CONTINUE TO BE VIGILANT SCOUTING FOR CUTWORMS

Just a friendly reminder that the late season cutworms will continue to be active throughout June. So, continue to scout for cutworms, especially since crops have been growing slowly. Excessive cool, wet soils tend to amplify stand reduction by slowing plant development relative to cutworm feeding. The Extension Entomology office has received an increased number of field reports on cutworm feeding from many different crops (sunflowers, canola, alfalfa, sugar beets, soybeans) this past week.

For economic thresholds and insecticides registered in North Dakota for cutworm control, consult the 2010 Field Crop Insect Management Guide at:
http://www.ag.ndsu.edu/pubs/plantsci/pests/e1143w1.htm

ALFALFA WEEVIL DEGREE DAY UPDATE

Growing degree days (base 48 F) for alfalfa weevil indicate that the central region of North Dakota is at risk for larval feeding activity (430 to 595 DD: Figure 1). There has been one report of weevil activity from the Jamestown area. Cool and wet weather has slowed weevil development and alfalfa cutting. As soon as it dries out, timely cutting should provide good alfalfa weevil control in the first cutting. Remember to scout second cutting for weevil feeding under the windrows.

Note: Please see issue #3 of Crop & Pest Report for scouting and pest management details.

SCOUTING FOR LEAFY SPURGE FLEA BEETLES

Leafy spurge flea beetles (Aphthona species) (Fig. 2) are an effective means of controlling leafy spurge in ND.
This group of flea beetles is host-specific to the leafy spurge plant, which makes them an ideal biological control choice. The accumulated growing degree days (AGDD) for sunflower (base of 44 F) can be used as a guide to determine when to begin scouting for adult flea beetles. Begin scouting for adult flea beetles when the AGDD approaches 1,000. **Flea beetles should be collected between 1,200 and the 1,600 using the sunflower GDD from NDAWN.** The southeastern region of North Dakota has accumulated over 1,000 growing degree days (GDD, Fig. 3) and scouting should begin for adult leafy spurge flea beetles. Use the sunflower degree days/growth stage application in NDAWN and enter “2010-03-01” for planting date and select “degree day” for map type.

http://ndawn.ndsu.nodak.edu/sunflowergdd-form.html

Adult flea beetles can be collected with sweep nets. After late July (or 1,600 AGDD), flea beetles begin to lay eggs and should not be moved or collected. Leafy spurge flea beetles typically take three to five years to establish and impact leafy spurge infestations.

To find collecting sites for leafy spurge flea beetle, contact your local county extension agent or weed control officer. A listing of the weed control officers by county can be found on the North Dakota Weed Control Association website:

http://ndweeds.homestead.com/10_County_City_Weed_Boards_Directory.pdf

**ECONOMIC_THRESHOLDS_FOR_CEREAL_GRAIN_APHIDS**

Fortunately, the cool temperatures and rains have kept aphid populations low in North Dakota (Fig. 4). This weather is also conducive for entopathogens (fungal diseases) that attack aphids, further reducing aphid populations. There also are many ladybird beetles and other predators that feed on aphids and can be observed in fields now.

Winter wheat is starting to flower and past the susceptible stages (vegetative to boot) where aphids may cause significant yield loss. So, no insecticides are recommended in winter wheat at this point.

There have been some questions about the two different sampling methods to make a decision on whether to treat or not for cereal aphids in small grains that was reported in the last issue of the Crop & Pest Report.

The "85% of the stems infested" (where infested is defined as one or more aphids on a stem) comes from a sequential sampling model developed by Boeve and Weiss at NDSU in the late 90s. The specific sampling method is described as: Walk into the field 100 ft from the edge before you begin sampling for aphids. Sample one stem every 25 paces. A stem is considered infested if one or more aphids are present. Sample at least 20 to 100 stems in this manner for every 100 acres. Divide number of infested stems by number of stems sampled to arrive at percent infested stems.

The other sampling method uses **12-15 aphids/stem**. For this sampling method, growers should examine at least 20 stems at 5 different locations in the field away from field edges. If the average is 12-15 aphids/stem, treatment is warranted. If not, continue to monitor for growing aphid populations. There is some flexibility to
wheat prices built into this sampling method. When the price for wheat is low, use the higher threshold of 15 aphids/stem and vice versa.

Without going into the research details, these are basically two different sampling methods for making decisions on whether to treat or not treat for cereal aphids. Producers and scouts can use either action threshold to arrive at the same decision.

Late vegetative through boot stage is the most critical time to scout and treat for cereal aphids to prevent yield loss.

PEA APHIDS DETECTED IN PULSE CROPS

Low levels of pea aphids have been detected in peas grown in the north central and northwest regions of North Dakota. This is the most common insect pest found in field pea. They are small, about 1/8+ inch long, and pale green (Fig. 5).

Last year, producers were surprised by pea aphids in their pea fields and some may have lost up to 10 bu/acre. So, it is wise to scout pea fields for aphids when 50-75% of the peas are flowering by using either a sweep net or examining the number of aphids per plant tip. Take 180-degree sweeps using a 15-inch sweep net or check at least five 8-inch plant tips from four different locations in the field. Population estimates should be calculated by averaging counts taken from four separate areas of the field.

