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QUALITY AND YIELD PERFORMANCE OF POPULAR TURKISH WINE VARITIES (KALECİK KARASI AND NARİNCE) IN LAKE REGION ECOLOGICAL CONDITIONS

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ABSTRACT

Turkey possesses a rich variety of grape types; around 1250 varieties are grown. Although Turkey has traditionally specialized in the production table grapes and raisins, it also has 34 kinds of wine grapes, 22 of which are valuable native varieties.

Lakes Region has an important vineyard areas and grape production between Middle Anatolia and Mediterranean Region. Vineyards are located in Isparta and Burdur mostly. This study was carried out in Eğirdir Horticultural Research Institute farmlands. Eğirdir is a district of Isparta. Its altitude is 920 m high and it represents passing zone climate and ecological conditions.

Popular Turkish red wine variety Kalecik Karası and white wine variety Narince had been determined for phenology stages, adaptation, yield and quality properties. Main aim of the study was to evaluate these varieties adaptation facilities and increasing development in rural area.

The vineyard was established in 2005 with in row with spacing 2 m X 3 m with irrigation. Three replications by random blocks design was applied in the study.

Observations analyses were done in 2008 and 2009 years. Phenology stages, yield and quality properties data had been obtained in vineyard. Soluble solid, titratable acidity, pH, number of cluster yield and adaptation ability were determined. Buds begin to open in the third week of April and grapes are harvested in the second week of September. Maximum yield for one wine grape is 22 kg for Kalecik Karası and 12 kg for Narince variety. Average weight of one cluster is 172 g for Kalecik Karası and 409 g for Narince. Both of the two wine varieties had been evaluated adaptable to Lakes Region ecological conditions by 2 years data.

These varieties had been evaluated in a good performance for Lakes Region in Turkey. Further studies will be planned about wine production and quality for these varieties.

Key Words: Lakes Region, wine grape varieties, performance, yield, quality

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L'ESPOIR INDIGENE DES VARIETES DES VINS LOCAUX (KALECIK KARASI ET NARINCE), LA PERFORMANCE DE RENDEMENT ET DE QUALITE DANS LES CONDITIONS ECOLOGIQUES AU REGION DU LAC.

La Turquie possède des types d'un raisin d'une variété plus riches; Environ 1250 variétés sont développées. Bien que la Turquie se soit spécialisée traditionnellement dans les raisins et les raisins secs de table de production, elle a également 34 genres de raisins de cuve, 22 dont sont les variétés indigènes valables. La plupart des vins turcs sont faits à partir des variétés indigènes de raisin de cuve. Les producteurs turcs de vin emploient également les raisins indigènes en combinaison avec les variétés européennes des vins à la qualité de changement du nouveau goût pour le marché vitivinicole du monde.

La région de lacs appartient des secteurs de raisins important, elle se situe entre l'Anatolie centrale et la région méditerranéenne. Les vignes sont situées à la providence d'Isparta et de Burdur. Cette étude a été effectuée dans les terres cultivables horticoles d'Institue de recherches d'Egirdir. Egirdir est une ville d'Isparta. L'altitude est de 920metres. L'altitude se représente comme le climat de zone et les conditions écologiques de la région. Le vin rouge de Kalecik Karası est un vin traditionnel et national. Le vin blanc, Narince avait été déterminé aux étapes de phénologie, elle se montre la diversité du rendement d'adaptation et de qualité. Le but principal de l'étude était d'évaluer ces équipements d'adaptation de variétés et développement croissant dans le secteur rural.

Kalecik Karası est une variété anatolienne centrale de raisin de la meilleure qualité pour faire le vin rouge. Il peut être développé dans les conditions microclimatiques à la grâce de région de Kızılırmak (fleuve rouge). Les procès indigènes de variété de Kalecik Karası est très douce pour gouter, il se présente aux arômes fruités.

La variété de Narince vient de la province de Tokat développée dans le sud de plateau d'Anatolie, les montagnes près des rivages de la Mer Noire. Narince se produit des vins riches équilibrés qui ont souvent une teinte de jaune verdâtre sensible, arômes fruités. Le vin de Narince convient au vieillissement, acquièrent un bouquet complexe riche avec le temps.

