

The Effectiveness of Deep Fertilizer Placement and Use of Different Nutrient Combinations in Relieving Nutritional Problems in Semirom Apple Orchards

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The first step in achieving desirable yield and quality in fruit production is to diagnose soil fertility limitations of the region, and accordingly use a balanced fertilization program. In this regard, an experiment was carried out in 1998 in Semirom, on shallow calcareous soils, to evaluate nutrient deficiencies, and methods for relieving such deficiencies with appropriate fertilization management. The experiment was based on a completely randomized factorial design of eleven treatments, placing the nutrients in deep holes in the soils of selected Semirom apple orchards. The results from leaf chlorophyll measurements, at two different times, showed that all the fertilizer treatments using deep placement method had a distinct improving effect on the leave chlorophyll content, compared with the control. This improvement ranged from 18% with manure to an average of 65% with a mixture of nutrient elements and manure, using deep placement method. The different treatments had no significant effect on the level of plant nutrients in the leaves, except that all the treatments consisting of deep fertilizer placement resulted in lower iron concentrations and increases in zinc and manganese levels, as compared with the control. The effect of treatments on yields was significant. Even though the critical problem in Semirom apple orchards was iron and zinc deficiency, the symptoms were not necessarily related to low availability indices, but that with proper management, one

different treatments were observed after 160 days in the cold storage room. No particular pattern was found among the treatments as to their effects on pH, acidity or TSS of fresh apples; however, there were increases in pH, and TSS and decreases in acidity among the treatments with increasing the storage period. The calcium content of the fruit had increased due to the foliar sprays without any changes in other nutrients levels, with the highest increase in calcium content of 65% resulting from 6 applications of 1% calcium chloride solution.

In conclusion, four to five foliar applications of 1% calcium chloride at 3-4 week intervals, starting one month after the fullbloom are recommended so as to increase the apple's calcium content and prevent physiological breakdowns which stem from calcium deficiency.