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PlantHealth

Sizing up spinosad

by DR. DAVID L. MORGAN

Spinosad is a newer class of pesticide that shows promise of becoming an excellent part of an environmentally sensitive pest-management program. It's approved for use in organic growing and is an environment-friendly material. It's a quick-kill product, and insect control is effective within one to three days.

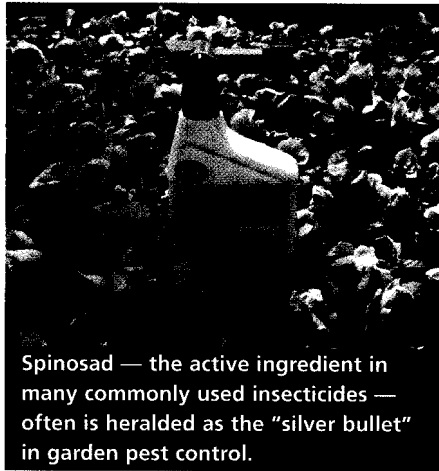
What's more, spinosad (pronounced "spin-OH-sid") is labeled for a very large and diverse number of garden, greenhouse and field pests. It's most effective on lepidopterous (moth and butterfly) caterpillars and western flower thrips. Spinosad also is effective against some beetle larvae, flies, red imported fire ants, pod gall midges, sod webworms, armyworms, bagworms, borers, loopers, sawflies, leafhoppers and leafminers. It may be labeled to control other horticultural pests, depending on the formulation. However, spinosad is not effective against sticking insects, like aphids and whiteflies.

Perhaps the best feature of spinosad-containing products is they are safe for use by applicators — including home gardeners — and are harmless to a large number of beneficial insects. Spinosad has moderate toxicity toward adult butterflies and many insect predators and parasites, including lady beetles, lacewings, big-eyed bugs and minute pirate bugs.

Though spinosad is not acutely toxic to birds, wildlife or fish, it is highly toxic to beneficial bees if sprayed on them directly. However, it is negligible if applications are made when bee activity is low and spray deposits have been allowed to dry.

Additionally, spinosad falls into the safest human health category. It's been so well-received that it has been registered for 250 crop uses in more than 70 countries. Spinosad has been classified by the World Health Organization (WHO) as an insect-control product "unlikely to present acute hazard," which is the most favorable of the five classifications WHO recognizes.

Resistance to spinosad. There are conflicting reports whether spinosad really is the final answer in pest-care management. Many entomologists agree it's an excellent product, but they caution that



Spinosad — the active ingredient in many commonly used insecticides — often is heralded as the "silver bullet" in garden pest control.

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when overused or misused, spinosad may cause resistance to develop. And though it's labeled for spider mites — one of the most bothersome garden pests — it's only moderately effective on them.

Dow AgroSciences LLC, Indianapolis, recently suspended the sale and use of its spinosad products in Broward County, FL, and in a portion of Palm Beach County,

FL. The action was in response to evidence that western flower thrips in those areas had developed resistance to a spinosad product.

According to Dow AgroSciences, Florida's long growing season combined with thrips' rapid reproduction cycle create an environment conducive to developing insecticide resistance. Dow AgroSciences also cancelled the use of its spinosad product on collards and other leafy *Brassica* crops in Georgia as a safeguard against resistance in diamondback moths. In a released statement, Dow AgroSciences said spinosad was misused and overused by a small minority of growers throughout the state.

How likely is it that resistance might occur as a result of prudent use of spinosad products? According to Dr. Michael Merchant, urban entomologist with the Texas AgriLife Extension Service, Dallas, the answer to that question is "hardly."

As Merchant explains, for backyard gardeners and industry professionals who use relatively small amounts of pesticides or rotate their pesticides frequently, selection pressures for resistance would be highly unlikely to develop. Spinosad has been found to possess no mutagenic potential.

The origins of spinosad. Spinosad, as we know it today, is not particularly new, having been granted organic status by the USDA National Organic Program in 2003. In fact, few home gardeners — and not all professionals — are aware of its potential uses.

Spinosad has an interesting history dating back to 1982, when a new species of actinomycete bacterium — *Saccharopolyspora spinosa* — was discovered on the Caribbean island of St. Thomas by a vacationing American scientist.

The scientist found the bacterium in the soil at an abandoned rum distillery, and after testing the substance in a lab, determined that the fermentation juices from this new organism had insecticidal properties. Oddly, the bacterium has not been found anywhere else in nature. Spinosad is the first active ingredient proposed for a new class of insect-management products known as the Naturalytes.