**Economic Thresholds:**

Economic thresholds may vary depending on the value of the crops and cost of control, as well as impacts of precipitation and heat stress. The economic threshold in peas at $5.71 per bushel and average control cost of $6.73-$9.25/acre is **2 to 3 aphids per 8-inch plant tips, or 9 to 12 aphids per sweep (or 90 to 120 aphids per 10 sweeps), at flowering**. If the economic threshold is exceeded, a single application of insecticide when 50% of plants have produced some young pods will protect the crop against yield loss and be cost-effective. Cultivars of peas may also vary in their tolerance to feeding by pea aphids. Thus, economic injury levels may differ between cultivars. The economic thresholds presented above were developed using “Century” field peas.

Aphid feeding on peas in the flowering and early pod stage can result in lower yields due to less seed formation and smaller seed size. Protein content and other quality issues do not appear to be affected.

Research in Manitoba has shown that insecticides applied when pods first form protects pea yield better than earlier or later applications. Control at the early pod stage provides best protection through the pod formation and elongation stages, which are very sensitive to aphid damage.

For insecticides registered in North Dakota for pea aphid control, consult the **2010 Field Crop Insect Management Guide** at: [http://www.ag.ndsu.edu/pubs/plantsci/pests/e1143w1.htm](http://www.ag.ndsu.edu/pubs/plantsci/pests/e1143w1.htm)

**WATCH GRASSHOPPER POPULATION LEVELS**

The silver lining to this cool, wet weather is that it has not been favorable for the predicted grasshopper outbreak in rangeland. However, there are some increasing numbers in Emmons and Kidder Counties in the south central region of North Dakota (Fig. 6). If the weather turns more favorable (hot and dry), grasshoppers populations can increase quickly. So, continue to scout ditches and field edges for grasshopper nymphs (young grasshoppers without wings). **The threatening level is 50-75 nymphs per square yard in ditches and 30-45 nymphs per square yard in fields.** A handy tool for estimating grasshopper numbers is the sweep net. Four 180-degree sweeps with a 15-inch sweep net is equal to one square yard.

![Grasshopper map](IPM Survey, J. Walker)
ADULT WHEAT STEM SAWFLY EMERGING

Joseph Stegmiller, my M.S. graduate student, has collected adult wheat stem sawfly in the southwest region (Scranton, Regeant, Hettinger, Mott) of North Dakota. Another sawfly report from the central region (Steele) came in today. There are NO insecticide strategies that work for control of the adult wheat stem sawfly. It is interesting to note when they emerge. A new NDSU Extension factsheet entitled Integrated Pest Management of Wheat Stem Sawfly is available at: http://www.ag.ndsu.nodak.edu/aginfo/entomology/entupdates/sawfly/e1479.pdf

This factsheet was published with cooperation and support from the North Dakota Wheat Commission.

EPA MOVES TO TERMINATE ALL USES OF INSECTICIDE ENDOSULFAN TO PROTECT HEALTH OF FARMWORKERS AND WILDLIFE

WASHINGTON - The U.S. Environmental Protection Agency (EPA) is taking action to end all uses of the insecticide endosulfan in the United States. Endosulfan, which is used on vegetables, fruits, and cotton, can pose unacceptable neurological and reproductive risks to farmworkers and wildlife and can persist in the environment.

New data generated in response to the agency's 2002 decision have shown that risks faced by workers are greater than previously known. EPA also finds that there are risks above the agency's level of concern to aquatic and terrestrial wildlife, as well as to birds and mammals that consume aquatic prey which have ingested endosulfan. Farmworkers can be exposed to endosulfan through inhalation and contact with the skin. Endosulfan is used on a very small percentage of the U.S. food supply and does not present a risk to human health from dietary exposure.

Makhteshim Agan of North America, the manufacturer of endosulfan, is in discussions with EPA to voluntarily terminate all endosulfan uses. EPA is currently working out the details of the decision that will eliminate all endosulfan uses, while incorporating consideration of the needs for growers to timely move to lower-risk pest control practices.

Under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), EPA must consider endosulfan's risks and benefits. While EPA implemented various restrictions in a 2002 re-registration decision, EPA's phaseout is based on new data and scientific peer review, which have improved EPA's assessment of the ecological and worker risks from endosulfan. EPA's 2010 revised ecological risk assessment reflects a comprehensive review of all available exposure and ecological effects information for endosulfan, including independent external peer-reviewed recommendations made by the endosulfan Scientific Advisory Panel.

Endosulfan, an organochlorine insecticide first registered in the 1950s, also is used on ornamental shrubs, trees, and herbaceous plants. It has no residential uses.

For more information: http://www.epa.gov/pesticides/reregistration/endosulfan/endosulfan-cancel-fs.html

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Dale Kemery kemery.dale@epa.gov 202-564-7839, 202-564-4355

Registered agricultural formulations in ND include Thionex 3EC and Thionex 50W. These products are labeled for mostly fruit and vegetable use, but also for potatoes, sweet corn, and forestry sites. Endosulfan is also the active ingredient in Avenger Insecticide Cattle Ear Tags. (Source, Jim Gray, North Dakota Department of Agriculture)

FUN INSECT QUESTION: What are these spiny caterpillars (larvae) feeding on willow?

