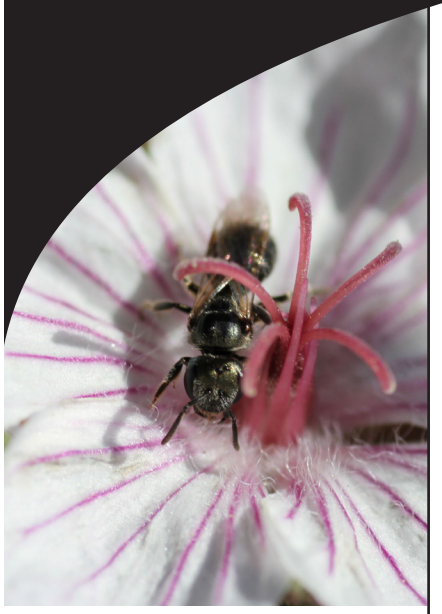
Montana IPM Bulletin

MONTANA STATE UNIVERSITY | EXTENSION

Fall 2013



INSIDE:

MONTANA Department of AGRICULTURE

EPA: Steps to Protect Pollinators from Pesticides

Cecil Tharp, MSU Pesticide Education Specialist, Department of Animal and Range Sciences

Pesticides are an important tool when managing weeds, insect and diseases. However, applicators should take precautions to protect bees and other pollinators. Honeybees play an important role in global food production with their value estimated at $15 - $20 billion annually. Honeybee colony losses from 2006 – 2011 averaged more than 32 percent each year. The USDA and EPA released a comprehensive report indicating honeybee losses can be attributed to loss of habitat, parasites, disease, genetics, poor nutrition and pesticide exposure (USDA; http://www.usda.gov/documents/ReportHoneyBeeHealth.pdf). Many tools are available to assist applicators in making sound management decisions that minimize impacts towards bees and other pollinators. This includes new pesticide product labels with a bee advisory box, websites, and pollinator brochures.

EPA has developed new pesticide product labels that have a bee advisory box that alerts users to additional restrictions pertaining to pesticides potentially hazardous to bees. This includes describing the dangers of directly applying pesticides to bees, dangers of off-site drift, as well as the hazards that some pesticides pose towards pollinators over much longer periods of time. The new labeling applies to neonicotinoid products containing:

- imidacloprid
- dinotefuran
- clothianidin
- thiamethoxam

This list only includes insecticides that have been identified as being highly toxic towards honey bees, referred to as pollinator toxic pesticides (PTP). As a general rule insecticides are more hazardous around pollinators than herbicides and fungicides, but not all insecticides are hazardous to

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Pollinators. Photo by R. O'Neill; Montana State University

(Pollinators, continued from page 1)

pollinators. Some of the PTP insecticides also have residual activity. This means that the chemical will not only kill bees on contact, but will also kill bees visiting sprayed plants at a later time.

Good Practices

Bees and other pollinators will travel miles to visit a wide array of blooming crops, trees, shrubs, weeds and even native vegetation. Applicators should understand the timing of blooms at their application site, as blossoms are often the only part of a plant that the bees will contact.

Neonicotinoid Products: Applicators should wait until after flower petals have fallen when using neonicotinoid products due to the residual activity of these products. Applicators should also be cautious when using neonicotinoid products as a soil drench, or tree injection to plants known to be frequented by bees as these methods can allow chemicals to persist at low levels in nectar and pollen for up to several years. Sub-lethal impacts of low concentrations of neonicotinoid products are still being studied. If a soil drench or tree injection is necessary applicators should wait until after bloom, and use the lowest rates possible.

Non-Neonicotinoid Insecticides: Always read and follow any product label restrictions. Many insecticide products have little residual and can be applied during bloom after evening pollinator foraging is complete.

Avoid Drift: Applicators should establish buffers between blooming areas and application site to minimize spray drift to blooming plants. Ideal conditions are typically 3-10 mph, no gusts, less than 90 degrees F, and relative humidity greater than 50 percent.

Be Wary of Seed Treatment Dusts: Imidacloprid and thiamethoxam treated seeds are common insecticide seed treatments in Montana small grain systems. Applicators using seeds treated with any neonicotinoids should be aware of dust movement with wind. Dusts carrying these active ingredients have been known to cause honey bee losses in other states. Avoid any off-site movement of dust to sensitive areas during planting, emptying, or cleaning of planting equipment.

