes. Breeders with minimum 80 head buffalo over 2 years old were included in the project. Milk yields, birth and live weight weights obtained between 2011 and 2019 were evaluated. Overall birth weight was 33.96 ± 0.102 kg in 3384 females and 34.79 ± 0.110 kg in 3421 males. Overall 6th month the body weight was found to be 112.01 ± 0.53 kg in 2185 head females and 116.66 ± 0.59 kg in 2064 head males. Overall 12th month body weight was determined as 191.21 ± 1.22 kg in 1494 head females and 200.45 ± 1.33 kg in 1406 head males. Overall lactation milk yield was $1234,20 \pm 6,05$ kg and lactation length was $227,57 \pm 0,85$ days in 5282 females.

Key words: Anatolian water buffalo, birth weight, lactation yield, lactation yield, body weights

ILSC

Determination of Tail Fat Fatty Acids Profile in Some Local Sheep Genotypes of Black Sea Region*

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Abstract

In this study, tail fat fatty acid contents of 6 months old male lambs of Artlı, Çepni, Karayaka and Of genotypes grown in Black Sea Region were investigated. Fatty acid composition was determined in TÜBİTAK MAM (Gebze, Kocaeli). According to the findings obtained in the study, saturated fatty acids content in tail fat for the genotypes Artlı, Çepni, Karayaka and Of were 52.08±1.188%, 51.66±1.093%, 42.67±1.522% and 52.92±1.219% (P <0.01), while the monounsaturated fatty acid contents were found as 33.25±0.676%, 33.12±0.694%, 33.07±1.553% and 32.34±1.341%, respectively. Polyunsaturated fatty acids were determined as 0.76±0.240%, 1.20±0.428%, 0.64±0.074% and 0.87±0.102% for the genotypes of Artlı, Çepni, Karayaka and Of, respectively. The presence of desired fatty acids in terms of health was determined as 46.94±1.813% in Artlı, 51.03±0.891% in Çepni, 51.51±1.017% in Karayaka and 49.51±0.489% in Of genotypes (P<0.05). The highest rate of polyunsaturated fatty acids in the fatty acids composition was determined in the Çepni genotype and the lowest rate was in the Karayaka genotype. It was found that fatty acid content had significant differences between the genotypes and within the genotypes. As a result, it has been scientifically demonstrated that tail fat is an important source of fatty acid profile in terms of desired fatty acid contents. In future studies, genetic breeding studies are recommended to increase the proportion of polyunsaturated fatty acids in meat and other adipose tissues in local genotypes.

Key words: Lamb, tail fat, fatty acids composition, mono unsaturated fatty acids, poly unsaturated fatty acids, saturated fatty acids.

The Relationship Between Cox-2, Nrf2, Tlr2 Genes Expression Levels And Somatic Cell Count In Goat Milk Somatic Cells

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Abstract

In this study, COX-2 (Cyclooxygenase 2), NRF2 (Nuclear Factor Erythroid 2-Related Factor 2) and TLR2 (Toll Like Receptor 2) genes expression levels were determined from goat milk somatic cell. Damascus goats aged 3-5 years were used. During morning milking, approximately 60 ml of milk samples were taken under sterile conditions from lactating goats without mastitis. Using 30 ml milk samples, the SCC levels were determined. The samples were divided into two groups according to somatic cell counts (SCC). First group (Low Somatic Cell Group, LSCG) samples had low SCC less than 1 million (n=12). The second group (High Somatic Cell Group, HSCG) samples SCCs were more than 1 million (n=12).

Total RNA isolation was performed from 30 ml goat milk according to Trizol method. Sufficient purity ($A_{260}/A_{280}=1.87\pm 0.03$) and concentration (303.09 ± 41.11 ng/ μ l) were obtained. ACTB was used as the housekeeping gene to determine the expression levels of COX-2, NRF2 and TLR2. The results were calculated as fold change by $2^{-\Delta\Delta Ct}$ method.

In the LSCG, COX-2, NRF2 and TLR2 expression levels were found to be 0.48 ± 0.18 , 0.31 ± 0.11 and 1.02 ± 0.18 , respectively. COX-2 and NRF2 were downregulated in HSCG. According to these findings, it is not possible to speak of oxidative stress with a high SCC in goats. NRF2 controls transcription by more than 2000 genes and plays a role in adaptation to oxidative stress. Considering that the amount of SCC in goats is related to milk synthesis mechanism, it is understood that there is no correlation between high SCC and COX-2 expression. At the level of gene expression, the low COX-2, is accepted as an oxidative stress parameter, indicates that there is no oxidation in somatic cells. Thereby, it is also expected that NRF2 expression is low. Beside general knowledge the expression level of the TLR2 gene, which is one of the most important markers of inflammation, is almost similar to the LSCG, indicating that there is no direct relationship between high SCC and inflammation in goats.

Keywords: Goat, Milk Somatic Cell, Cox-2, Nrf2, Tlr2, Gene Expression

The Evaluation Of The Kivircik Lambs Concerning Growing And Neonatal Loss Parameters Reared On Upland And Lowland Region In Bilecik Province Of Turkey Pertaining To Climatic And Altitude Factors

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Abstract

The unique transition province of Turkey, Bilecik, is located within the junction of Marmara, Blacksea, Cental Anatolia, and even including Eagean Regions. Thanks to its location with having climatic and altitude diversity of this particular feature makes it different from other province of Turkey. The structure of small ruminant rearing in its borders has depicted itself particularly as extensive system extended through upland and lowland breeding of flocks depending on altitude. The climatic diversity reflects itself as follows: the southeast area, northeast area and the area participated in South Marmara are predominated by continental climate, black sea climate with micro-climate and mediterranean climate, respectively. As a result of the variable altitude and climatic factors when compared together with the other province and regions of country, it has been stated that evaluation of breeding of the small ruminants have potential with regard to climatic and altitude factors located within its borders in terms of reflecting a vast diversified geographical state incorporated within the border of one single province as a pilot region. In this research, the data of 2019 year from lambing to weaning within the scope of the “National Animal Breeding Program” have been estimated in terms of altitude and climatic factors. In the first quarter of 2019, 4011 lambs borned in the project carried out with 25 producers in 4 districts. As for dual altitude classification sorted by 1000 m (L) and higher (U) showed that average daily gain (ADG) from birth to weaning, live weight in day 45 (LW45) and live weight in day 90 (LW90) ($p < 0.01$) were found significant between groups. From the point of climatic parameter, the temperature values of the first quarter of the year in which lambs borned was taken into account and the province classified as cold (1), mild (2) and warm (3) zones. Birth weight was found significant between region 1 and 3, 2 and 3, ($p < 0.05$). Neonatal lamb loss was estimated as 116 and it was found statistically significant that the higher the altitude the more loss of the lamb ($p < 0.01$) as for triplet classification of altitude sorted by 155-500 m (1), 501-900 m (2) ve 901-1465 m (3), demonstrated a linear relationship. Climatic classification also showed that neonatal lamb loss has an increasing trend from zone 3 to 1 ($p < 0.01$). Birth weight (BW) between death lambs and weaning lambs was found significant ($p < 0.01$). Consequently, the evaluation of BW, ADG, weaning LW90 and neonatal lamb losses on the scale of altitude and climatic factors in the year 2019 depicted us the overall profile of Kivircik breeding reared in Bilecik. It can be concluded and accentuated rationally

from this research that thanks to the outcomes of this data carried out within the borders of Bilecik province with its native Kivircik breed, comparison of its status with the other sub-projects of distinct sheep breeds' data could be helpfull in respect of adaptation status of breeds. Although the heterogeneity of geographical state is tought to be suitable for breeding native Kivircik breed in Bilecik, the possibility of negative effects of this heterogeneity on the progressing of breeding program has been kept in mind when estimated in terms of National Animal Breeding Program.

Key words: *Bilecik, Kivircik lamb rearing, Climatic and altitude factors, Neonatal lamb mortality*

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The growth performance of Denizli and Gerze native chicken breeds

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Abstract

In this study, growth performance such as body weight, weight gain and phenotypic correlations between body weights during growth periods in Denizli and Gerze of Turkish native chicken breeds were investigated. Research materials comprised of total 1432 Denizli and 325 Gerze animals from second and third - generation conserved flocks reared in International Center for Livestock Research and Training. There were significant ($P < 0.05$, $P < 0.01$ and $P < 0.001$) differences between breeds in chick weight at hatch and body weights at 6 days, 4, 6, 8, 24 weeks of age. Body weights were found to be higher in Denizli than in Gerze breed. Differences between generations were significant ($P < 0.001$) in chick weight at hatch, body weights at 4, 16 weeks of age and differences between sexes were also significant ($P < 0.001$) at 6 days, 4, 6, 8 and 16 weeks of age. There were significant ($P < 0.001$) differences between breeds and body weight gains were found to be higher in Denizli than in Gerze breed. Phenotypic correlations among body weight measurements were significant ($P < 0.05$, $P < 0.01$, $P < 0.001$) since from 4 or 6 weeks of age.

In conclusion, body weight and body weight gain were found to be higher in Denizli than in Gerze breed. Medium variance range of body weight was obtained in both breeds. Phenotypic correlations were also determined between body weights at different ages in both breeds.

Key words: Denizli, Gerze, growth, body weight, native breeds

Acknowledgements: The data of this research was obtained from Conservation of Turkish Native Chicken Breeds Project- (Project number: HAYSÜD/95/A01/P02/01-033) financed by General Directorate of Agricultural Researches and Politics (TAGEM)

Genetic Polymorphism of Some Domestic Sheep Breeds in Turkey

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Abstract

Genetic polymorphism studies in Turkey is important. Due to its geographical location, Anatolia is home to many different civilizations and is known as the cradle of domestication. Determining the level of genetic diversity in sheep breeds in Turkey is important only for the development of prevention program the detection of domestication and migration routes. Nowadays, microsatellites are widely used in animal DNA population genetic studies. In this study, we aimed to investigate genetic polymorphism of some sheep breeds in Turkey by using 12 microsatellite markers recommended by ISAG.

Working within the scope, a total 250 blood samples (fifty for each breed) were collected from Bafra, İvesi (Awassi), Kangal Akkaraman, Kivircik and Karacabey Merino sheep breed reared in different regions of Turkey. Genomic DNAs were isolated and qualities were checked by spectrophotometry and agarose gel electrophoresis. A total of 12 microsatellites (OarFCB20, INRA063, OarFCB304, INRA006, MAF65, MAF214, McM42, D5S2, OARCP49, McM527, INRA172 and OarAE129) were multiplexed according to their base pair lengths and labelled with fluorescent. Optimum PCR conditions were determined by gradient PCR. Two separate multiplex PCR systems were developed for fragment analysis using the Applied Biosystems 3130 Genetic Analyzer. General population parameters were statistically calculated. F statistic values (F_{ST} , F_{IS} , F_{IT}) and polymorphic information content (PIC) of sheep breeds were calculated. In addition, factorial correspondence analysis (FCA), assignment, bottleneck, genetic structure tests were performed.

While a total of different 212 alleles were obtained in populations, the average observed and expected heterozygosity values were calculated as 0.706 and 0.747, respectively. As in the FCA chart, in the genetic structure test all races were grouped differently. The intergenerational genetic distance was determined and the phylogenetic tree was drawn. While 5 sheep herds were separated from 3 main branches, genetically closest races to each other was found as İvesi and Kangal Akkaraman.

At the end of the study, genetic structure of Turkish sheep breed was revealed. Comparing the genetic diversity of European, Asian, Australian and African sheep breeds and Turkish sheep breeds by considering previous studies.

Key Words: Population genomics; fragment analysis; sheep; microsatellite; multiplex PCR

Molecular Phylogenetic Analysis of Mahalli Goats in Diyarbakır Region

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Abstract

The aim of this study is to determine phylogenetic relationships in Mahalli goats raised in Diyarbakır region, and the animal material of the study consisted of 24 heads of goats (n = 24). Blood samples were collected from the goats for DNA isolation, and only one goat was randomly sampled from each herd so that the selected animals were not genetically related to each other. This study was supported by the General Directorate of Agricultural Research and Policies (TAGEM).

Molecular genetic analyzes were performed in Animal Biotechnology and Genetics Laboratory of Faculty of Agriculture, Harran University. Firstly, the haplotypes determined in terms of D-loop gene regions in goats and the reference haplogroups (= strains) identified as A, B, C, D, F and G for goats in previous studies were evaluated together. Then, haplogroup detection and advanced phylogenetic analyzes for the samples were performed in the MEGA 4.0.1 program using the Kimura-2-parameter + Gamma distribution (K2P + Γ) model according to the Neighbor-Joining (NJ) method. Gamma distribution value was taken as $\alpha = 0.28$ for the formation of phylogenetic trees and Bootstrap test (1000 replicates) was used to test its reliability. The total number of regions, G + C ratio, number of polymorphic regions (S), number of haplotypes (h), haplotype difference (Hd) and nucleotide difference (π) were calculated for the populations.

In this study, 97 polymorphic regions and 19 haplotypes were identified in the Neighbor-Joining phylogenetic tree, which was formed with haplotype sequences and 22 reference sequences (for strains A, B, C, D, F and G). All 19 haplotypes were in strain A. Genetic distances between Mahalli goat haplotypes were calculated between 0.003-0.087 and genetic distances between the Mahalli goats and the other native goat breeds were calculated between 0.016-0.027.

Thus, it is thought that more molecular studies will be useful in researching the genetic relations of native goat breeds and local goats and the results of the research will contribute to genetic polymorphism, biodiversity and animal genetic resources conservation strategies

Key words: Mahalli goats, Genetic resources, Filogenetic analysis, Biodiversity

Determination Of Turkish Domestic Sheep Morkaraman (*Ovis aries*) Genetic Diversity Using mtDNA Marker*

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* This study was carried out from Oğuz AĞYAR's Ph.D. thesis.

Abstract

In this study, the phylogenetic structure of the Morkaraman sheep breed was aimed to be made using a marker based on the mitochondrial DNA (mtDNA) 16S rRNA gene. The animal material of the study consists of 11 samples selected from pre-study geographically distant Morkaraman herds in Karlıova, Merkez and Solhan counties of Bingöl province. Genomic DNA was isolated from blood samples taken from sheep. 16S rRNA gene regions of sheep (1574 bp) were amplified by PCR. The nucleotide sequence analysis of the amplified gene regions (1470 bp) was performed and the arrangements yielded 536 bp sequence information for all samples. As a result of the research, the determined 16S rRNA gene was calculated according to the nucleotide sequences; ratio G+C (0.437), number of polymorphic regions ($S=10$), number of haplotype ($h=8$), haplotype difference ($hd=0.927\pm 0.0044$) and nucleotide difference ($\pi=0,0043\pm 0,0012$). In addition, the nucleotide composition was determined as 24.2% Thymine (T (U)), 22.2% Cytosine (C), 32.1% Adenine (A) and 21.5% Guanine (G). Nucleotide sequences of the 16S rRNA gene identified in Morkaraman Sheep were published on the NCBI internet portal. As a result, phylogenetic relationships between mtDNA polymorphism, mtDNA haplotypes and haplogroups were determined together with 16S rRNA gene sequences and reference sequences in Morkaraman sheep breeds grown in Bingöl region.

Keywords: 16S rRNA, Morkaraman Sheep, Phylogenetic Analysis, mtDNA

A Genome-Wide Association Study To Identify Candidate Genes Associated With DAG Score In A Commercial Sheep Breeding Population

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Abstract

Sheep have economically significant effect on the global agriculture. Dagginess (faecal or breech soiling) is the accumulation of faecal material on the wool of perineum area of sheep. Dags cause high cost to sheep farmers because of dropping the value of wool and the welfare of animals. Moreover, dag increases the risk of flystrike. The comprehension of genetic architecture of dagginess would contribute to enhancing the welfare and productivity of animals and improving other traits as flystrike associated with dagginess.

The aim of this study was to determine the single nucleotide polymorphisms (SNPs) and candidate genes related to dagginess. A genome-wide association study (GWAS) was conducted using either Illumina OvineSNP50 Chip or Ovine15K custom assay and TASSEL software (v5.0) in a population of UK sheep consisting of Abermax, Texel and Texel x Charolais. After quality control, 197 animals and 11.267 SNPs were utilized for genomic association. 8 suggestive SNPs associated with dags were determined. These SNPs were located on OAR 3, OAR 7, OAR 9, OAR 17, OAR 20, and OAR 25. The strongest suggestive SNP was determined within the QTL on chromosome 3. The genes acting on faeces consistency; CPNE8 (on OAR 3), PRICKLE1 (on OAR3), KCNMA1 (on OAR 25) and DLG5 (on OAR 25) could also function on dagginess. These genes could be researched for future study to further examine the genetic mechanism of dags. Increasing the sample size and using a much denser distribution of SNPs throughout the genome would lead to further improvement in sheep GWAS.

Key words: Sheep, Dag Score, GWAS, Dagginess

Some Morphological Traits Of Karayaka Sheeps In Different Ages

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Abstract

This research is conducted in order to define the live weight and some body measures of the Karayaka Sheeps raised in five different age groups in Tokat province. A total of 514 sheep and 109 rams were measured as animal material from 5 different age groups (1,5, 2,5, 3,5, 4,5 and 5,5 year-old). In the study, height at withers (CY) was 70.57 ± 0.20 and 67.85 ± 0.09 cm, body length (VU) was 72.46 ± 0.20 and 68.93 ± 0.09 cm, chest girth (GC) was 100.20 ± 0.36 and 90.43 ± 0.16 cm, chest depth (GD) was 31.75 ± 0.13 and 28.91 ± 0.06 cm, head length (BU) was 26.75 ± 0.11 and 24.20 ± 0.05 cm, and anterior shin (OIC) was 9.79 ± 0.05 and 7.89 ± 0.02 cm, in males and females respectively. The highest CY (69.64 ± 0.20 cm) was obtained from 5 year old sheep, and the highest GC (97.30 ± 0.36 cm) and GD (31.01 ± 0.13 cm) was obtained from 6 year old sheep ($P < 0.001$). Differences between rams and sheep were found statistically significant in terms of measured parameters ($P < 0.001$). The effect of age was statistically significant on all measured parameters ($P < 0.05$) except ear length and tail length. As a result, it is considered that the Karayaka sheep can be improved in terms of current body characteristics by selection method.

Keywords: Sheep, Karayaka, Body Measurement

POSTER PRESENTATION

ELSC 2019

A National and Natural Source: Sheep Wool and Its Brilliant Future for Turkey

Esad Sami Polat

Selçuk Üniversitesi Veteriner Fakültesi Hayvan Besleme ve Beslenme Hastalıkları Anabilim Dalı KONYA

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Abstract

The coated fleece, which protects sheep against external influences, covering their bodies, obtained by shearing every year, is an extraordinary precious material. From 35 million sheep in Turkey, every year 60.000 tons of fleece is obtained and unfortunately a significant part of it is wasted. However, in developed countries, 3 different products contribute to human life and economy without wasting any particles of sheep fleece. The most important of these is the pelleting of wool dust and trimmings which make up 40% of its fleece used as natural fertilizer. Natural constituents in wool dirt and dust, trace elements ranging from nitrogen and sulfur to zinc and selenium are the elements with balanced amounts of natural life needs. Lanolin found in 8-12% of the wool of our domestic sheep and released during washing is a product used in pharmacology, cosmetics and automotive industries and is not produced in our country but all of the need is met by imports. The wool that emerged in the final stage during the processing of fleece is an intelligent textile fiber and it is the best quality insulation and air conditioning material of the world with its nano-technological and natural features. It is cooler in warmth and warmer if it is cold. The air temperature is 7°C cooler in the summer and 10°C warmer in the winter without using any air conditioning system in house insulated with sheepwool. It is a natural material that regulates the moisture and heat in the environment and also prevents negative vibration and sound waves. It has no negative impact on the environment and human health. The amount of energy and chemicals spent on the production of wool and products is low and non-hazardous, compared to other similar materials of the same category, it has important advantages such as active insulation and air-conditioning properties, environmental friendliness, prevention of waste of resources and reducing risks and risks to human health. In addition to meeting the very important needs of our country with the plant fertilizer, lanolin and insulation material obtained by evaluating the wool, 45.000 liras can be added to the economy. 2.700.000.000 liras, which can be obtained from 60.000 tons of fleece produced every year, is a considerable amount that should not be wasted.

A Practical Selection Method for Awassi Growth Traits with a Demonstrative Approach

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Abstract

One of the most important steps in animal breeding is that the best animal will be given the chance to reproduce in terms of breeding value. Selection of more productive animals is economically important for growth, production and reproduction. The methods and model used to estimate the breeding values of some yields in animal husbandry are very complex. But normal breeders need simple models and practice implementation for selection. The aim of this study is to demonstrate simple and practical method for awassi sheep breeders. A computer software called as Damızlık Asistanı (assistant for studs) was used for this purpose with a sample. The effects of some important environmental factors on the growth traits of awassi lambs were eliminated by the Damızlık Asistanı and then precious animals are detected with adjusted data and ordered by using an easy Index method. The data used in this poster were obtained from an awassi project of the General Directorate of Agricultural Research and Policies (GDAR) (TAGEM / 02IVES2014-01) in Adıyaman province.

Key Word: Breeding value, Awassi sheep, Pratic selection

Some Yield Traits of Dađlıç Sheep in Afyonkarahisar and KonyaN.Kürşat Akbulut *¹ Necdet Akay ¹ Tülay Canatan ¹

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Abstract

This study was carried out within the scope of the Conservation and Sustainable Use of Domestic Animal Genetic Resources national project. The animal material consists of sheep (n=1000) in Bolvadin district of Afyonkarahisar province and in Selçuklu district of Konya province. Within the scope of the study, the birth weights, the average live weights of 3, 6 months and adults of 2017 were given. In Bolvadin, Afyonkarahisar province, birth weights were found to be 2,67 kg for females and 3,13 kg for males. The 3-month live weights were found to be 30,44 kg for females, 35,37 kg for males, The 6-month 31,64 kg for females and 36,53 kg for males. Adult live weights were 50,10 kg for females and 67,09 kg for males. . In Selçuklu, Konya province, birth weights were found to be 2,22 kg for females and 2,82 kg for males. The 3-month live weights were found to be 23,77 kg for females, 26,37 kg for males, the 6-month 24,58 kg for females and 27,43 kg for males. Adult live weights were 43,10 kg for females and 52,30 kg for males.

Key Words: Dađlıç, Birth Weight, Yield Traits, Genetic Resources

**Some Reproductive Characteristics of White Karaman Sheep and
Survival Rates of Their Lambs at Breeders Conditions**

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Abstract

The aim of this study was to determine the reproductive characteristics of White Karaman sheep and survival rates (SR) of their lambs within first 120 day in National Improvement Project for Small Ruminants at Breeders Conditions flocks (Project No: 68 AKK2011-01)

In this study 5974 head of ewes and 6657 head of lambs data obtained from 24 White Karaman sheep breeder flocks in Aksaray province were used. The number of lambs born and mating record were recorded by breeders, and SRs within first 120 day and reproductive performance were determined by project crew in 2019. According to results in elite and base flocks lambing and twin birth rate, litter size were found %95.49, %94.51, % 15.50, 18.35, 1.16, 1.18 respectively. Within first 120 days survival rates of lambs in elite and base flocks were determined % 92.82, 92,84 respectively. As a result of the rates of litter size and twin birth rates were found significant as statistically by nucleus and and normal flocks ($P<0.05$).

Key Words: White Karaman Sheep, Fertility, Survival Rate

Acknowledgment: In this study, White Karaman sheep breeding-1 (Project No: 68 AKK2011-01) carried out in Aksaray province within National Sheep and Goat Breeding Project of Turkey data obtained from the sub- project were used. As all authors, we would like to thank our ministry

Conducted in the province of Aksaray “Breeding Project of Akkaraman Sheep in the Public Hand” farms, The Effect on year and Maternal Age to Birth Weight, Weaning Weight and Daily Live Weight Increases

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Abstract

This study was carried out in order to evaluate the birth weight, weaning weight and live weight increases in this period according to year and maternal age in breeding herds within the scope of public breeding projects carried out in Aksaray province between 2012 and 2016. Lamb's birth weights, 120th day corrected live weights and daily live weight increases in this period, GLM model evaluated with such these factors: year (2012-2016), mother age (2-6), business type (base, elite), gender (female, male). According to the years (2012, 2013, 2014, 2015 and 2016) of the total 32490 cattle in the investigated farms, lamb birth weights were respectively; 4.33 ± 0.01 , 4.56 ± 0.01 , 4.56 ± 0.01 , 4.59 ± 0.01 and 4.56 ± 0.01 , day 120. Live weights; 28.64 ± 0.59 , 33.27 ± 0.31 , 29.75 ± 0.31 , 33.44 ± 0.34 , and 32.82 ± 0.36 kg and the average live weight gain of 120 days; 202.3 ± 0.81 , 239.2 ± 0.77 , 209.8 ± 0.77 , 240.3 ± 0.65 , 235.3 ± 0.79 g / day ($P < 0.01$). Birth weights according to the age of mother (2, 3, 4, 5 and 6 years old) were 4.452 ± 0.01 , 4.548 ± 0.01 , 4.508 ± 0.01 , 4.561 ± 0.01 , 4.595 ± 0.02 , respectively, corrected live weights 31.81 ± 0.10 , 32.04 ± 0.08 , 30.68 ± 0.09 , 32.73 ± 0.11 , 31.58 ± 0.15 and 120 days average body weight increases were obtained as 227.8 ± 0.80 , 229.0 ± 0.61 , 217.9 ± 0.69 , 234.6 ± 0.89 , 224.8 ± 1.18 g / day, respectively. ($P < 0.01$). Lamb birth weights were similar in years, and the highest birth weights were measured in lambs born between 5 and 6 years old mothers. There has been an increasing momentum in weaning live weights over the years, and some decline in 2014 was due to drought in the region in general. As a result, it is seen that there are significant differences according to age and years between 2012 and 2016, which is the year in which the improvement project carried out by the public in Aksaray.

Key Words: Akkaraman Sheep, Birth weight, Maternal Age

Thanks: In this study, a Project conducted by the Republic of Turkey Agriculture and Forestry Ministry (68 AKK2011-01) coded 'National Breeding Project' 'scope carried out in Aksaray province' Akkaraman Sheep Breeding 'data obtained from the sub-projects were used. As all authors, we would like to thank our ministry.

Alternative Breeding Systems and Welfare in Laying Hens

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Abstract

The world population is rapidly increasing, and in parallel with the increasing population, food needs are rapidly increasing. The resources required to meet the needs are consumed in a limited and rapid manner. Poultry meat and especially chicken meat and eggs play an important role in meeting the food needs of people. Chicken eggs are the preferred food source, because they are cheap and abundant.

Recently, the trend towards animal welfare has been increasing in parallel with the increase in intensive production. In particular, animal protection associations, non-governmental organizations and sensitive people express that in this rapidly increasing production model, animals are used like machinery and cannot exhibit any natural behavior. With the necessity imposed by these developments, the idea of alternative breeding systems has emerged and studies continue increasingly in this direction.

In enriched cages, 750 cm² area and 45 cm height are arranged per chicken. In addition, the cage has a nest, 15 cm perch, 12 cm feeder, nail file apparatus that does not come into direct contact with the wire mesh floor and there are materials to meet their needs of pecking and scratch.

Key words: Alternative breeding, welfare, laying hens, enriched breeding systems.

An Overview Of The Effects Of Adipokines On The Reproductive System

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Abstract

There are many substances and hormones that affect reproduction in mammals. Leptin hormone was found in 1994, the role and importance of fat tissue has been noticed in this context. In the following years, it has been found that adiponectin, visfatin, omentin, resistin and other peptides are released from the adipose tissue. Investigating and compiling the new effects of all these hormones will also contribute to veterinary medicine. The purpose of this review is; to summarize the effects of adipokines on reproductive system in farm animals.

Keywords: adipokine, adiponectin, leptin, reproductive system, fat tissue

Investigation of Yeanlings Growth Data of Angora Goats Where Grown in Ankara in Circumstances of Breeding and Feeding Conditions

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Abstract

This study was carried out on farm animals supported by TAGEM s Project which named ‘‘ Breeding Angora Goat in the hand of Local Farmers ‘‘ conducted in Nallıhan Districts of Beypazarı, Ankara. Data were obtained from 3,596 yeanlings which breeding in 17 farms at two districts. The birth weight (BW) of the yeanling born in the farm was measured by electronic hang weighing, on the 90th day and the live weight (LW) was measured by means of a fixed electronic scale. The total average mean birth weight of the yeanlings was 2,23kg and the 90th day live weight was approx. It was determined as 12.06kg (BW). 2.97 ± 0.042^a kg the highest value and 1.64 ± 0.027^h kg the lowest values. The 90th day and the live weight $16,39 \pm 0,185^a$ kg the highest value and $8,64 \pm 0,231^j$ kg the lowest values. When the average mean (BW) and (LW) between the farms were examined, significant difference was found statistically in all parameters ($P=0.001$). The reason for the difference; In the face-to-face surveys conducted with the farm owners, it was concluded that the differences is: parasite controlling for yeanlings , the amount and duration of feed, vitamin-mineral supplementation throughout the herd, and the unevenness that would slow the herd movement in the pasture land structure.

Key Words: Ankara Goat, Yeanlings Growth, Birth Weight, 90th Day Live Weight

Acknowledgment: This study was funded by the Ministry of Agriculture and Forestry and was carried out under the coordination of the General Directorate of Agricultural Research and Policies within the scope of the ‘‘ Breeding Angora Goat in the hand of Local Farmers ‘‘Project.

Balarılarında Varroa Akarına Karşı Bazı Esansiyel Yağların Kullanımı

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Abstract

Varroa is the causative agent of Varroosis, one of the most important problems of bees. It is a dangerous external parasite that causes mass death of bees.

Essential oils and volatile fatty acids, which have no harmful effects on human health and do not carry residual risk in honey, have yielded successful results in the fight against Varroa.

This study was conducted in order to find an effective fight against varroa which is not harmful to bee and human health. The aim of this study was to determine the effect of Varroa destructor under control by using some essential oils in honey bee colonies.

Keywords; Varroa destructor, Essential Oil, Lavender Oil, Laurel Oil, Thymol Oil

Özet

Varroa, arıların en önemli problemlerinden biri olan Varroosis'in etkenidir, Arıların kitle halinde ölümüne sebep olan tehlikeli bir dış parazit akardır.

Varroa mücadelesinde insan sağlığına zararlı etkisi olmayan ve balda kalıntı riski taşımayan esansiyel yağlar, uçucu yağ asitleri başarılı sonuçlar vermiştir.

Bu çalışma arı ve insan sağlığına zararlı olmayan, varroaya karşı etkili mücadele yöntemi bulunması amacıyla yapılmıştır. Çalışmada bazı esansiyel yağların bal arısı kolonilerinde besleme yoluyla kullanılmasıyla Varroa destructor'un kontrol altına alınmasında etkisini ortaya koymak amaçlanmıştır.

Anahtar Kelimeler; Varroa destructor, Esansiyel Yağ, Lavanta Yağı, Defne Yağı, Kekik Yağı

Materyal- Metod

Araştırma, Sonbahar döneminde balarılarının şurupla besleme sezonunda iklim koşullarına bağlı 3 aylık besleme halinde yapılmıştır. Toplam 28 kovan üzerinden 7'şerli arılı kovan grupları oluşturulmuştur. 4 grup hazırlanmış 1 grup kontrol grubu olarak tutulup diğerleri deneme gruplarını oluşturmuştur. 3 deneme grubu; defne yağı, lavanta yağı, kekik yağından oluşmaktadır.

Sonbahar sezonunda şeker şurubu kontrol grubunun beslemesinde kullanılmıştır. Deneme gruplarında ise % 1'lik esansiyel yağ 1lt.'ye 10ml hesabıyla, hazırlanan şeker şurubuna katılmıştır. 500ml.lik hazırlanan şuruplar verilmiştir.

12.ve 42. gün her bir kovanın üst kapağından ve dış çerçevelerden toplanan yaklaşık 150 arı üzerinde bulunan varroa miktarı pudra şekeri yöntemiyle arılıkta sayılmıştır. Akarisit ilaçların etkinliğini belirlemede düşen varroaların ortalamalarına göre değerlendirme yapılmıştır.