This is the larva of the beautiful Mourning Cloak butterfly, Nymphalis antiopa (Lepidoptera: Nymphalidae). Larvae feed gregariously on willow, poplar, elm, birch or hackberry. They are black and spiny with fine white speckles and a row of red spots running down the back. It is also called the ‘spiny elm caterpillar.’ The adult butterfly is a strong flyer and migrates into North Dakota from Mexico each year. It is primarily a woodland butterfly and also the State Insect of Montana.

Janet Knodel Extension Entomologist janet.knodel@ndsu.edu

Figure 7. Mystery insect (Aimee Thapa, NDSU)

This is the larva of the beautiful Mourning Cloak butterfly, Nymphalis antiopa (Lepidoptera: Nymphalidae). Larvae feed gregariously on willow, poplar, elm, birch or hackberry. They are black and spiny with fine white speckles and a row of red spots running down the back. It is also called the ‘spiny elm caterpillar.’ The adult butterfly is a strong flyer and migrates into North Dakota from Mexico each year. It is primarily a woodland butterfly and also the State Insect of Montana.
DRY BEAN TYPES AND DEVELOPMENT STAGES

In dry edible bean there are basically two plant types, determinate (bush) or indeterminate (vining or trailing). For example, navy beans or pinto beans may be either of the bush or vining type. In the determinate type, stem elongation ceases when the terminal flower on the main stem or lateral branches have developed. In indeterminate types, flowering and pod fill will continue as long as temperature and moisture conditions are favorable for plant growth.

In addition to the distinction between determinate and indeterminate plant types, four plant growth habits have been identified. These are: Type I – Determinate bush; Type II – Upright short vine, narrow plant profile, three to four stems; Type III – Indeterminate, prostrate vine; Type IV – Indeterminate with strong climbing ability. These growth habits have become useful in identification and classification of new upright bean cultivars. Upright plant growth habit and architecture increase the efficiency of direct harvest of dry beans. The challenge for breeders has been to develop cultivars with upright architecture, while maintaining high yield potential. The recent NDSU pinto cultivar releases Lariat and Stampede have improved this trait. In contrast the cultivar Maverick is a Type III – prostrate indeterminate pinto bean.

Plant development for both determinate and indeterminate plant types has been divided into vegetative (V) and reproductive (R) stages as indicated in Table 1. Vegetative stages are determined by counting the number of fully expanded trifoliolate leaves on the main stem. Reproductive stages are described by pod and seed characters. The first pod developing on the plant is described and followed to full size. At the time of first bloom (R stage), secondary branching begins in the axis of lower nodes which will produce secondary groups of blooms or pods. To determine the growth state it is important to follow the main stem, which is readily discernible on both determinate and indeterminate plants. A trifoliolate is counted when it is fully unfolded.

<table>
<thead>
<tr>
<th>Stage</th>
<th>General Description</th>
<th>Days from planting</th>
</tr>
</thead>
<tbody>
<tr>
<td>VE</td>
<td>Hypocotyl emergence.</td>
<td>7</td>
</tr>
<tr>
<td>VC</td>
<td>Cotyledonary and unifoliolate leaves visible.</td>
<td>10</td>
</tr>
<tr>
<td>V1</td>
<td>First trifoliolate leaf unfolded</td>
<td>14</td>
</tr>
<tr>
<td>V2</td>
<td>Second trifoliolate leaf unfolded.</td>
<td>20</td>
</tr>
<tr>
<td>V3</td>
<td>Third trifoliolate leaf unfolded Secondary branching begins to show from branch of V1.</td>
<td>26</td>
</tr>
<tr>
<td>V(n)</td>
<td>n trifoliolates on the main stem, but with blossom clusters still not visibly opened.</td>
<td>New node each 3 days</td>
</tr>
<tr>
<td>V8</td>
<td>Vine (indeterminate) plants may begin to exhibit blossom and become stage R1.</td>
<td>40</td>
</tr>
<tr>
<td>R1</td>
<td>One blossom open at any node. Tendril will begin to show.</td>
<td>40</td>
</tr>
<tr>
<td>R2</td>
<td>Pods 1/2 inch long at first blossom position (node 2 to 5 most plants).</td>
<td>43</td>
</tr>
<tr>
<td>R3</td>
<td>Pods 1 inch long at first blossom position.</td>
<td>46</td>
</tr>
<tr>
<td>R4</td>
<td>Pods 2 inches long at first blossom position.</td>
<td>50</td>
</tr>
<tr>
<td>R5</td>
<td>Pods 3 plus inches long, seeds discernible by feel.</td>
<td>56</td>
</tr>
<tr>
<td>R6</td>
<td>Pods 4.5 inches long with spurs (maximum length). Seeds at least 1/4 inch long axis.</td>
<td>60</td>
</tr>
<tr>
<td>R7</td>
<td>Oldest pods have fully developed green seeds. Other parts of plant will have full length pods with seeds near same size. Pods to the top and blossom on tendril, nodes 10-13.</td>
<td>70</td>
</tr>
<tr>
<td>R8</td>
<td>Leaves yellowing over half of plant, very few small new pods/blossom developing, small pods may be drying. Point of maximum production has been reached.</td>
<td>82</td>
</tr>
<tr>
<td>R9</td>
<td>Mature, at least 80% of the pods showing yellow and mostly ripe. Only 30% of leaves are still green.</td>
<td>94</td>
</tr>
</tbody>
</table>

Table 1. Stages of vegetative and reproductive development in an indeterminate (Type III) dry bean.