Finally, applicators should communicate future insecticide applications to any nearby beekeepers. Beekeepers may be able to remove hives or cover them in wet burlap if use of a PTP is unavoidable. An applicator may also wish to navigate to https://mt.driftwatch.org/ and view any sensitive areas near their application sites.

For more information: View the infographic on EPA's new bee advisory box at http://www.epa.gov/pesticides/ecosystem/pollinator/bee-label-infographic.pdf. Navigate to the EPA's pollinator website at http://www.epa.gov/opp00001/ecosystem/pollinator/index.html. Ten ways to protect bees from pesticides, http://agr.wa.gov/fp/pubs/docs/388-TenWaysToProtectBeesFromPesticides.pdf

Going my way? Weed seeds as hitchhikers

Jane Mangold, MSU Invasive Plant Specialist, Department of Land Resources and Environmental Sciences

Weeds are often found along roads and trails. Weeds may commonly occur along travel routes because such areas are disturbance-prone, and weeds tend to prosper in disturbed areas. In addition, weed seeds are dispersed by humans traveling along such routes. A growing body of scientific literature suggests weed seeds are catching a free ride as we drive regular routes and hike our favorite trails. This article highlights some recent research about weed seed dispersal by humans along roads and trails. Although roads and trails have been implicated as an important factor contributing to weed spread, research in this area is limited. The research that exists, however, lends support to recommendations for preventing weed invasion, such as washing the undercarriage of vehicles before traveling into weed-free areas and using weed-seed-free forage.

Most research on hitchhiker weed seeds focuses on vehicles traveling along primary and secondary roads. There are four million miles of roads in the U.S. that are split almost evenly between paved and unpaved surfaces. The preponderance of roads and the abundance of weeds along many of these roads suggest that vehicles could be a major mode of weed seed dispersal. A series of studies conducted at Montana State University by Dr. Lisa Rew, assistant professor of non-native plant ecology, and her laboratory, measured the number of seeds picked up by vehicles and the distance seeds traveled on vehicles before they fell off. Different types of vehicles (trucks, ATVs, tracked vehicles), surfaces (paved and unpaved roads, on- and off-trails), and moisture conditions (wet, dry) were studied to determine how they affected seed dispersal. One study revealed that ATVs collected a large number of seeds when driven on- or off-trail, and more seeds were collected in the fall than in the spring, likely due to increased seed availability in the fall compared to spring. The highest number of seeds, about 5,500 seeds/

Houndstongue seeds on a pair of hunting pants. Photo by Jane Mangold.

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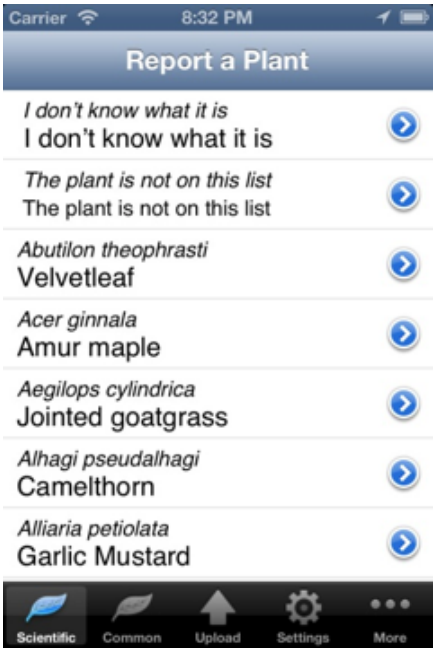
Use of Digital Technologies for Plant Pest Diagnosis

Mary Burrows, MSU Plant Pathologist, Department of Plant Sciences & Plant Pathology



Screen shots of smart phone apps.

Our smart phones keep us up-to-date in so many ways. They even make us look smarter than we are, sometimes (if you can type quickly, anyway). One way we can use these devices to our advantage is to diagnose pest problems. There are a number of benefits, and definitely some drawbacks, but digital diagnosis is a very useful tool.

