

# Montana IPM Bulletin



MONTANA STATE UNIVERSITY

EXTENSION

Spring 2011



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## Get ready for Spring: Weed Management for Lawns

*Fabian Menalled, MSU Crop Weed Specialist*

Many times, a weed-free lawn can seem like something that only occurs in televised golf tournaments. I don't know about you, but every spring I struggle to keep dandelion, nutsedge, and quackgrass from taking over my lawn.

While herbicides can help manage weeds in lawns, no single product will work against all weeds. For example, products that contain 2,4-D are designed for broadleaf weeds and won't work for grasses. Unless care is taken, herbicides can be dangerous to lawns, flowers, pets, and people. A successful weed management program takes advantage of many approaches including cultural practices, mowing, and, if necessary, herbicides.

The key to managing weeds is to outcompete them with a dense and vigorous lawn. Most weeds have very little chance of establishing if thick grass blocks sunlight, captures moisture and takes advantage of available nutrients.

A good fertilization program can help grow a dense and competitive lawn. Be aware that too much fertilizer, while helping to nurture a lawn, will also feed the weeds. Also, too little fertilizer can lead to a sparse and uncompetitive lawn. In Montana, one or two applications of fertilizer per year are usually enough. When purchasing fertilizer, choose a high percentage

of controlled-release nitrogen to provide a slow, steady nutrient supply. Consider having soil tested to know how much fertilizer is needed.

Mowing can help manage weeds, but it can also hurt your lawn. Frequent mowing weakens grass by reducing its ability to capture enough sunlight and produce food. Moreover, a short lawn allows too much sunlight to reach the soil surface, helping weed seeds sprout and grow. Mowing at the highest possible level – usually between 2 and 4 inches – will help manage unwanted weeds.

Frequency and timing of watering are also crucial to healthy lawns. Usually, lawns need about 1 inch of water per week. As a general rule, the best approach is to water lawns infrequently and deeply. Providing a lawn with infrequent, deep soakings helps grow deep-rooted grasses and prevents the germination and growth of shallow-rooted weeds.

Identifying weeds is also essential to reduce their spread and abundance. Grass and broadleaf weeds that are found in lawns fall into two main groups: annuals and perennials. An annual is a plant that dies at the end of each growing season and new plants are produced each year from seeds. Annual weeds, such as crabgrass and shepherd's-purse, are not that difficult to control. Preventing seed production in annual weeds by mowing or other means is often effective.

A perennial plant, on the other hand, lives for more than one year and grows back from the roots each year. Perennials also produce seeds, which can give rise to new plants. To effectively control deep-rooted perennials, such as Canada thistle or bindweed, concentrate efforts on managing roots. Roots of perennials often have vegetative buds, growing deep in soil. These buds can give rise to new, independent plants.



DANDELION. (GAINESVILLE STATE UNIVERSITY, 2011)



Certain herbicides, such as those containing glyphosate, can move within the plant, down into the root system. A fall application is usually recommended to maximize herbicide translocation to the root system.

If you are not sure of the identity of a weed, take a sample to your county Extension agent or county weed office. They will also help design a weed management program that integrates as many practices as possible.

Believe it or not, hand-pulling is still one of the best defenses against weeds. Pulling annual weeds before they flower and seed is the simplest way to prevent them from spreading. Hand-pulling is easier when soil is moist. A sharp spade or digger can help do the job.

When using an herbicide, choose one that is labeled for the type of lawn you have and is effective against the weeds you have. Before spraying any herbicide, read the label and follow directions carefully. Some herbicides work within a certain temperature range; others need to be applied at a specific time of year. When used incorrectly, herbicides can injure or kill turf and other desirable plants.

If efforts to get a weed-free manicured lawn – one that is the envy of a professional golf-course manager – don't work, relax and enjoy the summer anyway. I don't know about you, but I'm learning to live with my dandelions.

## Plant diseases of concern in spring: Wheat streak mosaic virus and stripe rust

*Mary Burrows, MSU Plant Pathologist*

Wheat streak mosaic virus (WSMV) (Figure 1) and stripe rust may be important diseases in the Golden Triangle this spring. We saw quite a few samples in the Schutter Diagnostic Lab and in county Extension offices last fall with these diseases, and both will survive the winter on green plant tissue. The prevalence of these diseases this spring will depend on weather conditions. Both are favored by a cool, wet spring.

Both of these diseases survive due to the green bridge, or green plants present between the harvesting of one crop and the emergence of the next. These diseases were prevalent last year due to the delayed maturity of the spring wheat, early winter wheat planting and mild fall temperatures. We've also had quite a bit of volunteer grain due to hail and wheat stem sawfly in the Triangle.