12. Gün	Varroa	42.Gün	Varroa
Defne Es.Y.G.Ort	2,3	Defne Es.Y.G.Ort	0,2
Lavanta Es.Y.G.Ort	3,5	Lavanta Es.Y.G.Ort	0,5
Kekik Es.Y.G.Ort	3,2	Kekik Es.Y.G.Ort	0,5
Kontrol Grubu	2	Kontrol Grubu	7,42

Sonuç ve Tartışma

Kullanılan Esansiyel Yağların varroa üzerine etkili olduğu 42. Gün sayımlarında farkedilmektedir. Kontrol grubunda varroa sayısında artış görünürken esansiyel yağ gruplarında belirgin bir düşüş görülmektedir. Çalışmalar sezona bağlı devam etmektedir.

Sonuç olarak, aromatik bitkilerden çıkartılan esansiyel yağ asitlerinin Varroa destructor mücadelesinde etkili olduğu görülmektedir. Esansiyel yağ kullanımının, insan sağlığı üzerine olumsuz bir etkisi olmadığı gibi arı aileleri üzerinde de anormal bir yan etkisi görülmemektedir. Araştırmalar, bu maddelerin doğru kullanımı sonucu balda oluşacak kalıntının eşik düzeyinin altında kaldığını göstermektedir.

REFERANSLAR

- Goodwin M, Eaton Van C. Control Of Varroa A Guide For New Zealand Beekeepers. New Zealand Ministry Of Agriculture And Forestry, 2001
- Imdorf A, Bogdanov S, Ibanez O, Calderone N.W. Use Of Essential Oils For The Control Of V.Jacobsoni Honey Bee Colonies. Apidologie (30): 209-228. 1999.
- Amrine J, Noel B, Mallow H, Stasny T, Skidmore R. Essential Oils Used To Control Mites In Honey Bees. 1996.
- Nitsche A, Tokalov Sv, Gutzeit Ho, Müller Jt. Chemical And Biological Characterization Of Cinnamic Acid Derivatives From Cell Culture Lavender (*Lavandula Officinalis*) Induced By Stres And Jasmonic Acid. Journal Of Agricultural And Food Chemistry, 52: 2915-2923,2004.

Biotechnological Studies in Laying Hens

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Abstract

Today, biotechnology has become one of the main subjects on poultry industry. Applications in biotechnology will continue in the future to have a major impact on poultry health (vaccines and antibiotics), nutrients ((probiotic, prebiotic), transgenic animals (therapeutic proteins) and genomic studies (breeding). A great number of publications on the use of biotechnology in poultry breeding have been made for the past thirty years. In this article, publications on applications in laying hens were reviewed. The purpose of the article is to present some of the studies on this subject to interested people and to ensure that poultry breeders benefit from these new technologies. **Keywords:** Poultry, biotechnology, layer, poultry genomics

Can miRNAs' Expression Profile Of Cervico-Vaginal Mucus(CVM) Be A Biomarker For Early Pregnancy Diagnosis In Cattle?

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Abstract

miRNAs are important biomarkers -which can be obtained by minimally invasive techniques- for many biological processes. Intracellular/extracellular miRNAs exist in the mucus of animals and this miRNA density varies depending on the infection and the physiological state of the animal. Differences in expression of CVM miRNAs can be used as biomarkers for pathological conditions such as molecular diagnosis, disease diagnosis and prognosis or different physiological conditions such as pregnancy.

Significant differences in miRNA expression in some miRNom studies to date support use of miRNAs as biomarkers; blastocyte development of embryo affected by miR-24 in cow, detection of pregnancy-related bta-mir 140 in pregnant cow's circular blood on the 13/19th day, finding different miRNA expression in embryonic stages on 10/12/16/20th day, differences in 27 miRNA expression of blood in embryonic deaths etc. However, in the current literature CVM miRNA expression profiles related to pregnancy process in cattle have not been studied yet. It is obvious that illumination of the implantation mechanism, which is one of the most critical stages of a successful pregnancy, will contribute greatly to the increase of reproductive efficiency in the livestock sector.

It is reported that embryo losses in cows resulting in miscarriage due to failure in maternal recognition have increased to 25%. On the other hand, due to the lack of economic, reliable and high accuracy method of pregnancy diagnosis in cows in the early stages of pregnancy, there is a decrease in productivity and thus economic losses in the sector.

It is important to compare CVM miRNA expression profiles of cows in the critical period starting from maternal recognition(16-18th days) to the end of implantation (28-42nd days) with non-pregnant cows. In cows, it is possible to detect miRNAs in CVM that are effective in the harmonious action of cytokines, steroid hormones, growth factors and metabolites involved in complex interaction for embryo attachment to the uterus. If significant miRNA expression profiles are obtained, enlightening information about the critical stages of the reproductive process can be obtained minimal invasive techniques in cows. New information on the stages of early pregnancy and the elucidation of the stages affecting reproductive efficiency will provide practical information for herd management and animal breeding strategies. In addition, economic strip test kits can be designed for early pregnancy diagnosis based on the proteins controlled by the miRNAs to be detected.

Keywords: Cervico-vaginal mucus(CVM), miRNA, Early pregnancy diagnosis, Biomarker

Contribution of Breeding Studies on Birth and Weaning Weight in Akkaraman Lambs in Konya Region

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Abstract

In this study, the data of 40378 lambs born between 2007 and 2019 were used to determine the contribution of the “Nationwide Genetic Improvement of Small Ruminants in Farm Condition” project on birth (BW) and 120th day weaning weight (WW) of Akkaraman lambs. For this aim, BW and WW of lambs born in 2007-2011 (1st period), 2012-2016 (2nd period) and 2017-2019 (3rd period) within the project 42AKK2005-01 carried out in Karakaya and Divanlar villages in Karatay district of Konya province. The data were analyzed by general linear model with a least-squares means. In the analysis, period, enterprise, ewe’s age, gender and birth type were selected as environmental factors. Multi Anova test was used to determine whether the factors were significant. Comparisons among the subclass means were carried out using Tukey multiple range test. The effect of all factors on BW and WW was statistically significant ($P<0.001$). In addition, 1-Sample Z test, also known as significance test, was performed to determine the differences between the 1st and 3rd period averages. It was found from the Z test that, mean BW and WW obtained in the 3rd period of the project were significantly higher than that in the 1st period (BW-Z: 111.39, WW-Z: 46.03, $P<0.001$). The mean BW and WW were 4.12 ± 0.005 and 34.17 ± 0.045 kg, respectively. BW were 4.01, 3.74 and 4.60 kg and, WW were 33.04, 32.86 and 36.59 kg in the 1st, 2nd and 3rd periods, respectively. It was found that BW and WW obtained in the last period were 14.78% and 10.74% higher than that in the first period of the Project, respectively. As a result, it is thought that 42AKK2005-01 project contributes positively to BW and WW in the flocks where the study is carried out, and therefore, the project is also beneficial to the breeders economically.

Key words: Akkaraman, Breeding Project, Birth weight, Weaning weight

Acknowledgments: The authors thank Ministry of Agriculture and Forestry because the data of "Nationwide Genetic Improvement of Small Ruminants in Farm Condition" project (Project Code: 42AKK2005-01) were used in this study.

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CRISPR-Cas9 System use of Virology

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Abstract

CRISPR-Cas systems (clustered regularly interspaced short palindromic repeats and associated proteins) are adaptive immune defense systems, such as receptor mutation and restriction modification, found in bacteria and archaea. The CRISPR / Cas system is a family of DNA consisting of repetitive DNA sequences that are found in 84% of archaea and about 45% of bacteria. Bacteria have a system that replicates some of the DNA of the viruses they are exposed to and adds them to their own DNA to protect them from subsequent infection of the same virus. These DNA fragments are encoded into the region called the CRISPR sequence. Effective use of the encoded DNA region is possible with crRNA and Cas proteins synthesized from CRISPR. The bacterial CRISPR- gene editing system can be used to resistance to DNA and RNA viruses through direct division of the virus genome.

The CRISPR-Cas immune system performs immunity within the cell in three stages; adaptation, expression and interference. The first is the adaptation of exogenous DNA to the CRISPR region. Secondly, the region in which the target sequence in the invasive DNA is put into the CRISPR locus is transcribed into the messenger CRISPR RNAs (pre-crRNA) and the resulting pre-crRNA transcripts are change with Cas endoribonucleases into small crRNAs exogenous DNA target sequences. The finally, invasive nucleic acids are targeted using crRNA and inhibiting the proliferation of viruses and plasmids by cutting homologous sequences with Cas nucleases.

The first use of this technology targeted Meq and pp38 genes mutations into the MDV-1. The CRISPR/Cas9 system used to manipulate genomes of several DNA viruses; herpes simplex virus type I, adenovirus, pseudorabies virus, vaccinia virus, Epstein-Barr virus, guinea pig cytomegalovirus, and duck enteritis virus.

Current Approaches to Pre-Synchronization Protocols Increase the Submission Rate in Dairy Cows

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Abstract

Ovulation synchronization protocols, which do not require oestrus monitoring to increase the submission rate, can be applied to problem cows whose oestrus cannot be detected. There are pre-synchronization methods that increase the effectiveness of these protocols. The purpose of pre-synchronization; instead of waiting for cows to show oestrus after voluntary waiting period and inseminating, the animals are treated early after calving and inseminated by ovulation synchronization protocols without waiting to observe oestrus. When this treatment is performed, the sexual cycle of the cow will be regulated even if it does not become pregnant in the first insemination and it will show oestrus every 18-24 days. Therefore, at least 3-4 times chance of insemination could be obtained until the 125th day after calving.

Hormonal applications such as Presynch, Double-Ovsynch, Doublesynch, PG+G, G6G, PG-3-G, which increase the submission rate, are important in this context. These pre-synchronization protocols coincide with the beginning of the Ovsynch to the period in which the early luteal phase of the sexual cycle - the period in which a dominant follicle (diestrus between 5-9 days of the sexual cycle) and a high pregnancy rate is achieved. Since the first GnRH administration of the Ovsynch protocol during this period produces ovulation from the existing follicle, a high P4 concentration is achieved during the PGF2 α administration of the Ovsynch. The increase in P4 level is due to accessory CL formation. Only PGF2 α -containing pre-synchronization methods may fail to stimulate the cycle in non-cyclic animals. Because PGF2 α cannot change the course of follicular development, the difference in oestrus and ovulation time, depending on the developmental period of the follicular wave, may cause problems when administered. Therefore, pre-synchronization protocols including PGF2 α and GnRH such as Double-Ovsynch, PG+G, G6G, PG-3-G have been developed.

In conclusion Pre-synchronization protocols are aimed at increasing reproductive efficiency.

Keywords: Cows, Presynch, G6G, PG-3-G, Submission Rate.

Evaluation of Plant Nutrient Content in Terms of Animal Nutrition According to Vegetation Periods of Çorum Province Pastures

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Abstract

In this study, it was aimed to determine the plant nutrient contents of 7 different pastures in 5 different districts (Centre, Sungurlu, İskilip; Uğurludağ, Mecitözü) of Çorum province in which Akkaraman I and II sub-projects of “National Sheep Animal Breeding Project” were carried out. 50 iron cages with 2x2 m² dimensions were placed in the pastures to collect grass samples. Plant samples from the cages were collected in April, June and August for the necessary analyzes. Dry matter (DM), crude ash (CA), crude oil (CO), crude protein (CP) analyzes were performed according to the method of Association of Analytical Chemists (AOAC, 1995). Neutral Detergent Fiber (NDF), Acid Detergent Fiber (ADF), Acid Detergent Lignin (ADL) and Crude cellulose (CS) chemical analyzes were performed by ANKOM 200 Fiber Analyzer according to Van Soest et al. (1991). NDF average of pasture grasses in April, June and August were 54.21%, 58.78%, 66.63% and ADF averages were 37.87%, 44.26%, 45.31% respectively. The variation of NDF and ADF contents of the samples in terms of periods was found to be statistically significant ($p < 0.05$). It was determined that NDF and ADF contents of pasture grass samples increased parallel to the vegetation of the plant. The changes in crude cellulose ratios according to periods were found to be 26.91%, 33.48% and 36.37% respectively, and the difference between the averages is significant ($p < 0.05$). Changes in pasture HP levels were found to be 13.37%, 9.73% and 7.38% respectively, and the effect of vegetation was significant ($p < 0.05$). In this study, when the nutrient contents of the grass samples obtained from the pastures of Çorum province were examined, it was concluded that the pastures were sufficient in April and June but additional feeding was needed in the following periods.

Key Words: Pasture, Plant nutrient contents, Crude protein, NDF, ADF, Çorum

Damızlık Yumurtalarda Kuluçka Sıcaklığının Kuluçka Performansı, Cıvıv Kalitesi ve Eşey Oranına Etkisi

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Abstract

This work was carried out to the effects of different eggshell temperatures on hatchability, sex ratio, livability, chick quality and embryonic mortality of layer breeder eggs.

In Exp., fertile eggs (33-41 wk-old breeders) were incubated at three different eggshell temperatures (36.7, 37.7 and 38.7 °C). Eggs incubated at 36.7 °C and 38.7 °C had a lower hatchability than the control group. No significant difference was found for sex ratio among treatments. The mortality during the early and middle period did not differ among treatments; however, a higher late mortality rate was observed numerically in the high and low EST groups (33 and 37 wk olds) . The daily mass loss was higher at eggshell temperature of 38,7 °C.

Key words: Hatchability, eggshell temperature, sex ratio, chick quality.

Determination of Nutrient Content and Some Physico-Chemical Properties of Native Southern Yellow Cattle Milks in Eastern Mediterranean Region of Turkey

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Abstract

Native Southern Yellow Cattle (Yerli Güney Sarısı, YGS) is an important domestic cattle breed for Turkey which are under protection within the scope of in situ conservation project initiated by GDARP (General Directorate of Agricultural Research And Policies) in 2005. This project is carried out within the Eastern Mediterranean Agricultural Research Institute. This breed is grown for combined (meat and milk) purposes and grazes about 9-10 months of the year in extensive conditions. The remaining time is spent intensively in animal stalls during winter months. Births are taking place in spring and milking continues until November. Even though milk yield of this breed is lower than that of cultured breeds, it is used in the production of cheese, yogurt and butter and contributes to meet some of the expenses of the enterprises. This study examines the quality parameters of milk obtained from the Native Southern Yellow Cattle in Bağdatlı, Yaylapınarı, Güzıpınarı and Suphandere villages in Feke District of Adana province and in Sincan village of Hatay province Payas District in October 2017. Two different milk samples were taken. The first of these is colostrum milk from Güzıpınarı, Bahçecik and Yaylapınarı villages and the second one is normal milk from all villages. As a result of the analysis; It was concluded that milk is healthy and high quality according to EU and Turkish Food Codex Standards.

Keywords: Native Southern Yellow Cattle, Milk, Colostrum, Milk Quality Parameters, Adana

Determination of *In Vitro* Digestibility Levels of Italian Ryegrass(*Lolium multiflorum*) Cultivars Harvested at Two Different Growth Stages

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Abstract

In vitro true dry matter digestibility (IVDMD) of two Italian ryegrass varieties (*Lolium italicum* L. Syn. *L. multiflorum* Lam; Barspectra II ve Bartigravariety) in beginning of heading (BH) and dough (DS) stages and, 3 different cutting times (1, 2 and 3) during the vegetation are presented in this research. The digestibility's of the Italian ryegrass samples were compared with the alfalfa hay, which was prepared by cutting from 4 different fields and mixing in equal proportions and which was the standard forage source (StK) in *in vitro* studies. *In vitro* true dry matter digestibility was determined in an *in vitro* incubator (Daisy^{II}) using the Two Stage Method (Tilley and Terry (1963) NDF procedure reported by Goering ve VanSoest, 1970.

According to the results of the study, no difference was found between Barspectra II and Bartigra varieties in terms of IVDMD levels (75.20% vs. 74.24%). It was determined that the digestibility of Italian ryegrass varieties did not differ from alfalfa hay (73.56%), which is accepted as a source of quality forage. It was determined that the average IVDMD level was higher 78.20% vs. 71.92% ($P < 0.001$) when the Italian ryegrass was cut in the BH stage of vegetation than in the DS stage. In the same vegetation period, it was found that Italian ryegrass was digested more in 3rd (78.12%) than 1st (73.86%) and 2nd (73.15%) cuttings ($P < 0.001$). There was an interaction between vegetation period and number of cuttings, it was determined that digestibility was higher in both BH and DS vegetation periods in 3rd cutting than 1st and 2nd cuttings ($P < 0.004$).

As a result, it can be said that the level of IVDMD will be higher when the Italian ryegrass is cut at the beginning of heading stage of vegetation and in the 3rd cutting. Italian ryegrass can be an alternative source for the solution of the high quality forage problem in Turkey.

Keywords: Italian ryegrass, cutting periods, cutting numbers, *in vitro* dry matter digestibility

Determination Of The Effect Of Some Environmental Factors On The Probability Of Survival Of Pırlak Lambs Until Weaning By Logistic Regression Analysis

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Abstract

In this study, the effect of factors such as age, lambs gender, type of birth and birth weight on survival possibility of lambs from birth to weaning was determined by logistic regression analysis. For this purpose, data of 4230 lambs belonging to Eskişehir Pırlak-1 project were used within the scope of "Nationwide Genetic Improvement of Small Ruminants in Farm Condition". In logistic regression analysis, 2 old for ewes age group, female lambs for gender group, and multiple born lambs for birth type were used as reference for categorical factors. Birth weight was included as a continuous factor in the model. It was found that the difference between the survival possibility of lambs born from two-aged ewes and the survival possibility of lambs born from seven-year-old ewes was significant ($P < 0.001$), whereas the difference between other age groups was not significant ($P > 0.05$). The survival possibility of lambs born from 7 years old ewes were found to have 4.797 times more than 2 years old ewes. It was determined that the effect of gender on survival possibility was not significant ($P > 0.05$) and birth type was significant ($P < 0.001$). The effect of birth type was statistically significant ($P < 0.001$). Survival possibility of single born lambs were found to have 1.477 times more than multiple born lambs. The effect of birth weight of lambs on survival possibility was also significantly important ($P < 0.001$) and each unit increase in birth weight increased survival by 1.223 times.

As a result; it was concluded that while multiple born rate of Pırlak lambs increasing, the survival possibility of lambs should be increased, and in order to increase the birth weight of the born lambs, to improve the care and feeding conditions of the ewe during the period of pregnancy would have positive effects on the survival possibility of multiple-born Pırlak lambs.

Key words: Pırlak, survival possibility of lambs, gender, birth weight, birth type

Acknowledgments: The authors thanks Ministry of Agriculture and Forestry because the data of "Nationwide Genetic Improvement of Small Ruminants in Farm Condition" (Project Code: 26PLK2011-01) were used in this study.

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Determination of The Factors Affecting Honey Cost In Beekeeping Enterprises

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Abstract

Beekeeping is an important livestock sub-sector in which economically profitable products such as honey, pollen, propolis and bee milk which have importance in terms of human health are produced, by blending plants, bee and effort. Beekeeping has advantages such as less labor force requirement and less dependency on land than other livestock sub-sectors. The aim of this study is determine some factors affecting honey cost in beekeeping enterprises by using linear regression.

In accordance with the aim of this study, honey cost (y), bee feeding cost (x_1), transportation and hive accommodation cost (x_2), number of colony (x_4), honey yield (x_5), experience of beekeeper (x_6), breed of bee (x_7) and another job status except for beekeeping (x_8) were collected from 43 beekeeping enterprises. Linear regression analysis was applied to estimate honey cost by using other variables. All data were analyzed using SPSS 22.0.

In the model that was estimated honey cost, the effect of transportation and hive accommodation cost, number of colony, honey yield and experience of beekeeper were found statistically significant ($p < 0.05$). The effect of bee feeding cost, breed of bee and another job status were found to be non-significant ($p > 0.05$).

As a result, beekeepers can reduce honey cost by increasing honey yield and decreasing transportation and hive accommodation cost. In addition, to gain more experience in beekeeping is important for both honey cost and breeding.

Key Words: Beekeeping, Beekeeping enterprises, Honey cost, Regression

The Environmentally Measurements Evaluation of Silkworm Breeding Where in Some Villages of Kulp District of Diyarbakır Province*

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Abstract

Kulp district are meets the cocoon production proportion 50% in the Turkey. In this study, the environmental conditions (Temperature, Humidity, Light, Carbondioxide) in the spring feeding period of 2019 were examined in the production businessess of silkworm growers in the some villages of Kulp district of Diyarbakır province.. For this purpose, at the end of the 5th Larval stage and at the beginning of the cocoon weaving period, 90 people engaged in silkworm breeding were visited. The data of Ağıllı, Akdoruk, İslamköy, Soğanlı, Yukarı Elmalı and Yuvacık villages are respectively Temperature(°C) as 27.7±0.45, 27.7±0.90, 28.9±0.34, 29.2±0.26, 29.5±0.47, 28.3±0.30, Humidity(%) as 62.1±3.15a, 53.9±2.60ab, 55.4±2.17ab, 49.5±2.65b, 51.7±1.90ab, 62.4±1.69a, Light (Lux) as 20.5±5.67, 21.2±6.98 53.1±21.04, 43.6±12.83, 47.3±11.83, 41.2±11.26, Carbondioxide (ppm) as 1570.1±287.60a, 1226.0±170.37ab, 1110.6±178.57ab, 857.5±112.23b, 1064.3±95.55ab, 1569.6±100.39a were determined. In the results of our study, a significant difference (P <0.01) was found between the humidity and CO2 values of the villages. It is seen that these data are not compatible with the values in literature and desired values in aquaculture.

Key Words: Silkworm, Data Environmentally, Measurements

* This Project was supported by General Directorate of Agricultural Research and Policies and carried out by GAP International Agricultural Research and Training Center

The Technology Of Dna Microarray

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Abstract

Microarrays are high throughput devices which enable hundreds known biomolecules (nucleic acid, protein, cell, tissue) to attached to a surface and then enabling identification of unknown biomolecules after hybridization with the knowns.

DNA microarray is a technology based on hybridization of nucleic acids of interest with known nucleic acids binding to two- or three-dimensional solid surface covalently or non-covalently. Then, the concentration of these target-probe structures tied together by hybridization is measured and visualized. For an accurate measurement, hybridization is one of the most important steps. The more increase in hybridization temperature and duration, the more rate of heterogeneous signals. Bioinformatics analyses based on mathematics, statistics and computerized processes/pipelines are used for the evaluation of biological data obtained by reading the signals.

Types of DNA Microarray:

SNP (Single Nucleotide Polymorphism) Microarray: It is the specific array that allows thousands or even millions of SNP regions in the genome to be scanned. SNP arrays are designed for genotyping. By using linkage disequilibrium phenomena and the result of SNP arrays a various number of studies, such as QTL discovery, genomic characterization, genomic selection, are possible to be conducted.

RNA Microarray: This type of arrays is used to detect expression levels of certain gene regions at the RNA level. For RNA analysis, oligonucleotides prepared from cDNA are fixed to the array surface and these are called RNA microarray.

CNV (Copy Number Variation) Microarray: This technique, also called aCGH (array-based comparative genomic hybridization), allows copy number variation to be determined comparatively among individuals (control and case).

Methylation Microarray: It is array type developed from nucleotide sites from CpG islands where methylation occurs at a high rate, from the regions methylated differentially without CpG, from open chromatin regions, from enhancer regions, from the regions to which transcription factors bind, and from miRNA promoter regions.

Custom Microarrays: They are custom designed microarrays. With advances in microarray technology and the development of more flexible array surfaces, many special demands are fulfilled by producers of microarray.

DNA microarray is a revolutionary technology that allows simultaneous analysis of tens of thousands of nucleic acid sites compared to the conventional methods. It has been the basis of biological and biomedical research for more than a decade. For a successful microarray analysis, problem-specific microarray selection, a good experimental design and bioinformatics knowledge are required.

Key words: DNA, genome, microarray.

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Effects Of Chromium On Laying Hen's Performance Under Low Temperature

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Abstract

In poultry breeding, sudden decreases in poultry and ambient temperatures it can cause cold stress. This situation has negative consequences for poultry production in the world as in our country. The limits of the desired thermal comfort zone in poultry breeding are 18-21⁰C. They cannot maintain the body temperature if the ambient temperature is 10°C. The actual dangerous limit is the temperature below 0°C. Therefore, the use of minerals such as chromium has been the subject of research recently in order to increase egg productivity and reduce the problems that may cause stress.

Chromium (Cr) is an essential trace element that plays a role in carbohydrate, lipid, protein and nucleic acid metabolisms. It is reported that chromium level in the ration should be added considering environmental stress factors. But as with other livestock, the amount of chromium to be taken daily for poultry hasn't been determined.

In conclusion, in recent years, it can be said that adding chromium to the ration of laying hens improves performance by reducing the negative effects of cold stress. However, it is necessary to make more studies to determine the factors affecting the efficiency and concentration of chromium to be used in ration.

Keywords: Cold Stress, Chromium, Laying Hens, Performance

Effect of Birth Type, Birth Year, Gender and Different Flocks on Birth and Weaning Weight of Şavak Lambs Reared in Farmers ConditionsHasan Çetin¹, Tahir Bayrıl², Şahin Tez¹¹GAP International Agricultural Research and Training Center, 21100 Diyarbakır²Department of Animal Husbandry, Faculty of Veterinary Medicine, Dicle University, 21280, Diyarbakır, Turkey**Abstract**

This study was conducted to determinate birth type (BT), birth year (BY), birth months (BM), gender, different flocks on growing performance of Şavak lambs during the suckling period reared in different farmer conditions. The research was carried out on twenty five different flocks randomly chosen among the Şavak sheep flocks in the district of Pertek surrounded by Tunceli provinces. The data consisted of 10069 heads of lamb born in 2018 and 2019. The projects have been supported by the General Directorate of Agricultural Researches and Politics (TAGEM). The Average live weights (ALW) of birth, 30th, 60th and 90th days and daily live weight gain (DLWG) of the Şavak lambs were 3.34, 12.12, 23.74, 35.30kg and 355 g, respectively. Effect of gender, birth type, birth months and birth years on live weights of birth, 30th, 60th and 90th days was found statistically significant (($P<0.05$; $P<0.001$) for Şavak lambs. Besides, Live weights of birth, 30th, 60th and 90th days was also significantly affected by farmer conditions ($P<0.001$)

As a result, daily live weight gain and 90th day live weight increase of Şavak lambs were higher than other other native breeds.

Key words: Şavak Lambs, Birth Weight, Growing Performance, Different Flock

Effects Of Ewe Age And Birth Weight At Lambing On Survival Rate Of Kivircik Lambs With Binary Logistic Regression Analysis

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Abstract

The aim of this study was to determinate the effects of ewe age(EA) and birth weight(BW) at lambing on survival rate of Kivircik lambs (SR) within first 90 day in National Improvement Project for Small Ruminants at Breeders Conditions flocks (Project No: 10KIV2011-02). In this study 4367 head of ewes and 4962 head of lambs data obtained from 58 Kivircik breeder flocks 7 different vilages in Balıkesir Province Dursunbey and Sındirgi district were used. The number of lambs born and birth weight were recorded by breeders, and SRs at days 45 and 90 and EA were determined by project crew in 2016

According to binary logistic regression analysis results, the effect of the EA on the SR of the lambs at day 45 was found to be statistically insignificant but, on the other hand SR was found to be significant at day 90. Lambs born to ewes in the 4 and 6 year-old groups ($P<0,000-0.001$) had a better odds ratio value according to other groups years old ewe for at day 90.Odds ratio values were determined 1.863 and 1.875 respectively according to 4 and 6 years old ewes. Also by looking at the analysis results, it is found that each unit increase on birth weight statistically increases lamb survival rate on 45. and 90. days 1.390 and 1.713 times respectively.

In summary, with a better maternal instinct and maternal experience provide higher SR on Kivircik lambs at 90. days. However, even if older ewes (7 or more age) provide higher SR, this situation is not desirable in animal breeding, therefore the 4 and 6 age is ideal.

Keywords: Kivircik sheep, ewe age, birth weight, binary logistic regression

Acknowledgements: The data of this research was obtained from “National Animal Breeding Program-Kivircik Sheep Project-Balıkesir” which is conducted by TAGEM.

Effects Of Ewe Age And Live Weight On Reproductive Performance In White Karaman SheepŞükrü Doğan^{1*}, Halil Kayar¹, Bülent Bülbül¹, B. Emre Teke¹¹ Department of Animal Science, Bahri Dağdaş International Agricultural Research Institute, Konya, Turkey**Abstract**

The aim of this study was to evaluate the effects of pre-mating ewe weight and age on ewe reproductive performance in White Karaman sheep. In the trial, data of 46738 head of ewes obtained from 28 White Karaman breeder flocks in Konya Province were used. One week before the mating season ewes were weighed and allocated into 6 groups according to their LW (≤ 45 , 45-50, 50-55, 55-60, 60-65 and $65 \leq$ kg). Seven different groups were formed according to the age of sheep at mating time (1.5, 2.5, 3.5, 4.5, 5.5, 6.5 and 7.5 years). Binary logistic regression analysis was used to determine the influence of the live weight and age of the ewes on the fertility rate. Binary variables were coded as 1 (lamb) and 0 (did not lamb) for fertility rate. 1.5-year-old sheep for the age group, and sheep weighing 45 kg or less for the live-weight group were considered as reference. The effects of the live weight and age of the ewe were found to be important for the reproductive performance of ewes ($P < 0.05$). The fertility rate was similar in 1.5, 6.5 and 7.5 year old sheep and was lower than other old sheep (93.2%, 93.5% and 93.3%, respectively). Odds ratio values of 2.5, 3.5, 4.5, 5.5, 6.5 and $7.5 \leq$ years-old sheep compared to 1.5 years-old sheep were determined as 1.34, 1.56, 1.42, 1.49, 1.06 and 1.01, respectively. Ewe groups of weighing ≤ 45 kg and $65 \leq$ kg had a similar fertility rate (93.2% and 93.3%). Their fertility rates were lower than other live weight groups. Odds ratio values of 45-50, 50-55, 55-60, 60-65 and $65 \leq$ kg sheep compared to ≤ 45 kg were found to be 1.41, 1.49, 1.45, 1.59 and 0.96, respectively.

As a result, in White Karaman sheep flocks, weeding the sheep older than 6.5 years and live weight of ≤ 45 kg and $65 \leq$ kg at the mating time can increase the birth rate feature.

Acknowledgments: The authors thank Ministry of Agriculture and Forestry because the data of "Nationwide Genetic Improvement of Small Ruminants in Farm Condition" (Project Code: 42AKK2011-02 and 42AKK2012-03) were used in this study.

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Should Angiogenic Factors Be Considered In Early Pregnancy Losses?

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Abstract

The embryo attachment to the endometrium (implantation) and formation of a functional placenta (placentation) is one of the most critical stages of the pregnancy process. Placentation begins shortly after implantation occurs. Healthy placentation is possible by establishing a functional vascular network between mother and offspring. The transporting of the nutrients and gases necessary for the development of the offspring from the mother's circulation to the offspring and then the return of the wastes generated as a result of the offspring's metabolic activities to the mother's circulation is possible through this vascular network. The formation of new vessels and connect at the placental level is necessary for the mother and offspring to communicate. This process, defined as angiogenesis, is a very critical and complex process in which many maternal and fetal genetic, epigenetic and environmental factors interact with each other. Identification of problems that may occur in angiogenesis will cause malnutrition of offspring, miscellaneous complications, and premature pregnancy loss. In this context, vascular endothelial growth factor (VEGF) and its receptors (VEGFR-1 and 2), placental growth factor (PLGF), fibroblast growth factor 2 (FGF2), angiopoietins (ANGPT), nitric oxide (NO) and hypoxia involved in the regulation of VEGF expression angiogenic factors such as hypoxia inducible factors (HIF-1A, -2A, -3A) are directly effective in angiogenesis. In addition, some matrix metalloproteinases (MMP2, MMP9) and tissue inhibitors (TIMPs) have indirect effects in this process. In order to stimulate angiogenesis, the changes in the expression profile levels of these factors are controlled by different epigenetic mechanisms (DNA methylation, histone modifications and non-coding regulatory RNAs). In particular, microRNAs (miRNAs) (e.g. miR-17, miR-27a, miR-92b etc.) are primary epigenetic regulators that play an important role in placenta development and function. The changes in genetic and epigenetic mechanisms have the potential to may be used as a biomarker in terms of the development of new diagnostic and treatment methods related to the problems during the angiogenesis process. The identification of such biomarkers and the widespread use of these biomarkers; detection and prevention of early pregnancy losses that lead to serious economic losses, as a result, will contribute to the growing profitability.