La place d'essaie de la vignoble a été établie en 2005 avec une rangée d'espacement 2m X 3m. Trois répliques par conception de blocs aléatoire ont été appliquées dans l'étude.

Les observations et les analyses sont faites aux années 2008 et 2009. Le rendement et les étapes de phénologie, la particularité de qualité avaient été obtenus. Le solide soluble, l'acidité titrée, le pH, le nombre de rendement de faisceau et la capacité d'adaptation étaient déterminés. Toutes les deux variétés de vin avaient été adaptables et évalués aux états écologiques dans la région de lacs dans une période de deux ans. Les bourgeons commencent à s'ouvrir à la troisième semaine du mois avril et les raisins sont moissonnés à la deuxième semaine du mois septembre. Le rendement maximum pour un raisin de cuve est de 22 kilogrammes pour Kalecik Karası et de 12 kilogrammes pour la variété de Narince. Le poids moyen d'une grappe est 172 g pour Kalecik Karası et 409 g pour Narince.

Ces variétés avaient été évaluées dans une bonne exécution pour la région de lacs en Turquie. D'autres études seront prévues au sujet de la production vinicole et de la qualité pour ces variétés.

Mots clés : Région de lacs, variétés des raisins, exécution, rendement, qualité.

INTRODUCTION

Turkey's climate conditions are most suitable for grape production in the world. According to FAO statistics data in 2008 3.918.440 ton grapes have been produced in 482.789 ha vineyard area in Turkey (Anonymous, 2010). Turkey is in the rank 6th and 4th for the grape production and grape area respectively. 37% of grape production is used for drying, 30% for table grape, 30% for making grape products and 3% for making wine.

Turkey possesses a rich variety of grape types; around 1250 varieties can be found in genetic sources. Although Turkey has traditionally specialized in the production table grapes and raisins, Turkey also has 34 kinds of native and foreign wine grapes which are cultivated widespread, 22 of which are valuable native varieties. Öküzgözü, Boğazkere, Kalecik Karası, Çal Karası, Emir and Narince are local wine varieties and Cabarnet Sauvignon, Syrah, Merlot, Cinsaut, Alicante Bouschet, Carignane and Chardonnay are known foreign wine varieties cultivated in Turkey.

Turkish wine sector has accelerated since 1990. New foreign and native grape varieties and quality entered to production. Kalecik Karası and Narince varieties have been world famous varieties. Foreign and native wine varieties which are grown in Turkey are listed in table 1 (Oraman, 1996),(Gümüş, 2008).

Table 1. Some of the important grape varieties in Turkey for producing wine

	Native wine grape varieties	**Foreign wine grape varieties**
White wine varieties	Narince Emir Misket Sultaniye Yapıncak	Chardonnay Sauvignon Blanc Muscat Riesling Muscadella Semillon Blanc
Red wine varieties	Kalecik Karası Öküzgözü Adakarası Boğazkere Papazkarası	Cabernet Sauvignon Merlot Gamay Carignane Syrah

Turkey has a very long of vineyard cultivation and wine production. It is well known that Anatolia, the Asian part Turkey, is one of the motherland of vineyards and wine. Evidence indicates that grapes were processed into wine and named "VINO" by the Pre-Hitities who lived in Anatolia between 3000- 4000 B.C.

Turkey has diverse soils and climates allowing wine producers to cultivate several types of grapes for manufacturing different types and tastes of wine. The producers in the sector continue to increase their present wine production capacity and invest utilize modern technologies. As well as the large wine producer companies, there are almost 300 small producers located in Central Anatolia, Marmara- Thrace and the Aegean region. Total wine capacity of the sector is about 120 million liters (Karabayır, 2009).

