ABSTRACT

Effects of Plastic Mulching and Soil Chemicals on Foliar and Soil Nutrient Levels in Citrus, Coconut, Coffee and Cucumber Fields, Soil Microbe Populations and VAM

Laura Rosa Ogle

Experiments were conducted on citrus, coconut and coffee crops to evaluate the effects of soil treatment on foliar and soil N, P and K, soil pH, soil microbe population densities and VAM abundance in citrus. Similar analyses of foliar and soil nutrients and other soil characteristics were conducted for cucumber experiments being performed by the supervisor of this thesis, Dr. Phyllis Coates-Beckford, with some input from the author of this thesis. The cucumber experiments were investigating the influence of (1) clear and black plastic mulch, nematicide, fungicide and fertilizer, (2) the time of year of solarization, (3) the thickness of plastic used in solarization and (4) the duration of solarization on soil nematode population densities, plant growth and yield.

The soil treatments for the tree crops were: (1) mulched once for three to six months with 0.4-mm-thick black or clear plastic and fertilized subsequently, (2) mulched in two successive years for three to six months each year with 0.4-mm-thick black or clear plastic and not fertilized, (3) not mulched and either fertilized

or not fertilized, (4) not mulched and treated with Banrot 40WP or Furadan 10G applied at commercially recommended rates and fertilized.

There were occasional significant differences amongst treatments in soil nitrogen levels for the cucumber crops and in soil pH for citrus and cucumber immediately after mulching. There were no significant differences amongst treatments in foliar N and foliar and soil P and K for any of the tree and cucumber crops.

There were no significant differences amongst treatments in either soil microbial population densities for the tree crops or VAM abundance in citrus. For cucumber, the population densities of soil fungi sometimes were significantly lower in clear-plastic-mulched plots than in black-plastic-mulched and non-mulched plots at the end of the mulching period.

Keywords: Laura Rosa Ogle; plastic mulching; soil nematicide, fungicide and fertilizer; citrus; coconut; coffee; cucumber; foliar and soil N, P and K levels; soil pH; soil microbe population densities; VAM in citrus.