Keywords: Angiogenesis, angiogenic factor, epigenetic, pregnancy.

Evaluation of Natural Kangal Meadows' Quality and Quantity

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Abstract

A field and laboratory research combined with statistical analysis and evaluation study was carried out on the characteristics of local meadows consumed by the sheep herds involved in the NATIONAL COUNTRYSIDE SMALL RUMINANT ANIMAL BREEDING PROJECT which was carried out on Sivas Kangal Akkaraman sheep. The meadows in the region are harvested at the end of summer and stored as winter forage feed stock. The amount and quality of the plant samples taken from 6 different meadows in Kangal district were measured and the value of these meadows as forage was evaluated. In Kangal sheep production, meadow hay is widely used in ruminant animal nutrition. Meadow plants were sampled from different locations; dry matter yield and composition and chemical structure were analyzed. Forage quality was evaluated, regarding to the energy availability. The dry matter yield was found 560 kg/da, legume content 25 %, crude protein 8.9 %, NDF 58.4 %, ADF 37% and OM 89.6 % as average. Digestible dry matter was found 60 %, dry matter intake as percentage liveweight was 2.08 and relative feed value was 96.6. By this method, it was seen that forage quality value could be better evaluated with the coefficients used to determine the energy value of roughage.

Evaluation to Change of Lactation Milk Yield in Different Years And Seasons in Anatolian Water Buffaloes in Çorum Province

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Abstract

In this study, it has aimed to indicate the relationship between Lactation Milk Yield (LMY) difference determine according to years and seasons of 1972 rootstocks Anatolian Buffaloes from 2013 to 2018 in Çorum province. To that end, the rootstock material used in the Breeding Project carried out in Çorum within the scope of the National Buffaloes Breeding Project, which was begun in 2012 by the General Directorate of Agricultural Research and Policies. The project is still continuing with 826 headstock buffaloes and 60 head buffalo bulls in 2019. In this study, lactation data according to years 2013, 2014, 2015, 2016, 2017 and 2018; 70, 347, 379, 494, 465 and 217 were used respectively. According to years, LMY averages were 1.361 kg in 2013, 1.164 kg in 2014, 1.232 kg in 2015, 1.193 kg in 2016, 1.154 kg in 2017 and 1.205 kg in 2018 respectively. Based on the research related to years to LMY of animals, there are no differences between years ($P>0.05$). In recent study, when datas evaluated according to seasons between 2013 and 2018, 1132 lactation period has started in the spring, 466 lactation period has started in the summer, 119 lactation period has started in the autumn and 255 lactation period has started in the winter. Lactations started in 57.4% in spring, 23.6% in summer, 6% in autumn, 11.4% in winter. LMY averages with respect to beginning seasons in the spring 1.174 kg, in the summer 1.155, in the autumn 1.243 and in the winter 1.327 kg were measured. There was no seasonal effect on milk yield ($P>0.05$). Although many studies have indicated that the year and season are effective on LMY in Anatolian Buffaloes, in this study, it may be realized that the year and season effect may be due to the location, geographical conditions and climate of the region.

Key Words: Çorum, Anatolian Buffalo, Lactation Milk Yield, Effect of Years, Effect of Season

Acknowledgement: This project is funded by the Ministry of Agriculture and Forestry, under the coordination of the Directorate of Livestock and Aquaculture Research, General Directorate of Agricultural Research and Policy, in cooperation with Çorum Provincial Breeders' Breeders Association.

Free Oxygen Radicals And Their Oxidative Stress On Embryo Cells

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Abstract

Atoms or molecules with unpaired electrons in their outer orbitals are defined as free radicals (FR). FR's are reactive molecules that occur during the conversion of nutrients into energy using oxygen. Oxygen molecules are indispensable for life, but during the metabolism, known as the source of free radicals and highly reactive intermediate products are formed, the most important of these free radicals are free radicals composed of oxygen. FR's have different chemical structures such as hydroxyl, superoxide, nitric oxide and lipid peroxide radicals. These molecules, known as reactive oxygen species (ROS) or metabolites, damage cell components such as lipids, proteins and DNA. As a result of oxidative damage caused by the increase of FR's, it has been observed that membrane integrity is deteriorated, DNA strand breaks, and structure and function of proteins change.

Under normal conditions, the main source of ROS in cells is the electrons escaping from the mitochondria and endoplasmic reticulum transport chains. ROS (superoxide anion, hydrogen peroxide, hydroxyl ion) cause changes in mutagenicity, cytotoxicity and gene expression as a result of cellular and molecular effects. There are protective mechanisms expressed as antioxidants in the organism against the harmful effects of FR's. Some of these protective mechanisms prevent the formation of FR's, while others prevent the harmful effects of FR's.

FR Effects on Oxidative Stress

FR's show their effects as oxidative stress in tissues and cells. In other words, oxidative stress can be defined simply as the imbalance between the body's antioxidant defense and FR production. The organism is not affected by these compounds as long as the rate of formation of FR's and the rate of inactivation are in balance. Conversely, if the defense decreases or the rate of formation of these harmful compounds exceeds the defensive power of the system, this equilibrium breaks down and harmful effects due to free radicals begin to emerge. Low concentration of FR's; it is necessary for host defense, cell proliferation, signal transduction and gene expression. But overproduction of FR's or insufficiency of the antioxidant defense system leads to a condition called oxidative stress, which leads to aging by damaging signal transduction pathways, apoptosis and cellular components.

Oxidative stress factor is associated with the development of damaged embryos as well as free oxygen in the environment. After oxidative stress, the excess free oxygen radicals (FOR) that arise from the

embryo and the embryo environment cause changes in the molecules contained in the cells and suppress the development of the embryo. Damages caused by oxidative stress are caused by excessively released ROS. These FR's cross the cell membranes and alter the structure of cellular molecules such as lipids, proteins, nucleic acids. It leads to changes in mitochondria, blockage in embryonal cell development, excessive ATP consumption and apoptosis. Normally, embryos that develop in vitro have no other protective mechanism against oxidative stress other than their own antioxidant systems. However, the control and protection of oxidative stress is essential for embryo production in vitro. It is the duty of antioxidants to prevent damage resulting from the oxidation of carbohydrates, proteins and lipids in cellular components due to the excess reactive structures of radicals. In other words, endogenous and exogenous antioxidants in the organism collect ROS and inhibit lipid peroxidation. For this purpose, antioxidant enzymes are added to in vitro culture media where embryo will develop.

Keywords: Free Radicals, Oxidative Stress, Antioxidant, Embryo.

GDF9 Gene Exon 2 Variants Of Prolific And Non-Prolific Native Turkish Sheep

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Abstract

Growth differentiation factor 9 (GDF9) or FecG gene is a member of the transforming growth factor β superfamily that is one of the major genes affecting prolificacy. The protein encoded by this gene is essential for ovarian folliculogenesis and female fertility.

The ovine GDF9 gene is located on chromosome 5 and contains two exons. There are 29 variations identified in GDF9 gene and some of these mutated alleles are associated with an increase in ovulation rate in sheep. Eight mutations (SNP) (260, 471, 477, 721, 978, 994, 1111, 1184 nucleotide position) were found and described as G1–G8 in Cambridge and Belclare sheep. Their results show that only G8/FecG^H mutation in GDF9 gene have an increased ovulation rate. In addition, considering other researches, G1 mutation in exon 1 has been found to be associated with litter size and ovulation rate in Iranian Moghani, Ghezel, Garole and Chilota sheep breeds.

In this study, to compare GDF9 variant profile, two non-prolific breeds (Karacabey merino and Kivircik) and a prolific breed (Chios) was sequenced according to *GDF9* exon2. Three synonymous and two missense variants were detected. Missense variants were K241E and V332I. Minor allele frequencies of missense variants are given in table 1.

Table 1: GDF9 exon 2 missense variants profile of Chios, Kivircik and Karacabey merino.

Breeds	<i>n</i>	Missense variants	HW p-value	MAF	Alleles
Chios	134	K241E	0.1454	0.157	G:A
		V332I	0.506	0.302	G:A
Kivircik	42	K241E	0.7122	0.317	G:A
		V332I	1.0	0.048	G:A
K. Merino	115	K241E	0.8901	0.083	G:A
		V332I	1.0	0.07	G:A

As a result; we compared prolific and non-prolific breeds in terms of GDF9 exon 2. GDF9 missense variants reported in this study have been reported previous studies. No GDF9 variant specific to prolific Chios was detected.

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Comparison of Food Additives and Feed Additives

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Abstract

Food additives are defined in the Turkish Food Codex Regulation “Not consumed alone as food or used as food raw material and auxiliary material; residues or derivatives which may be present in the manufactured material during the process or manufacturing, used according to the selected technology; are used to preserve, correct or prevent undesirable changes in the taste, smell, appearance, structure and other characteristics of foodstuffs during the production, classification, processing, preparation, packaging, transportation, storage of foodstuffs. ” Food additives and food enzymes can be classified functionally in a wide range. Feed additives; in the feed law it is expressed as substances that affect the production of animals and the properties of feeds when they are added to feeds; other than feedstuffs and premixes, it increases the quality of feed or animal products, increases animal production and welfare level of animals, improves the digestion and digestive system microflora, increases the amount of nutrients in feed, contributes to the protection of nutrients and feed. products and microorganisms that reduce environmental damage. Generally, they can be classified as technological, sensory, nutritional, zootechnical feed additives and coccidiostats and histomonostats. The same departments of the FDA in the US and EFSA in the EU work on both food and feed additives. In our country, the necessary legal arrangements on food and feed additives are handled by the Ministry of Agriculture and Forestry, Department of Food Enterprises and Codex under the General Directorate of Food and Control. This review focuses on the comparison of food and feed additives with their intended use, legal and illegal situations in their use, legal regulations and restrictions on their use in Turkey and the EU and import and export data.

Key words: Food Additives, Feed Additives, Nutrition, Import and Export, Legal Regulations

Anahtar kelimeler: Gıda Katkı Maddeleri, Yem Katkı Maddeleri, Beslenme, İthalat ve İhracat, Yasal Düzenlemeler

Growth Characteristics of Colored Angora Goat in Siirt Province

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Abstract

This study carried out to investigate the growth characteristics of Colored Angora goat raised in farmer condition in Siirt province from 2013 to 2016 and supported by the General Directorate of Agricultural Researches and Politics (TAGEM) in the scope of *National Small Ruminant Improvement Project Under Farmer Condition*.

The study was carried out in 32 flocks and live weight records of 13694 kids from birth to 120 days of age were used in the analysis. The mean birth (BW0), 30th day (BW30), 60th day (BW60), 90th day (BW90) and 120th day (BW120) weights and average daily weight gain from birth to 90 days of age (ADWG90) and their standard errors were found as 2.09±0.004, 6.34±0.031, 8.33±0.021, 10.82±0.023, 11.94±0.034 kg and 97.08±0.260 g, respectively. It was observed that flock, sex and season of birth of kids significantly affected the live weights in all periods (P<0.01). The type of birth had significant effect only on BW0 and BW30 (P<0.01). It was also observed that BW0, as covariate, was effective (P<0.01) on BW30 and BW60. The least square means of BW0, BW90 and BW120 in 2013 and 2016 were 2.13 and 2.13 kg, 9.98 and 10.21 kg, 10.91 and 10.92 kg, respectively.

Findings from the study indicate that the breeding program applied did not have significant effect on early growth traits of Colored Angora goat during the 4 years. On the other hand, survival rate until weaning was improved from %81.5 in 2013 to %95.0 in 2016.

Keywords: Colored Angora goat, growth characteristics, survival rate

Growth And Survival Characteristics Of Central Anatolian Merino Lambs Grown In Karaman Province

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Abstract

In this study, it was aimed to investigate the growth and survival characteristics of the Central Anatolian Merino lambs grown in breeders condition in Karaman province. For this purpose, live weights of lambs were determined at birth and weaning (90 days of age) and about 10% of male and 50% of female lambs which have the best growth and breeding characteristics according to these characteristics were selected. The morphological characteristics of the Central Anatolian Merino breed also have been taken into account in the breeding selection. The growth and survival characteristics of Central Anatolian Merino lambs between 2012-2016 have been examined in the study. For this purpose, the birth weight of 24628 lambs was 3.90 kg and the weight of 90th d was 23.63 kg. In years, the lambs' survival rate at weaning were between 85.1% and 94.9%. As a result, according to the first year records in the study (2012); birth weight, live weight and survival rate at weaning have been increased 0.49 and 3.39 kg and 4.6%, respectively. During the 5-year study, the increases in the results of the work done in Central Anatolian Merino sheep are thought to be satisfactory.

Key words: Central Anatolian Merino, breeding, growth characteristics

Acknowledgment: In this study, *Central Anatolian Merino-1 (70OAM2011-01)* carried out in Karaman province within *National Sheep and Goat Breeding Project of Turkey* data obtained from the sub-project were used. As all authors, we would like to thank our ministry

Determining Milk Composition and Somatic Cell Count According to the Lactation Periods in Akkaraman Şavak Ewes Raised by the Breeders*

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Abstract

This study was carried out for determining the milk composition and somatic cell count (SCC) in the Akkaraman Şavak ewes that have been bred by the local breeders in the content of National Small Ruminant Breeding project, Elazığ province. In order to verify that the animals are healthy, those that were free of Bucella and Mastitis were selected. The selected ewes have been vaccinated for Brucella periodically. Milk samples were taken from 80 of the randomly selected ewes at 4 years old from their both udder lobes and CMT (California Mastitis Test) were performed for subclinical mastitis surveillance. When CMT was negative, SCC test was carried out. After the milk samples were transferred to the laboratory, they were analyzed for chemical composition (fat, protein, lactose, density, fat-free dry substance, water, and conductivity) of February and June by the Lactoscan, which works based on ultrasonic principles. Using the last year's milk yield record, those animals that were below the average milk yield were included in the low-yield group while those that were with higher milk yield were included in the high-yield group. Results of CMT tests applied to 80 ewes indicated that 17 animals were CMT positive and the remaining 63 were negative. Those that were CMT positive were excluded from the study. The remaining 63 animals were subjected to SHS test and those with 1×10^5 cell/ml excluded from the sampling plan. There was no significant difference in SCC between low-yield and high-yield groups. Milk protein, fat, and lactose levels significantly changed by lactation period.

Key words: Akkaraman, Şavak, Milk composition, CMT, SCC.

*This study was supported by the funds provided by the National Project of Animal Breeding by the Republic of Turkey Ministry of Agriculture and Forestry.

**Effects of Some Environmental Factors on the Early Growth Characteristics of Kıvrıkcık Sheep
in Farmer Conditions**

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Abstract

This research is carried out to determine the early growth performance of the lambs of the Kıvrıkcık sheep under farmer condition in Bursa.

The animal material of the research is consisted of 5668 heads of male and female kıvrıkcık lambs from 2017 to 2018 years. Average birth weight and weaning weight (120 days) of the lambs are found as 3,74±0,01 kg and 34,00±0.02 kg, respectively. Birth weight was significantly affected by year and birth type, and weaning weight was significantly affected by year, birth type and sex (p<0.001). The average daily weight gain of lambs of Kıvrıkcık sheep was found 252±1.000 g from birth to weaning, and significantly affected by the year, type of birth and sex factors (p<0.001). These results show that environmental factors are significant lamb's growth capacities.

Acknowledgements: The data of this research was obtained from ‘ National Animal Breeding Program- Kıvrıkcık Sheep Project - Bursa sub Project within the scope of ‘National Animal Breeding Program’ which is conducted by TAGEM.

Key words: Lamb, birth weight, growth, weaning weight.

Effects of Some Factors on the Length of Gestation in Hasmer and Hasak Sheep

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Abstract

In this study, it has been investigated the effects of breed, ewe age, year, sex of lamb, birth type and birth weight from 646 data obtained to 2017-2018 in 110 Hasmer sheep and 170 Hasak sheep breeding in Konya Bahri Dağdaş International Agricultural Research Institute. Flock mean of the least squares of length of gestation was calculated as 149.52 ± 0.10 days. The effect of breed, birth type and birth weight on length of gestation was significant ($P < 0.01$), but the effect of ewe age, year and sex of lamb was not significant. The length of gestation was longer in the hasmer breed than the hasak (149.97 ± 0.14 vs 149.07 ± 0.12 days), in twin lambs than single lambs (150.07 ± 0.19 vs 148.97 ± 0.11 days), and in those with high birth weight than the low birth weight.

Keyword: Sheep, hasmer, hasak, length of gestation

Livestock Population Figures of the Hatay, Osmaniye and Kahramanmaraş Provinces*

Sema Alaşahan

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The livestock population figures of Turkey are based on data published on the website of the Turkish Statistical Institute (TÜİK). According to this data, during the period from 2010 to 2017, the numbers of imported and crossbred cattle, hair goats, Angora goats, local sheep, Merino sheep, chickens, turkeys, geese and ducks increased. While the numbers of local, imported and crossbred cattle increased in the Kahramanmaraş province, only imported cattle increased in the Osmaniye and Hatay provinces. According to official statistical data, while Angora goats are not raised in Hatay, Osmaniye and Kahramanmaraş, hair goats are raised in all three provinces. Between 2010 and 2017, the number of hair goats decreased in Kahramanmaraş, but increased in Osmaniye and Hatay. The population of local sheep breeds increased in all three provinces. The population of Merino sheep, reported not to be raised in Kahramanmaraş, decreased in the Osmaniye province and increased in the Hatay province. While geese and turkey populations decreased in Kahramanmaraş and Osmaniye, the numbers of broiler chickens, geese and ducks decreased in Hatay. This study was aimed to provide an overview of the livestock population of Turkey, and the population figures of its three neighbouring provinces, namely, Hatay, Osmaniye, and Kahramanmaraş, according to official statistical data published by the Turkish Statistical Institute, and to show the changes that occurred in the animal population figures of these provinces between 2010 and 2017.

Key words: Cattle, livestock population and population changes, poultry, sheep and goats

Introduction

In Turkey, livestock farming is classified as an agricultural activity, and several animal species are raised for economic production. Commercially raised livestock species include mainly cattle, buffaloes, sheep, goats, chickens, turkeys, geese and ducks. Furthermore, in recent years, quail production as well as sericulture and apiculture have also increased. Although there are no figures published specifically for quail production, the Turkish Statistical Institute (TÜİK) has included quails among the poultry species raised in Turkey. Moreover, partridges and pheasants, both classified as game animals, have also started to increase in number owing to the increased interest of hobbyist farmers in these species.

The livestock sector comprises both large holdings and small-sized subsistence family-run holdings with low income. In Turkey, 59.7% of the bovine holdings raise 1-4 heads, and only 0.7%

own 50-149 heads. As for ovine and caprine holdings, 18.6% raise 1-4 heads, and 21.9% own 50-149 heads (www.tuik.gov.tr).

The assessment of farm record-keeping data provides insight on how to sustain and increase livestock populations in a country. In the livestock sector, record-keeping starts at the smallest production unit, and the records kept by these units are transferred to the data registration units in the district/province to which the holding is registered. From the district/provincial local data registration units, these records are finally transferred to the central data registration unit. Ensuring the flow of accurate data safeguards the sustainability of the livestock sector.

This study presents an overview of the livestock population of Turkey, livestock numbers in its three neighbouring provinces namely, Hatay, Osmaniye and Kahramanmaraş, and the distribution of livestock species in the districts of these provinces, based on statistical data published by TÜİK.

Characteristics of Bovine Animals

Bovine animals, also referred to as large ruminants, include cattle and buffaloes. The most important species of the family *Bovidae* is *Bos taurus*, namely, the domestic cattle (İnal et al., 2016). The Turkish Statistical Institute classifies cattle under three groups: local (native, indigenous) cattle breeds, imported cattle breeds and crossbred cattle (www.tuik.gov.tr).

The definitions of local cattle, imported cattle, crossbred cattle and buffaloes published in the Glossary of Veterinary Medical Terms (Working Group for Veterinary Medical Terms, 2009) are as follows:

Local cattle: These breeds have evolved, mainly, under the influence of natural environmental conditions, and are resistant to harsh conditions and diseases. Their growth and development are slow, feed conversion rate is low, and performance and fertility are poor. They are well adapted to the environmental conditions of their habitat and are capable of efficiently converting low-quality feedstuffs.

Imported cattle: These breeds originate from locations characterized by high-quality fertile meadows and grassland, and favourable marketing opportunities. They can be raised for milk (dairy cattle), meat (beef cattle) or both (dual-purpose cattle), and have been developed by the pure breeding and selection of indigenous cattle breeds.

Crossbred cattle: These animals result from the mating of different breeds of the cattle species or the mating of different genetic varieties or lines within the same cattle breed.

Buffaloes: These are large, horned, domestic ruminants with shaggy fur, classified under the family *Bovidae* and subfamily *Bovinae*.

Figures of Bovine Animals

The cattle population of Turkey and the changes observed in the cattle population between the years 2010 and 2017 are shown in Table 1. In Turkey, the total number of cattle was 11,369,800 heads

in 2010 and 15,943,586 heads in 2017. Thus, the cattle population of the country increased by 40.23% over the 2010-2017 period. The assessment of the annual population change rates demonstrated that the highest positive change rate occurred by 12.34% between 2011-2012, and the lowest negative change rate occurred by -1.33% between 2013-2014.

Table 1. Numbers of cattle and percentage change rates in Turkey, and the Hatay, Osmaniye, and Kahramanmaraş provinces.

Yıllar	Yerli (baş)	Kültür (baş)	Kültür melezi (baş)	Toplam (baş)
I-2010	2.464.722	4.197.890	4.707.188	11.369.800
I-2011	2.429.169	4.836.574	5.120.621	12.386.337
I-2012	2.459.400	5.679.484	5.776.028	13.914.912
I-2013	2.348.487	5.954.333	6.112.437	14.415.257
I-2014	1.983.415	6.178.757	6.060.937	14.223.109
I-2015	1.874.925	6.385.343	5.733.803	13.994.071
I-2016	1.733.292	6.588.527	5.758.336	14.080.155
I-2017	1.602.925	7.804.588	6.536.073	15.943.586
I-2010-2017 (%)	-53.76	85.92	38.85	40.223
II-2010	20.222	26.623	79.953	126.798
II-2011	18.344	30.236	80.294	128.874
II-2012	12.601	31.886	94.752	139.239
II-2013	12.518	33.530	95.688	141.736
II-2014	8.535	52.559	69.452	130.546
II-2015	9.107	49.243	67.712	126.062
II-2016	7.923	50.631	65.153	123.707
II-2017	8.153	95.304	45.282	148.739
II-2010-2017 (%)	-59.68	257.98	-43.36	17.30
III-2010	2.003	20.876	41.748	64.627
III-2011	1.785	22.936	40.892	65.613
III-2012	1.959	27.665	50.223	79.847
III-2013	1.543	26.788	58.696	87.027
III-2014	1.535	22.398	43.707	67.640
III-2015	1.545	22.218	41.612	65.375
III-2016	1.555	22.551	40.736	64.842
III-2017	1.354	39.530	41.456	82.340
III-2010-2017 (%)	-32.40	89.36	-0.70	27.41
IV-2010	11.460	27.964	58.594	98.018
IV-2011	11.646	38.861	68.714	119.221
IV-2012	12.356	53.045	67.221	132.622
IV-2013	12.907	56.359	74.016	143.282
IV-2014	15.013	76.728	77.544	169.285
IV-2015	14.046	80.313	75.739	170.128
IV-2016	13.370	80.237	84.521	178.128
IV-2017	5.375	104.423	40.306	150.104
IV-2010-2017 (%)	-53.10	273.42	-31.21	53.14

I: Turkey II: Hatay III: Osmaniye IV: Kahramanmaraş

During the period between 2010 and 2017, the local cattle population of Turkey decreased by -53.76% from 2,464,722 heads to 1,602,925 heads. On the other hand, the numbers of imported cattle and crossbred cattle increased by 85.92% and 38.85%, respectively, over the same period. Accordingly, while the population of imported cattle increased from 4,197,890 heads in 2010 to 7,804,588 heads in 2017, the population of crossbred cattle increased from 4,707,188 heads in 2010 to 6,536,073 heads in 2017.

In 2010, the cattle population of the Hatay province was 126,798 heads, and was composed of 15.95% local cattle, 21.00% imported cattle, and 63.06% crossbred cattle. In 2017, the cattle

population was 148,739 heads and was determined to have increased by 17.30% in comparison to 2010. In 2017, the cattle population of Hatay was composed of 5.48% local cattle, 64.08% imported cattle, and 30.44% crossbred cattle (Table 1).

In the Hatay province, during the period between 2010 and 2017, the local cattle population decreased by -59.68% to 8,153 heads. The number of imported cattle increased by 257.98% to 95,304 heads, and the number of crossbred cattle decreased by -43.36% to 45,282 heads. While the local cattle population decreased between 2011 and 2012 (-31.31%), the population of crossbred cattle decreased between 2013 and 2014 (-27.42%). Following a steady increase over the 2010-2014 period, the number of imported cattle showed a one-year decrease between 2014 and 2015, and returned to an increasing trend thereafter.

As shown in Table 1, the cattle population of the Osmaniye province increased by 27.41% between 2010 and 2017. Accordingly, the total number of cattle rose from 64,627 heads in 2010 to 82,340 heads in 2017.

The highest share in the total cattle population of Osmaniye belongs to crossbred cattle, the number of which decreased from 41,748 heads in 2010 to 41,456 heads in 2017. The number of imported cattle raised in the province increased by 89.36% from 20,876 heads in 2010 to 39,530 heads in 2017. The highest increase in the number of imported cattle occurred by 32.52% between 2010-2012, such that the population reached a level of 27,665 heads. In the following period, until 2017, the number of imported cattle decreased. The local cattle population of the province decreased by -32.40% from 2,003 heads in 2010 to 1,354 heads in 2017.

The total cattle population of the Kahramanmaraş province increased by 53.14% over the 2010-2017 period (Table 1). The number of local cattle increased by 31% between the years 2010 and 2014 from 11,460 heads to 15,013 heads, but later decreased to 14,046 heads in 2015, 13,370 heads in 2016 and 5,375 heads in 2017. Thus, a negative change rate of -53.10% was observed over the 2010-2017 period.

In the Kahramanmaraş province, the number of imported cattle increased by 187.20% between 2010 and 2015 from 27,964 heads to 80,313 heads. Following a -0.10% decrease to 80,237 heads in 2016, the imported cattle population increased to 104,423 heads in 2017. The number of crossbred cattle raised in the province decreased by -31.21% over the 2010-2017 period. While the population of crossbred cattle first increased by 32.34% between 2010 and 2014 from 58,594 heads to 77,544 heads, it subsequently decreased to 75,739 heads in 2015, increased to 84,521 in 2016, and then fell to 40,306 heads in 2017.

Characteristics of Ovine and Caprine Animals

The Turkish Statistical Institute publishes data for sheep and goats under the subtitle small ruminants (www.tuik.gov.tr). The sheep population of the country is composed of local breeds and Merino sheep, and the goat population is composed of hair goats and Angora goats (Kaymakçı, 2016).

Sheep: Domestic animals, which are classified under the subfamily *Ovinae*, and are raised for meat, milk, wool and hide (Working Group for Veterinary Medical Terms, 2009). **Merino Sheep:** A sheep breed imported into Turkey for its high-quality soft, fine wool. **Goats:** Ruminant mammals classified under the genus *Capra*, subfamily *Bovinae*, and family *Bovidae* (Working Group for Veterinary Medical Terms, 2009). **Hair Goat:** Indigenous to Turkey, this is the most common and economically important goat breed raised throughout the territory of the country. It is generally black, but may also be of brown, dark grey, yellowish white or even white colour. This breed is characterized by long, straight and coarse hair and a slightly convex head, and is larger in size than the Angora goat. Both males and females are horned and bearded. The milk yield of this breed is low, but the fat content of its milk is very high. Hair goats are also referred to as **black goats** (Working Group for Veterinary Medical Terms, 2009). **Angora Goat:** Also referred to as the Turkish Angora Goat, this breed is indigenous to Turkey, and is raised particularly in Central and South-eastern Anatolia. Characterized by a small and slender body structure, this breed is raised for its very soft and shiny mohair. Angora goats, raised in the Ankara province and its vicinity, are of white colour, whilst those raised in the Mardin and Siirt provinces can be black, dark grey, yellow or beige (Working Group for Veterinary Medical Terms, 2009).

Figures of Ovine and Caprine Animals

The sheep population of Turkey, and the Hatay, Osmaniye and Kahramanmaraş provinces, and the changes observed in the sheep population between the years 2010 and 2017 are shown in Table 2. In Turkey, the total number of sheep was 23,089,691 heads in 2010 and increased to 33,677,636 heads in 2017. Thus, the total sheep population increased by 45.86% over an eight-year period between 2010 and 2017. The numbers of local sheep and Merino sheep increased by 42.06% and 122.78%, respectively, in the same period.

The total sheep population of the Hatay province was 92,116 heads in 2010, such that 91,066 were of local breeds and 1,050 of the Merino breed. The total number of sheep increased by 153.04% and rose to 233,089 heads in 2017.

The numbers of local sheep breeds and Merino sheep raised in Hatay have increased over the years. In the period between 2010 and 2017, the local sheep and Merino sheep populations increased by 151.30% and 304.00%, respectively. However, the number of local sheep decreased by -21.16% between 2013 and 2014, and the number of Merino sheep decreased by -6.19% between 2014 and 2015.

In the Osmaniye province, the total sheep population increased by 68.73% from 67,398 heads in 2010 to 113,723 heads in 2017. The numbers of local sheep and Merino sheep increased by 98.32% and 68.29%, respectively, between 2010 and 2014, but fluctuated between the years 2015 and 2017.

The local sheep population of the Kahramanmaraş province increased by 25.74% over the 2010-2017 period. When assessed on a yearly basis, it was determined that the number of local sheep increased between 2010 and 2014, decreased in 2015, and increased thereafter. No statistical data or records have been published for Merino sheep in the Kahramanmaraş province. Therefore, it is considered that Merino sheep are either not raised or produced in very small numbers in this province.

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Table 2. Numbers of sheep and percentage change rates in Turkey, and the Hatay, Osmaniye, and Kahramanmaraş provinces.

Yıllar	Yerli (baş)	Merinos (baş)	Toplam (baş)
I-2010	22.003.299	1.086.392	23.089.691
I-2011	23.811.036	1.220.529	25.031.565
I-2012	25.892.582	1.532.651	27.425.233
I-2013	27.485.166	1.799.081	29.284.247
I-2014	29.033.981	2.106.263	31.140.244
I-2015	29.302.358	2.205.576	31.507.934
I-2016	28.832.669	2.151.264	30.983.933
I-2017	31.257.408	2.420.228	33.677.636
I-2010-2017 (%)	42.06	122.78	45.86
II-2010	91.066	1.050	92.116
II-2011	125.087	1.630	126.717
II-2012	178.314	2.490	180.804
II-2013	169.091	2.576	198.664
II-2014	154.593	3.118	157.711
II-2015	179.215	2.925	182.140
II-2016	175.898	3.041	178.939
II-2017	228.847	4.242	233.089
II-2010-2017 (%)	151.30	304.00	153.04
III-2010	65.030	2.368	67.398
III-2011	80.086	3.046	83.132
III-2012	90.939	3.551	94.490
III-2013	127.287	3.741	131.028
III-2014	128.970	3.985	132.955
III-2015	97.766	2.563	100.329
III-2016	82.498	2.187	84.685
III-2017	108.172	5.551	113.723
III-2010-2017 (%)	66.34	134.42	68.73
IV-2010	321.405	No statistical data	
IV-2011	330.410		
IV-2012	346.445		
IV-2013	339.245		
IV-2014	371.563		
IV-2015	309.485		
IV-2016	367.911		
IV-2017	403.474	688	404.435
IV-2010-2017 (%)	25.54	100	25.83

I: Turkey II: Hatay III: Osmaniye IV: Kahramanmaraş

The goat population of Turkey, and the Hatay, Osmaniye and Kahramanmaraş provinces, and the changes observed in the goat population between the years 2010 and 2017 are shown in Table 3. Accordingly, the total goat population of the country increased from 6,293,233 heads in 2010 to 10,634,672 heads in 2017. The total goat population was composed of 98.58% hair goats and 2.42% Angora goats in 2010, and of 97.97% hair goats and 2.03% Angora goats in 2017. The numbers of hair goats and Angora goats have increased over the years.

