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In This Issue:

Meet the IPM Stakeholder Committee

Introducing Cynthia Huebner, *Research Botanist, Forest Service, Northern Research Station*

Research botanist Cynthia Huebner is an adjunct associate professor in the Biology Department at West Virginia University. She received her Ph.D. in botany from Miami University in Oxford, Ohio; an M.S. in environmental science and an M.A. in plant ecology from Indiana University; and a B.S. in biology from the University of California.

Huebner joined the Ecology and Management of Invasive Species and Forest Ecosystems unit in Morgantown, West Virginia in August of 2000. Her current research focuses on the biology and ecology of invasive plant species in forest systems – especially in association with human and natural disturbances. Huebner is also working to determine how the common forest invaders (e.g., tree of heaven, Japanese stiltgrass, and garlic mustard) interact with native species under various environmental conditions.

Before joining West Virginia University, Huebner taught at Antioch University and Oberlin University in Ohio, and she worked for the Missouri Department of Conservation and the Nature Conservancy.

"Integrated pest management is an important component of managing forest ecosystems," said Cynthia.

WVU Awarded Part in Mid-Atlantic Region Pest Monitoring Project

About Pest Monitoring

Pest field observations provide a great deal of useful information to agricultural stakeholders. Tracking the movement of emerging pests allows government officials to develop appropriate control measures. When pests threaten high value commodities (such as tree fruits), having this information in a common platform allows quick access to information that can significantly assist in early detection, quick diagnosis, containment, mitigation, and recovery efforts.

About Project Grant

To make the sharing of pest observation data possible and to enhance IPM programming, the United States Department of Agriculture (USDA) awarded a five-year grant to multiple states in the mid-Atlantic region – including West Virginia. The project, titled Tree Fruit Integrated Pest Information Platform for Extension and Education (iPiPE), will be coordinated by WVU Extension Specialist Dr. Mahfuz Rahman, and it will cover West Virginia fruit growing areas in the eastern panhandle and neighboring counties in Virginia, Maryland, and Pennsylvania.

Goals of Project

The primary objective of the project is to encourage Extension professionals to recruit data collection stakeholders and have these data collectors submit their observations on new, foreign, and emerging pests – as well as important native pests and their hosts. The project will provide the necessary tools and required training to increase the efficiency of pest scouting and on-farm decision making by producers and consultants.

The project will also recruit and train undergraduate student interns to become familiar with all aspects of the monitoring and decision-making processes. They will work with Extension professionals to provide up-to-date pest management guidelines, commentary, and risk assessments.

Inspect Your Landscape Plants for Bagworms

Description

Bagworms (family *Psychidae*), are a group of moths whose larvae (or caterpillars) feed on the foliage of various woody ornamentals. Bagworms are easily identified by the characteristic bags or cases that the larvae construct from silk and pieces of host foliage (Fig. 1).

Figure 1. *Bagworm cases constructed from different woody ornamental plants. (Photo: D. Frank)*

Life Cycle

Upon hatching in late spring (May through early June), bagworm larvae immediately begin constructing a protective bag, which will enlarge as they feed and grow. Generally, larval feeding and development continues until August, when pupation occurs (stage between larvae and adult). In September, adult males begin emerging from bags to seek out female mates. The wingless females remain in their bags, and after mating, lay 500 to 1,000 eggs inside. The eggs remain in the bags until the following spring when the cycle begins again.

Infestation

Dispersal of bagworms to neighboring trees primarily occurs via a process called "ballooning," in which newly-hatched larvae produce silk threads that are carried by the wind to nearby plants. Because adult female bagworms cannot fly, populations can build rapidly on host plants. Heavy infestations of larvae can kill conifers in one season. Host plants commonly attacked by bagworm caterpillars include arborvitae, cedar, juniper, pine, and spruce.

However, damage to certain deciduous tree and shrub species may also occur. Deciduous hosts are generally less affected, because plants may regrow leaves after the larval attack.

