

IPM Projects: Learning to Work with the Agricultural Ecosystem

In addition to PFI projects with management of insects in strip intercropping, cooperators have been working in two projects that seek to expand the toolbox for insect management in corn and alfalfa. In 1995, PFI and ISU entomologists began a two-year investigation of biological control of the alfalfa weevil and the European corn borer. With support from the Leopold Center for Sustainable Agriculture, each year two farms worked on alfalfa weevil and two farms concentrated on corn borer. Integrated Pest Management (IPM) involves field sampling for pests to see if they have reached the threshold at which treatment is justified. "Treatment," as we understand more about the ecology of insects, increasingly includes more practices than spraying insecticide. Among these, "biological controls" manage pests by manipulating the agroecosystem.

Part of IPM research today is refining those thresholds. There are good economic reasons for this. Let's say you have scouted your hay field and found an average of two alfalfa weevil larvae per stem. Present guidelines say that is the threshold above which you will suffer losses if you don't do something. (Incidentally, a certain amount of insect feeding actually stimulates alfalfa leaf production, and that response also happens to peak at two larvae per stem.) But what if you knew half those alfalfa weevil larvae would be dead in a week? You might take a wait-and-see approach.

In fact, several organisms can devastate weevil populations. A variety of tiny wasps lay their eggs in the weevil larvae, and a common fungus, *Zoopthora phytonomi*, attacks the larvae under the right conditions. If farmers could make their own judgements about the "health" of alfalfa weevil populations, they could often save money and avoid insecticides, which may be harder on the weevil's enemies than on the alfalfa weevil itself. The study was designed to see if farmers can learn the necessary skills. The answer according to this project is "yes." As Figures 5 and 6 show, there was very good agreement between the scouting information collected by PFI cooperators and ISU entomologist Kris Giles.

Biological control was the other focus of the project. One promising biocontrol is the use of unharvested strips described by Jeff Klinge and Mark and Julie Roose. Findings from this project are leading to more research on these unharvested strips. Corn borer biocontrol was addressed both by the Leopold Center study, as reported by Joe Fitzgerald, and by the SARE-funded (Sustainable Agriculture Research and Education, USDA) research described by Dennis McLaughlin, Ron and LaDonna Brunk, and Doug Alert and Margaret Smith. ISU Entomologist Les Lewis also provides background on that project in the following pages.