Management of WSMV can only be achieved by eliminating the green bridge. There are no pesticides that will treat the virus and no effective acaricides (insecticides) to control the wheat curl mite

vector. If you have WSMV in your winter wheat or volunteer, you may consider replacing the crop early in the spring depending on the severity of infection and whether wheat curl mites are active this spring. Wheat curl mites spread the virus from plant to plant, so if they are active this spring they will be spreading the virus. Losses can range from 10 percent to total loss depending on the time of inoculation, the variety/crop, and the number of plants that are infected. Spring wheat is very susceptible to WSMV, while barley is less susceptible than winter wheat, but will get infected with both the virus and mite.

When planning spring planting, practice good volunteer and grassy weed control before planting. We recommend 2-3 weeks between the application of herbicide and planting of the new crop to allow the green plant tissue, the host of both virus and mite, to die. If you are planting into a clean field, plant spring crops as early as possible to avoid mite activity. Mites reproduce best at 75 to 80F, but can survive temperatures down to -20F. Mites move

## Good news for farm applicators regarding NPDES Permits

*Cecil Tharp, MSU Pesticide Education Specialist*

According to the January 7, 2009, ruling by the 6th Circuit Court, clean water permits (NPDES permits) will be required for all pesticide or biological applications to control pests directly to water, over water, or near water. This permit was designed to reduce discharges of pesticides to aquatic ecosystems. See the previous MSU Pesticide News story at <http://www.pesticides.montana.edu/News/Miscellaneous/agalertaquaticpesticidepermits.pdf>. This court mandate, which takes effect on April 9, 2011, will impact some Montana pesticide applicators.

Farm applicators have been concerned over this court decision due to the use of the words 'near water' in this ruling. This seems to implicate many agricultural or rangeland applications near the water's edge. Many applicators have asked, "Could this mean an extra permit

for anyone managing noxious weeds along a stream bank or ditch canal?" It was up to the Montana Department of Environmental Quality (MT DEQ) to interpret the language of 'near water'. MT DEQ has been working hard to ensure this ruling doesn't implicate many applicators who are simply targeting terrestrial weeds near water.

### Who does this impact?

According to MT DEQ staff, this permit will mainly impact applicators that apply pesticides over or within water. This includes: aquatic pest, aerial

applications over forest canopies (with water sources), mosquito abatement, and aquatic weed applicators. DEQ has interpreted the word 'near water' to include pesticides which may drip into a state water body or run off



[HTTP://WWW.NOAA.GOV/STORIES2008/20081118\\_PESTICIDES.HTML](http://www.noaa.gov/stories/2008/20081118_PESTICIDES.HTML)

with wind currents both short and long (up to 3 miles) distances. Summers of cool temperatures and above-average rainfall favor mite reproduction and dispersal. More information on both WSMV and the mite can be found at University of Nebraska-Lincoln's Extension publication: <http://elkhorn.unl.edu/epublic/live/ec1871/build/ec1871.pdf>.

Stripe rust was found in Montana last fall and has been surviving the winter in Washington and other areas of the United States. I expect it will survive in Montana, as well. Again, the severity of infection



FIGURE 1. WHEAT SHOWING WSMV.

will depend on spring weather conditions. Stripe rust is favored by cool moist weather, but it does need temperatures from 50-59F to sporulate and spread. A detailed discussion of the role of temperature and strain in disease development can be found in Xiangming Chen's review article at <http://ddr.nal.usda.gov/dspace/bitstream/10113/19970/1/IND43765026.pdf>. In 2010 we identified new strains of stripe rust in the Great Plains, which overcome the resistance of previously resistant varieties. At this point it is not known which strains we have. A rule of

thumb to tell if a variety is susceptible or resistant is to look at the color of spores on the leaves. If they are yellow/orange and prolific, your variety is susceptible. If there are dead or yellow patches where spores tried to infect and black pustules form, the variety is resistant.

Management of stripe rust can be achieved through variety selection and fungicide use. If you have planted a resistant

winter wheat variety, spraying fungicide is generally not recommended. University trials in both Montana and Washington have found no economic benefit to spraying a resistant variety. Resistant winter wheat varieties include Yellowstone, Jagalene, Jerry, NuFrontier, and Ledger. However, the new strains of stripe rust do infect Jagalene. Moderately resistant varieties include Rocky, Rampart, Genou, Vanguard, Wahoo, Hatcher, Above, and NuWest. Moderately susceptible and susceptible varieties include Pryor, CDC Falcon, CDC Buteo, Morgan, Neeley, NuSky, NuWest, and BigSky.

