SUGARBEET ROOT MAGGOT UPDATE: EXPECT MAJOR FLY ACTIVITY SURGE THIS WEEKEND!

High numbers of sugarbeet root maggot flies have emerged from the soil during the past few days. Sticky-stakes checked on Monday, June 13 indicated a significant increase in fly activity in the Cavalier, St. Thomas, and Minto areas of the Valley last weekend (Fig 1.). Recent field collections of larvae and pupae suggest that high numbers of flies are yet to emerge. Therefore, the flies that have entered beets to date may be just the tip of the iceberg. A significant increase in fly activity is expected to begin Friday afternoon, and will likely continue through most of next week, pending good flying weather.

The NDSU root maggot developmental model indicates that all monitoring sites in the Red River Valley will have surpassed the necessary 600 degree-day units for peak activity to occur, but recent cool and rainy weather has thus far kept most flies in grain fields, field margins, and shelterbelts. The expected warm and dry weather will lead to a rapid upsurge to peak fly activity in current-year beets during the next few days.

Growers in high-risk areas for maggot attack (central and southern Pembina County, ND and central Walsh County, ND) should apply a postemergence insecticide for added protection. Other areas to watch include the rest of Pembina and Walsh counties, northern Grand Forks county, and the Casselton/Amenia area of Cass cty.

**CONTROL OPTIONS:** Postemergence granules should work well this year because most soils are moist, and the moisture helps activate the insecticide quickly. Some growers’ fields may be too wet to enter for applying granular insecticides. The need for prompt action to protect fields will necessitate aerial application for those growers this year. Liquid insecticides should be effective if applied 2-3 days before or after peak fly activity. A broad peak in fly activity is expected this year, so applying 2 split treatments of a liquid insecticide may be more effective. If such a program is selected, apply the first treatment as soon as possible, and make the second application within 5 to 7 days.

For more information regarding postemergence root maggot control and for more specific product recommendations, refer to the “Insect Control” section of the 2005 Sugarbeet Production Guide or the “Sugarbeet Insects” section of the 2005 Field Crop Insect Mgmt. Recommendations. These publications are online at:

http://www.sibreb.org/Production/production.htm

http://www.ext.nodak.edu/extpubs/plantsci/pests/e1143w1.htm

*Always read, understand, and follow all pesticide labeling instructions and precautions - it’s the law.*

Mark Boetel
Research & Extension
Entomologist
mboetel@ndsuext.nodak.edu

Justin O. Knott
Plant Protection Specialist
ND Dept. of Agriculture
jknott@state.nd.us
NOXIOUS WEED AWARENESS MONTH

Governor John Hoeven has declared June 2005 “Noxious Weed Awareness Month”. All North Dakotan need to do their part to identify and control noxious weeds. The North Dakota state list of noxious weeds includes: absinth wormwood, Canada thistle, field bindweed, leafy spurge, musk thistle, purple loosestrife, Russian knapweed, spotted and diffuse knapweed, yellow starthistle, dalmatian toadflax, and saltcedar. These noxious weed species are recognized to harm North Dakota’s agriculture, natural resources and recreational lands, and can have significant detrimental short and long-term effects on these lands. When a weed species is first noticed, often times it clearly is not causing noticeable damage and consequently the land owner/manger waits to take action after the weed patch has grown considerably in size and is a significant problem. As a result, control efforts after weeds are causing significant damage can be too late to be cost-effective or even successful. Invest now in weed identification and control to prevent noxious weeds from establishing on your lands and causing significant economic losses. The following NDSU Extension publications on identification and control of noxious weeds are available at http://www.ext.nodak.edu/extpubs/weeds.htm or your county Extension Office.