The first way you can use your phone to get a digital diagnosis of a pest problem is simple: take a picture. Take some close ups and take pictures of the pattern in the field, if there is one. If it's not too blurry, you can share the picture with your consultant, county agent, or MSU pest specialist. Often we can tell with a glance what the pest is and give you advice on how, or whether to manage it based on other information you give us. These sorts of quick IDs are really valuable because they tell us what sorts of pests are emerging in the state and how prevalent and severe the pest problem is. Sometimes we use the images you send us to inform others about the pest, such as with Montana AgAlerts (www.mtagalert.org).

A second way to use your phone is to download pest identification keys or visit websites. Here's a list of widely available and useful pest ID apps and websites:

- Purdue University has apps for tree and annual and perennial plant 'Doctors'
- University of Georgia offers 'Turfgrass weeds'
- Many people like the app from Bayer called 'TurfXpert'
- If it's weeds you're interested in, check out EDDMaps West (www.eddmaps.org/mrwc/), which is coordinated by the Missouri River Watershed Coalition and the Center for Invasive Species Management at Montana State University: you can report sightings including GPS location information and pictures of the plant from your phone. The big downside of this app is that you have to be fairly familiar with the species, but there are state contacts in the 'More' portion of the app. And you can always submit a physical sample to your county agent or directly to the Schutter Diagnostic Laboratory at MSU.
- For invasive species, the 'Pacific Northwest Early Detection Network' and 'Outsmart Invasives' are good apps. They also allow you to upload data to a central database and contribute to early detection and research efforts. This database includes insects and weeds of special interest and has more pest images as guides for identification.

- A list of pest ID websites recommended by APHIS can be found at http://www.aphis.usda.gov/plant_health/identification/idaids.shtml; pest professionals use many of these websites.
- A list of apps from the Center for Invasive Species and Ecosystem Health (Bugwood) can be found at http://apps.bugwood.org/apps.html
- Busting Bugs: Identification tools including LUCID (multi-access) keys insects and other pests can be found at http://www.idtools.org/
- On the High Plains IPM Guide website we have two LUCID keys – one for ornamental pests and one for wheat pests. It is best to run these off the website, but they are directly linked to fact sheets for each pest.

 - http://wiki.bugwood.org/HPIPM:Woody_Ornamentals

 - http://wiki.bugwood.org/HPIPM:Small_Grains

- More images to confirm your diagnosis can be found at ipmimages.org

The downside of digital diagnosis is much like the downside of WebMD: you can misdiagnose the plant (or yourself) with some exotic disease, insect, or invasive plant that is not known to occur in your area. It's useful to keep in mind that, like most things, the simplest explanation is usually the correct one. If in doubt, grab a physical sample and take it to an expert for identification. Sample submission instructions and forms for the Schutter Diagnostic lab at Montana State University can be found at www.diagnostics.montana.edu.

(Weed Seed Hitchhikers, continued from page 2)

mile, was collected from ATVs driven off-trail in fall. Of these seeds, about 3,300 were from exotic plant species. Even when driven on-trail, ATVs collected about 400 seeds/mile in the fall. A second study determined that many more seeds were collected by vehicles driven under wet conditions than under dry conditions. The third study found that most seeds (99 percent on paved and 96 percent on unpaved roads) stayed attached to a vehicle for at least 160 miles under dry conditions, allowing for long distance transport of seeds. The Montana State University Extension MontGuide "Weed Seed Dispersal by Vehicles" (http://msuextension.org/publications/AgandNaturalResources/MT201105AG.pdf) provides more information about these studies.

Studies on weed seed dispersal by vehicles have been conducted in Europe. In one of these studies, researchers collected seeds moved by vehicles along urban roads near Berlin, Germany (von der Lippe and Kowarik 2007, http://www.eve.ucdavis.edu/catoft/eve101/Protected/PDF/lit/VonDerLippe_Kowarik_2006.pdf). The number of seeds collected ranged from 635 to 1579 seeds/m^2/year. The number of seeds collected depended on how close to the city the sampling occurred, and tended to increase as sampling sites moved further away from the city. Just over 200 species were collected, half of which were not native to the area. This suggests seed dispersal by vehicles is a source for introductions of new plant species. Another study in Germany found that vehicles not only pick up and drop off seeds along the road, but air currents created by passing cars facilitate the movement of seeds along roads and their accumulation along the roadside (von der Lippe et al. 2013, http://www.plosone.org/article/fetchObject.action?uri=info%3Adoi%2F10.1371%2Fjournal.pone.0052733&representation=PDF). The accumulation of seeds along the roadside may be yet another reason why weeds tend to be abundant along roads.

