IPM CROP SCOUTING

The IPM (Integrated Pest Management) field scouts training was conducted on May 25th at the Carrington REC. Field scouts in the IPM program will be surveying four crops (wheat, barley, sunflower and soybean) for major diseases and insect pests. The purpose of the survey program is to monitor for the major pests of these field crops and to provide timely pest alerts for producers and crop consultants. Survey results will be posted in map format on the NDSU IPM web page, and reported on in the NDSU Crop and Pest Report. The NDSU IPM scouts are:

Claire Endres, central and south central counties, working out of Carrington REC with Greg Endres
Brandi Herauf, southwest and west central counties, working out of Dickinson REC with Ryan Buetow
Hannah Kempler, north central counties, working out of NCREC in Minot with Travis Prochaska & Shana Forster
Taheni Gargouri, northwest counties, working out of Williston REC
Stafford Thompson & Taylor Senger, southeast and east central counties, working out of NDSU campus, Fargo with Jan Knodel, Andrew Friskop and Sam Markell
Jaime Lundquist, northeast counties, working out of Langdon REC with Leslie Lubenow and Benson County Extension Office with Scott Knoke

Kyle Aasand, former IPM scout, checking insect traps for sunflower insect pests. (Photo by G.Endres, CREC)

(See map on next page)
SCOUT FOR GRASSHOPPERS

IPM Scouts have observed very low numbers of grasshopper nymphs (only 1 nymph per square yard) that have just hatched in field ditches in Cass and Barnes counties in SE ND. Young grasshoppers are referred to as nymphs. They are similar to adults in general appearance but are smaller and have wing pads instead of wings. There are usually five or six nymphal stages depending on the species of grasshopper and the length of time from egg to adult is 40 to 60 days.

Grasshopper damage to wheat and other field crops is generally concentrated near field margins. Individual plants will exhibit leaf stripping, beard loss after heading, head clipping, and kernels that have been fed upon or completely destroyed. Later in field season, row crop producers should be aware of the potential for grasshoppers to move into row crops after small grains have begun to dry down.

Scouting for grasshoppers should be conducted through June. Inspect ditches and field margins for nymphs. For grasshopper thresholds, the ‘threatening’ rating is considered the action threshold for grasshoppers in any field crop. For example, grasshopper control is advised whenever 50 - 75 small nymphs per square yard can be found in adjacent, non-crop areas; or when 30 - 45 nymphs per square yard can be found within the field. Since it is difficult to estimate the number of grasshoppers per square yard when population densities are high, pest managers can use four 180-degree sweeps with a 15-inch sweep net, which is equivalent to the number of adult (or nymph) grasshoppers per square yard. Grasshopper infestations are often the heaviest on the field margins. Treating these areas may lessen the total numbers of grasshoppers successfully entering a field.
Weather is the main factor affecting grasshopper population levels. Outbreaks are usually preceded by several years of hot, dry summers and warm falls, allowing populations to increase slowly. This recent cool, wet weather will favor fungal pathogens that infect grasshoppers and slow emergence. The USDA APHIS grasshopper hazard map for rangeland (see map below) indicates that overall we had low population counts on rangeland in 2015. However, there are a number hotspots in McKenzie County that are localized. No outbreak conditions exist or are anticipated for the 2016 season, but that can change depending on weather and pasture/forage conditions. (Source: D. Hirsch, USDA APHIS PPQ, State Plant Health Director, North and South Dakota). As of May 31, pasture and range conditions rated 1 percent very poor, 4 poor, 24 fair, 65 good, and 6 excellent in ND (Source: USDA, NASS, ND Crop Progress and Conditions – May 31, 2016 News Release).
MYSTERY INSECT

This insect (life stage) was observed in garden soil in Burleigh County. This is the pupal stage of a Lepidoptera moth, probably a cutworm species that was in her garden. The variegated cutworm is common in gardens in North Dakota. This is the resting (or non-feeding) stage of its life cycle and the cutworm moth will emerge from the puparium after it completes its development. This process is called complete metamorphosis and includes the following life stages: egg to larval instars (or growth stages) to pupa to adult. It is found in beetles, moths, butterflies, bees, wasps and flies.

SUGARBEET ROOT MAGGOT: HIGH ACTIVITY EXPECTED NEXT WEEK!

Sugarbeet root maggot (SBRM) fly activity is currently at low levels throughout most of the Red River Valley (RRV); however, several sites within the Valley will experience very high populations this year. Root maggot populations have steadily increased during each of the past five growing seasons. In 2011, an average of 42 flies per trap were captured on NDSU sticky stakes. In 2015, we captured 210 flies per trap, which was a 400% increase over that observed in 2011. This trend suggests that some fields could have severe SBRM fly infestations this year.

Peak fly forecast. According to the NDSU root maggot developmental model, peak SBRM fly activity typically coincides with the first rain-free, warm (about 80°F), low-wind (< 10 mph) day at the accumulation of 650 degree-day (DD) units. To monitor SBRM DD accumulations for your area, consult the Root Maggot model application on the North Dakota Agricultural Weather Network (NDAWN). The site also includes a “help sheet” with information on how to use the model, recommendations for when insecticide applications are justified, and tips on when to apply them. American Crystal Sugar Company, in cooperation with NDSU, has developed a mobile device app based on our SBRM developmental model. The app is free, and available for both Android- and iOS-based mobile devices.