Bagworm Control

Winter and early spring are the ideal times to scout for bagworms in the landscape. The spindle-

– continued on page 4 –

Hot Topic

Starting an IPM Program in Commercial Greenhouses

Benefits

Scouting and monitoring your crops are the foundation of a successful Integrated Pest Management (IPM) program. These actions make growers aware of the presence of pests and their activity, and allows growers to consider necessary control actions. It also allows growers to reduce or eliminate pesticide applications that are unnecessary by ensuring application of pesticides at the proper pest life-stage for optimal effectiveness.

How to Begin Scouting and Montoring

What do you need to start? First, there must be enough time and money committed to the monitoring. Next, identify an IPM team to make pest management decisions. Third, provide all team members with certain simple equipment, such as hand lens (10×) or magnifier headset, colored tape or flags, sticky cards, data collection sheets, and maps of areas to be scouted. It is also important to provide access to resources for identifying pests, such as the Pest Diagnostic Laboratory at West Virginia University.

The spring issue of *IPM Chronicle (Vol: 3:2)* will include details about successfully launching a scouting and monitoring program in commercial greenhouses and high-tunnels. Please stay tuned!

Management of Brown Rot on Stone Fruit

About Brown Rot

Brown rot, caused by the fungal pathogen *Monilinia fructicola*, is one of the most prominent diseases of stone fruit (e.g., apricot, cherry, nectarine, peach, and plum). Serious crop yield loss can occur if the disease develops during the blossoming, preharvesting, or harvesting periods.

Identifying Brown Rot

Brown rot symptoms on a mature or ripening peach appear as rapidly-spreading brown decaying tissue that produces soft dry rot (Fig. 2). In warm, wet, or humid conditions, rot can cover the whole fruit in 48 hours.

Fruit with brown rot can produce many spores, shrivel, and become tough grayish-black mummies. These mummies may drop to the ground, where sexual spore-producing structures may develop (Fig. 3); however, mummies can also remain attached to the tree throughout the winter (Fig. 4).

In some cases, especially on immature nectarines, infections can remain latent. The latent infection presents as small, circular, decaying lesions. As the fruit matures, the infection becomes active and decay spreads from the lesion throughout the entire fruit. New infection in the early spring can also cause blossom blight, twig blight, and twig canker (Fig. 5). Blossom blight usually is an indication of the presence of the pathogen on or around a tree that will infect developing the fruit.

Figure 2. *Development of brown rot of peach on a tree in an old orchard. (Photo: MM Rahman)*

Figure 3. *Sexual structures of the brown rot fungus growing on a fruit mummy. (Photo: A.R. Biggs, WVU)*

Figure 4. *Mummified plum clinging in a tree at the end of the season. (Photo: MM Rahman)*

Figure 5. *Blighted blossom and shoot and twig canker on a peach tree. (Photo: A.R. Biggs, WVU)*

Control of Brown Rot

Sanitation plays a significant role in the management of brown rot. At the end of the season, completely remove any source of future infections, such as infected fruit and blighted or cankered stems. Do not dump any rotten fruit in the orchard floor or within close proximity.

In the spring, monitor for blossom infection and prune out any additional shoots with blight or canker symptoms. Prune overcrowded branches to allow air circulation and fertilize to maintain optimum nitrogen/potassium balance. If the orchard floor shows any presence of sexual spore-producing structures, the blossom should be protected with appropriate fungicide(s).

Small-scale growers can use Captan and Spectracide Immunox® in an alternating schedule. More effective fungicides usually available to commercial growers include Pristine®, Merivon®, Luna® Sensation, and Fontelis®. Detailed spray recommendations for the mid-Atlantic region can be found at *http://pubs.ext.vt.edu/456/456-419/456-419.html*. For more information, visit *http://www.caf.wvu.edu/kearneysville/disease_descriptions/ombrownr.html*.

