A Potent Weapon in the War on Gypsy Moths

By Terry Devitt

EDITOR'S NOTE: The feature this issue maybe should have been called FROM ACROSS THE VILLAGE (of Shorewood Hills) since it came from the UW-Madison News and Public Affairs Office.

Trees are very important features on most Wisconsin golf courses, and the threat posed by ever increasing numbers of gypsy moths is unnerving. Here at home in Dane County, the number of moths has taken a big jump. There aren't enough of them yet to cause serious defoliation, but we need to be concerned. In October, 2,246 moths were trapped in sample traps across the county. There is little comfort to me that we have never trapped one on our golf course; they are all around us.

Moths have been found in 53 of Wisconsin's 72 counties. More than likely they already have or soon will move into those which have escaped so far.

There are plans underway by the Wisconsin Department of Agriculture, Trade and Consumer Protection to deal with this pest. They are considering a quarantine of the sale of plants, trees, wood and forest products to slow the infestation. Under a quarantine, sales can continue, but only under strict inspection. They will decide whether or not to proceed on this front in January.

DATCP has sprayed a bacterial pesticide (B.t.) to knock down high moth numbers, but the moths return in a relatively short time.

Cotesia wasps have been released in northeastern Wisconsin. The wasps destroy moth larva. Mass trapping has also been used to disrupt mating patters. And in 1997 the state will start releasing a Japanese fungus that has seen some success in reducing gypsy moths populations in Michigan.

Where there is a problem, you can almost always figure someone at the UW-Madison has started looking for a solution. This report gives a new twist on research into a unique potential control for gypsy moths. MSM, Ed.

A ubiquitous tree that graces many city streets has given scientists an arsenal of new chemicals with which to fight the gypsy moth, one of the world's most feared defoliators.

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Plumbing the chemical depths of the green ash tree, Dale Norris, a College of Agricultural and Life Sciences entomologist, and graduate student Ingrid Markovic have extracted an array of natural chemical compounds that repel or poison gypsy moth larvae, the leaf-eating caterpillars with appetites the size of oak trees.

"Over the past 50 years, governments have spent hundreds of millions of dollars on gypsy moth research and control," says Norris. "But nobody bothered to look at the chemistry of plants that gypsy moths won't feed on."

Although the gypsy moth caterpillar will dine on any one of more than 300 different trees and shrubs, it exhibits a distinct aversion to the green ash.

"The caterpillars will starve to death before they'll feel significantly on it," Norris says.

"It is essentially immune from one of the most serious pests of plants, period."

That's because the green ash deploys a layered chemical defense, and Norris believes those same chemicals can now be used to defend hundreds of trees and shrub species now featured on the insect pest's menu.

Norris says that the green ash tree's first line of defense is a group of six to eight volatile chemical compounds that the gypsy moth caterpillar detects at a distance. "This mix of compounds sends the caterpillar in the opposite direction. They can detect these compounds without touching the tree."

If, however, a gypsy moth caterpillar accidentally drops on to the leaves of a green ash and is hungry enough to nibble, the tree deploys a second group of chemical compounds that quickly inhibit eating, and a third group that, when digested, poisons the caterpillar by disrupting its development.

"There is this range of chemistry, from highly volatile messengers that go out from the foliage and repulse the insect from several feet away, to relatively non-volatile compounds that deter feeding and lethally alter development and metamorphosis," Norris says.

These chemicals seem to work at very low concentrations — a few parts per million — and offer an apparently safe and environmentally benign weapon against the gypsy moth.

Norris and Markovic, working through the Wisconsin Alumni Research Foundation, have received a patent allowance on the green ash compounds. Norris envisions their use especially in sticky, protective strips wrapped around tree trunks and shrub stems as an adjunct or alternative to the aerial spraying of the caterpillar-killing bacterium, *Bacillus thuringiensis,* now the most widely used agent in the fight against the pest.

A tacky barrier, impregnated with the natural chemistry of the green ash and wrapped around a tree trunk or shrub stem, would be effective, says Norris, because gypsy moth caterpillars migrate daily up and down tree trunks and stems.

Interestingly, it is as caterpillars that gypsy moths primarily move about the landscape, hanging from threads and using the wind to "balloon" to new locales. They sometimes sail for great distances.

"Between the stickiness of a barrier and its green ash chemistry, we can greatly disrupt the normal movement of the larvae," Norris says. "We think we can give people a slick, safe tool to prevent this pest from denuding their valued and otherwise susceptible plants."