Stripe rust can also infect spring wheat. Resistant varieties include Conan and Scholar, and moderately resistant varieties include Hank, Freyr, Reeder, and Explorer. Highly susceptible varieties include McNeal, NorPro, and Fortuna. Varieties rated as moderately susceptible include Outlook, Choteau, Ernest, Kelby, and Knudson.

For specific fungicide recommendations, see [http://wiki.bugwood.org/HPIPM:Fungicide\\_table](http://wiki.bugwood.org/HPIPM:Fungicide_table). In general a mix of chemistries (a strobilurin and a trizole) give the best control.

as a consequence of over-application. In a nutshell, many farm/private applicators that are targeting noxious weeds near the water's edge are exempt. Weed districts, mosquito control districts, and commercial applicators in the category of aquatic pest control should pay special attention.

**What about spray drift?** Spray drift can, even on a relatively calm day (5 mph wind), move very small concentrations of pesticide from 5' – 20'. This could result in some small concentrations of pesticide to move off-target to a water source nearby. However, MT DEQ has stated repeatedly that this permit is not mandatory in situations where drift carries very small concentrations of pesticide to a water source. They are demanding permits only for applications directly over or within water. The definition, 'near water' applies when an applicator applies pesticides on brush hanging over the water's edge which results in dripping into a water source, or as a direct result of

over-application, which results in runoff.

**How much will it cost?** DEQ is still working on final costs associated with the program. It seems there may be two types of permits and associated costs. A minor use permit will be available for those that meet the definitions of to, over, or near water (see previous paragraph), but are under designated thresholds. This will be associated with minimal costs (approximately \$50). A major use permit will be available for those that meet the definitions of to, over, or near water, but are above designated thresholds. Costs may be around \$500 according to DEQ personnel. This should be finalized in upcoming months.

**What is the threshold?** DEQ is still working on designated thresholds. Estimates have varied according to the type of pesticide an applicator is using and type of activity conducted.

The U.S. Environmental Protection Agency (EPA) requested an extension to allow more

time for pesticide operators to obtain permits for pesticide discharges into U.S. waters. EPA requested that the deadline be extended from April 9, 2011, to October 31, 2011. While the court is considering this request, permits for pesticide applications will not be required under the Clean Water Act. This extension will allow sufficient time for EPA to engage in Endangered Species consultation and develop an electronic database to streamline requests. This extension will also allow states additional time to finish developing their state permits.

For more information contact the Department of Environmental Quality (Christine Weaver; [CWeaver@mt.gov](mailto:CWeaver@mt.gov)). See the EPA Final Rule on Aquatic Pesticides website (<http://cfpub.epa.gov/npdcs/>). If you have further questions regarding this article contact the MSU Pesticide Education Program office (Cecil Tharp, 406-994-5067, [ctharp@montana.edu](mailto:ctharp@montana.edu)).

# “Black Fingers of Death”: Potential Biocontrol for Cheatgrass

Jane Mangold, MSU Invasive Plant Specialist

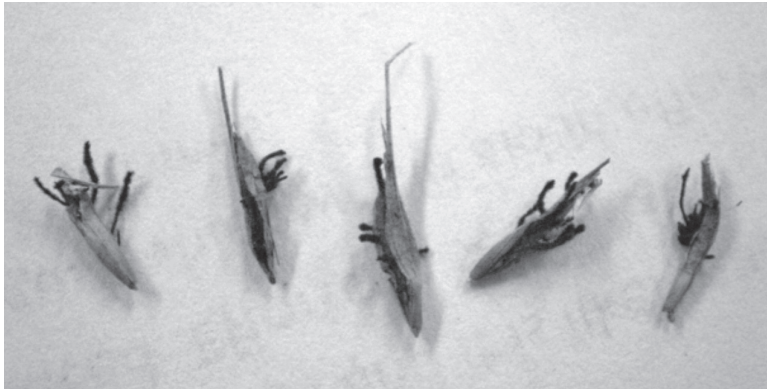


FIGURE 1. BLACK FINGERS OF DEATH (*PYRENOPHORA SEMENIPERDA*) PROTRUDING FROM CHEATGRASS SEEDS.

Cheatgrass (*Bromus tectorum*), also known as downy brome, is one of the most problematic weeds throughout western North America. Native to southwestern Asia, cheatgrass was first reported in North America in the late 1800s and has since spread throughout most of the West from Canada to Mexico. In 2003 an estimated 56 million acres were infested with cheatgrass in 17 western states.