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HEAD SCAB RISK

The ND Small Grain Disease Forecasting website (www.ag.ndsu.nodak.edu/cropdisease) and the US Wheat and Barley Scab Initiative Risk maps (www.wheatscab.psu.edu) indicate a high risk of Fusarium head blight (scab) infections currently (June 15) and for the next few days on moderately susceptible to susceptible flowering wheat crops. Some moderate risk exists on June 15 even for moderately resistant cultivars that might be flowering. The following pictures illustrate what these risk maps looked like on June 15.


These maps indicate that on June 15th and for the next several days, risk of scab infection for flowering wheat crops (and headed barley crops) was high on susceptible varieties. These forecast maps change daily, according to relative humidity durations across the state, so they should be checked periodically, especially as more spring wheat nears the flowering period. If we are fortunate, sunny and more windy days will return and reduce the head scab risk.

FUNGICIDES FOR FUSARIUM HEAD BLIGHT (SCAB) MANAGEMENT

Extensive university studies across the US have compared Caramba (metconazole) and Prosaro (prothioconazole + tebuconazole) fungicides with Folicur (tebuconazole) for Fusarium head blight reduction in wheat. Results across 12 states showed that Caramba (13.5 fl oz/acre rate) and Prosaro (6.5 fl oz/acre rate) each provided about a 20% better reduction of FHB and a 30% better reduction of vomitoxin (DON) than Folicur (4 fl oz/acre rate), when tested primarily on moderately susceptible to susceptible cultivars of spring, durum, or winter wheat.

How does this compare to results in ND? These products were compared from 2005-2009 in uniform trials at Fargo, Carrington and Langdon on spring wheat, durum and barley, and across various levels of variety susceptibility.

Comparisons from 2005-2008 on spring wheat and durum showed that Caramba or Prosaro (at rates equal to those in national trials) provided an average of 23-36% better reduction of scab severity, a 28 to 58% better reduction of DON (vomitoxin) levels, and a 32 to 44% increase in yield, over the Folicur applications. The yield improvement translates to about a 3 to 5 bu/acre better yield than achieved with Folicur, for a 50 bu/acre yield crop.
It is apparent to me that when head scab is present, the two better products will give enough disease reduction and yield improvements to be very economical, even if priced higher than tebuconazole. All three fungicides also give good control of other diseases, such as the rusts and leaf spots.

In the absence of scab or other disease pressure, the yield differences among these products is diminished. In 2009, scab levels and other disease pressures were very low. Although reductions in disease levels, percentage wise, were similar to previous years, disease ratings were relatively low, even in the untreated check. Yield improvements by Prosaro and Caramba vs Folicur were smaller, averaging from 7-10%. However, at this time in the 2010 growing season, we appear to have a lot more disease pressure (tan spot) and disease risk (scab) than occurred in 2009.

In barley tests from 2005-2008 at Fargo and Langdon, the Prosaro and Caramba products had even better rates of reduction of disease levels and better percentages of yield improvements over Folicur than they did in wheat, primarily because our current barley varieties have high susceptibility to scab.

TAN SPOT
Tan spot continues to be the most common disease found in wheat by the NDSU IPM field scouts. Of the 101 wheat fields surveyed in the past week, 90% showed some level of tan spot, with severity on the top leaves ranging from 1 to 33%. The disease is more common and severe where wheat stubble is present in the field. Maps of tan spot occurrence, as reported by the NDSU IPM field scouts, may be found under the wheat link at the following ND IPM website:
http://www.ag.ndsu.nodak.edu/aginfo/ndipm/

STRIPE RUST
Since the last pest report, when we reported that no detections of any rust in wheat had been made, stripe rust was detected at low levels - in Adams county in winter wheat by the NDSU IPM scout for that area, Dixie Dennis. Since that detection, some stripe rust has been reported in winter wheat variety trials at Hettinger, a producer north of Dickinson reported some stripe rust occurrence in RB07 spring wheat, and a consultant reported a very low level of stripe rust in winter wheat plots near Berthold.

On June 15, John Lukach of the Langdon REC, reported to me that he has observed stripe rust in winter wheat variety plots on the station. He observed 1-2% severity in Jagalene on the top leaves in all reps, a trace amount on all reps in Boomer, CA9 W07 817, and Hawken, and trace amounts in one or two reps of some other varieties. On June 16th, I found extensive stripe rust on jagalene at Forman, ND, and trace amounts on Hawken winter wheat. (See Crop and Pest Report May 27th issue for picture of stripe rust).

So, the disease is here, but still at only trace levels. It still remains undetected in other parts of the state. Because this disease is so explosive under favorable environmental conditions, scouts, producers and consultants must keep an eye on the stripe rust disease to see if it develops and spreads in these areas. The fungus prefers night time temps below 60 degrees F, so maybe the coming week’s temperatures will stop development.

