

FINDING ALTERNATIVE WAYS TO CONTROL ALIEN PESTS

PART 3: Biological Insecticides Kill Pests Naturally

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Biological insecticides, or bioinsecticides, consists of microorganisms including viruses, bacteria, fungi, protozoa and nematodes that cause diseases and eventual death of insects. Many of these biological agents are not yet commercially available in Hawaii because of concerns about their possible effects on native insect populations and stringent state quarantine laws that have remained unchanged until recently.

The only biological insecticide that is currently available in Hawaii is the bacterium *Bacillus thuringiensis* of B.t., sold as Biobit, Dipel, Gnatrol, MVP, and Thuricide. B.t. produces a toxin that, when ingested, causes gut paralysis and eventual death.

Effectiveness of B.t. varieties is specific to caterpillars, and fungus gnat and mosquito larvae. Since B.t. does not kill immediately, users may incorrectly assume that it is ineffective. The affected insect stops feeding within hours of ingestion, but it takes one to two days longer for death to occur from starvation and multiplication of bacteria in the insect's blood.

B.t. rapidly degrades in sunlight, so applications should be made in the late afternoon since most caterpillars feed after dusk. In Hawaii, B.t. is very effective against the green garden looper, a common pest on ti leaves, and

should also be effective against the newly discovered bougainvillea caterpillar.

Nematodes at Work

Last year, the Hawaii Department of Agriculture approved the insect parasitic nematode, *Steinernema carpocapsae*, for sale in Hawaii under specified conditions to assure that the product contains only live *S. carpocapsae* and no contaminants. The nematode should be effective against soil and boring insect pest including cutworm, armyworms, wireworms, and caterpillars of the banana moth occurring in moist, humid micro-environments.

The nematode releases a symbiotic bacterium that infects the insect and actually causes death. Insect parasitic nematodes will not be effective against foliar feeding (chewing or sucking) insects because nematodes desiccate without a moist environment. More information may be found at the following: <http://www.oardc.ohio-state.edu/nematodes/biologyecology.htm>

Fungus Among Us

The fungus *Beauveria bassiana* is a naturally-occurring insect disease that has been formulated as a bioinsecticide and available on the mainland as Botanigard and Naturalis. These products are not yet available in Hawaii. These insecticides claim effectiveness against numerous pests including aphids, mealybugs, spider mites, thrips and whiteflies. *Beauveria*

bassiana already exists naturally in Hawaii and commercial formulation of the fungus cannot persist in the environment to affect any non-target organisms, including native insects.

The use of biological insecticides, commercially-produced parasites and predators of insects offer pest control strategies that minimize the use of chemical insecticides. Recent changes in state quarantine laws will streamline approval of these insecticides in Hawaii.

Scientists at the University of Hawaii and the United States Department of Agriculture-Agricultural Research Service plan to collaboratively pursue testing and approval of these biological control agents for use in the state.

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More... PART 1: Limitations of Classical Biological Control and Conventional Insecticides

PART 2: New Insecticides Introduced to Fight Old Pests

PRECAUTIONARY STATEMENT

Use pesticides safely. Follow the pesticide label. Consult with the Cooperative Extension Service or the Hawai'i State Department of Agriculture for authorized special local need registrations or additional information. The user is responsible for the proper use, application, storage, and disposal of pesticides.

DISCLAIMER

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