

## REGULATED DEFICIT IRRIGATION AND SOIL MANAGEMENT PRACTICES IN 'PICUAL' OLIVE TREES FOR YIELD AND OIL PRODUCTION.

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### ABSTRACT

*The* experiment was conducted during 2005 and 2006 seasons at the Olive Research Farm, Faculty of Environmental Agricultural Sciences at El-Arish, Suez Canal University to study the effect of regulated deficit irrigation and soil management practices in 'Picual' olive trees on fruit and oil yields, fruit and oil quality. Three irrigation treatments 100%, RDI-70% and RDI-33% of evapotranspiration (ETc) were applied from March to November. In addition, four soil management practices hand hoeing was applied at three times to the depth of about 15 cm in mid April, mid June and mid August and three mulching treatments i.e. black plastic, olive pomace and rice straw mulches were spread on ground around trees in mid February. The irrigated trees at 100% of ETc (control) and the RDI-70% of ETc and mulched trees with black polyethylene plastic and rice straw mulches succeeded in increasing fruit and oil yields, and recorded the lowest values of alternate bearing index. Fruit quality increased significantly by increasing the amount of water. The oil acidity, peroxide, iodine values, oil chlorophyll and carotenoids content were decreased by increasing water stress. The olive trees subjected to this RDI-treatment (70% of ETc) with black plastic mulch or rice straw mulch saved water without reducing fruit yield or oil production as well as increased water use efficiency.

### INTRODUCTION

The olive (*Olea europea* L.) is a subtropical evergreen tree, in the family Oleaceae. World production of olive fruit is about 17.31 million ton per annum. Approximately 92% of this production is used for the extraction of olive oil and the remaining 8% is consumed as table olive. In Egypt, olive production increased considerably during the last two decades due to the horizontal extension in new reclaimed soil, olive area reached about 125369 feddan with total fruit production of 544640 tons according to the statistics offered by the Ministry of Agriculture and Land Reclamation, Egypt, 2006. The olive trees has been regarded as part of the social and cultural traditions of every country and region in which it has been grown. Because of its long life and hardiness and its adaptation to a climate of little rainfall and long summer in which precipitation is practically nil or little benefit. At the same time it is subject to intense evaporation. Water usually being the limiting factor in olive production. When

maximum olive yield is desired large amount of water for irrigation are needed, but these amounts are not always in the Mediterranean area. Regulated deficit irrigation strategies in olive trees are important to save water or increasing water use efficiency without reducing yield (Alegre *et al.*, 2000).

Mulching also may mitigate some of the harmful effects of saline irrigation water (5000 ppm) by decreasing moisture stress (Spiers, 1983) or by reducing infiltration (Hassan, 1985 and Oster *et al.*, 1986).

The objective of this study was to evaluate the effect of regulated deficit irrigation (RDI) and mulching treatments on 'Picual' olive trees. The beneficial effects of mulches such as conservation of soil moisture, less soil consumption, weeds control, reduced fertilizer leaching and increased soil temperatures have been documented (Schales and Sheldrake 1965 and Waggoner *et al.*, 1960).