At Forman we also detected common wheat rust on jagalene on June 16th. If stripe rust or leaf rust do appear to be present at levels of concern, the triazole fungicides that will be used for head scab control also do an excellent job of controlling rusts, when the rust severity is still low on the flag leaf (1-3% severity).

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EARLY SPORE STAGES OF SUNFLOWER RUST BEING OBSERVED
The early spore stages of sunflower rust have been observed by multiple people and in multiple locations throughout the state. The disease has been spotted on volunteers sunflowers near Jamestown, Bismarck, north of Minot, and in Manitoba. It is reasonable to believe that rust will be spotted in many other locations in the coming days or weeks. However, rust has not yet been seen in commercial fields in North Dakota.

The earliest spore stages of rust are the pycnial and aecial stage. The pycnial stage occurs first, usually observed as a relatively non-structural yellow-orange spot on the upper side of a leaf or cotyledon (Figure 1). The aecia will occur immediately opposite the pycnia on the underside of the leaf or cotyledon. Aecia are easier to see and will appear as a cluster of orange cups (Figure 2). When the spores produced in the aecia infect sunflowers they will cause the cinnamon-brown rust pustules we are used to seeing, the uredinia (Figure 3).

Figure 1. Sunflower rust Pycnia (Photo courtesy of Bob Harveson)
Rust is favored by moderate temperatures (55 – 85 F) and dew. Weather conditions will have a great influence on how severe and widespread rust is this year. However, the occurrence of the early spore stages suggests ample inoculum to cause disease will be present. Sunflower rust will take time to develop, but it is advised that growers monitor their fields for rust in the coming weeks. Scouting areas of fields first that have longer dew periods (such as by tree rows), are in close proximity to last year’s flowers, or are by wild sunflower species will give you a good idea if rust is present or not.

Sunflower rust can cause yield reduction in high pressure. Sunflower rust can be managed with fungicides, although it is unlikely that an application in vegetative stages would be necessary. For now, the biggest thing to do is to be aware of the occurrence, and look at your fields in the coming weeks. More information will follow in a future crop and pest report when rust is occurring in commercial fields.

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### BACTERIAL BLIGHT SHOWING UP ON PEAS

An abundance of rain, mixed with cool temperatures and moderate to high winds, have been very favorable for the development of bacterial blight throughout the pea growing regions in North Dakota.

Bacterial blight is unlikely to cause yield loss. As soon as temperatures warm up and/or the rain subsides bacterial blight development will stop. Lesions will dry and crack and the disease will effectively be stopped.

The biggest potential issue we see with bacterial blight is confusing the symptoms with *Mycosphaerella* and applying an unnecessary application of a fungicide. Bacterial blight symptoms begin as ‘water soaked’ lesions and/or translucent spots on leaves, often at the leaf tips or leaf edges (Figure 4). Lesions will be nearly clear when holding them to the sky. The margins of these lesions will darken, and the centers quickly turn tan, dry, and the centers crack. *Mycosphaerella* lesions begin as dark purple specks on the leaves. These lesions enlarge into small irregular dark purple spots (Figure 5). As they mature small black structures (pycnidia) may be produced in the center, but may not be visible without a hand lens. The best way to differentiate the diseases is to look for the early symptoms of bacterial blight, the translucent lesions.

Fungicide applications can manage fungal diseases, but will have little/no effect on bacteria. Further, fungicide applications have been most effective at managing *Mycosphaerella/Ascochyta* when the peas are in the early bloom stage.

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Figure 2. Sunflower rust Aecia.

Figure 3. Sunflower rust Uredinia.

Figure 4. Bacterial blight lesions.

Figure 5. Mycosphaerella lesions
IDC REVIEW

During the past week, soybeans have reached the first true leaf stage (first trifoliate) and in soils susceptible to iron deficiency chlorosis (IDC) they have started to express the symptoms of interveinal chlorosis on the newest leaves. To make soybeans susceptible to IDC a soil must first have free carbonates. A soil test is available that can provide a calcium carbonate equivalence (CCE) that will help explain why some areas are affected and some are not. In addition, wetter calcareous soils are more susceptible to IDC than dry soils. Wet soil conditions solubilize carbonates to form the ion bicarbonate, which is the culprit in causing IDC. Additional environmental and cultural conditions increase the incidence and severity of IDC. These are listed below with their counterpart to the right that decreases the risk and severity of IDC:

- cool soil and air temperatures, compared to warm temperatures. 50's are bad, low 80’s are good.
- high soil nitrate, compared with low soil nitrate
- high soluble salts, compared to salt levels below 0.5 mmohs
- wet soils, compared to dry soils
- poor North Dakota IDC tolerant varieties compared to Grade A varieties
- solid-seeded, compared to 20 inch and wider row spacings

Last week and the weekend were not good for IDC tolerance. The rain was cold and so was the air temperatures. The combination of rain and cold has contributed to the present symptoms on problem soils. Iron foliar amendments have not resulted in consistent yield benefits in our region.