In Montana cheatgrass is a growing problem that may require novel approaches for management. It negatively impacts a variety of agricultural lands and was recently added to the Montana Noxious Weed List as a Priority 3 regulated plant. Cheatgrass is particularly problematic in winter wheat cropping systems and rangeland. However, in recent years cheatgrass has become a problematic weed in spring-based small grain cereals, broadleaf crops, and CRP.

A main constraint to reducing the spread and impact of cheatgrass is due to the lack of consistent and efficient chemically-based options. Herbicides provide limited control for several reasons: 1) environmental conditions likely play a crucial role in determining the efficacy of chemical control, 2) cheatgrass can emerge both spring and fall, 3) non-target effects can be large due to similarities in morphology and phenology between cheatgrass, small grains, and native grass species, and 4) cheatgrass builds up large seedbanks, and herbicides have limited effects on seeds in the soil.

Because of the widespread distribution of cheatgrass and the difficulty in controlling it,

researchers have been investigating potential biocontrol agents. Forty-nine recorded fungal pathogens have been found on cheatgrass in North America, and a few of them have been the focus of biocontrol

research, primarily for control of cheatgrass in rangeland. Research has focused on pathogens that already occur on cheatgrass in North America under the assumption that large-scale introductions of these species present less risk than introducing novel biocontrol agents.

*Pyrenophora semeniperda* (Figure 1), also known as “black fingers of death,” is a naturally-occurring soil fungus that is being investigated as a potential cheatgrass biocontrol agent. Hyphae infect and kill seeds in the soil and on the plant, forming dark stromata up to several centimeters long (“black fingers of death”) that protrude from infected seeds. Research from Idaho and Utah has shown that this pathogen can significantly reduce cheatgrass seed banks, causing seed mortality rates as high as 90-100%, which is promising since herbicides have little effect on dormant seeds. Additionally, conidia (spores) infect leaves of grass seedlings, causing small purplish black spots which develop bleached centers (ring spot disease), and can also infect developing seeds resulting in reduced seedling vigor and increased seedling mortality. The pathogen has been reported in Montana and much of the state has climate that is moderately to highly suitable for the pathogen.

*Pyrenophora semeniperda* infection is not limited to cheatgrass and may pose a threat to crop and desirable range grasses. Its host range spans at least 36 genera of annual and perennial grasses, including all winter cereal crops, and six genera of broadleaf plants. Seeds of native grasses can also succumb to the pathogen. For example, seed mortality of

15-80% was recorded for several native grasses commonly found in Montana. In addition to infecting native grasses, *P. semeniperda* poses a threat to cereal crop production. While significant economic damage from *P. semeniperda* has not been reported in the U.S., it is known to infect wheat and barley in other countries. However, the potential impacts on cereal crops have only been documented for Australian strains of the pathogen, and risk of infection and disease development may vary with different pathogen strains, weed species and crop varieties.

Potential impacts on cereal crops with use of *P. semeniperda* is of particular concern since closely related species are major pests in wheat and barley. There is no information concerning the risks of introducing *P. semeniperda* as biocontrol agent in Montana. With financial support from the Montana Wheat and Barley Committee, we are currently investigating the geographic distribution of this pathogen across Montana and testing the virulence of various strains on wheat, barley, native grasses, and annual weedy grasses. If the pathogen is widely distributed in the state with no documented impacts on crops, then risks of using it as a biocontrol agent are reduced.

Another naturally-occurring soil fungus that has been explored as a biocontrol agent is *Ustilago bullata*. An infected plant will grow vegetatively, nearly indistinguishable from uninfected plants, but when the inflorescence develops, black smut balls will appear instead of viable seeds, thereby eliminating seed production. Unlike *P. semeniperda*, which destroys infected seeds, plants infected with *U. bullata* will be using water and nutrients, limiting the growth of desirable vegetation, and producing flammable fuel-like uninfected plants, and strains of *U. bullata* may be highly effective on one cheatgrass population but not on another. You may have noticed *U. bullata* as a black, powdery dust on cheatgrass plants from time to time.

I’ll keep you posted on the results of our research at MSU and any other developments in this intriguing story. Stay tuned!