Turkish Ministry of Agriculture Farmer Registration System reports that enterprise wine area is 1.3 ha and average wine area parcel is 0.5 ha. Insufficient Registration system, deficiency of technical knowledge and small scale vineyards are wine sectors important problems in Turkey (Karabat, 2008). Wine varieties are widely diversified and have improved

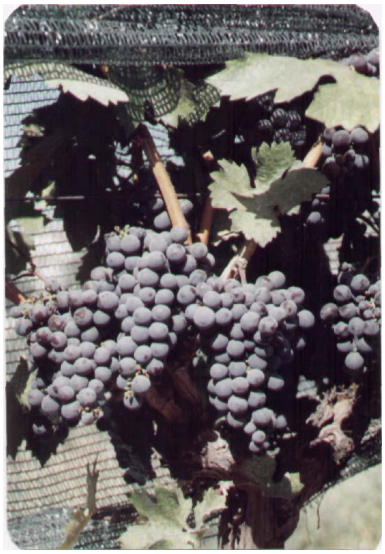
in quality. The market for wine is expanding in Turkey since more varieties and better quality wines become available. Wine varieties must be evaluated in different locations of Turkey, because Turkey has different suitable climate conditions to produce wines in different tastes.

Grape growing has to adapt somehow to climate change, in order to avoid negative effects. Rising temperatures anticipate phenological phases, extend the vegetative cycle and affect the grape composition resulting in high levels of sugars, rough tannins and oxidizing enzymes and low levels of organic acids, color and some aromatic compounds, affecting the wine quality. The adaptation choices are to shift the growing areas to higher latitudes and elevations, to select suitable varieties and rootstocks, to perform a proper canopy and soil management and to handle irrigation and mineral element supply (Fregoni, 2009).

Lakes Region has an important vineyard areas and grape production between Central Anatolia and Mediterranean region. Vineyards are located in Isparta and Burdur mostly. Table grape drying grape and wine production are one together by small farmer groups (Baydar, 1998). Home made wines are in a good quality for home production. Some local grape varieties are used for wine production in Lakes Region. Foreign and native popular varieties must be evaluated to increase wine quality and quantity. Our study's main aim was to evaluate adaptation abilities native wine varieties in a different location in Turkey than their own locations and to increase development in rural area. New wine cultivars will be cultivated in the region this means more income for farmers by evaluating native wine varieties in a different location.

Ağaoğlu et.all (1997) said that viticulture cultivation needs vegetation period of days which must be at least 160 days upper than 10°C and it needs at least 1300 hours sunshine time. Ecevit and Baydar (1998) determined 176.2- 222.3 day vegetation period for Isparta in their study, this means Lakes Region has suitable ecology for grape production.

Kalecik Karası variety is a good quality central Anatolian grape for making red wine. It can be grown under the microclimatic conditions of the region (Ankara, Kırıkkale and Cappadocia) thanks to the Kızılırmak (Red River). Its berries are in black-blue in color and in round shape. The indigenous Kalecik Karası variety produces easy to drink, smooth and fruity wines that invoke the aromas and tastes of fig, rose and strawberries. Kalecik Karası grapes are famous for their unique taste, aroma and flavor. This unique quality has been honored with many awards won in international wine competitions.



Picture 1. Kalecik Karası cv**.**

Picture 2. Narince cv.

Narince variety originally comes from Tokat province and grown on the Anatolia plateau south of the mountains near the Black Sea shores. Narince produces rich and balanced wines which often have a greenish yellow tint and delicate, fruity aromas. Because of their balanced acidity, these wines are suitable for aging and acquire a rich and complex bouquet over time.

Studies about these wine varieties were evaluated in different locations of Turkey. Kalecik karası variety was evaluated in Thrace region by Özen et all, in Adana Çukurova by Tangolar et all, in Konya conditions by Kara. It was aimed to evaluate these varieties in Lakes Region different than the locations were evaluated before in this research.

Özen et. all. (1996) experimented the adaptation of 23 domestic foreign wine grapes in the ecological conditions of Tekirdağ Vineculture Research Institute. In his study; yield growth, must and wine characteristics were investigated. In the result Kalecik Karası, Gamay, Cabarnet Sauvignon was determined to produce quality red vines under ecological conditions of Institute.

Tangolar et all. (2002) evaluated Kalecik Karası variety in Pozantı/Adana conditions. They noticed cluster, berry and must characteristics.

