EFFECT OF POST-PLANT SOIL SOLARIZATION ON SURVIVAL OF TEN PLANT SPECIES AND CONTROL OF SOILBORNE PATHOGENS.

W. I. Abu-Gharbieh*, H. Abu-Blan and F. Shatat
Faculty of Agriculture, University of Jordan, Amman, Jordan.

In 1979 Ashworth and coworkers (2) in California started research and field scale application of post-plant soil solarization in pistachio groves. Positive results gained from their experiments prompted other researchers to test the method on various tree and perennial crops in California, Mexico (3) Greece (4) and elsewhere. Transparent polyethylene (PE) was used in warm temperate zones, while black PE was employed in soil mulching in hot climates (1).

This field experiment was conducted at the University of Jordan Agricultural Experiment Station in the Central Jordan Valley during the period 1994-1996. The objective of the study was to assess effect of post-plant solarization on growth of ten fruit tree plant species, and soilborne pathogens.

Plant species included: apple, peach, grape, olive, guava, papaya, banana and lemon, orange and mandarin grafted on sour orange. Thirty six young plants of each plant species were planted in a separate plot. Each plot was arranged in a randomized complete block design. The treatments comprised nonmulched control, mulched for three months (July-September) or mulched for six months (April-September) with four seedlings in each replication. Each treatment was replicated three times. Citrus seedlings were inoculated with 10,000 J2/plant of *Tylenchulus semipenetrans.* Mulching with black PE (80µ thick and 1.6m wide) was performed down the rows by inserting seedling foliage through ca 10cm openings made in the center of PE strips, and edges anchored tightly in the soil. Mulching was removed in September of each year and replaced in the following year as designed. Data were taken on: Soil temperature at 15cm depth, plant growth (growth index), stem diameter at 10 cm above soil surface, weight of plant foliage at termination of the experiment, population density of *Fusarium oxysporum* and *Tylenchulus semipenetrans* (on citrus).

Results could be summarized as follows:

1. Among the evergreen fruit tree species used in this study, olive, citrus and guava were able to survive the post-plant solarization treatment.
2. Banana trees grew poorly and papaya plants died as a result of the treatment. Both possess a herbecous root system.
3. Trees of the deciduous fruit tree species (apple, peach and grape) failed to survive the treatment when bare-rooted planting material was used, but apple survived when seedlings were container grown.
4. Post-plant soil solarization effectively reduced populations of *Fusarium oxysporum* and *Tylenchulus semipenetrsns* in the soil.

References:

1. Abu-Gharbieh, W.I. 1997. Pre-and Post- plant Soil Solarization. Second Intl. Conf. On Soil Solarization and Integrated Management of Soilborne Pests. 16-21 March, 1997, ICARDA, Aleppo, Syria.

2. Ashworth. L.J. and S.A. Gaona. 1982. Evaluation of clear polyethylene mulch for controlling Verticilliam wilt in established pistachio nut groves. Phytopathology 72:243-246.

3. Stapleton, J.J. 1991. Soil Solarization in tropical agriculture for pre-and post-plant applications. In:*Soil solarization* FAO Plant Prod. And Prot. Paper 109.pp.220-228.

4. Tjamos, E.C., D.A. Biris, and E.J. Paplomatas. 1991. Recovery of olive trees with Verticillium wilt after individual application of soil solarization in established olive orchards. Plant Dis. 75:557-562.