This year’s DD accumulations suggest that fly activity will intensify very soon, and that activity peaks are expected during the early to middle part of next week. Latitude typically impacts the timing of peak fly activity, with infestations in southern latitudes peaking two to five days before those in northern areas. The current forecast for four representative RRV locations is presented in Table 1.
**Table 1. Degree-day (DD) based predictions for timing of high SBRM fly activity periods and peak fly activity in the Red River Valley**

<table>
<thead>
<tr>
<th>Location</th>
<th>Total DD (as of May 31)</th>
<th>High Fly Activity Period</th>
<th>Maximum Likelihood Peak Fly Date*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fargo, ND</td>
<td>567</td>
<td>June 5-7 (+80°F, dry, and low winds)</td>
<td>June 6</td>
</tr>
<tr>
<td>Hillsboro, ND</td>
<td>529</td>
<td>June 6-8 (+80°F, dry, and low winds)</td>
<td>June 7</td>
</tr>
<tr>
<td>Grand Forks, ND</td>
<td>540</td>
<td>June 7-9 (+80°F, dry, and low winds)</td>
<td>June 7</td>
</tr>
<tr>
<td>St. Thomas, ND</td>
<td>513</td>
<td>June 9-11 (+80°F, dry, and low winds)</td>
<td>June 10</td>
</tr>
</tbody>
</table>

*Maximum likelihood for peak fly activity is based on extended weather forecasts for wind speed, air temperature, and precipitation.

Peak fly in current-year beets usually coincides with the first rain-free, calm/low-wind day to reach 80°F after 650 DD are accumulated.

**IMPORTANT:** The “Maximum Likelihood Peak Fly Date” is an additional feature of the SBRM forecast that is provided to give pest managers our best estimate for when peak fly may occur. It is important to realize the following about this estimate: 1) it is based on the 10-day extended weather forecast; 2) it includes considerations for impacts of expected wind speed, air temperature, and precipitation events on SBRM flight behavior; and 3) it has the same intrinsic limitations that any 10-day weather forecast can have.

**Root maggot fly counts.** NDSU, in cooperation with the American Crystal and MinnDak sugar cooperatives, is monitoring SBRM activity at 48 RRV sites in ND and MN this year. Traps are checked three days per week (MWF), and counts are posted online late-afternoon each count day. To view counts in your area, visit: [http://www.ndsu.edu/entomology/people/faculty/boetel/flycounts/](http://www.ndsu.edu/entomology/people/faculty/boetel/flycounts/).

**Postemergence SBRM Control.** Growers in areas at high risk of having damaging SBRM infestations should plan on applying a postemergence insecticide for additive protection, especially if an insecticidal seed treatment or a low to moderate rate of a granular soil-applied insecticide was used at planting. Fields in which heavy rainfalls (> 3 inches) occurred within two to three days after at-plant insecticides were applied also may need additional postemergence protection.

Growers choosing to use a granular insecticide for postemergence SBRM control should apply it as soon as possible, because granules are most effective if applied between 4 and 14 days before peak fly activity. Postemergence liquid insecticides should be targeted at as close to peak fly activity as possible, but should provide good results if applied within 2-3 days before or after the peak. Treated fields should be monitored for potential fly resurgences, and may require retreatment if subsequent infestations reach or exceed 0.5 flies per plant.

**IMPORTANT:** If a chlorpyrifos-containing liquid spray (e.g., Lorsban 4E, Lorsban Advanced, or any generic chlorpyrifos product) is applied, 10 days must pass before another chlorpyrifos-containing liquid can be made to the same field. If retreatment is deemed necessary within 10 days of the initial chlorpyrifos application, an insecticide product containing a different active ingredient must be used. For more guidance on postemergence control strategies, consult the “Insect Control” section of this year’s Sugarbeet Production Guide. Always remember to READ, UNDERSTAND, and FOLLOW the label of your insecticide product – it’s the law.

Mark Boetel  
Research & Extension Entomologist

Daryl Ritchison  
Extension Meteorologist
ESTIMATING PLANT DENSITY WITH THE HOOP METHOD

In the beginning of the growing season it is important to evaluate how many of the seeds actually made it into a growing seedling. To estimate established plant densities for solid seeded canola, soybean, and other crops, the hoop or circle method can be used. A “hula hoop” or circle made from plastic or wire may work. The area of the circle is calculated with the formula: Square feet of the circle = \[3.14 \times (\text{radius in inches})^2\]/144. For instance if the diameter is 30 inches the radius is 15 inches. \[3.14 \times 15^2]/144 = 4.91 \text{ square feet (area within the circle)}\). It is important to count plants in various locations in the field. A sample size of 10 observations would give a good estimate of the plant population as long as the counts were done in representative areas of the field. For instance for canola take the average number of plants per hoop (total plants counted divided by 10). If you find 36 plants per hoop divide, for this example, by the area of the hoop 36/4.91 = 7.33 plants per square foot, which equals 7.33 \times 43,560 (square feet per acre) = 319,300 plants per acre.

For canola an ideal stand has between 8-12 plants per square foot, but as canola has a good ability to compensate and fill in the gaps, the stand of 7.33 plants per square foot would be adequate.

