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NEMATODES IN AVOCADOS

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Many plant parasitic nematode species and possible plant parasitic nematode species have been found in California soils in which avocados are growing. Only one of the approximately ten plant parasitic species found around avocado has been shown to be an important pest of this plant. This species has so far only limited distribution in the avocado plantings in southern California.

The common root-knot nematodes which attack over 1700 different plants have been reported to attack avocado, but are not known as pests of the avocado. The three species of root-knot nematode common in California did not attack avocado seedlings in greenhouse tests at Riverside.

Radopholus similis, the burrowing nematode, an important pest of avocado and citrus in Florida, has not been found in California fields.

The only nematode pest that has been seen doing injury in the field to avocados in California is **Pratylenchus vulnus**, a root-lesion nematode. Greenhouse tests have confirmed the pathogenicity of this nematode to avocado, and preplant fumigation for this nematode has given excellent tree response.

Root-lesion nematode disease of avocado has only been seen in Ventura where avocados have been planted after walnuts. Trees were stunted, feeder roots were scarce, and the trees appeared more susceptible to frost injury. Soil and avocado root samples contained the root-lesion nematode.

FIELD TEST

A preplant fumigation test was done in February 1957 to a portion of land that had previously grown walnuts for 25 years and was infested with root-lesion nematode. D-D (1,3 dichloropropene-dichloropropane mixture) at 120 gal./acre was applied by chisel application at a depth of 14 inches. Avocados (var. Zutano) were planted 3 months after fumigation. This test included 15 trees in fumigated and 15 trees in unfumigated soil.

One year after fumigation the treated tree sites had trees that were approximately twice the size of the trees growing in the nematode infested soil. No root-lesion nematodes were recovered from around the vigorous growing trees in fumigated soil. All the tree sites in untreated soil contained root-lesion nematodes.

The second year after fumigation trees in the fumigated sites continue to show about twice the growth of the trees in the unfumigated soil (Fig. 1). Soil samples again showed

root-lesion nematodes around the poor-growing trees and no nematodes around vigorous trees.

GREENHOUSE TESTS

Twenty-one avocado seedlings (var. Mexicola) were planted in 10-inch clay pots in steam sterilized sandy loam. Two weeks after planting, 7 pots were infested with 100 **Pratylenchus vulnus** and 7 pots with approximately 1000 **P. vulnus**.

One year after infestation, two 50 cc soil samples and two grams of roots were taken from each pot and the nematodes extracted. Dry weights of the plants were taken.

There was a marked reduction in size of all the plants infested with nematodes (Fig. 2). Feeder roots were lacking in all the pots infested with the root-lesion nematode **P. vulnus** was recovered in large numbers from all the soil and root samples in all the pots that were infested. No root-lesion nematodes were recovered from the healthy check plants (Table 1). The dry weights of the uninfested plants were significantly higher than the dry weight of the infested plants (Table 1).

Figure 1. Three-year-old avocado in the field. Grown in unfumigated soil at left, fumigated soil at right.

Table 1.—Dry weights of avocado plants and P. vulnus recovered in the soil and roots.

Treatment	Dry wt. of plants (g)	P. vulnus per 100 cc soil	P. vulnus per 2 g roots
100 P. vulnus	54.8	183.9	63.4
1000 P. vulnus	38.4	159.6	47.3
Check	202.3	0	0

Figure 2. Avocados grown in the greenhouse. From left to right, check, 100 P. vulnus, 1,000 P. vulnus.

DISCUSSION

Results of these tests show that **Pratylenchus vulnus** can cause extensive damage to young avocado trees. Preplant fumigation with 1,3 dichloropropene-dichloropropane (D-D or Telone) would be indicated when this nematode is present in land to be planted to avocado. Walnut orchards in California are usually infested with **P. vulnus** and the planting of avocado after walnuts would probably result in root-lesion nematode injury to avocados.

Investigations and control of nematodes that occur in avocado plantings are continuing at Riverside.