Research finds predatory insects valuable players in IPM strategy

COLLEGE PARK, MD—Are homeowners going to extremes in the quest for an insect-free garden?Dr. Michael Raupp of the University of Maryland thinks so, and he has the research to back it up.

Recent surveys conducted by the University of Maryland's Agricultural Experiment Station found that nine out of 10 Maryland homeowners use pesticides to rid their gardens of what they consider to be insect pests. But according to Raupp, a professor of entomology at the University of Maryland, College Park, as much as 95 percent of this pest control is unnecessary, and it is likely better to do nothing, so the beneficial predators can go to work.

The use of predator insects as a means of biological control is the center of Raupp's most recent research project, and it's a form of biological pest control he believes will be an important part of the future.

Raupp: Tests use "real world settings."

Most of the biological control research being done concerns food crops, but Raupp points out that the production of ornamental plants in greenhouses and nurseries is Maryland's largest agricultural crop industry.

Learning curve—There's still a lot left for researchers to uncover and learn about the predator insect control concept. According to Raupp, the interactions between predatory insects and their prey is virtually unknown for systems involving ornamental plants.

"A greater understanding of the potential and limitations of biological control will benefit virtually all of Maryland's citizens directly by reduced losses to pests," says Raupp, "and indirectly through reduced environmental contamination caused by unnecessary pesticide use when alternative controls, such as natural enemies, are available."

Raupp's study is a part of the Maryland Agricultural Experiment Station's Integrated Pest Management program— a program that uses multiple techniques—with the emphasis on cultural strategies—to combat pests in the most efficient manner.

"A vital component absent from current landscape and nursery IPM programs is classical biological control," Raupp says. "My research provides a foundation for incorporating classical biological control into IPM programs for landscape plants and nurseries in Maryland."

> The Korean ladybug is a natural enemy of the Euonymus scale, which attacks the Euonymus plant, a favorite in many landscape designs.

One of the predators currently studied by Raupp and two graduate assistants is the Korean ladybug, *Chilocorus kuwanae*. Raupp and his assistants hope to determine which pests are most vulnerable to the ladybug, and how quickly it can establish control over those pests in a natural setting.

The bug's a natural—The ladybug is a natural enemy of the Euonymus scale, an insect pest that attacks Euonymus plants, which are small trees and shrubs commonly found in the landscape.

Beyond its ability to thrive on the Euonymus scale, Raupp's research has found that the Korean ladybug can also survive on the San Jose scale, a pest that attacks fruit trees and many types of common landscape plants.

According to Raupp, the Korean ladybug's palate favors the Euonymus scale, however, about 10 percent of the Korean ladybug population studied in research prefers the San Jose scale.

Raupp realizes the importance of field research when it comes to ultimate acceptance of a pest control strategy.

"For the classical biological approach to be accepted as a viable management option, its merit must be evaluated in 'real world' settings," says Raupp. In initial testing, he and his assistants released the Korean ladybug at a housing project in Baltimore and several government facilities in Washington, D.C. The first 50 ladybugs were released in 1990.

There are now several thousand at the site. Many have migrated to plants on which they hadn't been released.

The bad news, says Raupp, is that the ladybug is not able to achieve successful control when the pest population is high.

When the pest population is moderate to low, and environmental conditions are favorable, the ladybug appears to maintain scale populations below damaging levels.

One year after the study began, Raupp says he did observe a dramatic decline in pest populations at several locations where beetles were released. "However, at several sites nearby, where no ladybugs were present, scale populations also declined.," says Raupp, who concludes that other factors such as bad weather were responsible for the pest reductions.

Questions remain—Raupp's research raises other biological control questions, such as which environmental factors favor pests, weaken plants and put predators at a disadvantage?

"The bottom line here is that we have to be careful," says Raupp. "Careful experimentation will help us avoid making premature recommendations concerning the use and efficacy of biological control agents such as ladybugs."

Some researchers believe that parasites, like wasps, which lay their eggs inside the pests, may be better at controlling pest populations than predators.

According to Raupp, another approach-which will be tried soon combines parasites with predator control.

A Korean ladybug feeds on Euonymus scale.