UNIVERSITY OF ILLINOIS EXTENSION

HOME, YARD & GARDEN PEST NEWSLETTER

College of Agricultural, Consumer and Environmental Sciences, University of Illinois at Urbana-Champaign
Illinois Natural History Survey, Champaign

No. 20 • November 26, 2003

Final 2003 Issue

This is the 20th and final issue of the *Home, Yard, and Garden Pest Newsletter* for 2003. The 2004 edition of the newsletter will begin in April and will strive to continue to provide up-to-date information on pest emergence, pest management, and other topics pertaining to the management of pests in the area of landscape horticulture. Thank you for your interest in this publication. *(Phil Nixon)*

Winter Programs

Following are educational programs for professional ornamental horticulturists scheduled for this winter. *(Phil Nixon)*

December 2 to 4: North Central Turfgrass Exposition (NCTE) at Pheasant Run Resort, St. Charles, IL. Sponsored by the Illinois Turfgrass Foundation (ITF), this 3-day event features a trade show and educational seminars and workshops for golf-course superintendents, landscape contractors, lawn-care companies, sports-turf managers, sod producers, turf technicians, and municipal and park-and-recreational field personal. For program and registration information, see the University of Illinois Turf Program Web site at **http://www.turf.uiuc.edu** and follow the link to the ITF Web site and then to the NCTE link. For additional information, telephone Jack Lagershausen at (847)706-6750.

January 6: Southern Illinois Bedding Plant School at Southwestern Illinois College, Belleville, IL. Registration starts at 8:30 a.m.; program, 9:00 a.m. to 4:00 p.m. For additional information, call (618)692-9434.

January 14 to 16: Mid Am Horticultural Trade Show, McCormick Place–Lakeside, Chicago, IL. For more information, visit **www.midam.org.**

January 16: Illinois Nurserymen's Association (INA) Garden Center New Ideas Exchange, McCormick Place–Lakeside, Chicago, IL. For more information, contact the INA office at (888)525-3900.

February 2: Pro Hort Seminar, Peoria, IL. For more information, visit **www.prohort.org.**

February 3 and 4: Pro Hort Symposium, Peoria, IL. For more information, visit **www.prohort.org.**

February 24 and 25: Southern Illinois Grounds Maintenance School at Gateway Convention Center, Collinsville, IL. Sessions in Spanish, as well as in English. Preregistration, $55 with lunch; walk-in registration, $75 without lunch. For additional information, call (618)692-9434.

February 26: Spanish/English Grounds Maintenance and Nursery Seminar at the Stratford Banquet Hall, 21007 McGuire Rd., Harvard, IL. Registration starts at 7 a.m.; program, 7:30 to 11:30 a.m. Preregistration, $20; walk-in registration, $30. Other sessions on April 1 and August 12, with different topics each day. For more informaiton, contact Jim Schuster, (708)-352-0109.

March 9 and 10: Illinois Landscape Contractors Association Winter Seminar at Stonegate Conference Center, Hoffman Estates, IL. This 2-day program offers opportunities for personal and business growth with sessions on marketing, managing, investments, insurance, retirement plans, employee rewards, image, safety, CPR & AED, container gardening, plants, water gardens—plus safety and supervisory skills, both taught in Spanish. For more information, visit **http://www.ilca.net/winter2002.html.**

March 11: Illinois/Wisconsin Stateline Conference for Landscape Professionals. 9 a.m. to 4 p.m. at the Rotary Gardens Parker Education Center, Janesville, WI. Course code: GI031104

From garden centers to nurseries, arborists to landscapers, staying updated on trends and practices is a must! Professionals and avid gardeners alike will have the opportunity to broaden their knowledge base during this daylong lecture with specialists from University of Illinois Extension and University of Wisconsin Extension. Professional emphasis.

- *Raymond Cloyd, U of I Extension entomology,* "Pestgalore: How are you going to deal with insect pests in the future?"

- *Sherry Combs, UW Extension soil science,* "Nutrient requirements of landscape plants"
- *Nancy Pataky, U of I Extension plant pathology,* "Know your diseases: What's new!"
- *Chris Williamson, UW Extension entomology,* "Pesticides: Modes of action"

Early-bird registration before February 15, 2004: $30. Registration after February 15: $40. No refunds for cancellations after March 9. Registration includes lunch, resource materials.

For more information, contact Mike Maddox, horticulture educator, Rock County UW Extension at Rotary Gardens, (608)752-3885x17.

April 1: Spanish/English Grounds Maintenance and Nursery Seminar in DuPage County, IL. Registration starts at 7 a.m.; program, 7:30 to 11:30 a.m. Preregistration, $20; walk-in registration, $30. Other sessions on February 26 and August 12, with different topics each day. For more information, contact Jim Schuster, (708)352-0109.