Table 3. Numbers of goats and percentage change rates in Turkey, and the Hatay, Osmaniye, and Kahramanmaraş provinces.

Yıllar	Kıl (baş)	Tiftik (baş)	Toplam (baş)
I-2010	6.140.627	152.606	6.293.233
I-2011	7.126.862	151.091	7.277.953
I-2012	8.199.184	158.102	8.357.286
I-2013	9.059.259	166.289	9.225.548
I-2014	10.167.125	177.811	10.344.936
I-2015	10.210.338	205.828	10.416.166
I-2016	10.137.534	207.765	10.345.299
I-2017	10.419.027	215.645	10.634.672
I-2010-2017 (%)	69.67	41.31	68.99
II-2010	70.981	No statistical data	
II-2011	113.475		
II-2012	134.167		
II-2013	133.309		
II-2014	142.185		
II-2015	156.919		
II-2016	153.066		
II-2017	158.170		
II-2010-2017 (%)	122.83		
III-2010	58.441	No statistical data	
III-2011	74.306		
III-2012	81.797		
III-2013	114.538		
III-2014	116.452		
III-2015	103.371		
III-2016	105.622		
III-2017	95.943		
III-2010-2017 (%)	64.17		
IV-2010	169.810	No statistical data	
IV-2011	190.355		
IV-2012	196.280		
IV-2013	208.850		
IV-2014	281.852		
IV-2015	263.761		
IV-2016	291.356		
IV-2017	357.656		
IV-2010-2017 (%)	110.62		

I: Turkey II: Hatay III: Osmaniye IV: Kahramanmaraş

According to data published by the Turkish Statistical Institute, the goat population of the Hatay province is composed solely of hair goats. The number of hair goats was 70,981 heads in 2010 and 158,170 heads in 2017. Following a 121.07% increase between 2010 and 2015, the hair goat population of Hatay decreased by -2.46% between 2015 and 2016, but rose to 158,170 heads in 2017.

The goat population of the Osmaniye province is also entirely composed of hair goats, and increased from 58,441 heads in 2010 to 95,943 heads in 2017. When assessed on a yearly basis, it was observed that the number of hair goats decreased by -17.61% after 2014.

Likewise, the goat population of the Kahramanmaraş province is also solely composed of hair goats, and increased from 169,810 heads in 2010 to 357,656 heads in 2017. While an increase of 65.98% was observed between 2010 and 2014, a decrease by -6.42% occurred in 2015.

Characteristics of Poultry Species

The Turkish Statistical Institute classifies the poultry population of Turkey under five groups, namely, laying hens, broiler chickens, turkeys, geese and ducks. **Broiler Chickens:** These are chicken breeds developed for rapid growth and maximum meat production. **Laying Hens:** Animals that are raised for egg production and reach their peak of lay around 32 weeks of age. Although mostly chickens are raised for egg production, ducks can be raised for their eggs too. **Turkeys:** A large gallinaceous bird raised for meat production. **Geese:** Large, white or grey feathered, web-footed birds classified under the sub-family *Anserinae*. **Ducks:** Web-footed swimming birds that are classified under the sub-family *Anatinae*, and are found in wetlands all over the world (Working Group for Veterinary Medical Terms, 2009).

Figures of Poultry Species

The population of poultry species in Turkey and the changes over the years are shown in Table 4. As indicated in several reports, the main poultry species reared in Turkey is the domestic chicken (Çiçekgil and Yazıcı, 2016; Keskin and Demirbaş, 2012). The assessment of data available for the 2010-2017 period has shown that an increase occurred in the numbers of laying hens as of 2011, broiler chickens as of 2012, turkeys and ducks as of 2014, and geese as of 2013.

As can be seen in Table 4, the two main poultry species raised in Turkey are laying hens and broiler chickens. The number of laying hens increased by 71.37% from 70,933,660 in 2010 to 121,556,027 in 2017. Furthermore, the number of broiler chickens increased by 34.92% from 163,984,725 in 2010 to 221,245,322 in 2017.

The numbers of turkeys, geese and ducks have fluctuated over the 2010-2017 period, but eventually have increased by 31.62%, 36.73% and 23.87%, respectively.

In the Hatay province, between 2010 and 2017, the laying hen population increased by 6.66% and reached a level of 401,970 in 2017, whilst the broiler chicken population decreased by -99.98% and fell to 368,000 in 2017.

Of the other poultry species raised in Hatay, between the years 2010 and 2017, geese decreased (-2.75%), and turkeys (9.03%) and ducks (44.98%) increased in number.

The total population of poultry species in the Osmaniye province increased by 170.36% from 227,768 in 2010 to 615,792 in 2017.

In Osmaniye, while the numbers of broiler chickens (667.14%), ducks (315.33%) and geese (60.79%) significantly increased between 2010 and 2017, the numbers of laying hens (-27.28%) and turkeys (-15.58%) decreased in the same period.

In the Kahramanmaraş province, the numbers of laying hens and broiler chickens decreased by -2.16% between 2010 and 2014, but increased as of 2015. The numbers of laying hens (251.95%) and broiler chickens (496.56%) increased as of 2015 to 1,086,639 and 354,000, respectively, in 2017. During the 2010-2017 period, while the number of turkeys raised in the province decreased by -20.02%, the numbers of geese and ducks increased by 7.71% and 138.87%, respectively.

Table 4. Numbers of poultry species and percentage change rates in Turkey, and the Hatay, Osmaniye, and Kahramanmaraş provinces.

Yıllar	Yumurta tavuğu	Et tavuğu	Hindi	Kaz	Ördek
I-2010	70.933.660	163.984.725	2.942.170	715.555	396.851
I-2011	78.956.861	158.916.608	2.563.330	679.516	382.223
I-2012	84.677.290	169.034.283	2.760.859	676.179	356.730
I-2013	88.720.709	177.432.745	2.925.473	755.286	367.821
I-2014	93.751.470	199.976.150	2.990.304	911.990	399.820
I-2015	98.597.340	231.658.294	2.827.731	850.694	398.387
I-2016	108.689.236	220.322.081	3.182.751	933.353	413.841
I-2017	121.556.027	221.245.322	3.872.460	978.384	491.561
I-2010-2017 (%)	71.37	34.92	31.62	36.73	23.87
II-2010	376.880	1.714.261	2.026	3.917	4.313
II-2011	366.600	493.300	1.633	2.404	3.577
II-2012	346.275	911.060	2.480	2.780	5.700
II-2013	333.573	420.979	2.509	2.805	5.824
II-2014	593.162	479.841	1.803	2.196	2.912
II-2015	339.080	518.850	2.252	2.830	3.593
II-2016	530.126	483.916	2.275	2.741	3.387
II-2017	401.970	368.000	2.209	3.809	5.186
II-2010-2017 (%)	6.66	-99.98	9.03	-2.75	44.98
III-2010	160.840	64.450	1.322	556	600
III-2011	183.156	180.000	1.117	387	531
III-2012	220.762	240.250	1.003	401	547
III-2013	199.020	80.000	1.441	855	821
III-2014	170.200	274.000	975	768	882
III-2015	275.290	409.000	1.066	768	2.739
III-2016	200.914	394.000	1.116	937	3.210
III-2017	116.959	494.420	1.027	894	2.492
III-2010-2017 (%)	-27.28	667.14	-22.32	60.79	315.33
IV-2010	315.550	110.500	17.980	7.280	3.460
IV-2011	304.550	109.500	21.986	6.842	3.053
IV-2012	305.450	77.450	15.215	6.155	5.335
IV-2013	273.400	76.600	16.160	6.150	5.410
IV-2014	308.750	59.340	16.030	4.850	5.180
IV-2015	595.086	172.535	16.235	4.521	4.881
IV-2016	705.878	406.295	14.380	4.248	5.156
IV-2017	1.086.639	354.000	14.380	7.841	8.265
IV-2010-2017 (%)	244.36	220.36	-20.02	7.71	138.87

I: Turkey II: Hatay III: Osmaniye IV: Kahramanmaraş

Evaluation and Conclusion

During the period between 2010 and 2017, while the number of local cattle decreased in Turkey, the numbers of imported and crossbred cattle, both considered to have higher genetic capacity, increased. Among the three provinces investigated in this study, Kahramanmaraş had the highest cattle population in 2017, and was followed by Hatay in second place. It was observed that, in the Kahramanmaraş province, while the numbers of local and crossbred cattle decreased, the number of imported cattle significantly increased in 2017. In the Hatay and Osmaniye provinces, while the numbers of local and crossbred cattle showed a steady decrease, the number of imported cattle increased. Due to the overall decrease in the number of local cattle raised in Turkey, today, these native breeds have become genetic resources required to be protected (İnal et al., 2016; Ertuğrul et al., 2009). To date, local breeds have been blamed for insufficient production levels without being given the opportunity to show their production potential. On the other hand, after purchasing imported and crossbred cattle at high prices, the majority of small farmers apply their customary husbandry methods to these breeds with no access to advice on updated modern management practices, which eventually results in these animals not producing in full capacity.

Statistical data shows that local cattle, sheep and goat breeds are declining in number. In the livestock sector, productivity is influenced by multiple factors. These factors are generally classified as genetic and environmental factors.

Cattle breeds native to Turkey include the *Anatolian Black*, *Turkish Grey*, *East Anatolian Red* and *South Anatolian Red* (Ministry of Agriculture and Rural Affairs, 2009). These local breeds are reported to have a low production capacity. However, native cattle have not been provided with the optimum environmental conditions for a better performance.

The native cattle breeds of Turkey are hardy, low-maintenance and disease-resistant animals that have well adapted to the climatic conditions of the country. Unfortunately, the sector has failed in providing favourable environmental conditions to these local breeds that would allow them to show their full genetic potential. It is a hard fact that, to date, local cattle have been kept in dark and closed stalls on dirty floor, and have been fed mainly on roughage such as wheat straw. In the recent past, the strategy to increase animal production has been based mainly on the importation of cattle breeds known to have high genetic capacity. However, the provision of the nutrition and housing conditions required for the realisation of this genetic capacity has been of secondary importance. Indeed, because of the impolicy of laws, degraded meadows and grassland have lost their pasturing value. Grassland needs to be improved and maintained. Furthermore, concentrate feed, which has become the main source for animal nutrition, is sold at high prices due to insufficient crop production. The unavailability of grazing animals on pasture together with limited access to concentrate feed have

obliged small farmers owning 1-5 heads of cattle to feed their animals on only straw and bran. Poor nutrition prevents animals with a high genetic capacity from showing a good performance.

Over the 2010-2017 period, the local sheep and Merino sheep populations of Turkey have increased (Kaymakçı, 2016). Similarly, the goat population has also increased. This increasing trend is also observed in the sheep and goat populations of the Hatay, Osmaniye and Kahramanmaraş provinces. In Kahramanmaraş, the goat population displayed a higher level of increase than the sheep population. Data published by the Turkish Statistical Institute demonstrates that goats raised in the Hatay, Osmaniye and Kahramanmaraş provinces are solely hair goats. However, it is known that, particularly in the Hatay province and its districts, the *Kilis* goat and *Halep (Damascus/Aleppo/Shami)* goat is also raised (Ministry of Food, Agriculture and Livestock, 2015). While Merino sheep are raised in Hatay and Osmaniye, 2010-2017 statistical data published for Kahramanmaraş points out to records only for local sheep breeds, suggesting that Merino sheep are not raised in this province.

The increase observed in the sheep and goat population of the country is considered as a positive development. In the recent past, goats, and in particular hair goats, were perceived as forest pests, such that forest conservation plans, including specific measures to reduce the goat population, were put into implementation (Ministry of Environment and Forestry, 2008; Günlü and Alaşahan, 2010). However, as families that had traditionally raised goats refused alternate animal production, these conservation plans were not able to be put into practice. Sheep and goat breeding is a very demanding type of animal production. Generally, forest and mountain villagers with low income raise sheep and goats. This is because it is more convenient for these villagers to raise smaller animals in their backyard, rather than cattle, which are larger and require more feed and large stalls.

Statistical data points out to varying annual trends in the poultry population of the country (www.tuik.gov.tr; Türkoğlu and Sarıca, 2014). In the Hatay province, while the numbers of laying hens and turkeys have increased, the numbers of broiler chickens, geese and ducks have decreased. While a population decrease has occurred only for turkeys in the Osmaniye province, both turkeys and geese have decreased in Kahramanmaraş.

In Turkey, the poultry sector is still dominated by the domestic chicken. Therefore, the term poultry is mostly associated with chickens. In order to develop integrated solutions for the poultry sector, an inclusive approach addressing other poultry species must be adopted.

Actions adopted at regional level may accelerate the improvement of the livestock sector. Turkey is divided into seven geographical regions with distinct surface areas, soil structure characteristics and climatic conditions. An assessment of the animal production and animal product consumption of these regions would contribute to the planning of animal production at provincial level. Support should be provided for the establishment of regional processing facilities and market chains to eliminate the difficulties faced by primary producers/farmers in the processing and marketing of animal products.

The only occupation of the farmer should be the production of good quality primary products, and measures should be taken to encourage this.

Production, processing and marketing units to be established at regional level should provide up-to-date, innovative information and advice to the farmers. The regular and systematic registration of animals should be ensured for the transfer of accurate data to the relevant central registration units.

Hatay, Osmaniye and Kahramanmaraş are three neighbouring provinces in Turkey with similar species and breed patterns for livestock. It is known that livestock species and breeds, apart from those for which statistical data is published by TÜİK, are also raised in these provinces. Therefore, further more detailed research is needed to identify all of the livestock species and breeds raised, and to ascertain the prevailing production levels and marketing opportunities in these provinces with a view to strengthen the livestock sector of the region.

References

- İnal Ş, Akmaz A, Garip M, 2016. Zootekni I: Süt Sığırcılığı, Sığır Besiciliği, At Yetiştirme. Birinci Baskı, Atlas Akademi, Konya, 401 s.
- Veteriner Hekimliği Terimleri Çalışma Grubu, 2009. Veteriner Hekimliği Terimleri Sözlüğü. Türk Dili Kurumu Yayınları:954, Terimler Sözlükler Dizisi:3, Acar Basım ve Cilt San. Tic. A.Ş. İstanbul. ISBN: 978-975-16-2124-5.
- Kaymakçı M, 2016. İleri Koyun Yetiştiriciliği (Genişletilmiş beşinci basım). Meta Basım Matbaacılık Hizmetleri, Bornova-İzmir, 359 s.
- Keskin B, Demirbaş N, 2012. Türkiye’de kanatlı eti sektöründe ortaya çıkan gelişmeler; Sorunlar ve Öneriler. Uludağ Üniversitesi Ziraat Fakültesi Dergisi, 26(1): 117-130.
- Çiçekgil Z, Yazıcı E, 2016. Türkiye’de tavuk yumurtası mevcut durumu ve üretim öngörüsü. TEAD, 2(2): 26-34. Ertuğrul M, Dellal G, Soysal İ, Elmacı C, Akın O, Arat S, Barıççı İ, Pehlivan E, Yılmaz O, 2009. Türkiye yerli koyun ırklarının korunması. Uludağ Üniversitesi Ziraat Fakültesi Dergisi, 23(2): 97-119.
- Tarım ve Köy İşleri Bakanlığı, 2009. Türkiye evcil hayvan genetik kaynakları tanıtım kataloğu. T.C. Tarım ve Köy İşleri Bakanlığı Tarımsal Araştırmalar Genel Müdürlüğü, Ankara.
- Gıda Tarım ve Hayvancılık Bakanlığı, 2015. Koyun keçi ırklarımız tanıtım klavuzu. T.C Gıda Tarım ve Hayvancılık Bakanlığı Tarımsal Araştırmalar ve Politikalar Genel Müdürlüğü İşbirliğinde Hazırlanmış, Ankara.
- Çevre ve Orman Bakanlığı, 2008. Keçi zararlarının azaltılması eylem planı 2008. T.C. Çevre ve Orman Bakanlığı Orman Genel Müdürlüğü, Ankara.
- Günlü A, Alaşahan S, 2010. Türkiye’de keçi yetiştiriciliği ve geleceği üzerine bazı değerlendirmeler. Veteriner Hekimler Derneği Dergisi, 81(2):15-20.
- Türkoğlu M, Sarıca M, 2014. Tavukçuluk Bilimi: Yetiştirme, Besleme, Hastalıklar. Genişletilmiş 4. Basım, Bey Ofset Matbaacılık, Ankara, 648 s.

Comparison Of Plasma/Fsh Level Between Conventional Multiple Superovulation Protocol And Superovulation With A Single Administration Of Fsh In Specific Adjuvant In Terms Of Pharmacokinetic In Holstein Cows

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Abstract

In this study, plasma FSH levels of Holstein cows were compared between the conventional superovulation protocol – application of decreasing doses of FSH- and novel approach of a single dose combined with a specific adjuvant (Montanide ISA 206 VG). For the current study, 6 Holstein cows aged 3-5 years in Cattle Breeding Department of our Directorate were utilized. Cows were randomly sorted out to 3 groups. CIDR (progesterone) was treated intravaginally to the donors in all three groups regardless of the period of sexual cycle and was accepted as 0 (zero) day. Group 1 (control) was treated with i.m. 10 ml. FSH (Stimufol) at decreasing doses (2-2,1.5-1.5,1-1,0.5-0,5 ml) at about 12 hours intervals starting from the seventh day for four days. On the seventh day, 10 ml FSH + 10 ml adjuvant mixture was administered as a single dose to the animals in the second group as s.c from the neck. In the third group, 8 ml FSH + 8 ml adjuvant mixture was administered as a single dose s.c from morning neck base. 8 ml FSH + 8 ml adjuvant mixture was administered as a single dose to the animals in the third group as s.c from the neck. After the application, blood samples were taken from all three groups at 0., 1., 2., 4., 8., 12., 24., 36., 48., 60., 72., and 80. hours and plasma FSH levels were determined by Bovine follicle-stimulating hormone (FSH) ELISA Kit. As a result of analysis, the mean plasma FSH levels in the control group were 0.446, 0.4285, 0.2255, 0.5075, 0.5165, 0.2305, 0.387, 0.376, 0.455, 0.527, 0.2045, 0.4495; in the second group, 0.5645, 0.8545, 0.204, 0.337, 0.319, 0.1415, 0.2165, 0.513, 0.3595, 0.5325, 0.258, 0.384; in the third group 0.3745, 0.9945, 0.354, 0.47, 1.2505, 0.297, 0.5085, 0.336, 0.3875, 0.1805, 0.3355, 0.3615. In conclusion; when the plasma / FSH levels of the 3 groups in the study were compared in terms of pharmacokinetics, the FSH levels of the adjuvant groups were similar to those of the decreasing doses. However, more studies and replication are needed to reveal more specific data.

Key words: FSH, Holstein, Superovulation, Adjuvant, Cattle.

Acknowledgement: In this study, data obtained from TAGEM/HAYSUD/B/19/A4/P11/1171 project of General Directorate of Agricultural Research and Policies, Department of Livestock and Fisheries Research are presented.

Improvement Project of Morkaraman Sheep and Recommended Breeding Model in Muş Province*

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Abstract

This research was carried out in order to determine the birth weight and the weaning weight in Red Karaman sheep under different raising conditions in Muş province of Turkey. The data used in this study was one year data obtained from a total of 28 sheep farms in Muş province. The means for birth weight and weaning weight of 90th day were calculated as 3.79±0.01 kg and 29.30±0.10 kg. The average daily live weight gain of lambs was found 272.8±0.01 g between birth and 90th day. Means for some reproductive traits as lambing rate, sterility rate, survival rate at 90th day weaning, fecundity, and litter size were found as 92.2%, 7.8%, 97%, 1.11, and 1.21, respectively. The most of sheep production in Turkey are carried out in extensive or semi-intensive systems. Muş city in located at East Anatolia region of Turkey is important for small ruminant production. There are systems of the stock breeding, the highland sheep husbandry, and the nomadic small ruminant husbandry in Muş province. Red Karaman sheep breed represents 21.5% of sheep breeds in Turkey. This breed is widely raised in the east of the country. Studies on Red Karaman sheep breed have mostly been performed in the Eastern Anatolia of Turkey. The results of this research have been the basis for the scientific studies taking into account birth weight, weaning weight, and some reproductive traits of Red Karaman sheep. In particular, the source of observed variation in birth and weaning weight in Red Karaman sheep may be the genetic and the environmental. The findings of this research and individual the observations have suggested that ram factor used in villages can be significant. As result, it has been recommended to perform the improvement studies in this direction and to focus on mutton production from these sheep.

Key words: Breeding model, sheep husbandry, Red Karaman, Muş province

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In Vitro Embryo Development Parameters In Anatolian Water Buffaloes

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Abstract

In this study, it was aimed to determine the number of oocytes obtained in vitro from the Anatolian Buffalo, and their morphological quality classification, maturation, fertilization, cleavage rates, access to blastocysts in culture medium and hatching blastocysts. The material of the study consisted of ovaries of Anatolian buffaloes slaughtered in a slaughterhouse in Afyonkarahisar. Ovaries were transported to the laboratory in 0.9 % physiological saline solution (25-30 °C) containing 100mg / L Kanamycin Sulfate, in 3-4 hours. The study was carried out in ET-IVF laboratory within the Directorate of International Center for Livestock Research and Training. 36 ovaries obtained from 18 Anatolian Buffaloes were utilized. A total of 54 oocytes were obtained from the ovaries by aspiration. Oocytes were aspirated from follicles of 2-8 mm diameter on the ovary surface by 18 Gauge cannula attached to a 5 ml syringe with 5% calf serum (CS) added Phosphate Buffer Solution (PBS). The oocyte ratio obtained per ovarium was 54/36 (1.5 units). 46 of the oocytes (85.1%) were evaluated as A / B quality, whereas 8 (14.9%) were evaluated as C / D quality. The quality classification of oocytes was performed morphologically under stereomicroscope according to the criteria of the International Embryo Technology Society (IETS) considering the position and layers of cumulus cell layers on Zona pellucid. TCM-199 + 10% FCS was used for the maturation of oocytes and performed at 24 hours. 48 oocytes with full cumulus expansion according to maturation criteria, were allowed to fertilize for 8 hours. For the fertilization of mature oocytes, frozen buffalo bull sperm of equal motility, obtained by direct flushing method using BO (Bracket & Oliphant) medium, were used. For this purpose, in 0.25 ml straws 25×10^6 frozen and 60% motile spermatozoa from the Anatolian Buffalo bull called KARAHIŞAR and TR030001442002 earring bull produced in our Directorate of Artificial Insemination Laboratory was used. The sperm used in fertilization was measured as 20.000-30.000 pieces (100 µl drop / 5×10^4) per oocyte. CR1aa medium was utilized for the culture of fertilized oocytes. For maturation, fertilization and embryo culture, the CO₂ incubator at 38.5 ° C containing 5% CO₂ and more than 95% relative humidity were used. Cleavage rates were determined as 16/48 (33.3%) at the first 24- 48 hours of the culture; 5/48 (10.4 %) between 7th and 8th days. Access rates of hatching blastocysts were 2/48 (6.25%). As a result, the first data of the study were studied in different breeds of buffaloes were found similar to the other IVF data. However, as

expected, it was found that embryos were obtained at very low rates when compared with the data in cattle, whether or not the cultured breed. Also, since it is appropriate to conduct at least 10 repetitions in standard IVF studies, it is concluded that repetitions of the same study will result in more accurate results.

Key Words: Anatolian Water Buffaloes, Embryo, Maturation, Oocyte, In Vitro Fertilization.

Acknowledgements: In this study, data obtained from TAGEM/HAYSUD/B/18/H/01/001 project of General Directorate of Agricultural Research and Policies, Department of Livestock and Fisheries Research are presented. The study is carried out with the permission of the Ethics Committee dated 29.12.2016 and numbered 131 of the Local Ethics Committee of International Center for Livestock Research and Training Directorate.

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Evaluation to Change of Lactation Milk Yield in Different Years and Seasons in Anatolian Water Buffaloes in Çorum Province

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Abstract

In this study, it has aimed to indicate the relationship between Lactation Milk Yield (LMY) difference determine according to years and seasons of 1972 rootstocks Anatolian Buffaloes from 2013 to 2018 in Çorum province. To that end, the rootstock material used in the Breeding Project carried out in Çorum within the scope of the National Buffaloes Breeding Project, which was begun in 2012 by the General Directorate of Agricultural Research and Policies. The project is still continuing with 826 headstock buffaloes and 60 head buffalo bulls in 2019. In this study, lactation data according to years 2013, 2014, 2015, 2016, 2017 and 2018; 70, 347, 379, 494, 465 and 217 were used respectively. According to years, LMY averages were 1.361 kg in 2013, 1.164 kg in 2014, 1.232 kg in 2015, 1.193 kg in 2016, 1.154 kg in 2017 and 1.205 kg in 2018 respectively. Based on the research related to years to LMY of animals, there are no differences between years ($P>0.05$). In recent study, when datas evaluated according to seasons between 2013 and 2018, 1132 lactation period has started in the spring, 466 lactation period has started in the summer, 119 lactation period has started in the autumn and 255 lactation period has started in the winter. Lactations started in 57.4% in spring, 23.6% in summer, 6% in autumn, 11.4% in winter. LMY averages with respect to beginning seasons in the spring 1.174 kg, in the summer 1.155, in the autumn 1.243 and in the winter 1.327 kg were measured. There was no seasonal effect on milk yield ($P>0.05$). Although many studies have indicated that the year and season are effective on LMY in Anatolian Buffaloes, in this study, it may be realized that the year and season effect may be due to the location, geographical conditions and climate of the region.

Key Words: Çorum, Anatolian Buffalo, Lactation Milk Yield, Effect of Years, Effect of Season

Acknowledgement: This project is funded by the Ministry of Agriculture and Forestry, under the coordination of the Directorate of Livestock and Aquaculture Research, General Directorate of Agricultural Research and Policy, in cooperation with Çorum Provincial Breeders' Breeders Association.

Investigation of The Fibre Quality of Karacabey Merino Cross Breed Raised in Tekirdag Province

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Abstract

In this study 30 heads of Karacabey Merino Cross-Breed sheep wools raised in various farms located around Tekirdağ province, Turkey was investigated. Fleece weight (FW), and physical wool properties such as fibre fineness, length, tenacity and elongation were examined. Samples were collected during the shearing of the animals. Samples from three different regions such as neck, middle and back from each animal were taken. Shearing was performed closely to the skin using fine scissors. Samples were kept in a thick paper bags for further analysis. Measurements of fibre fineness were carried out with OFDA 2000 test instrument according to IWTO 47 standard. Fibre length measurements were performed based on the measurement of single fibres according to ISO 6989:1981 standard. Fibre tenacity and elongation measurements were performed based on ASTM D3822 standard test method for tensile properties of single textile fibres by using single fibre tensile tester. According to the fibre fineness results, while the region of the animal where the sample was taken did not affect the fineness values of the fibres statistically, sex and age had a significant effect on fibre fineness. It can be said that fibres from the elder ewes and the back region were coarser. On the other hand fibres obtained from male ewes were found to be finer. An important point observed in this study is that the crossbreeding of Merino sheeps decrease the wool quality such as fibre fineness significantly.

Key words: Sheep, wool, fibre, fineness

Possibilities of using Different Fruit Pulp in Poultry Nutrition

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Abstract

Scientific studies concentrated in the 21st century have made significant improvements in the breeding, feeding and care conditions of chickens. 60-70% of the total expenses in animal husbandry enterprises and even 80% of the poultry feed constitutes feed expenses. In order to find alternative feed sources that can be used instead of products used as human food in livestock rations, the tendency towards alternative feed and additives has increased. In our rapidly industrializing country, it is thought that the use of various pulps obtained as a by-product of the food industry as a feed source in animal nutrition can reduce the pollution and harm that these products may cause to the environment, as well as provide added value to animal husbandry. The research on the feed value of pulp obtained as a by-product and the possibilities of using it in animal nutrition, especially on poultry, is limited. In this review, various fruit pulp (tomato, apple, etc.) studies in poultry feed participation rates (%) and the results are summarized.

Keywords: Poultry Feeding, fruit, fruit pulp

Phenotypic Correlation Coefficients Milk Yield, Udder Traits And Lamb Growth Characteristics Of Karakul Sheep

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Abstract

Karakul breed, fat-tailed sheep, has knotty and coarse fleece. The most important characteristic of this breed is the Astrakhan fur obtained from the newborn lambs. Other production traits are similar to those of native breeds. Due to the reduction in the number of Karakul sheep, two herds has been conserved in situ invivo conditions as a gene resource with the project entitled “Domestic Animal Genetic Resources Conservation and Sustainable Use” since 2005. There is no Astrakhan production in conserved Karakul herds. Majority income of breeders are obtained from lamb sales. Births starts at the beginning in February. Ewes are milked once a day by hand milking between April to July. Milk produced is evaluated by yoghurt.

Materials and Methods: The data were collected from Karakul sheep herds raised at Tokat province, Ulaş and Gölpinar villages, in 2013 year. Daily milk yields were controlled 60 ewes, selected randomly, from 1st, 2nd and 3th lactation number. Milk controls were performed on the 45th, 90th and 135th days of lactation. Lactation milk yield of ewes was calculated by Trapeze II method. Udder measurements were taken on the 45th and 135th days of lactation with tape measure and digital caliper just before morning milking. Live weight of ewes and lambs were determined at control milking days. Calculation of the phenotypic correlation coefficients was performed by using SPSS software package.

Results: The phenotypic correlation coefficients among daily milk yields and udder measurements, except for distance from teat to ground, and also the correlation coefficients among daily milk yield and additive milk production with growth of lambs were significant with positive direction at 45 and 135 days of lactation. As lactation progressed, correlation coefficients between milk yield and growth increased. This shows that the effect of milk yield of mothers on the growth characteristics of lambs continues for a long time. In addition, age and live weight of ewes positively affected the growth of lambs (0.154 - 0.504 ***).

Conclusion: The age, live weight and milk yield of ewes positively affected the live weight of lambs in various periods. In addition, positive correlation was found between daily milk yield and udder measurements except for distance from teat to ground.

Keywords: Karagül sheep breed, milk yield, udder measurements, live weight, phenotypic correlation

Effects Of Apricot Kernel Meal And Enzyme Addition On Broiler Performance And Gut Microbiota

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Abstract

In this research, effects of apricot kernel meal (AKM) and feed enzyme on performance and intestinal microbiota were investigated on broilers. In the study, effects of 3 different levels of apricot kernel meal (0% , 10% , 20%) and a protease enzyme mixture (-/+) 200g/ton in feed were investigated according to 3x2 factorial experimental design. In the present research, 4 animals in each experimental unit used to form 120 male chicks put in 30 divisions. The study continued for 21 days. In the end of the experiment, weight and length of intestinal tract and internal organs were measured and intestinal microbiota were investigated on one randomly chosen animal from every unit.

At the end of the research, weight gain and feed intake were increased in 10% AKM fed groups. Gizzard and duodenum weights were found higher especially in 20% usage of AKM. Enzyme supplementation had no effect on performance parameters and digestive organs. However, lactic acid bacteria (LAB), enterobacteria and yeast counts were significantly affected by AKM levels and enzyme supplementation in ileum. The enzyme supplementation was increased the numbers of LAB and enterobacteria, especially in AKM fed groups. As a result, usage of 10% AKM in broiler feeds seen positive effect on performance. However, higher levels of AKM resulted in a decrease on performance parameters. In addition, supplementation of AKM with enzyme were positively affected the ileum microbiota.