Kalecik Karası variety had been evaluated adaptable and it showed good performance in Konya conditions (Kara, 2005).

Grape varieties local adaptation facilities must be evaluated and according to result new vineyards must be planned with right varieties. Native grape varieties which are in high value for producing wine must be preserved and they must be spreaded to other locations in the result of the adaptation studies.

MATERIAL AND METHOD

This study was carried out in Eğirdir Horticultural Research Institute farmlands. Eğirdir is a district of Isparta in Mediterranean Region. Its altitude is 920 m high and it represents passing zone climate and ecological conditions. Geographical coordinates of Eğirdir district; are 37º 50′ 41″, 38º 16′ 55″ N latitude, 30º 57′ 43″, 30º 44′ 39″ E latitude.

Figure. 1 World Map

Figure. 2 Turkey Map

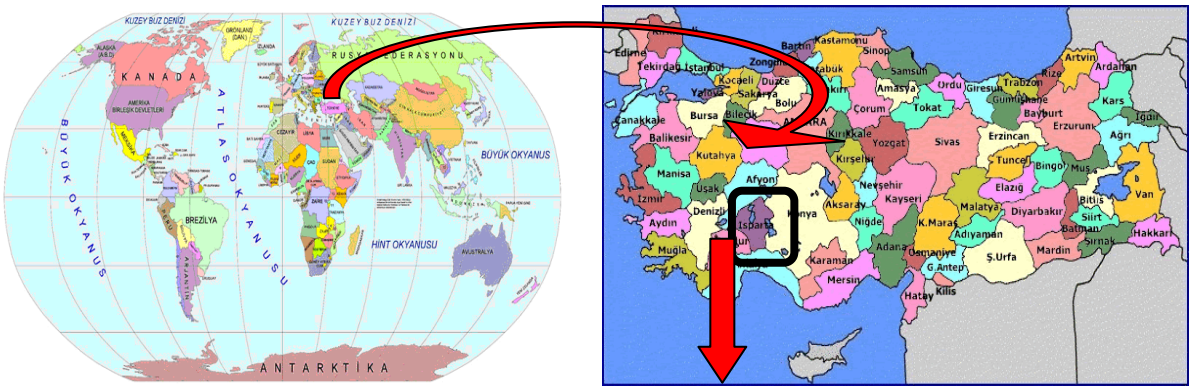


Figure. 3 Lakes Region Map

The vineyard was established in 2005 year with in row with spacing 2 m X 3 m with drip irrigation and on grafted 41B rootstock which was determined according to soil analyses. Soil is in clayish loam texture with 7,8 pH and contains high lime. Vines were trained to a bilateral double cordon and spur pruning system. The spur pruned vines had ten two node spurs per vine and wines were supported by three-wire trellis. There were 3 replications according to experimental figure of randomized blocks and there are 5 grapevines for each plot. The red wine variety Kalecik Karası and the white wine variety Narince were evaluated in the study.

Observations analyses were done in 2008 and 2009 years. Phenology stages, yield and quality properties data had been obtained in vineyard. Soluble solid (%), titratable acidity (g/l), pH, pruning weight (kg/vine), yield (kg/vine) and adaptation ability were determined. Also climate data for 2 years in the study had been recorded.

RESULTS AND DISCUSSION

It was tried to determine native wine grape varieties that were able to adaptable in the Lakes Region and their adaptation values were evaluated. Evaluations, findings and observations were obtained as a result of these analyses and measurements related to two varieties in 2008 and 2009 year with climate conditions are given in table 2. It is seen that climate conditions are suitable for grape growing in the region.