Weed seeds can also be dispersed by hikers. Finding cheatgrass or houndstongue seeds on your socks after spending time in the mountains or plains of Montana is not a surprise by any stretch of the imagination! But, in the last couple years innovative research has shown that dispersal of seeds by humans is potentially a major cause of spread of invasive weeds into roadless areas. In some studies, seeds of various shapes and sizes were attached to boots, socks, and pants. Hikers then walked a certain distance ranging from a few yards to a few miles. In most cases, seeds fell off the hikers within the first 14 to 20 feet, but some seeds stayed on for over three miles. The long-distance weed seed hitchhikers are the most worrisome because they may result in new introductions of weeds into the backcountry.

So, aside from staying confined to our own houses and yards, what can we do to stop hitchhiking weed seeds? As mentioned above, washing the undercarriage of vehicles before entering weed free areas is a good idea. You can read about the benefits of washing vehicles to remove weeds seeds in the Montana State University Extension MontGuide "Washing Vehicles to Prevent Weed Seed Dispersal" (http://msuextension.org/publications/AgandNaturalResources/MT201106AG.pdf). Check your outdoor gear and remove any hitchhiking seed, and when seed is found don't drop it wherever you are but instead place it in the trash or burn it. Avoid driving through weed infestations, particularly in the fall or under wet and muddy conditions. Use weed seed free forage for your pack animals if you are traveling into the backcountry or will be within the next few days. Regardless of all the precautions we take to minimize weed seeds that hitchhike on us, weeds will show up along roads and trails. In that case, monitor along these travel routes and remove any new weed infestations before they have a chance to become well-established.

Weed Seedling Identification Guide

by Fabian Menalled, MSU Crop Weeds Specialist, Department of Land Resources and Environmental Sciences

Researchers and Extension specialists at Montana State University have developed the "Weed Seedling Identification Guide for Montana and the Northern Great Plains." The new free, color publication will help farmers, land managers, ranchers and those interested in preserving Montana ecosystems identify weed and invasive plants at the seedlings stage.

The weed seedling guide provides information on 73 species, including 60 forbs (broadleaf) and 13 grass species. Each species includes a photo of the cotyledon leaves, first true leaves, rosettes (where applicable), mature plants, and seeds. Color coding and icons indicate whether the plant is primarily cropland or rangeland, life cycle, and cotyledon shapes (forbs), and ligule characteristics (grasses).

Redroot pigweed, Amaranthus retroflexus, demonstrating linear cotyledon leaf shape, first true leaves and red leaf underside (a helpful diagnostic feature). Photo by Hilary Parkinson

This information will allow the user of the guide to efficiently narrow down the options and expeditiously identify the weed seedling in question. The guide also provides a glossary and line drawings to help readers identify weed seedlings.

Rapid and accurate identification of weeds at the seedling stage is the first step in the design of a successful integrated weed management program that saves producers and land managers time, money, and reduces herbicide use in the environment. How does weed seedling identification provide these benefits? First, weed management is typically much easier,

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Meet Your Specialist

Linnea Skoglund, MSU Plant Disease Diagnostician, Schutter Diagnostic Lab, Plant Sciences and Plant Pathology

Where/when did you receive your degrees?
I received my Bachelor of Science in Horticulture from Iowa State University in 1980 and my doctorate in plant pathology from Colorado State University in 1988. Somewhere in my very distant past is a degree in music education from University of Northern Colorado.

What is your field of interest (scholastic and research)?
My first love in plant pathology was – and still is – diagnostics. When offered this position, I felt so fortunate to be able to return to diagnostics after a number of years in research.

When did you arrive in Bozeman?
I came to Bozeman in 2009 to be the disease diagnostician.

Where are you from originally?
I grew up in Colorado, first in a small mountain community and later in the Denver suburbs. I have lived in several other states as well as Peru and Kenya.

Where have you worked/taught in the past?
My agriculture and plant pathology experiences range from teaching general agriculture to high school girls in Kenya, to potato research in the highlands of Peru and Central Africa, to corn, turf and barley pathology in Colorado, to diagnostics in Colorado and Montana. As a diagnostician, I have concentrated on ornamentals.

