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Managing weedy grasses in pastures and hayfields

Jointhead grass *(Arthraxon hispidus)* and Japanese stiltgrass *(Microstegium vimineum)* invade pastures and hayfields in West Virginia (Figures 1 and 2). Both of these species are native to Asia and were introduced to North America in late 1800s to early 1900s.

Description

Jointhead grass and Japanese stiltgrass are both considered warm-season grasses, which are characterized by a photosynthetic pathway that is more efficient than that of cool-season grasses – especially under warm conditions experienced during summer months. The seeds of both these weeds are fairly short-lived with viability ranging from two to four years. As a species that can thrive in shaded areas, Japanese stiltgrass typically invades pastures and hayfields along the outer edge of wooded areas. However, both grasses can grow well in areas that receive full sun and have the ability to displace more desirable forage species.

Another weedy grass that tends to be a problem in hayfields, especially after first-cut, is yellow foxtail *(Setaria pumila)* (Figure 3). It is often found in hay that is fed to horses and can cause blisters to their mouthparts; hence, this weed must be actively managed in horse-hay.

Management

Both jointhead grass and Japanese stiltgrass possess nutritional value as a potential forage species; however, they are not usually preferred by livestock. Given their invasive nature, it could be a challenge to maintain a balanced stand in pasture without displacing desirable forages.

Figure 1. Seedlings of jointhead grass in a pasture (ball pen used for scale). (Photo credit: R. Chandran)

Figure 2. Seedlings of Japanese stiltgrass in a pasture (ball pen used for scale). (Photo credit: R. Chandran)

Based on past research in West Virginia, it was determined that the herbicide pendimethalin (Prowl H2O) applied by mid-April when the forsythias are in bloom provided control of both of these weeds. For Japanese stiltgrass, 4 quarts per acre applied prior to germination is necessary to obtain control (Figure 4), whereas, 2 quarts per acre applied prior to germination should control jointhead grass (Figure 5). Prior to applying the herbicide, remove any debris remaining from previous years' growth to ensure proper contact of the herbicide with the soil. Also, adequate levels of soil moisture are required to activate the herbicide pendimethalin to obtain consistent weed control. If the soil is dry at the time of herbicide application, ¼ inch precipitation or irrigation is needed within two weeks after application for herbicide activation.

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Return of the black bear

By the early 1970s, the black bear could only be found in 10 of West Virginia's eastern mountain counties. At that time, wildlife biologists believed the bear population was less than 500; however, over the course of nearly 50 years, many positive steps allowed the healthy growth of West Virginia's black bear population.

Research into the life cycle of the black bear helped wildlife biologists learn what factors control the growth of West Virginia's black bear population. Research findings were used to modify bear hunting seasons to protect female black bears, allowing the population to grow.

During the same time period, West Virginia's forests were maturing, providing more bear habitats. Also, people's attitudes toward black bears softened over time. Bears have become an animal to respect and enjoy instead of a nuisance to eliminate. The population has now spread statewide across West Virginia (Figure 6).

Figure 6. Black bears have been harvested in 46 of West Virginia's 55 counties.

Bear habits

In predicting black bear population dynamics, one factor that wildlife biologists underestimated was the black bear's adaptability and resilience. Once viewed as an animal of the wilderness, they were thought to need large tracts of undeveloped land to prosper. However, black bears have demonstrated that they can live in and around major cities.

In a recent study of the bear's habitat use and its vulnerability to hunting in urban areas of West Virginia, black bears were fitted with GPS tracking collars around the cities of Beckley, Charleston and Morgantown. Bears were found to be year-round residents of the area within 3 miles of city limits and occasionally ventured inside city limits.

Bears in urban areas preferred low-density housing areas where tracts of woods between homes serve as travel corridors, feeding areas and escape cover. These bears have easy access to human food in the form of garbage, pet food, and bird and animal feeders on a year-round basis.

Human-bear interactions

Bears coming into close proximity to humans or dwellings is the number one reported category of human-bear encounters. These situations arise as the bears are attracted to human-provided food. The remaining categories of encounters involve actual damage, with bears disturbing garbage accounting for twice the damage of all the other categories combined.

The tolerance levels for bears living in close proximity to people vary greatly. To some people, the mere sighting of a bear in their neighborhood causes fear of property damage and human safety. Others will tolerate bears raiding their bird feeders or scattering their trash. This tolerance level often depends on a person's knowledge of bears. The West Virginia Division of Natural Resources logged 16,601 human-bear interactions between 1997 and 2017.