• Leafy Spurge - Identification and Control (W-765)
• Perennial and Biennial Thistle Control (W-799)
• Identification and Control of Field Bindweed (W-802)
• Absinth Wormwood Control (W-838)
• Spotted Knapweed (Centaurea maculosa Lam.) (W-842)
• Integrated Management of Leafy Spurge (W-866)
• Leafy Spurge Biology, Ecology, and Mgmt. (W-1088)
• Controlling Leafy Spurge Using Goats and Sheep (R-1093)
• ND Noxious and Troublesome Weeds (W-1103)
• The Thistles of North Dakota (W-1120)
• Identification and Control of Purple Loosestrife (Lythrum salicaria L.) (W-1132)
• Know Your Knapweeds (W-1146)
• Leafy Spurge Control Using Flea Beetles (Aphthona spp.) (W-1183)
• Yellow Starthistle (Centaurea solstitialis) Identification and control (W-1222)
• Saltcedar (Tamarix spp.) Identification and Control (W-1223)
• Dalmatian Toadflax and Yellow Toadflax (Linaria genistifolia spp. dalmatica and Linaria vulgaris) Identification and Control (W-1239)

All North Dakotans must do their part to stop the spread and introduction of noxious and new invasive weed species in North Dakota.

Denise Olson
Research Entomologist
denise.olson@ndsu.edu

HAIL DAMAGE IN OILSEED & ROW CROPS

Hail damage to crops occurs somewhere in the state every year. Reports have already been made last week and this week of hail in some areas of the state. When hail damage occurs on corn, soybean, dry bean and sunflower early in the growing season, replanting is possible; but deciding whether to replant is usually difficult. Total stand reduction, leaf loss, stem injury, weed control, and calendar date are factors to consider when making this decision. At this time (Mid-June) its too late to consider a replant.

Corn: The growing point remains below ground 2-3 weeks after the plant emerges (5-leaf). If the growing point is not damaged, corn will recover and perform better than replanted corn. Split the stalk down the center and inspect the growing point. If normal, it will appear white in color and firm in texture. Injured growing points will appear brown or discolored 2-3 days following the hail. Complete loss of leaves early to corn when small usually does not greatly affect grain or silage yields. Corn in the silking and tasseling stage when damaged by hail can result in severe yield losses.

Soybean and Dry Bean: The growing points of beans are located in the top of the plant and in leaf axis. Growing points of beans are easily damaged by hail soon after emergence. Regrowth will not occur if hail stones cut the stem off below the cotyledonary node. If the tip of the plant is damaged, regrowth can occur from one or more axillary buds. Bean stems may be bruised or broken. The damage may not be severe enough to kill the plant. However, the plant may lodge later as the callus tissue is weak and cannot support the pod weight. Reduction in soybean stands to four plants per linear foot of row in 30 inch row spacings can still produce fair yields. For dry beans one can get down to two plants per foot of row and still get fair yields.

Sunflower: Sunflower may be more tolerant than beans, but the degree of hail tolerance depends on the intensity of the hailstorm and the stage of growth. Sunflower is least tolerant during the seedling and budding stages, and most tolerant after flowering. Hail damage may be direct or indirect. Direct damage results from stand reduction, loss of recoverable heads because of severely bruised or broken stems, and head shatter at later stages. Indirect damage results from defoliation and disease infestation to injured plant tissue.

Research conducted on simulated hail losses in sunflower indicated that a one-to-one relationship does not exist between stand reduction and yield loss. A 50% stand reduction resulted in only a 28% yield reduction. Defoliation of sunflower by hail was reported to be most
damaging during the bud stage. Defoliation of 80% at the 
bud stage resulted in yield reduction of 53%. Whereas 
80% defoliation at the 50% mature stage resulted in only a 
12% yield loss.

**Canola:** Plantings in seedling stages can have stands 
reduced by 50% and still produce acceptable yields. An 
average stand of 11-12 plants/sq. ft. can be reduced to 
4/sq. ft. before yield losses exceed 10 percent. Prior to 
bolting and flower development, canola can withstand hail 
without much economic loss. Canola with leaves that are 
torn and shredded suffer only partial loss, while leaves 
bruised on the main vein or torn and broken will be lost. 
Leaf area destroyed will result in seed yield loss. Seed 
yield losses in canola is approximately 25 percent of leaf 
area lost. If leaf defoliation is 50 percent, then yield loss 
would be approximately 12.5 percent.