# Mountain Pine Beetle *Kevin Wanner, MSU Cropland Entomologist*

A single insect pest, the mountain pine beetle (MPB), is having an immense impact on western North America by attacking and killing millions of acres of pine forest as well as high value urban pine trees. Vast areas of conifer forest are one of the most distinctive features of the West, and many are now visibly covered with red dying pine trees. The infestation stretches from Mexico to British Columbia wherever host pine forests are found. In Montana, more than 3.4 million acres were affected in 2009. All species of pine can be attacked, but native lodgepole, ponderosa and whitebark pines are favored hosts. Introduced Scots pine planted as ornamental trees are also very attractive to the beetle.

While the magnitude of the destruction is difficult to accept (it is believed to be the largest infestation in recorded history), MPBs are a native insect, and outbreaks are a natural event that occurs periodically when pine forests become old. Factors that promote large areas of even aged pine forest contribute to the size of an outbreak. Warmer winters are also thought to allow the insect's range to expand to higher elevations and more northerly latitudes. More information about the current infestation, the MPB and its management can be found on the interagency website [www.beetles.mt.gov](http://www.beetles.mt.gov).

Mountain Pine Beetles do not inhabit cities and backyards, but rather they infest forests.

However, if they fly or are windblown into an urban environment, they will attack whatever host trees they find. During summer 2008 about 1,000 attacked trees were removed from Great Falls. In 2009, funnel traps with baits attractive to MPBs were set out in the Great Falls and Conrad areas (Figure 1). County Extension agent Wade Crouch caught thousands of beetles with traps located more than 20 miles from any forest. A large flight of MPBs caught up in prevailing winds is the most likely explanation for this unusual trap catch and also explains attacks of isolated shelterbelt trees in central Montana.

What will 2011 look like? Aerial surveys conducted by the USDA Forest Service in 2010 indicate that the MPB infestation in Montana is beginning to decline overall, but in some areas it continues to expand. In areas like Butte, Helena and Bozeman, populations have begun to decline because most suitable host trees have now been killed. The cold spell during fall 2009 and the cool moist weather during spring 2010 slowed the infestation but only in some localized areas. In areas of western Montana where there is an abundance of susceptible host trees, such as Ravalli, Flathead and Lake Counties, MPB infestations continue to spread (Figure 2). A full report of Forest Insect and Disease Conditions in 2010 is available online:

<http://www.dnrc.mt.gov/forestry/Assistance/Pests/Documents/2010MTConditionsReport.pdf>

Should you be concerned about your favorite backyard pine trees? Following are four points to consider when thinking about managing MPB attacking urban and shelterbelt trees in Montana. A detailed discussion can be found online at: <http://www.beetles.mt.gov/Educational/PDF/MPBManagement.pdf>.

- 1) Learn to recognize the signs and symptoms of MPB attack. Evaluate the degree of risk to pine trees on your property. Is the property close to an infested forest? Are there infested trees on your property or in the general area?
- 2) Practice prevention. Remove and destroy infested trees by June 1 before beetles emerge to attack nearby trees. Do not bring infested firewood onto your property. If the pine trees are at risk of attack, keep them well watered.
- 3) If your pine trees are at risk, consider protecting them. Trees can be protected by spraying trunks with an insecticide or by applying a repellent pheromone prior to July 1.
- 4) During the fall season evaluate MPB damage to your pine trees and develop a management plan that utilizes prevention and protection if necessary. The current infestation will likely last for at least another three to five more years in some areas of Montana.



FIGURE 1. A FUNNEL TRAP BAITED WITH PHEROMONE ODOR TO ATTRACT MPB. TRAPS MORE THAN 20 MILES FROM THE CLOSEST FOREST CAUGHT THOUSANDS OF BEETLES IN 2009. (DAN PICARD, PONDERA COUNTY EXTENSION)