Depending on the abundance of natural food, the number of human-bear interactions fluctuates yearly. Some states have not seen a decrease in human-bear interactions because of recreational bear harvest. However, if recreational bear harvest reduces the overall bear population, a reduction in human-bear encounters is likely.

West Virginia began liberalizing bear hunting in 2008 as part of the West Virginia black bear management plan. While West Virginia will always have human-bear encounters, the trend has been decreasing since 2008. The goal is to balance the bear population with the tolerance levels of West Virginians, and to educate citizens about how to safely live with bears.

Preventing human-bear interactions

In most instances, prevention is key to avoiding human-bear conflicts. Follow these simple steps to help prevent human-bear interactions:

- Never feed or approach bears. Feeding bears trains them to approach homes and people for food – plus, it is illegal to feed or bait bears in West Virginia.

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Powdery mildew management

Production of vegetables, such as tomatoes, cucumbers and peppers, in protected environments, like greenhouses and high tunnels, has gained popularity in West Virginia due to proven advantages in extending the growing season and managing diseases. However, due to less wind movement and limited escape of plant-transpired water, these structures are prone to high humidity. This can lead to the development of specific diseases, such as leaf mold, gray mold and powdery mildew, which are less common in field production systems.

Powdery mildew

Among these diseases, powdery mildew can cause significant economic losses, especially on tomatoes (Figure 7) and cucumbers. Powdery mildew can occur in moderate relative humidity, although high relative humidity is needed for high disease severity.

Figure 7: Tomatoes severely affected by powdery mildew inside a greenhouse. (Photo credit: MM Rahman)

The disease can affect all above-ground plant parts and cover the plant's surface with white talcum powder-like fungal growth, including conidia and spores. Leaves may turn yellow and wither under severe infection, which restricts plant growth and affects yield.

Control options

Chemical control is often discouraged in protected environments due to the risk of health hazards. Only a few fungicides (Mural, Emblem, Fontelis, Milstop, M-Pede, Sonata, Cease) are approved for use in protected environments; however, these products do not show optimum efficacy if relative humidity is not kept below 90%. If a greenhouse is not automated to control humidity, a fan-jet or horizontal air flow system together with exhaust fans can be used to circulate and remove humid air from the greenhouses and high tunnels when the sides are closed.

Due to the limited fungicidal options, plant pathologists have explored alternative control options, such as the use of ultraviolet radiation lamps to slow the spread of foliar diseases, including powdery mildew. These options can reduce cost and health hazards, while attaining sustainable disease management.

UV is a short wavelength part of electromagnetic radiation, which can be divided further into UV-A, UV-B, UV-C and vacuum UV radiation, with the potential to interrupt the life cycle of fungal pathogens. However, results from multiple studies indicate that UV-B radiation has both damaging and protective effects on plants. The balance between damage and protection depends on the fluence rate of the UV-B radiation. Overall disease suppression can either be due to induced resistance in plants or the harmful effects of radiation on fungal pathogens or a combination of both.

Research trial

A researcher in Florida found that UV treatments applied once or twice weekly during the night were as effective as the best available fungicides applied on similar schedules for control of strawberry powdery mildew. Reduced powdery mildew severity with an increased UV-B dose was reported in grapevines when plant canopies were manipulated to increase light penetration. Exposure of the grapevines to UV-C radiation also reduced severity of powdery mildew but caused phytotoxicity at doses slightly greater than those required to suppress the disease. Thus, optimization of the dose effective on a specific host pathogen interaction should be determined based on observation.

Suppression of powdery mildew on greenhouse cucumbers provided by daily UV-B exposure of 1 watt per square meter for 10 minutes was greatest in the presence of red light or by a complete lack of background light. Powdery mildew suppression was least in the presence of UV-A or blue radiation compared with plants only exposed to 16 hours of daily natural light supplemented with high-pressure sodium lamps that supply broad-spectrum radiation with peaks in the yellow-orange region. Exposure of powdery mildew-inoculated plants to supplemental red light without UV-B beginning at the end of daylight also reduced disease severity; however, supplemental blue light applied in the same fashion had no effect.

Daily application of UV-B at 1 watt per square meter beginning on the day of inoculation significantly

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Managing mugwort in your garden

Mugwort *(Artemisia vulgaris)* is an example of a plant whose virtues are not as well understood as the menace it creates in a garden. It is native to Eurasia but has been naturalized in North America since the early settlers.