What do you like to do in your spare time?
I admit it: I am addicted to my Kindle.

Any hobbies?
I have always loved international travel and meeting people from other cultures. I find being a conversation partner and hosting home stays a great way to meet international visitors. I am fortunate to have sisters who share this interest. I make an international trip most every year with one of them.

Additional activities?
My sister and I love to visit Mayan ruins and have done so in Mexico, Belize and Guatemala. We have also visited Incan ruins in Peru. Machu Pichu (Peru) and Tikal (Guatemala) are very special places. There are several major sites in Central America still on our lists.

Professional Questions

What are some important areas of focus in your field?

Diagnostics is an art as well as a science. A successful diagnostician is a generalist with broad scientific knowledge in subjects such as botany, plant physiology, plant anatomy, soil science, cropping systems, horticulture, greenhouse/nursery management, pesticides, IPM, and, of course, plant pathology and entomology. The diagnostician is formally or informally part of the Extension community. The diagnostic lab is an important service that works closely with state and federal governments, the university, county Extension and the community.

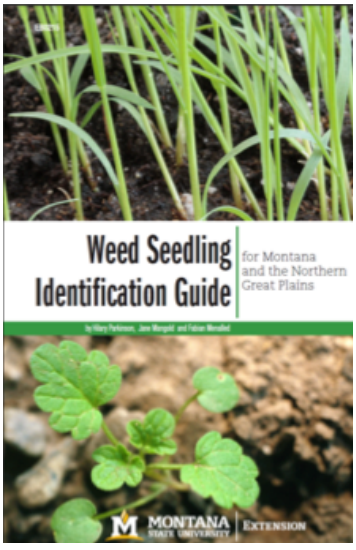
What are some of your current projects?
In addition to diagnostics, I carry out seed pathology testing for Ascochyta and other pathogens on pulse crops (pea, lentil and chickpea). This winter we will focus on developing testing methods and carrying out tests on the fungal population for resistance to the fungicide groups used on pulse crops.

How can farmers use your research to their benefit?
Disease resistance to fungicides is a serious problem threatening Montana production. Routine monitoring of the fungi in farmers' fields will improve fungicide efficacy and disease management.

(Weed Seedling Identification Guide, continued from page 4)

less costly, and more effective when the plant is a seedling or juvenile (e.g. rosette) compared to when it is mature. Second, controlling a weed during early growth stages may release neighboring, desired vegetation from competitive suppression by the weed, thereby improving overall plant community vigor. Finally, improper identification can result in misapplication of a management tool such as herbicides or failure to adequately control the weed at the time it is most vulnerable to integrated weed management practices. While almost all weed identification guides provide information on the mature stage of plants, very few guides focus on the seedling stage or are not specific to our region. The goal of the weed seedling guide is to fill these gaps and help citizens of Montana and the Northern Great Plains manage and identify weeds and invasive plants.

To get a copy of the guide, visit your local county or tribal MSU Extension office or go to the MSU Extension publications website, http://www.msuextension.org/store. You can also contact the authors of the guide, Hillary Parkinson (hilary.parkinson@montana.edu), Jane Mangold (jane.mangold@montana.edu), or Fabian Menalled (menalled@montana.edu).



Ask the Expert

Q. I did not see many grasshoppers in my county this summer, how did the population look across Montana?

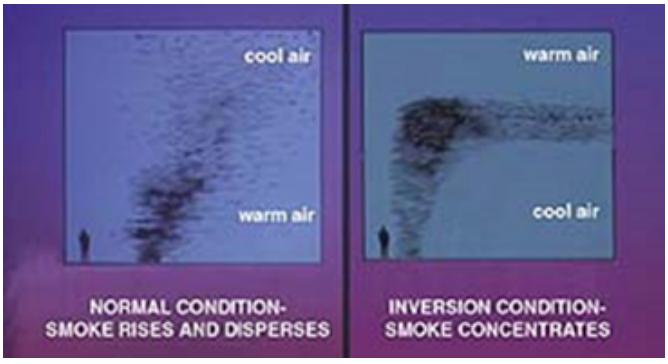
Kevin Wanner says: I am happy to say that it looks like we have finally dodged the grasshopper "bullet." Hopper numbers increased dramatically between 2007 and 2010, and it looked like we were headed for a regional outbreak as large as the one that occurred in the mid-1980s. But grasshoppers like long, hot and dry summers, and the successive cool wet spring seasons that we have experienced stalled the outbreak. The USDA-APHIS group, headquartered in Helena, conducts a survey of Montana rangeland every August for grasshopper densities and use these numbers to publish hazard maps. This year the numbers are much lower, indicating a collapse of the anticipated outbreak. But keep an eye out, there still can be isolated hot spots.