YELLOW CORN

The cool, wet weather has resulted in emerging corn leaves that are yellow in color. These symptoms are almost all due to the coolness, and not to any nutrient deficiency. In my corn plots observed June 14, the symptoms were seen regardless of N rate. Wait for some 80 degree temperatures for a couple days in a row before deciding if a sulfur/zinc application is warranted. If symptoms persist and the corn most affected is located in sander, lower organic matter areas, sulfur may be a problem and may need to be amended by dribbling ammonium sulfate or ammonium thiosulfate between the rows. If the problem is zinc, persistent striping and a tissue test AND soil test indicating that zinc is low may be diagnostic. A foliar zinc product of nearly any kind will pull corn out of a zinc problem.

CANOLA AND LATE N

Canola is not like wheat. By heading, wheat has determined its yield potential. By early flower, canola is still in the decision mode. If N appears short, additional stream-bar N may be applied during bolting and early flower. After early flower it is probably too late to make a difference. The flowering period may be two weeks or longer, so application early in the first week may still make a yield benefit. In determining practicality, figure about 10% yield increase in fields with questionable N levels, but also factor in the canola lost from driving over it to apply the 30 lb N/acre. If the result is a positive number considering the cost of N (about 50 cents/lb N from my state sources), then it would be good to apply. If not, save the money.

SLOW-RELEASE N WITH FUNGICIDE AT FLOWERING ON WHEAT

Some slow-release product sales people are promoting addition of their product at a low rate (1-2 gallons/acre; 2.5-5 lb total N) with a fungicide application at flowering. I would not support this application on two levels. First, none of the slow-release products are 100% slow release. Most are 1/3 to ½ urea or 28% N, with the rest slow-release. The urea or 28% would not be healthy for the delicate wheat flowers and may reduce the efficiency of pollination. Secondly, the amount of benefit for the buck with these products is very low. Please recall that the recommended recipe post-anthesis N application is 10 gallon 28% with equal water. This amounts to 30 lb
N/acre, which often results in 0.5-1% higher protein with no yield decrease at harvest. According to Carrington research in 2009, 30 lb slow-release N gives equivalent protein increase. Therefore 2.5-3 lb N/acre as a slow-release product would only give 0.05-0.1% protein (1/10 as much) increase for probably a similar cost as 15-20 lb N as 28%. Please do not use or promote the application of slow-release N at flowering.

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HERBICIDE NONPERFORMANCE IN COLD WEATHER

Have had reports of normal X rates of herbicides, especially applications with glyphosate, giving less weed control than expected when applied during cool/cold temperatures. Paragraph 16 on page 70 of the weed guide gives some information on glyphosate activity when applied in cool or cold conditions.

“16. Weed control from glyphosate applied during or after cold weather may be the same as from application in warm weather but the end result (weed control) will take longer. Ideal temperatures for applying POST herbicides are between 65 and 85 F. Speed of kill will be slower during cold weather also.

Use higher rates to overcome reduced control from cold temperatures before or after application. Cold weather is a stress to plants. Weeds with low level resistance may not be controlled whether in good or adverse conditions. Proper timing of glyphosate application is critical for adequate weed control. Glyphosate applied during cold weather and to large weeds will result in less weed control. AMS enhances weed control and can partially overcome reduced control of stressed plants.”

Data from research conducted by Dr. Jeff Stachler in 2009 (unpublished) give more insight on temperature affect. His data show that wide temperature fluctuations before and after application will decrease herbicide activity (plant response) as compared when cool/cold temperature exist before and after application. Final weed control was mostly affected when cool/cold conditions existed before and after applications but when temperatures varied widely the few days before and after application then control was greatly reduced. More research is needed as there are many variables at play here but wide temperature fluctuations may explain some situations where weed control was poor.

WEEDS STEAL NITROGEN INTENDED FOR CROP

For those that attended the Wild World of Weeds Workshop in January, Dr. Carrie Laboski gave our invited speaker presentation on N competition by weeds. Her results showing the amount of N taken up by weeds are startling. The data she presented reinforces good weed management not only in corn but any crop. Several have requested her presentation and below gives the web site where her presentation can be found. It has been posted on the website:

It’s the first presentation under teaching materials.

Some conclusions include:
• Economic optimum N rate (EONR) increases as weed control decreases.
• Additional N required to attain the same yield as using a PRE herbicide (no or little weed infestation):
  • 4 inch weeds = 28 to 61 lb N/A
  • 12 inch weeds = 64 to 157 lb N/A
  • No herbicide = No amount of N could compensate for no herbicide used.
• Additional N needed was greater than weed biomass N
• With no weed control, weed + corn N uptake was greater than corn N uptake with no weeds present
• At current N prices:
  • Failure to control weed is very costly
  • PRE (No/low weed pressure) and 4 inch weeds can sometimes provide similar economic returns

NEW RAGWEED PUBLICATION

Weed scientists in the NC region have developed a publication series called, "The Glyphosate, Weeds, and Crop Series". We have just printed another publication called, "Biology and Management of Common Ragweed". As this weed has become a greater problem in row crops, and has shown resistance to glyphosate, ALS herbicides, and PPO inhibiting herbicides, this information can be helpful to use every tool to control it.