Its perennial and spreading growth habit facilitated by extensive rhizomes make it a troublesome pest in gardens and is considered to be one of the worst weeds by the American nursery industry. Capable of tolerating low mowing heights, it can invade lawns as well as landscapes, roadsides and agronomic settings. As a beneficial plant, its aromatic leaves, stems and underground parts are considered to possess many medicinal attributes.

Figure 8. Mugwort has a silvery appearance on its lower leaf surface from tiny, densely-packed, wooly hairs. (Photo credit: R.S. Chandran)

Identification

One of the most striking characteristics of mugwort is the silvery appearance of its lower leaf surface from tiny, densely-packed, wooly hairs (Figure 8). The leaves are arranged alternately on the stem and shallowly lobed closer to the ground; however, they are deeply dissected and linear higher up with each lobe tapered to a point. They bloom from July to October with relatively inconspicuous flowers. Flowers are borne in clusters and are yellowish green in color, lacking petals. Mugwort seeds are not considered to be viable.

The volatile chemicals present in mugwort have a wide range of attributes ranging from their ability to repel certain insects to adversely affect the growth of other plants (allelopathy). It is reputed for its several medicinal properties and uses, such as a diuretic, to induce perspiration and blood flow, and as an anthelmintic. It is also historically used to flavor drinks, such as beer, along with extracts from ground ivy *(Glechoma hederacea)*.

Control

If left unattended, mugwort can be a tough weed in the garden to battle. Mechanical removal is often time-consuming and rather ineffective; studies have shown that rhizomes regenerated even after two years of routine mowing. Integrating the application of a systemic herbicide, as well as using mechanical methods, is known to be effective.

Directed spray of a non-selective herbicide, such as glyphosate, or an application of the same with a handheld weed wiper is effective in landscapes. Use a 3% to 4% solution of a concentrated glyphosate formulation (Roundup concentrate) or a 33% solution of the same when applied using a weed wiper.

Selective herbicides containing the active ingredients clopyralid (Lontrel) or triclopyr (Turflon) applied separately or in combination (Confront) can provide effective control of mugwort in lawns or other turfgrasses. If the herbicide clopyralid is used, do not use the plant material for composting because the herbicide residues can linger for long periods. Use a heavy-duty landscape fabric or other impenetrable mulch to contain mugwort in landscapes.

Powdery mildew management

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reduced the severity of powdery mildew to 15% compared with 100% severity on control plants. Maximum suppression of powdery mildew was observed after 15 minutes of exposure to UV-B (1.1% severity compared with 100% severity on control plants), but exposure time had to be limited to five to 10 minutes to reduce phytotoxicity. UV-B inhibited germination, infection, colony expansion and sporulation of *Podosphaera xanthii*, the causal agent of cucumber powdery mildew. The results suggest that efficacy of UV-B treatments, alone or in combination with red light, against *P. xanthii* can be enhanced by exposure of inoculated plants to these wavelengths of radiation during the night, thereby circumventing the counteracting effects of blue light and UV-A radiation.

The effect of UV-B on powdery mildew seems to be directly dependent upon the pathogen. Night exposure of plants to five to 10 minutes of UV-B at 1 watt per square meter and inexpensive, spectral-specific, light-emitting diodes may provide additional tools to suppress powdery mildews of diverse greenhouse crops.

Handling potted trees during the winter

When winter approaches, gardeners start thinking about putting their gardens to bed. This brings about the question of how to handle potted trees. Potted trees can be left outdoors or brought indoors where the temperature is between 35 to 50 F.

Taking trees indoors

Fig trees are a good candidate for moving indoors during the winter; however, if it is a hardy fig tree, you have the option to leave the tree outdoors. The exception to this is if you are in the United States Department of Agriculture plant hardiness zone 5a or 5b, in which case it is best to bring the tree indoors for the winter.

A potted tree can remain outdoors until the first frost. When leaves start falling off, the tree should be moved to a cool place, like an unheated garage, where the temperature will not go below freezing. This also is a good time to prune roots and repot the tree.

In the spring after the last frost, you should begin the acclimatization process by moving the tree out of the garage gradually – first, for a few hours and then, over a week's time, increasing the outside stay until the late afternoon. Only take the tree indoors if low temperatures are expected. After seven to 10 days, the tree will be sufficiently acclimated to be left outdoors.