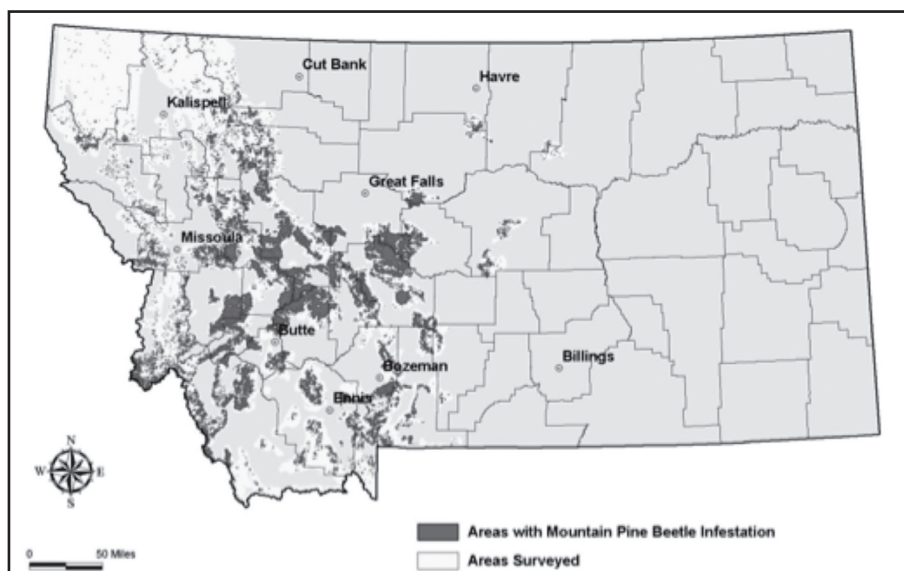


FIGURE 2. RESULTS OF AN AERIAL SURVEY OF FOREST CONDITIONS IN MONTANA IN 2010, REPRINTED FROM THE MONTANA FOREST INSECT AND DISEASE CONDITIONS AND PROGRAM HIGHLIGHTS - 2010, A JOINT REPORT PRODUCED BY THE USDA FOREST SERVICE AND THE MONTANA DNRC.

# Meet Your Specialist

## Jane Mangold, MSU Extension Invasive Plant Specialist

By Melissa Medley

Jane is originally from northeastern Iowa. She received her B.S. from Iowa State University in 1994. She completed both her M.S. (1997) and Ph. D. (2004) at Montana State University.

Her academic interests included biology, life sciences, ecology, and secondary education. Jane's research interests focused on invasive plant management in range and natural areas, revegetation, and plant-to-plant competitive relationships. She first worked for Montana State as a graduate research assistant and research associate from 1995-2004. She then worked with the USDA Agricultural Research Service in Burns, Oregon from 2004-2008.

Jane returned to MSU in September 2008 when she began her work as the Extension Invasive Plant Specialist. On a personal note, Jane is involved in a variety of outdoor activities including running, hiking, and cross-country skiing. She also enjoys baking, reading, and playing the piano. Jane sings in her church choir. She is also a member of several professional organizations including the Society for Range Management, the Western Society of Weed Science, the

Montana Association of County Agricultural Agents, and is a board member of the Montana Weed Control Association.

**Q: What do you feel are some key issues in Montana in terms of invasive plants?**

One of the biggest issues facing Montana at this time pertains to aquatic invasive plants. There are several aquatic invasive plants listed on the Montana Noxious Weeds list, including flowering rush (*Butomus umbellatus*), curlyleaf pondweed (*Potamogeton crispus*), and Eurasian watermilfoil (*Myriophyllum spicatum*). We are at a critical stage in the invasion process with these aquatic plants and our primary focus should be on preventing spread to non-infested areas. In areas where these species are already established, we must focus on management to prevent further spread.

Another key issue with management of invasive plants pertains to early detection and rapid response (EDRR) to new invaders. We have taken a proactive approach to EDRR in Montana. As part of this strategy, we have been conducting workshops to help train individuals how to recognize invasive plants and report their findings.

The last issue regarding invasive plant species that I feel is important in Montana focuses on cheatgrass. This grass is a problem

throughout the western U.S. In Montana our emphasis is on management of cheatgrass in range and natural areas across the state.

**Q: What are some of your current research projects?**

I currently have several research projects relating to revegetation of cheatgrass infested rangeland. These projects focus on integrating herbicide treatments with seeding to create desired plant communities. As part of this study, we are examining the importance of appropriate species selection in this process.

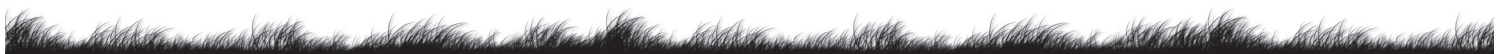
One of my other projects looks at the simultaneous management of spotted knapweed and cheatgrass in infested rangeland. Our goal with this project is to examine how successful control of these two invasive species can release desired plants still present in the plant community.

I also have several other projects looking at aspects of cheatgrass biology, ecology, and management. Aspects of interest with these projects include biocontrol for cheatgrass, including the use of sheep and a naturally occurring soil-borne fungus as control agents.

Additionally, I am involved with research examining management options for western salsify (*Tragopogon dubius*) in CRP and rangeland habitats.