Effects of Gender, Birth Type, Enterprise and Maternal Age on Birth Weight and 90th Day Weaning Weight on Hairy Goat Kids

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Abstract

This study was based on data obtained during 2019 from the hairy goat herds in Mersin within the the National Sheep and Goat Improvement Project. The animal material of the study consist of 6494 hairy goat kids from 46 enterprises. The goat kids weighed at birth and 90th day. Effects of gender, birth type, enterprise and maternal age on birth weight and 90th day weaning weight on hairy goat kids was investigated. GLM model used for the statical analyses by regarding maternal age (2-7), gender (male,female), birth type (singleton,twin) and enterprise factors.

Average birth weight , 90th day body weight and daily live weight gain were found 2,97 kg and 17,25 kg and 0,158 kg respectively. As a result, it was determined that maternal age, gender, birth type and enterprise effect the birth weight and 90th weaning weight on hairy goat kids. Also it was determined that gender, birth type and enterprise effect daily live weight gain but maternal age dont effect the daily live weight gain.

Keywords: Hairy goat, birth weight, weaning weight

Acknowledgments: This study was based on data obtained during 2019 from the hairy goat herds in Mersin Hair Goat-I within the the National Sheep and Goat Improvement Project

The Andrological Examinations of Rams and Bucks

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Abstract

The breeding soundness examination (BSE) of rams and bucks should be considered as a routine veterinary check before the each breeding season. This sytematic evaluation may not only reveal pathological deficiencies related to male reproductive organs, but also considers herd health management strategies. In addition, it is possible to perform advanced imaging with the help of ultrasound in reproductive anomalies that cannot be diagnosed directly by physical examination. Along with that, rams and bucks can be classified in terms of physical competence, reproductive phenotypic parameters (scrotal environment, testicular volume), libido, spermatological parameters (good, suspicious and inadequate) and this may reveal their service capacity. Animals carrying a pathological or congenital anomaly in this evaluation systematic should not be used in breeding activities. The libido abilities of rams and bucks can be evaluated by either observing the natural breeding or with a teaser female artifial semen collection training during breeding season. The quality of semen can be collect with artificial vagina or electroejaculation; and quality can be assesed with motility (%), concentration ($\times 10^9$ / ml), morphological (%) and viability (%) evaluation tests. As a result BSE could be used as important selection criteria for studs of breeding stock and it was concluded that they contribute to the repruductive efficiency.

Keywords: Ram, buck, andrological examination, semen.

The Role And Importance Of DNA Methylation In Placental Development In Early Pregnancy In Sheep

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Abstract

Placenta; it is a temporary organ that provides transplacental exchange of all respiratory gases, nutrients, and wastes between the fetus and the maternal tissue, as well as show effects on secreting of many different hormones, growth factors, transcription factors, extracellular matrix proteins, and angiogenic factors that provide adaptation of mother to pregnancy. Therefore; healthy placentation is critical for the continuation of pregnancy. In sheep having a placenta of the cotyledonary type; the placenta begins to form on the 25th day of pregnancy and is completed on the 75th day. Studies in different species reported that this process is regulated in harmony by mutual interactions of hormones, immunological factors, environmental effects, and epigenetic mechanisms. Epigenetic mechanisms that can affect the expression level of the gene without changing the DNA sequence; it is thought that many molecular and cellular mechanisms that have not been fully elucidated during pregnancy and placentation can be understood. In the studies examining the placental development process; vascular endothelial growth factor (VEGF), insulin-like growth factor (IGF), matrix metalloproteinase (MMP), hypoxia-inducible factors (HIF), epidermal growth factor (EGF) have been found to be involved in a number of factors affecting cellular change and differentiation. In the control of the expression of these factors; DNA methylation has been reported to play a determinative role. DNA methylation catalyzed by DNA methyltransferase enzymes (DNMT1, 3A, 3B) is binding of the fifth carbon of the cytosine base to the methyl group (-CH₃) by a covalent bond. As a result of DNA methylation, the expression of the gene of interest is reversibly suppressed. Irregularities in DNA methylation, which is an important control mechanism of expression of genes related to placentation, can lead to pregnancy losses. Therefore; the effectiveness of DNA methylation should be investigated especially in the placentation process to determine the cause of pregnancy losses. Thus; it maybe helps to improve clinical prediction and treatment approaches of pregnancy losses. In this sense; in order to keep the reproductive efficiency at an optimum level and ensure sustainability in sheep breeding which is an important economic activity field; apart from the main reasons such as maintenance-feeding deficiencies and diseases that affect fertility, it is important to reveal the effects of DNA methylation on placentation during pregnancy.

Keywords: DNA, pregnancy, sheep, methylation, placentation.

Lactation Characteristics of Zom Sheep Raised in Farmer ConditionsNalan Akça¹ Şahin Tez¹ Seyrani Koncagül² M.Emin Vural¹ Ahmet Karataş¹¹GAP International Agricultural Research and Training Center, 21100 Diyarbakır²Department of Animal Science, Faculty of Agriculture, Ankara University, 06110 Ankara**Abstract**

This study was conducted to evaluate lactation performances of Zom sheep under smallholder production systems in Diyarbakir, Turkey. Data were collected and analysed on the lactation characteristics of 3104 ewes owned by 4 households (2 and 4 flocks from Project 1 and 2, respectively) from 2014 to 2016. The projects have been supported by the General Directorate of Agricultural Researches and Politics (TAGEM).

During the years 2014-2016, lactation lengths (LL) were 171, 178 and 180 days, respectively, and corresponding lactation milk yields (LMY) were 73, 77 and 84 kg, and average daily milk yields (ADMY) was 435, 469 and 501 g, respectively. During the Project time, ADMY and LMY showed significant increases ($P<0.05$) from year to year. In addition, flock, parity and birth month also affected the ADMY and LMY, while birth type has no effect on ADMY and LMY.

Analyses showed that there is a large variance for LMY (37% CV) and ADMY (31% CV), indicating that LMY can be improved by continuous upward selection.

Keywords: Zom sheep, Lactation characteristics, Environment, Select

The Effect of Birth Season on The Lamb Birth Weight, Daily Weight Gain and Weaning Weight in Akkaraman Sheep Feeding Based on Pasture

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Abstract

In extensive small ruminants breeding, the feeding of animals is entirely based on pasture except winter. Although feeding in pasture conditions is insufficient, it could be more sufficient than the intensive feeding model applied in winter. In this study, animal materials provided by General Directorate of Agricultural Researches and Politics (TAGEM) in the scope of *National Small Ruminant Improvement Project Under Farmer Condition*. Akkaraman animals are accounted for about 40% of assets in Turkey and is generally performed extensive feeding. In recent study, growth data were collected 3990 lambs owned by 25 flocks which were born in 2018 autumn and 2019 spring in Çorum region. Birth records were obtained with electronic lamb birth scales, and weaning weights were taken by the project technicians at the age of 90 days with the help of electronic scales. The birth weight (BW (kg)), daily live weight gain (DLWI (kg)) and weaning weight (WW (kg)) data from animal records were used to determine the minimum age, gender, birth type, and month of birth. analysis of variance was performed by means of squares method and the mean was taken in Minitab 16 package program. All factors were significant on birth weight ($p < 0.001$). Tukey test was used for the analysis of variance between DLWI and WW. In the autumn, winter and spring months, mean birth weight, DLWI and WW averages 4.79 ± 0.038 kg, 4.61 ± 0.021 kg, 4.48 ± 0.044 kg, 0.264 ± 0.003 kg, 0.236 ± 0.002 kg, 0.276 ± 0.004 kg, $28,53 \pm 0,308$ kg, $25,84 \pm 0,149$ kg, $29,30 \pm 0,385$ kg. respectively. Changes in birth weight, DLWI and weaning weight according to the seasons were significant ($p < 0.001$).

When the obtained data were evaluated, it was found that autumn births had a higher weight in terms of birth weight. In terms of daily live weight gain, the best increase is seen in spring births. In terms of weaning weight, it was found that lambs born in autumn and spring reached a better weight than winter lambs.

As a result, it was determined that it would be more appropriate to apply mating program for the sheep dates of autumn or spring in Akkaraman sheep which has extensively feeding. Weaning weights of autumn and spring lambs compared to winter lambs approximately 3 kg heavier than others.

Neonatal Calf Diarrhea and Prevention Methods

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Abstract

Calves are born unprotected to an environment contaminated with numerous disease agents. The neonatal calf diarrhea, which is the most critical period of calf breeding between 0 and 28 days following birth, is one of the most common causes of production and economic loss in cattle breeding. In our country, calf losses are between 10-15% on average although they vary according to region and enterprises. Viral and parasitic pathogens, especially bacterial agents, play an important role in the etiology of neonatal calf diarrhea. Recent studies show that neonatal calf diarrhea is frequently encountered in the first four weeks of life caused by bacterial agents such as Escherichia Coli, parasitic agents Cryptosporidium, viral agents Rotavirus and Coronaviruses. The clinical symptoms may vary depending on the virulence of the agent and its combination with other factors, the age and immune resistance of the calf. The difficult clinical course of neonatal calf diarrhea is difficult to correct, economic losses due to fatalities, preventive medicine (herd health and management) and the importance of prevention measures.

Key Words: Neonatal, calf, diarrhea, prevention

Üzüm Posasının Besin Madde İçerikleri Ve Hayvan Beslemede Kullanımı

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KIRIKKALE

Özet

Üzüm ülkemizde yaygın olarak üretilen, sofraların vazgeçilmez meyvesidir. Sofralık olarak tüketimi yanı sıra kurutarak ya da sirke ve şarap gibi çeşitli şekillerde de değerlendirilen önemli bir tarım ürünüdür. Belirtilen biçimlerde tüketilen üzümün özellikle şarap üretiminde kullanılması sonucu atık madde olarak açığa çıkan yaş posa, değerlendirilmediğinde doğayı kirletmesi söz konusu olmaktadır. Yaş üzüm posası, içerdiği besin maddeleri yönünden hayvan yemi olarak değerlendirilebilir bir maddedir. Hayvansal ürün üretiminde kıymetli yeri bulunan gerek ruminantlar gerekse kanatlılar için hem üretimi desteklemekte hem de hayvan sağlığına katkıda bulunma özelliğine sahiptir. İçerdiği besin maddeleri ile birlikte fenolik bileşikler sayesinde antibakteriyel ve antioksidan etkilerinin de varlığı üzüm posasının diğer önemli bir özelliğidir. Atık madde olarak açığa çıkan üzüm posasının hayvan yemi olarak değerlendirilmesi ile çevre kirliliğinin önlenmesi yanında hayvan ve insan sağlığına önemli katkıları söz konusudur.

Anahtar Kelimeler: Üzüm, Posa, Besin Kalitesi, Yem Değeri.

Abstract

Grape is an indispensable fruit of edible which is widely produced in our country. It is an important agricultural product that is utilized as consumption in table as well as in various forms such as dried or vinegar and wine. The grape consumed in the specified forms, it is possible pollution of nature with wet pomace uncovered as waste material and not utilized when it use especially in wine production. Wet grape pomace is a substance which can be utilized as animal feed in terms of nutrients it contains. For ruminants and poultry, which have a valuable place in the production of animal products, it has the property both support production and contribute to animal health. Another important feature of grape pomace is the presence of antibacterial and antioxidant effects thanks to phenolic compounds alongside the nutrients it contains. When grape pomace uncovered as waste material is utilized as animal feed, it has important contributions to animal and human health as well as preventing environmental pollution.

Keywords: Grape, Pomace, Nutritional quality, Feed value.

Giriş

Ham bir maddenin hedef ürüne işlenmesi sonucunda geriye kalan artık kısım yan ürün olarak değerlendirilir. Bu yan ürünler ham maddenin işlenmesinde kullanılmayan kısımlardır (Akyüz 1979). Endüstride tarımsal ürünlerin kullanılması sonucu önemli miktarda yan ürün açığa çıkmaktadır. Bu yan ürünler de çoğu zaman herhangi işlem uygulanmadan çevreye atılmaktadır. Çoğu ülkede bu konuda yasal düzenlemeler yapılmış olmasına rağmen asıl çözüm bu atık ürünlerin değerlendirilmesinden geçmektedir. Son zamanlarda fenolik maddelerce zengin olan atık ürünlerin antioksidan etkilerinden yararlanılmak üzere yeniden değerlendirilmesi üzerinde durulmaktadır. Antioksidan kaynağı olarak uzun süre sentetik antioksidanlar kullanılmış ancak bunların kanserojen etkilerinden dolayı gıda ve yem sektöründe alternatif ürünlerin arayışı başlamıştır (Aktaş ve ark. 2013). Ayrıca hayvancılık işletmelerinin toplam giderlerinin %60-70 gibi yüksek miktarını yem giderleri oluşturmaktadır. Hayvan beslemede kullanılan yem hammadde miktarı ile kalitesinin artırılması ile birlikte ekonomik hayvancılık için alternatif yem maddelerinin kullanımı önem arz etmektedir (SARICA 2011).

Ülkemizde Üzüm Üretimi

Ülkemizde yem kaynaklarının yetersiz ve maliyetlerinin yüksek olması hayvancılık üretim işletmelerini alternatif yem maddeleri araştırmaya yönlendirmektedir. Geçmiş zamanlarda yem maddesi olarak değerlendirilmeyen (mısır ve pirinç kepeği gibi) birçok yan ürün günümüzde önemli yem hammaddeleri arasına girmiş durumdadır. Ülkemizde de buna benzer yan ürünlerin bazıları hayvan besleme için değerlendirilirken bazılarının ise henüz yem değeri belirlenmemiştir. Ülkemizde oldukça fazla düzeyde bulunan ancak hala yem değeri kazanmamış olan tarım sanayi yan ürünlerinden biri de üzümün pekmez, meyve suyu ve şarap gibi ürünleri elde edildikten sonra geriye kalan posa kısmıdır (Özdüven ve ark. 2005).

Günümüzde ülkemiz üzüm üretim miktarı 4 200 000 ton ile dünyada ilk 10 ülke arasında yer almaktadır. Bu miktar üretim ile üzüm ülkemizde üretilen tarımsal ürünler arasında da sekizinci en çok üretilen üründür (FAO, 2017). Ülkemizde 2018 yılında 4 170 410 dekar alandan toplam 3 933 000 ton üzüm üretimi gerçekleştirilmiştir. Üretilen bu üzümün 1 945 262 tonu sofralık, 1 524 091 tonu kuru üzüm olarak değerlendirilirken 463 647 tonu (~%12) şarap üretiminde kullanılmıştır (TÜİK, 2019). Üzüm işlendikten sonra %11-15 düzeyinde posa açığa çıktığı düşünüldüğünde ortalama 60 274 ton posa açığa çıktığı görülmektedir. Yaş olarak elde edilen üzüm posası yaklaşık %30 kuru madde düzeyine sahip olup kilogram kuru maddede 59.2 g ham kül, 100.7 gr ham yağ, 345.3 ham selüloz ve 109.7 gr ham protein içermektedir (Nerantzis ve ark. 2006; Şen, 2018).

Üzüm Posasının Yem Değeri

İçerdiği yüksek düzeydeki su nedeniyle üzüm posasının depolanması ve saklanması önemli sorun olmaktadır. Buna bağlı gelişen bozulmalar posanın yem olarak değerlendirilmesini engellemekte, tüketilmesi de çeşitli sindirim bozukluklarına neden olmaktadır. Bundan dolayı işletmeye getirilen posanın ya kısa süre içerisinde tüketilmesi ya da su düzeyi %10 seviyelerine kadar indirilerek muhafaza edilmesi gerekmektedir (Özdüven ve ark. 2005). Üzüm posası içerdiği kuru madde miktarı ile silaj yapımı için oldukça uygun bir yem maddesi olduğu söylenebilir. Ham protein içeriği buğdaygil tahıl tane yemlerine yakın olması da ham madde olarak kullanılabilirliğini artırmaktadır. Silaj yapılarak değerlendirilen üzüm posasının içerdiği protein düzeyi doğal üzüm posası ile benzer iken lignin seviyesi önemli düzeyde arttığı belirtilmektedir (Alipour ve Rouzbehan 2007). Üzüm posasının silajı yapılabilirdiği gibi diğer silajı yapılan yemlere katkı olarak katıldığında yemin kalitesinde olumlu yönde değişikliklere neden olduğu söylenebilir. Ke ve ark. (2015) yonca silajına %10 seviyesinde üzüm posası ilavesinin silajın kuru madde düzeyini artırdığını, protein seviyesinde herhangi değişiklik oluşturmadığını, silaj oleik ve linoleik asit seviyelerini artırdığını bildirmişlerdir. Yine aynı çalışmada aerobik stabilitenin üzüm posası ilavesi ile daha düşebileceği bunun da besin madde kaybı ve mikroorganizmalar tarafından mikotoksin üretilmesi durumunu azaltacağı belirtilmiştir. Ruminantların beslenmesinde kuru olarak yaygın bir şekilde kullanılan yonca, silaj yapılarak da değerlendirilebilen bir yem bitkisidir. Ancak içerdiği yüksek protein ve mineral düzeyleri ve düşük suda çözünabilir karbonhidrat seviyelerine bağlı olarak silajı zor yapılabilen bir yem bitkisidir. Taze üzüm posası da içerdiği %15-20 seviyelerindeki suda kolay çözünebilen karbonhidrat seviyesi ile yonca ve diğer silajı zor yapılabilen yemlere karbonhidrat kaynağı olarak katılabilmektedir. Yonca silajına %16 ve %20 düzeylerinde ilave edilen üzüm posasının ortam laktik asit miktarlarını önemli seviyede artırdığı, buna bağlı olarak da silaj pH'sında önemli düzeyde düşüş sağlandığı bildirilmiştir. Yine üzüm posası, yapısındaki tanen sayesinde yemler içerisindeki proteinleri bağlayarak amonyak azotu şeklinde azot kaybını azaltmakta ve bu şekilde de protein kayıplarını azaltmaktadır (Canbolat ve ark. 2010).

Üzüm posasının beyaz ve kırmızı üzüm türlerinden elde edilen çeşitlerinin besin madde içeriği Tablo 1'de verilmiştir. Üzüm posası içerdiği yüksek seviyelerdeki nötral deterjanda çözünmeyen lif (NDF) ve asit deterjanda çözünmeyen lif (ADF) düzeyleri ile monogastrik hayvan türleri için dezavantaja sahip olsa da ruminantlar için alternatif bir kaba yem kaynağı olarak düşünülebilir. Kılıç ve Abdivali (2016) şarap endüstrisi yan ürünlerinin In vitro sindirilebilirlikleri ile yem değerlerinin belirlenmesi üzerine yaptıkları çalışmalarında üzüm posasının %91.8 düzeyinde organik maddeye ve %49.6 NDF, %38.3 ADF, %73.80 In vitro gerçek sindirilebilirlik değerlerine sahip olduğunu belirtmişlerdir. İçerdiği NDF ve ADF düzeyleri ile %2.74 kuru madde tüketilebilirliği (% CA) ve %62.61 kuru madde

sindirilebilirliğine sahip olduğunu hesaplamışlardır. Başalan ve ark. (2011) üzüm posalarının besin madde içerikleri ile in vitro sindirilebilirliklerini beyaz ve kırmızı üzüm türlerinin posalarını kullanarak yaptıkları çalışmalarında beyaz ve kırmızı üzüm posalarının kuru madde, ham protein, ham yağ, NDF, ADF, ham kül, lif olmayan karbonhidrat değerleri (g/kg) ve metabolik enerji (ME) (MJ/kg) değerlerini belirlemişlerdir. Beyaz üzüm türlerinden elde ettikleri posaların besin madde içerikleri ortalamalarını sırasıyla 299.0, 83.1, 48.6, 374.9, 294.4, 50.3, 443.1, 6.86 belirlerken, kırmızı üzüm türlerinden elde ettikleri posaların 348.4, 108.4, 46.2, 425.3, 360.8, 63.0, 357.1, 6.85 olarak belirlemişlerdir. Aynı çalışmada beyaz üzüm türlerinin 0, 4, 12, 48 saat in vitro kuru madde sindirilebilirlikleri ortalamaları 28, 64, 289, 411 (g/kg), in vitro NDF sindirilebilirlikleri ortalamaları 3.2, 3.9, 163.2, 350.7 (g/kg) olarak belirlenirken kırmızı üzüm türlerinin 0, 4, 12, 48 saat in vitro kuru madde sindirilebilirlikleri 143, 199, 334, 408 (g/kg), in vitro NDF sindirilebilirlikleri ortalamaları 4.4, 6.0, 170.5, 376.4 (g/kg) olarak belirlenmiştir. Üzüm posasının genel olarak enerji değeri düşüktür. Ancak bu üzüm türüne ve fabrikada işleniş yöntemine göre farklılık gösterebilir. Yaşam payı seviyesinde, yüksek büyüme oranı yada süt verimi beklenmediği durumlarda rasyonlara katılması mümkündür (Baumgartel ve ark., 2007).

Besin maddesi	Beyaz üzüm posası	Kırmızı üzüm posası
Kuru madde (KM), g/kg	299.0	348.4
Ham protein, g/kg/KM	83.1	108.4
Ham yağ, g/kg/KM	48.6	46.2
NDF, g/kg/KM	374.9	425.3
ADF, g/kg/KM	294.4	360.8
Ham kül, g/kg/KM	50.3	63.0
Azotsuz öz madde, g/kg/KM	443.1	357.1
ME, MJ/kg	6.86	6.85

Tablo 1: Kırmızı ve Beyaz üzüm türlerinden açığa çıkan posaların besin madde içerikleri, g/kg (Başalan ve ark., 2011)

Üzüm posası ruminant rasyonlarında süt verimi ile süt yağ düzeyleri ve rumen metan seviyesinin azaltılması üzerine etkilerini belirlemek üzere değişik düzeylerde kullanılmaktadır. Manso ve ark. (2015) keten tohumu yağı içeren toplam karma rasyona %5 ve %10 düzeylerinde üzüm posası

ilavesinin kuru madde tüketimi, süt verimi ve kompozisyonuna herhangi olumsuz etki etmediğini bildirmişlerdir. Ancak üzüm posasının rumende metan üretimi ile ilgili olumlu etkilerinin bulunması yanında süt verimi ve süt yağ düzeyini olumsuz yönde etkilediğine dair çalışmalar mevcuttur. Moate ve ark. (2014) tarafından süt inekleri ile yapılan çalışmada üzüm posasının metan salınımını önemli düzeyde azalttığı, süt veriminin kurutulmuş üzüm posası ile kontrol grubunda benzer, silolanmış üzüm posası tüketenlerde önemli düzeyde azaldığı, süt yağ düzeyinin ise kurutulmuş üzüm posasını tüketenlerde kontrol ve silolanmış üzüm posası tüketen gruplara göre önemli düzeyde azaldığı görülmüştür. Foiklang ve ark. (2016) süt ineklerinde kuru madde tüketimlerinin %2'si düzeyinde üzüm posası tozu ilave ederek yaptıkları çalışmalarında yine ruminal fermentasyon ile metan üretiminin kontrol grubuna göre önemli düzeyde düşük olduğunu belirtmişlerdir. Silajı yapılmış üzüm posası besi sığırları rasyonlarında kullanıldığında performansı olumsuz yönde etkilediği ancak açığa çıkan metan seviyesinde değişiklik olmadığı görülmüştür. Caetano ve ark. (2019) besi sığırları rasyonlarına %30 düzeyinde üzüm posası ilavesinin günlük ortalama canlı ağırlık artışında değişim olmadığını, ancak besi sonu canlı ağırlıkların üzüm posası içeren rasyonu tüketenlerde %5 düzeyinde düşüşe neden olduğunu, yemden yararlanma oranının da üzüm posası içeren rasyonu tüketenlerde %16 daha yüksek bulunduğunu bildirmişlerdir.

Hayvanlardan daha ekonomik verimler sağlanması ve hayvan refahının geliştirilmesi amacıyla uzun yıllar antibiyotiklerden yararlanılmıştır. Ancak uzun yıllar hayvan yemlerine katılarak kullanılan antibiyotikler gerek hayvan gerekse de insan vücudunda bulunan patojen bakterilerin bu antibiyotiklere direnç kazanması endişesi doğurmuştur (Keser ve Bilal, 2010). Üzüm posası içerdiği besin maddeleri yanında sahip olduğu antibakteriyel aktivite sayesinde patojen mikroorganizmalara karşı hayvan sağlığını koruyucu etkisi de bulunmaktadır (Özkan ve ark., 2004). Yapısında barındırdığı fenolik maddelerin patojen bakterilere karşı bu koruyucu etkiyi sağladığı düşünülmektedir. Fenolik maddeler bitkilerin meyveleri ile birlikte tüm gövde, sap ve yapraklarında da bulunmaktadır (Nizamlioğlu ve Nas, 2010). Bununla birlikte rasyonu oluşturan ham maddelerin yapısında bulunan veya rasyona sonradan ilave edilen yağların havada bulunan oksijen ile oksitlenmesi sonucu yemlerde acılaşıma, enerji düzeylerinde azalma, biyolojik etkinliklerinin kaybolması, rasyon aroma, renk ve tadında bozulmalar meydana gelmektedir. Yağların oksitlenmesi, yağ asitleri yapısında bulunan çift bağların havadaki oksijenle birleşerek hidroperoksitleri meydana getirmesi durumudur. Hidroperoksitlerle beraber ortamda serbest radikallerde oluşur ve bu serbest radikaller yağların oksidasyonunu giderek artırma eğilimindedirler. Buna bağlı olarak rasyonun tat, koku, renk ve strüktürü giderek daha fazla bozulur (Özkan ve Açıkgöz, 2007). Üzüm posası içerdiği A, C, E vitaminleri ve fenolik bileşikler sayesinde antibakteriyel etkinin yanında antioksidan etkiye de sahiptir.

Kimyasal bileşikler iki ya da fazla elementin kimyasal bağlarla bir araya gelmesiyle oluşur. Kimyasal bileşiğin yapısındaki bu bağların çevresini negatif elektronlar sarmış durumdadır. Bu negatif elektronlar çiftlenmiş halde bulunması gerekmektedir. Aksi halde tekli elektron içeren moleküller kararsız bir hal alır ve reaktif duruma geçer. Yapısında böyle çiftlenmemiş elektron bulunan bileşiklere serbest radikaller denir. Serbest radikallerin bu kararsız durumu kararlı bir hale dönüştürmek için çevredeki diğer bileşiklerden elektron almak ister. Bir başka bileşikten bir elektron alarak kararlı hale geçer, ancak bu kez elektronu alan diğer bileşik kararsız hale geçer. Zincirleme olarak devam eden bu durum antioksidanlar sayesinde durdurulur. Vücutta aktif oksijen türlerinin meydana gelmesiyle, yaşam için esansiyel olan oksijen zararlı bir hal almaktadır. Vücuda alınan oksijenin tek değerli indirgenmesi ile süperoksit (O_2^-) radikali, iki değerli indirgenmesiyle hidrojen peroksit (H_2O_2) radikalini ve üç değerli indirgenmesi ile hidroksil ($\cdot OH$) radikalinin meydana gelmesine neden olmaktadır (Gökpinar ve ark., 2006; Nakazawa ve ark., 1996). Serbest radikaller vücutta en çok lipidleri etkilemektedir. Serbest radikaller hücrelerdeki fosfolipidlerin yükseltgenmesine ve peroksit türevlerinin açığa çıkmasına neden olmaktadır. Bu olaya lipid peroksidasyonu denmektedir. Bu olayın meydana gelmesinde süperoksit ve hidroksil gruplarının etkileri bulunmaktadır. Bunlardan süperoksit de bir takım olaylar neticesinde hidroksil radikale dönüşmektedir. Hidroksil radikalleri hücre membranında bulunan lipitlerle etkileşime girer ve bunun sonucunda dien konjugatları ve malondialdehid (MDA) gibi ürünler açığa çıkar. MDA lipid peroksidasyonu sonucu açığa çıkan en önemli üründür (Yarsan, 1998; Meral ve ark., 2012; Mercan 2004). Khodayari ve Shahriar (2014) temel rasyon yanısıra %2, 4, ve 6 düzeylerinde üzüm posası bulunan rasyonları tüketen broylerler ile yaptıkları çalışmalarında, üzüm posası içeren yemleri tüketen grupların kanlarında MDA düzeyi kontrol grubuna göre önemli düzeyde düşük olduğunu gözlemlemişlerdir. Brenes ve ark. (2008) doğal bir antioksidan olduğu bilinen vitamin E ile üzüm posasını karşılaştırmış, 1, 4 ve 7 gün süre ile depolanan piliç göğüs etlerinde MDA seviyelerinin benzer seviyelerde olduğunu belirlemişlerdir.

Üzüm posası ruminant yemlerinde değerlendirilip atık bir madde olmaktan çıkarılabilirken yapılan çalışmalarda her ne kadar yüksek denilebilecek selüloz düzeyine sahip olsada kanatlı rasyonlarında da kullanılmış ve olumsuz sonuçlar bulunmamıştır. Kanatlılardan broylerler üzerinde yapılan çalışmalar incelendiğinde, Viveros ve ark. (2011) %6 düzeyinde üzüm posası içeren rasyonu tüketen grup ile kontrol grubu arasında canlı ağırlık artışı ve yem tüketimi yönünden fark olmadığını, yemden yararlanma oranının kontrol grubuna göre önemli düzeyde yüksek olduğunu tespit etmişlerdir. Brenes ve ark. (2008) broylerlerde %1.5, 3 ve 6 düzeylerinde üzüm posasının canlı ağırlık artışı, yem tüketimi ve yemden yararlanma oranının kontrol grubu ile benzer olduğunu belirtmişlerdir. Lichovnikova ve ark. (2015) tarafından gerçekleştirilen bir diğer çalışmada %1.5 düzeyinde üzüm posası içeren rasyonu tüketen grup ile kontrol grubu arasında canlı ağırlıklar ve yemden yararlanma oranlarının benzer olduğunu bildirmişlerdir. Yumurtacı ırk tavuklar üzerinde üzüm posası ile yapılan çalışmalarda da

verim parametrelerinde düşüş olmadığı belirtilmiştir. Kara ve ark. (2016) 80 haftalık yaştaki yumurta tavukları ile yaptıkları çalışmalarında %4 ve 6 düzeyinde üzüm posası içeren yemleri tüketen grupların canlı ağırlık, yem tüketimi, yemden yararlanma oranı ve yumurta verimi yönlerinden kontrol grubu ile benzer sonuçlar verdiğini bildirmişlerdir. Bir başka çalışmada Kara ve Kocaoğlu-Güçlü (2012) tarafından 76 haftalık yaşta ve tüy dökmüş tavukların yemlerine ilave edilen %2 oranındaki üzüm posasının ortalama yumurta üretimi, yumurta ağırlığı ve yemden yararlanma oranını deęiřtirmedięi görülmüřtür. Üzüm posasının Japon bildircin yemlerine ilavesi ile yapılan çalışmalarda da verim parametrelerinin olumsuz etkilenmedięi belirlenmiştir. Konca ve ark. (2015) üzüm posasını %0, 1, 2, 4 ve 6 düzeylerinde Japon bildircini yemlerine ilave ederek gerçekleřtirdikleri çalışmalarda grupların canlı ağırlık, canlı ağırlık artışı, yem tüketimi ve yemden yararlanma oranları ile karkas randımanlarının benzer olduęu sonucunu kaydetmişlerdir. Japon bildircinleri ile yapılan başka bir çalışmada Silici ve ark. (2011) damızlık Japon bildircinleri yemlerine %0, 0.5, 1 ve 1.5 düzeylerinde öğütülmüş üzüm çekirdeęi ilave etmişler ve %0.5, 1, 1.5 düzeylerinin yem tüketimi, yumurta verimi ve yumurta ağırlıklarının kontrol grubu ile benzer olduęunu, bununla birlikte %1 ve 1.5 düzeylerinde öğütülmüş üzüm çekirdeęi ilavesinin damızlık Japon bildircinlerinin yemden yararlanma oranını kontrole göre iyileřtirdięini gözlemlemişlerdir.

