SCIENCE & EDUCATION Impact
Benefits from USDA/Land-Grant Partnership

It's a Bug Eat Bug World

Nature yields effective weapons in the pest control war.

One creature decapitates another and lays its eggs inside the victim's carcass. The hatched larva eats its way out. Science fiction? Hollywood horror? Nope. It's called biological control. USDA and Land-Grant university scientists are finding natural organisms from viruses to sheep that often are effective warriors in the battle against pests. In other cases the researchers only need to find ways of tipping the biological scales against the bad bugs. Research focuses on finding on-going solutions to pest problems that are cost effective and environmentally friendly.

Payoff

- **Cotton's friend.** The tobacco budworm and bollworm cause $169 million damage annually to cotton across the United States. **Arkansas** researchers are studying a wasp that lays its eggs in the pupae of the pests. In Australia, the wasp cuts larvae survival by 20 percent. A similar effect would save $3 million in Arkansas alone.

- **Punch in the snout.** With 1,200 acres of baby eucalyptus in **California**, eucalyptus snout beetle control could have cost up to $36 million, wiping out the industry. **California** researchers imported and released a tiny wasp that finds and destroys the insect's eggs, and the snout beetle has all but disappeared.

- **Out with a virus.** Researchers in **Delaware** found that sprays containing viruses could control gypsy moths. The technique has helped cut insecticide spraying from 67,000 acres to almost zero, and it saved about $2 million.

- **Thistle busters**. Scientists at **Virginia Tech** established field nurseries to raise the rosette weevil so they can supply the weevil to growers to control thistle infestations in pastures. Use of the weevil has eliminated the need for herbicides in some pastures. The weevils are being used in eight states.

RESEARCH, EXTENSION AND EDUCATION AT WORK

Science & Education Impact

Benefits from USDA/Land-Grant Partnership

- **Geranium juice**. Japanese beetles can devour rose blossoms quickly and attack other plants such as vegetables and trees. **Kentucky** entomologists found that juice from geranium petals paralyzes them for up to 18 hours. About a third of the beetles don't survive the period of stupor, and those that do develop a craving that brings them back for more.

- **Nifty nematodes**. Researchers at **Ohio State** found that one strain of nematodes, tiny parasitic worms, may be useful in seeking out and destroying white grubs, a hard-to-find turf pest. Another strain shows potential for controlling grape root borer, a major pest of the Ohio grape industry.

- **Purple plant eater**. Purple Loosestrife is a noxious weed that invades waterways and crowds out native vegetation, destroying wildlife habitat. **South Dakota State** researchers are using beetles raised by inmates at the state prison to slow the spread of the weed. Similar efforts are under way at **North Dakota State**, **Virginia Tech** and other places.

- **Spurge scourges**. Leafy spurge causes more than $144 million in losses in four northern Great Plains states alone. Cattle won't eat it, and it crowds out native vegetation. Because the weed is so tough and often grows on low-value rangeland or in difficult-to-reach areas, chemical control often is not cost effective or possible. Researchers in **Montana, North Dakota, South Dakota** and **Wyoming** are using flea beetles, sheep, goats and aggressive range plants to rid rangeland of the weed. Last year researchers released more than 20 million flea beetles to ranchers and land managers in seven states. At some research sites, the beetles reduced leafy spurge by nearly 90 percent in two years. They found that sheep grazing can reduce infestations by 50 percent or more.

- **Aerial attack**. Helicopters swept across parts of **Idaho** dropping ping-pong ball sized packages containing flea beetles on difficult-to-reach leafy spurge patches. The bug bombs cut control costs from $150 to $250 per acre to about $7.50.

- **Ant assault**. Fire ants in Tennessee have a painful sting, build large mounds and attack newborn calves, crops and electrical equipment. Annual damage is $1.3 million. **Tennessee** researchers found a bacteria and two species of flies that prey on the ants, weakening colonies and tipping the biological scales in favor of native ants and other insects.

- **Weed eaters.** Weeds reduce alfalfa yields, can cause off-flavors in milk and can be toxic to livestock. In **California's** Imperial Valley, researchers found that sheep are efficient weed removers, eliminating $40 per acre in herbicide applications and $35 per acre in harvesting costs. Producers also collect a grazing fee, about $34 per acre. Sheep perform as well on weedy alfalfa as pure alfalfa.

- **Pecan protectors.** Research in **Georgia** found 53 species of insects that damage the state's pecan crop. They also found dozens of beneficial bugs that feed on the bad ones. With that information they selected pesticides that targeted only the worst bugs and developed cultural techniques that favor the good bugs. Changes have been adopted on about 90 percent of pecan acres. The cost for controlling aphids has been cut by $40 per acre on 150,000 acres. Control costs for nut pests have been reduced by up to $60 per acre on 75,000 acres. Total saving is as much as $10.5 million.

Cooperative State Research, Education, and Extension Service
United States Department of Agriculture

Cooperative State Research, Education, and Extension Service in cooperation with the Extension Committee on Organization and Policy, the Experiment Station Committee on Organization and Policy, the Academic Programs Committee on Organization and Policy, the International Programs Committee on Organization and Policy, and the Louisiana State University Agricultural Center.

April 2001