Look Out for The Invasive Plant – Giant Hogweed

Native to the Caucasian mountains and southwestern Asia, giant hogweed (Heracleum mantegazzianum) is a harmful invasive weed that was brought to the United States as an ornamental plant. It is a fast-growing weed and behaves like a biennial or a short-lived perennial.

Identification

Often referred to as giant cow parsnip or wild rhubarb, the weed is characterized by large distinctive flower heads that resemble a wild carrot flower (Figure 6). It produces tuberous root stalks, which generate buds each year.

The large herbaceous plant can rapidly reach heights of 10 to 15 feet. The root of giant hogweed is pale yellow or brown, and exudes yellow sap from the cut surface. The stem is hollow and ridged with distinct purple blotches at the base that become increasingly less noticeable near the top.

Stem and petioles (slender leaf stems) are covered with bristles bearing small glands. In the dormant overwintering state, this plant usually bears a single large bud at the end of a stem covered by beginning bases of small leaves.

Hogweed Danger

Giant hogweed has increasingly become a public health hazard. The sap of giant hogweed causes severe blistering of human skin upon exposure to sunlight, a condition referred to as phytophotodermatitis. Bulbous eruptions appear on body parts that have been in contact with the plant's sap and exposed to the sun simultaneously or shortly thereafter. It may take up to 48 hours for symptoms to appear after initial contact and exposure to sunlight. This condition has been more widely reported by gardeners inadvertently exposed to giant hogweed sap from the plant's leaves, roots, or fruits.

Figure 6A. *Giant hogweed rosette in April. (Photo: R. Chandran)* ***6B.*** *Giant hogweed in bloom. (Photo: Appaloosa, Wikimedia Commons)*

Where Found

Although not yet documented in West Virginia, giant hogweed has been detected in neighboring Maryland, Ohio, and Pennsylvania. It can colonize in a wide variety of habitats – including roadsides, other right-of-ways, vacant lots, and stream and river banks.

Control

Giant hogweed may be controlled by weeding and other mechanical measures or with the use of herbicides. Plants may be removed before seeding to prevent seed dispersal; however, the perennial nature and the toxicity of the plant sap limits mechanical control.

Chemical control options include application of herbicides, such as triclopyr (e.g., Remedy Ultra®, Garlon-4®, Turflon®) and glyphosate (e.g., Roundup®). Directly spray the desired plants, being sure to avoid inadvertent injury. In late spring, apply a good coverage of the herbicide to fully expanded leaves. If necessary, follow up in the summer, especially if the plants come to bloom.

Once the weed is under control, reestablish the area with native plants. If you find giant hogweed, please report it to your county WVU Extension agent or the WVU Pest Diagnostics Laboratory.

Inspect for Bagworms *– continued from page 2 –*

shaped bags produced by last year's larvae will be 1 to 2 inches long and hang from twigs, like tree ornaments. Handpicking and destroying bags before the eggs inside hatch will help lower population numbers and reduce damage later in the year. If bags are too numerous and/or difficult to reach, insecticidal sprays may be necessary. The bacterial insecticide Bt (*Bacillus thuringiensis*), as well as many synthetic insecticides, are effective against young larvae. Applications should be made in mid- to late-June after all eggs have hatched and the larvae have finished ballooning. Thorough coverage of foliage is necessary, because larvae are protected from the insecticide contact when in the bags.

Late Winter White-tailed Deer Damage

Searching for Food Drives Deer to Residential Landscapes

Late winter is a stressful time for many wildlife species – especially for animals that do not hibernate, such as the white-tailed deer.

Since West Virginia is 78 percent forested, our wildlife rely heavily on hard mast (like acorns and beech nuts) in the fall and early winter to provide enough fat reserves to make it through the end of the winter season.

West Virginia experienced an exceptional hard mast crop this past fall and is having a mild winter thus far. Unfortunately, most of the hard mast has already been consumed with months of cold weather still ahead.