Sonuç

Üzüm posası içerdięi besin maddeleri ile oldukça iyi bir hayvan yemi olabileceęi söylenebilir. Açıęa çıktıęı gibi kullanılabilmesinin yanında hem silaj yapılarak saklanabilmesi hem de dięer silajı yapılacak yemlere katılarak suda çözünebilir karbonhidrat seviyesini artırması üzüm posasının avantajları olarak sıralanabilir. İçerdięi yüksek NDF ve ADF seviyeleri ile iyi bir kaba yem kaynaęı olabileceęi gibi yine içerdięi azotsuz öz madde seviyesi ile iyi bir enerji kaynaęı olduęu söylenebilir. Ruminant beslemede rumen metan seviyesinin azaltılması yönünden olumlu etkisinin olacaęı düşünülse de verim performansını çok iyi etkilemedięi söylenebilir. Kanatlılar için verim performansının üzüm posası ile herhangi bir olumsuz etki göstermemesi, selüloz seviyesi yüksek atık bir maddenin yem olarak deęerlendirilebilir olması açısından olumlu etkisinden söz edilebilir. Üzüm posası içerdięi dięer antibakteriyel ve antioksidan etkileri ile hayvan saęlığı ile birlikte üzüm insan saęlığı için de önemli bir meyvedir.

KAYNAKLAR

- AKYÜZ, N (1979) Süt endüstrisinde yan ürünlerin değerlendirilmesi ve önemi. *Journal of the Faculty of Agriculture* 10(1-2).
- AKTAŞ B., ÖZDEMİR P., Basmacıoğlu-Malayoğlu H. (2013) Bazı Agro-Endüstriyel Yan Ürünlerin Doğal Antioksidan Kaynağı Olarak Değerlendirilmesi, *Hayvansal Üretim* 54(2): 30-35.
- ALIPOUR D, ROUZBEHAN Y (2007) Effects of ensiling grape pomace and addition of polyethylene glycol on in vitro gas production and microbial biomass yield, *Animal Feed Science and Technology*, 137, 138–149.
- BASALAN M., GÜNGÖR T, OWENS FN, YALÇINKAYA İ (2011) Nutrient content and in vitro digestibility of Turkish grape pomaces, *Animal Feed Science and Technology* 169 (2011) 194–198.
- BAUMGARTEL T, KLUTH H, EPPERLEIN K, RODEHUTSCORD M (2007) A note on digestibility and energy value for sheep of different grape pomace, *Small Ruminant Research*, 67, 302–306.
- BRENES A, VIVEROS A, GOÑI I, CENTENO C, SÁYAGO-AYERDY S, ARIJA I ve SAURA-CALIXTO F (2008) Effect of grape pomace concentrate and vitamin e on digestibility of polyphenols and antioxidant activity in chickens. *Poultry science*, 87, 307-316.
- CANBOLAT Ö, KALKAN H, KARAMAN Ş, FİLYA İ (2010) Üzüm Posasının Yonca Silajlarında Karbonhidrat Kaynağı Olarak Kullanılma Olanakları, *Kafkas Univ Vet Fak Derg*, 16 (2): 269-276.
- CAETANO M, WILKES MJ, PITCHFORD WS, LEE SJ, HYND PI (2019) Effect of ensiled crimped grape marc on energy intake, performance and gas emissions of beef cattle, *Animal Feed Science and Technology*, 247 166–172.
- FAOSTAT (2017) Food and agriculture organization of the united nations, Erişim: http://www.fao.org/faostat/en/#rankings/countries_by_commodity Erişim tarihi: 14.03.2019.
- FOIKLANG S, WANAPAT M, NORRAPOKE T (2016) Effect of Grape Pomace Powder, Mangosteen Peel Powder and Monensin on Nutrient Digestibility, Rumen Fermentation, Nitrogen Balance and Microbial Protein Synthesis in Dairy Steers, *Asian-Australas J Anim Sci*, 29(10): 1416–1423.
- GÖKPINAR Ş, KORAY T, AYÇİÇEK E, GÖKSAN T, DURMAZ Y (2006) Algal antioksidanlar, *Su Ürünleri Dergisi*, 23.
- NAKAZAWA H, GENKA C, FUJISHIMA M (1996) Pathological aspects of active oxygens/free radicals, *The Japanese journal of physiology*, 46, 15-32.
- KARA K, KOCAOĞLU GÜÇLÜ B, BAYTOK E ve ŞENTÜRK M (2016) Effects of grape pomace supplementation to laying hen diet on performance, egg quality, egg lipid peroxidation and some biochemical parameters, *Journal of applied animal research*, 44, 303-310.
- KARA K VE KOCAOĞLU GÜÇLÜ B (2012) The effects of different molting methods and supplementation of grape pomace to the diet of molted hens on postmolt performance, egg quality and peroxidation of egg lipids, *Erciyes Üniversitesi Veteriner Fakültesi Dergisi*, 2012 Vol.9 No.3, 183-196.
- KE WC, YANG FY, UNDERSANDER DJ, GUO XS (2015) Fermentation characteristics, aerobic stability, proteolysis and lipid composition of alfalfa silage ensiled with apple or grape pomace, *Animal Feed Science and Technology*, 202, 12–19.
- KESER O VE BİLAL T (2010) İnülinin kanatlı beslemede kullanılması. *Kafkas Univ Vet Fak Derg*, 16, 685-695.
- KHODAYARI F VE SHAHRIAR HA (2014) The effect of red grape pomace on performance, lipid peroxidation (mda) and some serum biochemical parameters in broiler. *Adv. Biores*, 5, 82-87.

- KONCA Y, KARA K, KOCAOĞLU GÜÇLÜ B, BÜYÜKKILIÇ BEYZİ S (2015) Japon Bildircini (*Coturnix coturnix japonica*) Rasyonlarında Kurutulmuş Üzüm Posası Kullanımının Performans, Karkas ve İç Organ Özelliklerine Etkileri, *Tavukçuluk Araştırma Dergisi* 12 (1), 20-24.
- LICHOVNIKOVA M, KALHOTKA L, ADAM V, KLEJDUS B ve ANDERLE V (2015) The effects of red grape pomace inclusion in grower diet on amino acid digestibility, intestinal microflora, and sera and liver antioxidant activity in broilers, *Turkish Journal of Veterinary and Animal Sciences*, 39, 406-412.
- KILIÇ Ü VE ABDİWALI MA (2016) Alternatif Kaba Yem Kaynağı Olarak Şarapçılık Endüstrisi Üzüm Atıklarının İn Vitro Gerçek Sindirilebilirlikleri ve Nispi Yem Değerlerinin Belirlenmesi, *Kafkas Univ Vet Fak Derg*, 22 (6): 895-901.
- MANSO T, GALLARDO B, SALVÁ A, GUERRA-RIVAS C, MANTECÓN AR, LAVÍN P, DE LA FUENTE MA (2015) Influence of dietary grape pomace combined with linseed oil on fatty acid profile and milk composition, *J. Dairy Sci.* 99:1111–1120.
- MERAL R, DOĞAN İS, KANBEROĞLU GS (2012) Fonksiyonel gıda bileşeni olarak antioksidanlar, *Iğdır Üni. Fen Bilimleri Enst. Der.*, 2(2), 45-50.
- MERCAN U (2004) Toksikolojide serbest radikallerin önemi, *Yüzüncü Yıl Üniversitesi Veteriner Fakültesi Dergisi*, 15, 91-96.
- MOATE PJ, WILLIAMS SRO, TOROK VA, HANNAH MC, RIBAUX BE, TAVENDALE MH, ECKARD RJ, JACOBS JL, AULDIST MJ, WALES WJ (2014) Grape marc reduces methane emissions when fed to dairy cows, *J. Dairy Sci.* 97 :5073–5087.
- NERANTZIS E VE TATARIDIS P (2006) Integrated enology-utilization of winery by-products into high added value products, *J. Sci. Tech*, 1, 79-89.
- NIZAMLIOĞLU NM VE NAS S (2010) Meyve sebzelerde bulunan fenolik bileşikler; yapıları ve önemleri, *Gıda Teknolojileri Elektronik Dergisi*, 5, 20-35.
- ÖZDÜVEN ML, COŞKUNTUNA L, KOÇ F (2005) Üzüm Posası Silajının Fermantasyon ve Yem Değeri Özelliklerinin Saptanması, *Trakya Univ J Sci*, 6(1): 45-50.
- ÖZKAN G, SAGDIC O, BAYDAR NG, KURUMAHMUTOĞLU Z (2004) Antibacterial activities and total phenolic contents of grape pomace extracts, *J Sci Food Agric*, 84:1807–1811.
- ÖZKAN K VE AÇIKGÖZ Z (2007) Kanatlı kümes hayvanlarının beslenmesi, *Hasad Yayıncılık, Şan Ofset*, 89-90.
- SARICA Ş. (2011) Nar suyu yan ürünlerinin hayvan beslemede kullanım olanakları. *Gaziosmanpaşa Üniversitesi Ziraat Fakültesi Dergisi* 28(2), 97-101.
- SİLİCİ S, KOCAOĞLU GÜÇLÜ B, KARA K (2011) yumurtacı damızlık bildircin (*Coturnix Coturnix Japonica*) yemlerine öğütülmüş üzüm çekirdeği ilavesinin verim ve kuluçka performansı ile yumurta kalitesine etkisi, *Sağlık Bilimleri Dergisi (Journal of Health Sciences)* 20(1) 68-76.
- ŞEN G (2018) Broiler Rasyonlarında Üzüm Posası ile İnülün Kullanımının Performans, Karkas Randımanı, Barsak Viskozitesi, Bağışıklık ve Antioksidan Durum Üzerine Etkisi, *Doktora Tezi, Kırıkkale Üniversitesi, Sağlık Bilimleri Enstitüsü*.
- TÜİK (2017) Türkiye İstatistik Kurumu, Erişim: [www.tuik.gov.tr], Erişim tarihi: 14.03.2019.
- VIVEROS A, CHAMORRO S, PIZARRO M, ARIJA I, CENTENO C ve BRENES A (2011) Effects of dietary polyphenol-rich grape products on intestinal microflora and gut morphology in broiler chicks, *Poultry science*, 90, 566-578.
- YARSAN E (1998) Lipid peroksidasyon olayı ve önlenmesine yönelik uygulamalar, *Y.Y.Ü. Vet. Fak. Derg.*, 9, 89-95.

Comparison of Different Age Groups in Terms of Fleece Diameter and Length in Middle Anatolian Merino Sheep

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Abstract

Sheep is one of the most important livestock animals that have been raised by humans for meat, milk and fleece since historical domestication. Textile and weaving industries require high quality sheep wool to produce high quality products. The fineness and length of sheep fleece are important quality criteria. Lower micron and higher length of fleece are more desirable for the textile industry. The diameter and length of sheep fleece is influenced by many intrinsic and extrinsic factors such as breed, shearing period, age of the animal, and type of nutrition. In this study, the wool sample of approximately 1400 animals from 35 different farms within "National Small Ruminant Improvement in Public Condition of Middle Anatolian Merinos Sheep" project implemented by the General Directorate of Agricultural Research and Policies, were analyzed in terms of fineness and length, then they were compared among different age groups. Samples were collected from 4 different age groups namely, 0-6 months, 1,5-2,5 year, 2,5-3,5 year and 3,5 years and above for diameter and length dataset. Measurement of diameter and length were performed with OFDA 2000 instrument. The significant difference between the age groups was determined by One-way ANOVA statistical method and multiple comparisons between groups were implemented by Tukey HDS test. As a result, the difference between the lamb age group and all the others were found to be significant (P-value < 0.001) whereas the difference between the 1,5-2,5 year, 2,5-3,5 year and 3,5 years and above age groups were not significant for diameter analyses. In case of length analyses, the difference between 0-6 months and 1,5-2,5 years age groups and the difference between these groups and other two groups were significant (P-value < 0.001), while the difference between 2,5-3,5 year and 3,5 years and above were not significant.

Key Words: Middle Anatolian Merino, Fleece Quality, Fleece Diameter, Fleece Length

Some Wool Properties in Central Anatolian Merino Sheep

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Abstract

This research was conducted in Bahri Dağdaş International Agricultural Research Institute in 2014 and 2016. In this research, a total of 195 Central Anatolian Merino sheep, 140 head females and 55 head males, were used as animal material. The animals that were bred in the herd were determined by random sampling method according to age and sex and fleece samples were taken. The samples were analyzed in Lalahan International Livestock Research and Training Center. According to the results of the analysis, the wool properties of Central Anatolian Merino sheep; dirty wool yield was 3.52 kg, length (haute) 28.69 mm, length (Barbie) 35.8 mm, fineness 22.76 μ , elasticity 27.27%, strength 16.80 Cn / Tex and yield 51.71%. As a result, it was found that year and sex, fineness, sex and age, elasticity year and age and yield were statistically significant for polluted wool yield ($P < 0.05$). Yields are within the limits of the textile industry.

Key Words: C. A. Merino, Wool, Wool Properties

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The Effect of Some Environmental Factors on Growth Performance in Central Anatolian Merino Lambs

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Abstract

This research was carried out at Bahri Dağdaş International Agricultural Research Institute between 2014 and 2017. The animal materials used in this study consisted 3534 lambs. The Central Anatolian Merino herd reared in the Institute is divided into two as elite and breeding flocks according to the breeding values. The birth weight, weaning weight, six months and yearling live weights for elite and breeding flocks were 4.52 and 4.39, 23.12 and 21.18, 33.80 and 32.00, 45.86 and 43.91, respectively. It has been determined that the factors investigated during the period when living weights of lambs are measured are significantly effective ($P < 0.05$).

Key Words: Central Anatolia Merino, growth, environmental factor

Acknowledgment: In this study, conducted by the Ministry of Agriculture and Forestry of the Republic of Turkey "Central Anatolian Merino Development Sub-Project" which in "Improvement Project of the National Merino Sheep" it is used data obtained from. As all authors, we would like to thank our ministry

Ensability Characteristics and Silage Quality of Forage Turnips (Lenox, Brassica rapa L.)

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Abstract

In this study, it was aimed to determine the ensability characteristics and silage quality of forage turnips. For this purpose, the Lenox plant cultivated at the International Center for Livestock Research and Training has been harvested in the middle of flowering and silage was made after withering. In this study, 4 group (4 replicates/each group) of silage without additives (K), with 2% commercial inoculant as lactic acid bacteria (LA), 5% grounded barley grain (A1) and 10% grounded barley grain (A2) were made. Silages were opened at the end of 60 days of inoculation period and silage quality analyzes (pH, physical and sensory properties and aerobic stability) were performed and Flieg score was calculated. Samples were taken from the silages and dried at 45°C for 72 hours. The samples were then milled through a 1 mm sieve and analyzed for nutrient content (dry matter (DM), organic matter (OM), ether extract (EE), crude protein (HP), neutral detergent insoluble fiber (NDF), acid detergent insoluble fiber (ADF), acid detergent lignin (ADL) and crude fiber (CF).

The pH values of the silages were not significantly affected by the treatment, whereas in terms of aerobic stability CO₂ concentration was the lowest in the LA group (p <0.05). The effect of treatment was important when sensory properties were examined. According to the total score, silages of K, LA and A2 groups were classified as “good” and A1 group was found to be “satisfactory”. When the Flieg score was calculated, the A2 group silage was “very good” with a value of 85.97. When the nutrient values were examined, the dry matter values of the K and LA groups were 14.52% and 13.80%, while the addition of 5% and 10% barley (22.13% and 24.38%, respectively) significantly increased the dry matter (p <0.05). Crude protein levels were significantly higher in K group silage (18.10%) and LA group silage (18.49%) than that of barley supplemented groups (13.89% and 13.93%). Significant differences were observed in HS, ADF and ADL values of barley added silages compared to K group.

As a result, it is thought that silages obtained by adding different additives to the forage turnip (lenox, Brassica rapa L.) plants are generally high quality silage and the silages can be a source of good quality alternative roughage for ruminant nutrition.

Key words: Forage turnip (lenox, Brassica rapa L.), silage quality

Pharmacogenetic Differences In Breeds Of Sheep

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Abstract

The presence of genetic diseases in many ethnic and subethnic group of people have led us think that these diseases could occur in animal populations. Due to higher chance of mating between close relatives in animals compared to humans, occurrence of hereditary diseases is expected to be higher in animals.

Several studies have been employed to investigate the association between races of sheep and diseases such as infectious, parasitic, metabolic impairments and intoxication tendencies.

Despite the limited number of studies, it has been shown that there are pharmacokinetic and pharmacodynamic differences between drugs in some sheep breeds.

Pharmacogenetic characteristics of the organisms can alter the pharmacodynamic and pharmacokinetic parameters of the drugs. In the near future, use of individualized medicine for humans will arise the evaluation of the use of individualized/racialized medicine for different sheep flocks. Thus, it will minimize the inconveniences such as anaphylaxis, withdrawal of the drugs from meat, and development of antimicrobial resistance while using drugs.

Key words : pharmacogenetic , sheep , drug

Pre- and Post-Weaning Growth and Morphometric Measurements of Mahalli Goat Raised in Farmer Conditions

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Abstract

This study was carried out to determine the growth characteristics of Mahalli Goat belonging to 3 farmers in Diyarbakır in 2015. Live weights of all kids born in the three flocks were collected from birth to 210th day of age by every month and also 50 goats were randomly selected from each of the three flock for morphological measurements. The project was supported by the General Directorate of Agricultural Researches and Politics (TAGEM)

Birth, 30, 60, 90, 120, 150, 180 and 210th day weights of 286 kids 2.75, 7.76, 12.78, 17.11, 17.49, 19.89, 21.65 and 22.53 kg, respectively. The fertility rate, birth rate, twinning rate, number of kids born per single goat, number of kids born per goat gave birth and gestational productivity (kg) were 95%, 95%, 3.16%, 0.98, 1.03 and 267.63, respectively. The survival rate was found as 97.62%.

Average body weight (kg), shin circumference (cm), body height (cm), body length (cm), chest depth (cm), chest circumference (cm), head length (cm), head width (cm), ear length (cm) and ear width (cm) were 55.52, 10.19, 73.51, 69.67, 32.33, 85.57, 11.72, 11.02, 16.05 and 7.92 cm. In addition, the average nipple length was 3.58 in female goats, and the scrotum circumference and length were 28.00 and 18.00 cm, respectively in male goats.

Keywords: Mahalli goat, Growth, Survival, Morphometric measurements

Reproductive and growth performance of Sakız (Chios) sheep in conservation herds

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Abstract

In this study the data were obtained from in *ex-situ* flocks in the Bandırma Sheep Research Institute (BSRI) and *in-situ* flocks in the İzmir province (Çeşme and Urla) between 2008 and 2014. *Ex-situ* flock, composed of average 50 individuals, was kept indoors during winter and they were offered concentrate 400–600 g/ewe/day and alfalfa 0.8-1.0 kg/ewe/day depending on the physiological status. Lambs were kept alone with their mothers in stalls for 1 day after lambing. When lambs were 10 day old, they were fed ad libitum a creep–feed concentrate and alfalfa hay. The lambs were suckled twice a day, weaned at three months. In-situ flocks kept in traditional family farming system, 15 flocks were included with average flock size was 30, in Çeşme and Urla district of İzmir province. The data for litter size and lamb survival rate were collected from contracted farmers' herds for 6 years in *in-situ* farms. Growth parameters for birth, weaning, 6 months, yearling, 2, 3 and >4 age (n=286) obtained only *ex-situ* conservation flock in BSRI.

The average litter size was 1.69 (n=3340) and 1.88 (n=238) for *in-situ* and *ex-situ* conservation herds respectively. Survival rate at three months weaning age was 88% and 82% for *in-situ* and *ex-situ* conservation herds respectively. Birth rate was 72% for *ex-situ* conservation herd. Birth rate data was not collected in *in-situ* herds. Body weight at the birth, weaning, 6 months, yearling, 2, 3 and >4 age were; 3.46±1.48 kg, 24.16±1.08 kg, 34.33±1.12 kg, 41.87±1.53 kg, 49.02±1.68 kg, 58.40±1.75 kg, 62.00±1.79 kg and 59.07±1.79 kg respectively.

Keywords: Sakız, Reproductive, Growth lamb.

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The data of this research was obtained from “Conservation of Domestic Animal Genetic Resources Project” which is conducted by TAGEM.

Reproductive Yield of sheeps and Survival traits of Lambs in Central Anatolian Merino Grown in Institute Conditions

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Abstract

This research was carried out at Bahri Dağdaş International Agricultural Research Institute between 2013 and 2017 in order to determine fertility of sheep and survival traits of lamb in Central Anatolian Merino. The animal materials used in this study consisted a total of 6735 of which is 3201 ewes and 3534 lambs. According to the institute records, breeding value was determined and elite and breeding flocks were determined.

In 2013-2017, the estrus rate was 90.33-99.17%, the birth rate was 86.76-91.20%, the lamb yield was 1.02-1.14, litter size was 1.12-1.31, the multiple birth rate was 12.26-30.24% and wean survival 88.86-92.30% in the range, the average of these characteristics examined were 93.97%, 88.41%, 1.10, 1.25, 24.7% and 89.78% respectively. A statistically significant difference was found between the years in terms of obtained estrus, birth, multiple birth and wean survival values ($P < 0.05$).

As a result, all the features examined between years and When the flock type (elite / breeding flock) were examined between the rates of estrus (98.22% and 91.67%) and multiple births (27.47% and 23.18%), it was found that there was a statistically significant difference ($P < 0.05$).

Key Words: Central Anatolia Merino, reproductive traits, survival rate

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The Effects Of Fasn (Fatty Acid Synthase) Gene On The Yield Characteristics Of Ruminants

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Abstract

In this study, the effects of polymorphisms detected in FASN gene on meat and milk parameters of livestock were discussed. The quantity and quality of fat in meat and milk products obtained from ruminants are important in the aspects of the nutritional value, price and human health. There are worldwide researches on the genes affecting the quantity and quality of fat for this reason. One of them is the fatty acid synthase (FASN) gene. This gene affects the fatty acid synthase enzyme. Fatty acid synthase is a multifunctional enzyme that catalyzes the de novo biosynthesis of long chain saturated fatty acid. Structural changes in this enzyme can affect the fatty acid composition and thus the quality and quantity of meat and milk. The chromosomes and number of exons in which the FASN gene are located vary by species. In this direction, the gene in cattle (*Bos taurus*), water buffalo (*Bubalus bubalis*) and zebu cattle (*Bos indicus*) is in the 19th, 3rd and 19th chromosomes and has 42, 42 and 41 exons in respective species. The exon number of this gene, which is located in chromosomes 11th in sheep (*Ovis aries*) and 19th in goats (*Capra hircus*), is 42 in both species. As a result of the literature search, it was found that there are polymorphisms in FASN gene affecting the composition and quality of fat in meat and milk of ruminants. The polymorphisms in this gene may be considered in selection programs for increasing the quality and quantity of meat and dairy products in ruminants.

Key words: Ruminant, Fatty Acid Composition, Gene, FASN, Polymorphism

Determination of Gene Expression Levels of *eca-mir-27a* and *eca-mir-27b* in Pre-Race and Post-Race Saliva in Purebred Race Arabian Horses

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Abstract

Purebred racehorse horses are high-capacity animals for exercise and provide the energy required for racing performance from carbohydrate oxidation and fat oxidation. Therefore, lipid metabolism is very important for race horses. MiR-27a and miR-27b were found to be effective on lipid metabolism in pre- and post-exercise studies on athletes in human medicine. However, miR-27a and miR-27b are also known to have a regulatory effect on the Myostatin (MSTN) gene, which is considered a biomarker for optimal race distance, race performance and skeletal muscle mass in racehorses. In short, as a result of literature reviews, miR-27a / b has a regulatory effect on the MSTN gene, which is defined as a biomarker for horses, and has an effect on lipid metabolism required for performance. Saliva is an important biological fluid for diagnosis because it is easy and inexpensive to supply than blood or urine, and the risk of infection after ingestion is low. The aim of this study was to determine the gene expression levels of saline samples from pre-race and post-race pure racehorse race horses of *eca-miR-27a* and *eca-miR-27b* which are known to be effective on MSTN gene and lipid metabolism which is important for racehorse. In the study, miRNA was isolated from saliva samples taken before and after the race from 3 purebred Arabian horses (n = 13) running in the same race in Şanlıurfa Hippodrome. Afterwards, gene expression levels of *eca-miR-27a* and *eca-miR-27b* from cDNAs obtained by reverse transcription were determined by SYBR Green based quantitative simultaneous polymerase chain reaction (qPCR) and gene expression was determined. Statistically, the differences in the relative gene expression in the expression of *eca-miR-27a* and *eca-miR-27b* before and after the race were calculated by 2 Delta Delta Ct (2 $\Delta\Delta$ Ct) formula. There was no statistically significant difference in gene expression levels of *eca-miR-27a* and *eca-miR-27b* before and after the race. In conclusion, it is thought that more similar and more comprehensive studies with more horse numbers may be more useful in finding genes and miRNAs that affect lipid metabolism and indirectly in examining race performance of horses. In addition, for the first time, miRNA was isolated and extracted from saliva in horses. Therefore, it is thought that this study will constitute an important preliminary data for the studies in which future miRNA isolation and gene expression in saliva

is planned. In this way, the pathological and physical conditions of race horses can be easily investigated by minimizing the stress on sampling, cheap, fast and reliable from saliva material for race horses with high economic value.

Key Words: Arap ati, eca-miR-27a, eca-miR-27b, MSTN

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Semen Characteristics of The Anatolian Buffalo

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Abstract

In this experiment, the revealing of semen characteristics of two Anatolian buffalo (4 years of ages) bulls (*Bubalus bubalis*) were studied in 110 ejaculates which collected with a artificial vagina. The pH, volume and concentration values were found $6,57\pm0,17$, $1,45\pm0,63$ ml, $1770\pm41,7\times10^6$ spermatozoa/mL respectively. Each ejaculate was diluted with commercial semen extender (Andromed) to a final concentration 100×10^6 spermatozoa/mL. Afterward, semen samples were frozen in a digital freezing machine (DigitalCool, IMV). Besides, sperm motion characteristics of samples were determined by using a computer-assisted sperm analysis system (CASA, IVOS I) before cryopreservation and post-thaw. Before the cryopreservation, the percentages of total and progressively motile sperm values were $85.62\pm3.24\%$, $38.66\pm5.81\%$. The other kinematics parameters such VAP, VSL, VCL, ALH values were assessed $109.8\pm13,74\mu\text{m/s}$, $82.84\pm10.1\mu\text{m/s}$, $212.35\pm35.12\mu\text{m/s}$, $8.25\pm0.51\mu\text{m}$ respectively. The percentages of post-thaw total and progressively motile sperm values showed the values of $59.3\pm6.77\%$, $22.85\pm6.03\%$ and others VAP, VSL, VCL, ALH were found $101.10\pm15.56\mu\text{m/s}$, $77.2\pm10.1\mu\text{m/s}$, $175.38\pm22,49\mu\text{m/s}$, $7.66\pm0.81\mu\text{m}$ respectively. Even with limited results of this study, it is envisaged that Anatolian buffalo bulls have high sperm cryo-tolerance. However, repeated trials that revealing the biochemical and proteomic properties of semen are necessary to support this hypothesis.

Keywords: *Bubalus bubalis*, Mediterranean Buffalo, reproduction, cryopreservation, artificial insemination.

Seminal Plasma Proteins as Molecular Markers of Fertility

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Abstract

Recent researches have shown that criterias such as sperm motility and morphology have limited relationships with actual fertility in men and have encouraged research for other markers of fertility. In this context, intensive research studies have been conducted to identify molecular markers of fertility in almost all livestock and humans. All these studies are based on the hypothesis that the molecular components of semen affect male fertilization capacity and also they suggest that seminal plasma is much more than a complex fluid used as a means of transporting spermatozoa starting from the testes to the oocyte targets. Seminal plasma contains proteins that protect the sperm in the epididymis and in the female reproductive tract after ejaculation. These proteins modulate reproductive events such as sperm motility, capacitation, cell preservation, acrosome reaction, as well as successful fertilization and embryonic development and also act as a key regulator of the female genital tract environment, affecting the health of possible future offspring. Heparin Binding Proteins, Spermadhesins, Clusterin and Lactoferrin show a beneficial effect especially for protection of sperm, stabilization of plasma membrane, capacitation and acrosome reaction. Phospholipase A2, one of the proteins present in seminal plasma, is involved in the maturation process, while Kalikrein-kinin and ACE (Angiotensin Converting Enzym) proteins have positive correlation with sperm quality parameters such as sperm motility, viability, concentration and total sperm count. BSPs (Binder of sperm protein) may have harmful effects in semen cryopreservation process. In addition, antioxidant enzymes secreted from epididymis protect sperm against the harmful effects of reactive oxygen species (ROS). Significant relationships between seminal plasma proteins and fertility suggest that these proteins are potential molecular markers of male reproduction. In this study, it is aimed to evaluate the significant relationships between seminal plasma proteins and fertility by compiling the data obtained from various studies in the light of the current scientific literature.

Key Words: Seminal plasma, protein, fertility, molecular markers

Investigation of The Effect of Strategies Applied in Heat Stress Alleviate On Some Biochemical Parameters

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Abstract

Heat stress causes physiological, hormonal, behavioral and molecular changes due to its immunosuppressive effect. As a result, it leads to a slowdown in poultry growth, an increase in mortality such as disruption of physiological balance and significant economic losses.

Heat stress resulting from disruption of thermoregulation balance is successfully evaluated with biochemical parameters. Oxidative stress, organ-based enzyme and bioactive molecule analyzes are frequently studied as major parameters in response to heat stress. These markers are target biomolecules at heat stress alleviating strategies.

In this context, it is aimed to investigate the effects of heat stress alleviating strategies on some biochemical parameters. In addition, it is thought that the data to be obtained by bringing together the works done in this field will be the reference source for further studies.

Key words: heat stress, poultry, alleviate, biochemical parameters

Current Approaches to Identification and ID Security in Farm Animals

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Abstract

Whilst globalization of animal and animal products trade comes into prominence, it is necessary to take common precautions and solutions against global risks. Diseases and lack of yield (milk or meat) problems are the most forced subjects on animal and animal products foreign trade of Turkiye.

Some infectious diseases are still bursting and some pathological strains blow up which have never seen on Turkish lands whereas these diseases eradicated from many developed countries. Zoonotic diseases can be stopped and prevented by controlling animal health (especially by vaccination strategies) by veterinary professions. The 90% risk of foods for human health are related to animal products. In the 10 years it is known that animal and animal products derived pathogens are caused 75% of human diseases.

Due to existing security bugs of the current systems, to implementation of the actual technologies are avoided and manipulated different ways on farm animals. It is possible and practical to prevent all abusing usage of identification systems committed by public or private sector employees. As a rule, any external applications' purpose to the identification of farm animals is suitable to abuse and does not provide identification security. By this aim, the identification methods and technologies in animal husbandry are reviewed.

Key words: RFID,animal,identification

Silkworm-Breeding in Turkey: Overall Assessment, Problems and The Proposed Solutions

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Abstract

Silkworm-breeding, which was cultivated centuries ago, began in China and spread to the world from here. Silkworm has an important role in terms of social, cultural and economic developments in the regions where it is cultivated. This agricultural activity, which still exists today, has a positive effect on rural development, e.g. this production model provides source of side income for rural population. It is being made actively in many regions of Turkey by making large investments from silkworm-breeding to silk processing. Although these investments made Bursa, the city of Turkey, and the Silk of Bursa very famous over the world, Turkish Silkworm-Breeding had a negative effect due to various reasons as follows: 1) the closure of Sericulture Research Institute in Bursa in 2004, 2) damping on silk prices by China, and 3) breeder dissatisfaction and decreases on the rural population. Continuity of silkworm-breeding in Turkey and its transmission to future generations are very crucial to better understand the importance of gene resources. Various data obtained from Kozabirlik (i.e. the number of villages, the number of households in sericulture, the number of opened boxes and the amount of silkworm cocoon) was assessed and silkworm-breeding in Turkey was investigated in this study. In line with these data, for instance, the amount of produced silkworm cocoons decreased by around %97 and the number of households in sericulture reduced by approximately %95 in the period between 1991 and 2001 in Turkey. On the other hand, significant increases in key outputs have been currently experienced in Turkish silkworm-breeding. For example, in the last five years (i.e. 2014 - 2018), the number of villages, the number of households in sericulture, the number of opened boxes and the amount of silkworm cocoon increased by %103.82, %25.57, % 66.84 and %17.04, respectively. This study addressed Turkish silkworm-breeding and its overall assessment, problems and the proposed solutions. In conclusion, this study sheds light on silkworm-breeding for both agricultural companies and farmers to develop livestock policies and prepare breeding programs.