Table 2. Some Climatic data of the experiment area

	Mean temperature (°C)	**Minimum temperature (°C)**	**Mean precipitation (mm)**
Long years average	12.2	- 14.9	764
2008 year	11.6	- 10.4	449
2009 year	9.9	- 10.1	1106

Table 3. Monthly Climatic data of the experiment area

Month/year	Mean temperature (°C)	Mean precipitation (mm)
January 2008	-0.2	11.3
February 2008	0.1	35.4
March 2008	8.8	47.2
April 2008	12.2	80.7
May 2008	14.9	23.6
June 2008	21.4	7.1
August 2008	23.9	3.8
July 2008	24.6	12.9
September 2008	19.0	93.0
October 2008	12.3	35.8
November 2008	8.7	74.4
December 2008	3.7	24.7
January 2009	3.4	158.3
February 2009	4.4	173.3
March 2009	5.4	169.4
April 2009	10.7	62.6
May 2009	14.8	63.5
June 2009	20.8	25.1
July 2009	23.2	8.8
August 2009	22.3	10.7
September 2009	17.8	46.8
October 2009	14.8	42.3
November 2009	7.8	77.2
December 2009	6.3	258.6

Grape varieties which were evaluated in the study, all phenological stages were determined. Buds burst time, Full blossom time, verasion period and harvest time were given in 2008 and 2009 years in table 3.

Table 4. Phnelogical stages of the varieties in 2008 and 2009 year

Cultivar /Year	Buds burst time	Full blossom time	Verasion time	Harvest time
Kalecik Karası 2008	16.04.2008	13.06.2008	22.08.2008	14.09.2008
Narince 2008	15.04.2008	14.06.2008	24.08.2008	18.09.2008
Kalecik Karası 2009	21.04.2009	12.06.2009	10.08.2009	04.09.2009
Narince 2009	24.04.2009	16.06.2009	24.08.2009	11.09.2009

We can see by the two years phenologic data, there is enough climate conditions and for these varieties to be grown under Lakes Region ecological conditions.

Among the two variety evaluated in the project yield and quality properties data had been obtained in vineyard. Soluble solid (%), total titratable acidity (g/l), pH, Average bunch weight(g), pruning weight(g), 100 berry weight, yield and adaptation ability were determined. Two years data were given in table 4 and 5.

Table 5. Measurements and analyses performed on 2008 year

Cultivar	**Fresh grape yield (kg/vine)**	**Total soluble solids (%)**	**Titratable acidity (g/l)**	**pH**	**Pruning weight (kg/vine)**	**100 berry weight (g)**	**Average bunch weight (g)**
Kalecik Karası	14.5±2.1	19.7±2.6	5.5±0.6	2.79±0.3	1.25±0.4	164.06±15.1	207±23.1
Narince	12.2±1.9	18.4±2.7	6.1±0.7	3.01±0.2	1.10±0.3	201.28±24.3	409±22.5

Table 6. Measurements and analyses performed on 2009 year

Cultivar	**Fresh grape yield (kg/vine)**	**Total soluble solids (%)**	**Titratable acidity (g/l)**	**pH**	**Pruning weight (kg/vine)**	**100 berry weight (g)**	**Average bunch weight (g)**
Kalecik Karası	22.0±1.8	18.8±2.3	5.3±0.7	2.89±0.2	1.45±0.3	269.8±19.3	172±30.8
Narince	11.6±2.5	17.9±2.8	6.8±0.5	2.96±0.2	1.00±0.4	279.4±23.4	286±21.5

CONCLUSIONS

From the experiments conducted in this study these varieties had been evaluated in a good performance for Lakes Region in Turkey. After two years of experiments on these varieties performance results indicate that produce satisfactory yields of good quality grapes. They are suitable for Lakes Region agro-ecological conditions, as well as for the most widespread native grapevine varieties in Turkey. Total soluble solids numbers can be seen low but it was thought from the cropload and extreme climate conditions. In 2009 year total precipitation was higher than long years average and average temperature was lower than the long years average. This caused decrease in total soluble solid and also was affected by the cropload. This can be improved by cropload management and irrigation practices in the next years. Colour verasion had been evaluated significantly important in Lakes region because of day and night temperature differences. It is thought this will let to increase the wine quality. Results presented in this study confirmed the thesis that Kalecik Karasi and Narince are dominant cultivars in Turkish viticulture and wine sector and they can be successfully cultivated in the region. Further studies will be planned about wine production and wine quality for these varieties in the region and some new approaches, growing practices (cropload management and irrigation) will be planned to reach better wine quality for these varieties.

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