<table>
<thead>
<tr>
<th>Table 1. Minimum plant density levels of several crops that should be considered acceptable before replanting is done.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Crop</strong></td>
</tr>
<tr>
<td><strong>Plants per square foot</strong></td>
</tr>
<tr>
<td>Canola</td>
</tr>
<tr>
<td>Dry bean: Navy and Black</td>
</tr>
<tr>
<td>Dry bean: Pinto</td>
</tr>
<tr>
<td>Flax</td>
</tr>
<tr>
<td>Soybean</td>
</tr>
<tr>
<td>Sunflower</td>
</tr>
</tbody>
</table>

A guide for the minimum plant density per crop, regardless of row spacing, is provided in Table 1. However, there are many factors going into a re-planting decision. When considering re-planting, see the extension publication A934; Replanting or Late Planting Crops.

Hans Kandel
Extension Agronomist Broadleaf Crops

POTENTIAL IMPACTS OF POOR CORN EMERGENCE

In general, plant stands in most corn fields look great this year, especially when traveling on a paved road at the speed limit. However, dry soils, crusting and in a few cases frost damage have cause reduced populations and uneven emergence. I have had a few questions about what that will mean for yields. I previously reported guidelines for replanting based on the percent stand, so in this report I will focus on the impact of lack of uniformity in emergence on yield. Of the main crops planted in North Dakota, corn is one of the most sensitive when it comes to plant population and uniformity in timing of emergence. Partly this can be explained by the small number of seeds that are planted relative to other crops (30,000 for corn verse 1.5 million for wheat) so a missing plant has a proportionally greater impact. Additionally, corn is a poor competitor during early development, so a late emerging plant rarely will achieve its genetic potential and in the worst case will not produce an ear but will compete for light, water and nutrients with neighboring plants. In other words, it becomes an expensive weed. Under the leadership of Lindsay Novak, extension agents and specialists in many regions of the state evaluated corn fields for emergence uniformity in 2013 and 2014.
They also quantified the impact of observed planting outcomes on yield within a field and on individual ears. The most common problem observed was plants emerging late (5-7 days after the first flush). In the most variable rows monitored, up to 25% of the corn plants were found to be in this category in 2013. Doubles were rare (<2%), while skips or plants that failed to emerge averaged about 4.4% of the potential stand. Extra-late emergers (10-17 days after the first flush) averaged 4% of the plants.

Data from this study on yield loss based on the category of the plant and its position relative to either a skip or a late emerger are summarized in Table 1. Not surprisingly the most significant loss in yield occurred from skips (seeds that did not germinate, did not get planted or seedlings that failed to emerge). Though plants neighboring these skips grew larger cobs (see photo), this increase could only account for 22% of the yield that was lost by the missing plant. There was significant yield loss from late emergers and as previously mentioned this was the most common category. Moreover, the later the emergence relative to the first flush the greater the yield loss. In this study no late emergers were reported to be barren, though it is not unusual to see plants that emerge late that never produce a cob. They also found that doubles actually increased yields slightly. These data were collected from single ears so there is plenty of chance for errors when extrapolating to a whole field. Nevertheless, hopefully these data will give you some idea of the yield losses you may anticipate if you had issues with stand establishment this season.

<table>
<thead>
<tr>
<th>Plant Category</th>
<th>Yield of a single ear relative to an ear from a “normal” emerged plant (%)</th>
<th>Yield loss in a field with 200 bu/acre yield potential if 10% of plants were in this category (bu/acre)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Next to skip</td>
<td>111</td>
<td>NA</td>
</tr>
<tr>
<td>Next to late emerger</td>
<td>105</td>
<td>NA</td>
</tr>
<tr>
<td>Late emerger (5-7 days after first flush)</td>
<td>65</td>
<td>-5</td>
</tr>
<tr>
<td>Extra late emerger (10-17 days after first flush)</td>
<td>59</td>
<td>-6</td>
</tr>
<tr>
<td>Double (combine ears from both plants)</td>
<td>136†</td>
<td>+6</td>
</tr>
<tr>
<td>Skip</td>
<td>0†</td>
<td>-16</td>
</tr>
</tbody>
</table>

†Based on limited samples.
¥Though there was no yield from the plant that failed to emerged, the yield of neighboring plants had 11% greater yield so the actual yield loss was only 78%.
MANAGING RHIZOCTONIA ROOT ROT OF SUGARBEET

The fungus *Rhizoctonia solani* causes Rhizoctonia damping-off, crown and root rot of sugarbeet in North Dakota and Minnesota. Rhizoctonia is listed as the most important production problem for sugarbeet growers since 2009. Growers are using more Rhizoctonia tolerant varieties coupled with seed treatments to protect from damping-off. The most widely used seed treatment is Kabina, which gives about four to five weeks of protection. It is recommended that growers use a post emergent fungicide to protect plants from crown rot and root rot. Crown rot is initiated when soil with inoculum is thrown into the crown at cultivation, and during heavy rainfall or flooding. Crown rot has not been a major issue with the adoption of Roundup Ready sugarbeet and the concurrent reduction or non-use of cultivation for weed control. Root rot has been a major issue for growers. Fields with no fungicide seed treatment for control of Rhizoctonia should be treated before the daily average soil temperature at the 4-inch soil depth reaches 65°F and preferably timed just prior to a rainfall (¼ to ½ inch) event. Fields planted with Kabina or Kabina and Rizolex (or Vibrance) treated seeds can be treated with an effective fungicide such as Quadris, Priaxor and Proline when the plants are at the 4 to 6-leaf stage. The fungicide needs to get into the soil and as close as possible to the roots so treatment should be done before the leaves cover too much of the soil. Timing the fungicide application before a half-inch rainfall is ideal to get the fungicide to protect the roots and target the pathogen in the soil. Many growers with early planted sugarbeet have applied a fungicide and have had timely rains to move the products into the soil and surrounding roots which should result in adequate protection. Growers with replanted beets, especially in a field with a history of moderate to severe Rhizoctonia should also make a timely fungicide application to protect against Rhizoctonia root rot.

