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EFFECT OF SEWAGE WATER ON THE PENETRATION AND DEVELOPMENT OF *TYLENCHULUS SEMIPENETRANS*

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Recently, many countries have established sewage water treatment plants and have used treated sewage water for agricultural irrigation. As there is no published information, an experiment was undertaken to ascertain the effect of treated sewage water on the development of the citrus nematode (*Tylenchulus semipenetrans* Cobb) in lime (*Citrus aurantifolia* L.) roots.

Thirteen week old lime seedlings were transplanted singly into 20 cm diam plastic pots filled with equal parts of steam-sterilized clay, sand and peat. Fourteen pots were irrigated with tap water and another fourteen with treated sewage water obtained from the Agricultural Experiment Station, K.S.U., at Dirab. Nine weeks after transplanting, each seedling was inoculated with 5,000 *T. semipenetrans* juveniles (J2). The pots were then maintained in a growth chamber at a constant temperature of 27°C and a day-length of 12 hr at 20,000 lux. Irrigation with tap or sewage water continued until the end of the experiment.

One week after inoculation, two seedlings from each treatment were examined for the presence of nematodes in the roots and this was done at weekly intervals for a further four weeks. At each harvest, the root system of each seedling was washed gently in running tap water, dried and then stained with acid-fuchsin lactophenol (Daykin and Hussey, 1985). The developmental stages of the nematode were identified (Van Gundy, 1958) and counted.

Second stage juveniles (J2) were found in the roots one week after inoculation in both treatments. The numbers of juveniles from seedlings receiving sewage water were 38 per root system compared with 13 per root system from seedlings receiving tap water. At two weeks, J3 and J4's were present in both treatments. The numbers were 26 J3 and 16 J4 per root system in sewage water treatment and 22 J3 and 3 J4 in tap water treatment. The J2's had declined to 6 in sewage water but there were 64 in tap water. Four young females were also observed, at this time, feeding on seedlings in the sewage water treatment but not in tap water treatment. At three weeks, one adult female was observed in each treatment. Many adult and egg-laying females were present in both treatments by the fourth week. There were twice the number of adult and egg-laying females in the sewage water treatment compared with the tap water treatment. Second stage juveniles J2 of the second generation were present in the sewage water treatment by the fourth week and in tap water treatment by the fifth week. In the sewage water treatment there were more eggs and most of them were in advanced developmental stages compared with eggs in the tap water treatment.

The larger number of J2's penetrating the roots in sewage water, was reflected in the larger number of later stages present throughout the experiment. The presence of second generation J2's in the sewage water treatment at four weeks after inoculation suggests that the citrus nematodes developed faster in that treatment. This might be attributed to the better growth of the plants when irrigated with treated sewage water. Biological and/or chemical modifications of the soil ecology may not be excluded.

Literature cited

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