

Development of a Novel, Low-input, Environmentally Safe, Effective Method for Exclusion of Ants From Ornamental Plants

Harry H. Shorey

Ants are major pests of ornamental horticulture. They tend, protect, and obtain food from honey-dew-producing aphids, mealy bugs, and soft scales, which thereby become more persistent as pests in ornamental nurseries and gardens. In nature, ants are kept away from some potential food sources through the action of naturally occurring chemicals that apparently have evolved as effective ant repellents.

We have banded trees and shrubs of a variety of species, as well as rose bushes, with natural ant repellents that were found in our preliminary studies to be most effective in excluding ants. Pest ant species involved in this research include the Argentine ant, the native fire ant, and the native gray ant. The bands in some experiments have consisted of repellent chemicals mixed in known concentrations into stickem or tree tanglefoot, with the mixture then being incorporated into cotton string. We have experimented with a variety of other banding techniques, including repellent paste, delivered from a "squeeze-bottle" and formulated into a band around the plant stem or trunk, and "ant tape," made by placing the repellent chemical on sticky tape, covering it with a wax-paper surface, and wrapping it around the stem. Much of this field research has been backed up by bench-top experiments, in which we have tested a variety of chemicals and banding procedures against colonies of ant species in the laboratory.

Farnesol is the most active naturally occurring chemical that we have found in our tests for repellency against Argentine ants. Farnesol excludes this species from banded ornamental trees for over 3 months. The potent activity of farnesol is closely matched by its isomer, nerolidol; however, the latter material loses its activity rapidly under field

conditions, apparently becoming chemically modified on contact with outdoor light and atmospheric conditions. We are currently conducting research to find ways to stabilize the activity of nerolidol in the field.

Farnesol also is as repellent as any material we have tested against native gray ants and native fire ants. With these latter species, certain other chemicals, including methyl eugenol and methyl salicylate, also have been found to be highly active in excluding the ants from banded plants.

We have initiated a study at the UC Kearney Agricultural Center to determine the phytotoxicity of plant-banding chemicals (farnesol, methyl eugenol) and carriers (stickem, tree tanglefoot) to trees and rose bushes on which they are banded. Various combinations of these materials have been banded around the stems of young plants and will be reapplied at several-month intervals. The plants will be observed over a several-year period to determine the amount of phytotoxicity.

Both farnesol and nerolidol are presently registered for use on all raw agricultural commodities without requirement for a tolerance. They have no known harmful effect to humans or other vertebrates. They are inexpensive; nerolidol costing only 3 cents per gram and farnesol 7 cents per gram. We have initiated contact with a variety of specialty chemical companies in the hope that they will become interested in developing the commercial usage of farnesol and nerolidol as ant repellents.

Harry H. Shorey, Department of Entomology,
University of California, Davis