August 12: Spanish/English Grounds Maintenance and Nursery Seminar in Will County, IL. Registration starts at 7 a.m.; program, 7:30 to 11:30 a.m. Preregistration, $20; walk-in registration, $30. Other sessions on February 26 and April 1, with different topics each day. For more information, contact Jim Schuster, (708)352-0109.

PLANT DISEASES

National Plant Diagnostic Network

To protect agriculture throughout the nation, the U.S. Department of Agriculture has created a National Plant Diagnostic Network (NPDN). A separate network for animal systems is also under construction. The plant network provides an avenue to quickly detect, identify, and report pests and pathogens that have been deliberately or accidentally introduced into agricultural systems. The primary concern is food security, of course, but economic threats to the nation are also important. This network will tie together specialists from across the country to help in rapid and accurate problem identification. The NPDN system will provide clear avenues of communication from the first detectors through various players, including Extension educators, university diagnostic labs, state regulatory agencies, and national regulatory agencies.

Sometimes new pests and diseases slip past ports of entry and are detected by first responders, such as crop scouts who find soybean rust or possibly arborists who detect an insect pest in the trimming process. In the next year or two, special educational programs will be available to train first responders to recognize disease and insect problems that might appear unusual for an area. Training will begin in the agricultural arena but will most likely move to the green industry as well. We'll keep you posted when training is available.

The NPDN has been divided into five regional centers. Illinois is part of the north-central region. The University of Illinois Plant Clinic is intimately involved in the NPDN through the plant diagnostic information system. A new Internet-based system will be used at the Plant Clinic starting next May. This system includes use of a new database that is required by state and federal law to be reported to national authorities. Information will still be confidential within that system. The plant diagnostic system also includes a Web-based digital camera that will allow diagnostic labs to share images in real time with specialists anywhere. This does not guarantee that someone will always be available when needed, but it certainly provides opportunity for immediate and remote macroscopic or microscopic examination. The cost for samples at the Plant Clinic will not increase. Money has been provided to upgrade to this system. Look for details on clinic improvements and changes when we open again next May. Meanwhile, for more information on the NPDN, visit the web at **www.NPDN.org.** *(Nancy Pataky)*

INSECTS

Insect Response to Plant Health

It's common to hear that healthy plants have fewer insects. Is that really true? The answer is a definite yes and no. It is generally true that healthy plants are in better shape to handle insect attack, but healthy plants can actually be more attractive to some insects.

Borers are attracted to unhealthy trees and shrubs. Trees in decline are known to produce certain volatile chemicals (odors) that attract bark beetles and other borers to them. Borers are generally unable to survive in healthy trees. Beetle borers commonly chew niches through the bark to lay their eggs. Moth borers, unable to chew a hole through the bark with their siphoning mouthparts, lay their eggs in wounds. Healthy trees have a high sap flow that frequently washes the borer eggs out of natural wounds and those chewed by borers. Predators eat these eggs,

or the hatching larva are not be able to eat through the bark. Larvae that enter healthy trees are likely to drown in the heavy sap flow or be crushed by the high internal pressures caused by healthy sap flow. Recent research has shown that the Asian longhorned beetle, which attacks seemingly healthy maples and other trees, actually attacks trees that are under stress, as measured by instrumentation. In this case, trees that appear healthy are really not as healthy as they seem and are thus vulnerable to borer attack.

Properly fertilized plants tend to be healthier plants, and those that are fertilized tend to have higher nitrogen content. Many insects seek high-nitrogen sources. Insects tend to contain 8 to 14% nitrogen, but plants typically contain only 2 to 4% nitrogen. Compared to plant tissue, the liquids in plants are even lower in nitrogen. The phloem sap contains only one-half of 1% nitrogen or less, but xylem fluid contains only one-tenth of 1% nitrogen or less. Aphids and other sap-feeding insects are known to build up to higher populations more quickly on nitrogen-fertilized plants. However, nitrogen is an important component of tannins and alkaloids, chemicals that reduce insect digestion. Thus, many sap-feeding insects are more likely to attack healthy plants, but other insects may be more likely to attack unhealthy plants that are too weak to produce chemicals to defend themselves.

Healthy plants tend to have higher water content. Caterpillars need high amounts of water and develop 40% slower on plants with a low water content, even levels that are not low enough to cause wilting. On the other hand, desert grasshoppers are attracted to drought-stressed plants. Sugars and nitrogen are more concentrated in water-stressed plants, allowing insects to obtain more useable food in a shorter time. Water-stressed plants produce fewer chemicals that deter insect feeding.

