

Beetles Team With Insecticides To Control Apple Pests

One of the most important steps for apple growers who are interested in improving or adopting Integrated Pest Management (IPM) practices this year is to carefully plan their orchard pesticide program before the spring spraying season begins.

Although IPM in a broad sense may involve special strategies for controlling diseases, insects, weeds and a variety of other orchard pests, in the Mid-Atlantic region IPM is primarily centered around controlling the European red mite and other harmful mite species with the aid of beneficial insects and mites.

Mite Predators

The key to developing a successful integrated mite control program lies in orchard management which is designed to create a favorable environment for beneficials. In most apple growing regions throughout Delaware, Maryland, Pennsylvania, New Jersey, Virginia and West Virginia, the *Stethorus punctum*, a lady beetle, serves as the cornerstone of IPM programs. From May through late summer, the small black beetles can be found in nearly all commercial orchards feeding on two-spotted spider mites and European red mites. In the spring and early summer, the rust mite also serves as a food source for the ladybird beetles as they begin to reproduce and build in number.

Tim White of Crop Management Strategies, an agricultural consulting and research firm in Hereford, Pennsylvania, notes that while *S. punctum* is the number one beneficial throughout most of the mid-Atlantic region, a number of other predators may also help to control mites and certain insect pests.

Among those found in Pennsylvania and neighboring states are the predacious mite *Amblyseius fallacis* (a key predator in Michigan, New York and New England), and the *Aphidoletes aphidimyza*, a midge which preys on green apple aphid. Other beneficial species include predatory thrips which feed on mites, as well as lacewings which attack a wide range of insect pests.

"While each of these predators plays a role in biological control, the *S. punctum* is by far the most important beneficial in this part of the country," White says. "When a grower wants to build a strong IPM program, the first objective is to develop an orchard environment where the ladybird can survive and flourish. Once you've established a management program that supports the ladybird beetle, chances are good that you'll find one or more of these other predators are also present and aiding in control of certain insect pests."

Selective Pesticides Important

As White and other fruit specialists point out, given the right orchard conditions, the *S. punctum* will soon multiply to the point where it is capable of effectively controlling mites with little or no assistance from miticides. In economic terms, biological mite control can also pay attractive dividends to the grower by eliminating the need for one or more miticide sprays during the season. For each miticide spray excluded, savings in chemical costs alone often exceeds \$15 per acre.

To ensure the survival of predators throughout the growing season, however, careful selection of pesticides and timing of ap-

plication are critical. For controlling most pests, this means that organophosphate (OP) insecticides are preferred over pyrethroids and most carbamates.

This is particularly important during the period between petal fall and late summer when predators are breeding and building up to population level sufficient to keep mites from causing serious damage to the trees.

According to Dr. Doug Pfeiffer, extension entomologist at the Virginia polytechnic University Shenandoah Valley Research Station at Steeles Tavern, Virginia, growers who are interested in developing a strong IPM program need to be especially aware of the impact of pyrethroids on beneficials.

"We encourage growers who are interested in IPM strategies to avoid applying pyrethroids in their orchards, particularly after petal fall," Pfeiffer says. "Data from a number of studies shows that mite populations generally increase their pyrethroid applications, which we feel is due to the toxicity of the chemicals to important predators such as the *S. punctum*."

OP Resistance

For controlling most major insect pests in IPM programs, organophosphate (OP) insecticides are generally recommended by universities in post-petal fall cover sprays. The primary reason why many OP insecticides fit well in IPM programs is because predators such as *S. punctum* display a degree of tolerance or resistance to these chemicals.

In essence, this is due to the fact that for more than two decades, many successive generations of these predators have been exposed

to continuous application of the OP compounds in commercial orchards. As a result of this long-term exposure, selection for tolerance has occurred. Today, key predators such as the *S. punctum* are relatively insensitive to most commonly used OP materials, including such insecticides as Lorsban, Guthion, Imidan and Penncap.

The newest of these OP materials, Lorsban 50W insecticide, has been extensively evaluated in IPM situations over the last four years by many growers in the mid-Atlantic region, as well as by university and extension entomologists throughout the U.S.

Dr. Pfeiffer notes that in Virginia, as well as many neighboring states, Lorsban is recommended for a variety of

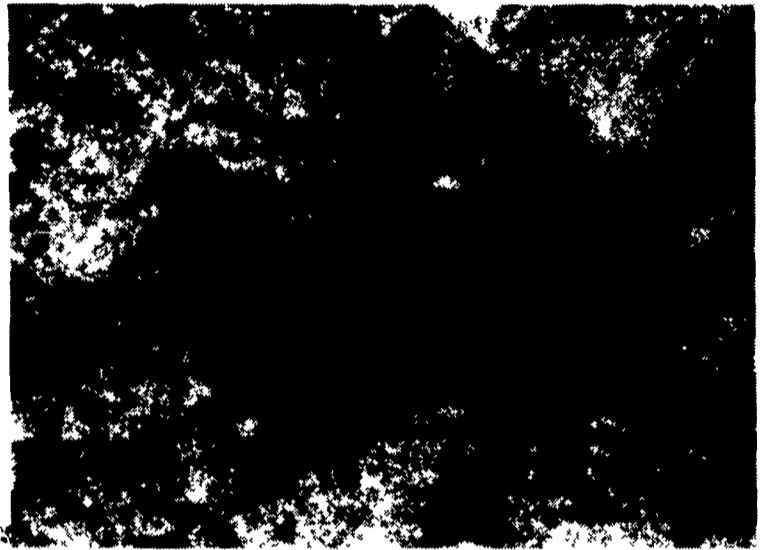
apple pests including codling moth, San Jose Scale crawlers, leafrollers, plum curculio and others.

"Our experience with Lorsban 50W thus far has shown that it fits very well in IPM programs," Pfeiffer says. "It's regarded as a general or broad spectrum product and is one of the few materials we recommend quite frequently for San Jose scale crawler sprays."

Marshall Kuntz, a partner in the tree fruit consulting firm of Rice and Kuntz, which serves several dozen growers in Adams County, Pennsylvania, agrees that insecticide selection and timing of application are key factors in protecting beneficials.

"In our experience, we've found that sulfur, pyrethroids and carbamate-type pesticides such as

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The ladybird beetle, pictured here in its larval (left) and adult forms, is cornerstone of most integrated pest management programs used by Pennsylvania apple growers.

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