**Q: How can farmers, ranchers, and/or land managers use your research to their benefit?**

Revegetation research provides critical information dealing with plant communities severely degraded by invasive plants. In cases where the weed has been prevalent for years, we must move beyond just killing the weed. The focus should be on re-establishing a plant community that is competitive and meets our land management objectives. Hopefully the outcomes of my research will provide us with new revegetation practices including appropriate species selection, site preparation, and invasive plant control methods that result in successful establishment of desired species and long-term weed suppression.



## Ask the Expert

**Q:** I'm a new lentil grower: what diseases should I be concerned about?

**A:** Congratulations! Planting pulse crops is a great way to break both disease and insect pest problems that have been a problem in your continuous cereal cropping system. With that said, there are also a number of plant pathogens that have what we call a 'broad host range' and can infect both pulse and cereal crops. These primarily include the soilborne plant pathogens such as Pythium, Rhizoctonia, and Fusarium. To manage these diseases, use a seed treatment with a mixture of chemistries that includes both metalaxyl or mefanoxam for the Pythium and a fungicide for the 'true' fungi. Registered products can be found at [http://wiki.bugwood.org/HPIPIM:Pulse\\_Crop\\_Seed\\_Fungicide\\_Table](http://wiki.bugwood.org/HPIPIM:Pulse_Crop_Seed_Fungicide_Table).

In addition to soilborne pathogens, a couple of diseases including Ascochyta blight and Anthracnose can come in on seed. Once in your field they are very difficult to get rid of, so the best strategy to keep them out is to plant clean seed. The Montana State Seed Testing Lab offers Ascochyta testing for a fee. We've also started monitoring seed samples for Anthracnose. If you find your seed is infected with either pathogen, there is a risk of disease development. There are foliar fungicide options, which can be found at [http://wiki.bugwood.org/HPIPIM:Pulse\\_Crop\\_Foliar\\_Fungicide\\_Table](http://wiki.bugwood.org/HPIPIM:Pulse_Crop_Foliar_Fungicide_Table).

**Q:** I read that rotating herbicides with different modes of action is important to reduce the spread of herbicide resistant weeds. How do I know the mode of action of a herbicide?

**A:** I'm glad you're concerned about the risk of herbicide resistance! Herbicide labels include a standardized system showing the product mode of action (MOA). Near the top of the label you can find a box labeled 'Herbicide Group'. Inside the box there is a number with the herbicide MOA based on a system developed by the Weed Science Society of America. Premixes containing more than one MOA have multiple numbers listed. As a general rule, the greater number of MOAs used, the lower the chances of

selecting herbicide resistant weeds. However, designing an integrated program is not as simple as randomly adding MOAs. The different MOAs used in the program must have good activity to successfully reduce herbicide resistance selection pressure. A complete list of the herbicide MOA with examples can be found at the Weed Science Society of America website ([www.wssa.net](http://www.wssa.net)).

**Q:** Are there any new herbicides available for range, pasture, and roadside noxious weeds?

**A:** On January 26, 2011, EPA granted registration approval for DuPont's Perspective™, Streamline™ and Viewpoint™ herbicides. The new active ingredient present in these general use herbicides is aminocyclopyrachlor, a synthetic auxin. These herbicides are in a dry flowable form and are labeled for non-crop use. Use rates range from about 1.75 to 11 ounces per acre for Perspective and Streamline and 13-20 ounces per acre for Viewpoint, depending on the target weed species. Key weed species controlled include bindweed, knapweeds, leafy spurge, rush skeletonweed, thistle complex, white top, yellow starthistle, toadflax, and black henbane. Always read the label carefully before using and use only according to label directions. Labels for these new herbicides and herbicides in general can be found at <http://www.greenbook.net>.

**Q:** What should I do if I suspect pesticide injury on my ornamental plants or garden?

**A:** If you suspect pesticide injury on plants on your property, conduct an investigation of your own. Determine if you could have injured your own plants. Keep in mind pesticide injury symptoms can be delayed for one season. Individuals often apply broadleaf herbicides too close to non-target trees. If the application was made late in the season, trees may delay symptoms of pesticide poisoning until the following season. If you didn't apply pesticides recently, a homeowner should answer the following questions:

- Has anyone else applied pesticides nearby?
- Could this be a nutrient deficiency (Nitrogen, Phosphorus, and Potassium)?
- Could this be due to environmental conditions (drought, excessive water)?

-Have you used compost in the last 24 months?

If you cannot find a nutrient deficiency or associate the symptoms to a pesticide application/environmental conditions then it may be time to send your samples to the MSU Diagnostic Clinic. Contact your local MSU Extension Office for further information on using this program. The MSU Diagnostic Clinic can be used to evaluate your plants for other plant pathogens or insects, as well as ascertain whether the symptoms may be due to pesticide injury. If the clinic finds that the symptoms may indeed be caused by pesticide injury, then you may wish to contact the Montana Department of Agriculture (406)444-5400 to file a formal complaint and begin an investigation.

