Physiological studies on irrigation of some olive cultivars

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Irrigation of Horticultural plan, it is becoming a major problem in Egypt and in other countries. Therefore, searching for other sources of water besides, the Nile in Egypt is the main goal. This work was undertaken during the seasons of 2000 & 2001 on some different mature olive trees (Aggizi, Koroneiki, Picual and Manzanillo) growing in a sandy loam soil and irrigated with drip irrigation. Transplants along with growing in the same soil in pots in a private olive orchard at El-Saf region, Giza governorate. The main aim of this work was to investigate the residual: effects on trees production, physical and chemical characteristics from two water sources (sewage and wells) applied at various levels.Results obtained in this study can be summarized as follows.I. MATURE OLIVE TREES.1-Shoot growth and flowering.It is clear that, the 1201,./tree level of sewage water irrigation in mulched soil gave the highest increase in shoot growth, sex expression, fruit set and fruit retention as percentages. In contrast, fruit DROP percentages of the four olive cultivars exhibited the highest significant values when irrigated with 60L./tree from wells' water in unmulched soil during the two growing seasons.The Koroneiki olive cv. showed the highest significant values in shoot growth, fruit set and fruit retention. whereas, in sex expression Aggizi olive cv. gave the highest values and Picual presented the extreme fruit DROP %.2-Fruit characters.The average fruit diameter, length weight and volume were affected significantly with the highest level of sewage water in mulched soil in both seasons.Concerning the variety, Aggizi olive cv. surpassed other cvs. in different fruit characters under study.Concerning the variety, Aggizi olive cv. surpassed other cvs. in different fruit characters wider study.3-Yield and fruit quality.Irrigation of olive trees with the higher level 120L./tree from sewage water in mulched soil gave the highest significant values of fruit pulp , fruit weight (gm) and moisture content %, consequentlyon yield (Kg)/tree. Analogous response to the fruit qualities was noticed especially in Aggizi (Table fruit).The same level of irrigation water and source in unmulchedsoil gave the highest oil content (%) as dry weight as obvious in Koroneiki (oil fruit).4-Chemical constituent.a.Photosynthetic pigments.Leaf chlorophyll A, B and carotene were significantly influenced with the highest irrigation level from sewage water in mulched soil. This showing highest levels between irrigation treatments. Varietals differences were noticed among cvs. studied.b.Leaf nutrients content.Concerning the different olive cvs. leaf macro and microelements content as affected by irrigation levels from sewage or wells' water and mulching, it is clear that irrigation with 60L./treesewage water in unmulched soil gave the superior significant values of N (%), Fe, Mn, Zn and Cu (mgL-I).Leaf N surpassed in Picual in the first season and Koroneiki in the second one. In addition, Fe showed analogous responses to N in Picual leaf content in both seasons. Meantime, Koroneiki olive cv. gave the highest leaf Mn, Zn and Cu content (mgL-I) as affectedby the same level, source of water and mulching in 2000 & 2001 seasons.The irrigation with the highest level of sewage water in mulched soil increased olive leaf P & K content. Moreover, Ca, Mg (%) irrigated with the same level of wells' water and mulching gave the same trend during the two growing seasons.Koroneiki and Aggizi olive cvs. showed the highest levels of K (%) in the first season and second season respectively. Meanwhile, Koroneiki cv. leaf P, Ca & Mg content were increased significantly during the two growing seasons.C. Fruit heavy metals.The study of fruit heavy metals content (Pb, Cd, Ni, Mn and Cu as mg1:1) in different olive cvs. revealed that irrigation with 60L./tree sewage water in unmulched soil gave the highest permissible contaminant levels in

fruits. While, the higher levels of water showed lower level in fruit heavy metals content as a result of dilution effect.Fruit Pb content showed the highest significant values in the trees of most olive cvs. under study.As a conclusion, though, irrigation with sewage water showed better significant values in growth, flowering, fruit characters, yield and oil content in different olive cultivars under study, the fruits exhibited the higher permissible contaminant levels of heavy metals.The irrigation studies on mature olive trees generally indicates varietals variations among olive cvs studies.II. ONE-YEAR-OLD OLIVE TRANSPLANTS.Irrigation transplants with sewage water surpassed wells' water in its effects on growth (shoot length and diameter, number of lateral branches, number of leaves, fresh and dry weight). ,Yet, higher growth values were obtained when the irrigation water levels were increased.Summary and conclusion159Concerning the chemical constituents, sewage water irrigation result in higher significant values of chlorophyll A,B and Carotene compared to wells water.Generally, using sewage water for irrigation showed high influence in leaf N, P and K (%) and Fe, Mn, Zn and Cu (mgU1) in comparison with the irrigation with wells' water. While, Ca and Mg % responded more significantly in leaf transplants irrigated with wells water.The four olive cvs under study showed different significant values in leaf Mack) and microelements.