Mohamed Khan
Extension Sugarbeet Specialist
NDSU & U of MN

IMPORTANT FIELD PEA DISEASES TO WATCH FOR

As field peas approach bloom, a review of diseases and management tools is warranted. In these articles, we review four important diseases of peas; Ascochyta/Mycosphaerella blight, Bacterial blight, White mold and Powdery mildew.
ASCOCHYTA /MYCOSPHAERELLA BLIGHT:

**Importance.** Ascochyta/Mycosphaerella blight can be an economically important disease when cool, wet weather occurs during bloom and pod-fill. The disease is widespread throughout the growing region and spores can travel long distances, which can place even new fields at risk.

**Symptoms.** This disease complex causes dark necrotic lesions on leaves, stems, and pods, with symptoms most severe in the lower canopy. Foliar symptoms develop as purplish-brown flecks and/or brown lesions with concentric rings; depending on conditions, either type of lesion or a mix of both types of lesions may develop. Stem lesions, which typically develop only at the base of plants, are brownish-purple and can cause lodging and, when severe, premature senescence. Ascochyta/Mycosphaerella blight is most easily confused with bacterial blight, a very different disease which is NOT managed by fungicides. Consequently, accurate identification is critical. An excellent and detailed resource to distinguish the two diseases is available on the NDSU Carrington Research Extension website

**Disease Cycle and Development.**
The pathogens causing Ascochyta/Mycosphaerella blight overwinter on crop residues and produce aerial spores in the spring. These spores can travel long enough distances in the atmosphere that even fields with no history of field peas are at risk. The disease is most damaging when cool, wet weather occurs during bloom and early to mid-pod development.

**Management.** Foliar fungicides can decrease yield losses to the disease and also significantly improve harvest ease by reducing the basal stem lesions that can cause lodging. The optimal application timing generally coincides with full bloom and early pod development (when the first pods are still flat), but applying fungicides at bloom initiation may be advised if the canopy is very dense and conditions are highly favorable for disease (wet and cool). A single fungicide application generally provides adequate control. The triazole (DMI / FRAC 3) fungicide Proline and the strobilurin (QoI / FRAC 11) fungicides Headline, Quadris, and Aproach are effective and have performed comparably in research trials. The SDHI (FRAC 7) fungicides Endura and Vertisan have exhibited reduced efficacy in research trials.

When considering fungicides, producers should be careful to rotate fungicide chemistries when more than one application is made in a season, or when a single fungicide application is made in sequential seasons. Low to moderate frequency of fungicide resistance to the QoI fungicides has been reported in parts of Montana and Alberta. While this is not yet known to occur in our region, it serves as a cautionary note that these fungicides are vulnerable. Also, it is important to note that the pathogens that cause Ascochyta blight on lentils and chickpeas are different pathogens, and that the widespread fungicide resistance to the Ascochyta blight pathogen on chickpeas is not relevant to field peas.
POWDERY MILDEW:

**Importance.** Powdery mildew can be a very important disease when conditions are favorable. It reduces seed size and can sharply reduce yields if it develops during early to mid-pod development. Late planted peas are at greater risk for yield loss than early planted peas. Most commercial field pea varieties grown in North Dakota are susceptible to the disease, but there are some varieties that are resistant (immune).

**Symptoms.** Powdery mildew causes white powdery fungal growth over all above-ground parts of the plant. The disease usually begins as small discrete white tufts. Once it appears, the disease can spread very fast and the white fungal growth can quickly cover entire leaves and other green tissues. As the disease is developing, the white fungal growth can be easily rubbed off, and the tissue underneath may appear normal or slightly yellowed. As the disease progresses, black specs (fungal reproductive structures) often develop within the white fungal growth, and the peas take on a bluish color.

**Disease Cycle and Development.** The pathogen overwinters in small black reproductive structures that release aerial spores in the spring/summer. Powdery mildew infection and development is favored when dry, warm weather are accompanied by nights that are cool enough for dew to develop. The disease can develop very rapidly when environmental conditions are favorable.

**Management.** Fungicide applications are highly effective against powdery mildew but it is critical to apply them before an epidemic begins; apply at either the first appearance of trace levels of powdery mildew in the lower canopy or on the basis of perceived risk if weather conducive to the disease occurs during bloom and pod-fill. Very little fungicide efficacy testing has been conducted for this disease on field peas, but the fungicides Proline, Quadris, Headline, and Priaxor (with triazole [DMI / FRAC 3], strobilurin [QoI / FRAC 11], and/or SDHI [FRAC 7] active ingredients) have shown efficacy in the relatively small number of field trials that have been conducted evaluating fungicides for control of this disease.
WHITE MOLD/SCLEROTINIA:

**Importance.** White mold is rarely a disease of economic importance in dryland field pea production but can be important in irrigated pea production. The pathogen that causes white mold on other broadleaf crops (canola, dry edible beans, soybeans, sunflower, etc...) is the same pathogen that causes white mold on other broadleaf crops. Your fields may be at lower/higher risk depending on the history of white mold in your previous broadleaf crop, and the level of white mold in your current field peas could decrease/increase the white-mold risk to future broadleaf crops planted into that field in the future.

