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Pest Busters

Creative thinking leads to innovative pest controls.

Pests come in all shapes and sizes — from mega weeds to microscopic worms and disease organisms. Farmers hate ‘em. Consumers pay for their damage in the form of higher prices. The best way to thwart pests is to outsmart them. Cultural practices like early or late planting can be successful. Pest resistance in crops often is the most reliable and cost-effective approach. Pesticides are effective, but costly and may have environmental impacts. Combinations of control tactics often work best. But pests are adaptable. And environmental limitations, susceptible crops and concerns for other insects and animals pose special challenges. That’s when USDA and Land-Grant university researchers really have to be creative.

Payoff

- **Fatal attraction.** Researchers at **Colorado State** found that carbon dioxide given off by corn attracts western corn rootworm larvae. They developed a formulation of granules that produces the gas to lure the pests away from the corn. The technique also is proving effective in attracting and trapping termites.
- **Fence of death.** Carbon dioxide also attracts biting sand flies to their human prey. At an elementary school, **Florida** researchers built a fence that used the gas and another chemical to attract the tiny flies to panels coated with mineral oil where the flies are trapped and die. In laboratory tests, the fence killed up to 200,000 flies per night. Parents and children at the school were pleased when the pests became less of a problem. Developers say the fence has potential uses ranging from backyards to athletic fields.
- **You collect what?** The entomology collection at **Montana State** with its 1.5 million specimens is a repository for the state’s insect knowledge, helping scientists, land managers, producers and others identify pests and beneficial species. The collection provided information that helped resolve litigation. Development of a parking lot in Glacier National Park was halted because data from the collection helped identify the area as environmentally sensitive. Entomologists studied

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cultural practices that led to the emergence of a new wheat pest after information from the collection showed the insect was native to the state and not a migrating pest.

- **Eyes in the sky.** Satellite images of forests reveal potential oak wilt sites in **Minnesota** research. The Minnesota Department of Natural Resources and the U.S. Forest Service have adopted the satellite imaging technique. As a result, forest inventories that could be completed only every 15 years by field crews can be completed in four years for less cost. Forest managers now can use this early warning to tackle forest disease problems sooner. **Virginia** researchers are using images from satellites and remote control aircraft to identify vegetation under stress from pest attacks. Once commercialized, the techniques will allow producers to precisely tailor and target control strategies. **Colorado** researchers are coupling those techniques with global information systems and geographic positioning systems to develop fertilizer and pesticide applicators that can be adjusted on-the-go for precise placement in the field.
- **Termite “fingerprints.”** Researchers in **Hawaii** have applied molecular genetics techniques, including DNA fingerprinting to follow the path and spread of termites from one location to another. By observing the “barcode” of DNA, researchers can tell whether an infestation is new or a recurrence of a previous colony. Termites cause \$100 million in damage annually in Hawaii and these techniques are now being applied in the field to control pests.
- **Head ache.** Most wheat diseases attack the leaves, but fusarium head blight attacks the grain head. **North Dakota State** researchers developed a computerized system that uses infrared video to assess spray coverage on the complex surface of a vertical grain head. Based on this research, extension specialists recommended low-cost modifications to sprayers and sprayer operation. Producers who made the modifications and newly approved fungicides increased net profit \$15 -16 per acre.
- **Detergent power.** Powdery mildew stunts the growth of flowering dogwood trees and reduces their beauty. **Tennessee** researchers identified a bicarbonate salt and

three household detergents that control powdery mildew in dogwoods. Using the compounds can cut fungicide use up to 70 percent.

- **Go, spot, go.** Because leafspot infects peanuts only under specific weather conditions, **North Carolina State** researchers developed a weather-monitoring system to alert peanut producers when the disease would be a problem. The leafspot advisory helps producers cut fungicide applications dramatically, saving them up to \$7 million per year.
- **Trapped.** Turnips lured sugar beet nematodes away from sugar beets in **Wyoming** research. If turnips were used as a trap crop to protect sugar beets on 7,200 acres in the state, producers would save nearly \$1 million in nematicides that are among the most toxic of agricultural chemicals.
- **Micro rate, mega impact.** Scientists at **North Dakota State** developed a micro-rate application plan for applying herbicides combined with seed oil to sugar beets. The practice cuts herbicide rates up to 75 percent. A survey showed more than 95 percent of sugar beet growers in the Red River Valley of North Dakota and Minnesota have adopted the practice, saving more than \$20 million. Researchers are adapting the practice to corn and other crops in the region.
- **What a way to go.** Studies in **Georgia** showed treating soil with poultry manure may reduce nematode numbers and limit crop losses. Adding nematode-attacking fungi to the manure makes it even more effective. Nematodes cause 23 percent of all disease losses on cotton, and losses can be as high as 70 percent in fields infested with some strains of the parasitic worm.



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