Overwintering trees outdoors

If grafted potted trees are going to be overwintered outdoors, they have to be prepared to face low temperatures. Place all potted trees close together and against a south-facing wall, which generates radiation for added temperature protection. The pots should be covered or buried in shredded bark that covers the sides and goes over the top of the pot a few inches above the graft union.

Another way to winterize potted trees is to dig a trench 18 to 20 inches deep, place the trees in the trench and backfill it. In the spring, dig up the pots and, if needed, transplant the trees into pots that are 2 to 3 inches larger. At the time of transplanting, prune the roots by cutting off about one-third of the roots. This will keep the roots rejuvenated and keep the tree growth under control to encourage fruiting. For best results, root pruning should be done every two to three years.

Managing weedy grasses in pastures and hayfields *– continued from page 1 –*

Compared to jointhead grass and Japanese stiltgrass, yellow foxtail germinates later in the growing season (late May to early June). Therefore, herbicide application timing will need to be modified accordingly. In hayfields, it may be best to wait until after the hay is cut and removed. While foxtail is in the two- to three-tiller stage (about seven to 10 days after cutting hay), apply the herbicide quinchlorac (Facet) at 32 ounces per acre (along with methylated seed oil as an adjuvant). Adding Prowl H2O at 2 quarts per acre to the tank mixture during this time will help provide residual control of foxtails that germinate later.

Figure 3. Yellow foxtail taking over a hayfield near Beckley, West Virginia. (Photo credit: J. Hatfield)

Figure 4. Japanese stiltgrass 12 weeks after Prowl H2O treatment was applied at 4 quarts per acre. Treated area is shown below the red line. (Photo credit: R. Chandran)

Figure 5. Jointhead grass plots six months after a Prowl H2O treatment was applied prior to seed germination in early April at 2 quarts per acre. (Photo credit: R. Chandran)

Invasion of the millipedes

Millipedes live outdoors in moist areas with large amounts of plant material. They are scavengers that feed on decaying organic matter. Occasionally, large populations can become pests when they invade homes and farmland by the hundreds or even thousands.

Description

Millipedes are a group of arthropods characterized by having two pairs of legs on each body segment (except for the first three body segments that only have one pair of legs each). The millipede species commonly found invading homes are brown to black in color, ½ to 1½ inches long and roll into a coil when disturbed (Figure 9).

Figure 9. Millipedes are brown to black in color, ½ to 1½ inches long and roll into a coil when disturbed. (Photo credit: Gary Alpert, Harvard University, Bugwood.org)

Millipedes are most active at night. During the day, they take refuge in mulch or beneath rocks, logs or other protected places. Mass millipede migrations normally take place during dry spells in the fall or spring. At such times, millipedes move across lawns or fields and into buildings, searching for moisture.

They cause no damage inside buildings, but their mere presence can be a nuisance. Minor household invasions also occur when millipedes find their way in through cracks and crevices.

Prevention and control

Prevention of millipede presence centers around three tactics: habitat modification, exclusion and moisture control.

Eliminate decaying plant matter, mulch and leaves around the foundation of buildings. This will remove millipede hiding places, which decreases habitats. Repair foundation blocks and seal any openings around basement windows and doors to reduce entry points.

Since millipedes require moisture, moisture control can sometimes be an effective prevention method. Reduce the moisture in crawl spaces with plastic vapor barriers and ventilation openings. In living areas or basements, an air conditioner or dehumidifier can help to reduce moisture.

If millipedes do manage to get into the home, use a vacuum to remove them. For severe cases, a pyrethroid-type insecticide (e.g., Talstar or Tempo) can be sprayed around the home's perimeter. However, insecticides are only a temporary fix and will likely need to be reapplied periodically.

Return of the black bear

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- Secure food, garbage and recycling, so it is not easily available.
- Remove bird feeders when bears are active. Birdseed and other grains are very attractive to bears.
- Never leave pet food out. Remove leftover food and the food bowl.
- Clean outdoor grills thoroughly to remove all grease and fat. Store grills and smokers in a secure area.
- Share news about recent bear activity and how to avoid bear conflicts.

For additional information, visit *www.wvdnr.gov* or *www.bearwise.org*.

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*

WVU-ES Creative Team:
Greg Jacobs, *Graphic Designer*

Lindsay Wiles, *Editor*

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