

RESPONSE OF 'GRANNY SMITH' APPLE TREES TO FOLIAR TITANIUM SPRAYS UNDER CONDITIONS OF LOW SOIL AVAILABILITY OF IRON, MANGANESE, AND ZINC

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□ The aim of the study was to examine impact of foliar titanium (Ti) sprays on vegetative and reproductive response of apple (*Malus domestica* Borkh.) trees under conditions of low soil availability of iron (Fe), manganese (Mn), and zinc (Zn). The experiment was conducted during 2005–2006 at a Experimental Station in Isparta region, Turkey, on mature 'Granny Smith' apple trees/M.9, planted at a spacing of 3.5×1.5 m, on fine-textured soil with neutral reaction, medium status of organic matter, high amounts of available phosphorus (P), potassium (K), and magnesium (Mg), and low availability of Fe, Mn, and Zn. The trees were sprayed with Ti-ascorbate at the green and pink bud stage, petal fall, and 3, 6, and 9 weeks after full bloom, at a rate of 3 g Ti ha⁻¹ per spray. The efficiency of Ti sprays was compared to combined sprays of Fe, Mn, and Zn [chelated with ethylenediaminetetraacetic acid (EDTA)], applied at the same terms as Ti sprays, at rate of 36 g, 36 g and 24 g per spray, respectively. Trees unsprayed with Ti, Fe, Mn, and Zn served as the control. It was shown that summer leaf Ti concentrations of the trees untreated with Ti were high, varying from 34 to 36 mg kg⁻¹ dry matter. Foliar Ti sprays increased leaf status of this nutrient but they had no effect on nutrition of essential macro- and microelements, tree vigor, and fruit yield. Mean apple weight, coloring, firmness, soluble solids concentration, and titratable acidity of fruit were not also influenced by Ti sprays. Foliar sprays of Fe, Mn, and Zn improved leaf status of nitrogen (N), Mg, Fe, Mn, and Zn; leaves of the trees sprayed with those micronutrients were also greener, and contained more Fe²⁺ than those of the control plants. Combined sprays of Fe, Mn, and Zn improved tree vigor and fruit yield.

Keywords: apple tree, foliar sprays of titanium, vigor, yield

Received 20 November 2008; accepted 26 July 2009.

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