

EFFECTS OF ORGANIC FERTILIZERS AND IRRIGATION LEVELS ON WATER USE, GROWTH AND PRODUCTIVITY OF PEAR TREES

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Abstract

This experiment was initiated to study the effects of organic fertilization by chicken and cattle manures and some irrigation regimes (70% and 50% available soil water) on water consumptive use, growth, productivity and leaf mineral contents of pear trees grown in new reclaimed lands during 2004 and 2005 seasons.

Total water use of pear trees was 602.67 and 531.56 mm/year in the first season while it was 624.36 and 514.78 mm/year in the second season when trees were irrigated at 70 % and 50% of available water, respectively. Water use of pear trees which fertilized by mineral fertilizers was 599.31 and 628.53 mm/year in the first and second seasons respectively, application of organic fertilizers saved water use of pear trees by 9.8% for trees fertilized by cattle manure and by 12.8% for trees fertilized by chicken manure comparing with application of mineral fertilizers.

Data showed that pear trees irrigated at 70% available soil water (AW) gave the highest values of canopy volume, tree height and leaf area compared to those irrigated at 50% (AW). No significant differences were found between the effect of organic and mineral fertilizers on canopy volume and leaf area through the two studied seasons.

Average yield was 13.47 Kg/tree for pear trees irrigated at 70% available water, while it was decreased by 39.19% when trees received 50% (AW). Application of cattle and chicken manures increased yield/tree by 19.94 % and 8.44%, respectively comparing to the yield of trees fertilized by mineral fertilizers.

Yield efficiency of pear trees did not significantly affect by irrigation regimes, fertilizer types. Meanwhile, water use efficiency (WUE) was significantly affected by irrigation regimes and fertilizer types.

Leaves of pear trees received 50% of available soil water contained the higher values of N, Fe, Zn and Mn and lower values of (K) comparing with those irrigated at 70% (AW). Organic fertilizers increased leaf K, P, Fe and Mn contents. Cattle manure gave the highest values of Zn content. On the contrary, adding mineral fertilizers gave the highest values of leaf N content.

Key words:

Pear trees, organic fertilizers, irrigation regimes, water use, water use efficiency, yield efficiency, growth parameters, Productivity.