Younger leaves tend to contain more water and nitrogen than older leaves, making them more vulnerable to some insects. Tree leaves tend to be much lower in water and nitrogen than low-growing perennial plants. The water and nitrogen content of leaves decreases later in the growing season.

In summary, borers are attracted to unhealthy plants, sap-feeding insects tend to be attracted to healthy plants, caterpillars prefer well-watered plants, and the rest of the insects are variable in preference. Whether a plant is more or less attractive to insects when healthy, a healthy plant is more likely to survive an insect attack than an unhealthy plant. *(Phil Nixon)*

Chloronicotinyl Insecticides

The chemical class chloronicotinyl is a relatively new one that contains a number of systemic insecticides that are registered for use in greenhouses. These include imidacloprid (Marathon), acetamiprid (Tristar), and thiamethoxam (Flagship). These materials are transported throughout the plant in the transpiration stream and provide a certain degree of residual activity after application. The products currently available vary in their water solubility, which affects how rapidly the active ingredient is taken up by the plant.

Chloronicotinyls have a different mode of action, compared to organophosphates (Orthene and Duraguard), carbamates (Mesurol), pyrethroids (Talstar, Decathlon, and Mavrik), and macrocyclic lactone (Avid). Chloronicotinyl insecticides kill target pests in a similar manner as the natural product nicotine, by acting on the central nervous system, causing irreversible blockage of the postsynaptic nicotinergic acetylcholine receptors. These insecticides disrupt nerve transmission in insects, causing uncontrolled firing of nerves. This results in rapid pulses from the steady influx of sodium, leading to hyperexcitation, convulsions, paralysis, and death. A general characteristic of chloronicotinyl insecticides is that they are highly effective in controlling phloem-feeding or sucking insects, including aphids, whiteflies, and mealybugs; however, they are not active on spider mites (that is, twospotted spider mite).

Because all three commercially available chloronicotinyls have similar modes of activity, it is important not to rotate from one chloronicotinyl to the next, as this would increase the selection pressure on the target pest population and may potentially enhance the development of resistance. To avoid the issue of resistance, use an insecticide with a different mode of activity either before or after using a chloronicotinyl insecticide. *(Raymond Cloyd)*

Overwintering Strategies of Insects and Implications for IPM

As you sit drinking your morning cup of coffee with the snow falling and the wind howling, the last thing you are thinking about is those poor little insects out there trying to make it through the cold adversities of winter. Instead of thinking of the winter as a kind of "black box," careful observation during the winter can provide several clues as to which insects and mites could be potential problems for the coming season.

By making written or mental notes on the severity of the winter (that is, snow levels, prolonged cold, sudden temperature changes) and knowing the basic life cycle and habits of the pest, we can catch a glimpse of how these animals survive and their potential to become problems during the growing season.

As early as the 1930s, the importance of overwintering biology on pest management was recognized. Salt states that "preparations for the control of pest species could be made more intelligently if information was available on the ability of insects to resist winter temperatures."

Winter is a period of dormancy for most insects. They seek protected places where they are not exposed to predators or repeated freezing and thawing. Insects and mites have a variety of ways they survive the winter.

Many insects overwinter as adults, such as leaf beetles, some aphids, most leafhoppers, and many beetles. Overwintering sites include those under the loose bark of trees, fallen leaves, and other debris on the ground. Some insects, such as the elm leaf beetle and boxelder bugs, actually seek shelter indoors in homes or other protected structures.

A vast number of insects overwinter as eggs, either singly or in masses. We have probably all seen the egg mass of the eastern tent caterpillar attached to a twig and exposed. Aphid and plant bug eggs many times are situated in leaf and bud scales on woody plants, where they are protected. The notorious female gypsy moth lays her eggs near the base of trees and covers them with hairs from her body. Bagworms spend the winter as eggs in the old bags from the previous year.

An equally common life stage for overwintering is the larval and/or pupal stage. Many of the leaf-eating caterpillars (that is, mimosa webworm and cecropia moth) overwinter as pupae in a silken cocoon or other protective structure. Turf-feeding grubs (that is, southern masked chafer, Japanese beetle) overwinter in the soil, where they are generally protected from the extremes of winter temperatures.

In spite of these effective overwintering strategies, insects are still vulnerable to winter conditions. Studies on the overwintering biology of economic pests teach us much about the relationship between overwintering strategies and pest population dynamics. Here are several examples of how this information can be helpful in pest management.