**Symptoms.** Lesions and white fluffy mold can occur on all above ground plant parts. Lesions being as water-soaked spots but take on the characteristic white, bleached color as they age. White fluffy growth may occur on lesions, particularly when canopies are wet for long periods of time. Sclerotia, black resting structures of the causal pathogen, are produced in and on diseased tissue.

**Disease Cycle and Development.** The disease cycle and favorable conditions for white mold on peas are essentially the same as on canola, dry edible beans, soybeans and other crops (sunflowers is a little different). The pathogen overwinters in the mouse-dropping size black fungal structures (sclerotia) at the end of the season. When adequate rain occurs in the spring and the soil is saturated (or near saturated), these sclerotia produce small mushrooms (apothecia) that release airborne spores. The infection process begins when spores land on flower petals, begin to digest them, and the subsequent fungal growth moves into healthy tissue. Consequently, field peas are not at risk for infection until bloom begins. For infection to occur, the soils must be wet enough to produce the small mushrooms 1-2 weeks before bloom. White mold is very dependent on cool and wet conditions for disease to develop.

**Management.** Data on the comparative efficacy of fungicides for control of white mold on field peas are not available, but testing conducted on other crops suggests that Proline and Aproach may be useful for managing white mold if applied when excellent fungicide deposition to the lower canopy can be achieved. If it is difficult to obtain excellent fungicide deposition to the lower canopy, Endura is likely to be the most effective registered product. Fungicide applications targeting white mold in field peas are unlikely to be profitable unless field peas are produced under irrigation and the weather is cool (highs in the 60s to 70s Fahrenheit) during bloom.
BACTERIAL BLIGHT AND BROWN SPOT:

Importance. Bacterial blight is generally not considered an economically important disease of field peas in North Dakota, but severe losses to the disease have been reported in neighboring states. The disease is caused by a bacterial pathogen; fungicides have not efficacy against bacterial pathogens, and fungicides are NOT recommended for management. However, bacterial blight is often confused with Ascochyta blight, which is an economically important disease that can be managed with fungicides. Consequently, accurate identification of this disease is critical. Bacterial blight can be common when frequent rains occur with conditions that damage plant tissue (hail, high winds).

Symptoms. Lesions can occur on all above-ground plant parts. Lesions begin as small greasy or water-soaked spots that will quickly turn necrotic. Unlike Mycosphaerella/Ascochyta blight lesions, bacterial blight lesions do not readily cross leaf veins and will take on an angular shape and appearance. Under high humidity, bacterial ooze may be visible from the lesions. Eventually, the centers of the lesions may dry up and fall out.

Disease Cycle and Development. The pathogen is primarily residue-borne but can also be seed-borne. Infection begins when spores produced in bacterial ooze are splashed onto pea growth. Typically, a combination of plant injury (such as from hail or wind-driven soil) and moisture is needed for infection to occur. The disease will progress if frequent rains persist but will slow or stop if dry conditions occur.

Management: The most important consideration when examining peas for bacterial blight is to accurately distinguish it from Mycosphaerella/Ascochyta Blight. Fungicides may be recommended for Mycosphaerella/Ascochyta blight, but are NOT recommended for bacterial blight. Misdiagnosis of these two disease can result in an unnecessary fungicide application, or, an erroneous no-spray recommendation – both situations can be costly. If Bacterial blight occurs, stay out of the fields when wet to avoid mechanical transmission of the disease. Because the disease is seed-borne and seed-transmitted, it is advisable to avoid seed lots originating from fields where bacterial blight developed above low levels.

FIELD PEA DISEASE RESOURCES:
- How to distinguish Mycosphaerella/Ascochyta blight and bacterial blight.
- The 2016 North Dakota Field Crop Plant Disease Management Guide – PP-622
- Some fungicide testing results for Mycosphaerella/Ascochyta blight at the Carrington REC website

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Extension Plant Pathologist,  
Broad-leaf Crops

Julie Pasche  
Research Plant Pathologist  
NDSU Dept. of Plant Pathology

Michael Wunsch  
Research and Extension Pathologist  
NDSU Carrington REC
FUSARIUM HEAD BLIGHT (SCAB) RISK IN WINTER WHEAT

Fusarium head blight (scab) risk season has begun in North Dakota as some of the winter wheat fields in the state have headed. Scab risk is highest when warm weather, high humidity and prolonged periods of moisture occur prior to and throughout the flowering stages of wheat. The best way to manage scab is to use less susceptible varieties and a well-timed triazole fungicide (ie: Prosaro, Caramba, Tebuconazole generics) application when 50% of the field is at early-flowering. However, recent research in wheat and barley have indicated post-flowering fungicide applications (up to 7 days after early-flowering) still offer scab and DON (mycotoxin) suppression.