**Q:** Last summer damage from grasshoppers was not as bad as I expected. What is the forecast for this coming summer?

**A:** Last summer Montana was expected to suffer from the largest grasshopper outbreak since the 1980s. But last year's cool and wet spring averted potential catastrophic losses in two ways. Grasshoppers are adapted to dry hot weather where they develop quickly and diseases that kill them are less common. Also, under these drought conditions, grasses do not recover well from feeding damage. Last summer, even eastern Montana was green well into July. Cool wet weather slows grasshopper development and natural diseases become more common. With extra soil moisture, grasses recover from feeding damage more easily. Together these factors helped avert more severe rangeland and crop damage in Montana.

What about 2011? Grasshopper surveys conducted by the USDA-APHIS group based out of Helena still found lots of grasshoppers during August 2011. However, development was notably delayed and the number of females reaching maturity to lay eggs remains unknown. Bottom line, you need to be on the lookout this spring to survey the number of hatching grasshoppers. If we have a hot, dry spring and summer, Montana may be back into a bleak outlook for grasshopper damage.



# Pest Management Tool-kit

**First Detector Training:** [www.npdn.org/first\\_detector](http://www.npdn.org/first_detector). Are you interested in protecting U.S. agriculture and natural areas from exotic pests? Do you work with plants on a daily basis? You may like to become a First Detector by completing the convenient online training models. The NPDN Crop Biosecurity Course, released in April of 2008, consists of the following modules:

- Mission of the NPDN
- Monitoring for High Risk Pests
- Diagnosing Plant Problems
- Submitting Diagnostic Samples
- Photography for Diagnosis
- Disease and Pest Scenarios

Learners who complete the Crop Biosecurity Course can download their Certificate of Completion after logging into the system. During 2010, each of the Crop Biosecurity Modules was approved for one continuing education (CEU) in pest management by the National Certified Crop Advisor (CCA) Program.

New modules are being added, such as the series on identification, monitoring and management of the Emerald Ash Borer. Visit <http://cbc.at.ufl.edu/> for further details. Or contact Linnea Skoglund, (406) 994-5150.

**A new tool to ID weeds.** Researchers and Extension specialists from Montana State University and Colorado State University have developed an interactive and easy-to-use electronic key to help growers, county Extension agents, and stakeholders across the region identify weeds commonly found in small grain systems. By answering a series of simple questions and with the help of drawings and pictures, this identification key will narrow down choices and provide the identity of unknown grasses or broadleaf weeds. This key is available at the MSU Cropland Weed Management website (<http://ipm.montana.edu/cropweeds>). It will also provide management options for several of the listed weeds.

**New Extension weed publications** for flowering rush, knotweed complex, Scotch broom, and yellow starthistle; contact Extension publications at <http://www.msuxextension.org/store/> or 406-994-3273

**Government Herbicide Applicators Licensing Course**, May 24-26, Missoula, USFS Missoula Technology Development Center; register and obtain training manuals from Cindy Simmons, [csimmons01@fs.fed.us](mailto:csimmons01@fs.fed.us), (801) 625-5686.

**Lavina Weed Education Class.** Musselshell County. April 20, 2011. 3 private applicator credits. This class offers presentations in calibration, reading and understanding pesticide product labels, and weed identification.

**MSU Wireworm Survey.** In some areas of Montana wireworm damage to small grain crops has been increasing. Wireworms are the larval stage of click beetles and more than 150 species are known to occur in Montana alone. MSU is seeking producers willing to survey wireworms infesting their fields by setting out simple bait traps shortly after crop emergence. Both irrigated and dryland wheat and barley fields are sought, with and without a history of wireworm damage, as well as pulse crop fields in rotation with small grains. MSU will mail out five bait stations to each collaborator with instructions and prepaid postage for return shipping to MSU. For more information and to participate, please contact Kevin Wanner, Extension Specialist, (406) 994-5663, [kwanner@montana.edu](mailto:kwanner@montana.edu).

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## DO YOU HAVE A COMMENT OR QUESTION REGARDING THE MONTANA IPM BULLETIN?

Send your questions or suggestions to:

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**If you wish to have the Montana IPM Bulletin emailed to you for free, contact the MSU Pesticide Education Program office: [ctharp@montana.edu](mailto:ctharp@montana.edu).**



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