Key Words: Sericulture, Overall Assessment, Current Problems, Proposed Solutions, Turkey

Some Growth Characteristics White Karaman, Hasak xWhite Karaman (F1) Crossbreed Lambs Breeding in the Kuyulusebil Village Pasture

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Abstract

In this study was carried out with the lambs of White Karaman sheep grown in the village of Kuyulusebil in Konya province as a result of crossbreed of the Hasak sheep breeds rams. The general averages of birth weight, 30, 60, 90, 120, 150 ve 180.days live weight for White Karaman , Hasak x White Karaman (F1) crossbreed lambs were found 3.65 kg, 8.02 kg, 12.92 kg, 18.28 kg, 24.23 kg, 30.68 kg, 37.28kg; 4.78kg, 10.57 kg, 17.06 kg, 24.35 kg, 31.84 kg, 39.09 kg, 46.24 kg , daily live weight gain 30, 60, 90, 120, 150, 180 ve 0-180. day; 145.62 g, 163.36 g, 178.67 g, 197.62 g, 214.90 g, 222.93 g, 187. 89 g; 192.76 g, 215.86 g, 242. 34 g, 249.01 g, 244.58 g, 235.04 g, 230.14 g, respectively P<0,05). White Karaman and Hasak x White Karaman (F1) crossbreed lambs 75 and 180.day the survival ability respectively ; % 99.12, % 85.53; % 94.74, % 90.43 as determined.

As a result; It was determined that the growth performances of the lambs obtained as a result of the conversion of the Hasak sheep breed to the White Karaman breed, which is one of our low-yield domestic breeds, were better than the White Karaman sheep.

Keywords: Growth, Live weight, live weight gain, lamb, White Karaman

Some Morphological Characteristics Of Karakoyun (Güney Karaman) Sheep

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This research was carried out to determine some morphological characteristics of different age and sex groups on Karakoyun (Güney Karaman) sheep raised in province Mersin. In this study, a total of 43 rams and 133 ewes were measured. Overall means and standart errors of some characters of rams and ewes were: withers height 85.7 ± 0.56 and 75.8 ± 0.31 cm, body length 89.3 ± 0.89 and 80.4 ± 0.50 cm, body depth 58.6 ± 0.67 and 52.7 ± 0.40 cm, hearth girth 109.6 ± 0.9 and 101.3 ± 0.54 cm, chest width 26.2 ± 0.46 and 22.9 ± 0.21 cm, chest depth 52.0 ± 0.4 and 46.5 ± 0.32 cm, rump height 83.6 ± 0.49 and 74.8 ± 0.30 cm, rump width 25.8 ± 0.62 and 24.2 ± 0.18 cm, respectively.

Keywords: Karakoyun (Güney Karaman) sheep, morphological traits, body measurements

Some Reproductive Characteristics of Central Anatolian Merino Sheep and Survival Rates of their Lambs at Breeders Conditions

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Abstract

The aim of this study was to determine the reproductive characteristics of Central Anatolian Merino sheep and survival rates (SR) of their lambs within first 60 and 120 day in National Improvement Project for Small Ruminants at Breeders Conditions flocks (Project No:26OAM2006-01).

In this study 5100 head of ewes and 6275 head of lambs data obtained from 23 Central Anatolian Merino sheep breeder flocks 8 different vilages in Eskişehir province were used. The number of lambs born and mating record were recorded by breeders, and SRs within first 60 and 120 day and reproductive performance were determined by project crew in 2019. According to results in nucleus and base flocks lambing and twin birth rate, litter size (as ewes exposed) were found % 90.94, 87.97, % 44.77, 32.63, 1.33, 1.17 respectively. Within first 60 and 120 days survival rates of lambs in nucleus and base flocks were determined % 90.87, 89.99, 90.14, 89.07 respectively. The rates of the the twin birth and litter size (as ewes exposed) of Central Anatolian Merino ewes were found significant as statistically different by nucleus and and normal flocks ($p<001$).

Acknowledgment: In this study, Central Anatolian Merino sheep breeding-1 (Project No:26OAM2006-01) carried out in Eskişehir province within National Sheep and Goat Breeding Project of Turkey data obtained from the sub-project were used. As all authors, we would like to thank our ministry.

Some Reproductive Traits in Central Anatolian Merino Ewes in Farm Condition

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Data of a total of 17490 ewes in 23 enterprises in three consecutive years (2014-2016) in Central Anatolian Merino-1 project (Project Code: 70OAM2011-01) carried out in Karaman province within the project "Nationwide Genetic Improvement of Small Ruminants in Farm Condition" were used to determine the birth rate, multiple birth rate, litter size and fecundity and, year effect on these reproductive traits. Mean birth and multiple birth rates, litter size and fecundity for three years were 80.92%, 15.80%, 1.16 and 0.94, respectively. Year had a significant effect on all of the traits evaluated ($p < 0.001$) and, birth and multiple birth rates, litter sizes and fecundity in 2014, 2015 and 2016 were 80.26%, 80.05% and 82.38%; 10.02%, 18.87% and 18.32%; 1.10, 1.19 and 1.18; 0.88, 0.95 and 0.98, respectively. As a result, it is thought that 70OAM2011-01 project contributes positively to birth rate, multiple birth rate, litter size and fecundity in the flocks where the study is carried out, and therefore, the project is also beneficial to the breeders economically.

Key words: Central Anatolian Merino, reproductive traits, farm condition.

Acknowledgments: The authors thank Ministry of Agriculture and Forestry because the data of "Nationwide Genetic Improvement of Small Ruminants in Farm Condition" (Project Code: 70OAM2011-01) were used in this study.

The Breeding Of Karacabey Merino In Farm Of Balıkesir Province

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Abstract

Karacabey Merino breed, common in the Marmara region in Northwest Turkey, is reared for meat and wool production. It was genetically improved by crossbreeding German Mutton Merino (96%) and Kivircik (4%). The breeding project of Karacabey merino was started by TAGEM in the central villages of Balıkesir in 2006 and continues in 5-year periods.

In this study, it is aimed to increase the meat yield of Karacabey merino which is reared in farms in Balıkesir central villages by breeding. Between 2012-2016, the second 5 years, the birth weights of Karacabey merino breed by years and 90th day weights were selected as the best breeding animals during the year.

In this study, twinning rate was evaluated according to birth weight, 90th day weight and lamb survival rate. In 2012, when the twinning rate was lowest, birth weight, 90th day weight and survival rate of lambs were 3.98 ± 0.01 , 27.39 ± 6.36 , 86.54%, respectively. In 2013, which is one of the highest twinning rates, the birth weight, 90th day weight and survival rate of lambs were 3.97 ± 0.01 , 26.36 ± 6.39 and 82.59%, respectively. The birth weight, 90th day weight and survival rate of lambs were found to be 3.86 ± 0.009 , $27.08 \pm 6.97\%$, 76.43% in 2016, which is another year with the highest rate of twins.

In this study, it was found that the effect of twins ratio on birth weight and 90th day weight was insignificant, but the effect on survival rate was significant.

Key words: Karacabey Merino, Twinning ratio, Survival, birth weight, 90th day weight

Acknowledgement: This project is funded by the Ministry of Agriculture and Forestry, under the coordination of the Directorate of Livestock and Aquaculture Research, General Directorate of Agricultural Research and Policy, in cooperation with Balıkesir Goat-Sheep Provincial Breeders' Breeders Association.

The Determination of the Enterprise Effect on Growth Characteristics of Akkaraman Lambs: The Case of Karaman Province

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Abstract

This research was carried out in Akkaraman-2 project (Project Code: 70AKK2012-02) in Karaman province within the project Nationwide Genetic Improvement of Small Ruminants in Farm Condition to determine the enterprise effect on birth weight (BW) and 120th d weaning weight (WW) of lambs. For this aim, 2019 data of 5387 lambs in 28 enterprises were used. Mother age (2, 3, 4, 5, 6, 7, 8), gender (male-female), birth type (single-twin) and enterprise effect on BW and WW were calculated by Least Squares Method. The significance level of the differences among the averages in enterprises is compared with Tukey test. Statistical analyses were done with JMP 11 packet program. The effect of the factors studied except mother age on BW and WW was found to be significant ($P < 0.01$). The average BW and WW of the enterprises were determined as 3.75 and 32.04 kg, respectively. The lowest and the highest BW were at 21st and 12th enterprises (3.17 kg and 4.61 kg), and the lowest and the highest WW were at the 19th and 6th enterprises (26.69 kg and 37.13 kg), respectively. In the enterprise with the lowest WW, it was calculated that an additional 26.74 kg feed should be given to bring a lamb to the population average (feed conversion ratio was taken as 5), and the loss from a lamb sale was calculated as 101.61 TL according to the population average. In the enterprise with the highest WW, it was found that the gain from a lamb sale was 96.75 TL according to the population average (lamb live price was taken as 19 TL / kg)

As a result, if the conditions such as shelter, maintenance and feeding in the enterprises are improved, the economic gain based on the enterprise is expected to be higher.

Key Words: Akkaraman, lamb, birth weight, weaning weight, enterprise effect

Acknowledgments: The authors thank of Ministry of Agriculture and Forestry because the data "Nationwide Genetic Improvement of Small Ruminants in Farm Condition" (Project Code: 70AKK2012-02) were used in this study.

The Effect Of Import Policy On Cattle Production And Prices In Turkey

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Abstract

When the data, between the years 2004-2019, examined the presence of cattle has increased over the years especially with the effect of imports and the component of cattle asset has changed. All red meat demands in Turkey are obtained from cattle and sheep, however the majority of the demand is provided by beef. In animal products, especially red meat, the addiction on beef has increased over the years. Although the sector's share in agricultural production is around 25%, adequate supply cannot be realized with the existing animal assets. For the solution of these problems in the red meat sector, in the short term, import policies were carried out. Import of bulls for slaughter and fattening, which started in 2010, peaked in 2018. In this process, it was observed that imports had no downward impact on meat prices. When we look at the amount of meat produced and the number of slaughtered animals between 2004 and 2019; it is seen that the amount of meat produced per animal increases by 40%. The dependence on foreign sources in feed raw materials causes the increase in feed prices which make up 50-70% of total expenses. Again, low raw milk prices and the rising share of current costs adversely affected the sustainability of enterprises, either breeding animals were sent to slaughter or production was abandoned. The presence of dairy cattle increased by 56% in 2008-2018 in parallel with the increase in total animal assets. In this study, the import figures were examined in the light of the data collected from various sources and situation analysis was performed related to number of animals, meat production, meat prices, raw milk production, cost and milk/feed parity in cattle for the last 15 years.

Key Words: Cattle breeding, Import of Cattle, Meat Production, Raw Milk Production

The Effects of Order of Lactation on Milk Components in Water Buffalo Raised in Sheep Breeding Research Institute

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Abstract

In this study was make in order to determine according to the order of lactation, composition of milk, milk density and freezing point, Murrah x Anatolian Water Buffaloes (M x A) crossbreds raised in Institute conditions.

The animal material consisted of total 47 heads M x A crossbreds cows. The data of study included between february 2016 and january 2018. Actual milk yield was used to determine average lactation length and lactation milk yield. Milk samples were taken to specify the milk components. The fat, nonfat dry matter, protein and lactose contents of water buffalo milk samples were determined by using a Funke Gerber milk analyzer.

Lactation length and lactation milk yield were found to be 259 days and 1343.14 litres respectively. Least square means was founded fat, nonfat dry matter, protein and lactose, 7.20% , 10.66%, 4.00% and 5.88% respectively.

The milk yield in the first and second lactations of G₂ (M x A) crossbreds and Murah genotype were higher than others in the present study. Negative correlation between milk yield and milk fat is expected. Although not statistically significant, a negative correlation was determined as expected.

As a result; lactation order have no effect on lactation length, lactation milk yield and milk components. The results are likely to change as animal material increases depending on “Breeding of Anatolian Buffalo Project”.

Keywords: Anatolian Buffalo, Murrah, milk component, milk yield.

Acknowledgements

The data of this research was obtained from “Breeding of Anatolian Buffalo Project” which is conducted by TAGEM.

The Impact of Some Environmental Factors on Distribution of Births within Day of Akkaraman Sheep in Farmers Conditions

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Abstract

In this study, some yields of Akkaraman sheep reared in a private sheep farm in Kuyulusebil village of Sarayönü district of Konya province were evaluated. In the study, the effects of sex, birth type, maternal age and year on the birth times of 367 head sheep and 415 head akkaraman lambs born between 2-5 in 2012 and 2013 were investigated. During the lambing period, sheep kept in the pen were observed hourly during the daytime hours and every two hours during the night hours. In this observation, data on birth time, type of birth, lamb sex and maternal age were recorded. One day (24) hours to determine which time period of lambing occurs more 04:01-10:00; 10:01-16:00; 16:01-22:00 and 22:01-04:00 is divided into four time zones. The chi-square (2) test Minitab (16) was used to determine whether the age, lamb gender, birth type and year factor were effective on the distribution of lambs over time periods. As a result of the two-year research conducted in Kuyulusebil Village of Sarayönü District of Konya, it was found that 195 (90 females, 105 males) of the total 415 lambs were in 2012 and 220 of them (101 females, 119 males) in 2013. There have been 22 sheep twin births in 2012 and 26 in 2013. Accordingly, 52.3% of births took place in 2012(04:01-10:00; 10:01-16:00), 2013 62.3% of births occurred in the year(04:01-10:00; 10:01-16:00) It was found to be in his watches. It is observed that births are concentrated between 10:01-16:00 in 2 aged mothers, 16:01-22:00 in 3 aged mothers, and 04:01-10:00 in 4-5 mothers. As a result of chi-square (2) test, maternal age was found to be effective on delivery time ($P < 0.05$). 54.0% of lambs born were male and 46% were female, and 54.4 % of male lambs (04:01-10; 22:01-04:00), 84.2 % of female lambs(04:01-10:00; 10:01-16:00; 16:01-22:00) It was observed that he was born between hours ($P < 0.05$). 76.9% of lambs born are single, 23.1% are twin born, 56.4% of single lambs(04:01-10:00; 10:01-16:00), 62.6% of twin lambs (04:01-10:00; 16:01-22:00) It was observed to be born within hours ($P < 0.05$).

Key words: Sheep, White Akkaraman, birth times, lamb sex, birth type

The Opportunities to Use Full Feed and Intensive Fattening for Beef Cattle

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Abstract

Roughage has a great importance in ruminant-breeding. Ruminant animals can digest cellulose, hemicellulose and lignin through microorganisms in the rumen while monogastric animals cannot digest them. Therefore, some metabolic diseases are prevented. However, fattening with intensive feed might be used in such cases, for example, facing with a number of problems in supplying quality roughage, excessive increase in roughage prices, and short-term fattening planning. Fattening with intensive feed is the ration without roughage or including very small amount of roughage. This fattening method was started to be tried in England in 1950s and applied in USA. A study investigated 3-12 months Holstein steers and found daily weight gain by 1.2 kg, feed utilization rate by 4.62 and carcass yield by 54.9%. Since USA has better pasture facilities, animals are fed by short-term fattening with intensive feed after that they feed on pastures for 12-18 months. Metabolic diseases such as acidosis, tympani, liver abscesses, laminitis may occur in animals with grain-weighted feeding method. Particularly, Laminitis occurs in cases where the amount of roughage is less than 5 - 10% in the ration. It is stated that fattening cattle ration in NRC should contain a minimum of 20% eNDF. Therefore, fattening without roughage should not be preferred in terms of animal health. In order to maintain animal health, 1) transition to fattening with intensive feed should be long, 2) ration crude cellulose rate should be at least 15%, 3) the animals should be fed by at least 1 kg hay or straw daily, and, 4) rumen pH regulating additives should be used.

Keywords: Full feed, intensive fattening, roughage, beef cattle.

Determination Of The Factors Effecting Organic Egg Options Of The Consumers: Istanbul, Ankara And Izmir

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Abstract

Markets of organic agricultural products in the World rapidly increases especially in the developing countries and correspondingly in our country in recent years. The most important factor in the growth of this market is consumer demand. Increase of education and income levels of the consumers, increase of the care of the quality of the consumed crops, conscious level about food security and consuming more natural and qualified crops increase organic product demand. As a result, they started to prefer organic eggs and products and became more interested as their concerns increased in parallel with their health concerns. This research was conducted face to face survey with 498 participants in Istanbul, Ankara and Izmir. The number of participants for each of the three provinces was calculated using the proportional sampling formula. Thus, the comparison of the organic egg consuming and non-consuming consumers of the participants, revealing the factors affecting the buying behaviors, and the differences of consumption between the provinces were determined.

Keywords: Organic Agriculture, Organic Egg Consumption, Consumer Behavior.

Overview of Academic studies for Improvement of Fattening and Carcass Characteristics in the last 25 year in Turkey Sheep husbandry

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Abstract

In Turkey, after the establishment of the Republic, sheep improvement studies was come to order with merino breeds for the production wool of quality, after that improvement studies of native breeds were considered insufficient and crossbreeding studies gained importance. Targets have not been met in these programs. Because livestock supports were primarily given to cattle breeding, moreover too national science and state policies were short-term and irregular. Thousands of tons of meat is wasted with the slaughter of male / female lambs sold without being fed. Red meat is an important component of a healthy and balanced diet due to its rich nutritional content and consequently red meat consumption is a strategic product, especially the brain and s internal development of the future generation. In almost all native sheep breeds in Turkey, lamb production and thus lamb meat production are at the forefront. The change in the demographic structure of cities brought about changes in production and consumption. As a result of the inability to sell the value of wool and the decrease of milking, the yield preference has shifted to meat yield. Although there have been studies to reduce the tail structure in fat tailed breeds, today, with its high market value, tail oil provides economic gain. In the literature review, 54 articles were examined. As a result; Turkey's domestic breeds, fattening period, daily live weight gain, the ability to benefit from feed, lamb yield, vigor, fattening beginning and end of live weight, birth weight, warm and MLD-sectional area with cold efficiency weight was found as 25 respectively in the above order 92.26±30.72 gün, 239.59±59.76 g, 4.48±0.73, 1.25±0.14, 92.85±5.22, 21,23±2.04 kg ve 42.33±2.59kg, 4.33±0.55 kg, %48.38±1.89 ve %48.33±2.10 ile 14.21±2.16 cm The crossbreeding between thin tailed sheep and fat tailed sheep breeds is difficult to transfer to the farmers, and the results of academic / state institutions studies cannot reach the breeders sufficiently. National Sheep Breeding Project of Turkey is an important development in the field of information transfer to breeders. This study was conducted generally to evaluate the studies conducted to improve carcass quality from academic data obtained from pure and crossbred fattening animals in the last 25 years in Turkey.

Use Of High- Density Single Nucleotide Polymorphism Markers To Identify Genomic Differences Between Holstein And Simmental Cattle

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Abstract

Understanding the particular loci of a phenotype and the genomic structure of characteristics are essential due to providing anticipation of the differences and important traits. SNP (Single Nucleotide Polymorphism) is a single base change causing a difference in a DNA sequence and a great source of genetic variation for gene mapping and studies in populations. Genome-wide association study (GWAS) is a technology scanning lots of genetic markers on numerous characteristics to identify and score the genetic diversity with a particular phenotype or trait. In this study, we aimed to determine the differences between Holstein and Simmental breeds and map the SNPs locations in those two breeds to understand the association of the SNPs and known genes. The other objective of this study was to determine the SNPs related to phenotypic differences with the comparison. The final aim was an attempt to get specific genes for fertility to understand if SNPs' differences cause a difference in those breeds. The data about 20 Holstein and 20 Simmental cows were achieved from “Worldwide Data”, and Tassel 5.2.28 software mixed linear model was used for data analysis. Two significantly different SNPs; rs109427309 and rs4361233 located on chromosome 20 and chromosome 18, respectively, were identified with their loci. The genes associated with those SNPs were identified by using the NCBI genome data viewer. Only rs4361233 was found as located on a gene called SPG7 on chromosome 18. MICR, GHR, Zar-1, and PRLR were the genes associated with the objectives of the study. A range of other associated genes was found associated with immune response, protein-coding, and diseases. However, there was not a clear link between those genes and the phenotypic differences between the two breeds. LOC104975285 was found as an uncharacterized gene. It is no clear how the genes, which were near the markers, are linked to known phenotypic differences. Further studies may identify the reason why those markers are divergent.

Key words: SNP, GWAS, Holstein, Simmental, Gene

Use of Micro-algae Biomass and Biomolecules in Animal Nutrition

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Abstract

Despite being more popular for biofuel production, microalgae gained attention for animal nutrition due to its valuable biomolecules, high protein contents, poly unsaturated fatty acids and bioactive carbohydrates. Especially, the high rates of protein content and the balance between the amino acids that make up the protein has made micro-algae become the center of interest in poultry and aquaculture. As a result of nutritional and toxicological research, it has been concluded that micro-algae biomass can be used as a safe supplement or substitute for conventional protein sources. In addition, research on the effect of high fat content micro-algae on milk yield and components in ruminants have accelerated due to their easy manipulation on production process.

A general review of the contribution of micro-algae to meet the requirements of nutrients in animal nutrition and aquaculture is presented in this study. In addition to use of micro-algae as a biomass, the effects of biomolecules obtained from algae such as astaxanthin, lutein, beta-carotene as well as other molecules in terms of animal health are evaluated.

Key words: Micro-algae, Biomolecules, Aquaculture, Animal Nutrition

Pharmacological Approaches Against Mitochondrial Diseases In Veterinary Medicine

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Abstract

It is known that mitochondria are important for apoptosis, neoplasia, cell differentiation, innate immune system, oxygen and hypoxia sensitivity and calcium metabolism. The deterioration of these processes initiates the pathological process, which makes mitochondria an important target. Mitochondrial dysfunction is often associated with oxidative damage, calcium dyshomeostasis, and defective of ATP synthesis.

Mitochondrial disorder and associated oxidative metabolic problems are known to be characteristic of many chronic diseases. Some of these diseases are cardiovascular diseases, cancer, MS (multiple sclerosis), Parkinson, schizophrenia, autism and depression. Mitochondrial disorders are caused by mutations in mitochondria or nuclear genomes. Although not frequently reported in veterinary practice, mitochondrial myopathy and some tumour cases in dogs and Feline calicivirus (FCV) symptoms in cats have been found to be associated with mitochondrial disorders. In addition, decreased ATP production due to mitochondrial damage in chickens increased cardiac hypertrophy.

Therapy strategies designed to prevent mitochondrial damage are important. Different strategies are being followed in mitochondrial pharmacology. Such as; using lipophilic cations or peptides to directly target certain compounds in mitochondria, targeting molecules indirectly targeting certain molecules in mitochondria, or altering transcription factors of genes associated with mitochondria. Many important diseases in animals have been associated with mitochondrial dysfunction, even if the name is not identified as mitochondrial disease. Therefore, addressing mitochondrial dysfunction will be beneficial for alternative therapeutic methods.

Key words: Mitochondria, Mitochondrial Diseases in Animals, Mitochondrial Pharmacology

Yanki[®] (Rfid-Rf) System Configurations

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Abstract

Oestrus detection is the cornerstone of farm animal breeding. The immobilize standing position during the mounting of other cows is most conspicuous behaviour by visual observation of oestrus detection and it can be accepted as ready as insemination with high accuracy rate. YANKI[®] (RFID-RF) system is a solution-based design that the internet of things (IoT) and RFID technologies are merging by using machine type learning (MTC) abilities with smart agriculture applications and infrastructures in new generation farms. YANKI[®] oestrus detection system is an industry 4.0 technology that assigns a meaning through GSM with the collected information from big data and artificial intelligence which allows efficient and foresight farm animal management by linked (1) identification security system (HIS), (2) YANKI[®] oestrus detection system and (3) GSM technologies that briefly named as the National Web of Artificial Insemination (USUTA). Despite to the most common cattle based pedometric systems, YANKI[®] is a detector (teaser) bull based system that used for the observation of male mating (jumping) behaviour. The oestrus positive cattle notification transmitted through GSM network by filtered and embedded software.

In the YANKI[®] RFID system transponders (8-12 mm length) are implanted by subcutaneous injection on the dorsolateral position to 2. caudal vertebrae. This novel electronic identification method and anatomical location take some advantages with 3 consecutive security configurations; secure to food safety subsequent the implantation and block to human manipulations. The USUTA design can be marketing with multifunctional options as YANKI[®] system inform to best insemination time to contracted customers and provide the positive/negative feedback to authorized persons through GSM network on the national scale.

Key words: RFID, Oestrus, Cow, identification, Artificial Insemination

Year, Gender, Birth Type and Enterprise Effect on Growth Characteristics and Year Effect on Some Reproductive Traits in Central Anatolian Merino Ewes and Lambs

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Abstract

Data of a total of 9790 ewes and 10088 lambs in 15 enterprises in two consecutive years (2018 and 2019) in Central Anatolian Merino-2 project (Project Code: 70OAM2012-02) carried out in the village of Ekinözü in Karaman province within the project "Nationwide Genetic Improvement of Small Ruminants in Farm Condition" were used to determine the effect of year, gender, birth type and enterprise on birth (BW) and 90th d live weights (90LW), and year on some reproductive traits. Mean BW and 90LW were 4.164 and 26.767 kg. Year, gender, birth type and enterprise had an effect on BW and 90LW ($p < 0.001$). The lowest and highest BW were in 13th and 4th enterprises (3.326 and 4.811 kg) while 90LW were in 7th and 9th (24.360 and 28.240 kg), respectively. BW had an effect on 90LW ($90LW = 26.2 + 0.146BW$; $p = 0.056$). Year had an effect on lambing (89.80% and 79.81%) and multiple birth rates (18.78% and 25.11%), fecundity (1.0667 and 0.9985) and litter size (1.1878 and 1.2511) ($p < 0.001$) and live rate on d 90 (91.75% and 90.22%) ($p < 0.01$). It has been determined that to bring a lamb to the population average (26.767 kg) on 90th d, an additional of 12.035 kg concentrate feed should be given for a lamb (feed conversion ratio was taken as 5). As a result, year, gender, birth type and enterprise has an effect on birth weight and on 90th d live weight. In addition, reproduction traits also can be effected by year in ewes.

Key words: Central Anatolian Merino, reproductive traits, birth weight, 90th d live weight.

Acknowledgments: The authors thank Ministry of Agriculture and Forestry because the data of "Nationwide Genetic Improvement of Small Ruminants in Farm Condition Project" (Project Code: 70OAM2012-02) were used in this study.

Evaluation Of Some Environmental Factors On Birth Weight, Daily Live Weight Gain And Weaning Weight In Ankara Goat Goats In Breeder Conditions

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Abstract

Ankara (Angora) Goat Breeding program under the breeding program of the General Directorate of Agricultural Research and Policies has been carried out under farm conditions since 2005. In this study, data obtained from 19 farms and 3,426 animals belonging to sub-projects carried out in Gdl, Polatlı, Beypazarı, and Ayaş districts of Ankara were used. In this study, the effects of the Farms, Maternal Age (MA), Gender (G) and Birth Season (BS) on Birth Weight (BW), Daily Live Weight Gain (DLWG) and Weaning Weight (WW) were investigated. BW and WW were measured by using an electronic weighing scale, and DLWG was measured by obtained data. Minitab 16 software was utilized for statistical analysis. As a result of statistical analysis, the birth weight was determined as 2.05 ± 0.164 in female kids and 2.17 ± 0.165 in male kids. As a result of statistical analysis, the birth weight was found as 2.05 ± 0.164 for female kids and 2.17 ± 0.165 for male kids. Similarly, the weaning weight was found 10.09 ± 0.585 kg in female kids and 11.52 ± 0.861 kg in male kids. Moreover, the daily growth rate was 89 ± 10 gr in female kids and 104 ± 10 gr in male kids. A significant difference was found among all the groups ($p=0.001$), and BW, DLGW, WW values were higher in male kids compared with female kids. In our study, while BW was found 2.41 ± 0.052 kg in singletons and 2.25 ± 0.57 kg in twins. Also, the WW was found as 11.44 ± 0.274 kg in singletons and 10.54 ± 0.300 kg in twins. Similarly, DLWG was 100 ± 3 g in singletons and 92 ± 3 gr in twins. BW, DLGW and WW parameters were found lower in twins ($p=0.001$). The results of this study were found in parallel with the results in other similar literature. On the other hand, it was observed that the yields of the animals born in spring were higher than those born during the season. The BW was found as 2.02 ± 0.166 kg in February, 2.17 ± 0.173 kg in may. The WW was 9.50 ± 0.867 kg in February and 13.68 ± 0.906 kg in may. A significant difference was found among all the groups. It is thought to be due to poor management and feeding conditions. In conclusion, it was found that farms, MA, S, and PS affect BW, DLWG, and WW.

Key Words: Angora Goats, Birth Weight, Daily Live Weight Gain, Wewaning Weight, Survival Rates

Acknowledge: This study; funded by Ministry of Agriculture and Forestry General Directorate of Agricultural Research and Policies (GDARP) (Project Number: 06TIF2011-03, 06TIF2012-04).

Correlation and Basic Components (PCA) Analysis of Some Growth Parameters and Environmental Factors of Ankara Goat Kids in Breeder Conditions

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Abstract

In this study, the environmental factors affecting the growth in Ankara (Angora) kids under the breeding program carried out by the General Directorate of Agricultural Research and Policies, were investigated. For this purpose, the data belonging 3426 kids from Ankara, Gdl, Polatlı, Beypazarı, and Ayaş districts were obtained. Correlation and principal components analysis of yields and analysis of environmental factors were performed. At the end of the correlation analysis, a significant ($p < 0.001$) negative correlation was found between maternal age (MA) and birth month (BM) ($r=-0.205$) and weaning weight (WW)($r=-0.077$) and daily live weight gain (DLWG) ($r=-0.078$). A positive effect of birth type ($r=0.060$) and BM ($r=0.056$) on mother mohair yield was found significant ($p<0.001$). A positive correlation and effect of the BM of Angora kids($r=0.108$) on birth weight (BW), DLWG ($r=0.292$) and WW ($r=0.310$) were found significant ($p<0.001$). Regression analysis was performed according to the significant correlation between WW and BW. When the results of the principal component analysis of the variables of farms, maternal age, mohair weight, gender, type of birth, BW and DLWG were examined; Eigen value of more than 1.00 farm, maternal age, mohair yield, and gender factors was determined as significant. As a result, it is thought that it is important to take into consideration the parameters which have a significant correlation between them in the Angora Goat breeding program. Especially considering the average and positive effect of the month of birth on DLWG and WW, it is important to plan births for spring months. In the analysis of the main components, it was seen that mohair yield was significantly affected by all components so that, it is thought that the maternal age, gender, and type of birth should be taken into consideration in the breeding programs.

Key words: Angora Goats, Birth weight, Daily Live Weight Gain, Weaning Weight

Acknowledge: This study; funded by Ministry of Agriculture and Forestry General Directorate of Agricultural Research and Policies (GDARP) (Project Number: 06TIF2011-03, 06TIF2012-04).

Investigation Of The Use And Effects Of B-Carotene As A Bioactive Molecule In Poultry Nutrition

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Abstract

β -carotene; Immunostimulant and antioxidant properties, as well as anticarcinogenic function is a molecule used in increasing efficiency in animals. Serum β -carotene levels vary depending on many physiological factors such as season, race and age. Since they can not be synthesized by animals, they have to provide their needs from feed. Therefore, studies on the physiological and biochemical roles of carotenoids are important.

β -carotene has a regulatory role in the regulation of physiological functioning in the assessment of metabolic processes. The key role of β -carotene in the prognosis and prophylactic evaluation of physiological and pathogonomic structures was evaluated.

In this context, we aimed to investigate the use and effects of β -carotene, an immunostimulant and antioxidant molecule in poultry nutrition.

Key words: β -carotene, immunostimulant, antioxidant, poultry

The Effects of Environmental Factors on Honey Bees Flight Activities

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Abstract

Even though honey bees produce honey, wax, venom, pollen, propolis, and royal jelly, pollination activity that doing by honey bees is more economically valuable than these products. Climate change, global warming, ozone layer depletion and environmental stress resilience can change the honey bees behavior such as flight activities and plant preferences. Flight activities have significant role on both pollination and bee product production. There are four outstanding reason that change honey bees flight activities; environmental temperature, humidity, solar radiation and wind.