How does spinosad work? Spinosad is an insect nerve poison that works both by

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ingestion and by making contact with the pest. It's highly active at low application rates, has little odor, is nontoxic to ornamentals and turfgrasses where labeled, and has a low residual in soil. Spinosad quickly degrades in sunlight on a sprayed plant. The chemical has been compared to *Bacillus thuringiensis* (*Bt*) — also a bacterium and a standard weapon in the war against caterpillars. *Bt* is a safe, selective product, but it lacks staying power. Instead of *Bt*'s residual of one or two days, spinosad keeps working for as many as four weeks and acts on pests more quickly than *Bt*. Additionally, spinosad targets thrips, which *Bt* doesn't harm at all.

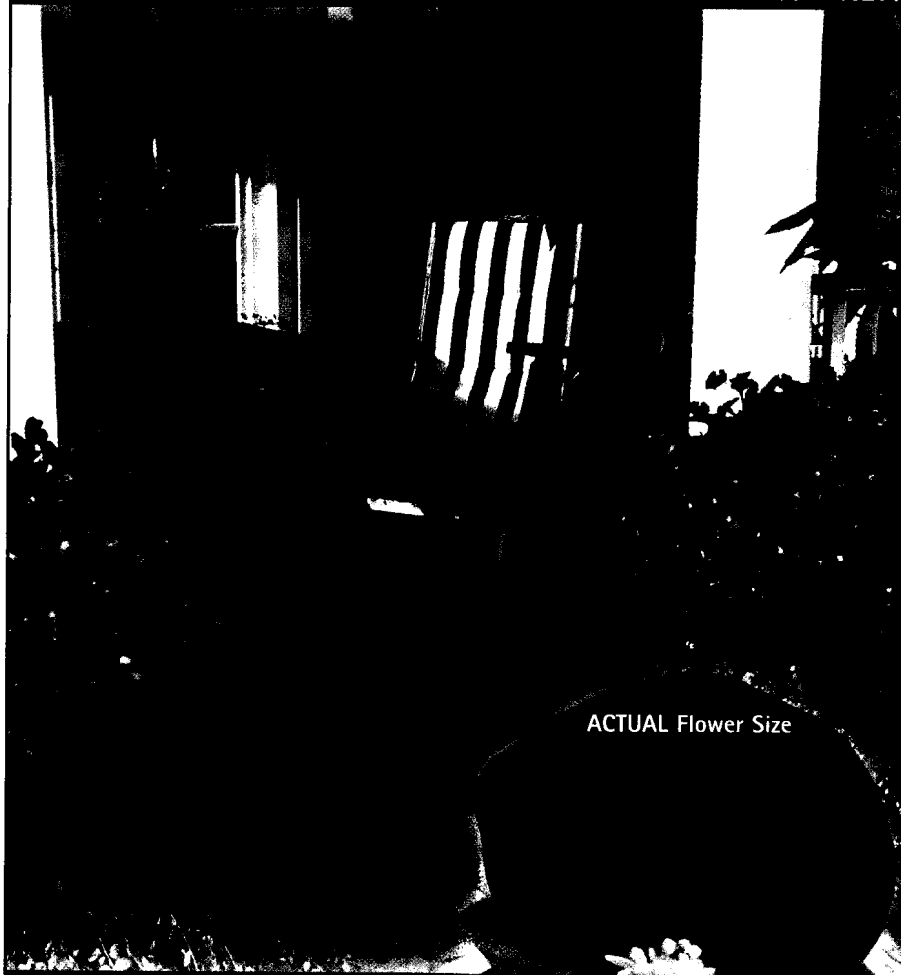
Products that contain spinosad. The most commonly known products to contain spinosad include Monterey Lawn and Garden Products Inc.'s Insect Spray and Sluggo Plus, as well as Bayer Environmental Science's Laser. Voluntary Purchasing Group also offers products containing spinosad, such as its Bull's-Eye Bioinsecticide and its Ferti-lome Borer and Bagworm & Caterpillar Spray. Safer Brand's Fire Ant Bait contains spinosad, as does Dow AgroSciences' Entrust — a wettable powder version of spinosad that has been labeled for use on a wide variety of insect pests on organic crops, fruits and vegetables.

Justice Fire Ant Bait from Dow AgroSciences and Voluntary Purchasing Group's Ferti-lome and Come and Get It Fire Ant Killer are all labeled as fire ant baits and are sold to commercial applicators that work with home landscapes. What's more, Dow AgroSciences' Conserve SC (various formulations) is labeled as a liquid spray for turfgrass and ornamentals.

In 1999, the EPA awarded spinosad with the Presidential Green Chemistry Challenge Award for chemical products that reduce impact on human health and the environment.

Although there is no "silver bullet" to control all pests within the gardening palette, new insecticidal products containing spinosad appear to take the best shot, particularly in our chemically sensitive climate.

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