Canola plants injured in late bolting or early 
flowering stages seldom die. The well developed root 
systems and ability to rebranch and develop secondary 
flower clusters help the plants recover. When buds or 
flowers are destroyed, the canola recovers rapidly by 
development of flowers which normally would have 
aborted. New branches also develop from growth buds 
lower down on the plant. Seed yield loss will depend on 
both percent leaves and branches lost. For example, if 
canola has 60 percent lost branches 7 days into flowering, 
seed yield loss is estimated at 18 percent, whereas 21 days 
into flowering, yield loss would be an estimated 60 
percent. If hail strikes late, such as during pod filling or 
ripening, plant recovery is not possible. The time needed 
to develop new growth, flowers and mature is limited 
before a killing frost. Canola seed yield loss if injury 
occurs at the ripening stage depends directly on the loss of 
branches, individual pods and seed knocked out of pods. 
Severe hail losses have occurred in canola swaths.

**ANALYZING AND EVALUATING CROP PROBLEMS**

Persons working in crop production are often called 
upon to trouble-shoot in situations involving suspected 
crop injury from herbicides. These situations require 
careful analysis and scouting before judgements are 
formulated. For purposes of this article, I would like to 
define “injury” as stunting, delayed development or 
malformation of plant tissues which may or may not affect 
yields. Herbicide injury may result from applications to 
the crop, from residues in the soil or from drift. 

When evaluating crops involved in suspected 
herbicide injury, keep in mind that some other factors may 
have caused the observed effects or the herbicide may be 
only one of a combination of several casual factors. Look 
for other possible causes. Are there holes in the leaves or 
stems or pruned roots from insect damage? Has there been 
severe weather - wind, drought, hail, flooding, frost, high 
temperatures, etc. - that could have caused damage, 
Flooding damage in crops which recently occurred in 
June, greatly compounds the diagnosis. Could a disease be 
involved? Could it be excessive or misplaced row 
fertilizer or a nutrient deficiency? Or is the effect resulting 
from a combination of causes?

Look for patterns of injury in the field. Herbicide 
injury is often in a pattern associated with soil types or 
movement of application or incorporation equipment. 
Observe other susceptible crops or weeds in the area for 
herbicide effects. For comparison, try to find a check area 
where no herbicide was applied in the same field.

If you conclude that herbicides are the probable cause 
of crop injury, try to determine why the injury occurred. 
Limited crop tolerance to certain herbicides is sometimes 
a problem especially under heavy rainfall or sandy soils or 
on dry, loose soil. Miss use high rates, wrong chemical, 
contaminated spray tank, improper method of application, 
nonuniform application, overlaps, improper applicator 
adjustments and tillage operations that concentrate the 
chemical - are some reasons for herbicide injury. Some 
varieties/hybrids are more susceptible than others. 
Weather and soil conditions that cause plant stress may 
make the crop more susceptible to herbicide injury.

Don't be too hasty to evaluate the effects of herbicide 
injury. Give the plants a chance to recover. Check 
growing points to see if the plants have potential for 
recover. Compare injury effects and weed control 
benefits. Stand counts and injured plant counts are 
important considerations. Unbiased yield checks later in 
affected and unaffected similar areas of the same field are 
the best estimates in damage losses.

**CHECK YOUR SOYBEANS FOR NODULATION**

Soybean plants that are five to six inches tall should 
have their first unfolded leaflets (V2 stage). Nodulation, 
the symbiotic relationship of bacteria on the soybean 
roots, can be seen shortly after emergence, but the plant is 
not actively fixing nitrogen until the V2 to V3 stages. The 
number and nodules formed on the soybean roots along 
with the amount of nitrogen fixed increases until the R5.5 
stage. Nodules actively fixing nitrogen for the plant are 
pink or red inside. White, brown or green nodules indicate 
that nitrogen-fixation is not occurring. Nitrogen 
fertilization after planting (other than pop-up or early, 
limited fertilization) is not recommended as nitrogen 
fertilizer applied to active nodules will render these 
nodules inactive or inefficient, depending on the amount 
of nitrogen applied. Soil nitrogen is utilized over fixed 
nitrogen, if available in large amounts. Check the health 
of your soybean nodules and check root proliferation. 
Soybean roots should be dug up to check nodules and not 
pulled from the soil. The pulling action tends to slough 
off nodules and results in an inaccurate assessment. At 
V2, soybeans should be rooting down six inches into the 
soil and by V5 will completely reach between 30-inch 
rows, making any cultivation at V5 needing to be very 
shallow.