Currently, the two scab forecasting models (NDSU Small Grains Disease Model and National Fusarium Head Blight Model) have different estimations of scab risk for flowering wheat in the state. For susceptible varieties, the NDSU model indicates most of the state is at moderate to high scab risk (Figure 1) and the National FHB model indicates low scab risk for the entire state (Figure 2). For moderately susceptible varieties, the NDSU model indicates moderate risk in the northwest and northeast portions of the state. Areas indicated to have the greatest scab risk in ND have received significant precipitation over the past seven days.

As a final note, scab models are a good guideline when making the decision to apply a fungicide. However, remember that other factors such as field location, yield potential and future weather conditions will influence the decision to apply a fungicide.

Andrew Friskop
Extension Plant Pathology, Cereal Crops
SIDEDRESS TIME APPROACHES

Corn in some areas is approaching V5 growth stage, which is the stage in which most side-dress N application should begin in this region. In areas where rainfall has been low to modest, with no flooding rains, standing water, or in high clay soils, no continuously muddy conditions, the difference in corn N calculator values between what is recommended preplant and what was applied preplant should be a good rate. In soils with water issues, the rate should be higher. If you were wise and used a nitrogen-nonlimiting area as a standard when applying the preplant N application, and now will use an active-optical sensor to direct your sidedress, the sidedress rate will be directed by the active-sensor algorithm in the NDSU circular. If use of an active-sensor is not part of the side-dress strategy, educated guessing is required. In a high-clay soil, any saturated muddy conditions results in about a 1.5% N loss per day. In a sandy soil with high (2 inch+) individual rainfall event or events, downward movement of N is likely, so increasing N rates by 20-40% depending on how much rain fell until the time of sidedress is probably a good estimate. If a nitrapyrin or DCD nitrification inhibitor or ESN® was used preplant, then losses in a high clay soil or in a sandy soil will be less. If Nutrisphere® or NZone®, which are not nitrification inhibitors, was used, then no modification of loss should be expected.

If the soil will allow, anhydrous ammonia can be used as a sidedress fertilizer. It can be applied to every other row. Apply at least 4 inches deep. Somewhere around 6 inches is a normal application depth. Consider (strongly consider) some kind of trench-covering tool to use on the applicator. I told a cooperator friend of mine 15 years ago that a covering tool would help his ammonia application, but he was reluctant to be the only farmer in North Dakota to use one I think. About 5 years ago, he decided to take my advice and put them on. He told me that he wished he had paid attention to me when I first suggested it. In high clay soils, a coulter UAN applicator can be used, with a coulter every-other-row, since the trench made by an anhydrous ammonia applicator will be resistant to closure even with a closing tool. A coulter UAN applicator can be used in other soils, and has the advantage of moving the UAN deep without additional rainfall in years where that may be a problem for surface applied N. For surface application options in our area, a drop tube down the middle between every row is just as effective as the y-drop option for side-dress N and is less expensive to set up. Both will perform similarly in our climate. The other alternative is urea over the top. Rates should not exceed 50 pounds N per acre, the urea should be treated with Agrotain® (or any NBPT containing brother or sister product at the proper a.i. per ton rate) or Limus® (NBPT + NPPT) to keep the urea safe from ammonia volatility for about 10 days.

In spring wheat, the best post-N treatment for yield is stream-bar applied UAN at 4 leaf to early jointing. N application after this growth stage may increase grain protein, but not yield. Post N treatment for barley is not recommended, unless the barley is designated as feed barley. The best time for N application for protein increase in wheat is immediately post-anthesis, not before or at heading regardless of the N product used.

Dave Franzen
NDSU Extension Soil Specialist
GROUP 2 HERBICIDE RESISTANCE – ND UPDATE

Another herbicide resistance issue was identified in 2015. A grower sprayed his wheat with Starane Flex and Varro, but redroot pigweed was not controlled. We know Starane provides little activity on pigweed, but pigweed is normally controlled by Group 2 herbicides (see bottom half of picture). Seed was collected in late summer of 2015. In a greenhouse screen, the pigweed was not controlled by Everest or Varro and only suppressed slightly by Starane Flex and Affinity BS (see top half of picture). It is interesting that the pigweed was still susceptible to Ally, GoldSky, and PerfectMatch. In other greenhouse treatments where we sprayed these same Group 2 herbicides with 2,4-D, the pigweed was controlled. Thus, we recommend adding another mode of action to the tank (e.g., 2,4-D) to control weeds in wheat and not rely solely on Group 2 herbicides. Having multiple modes of action will help delay or avoid resistance.
WATERPOD

Each year it seems a different weed becomes the mystery weed to identify. To this point, waterpod seems to have the crown. Waterpod (*Ellisia nyctelea* L.) is an annual broadleaf plant in the Waterleaf family (Hydrophyllaceae). There are no other (common) weeds in this family that infests cropland in the northern plains. My experience with waterpod has been intermittent – it has been more of a “nuisance” weed and it shows here and there and rarely in high densities. It does not seem to be tolerant to many POST herbicides. Our observations and data base shows 2,4-D, and many ALS herbicides are effective in controlling waterpod. I suspect the cool and moist conditions must be conducive to emergence and growth and glyphosate and most POST herbicides will control it. Refer to photos below for help in identification.

ND SLN LABELS RENEWED

Dow petitioned the ND Department of Ag to renew two SLN labels for the product Sonalan 10G.

