THE RELATIONSHIP BETWEEN SOIL AMENDMENTS AND NEMATODES IN AN AVOCADO GROVE

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A new strategy for managing *Phytophthora* root rot of avocado is to promote soil conditions that suppress *Phytopthora cinnamomi.* Suppressive soils have high levels of calcium and organic matter and a reduced incidence *of Phytophthora* root rot. Applying a calcium source and an organic mulch to an avocado grove could simulate a suppressive soil and also benefit avocado production by conserving water, controlling weeds, and reducing nematode populations.

Practically nothing is known about nematodes in avocado groves. Yet these soil-inhabiting roundworms feed on roots, transmit plant viruses, contribute to organic-matter decomposition, and may indicate soil quality. Plant-parasitic nematodes may affect avocado root growth directly. Other nematode groups than the plant-parasites (bacterivorous nematodes, fungivorous nematodes, and omnivorous nematodes) also may affect avocado — but indirectly, by feeding on the bacteria and fungi that break down the organic mulches applied to a grove soil.

The present study was initiated as the nematode component of a long-term investigation implemented by Drs. John Menge and Howard Ohr at South Coast Field Station that is evaluating soil amendments as a new management practice for avocado production. Our goal is to determine how nematode biodiversity and abundance affects avocado growth and organic mulch decomposition in a young 2-yr-old avocado grove. We are comparing the effects of an untreated control and a fungicide (Ridomil) with alfalfa hay and gypsum (CaSO4). We have monitored the tree canopy volume, fruit biomass, alfalfa hay decomposition, microbial activity, soil properties and nematodes in an avocado grove throughout a six month period.

Decomposition was monitored using 100 litterbags constructed of nylon windowscreen and filled with 10 g alfalfa hay. Twenty litterbags were assayed at initiation of the study. Eighty litterbags were placed in the grove and then retrieved and assayed on four dates throughout the study. Microbial activity of soil and litter samples was determined using the substrate induced respiration (SIR) technique.

Data analysis is continuing, but general relationships among nematodes, alfalfa mulch, and avocado growth seem evident. Trees with alfalfa hay had greater fruit biomass, soil microbial activity, and nematode abundances than did untreated control trees or trees with Ridomil or gypsum. Little alfalfa hay remained in the litterbags after six months. Based on the composition and abundance of nematode species, plant-parasites did not appear to be a major component of the nematode community. Instead, the community seemed dominated by bacterivorous nematodes. Whether or not any shifts in

bacterivorous species correlate with patterns of microbial activity, root rot, alfalfa hay decomposition, or avocado growth and yield is an issue that our future analysis will focus on.