Because of this, deer will begin to venture out of the forests and into residential areas to look for alternative food sources. Many times, we inadvertently provide them a variety of food resources in our landscaping.

Fencing is a Good Control Option

With wildlife becoming more desperate, some of the conventional methods of protecting our landscaping may not be as effective. Even though, chemical repellents are commonly used to deter deer from eating ornamental plants and shrubs, this winter's increased rain and snow fall require these to be reapplied often – reducing their effectiveness.

The best option for reducing winter deer damage may be fencing.

Figure 7. *Fencing is the best option for reducing winter deer damage. (Photo: flickr.com / creative commons)*

Fencing can be applied to single plants, groups of plants, or an entire yard. Single plants or small groups can be protected with a woven wire or plastic fence no taller than 4 feet. Make sure the fence is far enough away from the vegetation to prevent deer from reaching over it to browse. Shorter fences become less effective on larger areas, because deer can easily jump over them; however, increasing the fence height to 5 to 7 feet will reduce this likelihood.

Because deer are more likely to go under or through a fence, woven wire or plastic mesh fencing is a good choice. Electric fencing is another option, but regular maintenance may be required with snow and ice accumulation. Protect small evergreen trees or shrubs by wrapping them in burlap. This will not only protect against deer damage, but also winter weather damage. Additionally, netting can be applied over shrubs and trees to prevent deer from browsing on twigs and buds.

Figure 8. *Landscaping inadvertently provides a food source for hungry deer. (Photo: flickr.com / creative commons)*

Plan Ahead for Deer Control in Spring

February is the ideal time to begin thinking about your spring plantings and how wildlife might impact them. If this winter remains mild, the deer population may not suffer the typical losses of West Virginia's harsh winters. With more deer surviving winter, more deer will be looking for early spring food. Tender green shoots and swelling buds on landscape trees, shrubs, and flowers will be a tempting treat for hungry deer, so start planning now for how you will keep deer out of your landscaping.

Blueberry Bud Development and Critical Temperatures for Survival

Blueberry crop yield is influenced by many factors. One of the most critical environmental factors is cold temperatures. Cold temperatures affect the development of viable flower buds, which in turn affects the crop yield.

Throughout the year, flower buds go through various stages of development. The bud's temperature sensitivity depends on the developmental stage when the cold temperatures occur. The image shows the various stages of flower bud development and the low temperatures critical for bud survival.

(Photos: M. Danilovich)

** Temperature indicates tolerance level for that stage of blueberry development.*

***1. Dormant-tight Bud** – (–10°F)**

***2. Bud Swell** – Outer scales expose inner, light-colored bud scales. (10° to 15°F)**

***3. Flower Bud** – Individual buds visible. (20° to 23°F)**

***4. Early Pink Bud** – Pinkish flowers are short and closed. (23° to 25°F)**

***5. Pink Bud** – Petals are white, fully elongated but still closed. (24° to 27°F)**

***6. Early Bloom** – Some bloom and some closed. (24° to 27°F)**

***7. Full Bloom** – Could tolerate 28°F.*

***8. Petal Fall** – (Below or equal to 32°F)**

***9. Early Green Fruit** – (Below or equal to 32°F)**

***10. Late Green Fruit** – (Below or equal to 32°F)**

About *IPM Chronicle*

Rakesh S. Chandran, *IPM Chronicle Manager*
304-293-2603

WVU Extension Service Contributing Authors:

Rakesh S. Chandran, *Weed Scientist* and *IPM Program Coordinator*

Mira Danilovich, *Consumer Horticulturist*

Daniel Frank, *Entomologist*

Sheldon Owen, *Wildlife Specialist*

MM (Mahfuz) Rahman, *Plant Pathologist*

Other Contributing Authors:

Barbara E. Liedl, *Associate Professor, Plant Breeding and Genetics; West Virginia State University*

WVU-ES Creative Team:

Meg Baughman, *Creative Director*

Greg Jacobs, *Graphic Designer*

Lindsay Wiles, *Editor*

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