Duane R. Berglund
Extension Agronomist
duane.berglund@ndsu.edu
CEREAL CROP GROWTH IN SATURATED SOILS

With the nearly continuous rains of the last few weeks, soils have become saturated. Ponding is so common in parts of the state that ducks have a nearly endless supply of places in which to paddle.

Waterlogging (ponding/saturated soils) affects a number of biological processes in plants and soils and can be damaging to crop growth. The extent of yield loss caused by excessive moisture, however, cannot be easily generalized as it is influenced by a number of factors.

The primary cause of damage to cereal crops by waterlogging is oxygen deprivation. The rate of oxygen depletion in a saturated soil is dependant on a number of factors, but temperature is the most important and predictable factor; the higher the temperature the faster the rate of oxygen depletion. Fortunately, up until now temperatures have been moderate which have helped slow the deleterious effects of waterlogging. Generally, the oxygen level in a saturated soil reaches the point that is harmful to plant growth after about 48 to 96 hours.

Effects on Corn - Much of the corn in the state is currently at or near the 4 leaf stage. The growing point of the corn plant remains below the surface of the soil until the 5-6 leaf stage and is quite sensitive to waterlogged conditions at this stage. Young corn plants can be killed if soils are saturated beyond 48 hours, particularly when soil temperatures are high (i.e. above 65 degrees)

Waterlogging also reduces root growth and predisposes the plant to root rots later in the season. To determine if plants have been killed by ponding, wait 3 to 5 days after the excessive moisture has drained through the soil and then check to see if there is any visible re-growth.

Effects on small grains - Depending on planting date, small grains currently vary from the 4 leaf stage to heading.

Barley is reported to be more sensitive to temporary waterlogging than is wheat. Furthermore, varieties vary considerably in their response to waterlogging, though I am not aware of any data on how varieties commonly grown in North Dakota respond. Sensitivity to waterlogging generally decreases with age with spike size and tiller numbers being the yield components most affected. Though leaf yellowing is common in small grains after soils have been waterlogged, yield loss can occur, even if these visible symptoms are not observed.

Effects on the soil - Water-logging can also indirectly impact cereal crop growth by affecting the availability of nitrogen in the soil and by reducing root development. Excessive water can cause leaching of nitrate nitrogen beyond the rooting zone of the developing plant, particularly in lighter textured soils. Furthermore, when oxygen levels become depleted, nitrate nitrogen is converted to a gaseous form that is lost to the air.

Research conducted in other states has found losses between 1 and 5% of the nitrate N lost for each day that the soil remains saturated. Corn responds to additions of N when N is limiting up to the beginning of grain filling. Consider side-dressing N to corn fields with good stands where excess water caused be economical once that this year. In small grains, in order to impact yield, additional N should be applied prior to the 6 leaf stage. Additional N, after this stage, however, does have the potential to increase protein levels. See Dave Franzen's article in last week's Crop and Pest Report for more details.

Joel Ransom
NDSU Extension Agronomist
Cereal Crops
joel.ransom@ndsu.edu
Tan spot was observed in 65.5% of the wheat fields surveyed. Severity of tan spot in these fields ranged from 1 to 25%, with highest severities generally in southwest counties (see figure of tan spot severity).

Spot blotch fungal leaf spot was observed in two wheat fields and six barley fields. Net blotch was observed in three barley fields surveyed.

NDSU DISEASE FORECASTING

To no one’s surprise, the NDSU wheat disease forecasting web site has predicted favorable weather for tan spot, leaf rust and Fusarium head blight across most of the NDAWN stations over the past week. Growers and consultants must monitor their crop and determine presence of leaf rust and/or tan spot on leaves below the flag. In headed winter wheat, the other concern is the risk of Fusarium head blight. The decision to use fungicides this year may depend more on when and how, than if. However, growers must take stock of their crop health once the rains stop and fields drain, to determine if fungicides are warranted and to determine appropriate timing of application.