The publication is free and can be ordered from our NDSU Ext. Distribution Center -sharon.lane@ndsu.edu
The publication is also available on the web:

http://www.glyphosateweedscrops.org/

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SEQUENTIAL GLYPHOSATE APPLICATIONS IN ROUNDUP READY SUGARBEET

Scout Roundup Ready sugar beet fields 14 to 18 days after the initial glyphosate application to determine the effectiveness of the herbicide treatment. If weeds survived the initial application, determine why they survived. Once surviving plants have grown 1 to 3” taller/larger compared to when they were sprayed, apply glyphosate at the maximum legal amount available. The maximum amount of glyphosate that may be applied to Roundup Ready sugar beet in a single application prior to the 8-leaf sugar beet stage is 1.125 pounds acid equivalent per acre (lbs ae/A). Consult the Glyphosate Formulations Labeled for RR Sugarbeet in 2010 publication found at the website, http://www.ag.ndsu.edu/weeds/sugarbeet-files/Glyt%20RRbeets.pdf or page 71 of the 2010 North Dakota Weed Control Guide for additional information about product rates of various glyphosate formulations. The total maximum amount of glyphosate that may be applied prior to the 8-leaf sugar beet stage is 1.96 lb ae/A. The maximum amount of glyphosate that may be applied in a single application after the 8-leaf sugar beet stage is 0.75 lb ae/A. If weeds surviving the initial glyphosate application can be controlled by other sugar beet herbicides, mix the appropriate herbicides with glyphosate in the second application. Include an adjuvant that maximizes the activity of the tank-mix partner. If lambsquarters is surviving the initial glyphosate application, include a good quality nonionic surfactant (NIS) with all glyphosate formulations, unless prohibited. If all weeds were controlled by the initial glyphosate application and newly emerged weeds are present, apply glyphosate approximately 21 days after the initial application or when newly emerged weeds reach 2 to 3 inches in height.

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NDSU OFFERS SUMMER GRAIN STORAGE TIPS

The storability of grain depends on the grain’s quality, moisture content and temperature.

Grain moisture content must decrease as grain temperature increases to store grain properly. For example, the allowable storage time (AST) of 15 percent moisture corn is about nine months at 60 degrees, five months at 70 degrees and only three months at 80 degrees. The AST is reduced by approximately one-half for each 10-degree increase in grain temperature. If grain can be kept cooler, then it can be stored at higher moisture contents.

The recommended long-term grain storage moisture content normally is associated with the equilibrium moisture content (EMC) for the grain at a relative humidity of about 65 percent to limit mold growth at summer storage temperatures. The EMC at 80 degrees and 65 percent relative humidity is about 13.5 percent for wheat, 12.2 percent for barley, 13.1 percent for corn, 11.2 percent for soybeans, 7.6 percent for oil sunflowers and 9.9 percent for confectionary (non-oil) sunflowers. These EMCs correspond to the general recommended long-term storage moisture contents of 13.5 percent for wheat and corn, 12 percent for barley, 11 percent for soybeans, 8 percent for oil sunflowers and 10 percent for confectionary sunflowers.

Grain with mechanical damage is more susceptible to mold growth and has a shorter allowable storage life than undamaged grain. Corn harvested at moisture contents of 25 percent and higher likely has a higher than normal amount of mechanical damage and will have a shorter allowable storage life than corn with limited mechanical damage.

Immature or poor-quality grain generally has a lower test weight and is more susceptible to deterioration in storage. The allowable storage life of low-test weight corn may be only about one-half of that expected for mature, good-quality grain. Also, allowable storage time can vary among corn hybrids, so the numbers in AST charts should be considered only estimates.

Mold growth and insect infestations occur rapidly at summer temperatures, so stored grain should be checked every two weeks. An insect infestation can go from only a few insects to a major infestation in less than a month. I recommend using insect traps or placing samples on white material to aid in looking for insects.

Check the grain moisture content to assure the grain is dry enough for storage at summer temperatures. Measure the stored grain temperature at several locations near the top surface, along the walls and several feet into
the grain.

Temperature sensors are an excellent tool, but remember that they only measure the temperature of the grain next to the sensor. Since grain is an excellent insulator, the grain temperature may be much different just a few feet from the sensor and not affect the measured temperature.

Record the measured temperatures. Rising grain temperature may be an indicator of an insect infestation or mold growth.

The goal for summer storage should be to keep the grain as cool as possible to limit insect activity and reduce the potential for mold growth. Insect reproduction is reduced at temperatures below about 65 to 70 degrees.

Grain should not be warmed using aeration during the spring and summer. Aeration fans should be covered to prevent wind and a natural chimney effect from warming the grain. Grain near the top of the bin should be cooled every two to three weeks by operating the aeration fan for a few hours during a cool morning. Using positive pressure aeration to push air up through the grain enables the cool grain in the bottom of the bin to cool the air and exhausts the warm air from the grain out the top of the bin.

Only run the fan a few hours, or just long enough to cool the grain near the top surface. Running the fan more than necessary will warm more grain at the bottom of the bin, increasing the potential for storage problems. Cover the aeration fan when it is not running.

A galvanized bin roof absorbs large amounts of solar energy during the summer, heating the air above the grain. Convection currents in the grain flow up along the bin wall and down into the grain near the top middle of the bin during the summer, drawing this heated air into the grain. Ventilating the space between the grain and the bin roof can reduce the amount that the grain near the top of the bin is warmed.

