



Nematode Control Increases Yields of Infested Citrus

John H. O'Bannon and Harold W. Reynolds

The citrus nematode (*Tylenchulus semipenetrans*) is a worm of microscopic size which feeds on citrus roots. It has been found in all of the principal citrus producing regions of the world, including Arizona, where it was first recognized in 1926.

Citrus nematodes damage feeder roots of citrus, causing damage which debilitates the trees over a period of several seasons. The result is a progressive decline which is manifest in a general unhealthy appearance of the foliage of the tree and a reduction in yield and size of fruit.

Having reached a certain stage of decline, the tree tends to remain in a weakened state indefinitely, neither improving very much nor dying.

Nematocide Effective

Experiments during the past 10 years have shown that the citrus nematode can be controlled and growth and yield of citrus trees can be improved by treatment with a chemical which kills the nematodes, thus eliminating the damage to the feeder roots. The chemical is the nematocide, 1,2-dibromo-3-chloropropane (DBCP), sold under the trade names "Nemagon" and "Fumazone". It is applied to citrus groves by mixing with five or six inches of irrigation water.

The apparatus for this is fairly simple, consisting of a device for metering the chemical and delivering of an emulsifiable formulation at the point of greatest turbulence of the inflowing irrigation water, so that it is thoroughly and evenly mixed with the water. The

CITRUS NEMATODE infected grapefruit tree shown at left, above. Uppermost portion of this tree shows extensive dieback, small leaves and sparseness of foliage. Tree at right, above, is a grapefruit tree four years after DBCP treatment. Note the abundant shoot growth, larger leaves and lush dense foliage.

operation is carried out at a time when the soil is in good tilth, free of weeds and as level as possible.

In groves which are not level or have a little too much slope, cross checks may be used to facilitate even distribution. The amount used is two to six gallons of the emulsifiable formulation, which contains one to three gallons of active ingredient, respectively.

As early as six months after experimental applications, improved vegetative response of grapefruit trees has been noted. Continued improvement resulted over several years. This consisted of increased shoot growth and larger leaves, accompanied by greater tree density than in adjacent untreated trees. The better growth results in increased yields and larger fruit for a period of several years.

Yields Increased

In one experiment the yield of treated trees was 22 percent more than that of adjacent untreated trees the first crop after treatment. Fruit size ranged from 44 to 70 percent larger over a three-year period.

Treatment of a navel orange grove gave similar results. Yield increases were 12, 38 and 24 percent respectively for the first three years after treatment, and in the second and third years fruit sizes increased by 22 and 11 percent.

The improvement lasts for about as many years as the number of gallons of DBCP used for treatment, then should be repeated to prevent the trees from returning to the decline state. This can happen, because it is virtually impossible to kill all of the nematodes. A small percentage escape the treatment and multiplication of their progeny can return the trees to a state of decline if not checked in time.

However, there is no apparent reason why the treatment cannot be repeated at intervals for an indefinite period. The increased yields are sufficient to pay for it several times over during the effective period of the treatment.