BARLEY YELLOW DWARF VIRUS (BYDV)

Cereal or grain aphids were observed in 6.9% of wheat and barley fields surveyed by NDSU IPM field scouts during June 3 through June 10th, primarily found in the south central part of the state. Percent of tillers with aphids present ranged from 2 to 12%. These grain aphids may vector Barley Yellow Dwarf Virus (BYDV). Symptoms of BYDV were not yet observed by the scouts.

Although the ND IPM field scouts have not yet reported observing symptoms of BYDV, South Dakota State University plant pathologists are observing BYDV symptoms in some winter wheat. BYDV is characterized by a distinct golden yellowing of leaf tips in barley, while in wheat, a slight purple discoloration may accompany the yellow discoloration of the leaf tip, to about 1/3 the length of the leaf. Generally these symptoms appear on the flag leaf, and symptomatic plants are in patches or along field edges, where the grain aphid vectors of the virus have congregated.

As the % of tillers with one or more aphids detected was very low (12% or less) in the few fields where grain aphids were detected in the NDSU IPM survey, these fields would not warrant insecticide treatment at this time. To protect against feeding damage, the threshold for small grains for grain aphids is 85% of stems with at least one aphid. Dr. Phil Glogoza, former NDSU extension entomologist, advised that if BYDV was of concern, this threshold could drop to 50% of tillers with one or more grain aphids. Small grain crops should be closely monitored now for grain aphids, as well as for diseases.

Marcia McMullen
Extension Plant Pathologist
Marcia.McMullen@ndsu.edu

SCLEROTINIA RISK MAPS FOR CANOLA BEGAN JUNE 13

The threat of Sclerotinia stem rot of canola draws nearer as the crop approaches flowering. With all of the wet weather throughout the state, fungicides may needed to help manage Sclerotinia stem rot in canola this year. To help growers make spraying decisions, the Sclerotinia Risk Map Project has begun its fifth season of use for North Dakota and Minnesota. The map projects the risk of Sclerotinia stem rot, by using models to determine when apothecia may emerge from the soil. The apothecia of the Sclerotinia fungus are small, cup-shaped, mushroom-like structures that produce airborne spores that infect dead flower petals of canola plants, which leads to Sclerotinia stem rot. Besides the Risk Map, a Top-zone Soil Moisture Map, and a Canola Growth Stage Map (based on average regional seeding date) are also available. All three maps are updated twice per week. The first set of maps for the season were made available on-line on June 13, and the maps will continue through canola flowering. The maps are available through the Northern Canola Growers Association website and an NDSU website. The URLs for these sites are:

http://www.northerncanola.com/
or
http://www.ag.ndsu.nodak.edu/aginfo/sclerotinia/sclerotinia.htm

The June 13 Risk Map indicates a moderate risk for most of the North Dakota and Minnesota canola production regions. However, most of the canola is not in the flowering stages, and is not susceptible at this time.

The Sclerotinia Risk Map Project is coordinated by Drs. Luis del Rio, Carl Bradley, and Art Lamey with NDSU-Plant Pathology, and Gary Platford and Jennifer Lamb with P & D Agro Consulting, Inc. Weather data is provided by the North Dakota Agricultural Weather Network (NDAWN) and Environment Canada Meteorology Services. Financial support for this project is provided by the Northern Canola Growers Association, State Board of Agricultural Research and Education (SBARE), and the USDA-CSREES North Central Canola Research Program.
LOOK OUT FOR SUNFLOWER DOWNY MILDEW

Downy mildew of sunflower is favored by the saturated soil conditions and cool weather that North Dakota has been receiving lately. This soilborne disease can stunt plant growth and cause chlorosis (yellowing) along the leaf veins on the upper-surface of the leaf. Under humid conditions, a fluffy fungal growth may be observed on the bottom-surface of the leaf. No management options are available during the cropping season that will control downy mildew. Resistant hybrids are available; however, most are not resistant to all races present in North Dakota. Apron XL or Allegiance fungicide seed treatments may be effective against some populations of the downy mildew pathogen, however, populations resistant to these fungicides are present throughout North Dakota. Dynasty seed treatment may help with the control of downy mildew pathogen populations that are resistant to the Apron XL and Allegiance fungicides. Extending the number of years between sunflower crops in problematic fields may help reduce inoculum levels, which will reduce the risk of downy mildew.