The mimosa webworm is a common defoliator of honey locust trees in the South and Midwest, where it forms unsightly webbing and browning of the leaves. In the fall, the larvae descend the tree and look for overwintering sites, which may include everything from mailboxes to shutters to door frames. In more isolated areas, the larvae seek out cracks and crevices in the bark of the host tree. Once in place, the larvae spin a white silken cocoon and pupate. The silken cocoon is quite durable, waterproof, and protects them from cold, drying winds of winter. In spite of these strategies, the mimosa webworm is still vulnerable to extreme winter conditions.

What do we mean by extremes? Studies conducted in central Iowa in the early 1980s revealed that, following severe winters with prolonged cold and consistent overnight temperatures of –20° to –25°F for 2 to 3 weeks, webworm populations were greatly reduced the following season. During the winter of 1981–1982, field studies showed 100% mortality of webworm pupae in the study sites. Two weeks of prolonged cold had preceded this dramatic drop in sur-vival. In contrast, during the 1982–1983 winter, which was mild, adult emergence in our studies was 66% with 50 to 80% defoliation of honey locust trees being common the following season.

What keeps these extremes from wiping out the population? Obviously, some of them survive, but where? Studies on their overwintering habits revealed that the larvae that overwinter behind shutters, eaves, and other protected sites on homes experienced temperatures 5° to 10°F warmer than their less fortunate "cousins" who were forced to overwinter on exposed sites on the trunk of the tree. This 5° to 10°F temperature differential makes all the difference in survival. In addition, the microhabitat of the host plant is also important. Trees that are situated in protected locations (that is, surrounded by structures in courtyards) tend to have chronic mimosa webworm infestations. In addition to protected sites, the mimosa webworm, like many temperate insects, has the ability to supercool (cool below 32°F without ice formation). However, once that supercooling point is exceeded, the freezing of body fluids and cells is lethal. During the Iowa winter of 1981–1982, overnight temperatures regularly equaled or exceeded the supercooling point of the mimosa webworm. One or two isolated nights at these temperatures may not cause dramatic mortality, but duration of exposure begins to play a major role. The longer the exposure, the greater the probability of mortality. Cold temperatures and duration of cold are a one–two punch in mimosa webworm population dynamic.

Another example is the gypsy moth. This insect is a serious defoliator of forests and woody landscape plants. The larvae feed during the months of May to early July, pupate; and then the adult moths emerge. Female moths lay their eggs in July at the base of trees or any structure that appears suitable. These eggs remain throughout the fall and winter, hatching the following spring. As with the Japanese beetle, snow cover and winter temperatures have a dramatic effect on overwintering survival of the eggs. Studies have shown that eggs die at –18° to –25°F, and ambient tem-peratures of –22° to –24°F can be lethal if they last for 14 days. Like the mimosa webworm, the eggs are able to supercool (compliments of glycerol, closely related to ethylene glycol) to –22°F.

In Maine, gypsy moth eggs were observed to survive to –26°F with snow cover and in Russia under snow cover at –60°F. The gypsy moth is a survivor. Without adequate snow cover, it is much more vulnerable to extremes in temperature. Some biologists believe the gypsy moth will not be limited by hosts but by the depth of snow cover. Observations on temperature extremes and snow depth can be helpful predictors in anticipating overwintering egg survival of the gypsy moth.

These examples illustrate how overwintering strategies and climatic factors affect pest population dynamics. Little is known about how the majority of insects overwinter. While not an exact science (just like predicting the weather), basic observations, record-keeping, and a little thought can be helpful in "predicting" what your potential populations might be when, finally, the sun is shining and the birds are singing. *(Fredric Miller, Joliet Junior College and Morton Arboretum)*

INDEX 2003

General

Insects

Plant Diseases

Weeds

Home, Yard, and Garden Pest Newsletter is prepared by Extension specialists from the University of Illinois at Urbana-Champaign and the Illinois Natural History Survey. Information for this newsletter is gathered with the help of staff members, Extension field staff, and others. Karel Jacobs and Donna Danielson of The Morton Arboretum also provide information and articles.

Major authors are Phil Nixon, (217)333-6650, Fredric Miller, (708)352-0109, and Raymond Cloyd, (217)244-7218, entomologists; Nancy Pataky, (217)333-0519, plant pathologist; Bruce Paulsrud, (217)244-9646, pesticide applicator training; and Tom Voigt and David Williams, (217)333-0350, and Michelle Weisbrook, (217)244-4397, horticulturists. Phil Nixon is the executive editor of the *Home, Yard, and Garden Pest Newsletter*. This newsletter is written by faculty in the Department of Natural Resources and Environmental Sciences and the Department of Crop Sciences. It is edited by Mary Overmier, Information Technology and Communication Services.

For subscription information, phone (217)333-2666 or (800)345-6087, or e-mail acesnews@uiuc.edu. Web subscriptions are available (http://www.ag.uiuc.edu/cespubs/hyg).