1. Fall application to lentils.
2. Fall application to yellow mustard.

The ND DOA renewed these state labels based on the limited number of weed control products available.

Rich Zollinger
Extension Weed Specialist
SCOUT FOR WATERHEMP IN SUGARBEET

Most areas in the sugarbeet growing region received precipitation last week. However, soil-applied herbicides applied early postemergence for waterhemp control in sugarbeet laid on the soil surface up to 14 days before activation in some cases. Scout fields for waterhemp escapes and take a proactive and aggressive approach to control them, especially when waterhemp is small.

Small weeds (less than 3 inches) are more susceptible to herbicides than large weeds. Even weeds with a low level herbicide resistance are more susceptible at 1 inch than at a larger growth stage. Apply glyphosate at full rates with effective herbicides tank-mixes and adjuvants to control waterhemp.

The following table is a summary of multiple experiments targeting waterhemp control from glyphosate alone and glyphosate in mixtures in sugarbeet. Herbicide treatments were repeat application targeting two to three inch waterhemp.

<table>
<thead>
<tr>
<th>Herbicide</th>
<th>Rate, oz. or fl oz./A</th>
<th>Percent Visual Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>glyphosate</td>
<td>28 / 28 / 22</td>
<td>46</td>
</tr>
<tr>
<td>glyphosate + ethofumesate</td>
<td>28 + 4 / 28 + 4 / 22 + 4</td>
<td>61</td>
</tr>
<tr>
<td>glyphosate + Betamix</td>
<td>28 + 12 / 28 + 16 / 22 + 24</td>
<td>65</td>
</tr>
<tr>
<td>glyphosate + UpBeet</td>
<td>28 + 0.75 / 28 + 0.75 / 22 + 0.75</td>
<td>65</td>
</tr>
<tr>
<td>Glyphosate + ethofumesate + UpBeet</td>
<td>28 + 4 + 0.75 / 28 + 4 + 0.75 / 22 + 0.75</td>
<td>72</td>
</tr>
<tr>
<td>Glyphosate + Betamix + UpBeet</td>
<td>28 + 0.75 + 10 / 28 + 0.75 + 16 / 22 + 0.75 + 24</td>
<td>76</td>
</tr>
<tr>
<td>Glyphosate + ethofumesate + Betamix</td>
<td>28 + 4 + 10 / 28 + 4 + 16 / 22 + 4 + 24</td>
<td>78</td>
</tr>
</tbody>
</table>

1Roundup alone with Prefer 90 NIS at 0.25% v/v and N-Pak AMS at 2.5% v/v. Roundup tank-mixes with Destiny HC at 1.5 pt./A and N-Pak AMS at 2.5% v/v.

2Visual percent waterhemp control at preharvest evaluation

Waterhemp is a tough to control weed in sugarbeet, especially resistant populations. Best opportunity for control is small weeds, full glyphosate rates and a tank-mix strategy that includes ethofumesate, Betamix and/or UpBeet.

Tom Peters
Extension Sugarbeet Agronomist
NDSU & U of MN
TENT CATERPILLARS

Forest tent caterpillars (Malacosoma disstria) and Eastern tent caterpillars (Malacosoma americanum) are feeding on tree foliage this time of year. The eastern tent caterpillars make the webbed tents in the forks of tree branches, which are used as shelters and resting places. People consider the webbed tents unsightly in trees. The forest tent caterpillar does not make any webbed tents, but they wander around in masses of larvae and crawl over trees, picnic tables, patios, lawns, etc. which people consider extremely objectionable. Fortunately, they do not bite. Large numbers of forest tent caterpillars crushed on roads causes the roadway surfaces to become greasy and slippery. They infest many trees hosts: ash, aspen, basswood, birch, chokecherry, cottonwood, elm, maple, oak, pin cherry, poplar, and other hardwoods.

There is one generation per year for either species. Both overwinter as eggs. Larvae hatch in early spring. For the forest tent caterpillar, larvae are easily identified by the keyhole shaped spots along their backs and broad bluish lateral bands. For the eastern tent caterpillar, larvae are black and somewhat hairy with a whitish-yellow stripe down the middle of the back, narrow broken orange-colored subdorsal stripes, and lateral white and blue markings. In five to six weeks, the larvae pass through five larval instars and are about 2 inches long. Mature larvae then form silken cocoons to pupate. Adult moths will emerge from cocoons during early summer (late June or early July).

Damage: Defoliation is caused by larvae of both species. Light defoliation has little effect on tree health. Two or more years of moderate-to-severe defoliation by forest tent caterpillar is necessary to affect radial growth and cause branch and twig mortality. When populations of eastern tent caterpillars are high, whole trees can become covered with webbing and defoliated.

Pest Management: Bt (or Bacillus thuringiensis var. kurstaki; Dipel, Thuricide), a natural occurring soil bacterium, works well to control young caterpillars and conserves beneficial insects. Other insecticides available to homeowners include: acephate (Orthene), azadirachtin (Azatin), carbaryl (Sevin), esfenvalerate (Bug-B-Gon), malathion, permethrin, spinosad (Conserve), or other insecticides registered for trees. Always read, understand and follow the insecticide label directions.
AROUND THE STATE

NORTHWEST ND
Northwest ND picked up some much needed rain on Saturday and again on Memorial Day and into Tuesday. Totals as of mid-day Tuesday ranged from 0.75” in the southern portions of McKenzie Co. up to 1.5” in portions of Burke Co. The rain is welcome and should give crops the water they need after what has otherwise been a dry May for much of the area. Most planting was finished before rain started over the weekend, but some sunflowers, soybean, and other warm-season crops have yet to be planted.