Q. I went to harvest my barley and it yielded much less than expected, what went wrong?

Mary Burrows says: This is a pretty common question we get this time of the year in the diagnostic lab. The answer to that question is really hard to pin down, and we need a lot of information to help you tease out the answer. When a crop doesn't perform as well as expected we need to take into account everything that went into growing the crop: the variety, the weather, and any stresses (herbicide, insect, disease). We need to look at the yield loss in the field and determine if there are any patterns. You may have to pull up plants and look for discoloration at the base which would indicate crown rots. Try to remember what crop stresses, including water or temperature, occurred at critical time points such as establishment, flowering and during grain fill. Look at your nutrient and pesticide applications and make sure they were timely and according to the label. Compare your crop to other, similar crops nearby and try to determine what was different. Try to plan ahead for next year and avoid the issue(s) that caused crop losses if you can.

Q. Is it safe to spray a pesticide when it is calm outside?

Cecil Tharp says: Calm conditions are enticing for applicators that fight the wind on a daily basis, but calm conditions could be a sign of a temperature inversion. A temperature inversion is caused by cool air next to the ground trapped by warm air above. As soil cools in the late evening, inversions often form which then dissipate early the next morning due to the warming of soil from sunlight. A significant temperature inversion may set up much earlier in the evening and break up much later the next day if conditions are ideal. When this occurs pesticide droplets will often become trapped in this cool layer close to the ground. To make matters worse, the lack of turbulence caused by a temperature inversion lowers the amount of mixing that occurs at the ground level, which in turn lowers the amount of pesticide that reaches the target pest. Pesticide movement becomes very hard to predict and often depends on when the inversion dissipates and what direction the prevailing winds travel once it does dissipate. Temperature inversions may cause non-target damage miles from application sites. Applicators should look for the signs of a temperature inversion prior to spraying. Some warning signs are fog or heavy dew in the morning, smoke or dust hanging in the air, and lack of cloud cover for extended periods of time.



Q. Does poison hemlock lose its toxic qualities after it is sprayed?

Jane Mangold says: Poison hemlock retains some of its poisonous compounds even after it dries, so it can still be toxic after spraying. Growth stage and age affect toxicity. The toxicity of poison hemlock is worse when the plant is green compared to when it is dry. The leaves and stems prior to development of seed head are the most toxic part of the plant, and seeds are highly toxic. Young plants in the first year of growth are less toxic than mature plants. Some herbicides contain salts which can be attractive to livestock. If poison hemlock is sprayed, monitor livestock grazing to ensure they are not eating the treated poison hemlock.

Q. Can I legally spray glyphosate (Roundup and other generic products) to desiccate pulse crops?

Fabian Menalled says: Yes. Glyphosate is labeled as a pre-harvest aid for pea, lentil, and chickpea. For most formulations, there is a seven-day restriction on harvest after spraying and only one application may be done per year. Be aware that treated vines and hay cannot be fed to livestock and that preharvest application is not recommended for legumes grown for seed, as a reduction in germination or vigor may occur. As a general rule, there should be no problem in exporting treated crops as herbicide residue in our peas and lentils are in the three ppm (parts per million) range and the USA mrl (maximum residue level) is eight ppm while Canada and the European Union is five ppm. However, to avoid any "legal" problem, always read and follow the label. You can check herbicide labels at http://www.cdms.net/LabelsMsds/LMDefault.aspx?t=

The Wheat Midge: Increasing Pest Threat to Montana Spring Wheat

Kevin Wanner, MSU Cropland Entomologist, Department of Plant Sciences & Plant Pathology

The wheat midge (also called the orange wheat blossom midge), *Sitodiplosis mosellana*, may become a more serious pest of spring wheat in Montana. During the mid-1990s North Dakota experienced a wheat midge outbreak that caused an estimated $27 million in economic damage, and it continues to be a serious concern. Severe infestations appeared in the Kalispell area of Montana during 2006, and since then it has become established in the Flathead Valley. This last summer, however, significant economic damage by this insect was reported from Pondera County and surrounding areas.