Natural ventilation to cool this space can occur if the bin has openings near the eave and peak in a manner similar to ventilating the attic of a building. The heated air rises and exits near the peak, drawing in cooler air near the eave. This natural ventilation will not occur unless the bin has adequate openings at both the eave and peak. Roof exhaust fans also can be used to draw the heated air out of the bin if it has openings to allow air into the area above the grain.

Removing peaked grain reduces the potential for grain warming at the top of the bin. A cone-shaped peak has a larger ratio of surface area to grain quantity, which leads to more warming of the grain, than the cylindrical shape of leveled grain.

For more information about storing grain, visit http://www.ag.ndsu.nodak.edu/abeng/postharvest.htm.

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Southwest ND

Precipitation across the area was light with most NDAWN stations reporting between 0.10 and 0.15 inches. Wind has been a major hindrance to in-crop applications of pesticides. However over the last three days (Sunday – Tuesday) wind conditions have improved and good progress has been made with these applications.

Producers continue to seed late spring seeded crops such as sunflower and buckwheat. Dwain Barondeau, Hettinger County Agent reported that winter wheat is heading out and canola is beginning to bolt in his county. Hay harvest is beginning in Dunn, Hettinger, Bowman, Stark and Golden Valley Counties. Andrea Bowman, Bowman County Agent is reporting that the western part of her county is beginning to show signs of moisture stress as that part of the county hasn’t had the rainfall that other areas. Lane Hall, Slope County Agent, indicated grasshopper numbers are building in the western part of that county. For more information see Janet Knodel’s article on page 3.

Producers have been reporting low severity stripe rust infections in both winter and spring wheat. HRSW varieties exhibiting symptoms include Glenn, RB07, and Albany. This year’s experience with stripe rust will provide NDSU agronomists and plant pathologists and excellent opportunity to evaluate ND varieties for susceptibility to stripe rust.

Sunflower rust in the BisMan area should be of concern to sunflower growers (see article by Sam Markell in this issue). I haven’t found any of the pycnia on the wild sunflowers along the road NW of Dickinson, but growers should scout areas where wild sunflower are found. Even though some sunflower fields haven’t emerged, this will give them an idea of the potential for this disease to be a problem in production fields early in the season.

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**Small grains:**
Army cutworms, *Phyllophaga* beetle grubs, and wireworm adults (click beetles) were found in a barley field in the Upham area that was declared a total stand loss by the crop adjuster. Many of the cutworms were in the pupal stage but beetle grubs were found at various stages (early and late instar larvae).

When deciding whether or not to make an insecticide application for cutworms and other soil dwelling insects it is important to determine the stage of the insect and the pest density. Although early instar larvae can cause significant damage, a disproportionate amount of damage is caused by late instar, one inch cutworms and one to two inch beetle grubs. When a majority of the cutworms in a field are in the orange-brown pupa stage, most of the damage is done and insecticide treatments are generally not economical. Spring hatching cutworms (e.g., pale western cutworms) may still be at early larval instars when control is warranted. Thresholds for cutworms range from 0.3 larvae/ft² in canola, field peas, and lentils to 2-5 larvae/ft² in small grains depending on plant population and species of cutworm. Although insecticide seed treatments are effective at controlling wireworms, they generally are less effective against cutworms.

For more information and photos:
[http://www.ag.ndsu.edu/pubs/plantsci/pests/e830w.htm](http://www.ag.ndsu.edu/pubs/plantsci/pests/e830w.htm)

[http://www.ag.ndsu.nodak.edu/aginfo/entomology/ndsucrp/Years/2008/june/19/ent.htm](http://www.ag.ndsu.nodak.edu/aginfo/entomology/ndsucrp/Years/2008/june/19/ent.htm)

[http://www.ianrpubs.unl.edu/epublic/pages/publicationD.jsp?publicationId=554](http://www.ianrpubs.unl.edu/epublic/pages/publicationD.jsp?publicationId=554)

**Peas and Lentils:**
Some bacterial blight has been found in the area. It is important to differentiate bacterial blight from the fungal disease, *Mycosphaerella/Ascochyta*, because fungicides are not effective against bacterial blight. Please refer to the article on bacterial blight in this edition of the Crop and Pest Report for more information.

With the wet cool weather we’ve had, root rots are also common, especially in fields that did not use fungicide treated seed. Fungal root rots have a darkening and softening of the stem near the soil level. Root loss and damage can be seen on plants that are carefully removed from the soil.

Pea aphids have been found in pea and lentil fields in the area. At this point the aphids were well below the threshold. Bloom time is the best time to scout for these insects. Treatment is recommended post-bloom when aphids are greater than four per plant. See Janet Knodel’s article on page 3 for more information.

**Canola:**
Diamondback moth and bertha armyworm moths have been caught in traps at the North Central Research Extension Center and in a canola field in McLean County. Flea beetle damage is common but fields above the 25% damage threshold have not been observed. Flea beetle damage is still a risk up to the 6 leaf stage.

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weather

7-Day Accumulated Precipitation

7-Day Average Temperature
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