The forecast for the remainder of the week is favorable for fields drying out and allowing planting to wrap up. Growers are encouraged to scout emerging crops for diseases, insect pests, and weeds that are likely to emerge with recent rains. If pre-herbicides were applied in the last few weeks, they should still be activated by the rain as long as the soil to which they were applied did not leave the field, i.e. blow away.

Clair Keene
Area Extension Specialist/Cropping Systems
NDSU Williston Research Extension Center

NORTHEAST ND
Like the rest of the state, Memorial Day's weekend rain was welcome across the whole region. Winter wheat is emerging from the boot to heading. With the rain and possible humidity, winter wheat producers should be conscious of scab risk. Grain aphids are detected in the lush winter wheat, but not to IPM spray levels. In canola, flea beetles have been overcoming seed treatments and foliar application of insecticides have been needed as last Friday. Growers should scout fields regularly for flea beetle damage. When it’s cool, scout the undersides of the cotyledons and leaves and the stem for beetle damage. We are in prime herbicide spraying season which has been slowed due to rain events. Sporadic farms have acres to finish seeding, notably in edible beans and sunflower.

Lesley Lubenow
Area Extension Specialist/Agronomy

SOUTH-CENTRAL ND
The region’s NDAWN stations indicate rainfall ranging from 0.6 inch (Carrington) to 2.7 inches (Linton) during the past week (May 25-31).

Alfalfa is in the bud to early flower stages. Winter cereals are heading. Barley and spring wheat seeded the first-half of April range from jointing to flag leaf (Barley) growth stages.

April-planted corn is in the three- to four-leaf (V3-4) stages. Based on NDAWN, corn planted on April 30 has accumulated 290 to 400 growing degree day (GDD) units through May 31. For this period, 30 to 110 more GDD units have accumulated compared to the long-term average. Some corn fields have variable timing of plant emergence, likely due to dry conditions during and following planting.

Soybean planted the first week of May or earlier is in the unifoliate to first trifoliate stages (VC-V1). Soybean, dry bean, sunflower and flax planting should soon be completed. Also, annual warm-season forages are being planted. Pasture growth generally is slow.

Greg Endres
Area Extension Specialist/Cropping Systems
NDSU Carrington Research Extension Center
SOUTHWEST ND

Much needed precipitation over the last week. Rainfall amounts were spotty with some getting close to 2 inches and others barely receiving any moisture. NDAWN observed 1.16 inch in Dickinson, 1.74 inch in Dunn County, and 0.68 inch in Mott. Most growers are either finished planting or finishing up corn and sunflowers. Spraying is in full swing with most working on weed control. There are some reports of frost damage becoming visible from the frost earlier in the growing season on winter wheat and alfalfa.

There have been some reports of wheat streak mosaic virus in the region. Importance of crop rotation and killing the green bridge is evident in situations like this. Rotating from cereals to broadleaf crops like alfalfa, peas, sunflowers, or canola could help avoid disease outbreaks and help with weed control. As winter wheat heads are beginning to peak out keep in mind to kill off the green bridge post-harvest later this season.

Ryan Buetow
Area Extension Specialist/Cropping Systems
WEATHER FORECAST: JUNE 2 – JUNE 8

The last ten days of May recorded significant rain for some parts of North Dakota, but certainly not for everyone. In fact, greater than 50% of the state recorded below normal rainfall in May. Yet, the heavier rain bands that did form were associated with mid-latitude cyclones (low pressure centers). Strong “lows” tend to become less common as we move into the summer months across the northern plains as the temperature contrasts across the Northern Hemisphere weaken as the high latitudes gradually warm up.

As we begin the month of June, no strong low pressure systems are expected as the upper-level wind flow transitions to the northwest (Figure 1, wind flow is parallel to the black lines). Instead, rainy periods in the next 6-10 days will come principally from frontal systems passing through the region. These fronts will trigger storms, but usually in this pattern, any significant rain totals tend to be in localized areas instead of in broad bands. Although isolated afternoon development may occur on other days, the main rain chances will come Thursday night into Friday and again toward the middle of next week.

Temperatures in the next seven days are projected to be near seasonal averages through the weekend, with the potential for well above average temperatures developing next week. The projected Growing Degree Days (GDDs), base 34°, 44° and 50° for the period June 2 through June 8, 2016 are presented in Figure 2. This forecast period will likely produce the highest GDD total of any week so far this growing season.

Figure 1. 500 mb (18,000 ft) Anomalies from June 4 through June 8, 2016. Used with permission from Weatherbell Analytics

Figure 2. Projected Growing Degree Days from June 2 through June 8, 2016

Daryl Ritchison
Assistant State Climatologist/Meteorologist
(701-231-8209) Twitter: @darylritchison
WEATHER/CROP PHENOLOGY MAPS

Corn Accumulated Growing Degree Days (°F) (2016–05–02 – 2016–05–31)

Departure from Normal Average Air Temperature (°F) (2016–05–25 – 2016–05–31)


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North Dakota State Climatologist
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