Dr. Bob Stougaard with the Montana State University Northwestern Agriculture Research Center in Kalispell has been researching this insect pest since it appeared in the Flathead Valley. A monitoring program that uses pheromone-baited traps detected wheat midge in Valier in 2011, and the recent economic damage suggests this pest has now established itself in the Golden Triangle of north central Montana.

Adults are small orange-colored midges about half the size of a mosquito. Females emerge, mate and lay eggs typically during the last week of June and first week of July. Females lay eggs on newly emerged wheat heads in the evening, and after hatching, the larvae feed on the developing kernels. In response to moisture, mature larvae drop to the soil where they form overwintering cocoons. Overwintering larvae become active the following year during June, when they pupate to complete development into the next generation of adults.

Damage to the crop is not obvious until harvesting begins, since larvae are not visible while feeding on seeds within the wheat head. In the Flathead Valley where damage has been severe, the yield of some spring wheat fields was reduced to a few bushels. Due to the cryptic nature of the larvae, the window for treating with insecticides is narrow and monitoring is critical.

Economic thresholds are determined by scouting for adult midges that are active in the evening, during late June and early July. Dusk is the best time to count midges, typically between 8:30-11 p.m. when winds are calm. Fields should be monitored daily from the time the heads begin to emerge from the boot until the anthers are visible. Treatment is recommended when there is an average of at least one adult midge for every four or five wheat heads. Several sites within the field should be examined (at least four locations in each field).

The wheat heads are most susceptible to damage by the midge larvae when egg laying occurs during heading. When the economic threshold has been exceeded, the decision to apply insecticide depends in part on the crop stage. If 30 percent of the wheat crop is at heading, wait up to four days before treating. Treat immediately if 70 percent of wheat is at heading to flowering. If 30-60 percent of wheat heads are flowering, insecticide can be applied but control will not likely be as effective. Treatments are not recommended when 80 percent of the heads are flowering since most of the midge larvae are inside the wheat head by this stage, where they are protected from the spray.

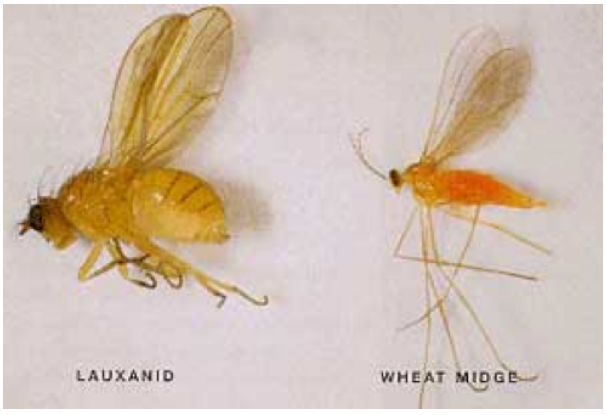
A small parasitic wasp, *Macroglenes penetrans*, is the most common biological control agent that has helped keep midge populations in check in parts of Canada and North Dakota. The wasp lays its eggs inside the midge larvae and completes its development the next spring, killing the midge larvae. The Northwestern Agriculture Research Center has collected and released this wasp in Flathead County. Other options include planting crops other than wheat, which are not susceptible to the midge. Vigilant monitoring is important to avoid unnecessarily damaging beneficial parasitoid populations: insecticides should only be applied when the economic threshold has been exceeded and not after 80% of the wheat heads are flowering. In addition to the midge parasitoid, parasitoids of another major wheat pest, the wheat stem sawfly, are also active in fields at this time.

Additional online resources, including insecticide recommendations, include:

High Plains IPM Guide:
http://wiki.bugwood.org/HPIPM:Orange_Wheat_Blossom_Midge

IPM of the Wheat Midge in North Dakota
http://www.ag.ndsu.edu/pubs/plantsci/pests/e1330.pdf

Wheat Midge, Alberta Agrifacts
http://www1.agric.gov.ab.ca/$department/deptdocs.nsf/all/agdex2507/$file/622-22.pdf?OpenElement



Adult wheat midge. Photo by Walloon Agricultural Research Center, Belgium. **FIGURE 6.** Adult wheat midges should not be confused with Lauxaniid flies that may be found in the wheat field at the same time and are not pests. Photo by Saskatoon Research Center.