There are four possible factors effect of bee's flight activities which are environmental temperature, humidity, solar radiation and wind. The reasons will be covered in this study. Last year's environmental temperature shows some more fluctuation in winter time than past. Honey bees developed winter cluster under 7 degree Celsius and broke it above 7 degree Celsius. In winter time, there is so much fluctuation above and below 7 degree and this fluctuation give damage to honey bee colonies. After start ozone layer depletion, the solar radiation arrives earth surface without having filtration. That is why insects have more solar radiations than past. Honey bees can active between 15-30-degree Celsius. The most activity has been calculated 24 degree Celsius. Humidity also affect the flight activity. Below 30 % of relative humidity bees decrease the flight activity. While the temperature increase, the relative humidity is decreasing. That is why there is a negative correlation between flight activity and relative humidity. The solar radiation will affect the honey bees flight activity. Below than 0.5 mega joule honey bees very less active. On the other hand under 2.5 mega joule solar radiation honey bees show the most active flight activities. Other factor is wind which considerably affect the honey bees flight activity. There is a negative correlation between wind speed and honey bees activity. More than 30 km wind speed, honey bee almost no goes out of the hive. The wind direction is not affect the honey bees flight activity.

Keywords: Honey bee; Flight Activity; Environmental Factors; honey; pollen

The Importance of Pollination in Plant Production and the Studies Carried Out Within the Institute

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Abstract

In the world of plants, the most important event for plant species to continue their generation is the beginning of pollination, fertilization and fruit and seed formation processes. Accession of male organ of one flower to the female organ of another flower is called pollination. Honeybee which produces products with high food and pharmacological values such as honey, beeswax, bee venom and propolis, provides that the product is superior in terms of quantity and quality by achieving pollination in plants which is more important than these (Free, 1993).

90 % of food of the world is obtained from 82 plant species. 63 (77%) of these plant species require pollination by bees. Especially for 39 plant species bee pollination is absolutely necessary. 1/3 of human food consists of plants that need direct bee pollination directly or indirectly. Therefore, bee colonies are needed during flowering periods to provide sufficient pollination (Güler, 2006). In order to get the most of the honey bee pollination, the apiary should not be more than a certain distance from the plants to be pollinated. Eckert (1933) indicates that honey bee can go up to 11.3 km but it works intensively in the distance up to 800 m. As Peer (1955) emphasizes that the maximum distance to which the honeybee successfully worked as 5.6 km and mostly concentrated in 4 km, Lecomte (1960) records the honeybee does not tend to go further than 600m. unless is forced to.

In this study information about the importance of pollination in plant production and the studies carried out within the Institute, was given.

Key words: Honey Bee; Pollination; Almond; Strawberry; Kiwi

Key Countries in the World Honey Export and Import

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Abstract

According to 2017 FAO data; 693,249 tons of honey was exported and approximately 2.3 billion dollars of revenue was generated worldwide. China, Argentina, India, Mexico, Ukraine and Vietnam are the main exporting countries whereas The United States, Germany, the United Kingdom, Japan and France are important importing countries.

In Turkey in 2018 107 920 tons of honey producing colonies with 8,108,424 units was carried out (Turkish Statistical Ins, 2019). In 2018 by Turkey 6.413 tons of honey was exported to 45 countries particularly to Germany and the USA and revenues of \$ 26 million was obtained(FAO,2019).

In this study; regarding honey which is one of the primary bee products, country based production, export and import data were evaluated.

Key words: Honey; Export; Import; Foreign Trade; Beekeeping

Determination of the Effect of Some Properties on Egg Yield with Regression Analysis Method Bagging Mars and R Application

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Abstract

BAGGING (**BAGGING=BOOTSTRAP+AGGREATING**), called resampling clustering; is one of several classifications and important regression methods used to improve predictive accuracy in very large data sets. In this research, the use of a hybrid approach obtained by combining **BAGGING** and **MARS** is shown for a data set of egg data. In the study; egg data of 2018 obtained from livestock business in Adana Çukurova Region were used with permission. The data used in the study are *Lohman* chickens between 60 weeks of age. In the Bagging MARS algorithm, earth (*enhanced adaptive regression through hinges*) and caret (*classification and regression training*), mda (*Mixture Discriminant Analysis*) packages were used to provide a stronger solution of regression problems. The Bagging MARS method was used to improve the classification accuracy of the regression method. The estimation performance of the Bagging MARS method was evaluated by measuring for various bootstrap samples, i.e 3, 5, 10, 15, 20, 25 and 50. Therefore, this study is expected to achieve better modeling and classification functions by bagging MARS method.

Key Words: Bagging MARS, Bootstrap Aggreating, BAGGING, Lohman breed

The Investigation Of Kid Growth Data In Various Factors Of Hair Goats Grown In Çorum Province

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Abstract

In this study, 7461 kid goats of Hair Mother Goats (HMG) from 24 farms in Corum province were examined and the relationship between collected data based on years, months, genders, and birth time and birth weight (BW), weaning weight (WW) and daily live weight increase (DLWI) is presented. All statistics in this research were analysed through Minitab package programme. In the study, based on evaluation yearly data, the averages were found to be as BW 3.17±0.05 kg, WW 18.16±0.26 kg and DLWI 167±3 g in 2018 and BW 3.20±0.05 kg, WW 19.43±0.26 kg and DLWI 180±3 g in 2019 and statistical significances were determined. There was no statistically significant difference between HMG giving birth years and kid goats' BW ($p > 0.05$) and DLWI and WW ($p = 0.001$), but there was statistical significance ($p = 0.001$) in DLWI and WW. Gender based differences were found: female kid goats' average BW 3.10±0.052 kg, WW 17.33±0.25 kg and DLWI 158±3 g, in male kid goats' average BW 3.27±0.05 kg, WW 20.26±0.24 kg and DLWI 20.26±0.24 g. There were statistical differences between females and males in BW, WW and DLWI; BW, WW and DLWI in males were determined to be higher ($p=0.001$). Significant statistical differences were found in birth type as average BW in signletons was 3.49±0.033 kg, in twins 3.20±0.037 kg and triplets 2.87±0.123 kg. These findings are consistent with the literature. When BW was measured based on birth month, the average BW was found as 3.09±0.127 kg in January, 2.99±0.065 kg in February, 3.06±0.048 kg in March, 3.16±0.048 kg in April, 3.33±0.063 kg in May and 3.50±0.087 kg in June. When WW was measured based on birth month, the average WW was determined as 13.25±0.60 kg in January, 14.07±0.30 kg in February, 16.12±0.231 kg in March, 17.87±0.22 kg in April, 21.67±0.29 kg in May and 29.81±0.41kg in June. When DLWI was measured based on birth month, the average DLWI was found as 113±7 g in January, 123±3 g in February, 145±3 g in March, 163±3 g in April, 204±3 g in May and 292±5 g in June. As a result, it was seen that BW average of the kid goats born in mid-winter and late winter was lower than BW of kid goats born at the end of spring and beginning of summer. Also, statistically significant increase in WW and DLWI in summer was

measured. This shows that pasturing in spring is very important for pregnant goats and growth of kid goats.

Key Words: Çorum, Hair Goat, gid goat growe, birth type, birth weight

Acknowledgement: This project is funded by the Ministry of Agriculture and Forestry, under the coordination of the Directorate of Livestock and Aquaculture Research, General Directorate of Agricultural Research and Policy, in cooperation with Corum Goat-Sheep Provincial Breeders' Breeders Association.

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Evaluation Of The Relationship Between The Kids Growth Data And The Ages Of Hair Goat Rootstock In Çorum Region

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Abstract

In this study, the relationship between birth weight (BW), three months live weight (TLW) and daily live weight increase (DLWI) of 4011 kid goats which were given birth by mother hairy goats (MHG) in Çorum between 2017-2019 is presented. For this purpose, MHG in the Hair Goat-1 Breeding Project which started in 2017 in Çorum was used. In the study, kid growth data (KGD) of 861 of 2-year old MHG, 1752 of 3-year old MHG, 612 of 4-year old MHG, 563 of 5-year old MHG and 158 of 7-year old MHG were used. The average BW of kid goats in accordance with the age of giving birth of MHG were found as 3.29 ± 0.34 kg at the age of 2, 3.29 ± 0.22 kg at the age of 3, 3.47 ± 0.41 kg at the age of 4, 3.41 ± 0.44 kg at the age of 5, 3.53 ± 0.77 kg at the age of 6 and 2.89 ± 1.37 kg at age 7. The average BW of 4011 kid goats were determined as 3.34 ± 0.15 kg. The BW of kid goats were given birth by 4, 5 ve 6-year old MHG were found to be the highest while it was the lowest in 7-year old MHG. There was no statistical significance between BW of kid goats and MHG ($p > 0.05$). The average TLW of kid goats in accordance with the age of giving birth of MHG were measured as 22.21 ± 2.06 kg at the age of 2, 22.55 ± 1.82 kg at the age of 3, 22.90 ± 2.44 kg at the age of 4, 21.57 ± 2.65 kg at the age of 5, 22.10 ± 4.85 kg at the age of 6 and 22.29 ± 6.46 kg at the age of 7. There was no statistical significance between BW of kid goats ($p = 0.071$) and MHG ($p > 0.05$). However, it was seen that the average age of TLW of the kid goats was the highest in 4-year old birth age of MHG.

The average DLWI of kid goats in accordance with the age of giving birth of MHG were measured as 207 ± 2.29 g at the age of 2, 211 ± 2.00 g at the age of 3, 213 ± 2.70 g at the age of 4, 199 ± 2.92 g at the age of 5, 204 ± 5.24 g at the age of 6 and 213 ± 7.14 g at the age of 7. There was no statistical significance between TLWI of kid goats ($p=0.087$) and MHG ($p > 0.05$). All statistics of the study were measured by using IBM SPSS package program. In conclusion, in this study, it is concluded that there is no statistically significant difference between KGD and MHG birth age due to factors such as kid goat gender, type of birth (single, twin, triplet), climatic conditions between years and birth season.

Key Words: Çorum, Hair Goat, gid goat growe, birth type, birth weight

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ILSC 2019

Reasons for Culling of Polish Holstein-Friesian Cows Milked in Conventional or Automatic Milking Systems

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Abstract

The objective of the study was to analyse reasons for culling of Polish Holstein-Friesian cows in barns equipped with conventional and automatic milking systems. The study was conducted in 15 herds located in Poland. In the years 2010–2013, these herds changed the milking system from conventional (CMS) to automatic (AMS). One to four Lely Astronaut A4 robotic milkers were installed depending on the farm. The present study assessed reasons for culling 1413 cows: 805 CMS and 608 AMS cows. The following culling reasons were identified: low milk yield, udder diseases, infertility and reproductive disorders, diseases of the locomotor system, sold for further breeding, metabolic, digestive and respiratory diseases, accidents and chance events. The statistical analysis of the culling reasons was performed by means of χ^2 test. The reasons for culling of cows in the compared milking systems were analysed in detail up to the fourth lactation only. The percentage of cows culled from the herds in both milking systems was similar in successive lactations and amounted to approximately 46%, 30%, 17% and 6%, respectively. Regardless of the milking system the most frequent culling reasons were infertility and reproductive disorders, followed by accidents and chance events, and sale for further breeding. It should be stressed that after the AMS system was introduced into the herds, the rate of culling for metabolic, digestive and respiratory diseases increased by 4.03 percentage points (p.p.), by 1.6 p.p. due to infertility and reproductive disorders, and by 0.87 p.p. due to locomotor diseases. It was also observed that the automation of milking reduced culling due to udder diseases by 2.08 p.p.

Comparison of two mathematical models for describing lactation curves fitted with data from conventional and automated milking systems

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Abstract

The aim of the paper was to compare the fit of data derived from daily automatic milking systems (AMS) and monthly test-day records with the use of lactation curves; data was analysed separately for primiparas and multiparas. The study was carried out on three Polish Holstein-Friesians dairy herds. The farms were equipped with an automatic milking system which provided information on milking performance throughout lactation. Once a month cows were also subjected to test-day milkings (method A4). Most studies described in the literature are based on test-day data; therefore, we aimed to compare models based on both test-day and AMS data to determine which mathematical model (Wood or Wilmink) would be the better fit. Results show that lactation curves constructed from data derived from the AMS were better adjusted to the actual milk yield (MY) data regardless of the lactation number and model. Also, we found that the Wilmink model may be a better fit for modelling the lactation curve of HF cows milked by an AMS as it had the lowest values of Akaike information criterion, Bayesian information criterion, mean square error, the highest coefficient of determination values, and was more accurate in estimating MY than the Wood model. Although both models underestimated peak MY, mean, and total MY, the Wilmink model was closer to the real values.

Models of lactation curves may have an economic impact and may be helpful in terms of herd management and decision-making as they assist in forecasting milk yield at any moment of lactation. Also, data obtained from modelling can help with monitoring milk performance of each cow, diet planning, as well as monitoring the health of the cow.

The Effect of Some Factors on Birth and Weaning Weights and Daily Live Weight Increase in Hair Goat Kids

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Abstract

This study was prepared by using the data of the year 2019 in the Hair Goat-II (project code: 70KIL2013-2) project carried out in Karaman province within the scope of “National Improvement Project for Small Ruminants at Breeders Conditions flocks”. For this purpose, the effects of maternal age, gender, type of birth and management factors on birth weight and 120th day weaning and live weight gains of 5177 hair goat kids on 35 hair goat breeder flocks were investigated. Birth weights and 120th day weaning weights of kids and daily live weight gains in this period were evaluated in GLM model by considering the age of mother (2-7), gender (female, male), type of birth (single, twin) and management factors. The average birth weight was 3.43 kg, the weaning weight was 21.56 kg on the 120th day and the daily live weight gain was 0.151 kg. Maternal age, sex, type of birth and enterprise had effect on birth weight, and birth type, gender and enterprise factors had effect on 120th day weaning weight and daily live weight gain ($p < 0.000$). In conclusion, maternal age, sex, type of birth and enterprise had effect on birth weight, type of birth, sex and enterprise had effect on 120th day weaning weight and live weight gain, and maternal age effect was not valid for these characteristics.

Key words: Hair goat, birth weight, weaning weight, environmental factors

Acknowledgments: This study was prepared by using the data of the year 2019 in the Karaman province Hair Goat-II (project code: 70KIL2013-2) project carried out by Turkish Republic Ministry of Agriculture and Forestry within the scope of “National Improvement Project for Small Ruminants at Breeders Conditions flocks”.

Growth And Survival Traits Of Central Anatolianmerinolambs İn Karaman Province

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Abstract

This research was carried out in order to investigate the growth and survival traits of Central Anatolian Merino lambs grown under Breeder Conditions. The research was conducted on 11303 lambs in 21 breeding flocks in Karaman province.

The study was conducted on lambs born in 2018 and 2019. The lambs were investigated of birth year, sex, type of birth, mother age and the effects of the breeding flocks on the birth weight, weaning weight (90th day) and average daily gain. In addition, the survival traits of weaning was examined.

In the study, birth weight, weaning weight, daily weight gain and survival rate of lambs were found to be 4.21 kg, 25.44 kg, 28.3 kg, 0.236 kg and 93.14%, respectively. The effects of all factors examined on birth, weaning age and daily weight gain were significant ($P < 0.01$). There is no difference in survival rate of lambs over the years.

As a result, it can be said that the growth and survival rate of the Central Anatolian Merino lambs raised in Karaman province are sufficient and that these characteristics can be improved in the following years through breeding studies.

Keywords: Central Anatolian Merino, growth characteristics, survival rate

Acknowledgment: In this study, Central Anatolian Merino sheep breeding-1 (70OAM2011-01) carried out in Karaman province within National Sheep and Goat Breeding Project of Turkey data obtained from the sub-project were used. As all authors, we would like to thank our ministry

Akkaraman Koyunlarda Ana Doğum Ağırlığı ve Sütten Kesim Ağırlığı ile Yavru Doğum Ağırlığı ve Sütten Kesim Ağırlığı Arasında İlişki

Çağrı Melikşah Sakar

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ÖZET

Bu çalışma, Akkaraman kuzularda doğum ağırlığı ve sütten kesim ağırlığı ile analarının doğum ağırlığı ve sütten kesim ağırlığı arasındaki ilişkinin belirlenmesi amacıyla yapılmıştır. Çalışmanın hayvan materyalini, Çankırı İli'nde yetiştirilen 2018 yılında doğmuş, toplam 116 dişi kuzu ve bu kuzuların anaları oluşturmuştur. Kuzulara ait doğum ve sütten kesim ağırlıkları sırasıyla 4.173 kg ve 29.835 kg, analarına ait doğum ve sütten kesim ağırlıkları sırasıyla 3.766 kg ve 28.489 kg olarak bulunmuştur. Çalışmada ana - yavru doğum ağırlıkları arasında korelasyon katsayısı -0.046, ana - yavru sütten kesim ağırlıkları arasında korelasyon katsayısı 0.061 olarak tespit edilmiştir. Korelasyon katsayılarının düşük olması ve aradaki ilişkilerin istatistiksel olarak önemsiz ($P>0.05$) bulunması, sürülerdeki beslenme dağılımının varyasyonunun fazla olmasından kaynaklanabilir.

Anahtar Kelimeler: Akkaraman, kuzu ağırlığı, korelasyon katsayısı

The Relationship Between Offspring Birth Weight and Weaning Weight with Mother Birth Weight and Weaning Weight in Akkaraman Sheeps

Abstract

This study was carried out to determine the relationship between birth weight and weaning weight of the Akkaraman lambs and birth weight and weaning weight of their mothers. The animal material of this study consisted of 116 female lambs born in 2018 and their mothers which grown in Cankırı province. The birth weights and weaning weights of lambs were found 4.173 kg and 29.835 kg respectively, while birth weights and weaning weights of mothers of the lambs were found 3.766 kg and 28.489 kg respectively. In the study, the correlation coefficients has been identified between mother - offspring birth weights were found -0.046; between mother - offspring weaning weights 0.061. Low correlation coefficients and statistically not significant relationships ($P>0.05$) may be due to high variation in distribution of feeding in herds.

Key Words: Akkaraman, lamb weight, correlation coefficients.

GİRİŞ

Koyun ve keçi yetiştiriciliğinde kârlılığı belirleyen en önemli ölçüt, sütten kesimde kuzu veya oğlak ağırlığıdır. Bu ölçütün önemli bir özelliği, fertilitenin başlıca göstergesi olmasıdır. Doğum tipi, doğum ağırlığı, yavrunun cinsiyeti ve ana yaşı sütten kesimdeki yavru ağırlığını etkilemektedir. Bu nedenle, yukarıda belirtilen etmenlerin, oğlak veya kuzuların doğum ağırlığı, 30. gün ve sütten kesim canlı ağırlıkları üzerine etkilerinin araştırılması gerekir [3]. Türkiye koyunculugu dikkate alındığında ırk ve tip bakımından oldukça geniş bir varyasyon bulunmaktadır. Söz konusu gen kaynaklarında çeşitli dönemlerde büyüme ile ilgili parametrelerin tespiti, ileride yapılacak seleksiyon çalışmalarına, bakım ve besleme ile ilgili uygulamalara fayda sağlayacaktır [1]. Türkiye koyun varlığının yaklaşık % 40-45'lik kısmını oluşturan Akkaramanlar daha çok Orta Anadolu'da yayılmışlardır. Bölgenin sert iklim şartlarına uyum sağlamış dayanıklı bir ırktır. Besleme için genellikle ilkbahar ve sonbaharda meralardan, yazın ise anızlardan yararlanırlar [2]. Bu çalışma, Çankırı yöresinde yetiştirilen Akkaraman kuzuların doğum ve sütten kesim ağırlıklarının ana doğum ve sütten kesim ağırlıklarından etkilenip etkilenmediğinin belirlenmesi amacıyla yapılmıştır.

MATERYAL VE METOT

Bu çalışmanın hayvan materyalini, TAGEM tarafından yürütülen “Halk Elinde Hayvan Islahı Ülkesel Projesi” kapsamında “Çankırı İli Akkaraman ırkı Alt Projesi”nde yetiştirilen 2018 yılında doğmuş, Akkaraman ırkı toplam 116 dişi kuzu ve analarına ait veriler oluşturmuştur. Araştırmada, kuzuların ve analarının doğum ve sütten kesim (90. gün) ağırlıkları belirlenmiştir.

Verilerin değerlendirilmesinde ve istatistik analizlerinde “Minitab 16” paket programı kullanılmıştır. Grup ortalamaları arasındaki farklarda, hangi iki grup ortalaması arasındaki farkın önemli olduğunun belirlenmesinde Duncan çoklu karşılaştırma testinden yararlanılmıştır.

BULGULAR VE TARTIŞMA

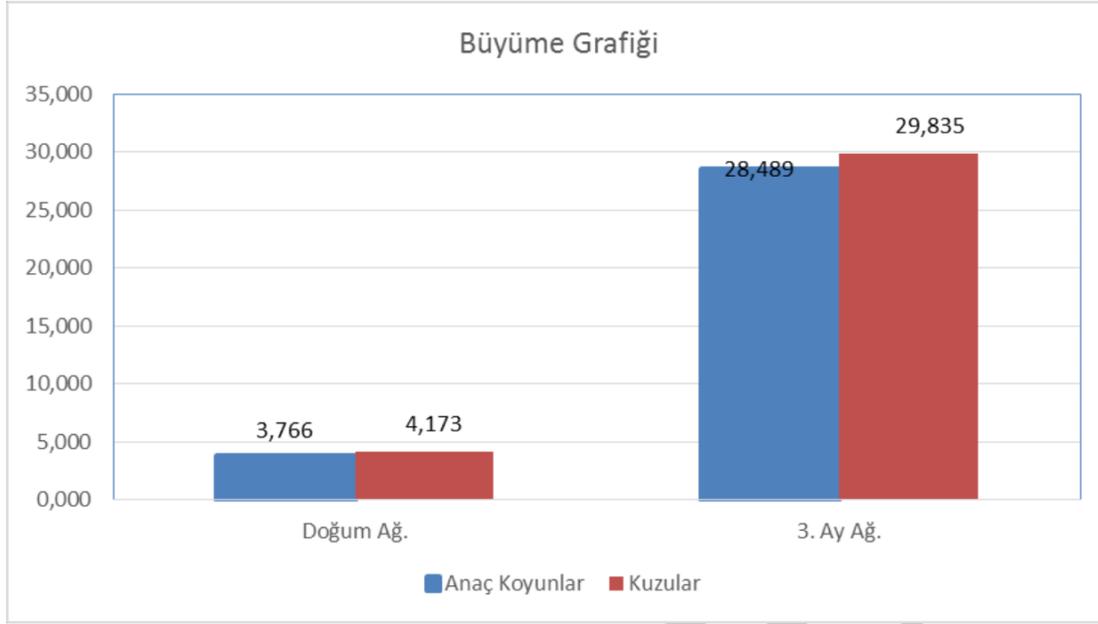
Ana ve yavruya ait doğum ve sütten kesim ağırlıklarına ilişkin ortalama değerler ve standart hata değerleri Çizelge 1’de verilmiştir. Ana ve kuzuların doğumdan sütten kesime kadar gelişim grafiği Şekil 1’de gösterilmiştir. Kuzular ve anaları arasında korelasyonlar değerleri de Çizelge 2’de sunulmuştur.

Çizelge 1. Doğum ve 3 aylık dönemlere ait ortalama canlı ağırlıklar ve standart hata değerleri

Ağırlıklar		N	Doğum Ağırlığı (kg)	Sütten Kesim Ağırlığı (kg)
Genel				
Ana		116	3.766±0.083b	28.489±0.710
Yavru			4.173±0.079a	29.835±0.466
<i>P Değeri</i>			0.001	0.114
Ana Doğum Tipi				
Tekiz	Ana	104	3.843±0.088b	28.342±0.716
	Yavru		4.175±0.082a	29.894±0.507
	<i>P Değeri</i>		0.006	0.078
İkiz	Ana	12	3.102±0.164b	29.760±3.050
	Yavru		4.162±0.287a	29.330±1.030
	<i>P Değeri</i>		0.004	0.893
Ana Yaşı				
2	Ana	40	3.981±0.155	23.772±0.686b
	Yavru		4.236±0.134	29.864±0.965a
	<i>P Değeri</i>		0.217	0.001
3	Ana	20	3.837±0.189	32.250±1.030
	Yavru		4.239±0.190	29.709±0.742
	<i>P Değeri</i>		0.142	0.053
4	Ana	29	3.527±0.131b	29.900±1.290
	Yavru		4.178 ±0.159a	28.603±0.806
	<i>P Değeri</i>		0.001	0.397
5 ve üzeri	Ana	27	3.653±0.183	31.180±2.010
	Yavru		4.027 ±0.168	31.210±0.935
	<i>P Değeri</i>		0.136	0.990

Aynı sütunda farklı harfle gösterilen ortalamalar arasındaki fark önemlidir (P<0.05)

116 baş Akkaraman ırkı kuzuda doğum ağırlığı 4.173 kg, analarının doğum ağırlığı ise 3.766 kg olarak bulunmuş olup, aradaki fark istatistiksel olarak önemli (P<0.05) bulunmuştur. Çalışmada, kuzuların sütten kesim ağırlığı 29.835 kg, analarının sütten kesim ağırlığı ise 28.489 kg olarak bulunurken, aradaki fark istatistiksel olarak önemsiz (P>0.05) bulunmuştur.



Şekil 1. Kuzular ve Analarının Gelişim Grafiği (kg)

Çizelge 2. Kuzular ve Anaları Arasında Korelasyonlar Değerleri

Faktör	Değer	Ana Doğum Ağırlığı	Ana Sütten Kesim Ağırlığı	Yavru Doğum Ağırlığı
Ana Sütten Kesim Ağırlığı	Korelasyon Oranı	0.252		
	<i>P Değeri</i>	0.006		
Yavru Doğum Ağırlığı	Korelasyon Oranı	-0.046	-0.043	
	<i>P Değeri</i>	0.621	0.644	
Yavru Sütten Kesim Ağırlığı	Korelasyon Oranı	0.080	0.061	-0.143
	<i>P Değeri</i>	0.390	0.517	0.126

Araştırmada, ana doğum ağırlığı ile yavru doğum ağırlığı arasında negatif bir ilişki bulunmuş olup, korelasyon değeri -0.046 olarak tespit edilmiştir. Fakat ana sütten kesim ağırlığı ile yavru sütten kesim ağırlığı arasında pozitif ilişki bulunmuş olup, korelasyon değeri 0.061 olarak tespit edilmiştir. Çalışmada,

her iki karşılaştırmada da aradaki ilişkiler istatistiksel olarak önemsiz ($P>0.05$) bulunmuştur. Ayrıca, ana doğum ağırlığı ile yavru süttten kesim ağırlığı arasında da pozitif bir korelasyon değeri (0.080) bulunmuştur.

SONUÇ

Sonuç olarak, koyun yetiştiriciliğinde dikkate alınması gereken özelliklerden olan kuzu büyüme, gelişme ve ana ile yavruya ilişkin ağırlıkların incelendiği bu araştırmada; yavru süttten kesim ağırlığı, ana doğum ve ana süttten kesim ağırlıklarından pozitif oranda etkilenmiştir. Kuzu yetiştiriciliğinde gerek damızlık gerekse besilik olsun süttten kesim ağırlığı büyüme ve gelişmenin en önemli göstergelerinden olduğundan çevre şartlarında yapılacak iyileştirmeler ile birlikte, bu yönde yapılacak seleksiyon olumlu sonuçlar verebilir.

KAYNAKLAR

- Aytekin, İ., Karabacak, A., Zülkadir, U., Keskin, İ., Boztepe, S., 2009. Açık ve Kapalı Ağılarda Besiye Alınan Akkaraman ve Anadolu Merinosu Kuzuların Besi Periyodu Büyüme Eğrilerinin Tanımlanmasında Bazı Modellerin Kullanımı. Selçuk Ün., Selçuk Tarım ve Gıda Bilimleri Dergisi, ISSN:1309-0550, 23 (49): (2009) 30-35.
- Boztepe, S., 2015. Koyun Yetiştiriciliği. 1. Baskı, ISBN:978-605-85836-3-4, Selçuk Ün. Basımevi, Konya, s.n. V, 20.
- Duman, A., Demirören, E., 2002. Süt Tipi Oğlakların Doğum, 30. Gün ve 60. Gün Canlı Ağırlıkları Üzerine Sistemik Çevre Etkilerinin Etkileri. Ege Üniv. Ziraat Fak. Derg., 2002, 39 (2):73-78.

Growth Characteristics and Morphometric Measurements of Suruç Sheep

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Abstract

This study was aimed to determine growth characteristics of Suruç sheep in farmer condition in 2019 in Şanlıurfa, Turkey. Materials of this research consisted of 198 lambs born from 169 ewes in three flocks in different villages. Live weights of lambs were taken from birth to 180th day of age by every month. In addition, 190 heads of ewe and 5 rams in the same flocks were used to determine the morphometric characteristics of Suruç sheep. The projects was supported by the General Directorate of Agricultural Researches and Politics (TAGEM).

Birth, 30, 60, 90, 120, 150 and 180th day weights were 4.81, 11.50, 17.80, 24.01, 30.08, 35.23 and 40.80 kg, respectively. Twinning rate and survival rate until weaning were 22% and %82, respectively. The effects of flock, birth month, type of birth and sex of lambs were significant on live weight in 90-day of age, while only the effect of flock and birth month on birth weight, and of sex on weight in 150-day of age, and of birth month on weight in 180-day of age were significant ($P<0.05$).

Body height, body length, chest depth, chest circumference, head length, head width, ear length and ear width were 78.26, 73.24, 36.05, 100.58, 32.29, 21.20, 10.65 cm, respectively. In addition, the average nipple length was 3.39 in ewes, and the scrotum circumference and length were 31.40 and 17.10 cm, respectively in rams.

Keywords: Suruç sheep, Growth, Survival, Morphometric measurements

***Pre- and Post-Weaning Growth of Awassi Sheep
in Şanlıurfa Province***

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Abstract

This study was conducted to evaluate growth performances of Awassi sheep under smallholder production systems in Şanlıurfa, Turkey. Growth data were collected and analysed on 59283 lambs owned by 83 households from 2013 to 2019 in two sub-projects of Genetic Improvement of Awassi sheep that have been supported by the General Directorate of Agricultural Researches and Politics (TAGEM) in the scope of *National Small Ruminant Improvement Project Under Farmer Condition*.

Live weight of İvesi lambs at birth (BW0), 2 (BW60) and 4 (BW120) months of age were 3.57 ± 0.004 , 15.15 ± 0.045 , 26.01 ± 0.044 kg, respectively. Weights in all ages were significantly ($P < 0.05$) affected by project, flock, year and season of birth, birth type and sex of lamb. Direct heritability estimates were 0.38, 0.15 and 0.34 for corresponding traits, respectively, and the estimates of the additive genetic correlation were ranged from 0.08 to 0.24 among the traits.

Analyses showed that there is a large genetic variance for *pre-* and *post-*weaning growth traits in Awassi sheep and the growth rate before and after weaning can be improved by continuous upward selection while applying a constrain on BW0.

Keywords: Awassi sheep, Growth traits, Environment, Genetic parameters, Selection

Current Status of Buffalo Breeding in Çaycuma District of Zonguldak

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Abstract

This study was carried out to obtain information about breeding practices, important sources of income, current status and the future of Buffalo farming in Çaycuma district of Zonguldak province. For this purpose, 36 breeders from the villages of Çaycuma district constituting the buffalo population in the region.

The breeders in different parts of the district have sufficient animal material for this study in terms of determining the current status of buffalo breeding. A survey was conducted through face-to-face interviews with the breeders and the data of the Turkish Statistical Institute (TÜİK) were also used.

The data were analyzed by *Proc Freq* method in SAS (2017) package program. The results of the analysis showed that the average age of the buffalo breeders was over 50 years and performing buffalo farming because of their past habits. In Çaycuma region, buffalo milk, yogurt and meat used in sausage making have been identified as the most important sources of income.

Key Words: Zonguldak, Çaycuma, Buffalo breeding