Disclosure: Common chemical and trade names are used in this publication for clarity by the reader. Inclusion of a common chemical or trade name does not imply endorsement of that particular product or brand of herbicide. Recommendations are not meant to replace those provided in the label. Consult the label prior to any application.

Pest Management Tool Kit

From Fabian Menalled:

Herbicide selection web-based tool. This web page, developed by Montana State University Extension Cropping Specialist Dr. Kent McVay, is a simple-to-use yet powerful tool to select herbicides. It requests the user to respond to a few simple questions such as current and next crop, rotation interval, and weed species present. The output provides a list of products that can be used in that scenario, the product's price, and a link to the product label. The herbicide selection tool is available at http://www.sarc.montana.edu/php/weeds/

From Cecil Tharp:

2013 Pest Management Tour. Oct. 7 in Kalispell and Ronan, Oct. 8 in Plains and Superior, and Oct. 9 in Missoula and Hamilton. Six private applicator recertification credits and five commercial / government applicator credits in categories of Dealer, Demonstration and Research, Ag. Plant Pest and Right of Way. This program presents information on pesticide fate, rangeland weeds, cropland weeds, cropland insects and plant disease. For more information see the agenda at www.pesticides.montana.edu and select '2013 Pest Management Tour.'

Montana Pesticide Recordkeeping Handbook and Calibration Guide for Private Applicators. This small, easy-to-use handbook assists applicators in tracking their pesticide applications as according to regulations set forth in the 1990 Farm Bill. It also has an easy to read section on calibrating hand-wand, boom and broadjet sprayers. Available online at http://pesticides.montana.edu/Reference/PestRecKeep0158.pdf or you can contact Montana State University Extension publications distribution at (406) 994-3273 for hardcopies, priced at $4 a copy. For more information contact Cecil Tharp (406) 994-5067 or email ctharp@montana.edu.

IPM Technology Forum. Dec. 5 in Bozeman. This class is worth three private applicator credits and commercial / government applicator credits. This program will focus on new technologies used in the pest management and pesticide applicator world. For more information contact Cecil Tharp at (406) 994-5067 or email ctharp@montana.edu to pre-register for event.

From Kevin Wanner:

2014 Crop and Pest Management School. Held on the Montana State University Bozeman campus January 2-4. The CPMS is an annual 2.5 day workshop for producers, county agents and private and public agricultural professionals. Completion of the workshop provides students with certified crop advisor (CCA) and pesticide applicator credits. Speakers will include MSU faculty, local, state, and federal scientists, and out-of-state special guest speakers. A registration fee of $195 is charged in advance. Watch for the agenda and registration form that will be advertised in October. Contact Kevin Wanner at (406) 994-5663 or kwanner@montana.edu for more information.

From Mary Burrows:

New publication: Fungicides for Fields Crops by Mueller, D., K. Wise, N. Dufault, C. Bradley, and M. Chilvers, from APS Press available to order at: http://www.apsnet.org/apsstore/shopapspress/Pages/44204.aspx

Updates to two MSU Integrated Pest Management websites. Check them out: http://ipm.montana.edu/ and http://diagnostics.montana.edu/

From Jane Mangold:

New publication from Montana Department of Agriculture: A Guide to Montana's Freshwater Aquatic Plants. Available on-line at http://www.agr.mt.gov/agr/Programs/Weeds/AquaticWeeds/ or by contacting Shantell Frame-Martin at (406) 444-9491 or shantell.frame@montana.edu

New MSU Extension MontGuide: Plant Identification Basics guides readers through eight questions they can ask about a plant to help them determine its identity. Available at www.msuextension.org/store/Products/Plant-Identification-Basics__MT201304AG.aspx or by contacting Jane Mangold at (406) 994-5513 or jane.mangold@montana.edu.

North American Invasive Species Management Association (NAISMA) and Wyoming Weed and Pest Council joint annual conference, Oct. 28-31, 2013; Jackson, Wyo. See http://www.naisma.org/ for more information.

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

Send your questions or suggestions to:

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