Stunted sunflower plant with chlorotic leaves affected by downy mildew

Carl A. Bradley
Extension Plant Pathologist
carl.bradley@ndsu.edu

STRANGE SYMPTOMS ON ORNAMENTAL PLANTS IN THE PLANT DIAGNOSTIC LAB

Purple felt on maple leaves, white fuzz on viburnum leaves, and rust-spotted apples leaves, nipple-like galls on various tree leaves. What do these symptoms have in common?

They are caused by tiny creatures known as eriophyid mites, also known as bud mites, gall mites, and blister mites. These mites seem to be especially active this year in North Dakota. Eriophyid mites are too tiny to see with the naked eye. With a dissecting scope, you can see these tiny, carrot-shaped critters, which range in color from yellowish to light bronze.

Such mites are responsible for strange symptoms seen on samples submitted to the plant diagnostic lab lately. These symptoms include spindle-like galls, blistering, spotting (as in the apple rust mite), or proliferation of trichomes (plant hairs). Sometimes a bold red color is associated with these symptoms. Not much is known about the biology and ecology of these mites, but they are closely related to spiders. They are usually host specific. So, an eriophyid mite that feeds on maple leaves does not feed on Viburnum, for example.

Most eriophyid mites are believed to cause little or no harm to the host. Damage is considered aesthetic for most ornamental and landscape plants, so treatment is seldom recommended. Fruit quality can sometimes be negatively affected on raspberry, apple, pear, and other fruits, depending on which mite is present. In some cases, such as with the apple rust mite, no treatment is applied, since the mites provide an alternative food source to natural predators of the more harmful spider mite. Orchardists have learned to live with and even accept the presence of the apple rust mite. In the event that a mite population is undesirable, treatment can be challenging because by the time the symptoms are observed, the mites are typically inside the galls and thus protected. Applying miticides at the proper time, when mites exit their protective galls, is critical.

An eriophyid mite that is thought to be previously undescribed has been found recently on several samples of Viburnum, from around the state. This is believed to be the same mite that was observed on Viburnum several years ago in Bismarck. The impact of this mite on Viburnum is unknown. Symptoms include a white to cream colored proliferation of plant hairs growing on the leaf surfaces, seemingly concentrated at the tips and along the midrib (see photo). At first, it might be mistaken for a downy mildew, but it appears on the upper leaf surface, and downy mildew fruiting bodies are predominantly on lower leaf surfaces. A pink or reddish-purple tinge might also be visible. New, affected growth may be puckered and crinkled, and this might be mistaken for herbicide injury.
In wheat production, an important eriophyid mite is the wheat leaf curl mite, because it vectors the Wheat Streak Mosaic Virus (WSMV). Symptoms of mite infection, along with WSMV symptoms, usually indicate, with a fair degree of certainty, that the plant is infected with WSMV. Without seeing the mite, the cause of WSMV-like symptoms could be due to other factors. A serological test can be performed for confirmation.

You can read more about eriophyid mites on ornamentals by entering the following web sites into your browser’s address bar and clicking on the ‘go’ button:

http://www.ento.vt.edu/Fruitfiles/ARM.html

http://www.puyallup.wsu.edu/plantclinic/resources/pdf/pls 89eriophyidmites.pdf

http://www.coopext.colostate.edu/TRA/PLANTS/index.htmlhttp://www.colostate.edu/Dept/CoopExt/TRA/PLANTS/erio.html

http://www.colostate.edu/Depts/CoopExt/4DMG/Pests/ermite1.htm

Kasia Kinzer
Plant Diagnostician
kasia.kinzer@ndsu.edu

SUGARBEET – LOOKOUT FOR DISEASES

Rhizoctonia root and crown rot is caused by the fungus Rhizoctonia solani. The fungus causes infection when soil moisture range from somewhat dry to wet and soil temperatures above 68°F. Characteristic symptoms of Rhizoctonia include sudden wilting of leaves, and petioles of outer leaves are blackened at the point of attachment to the crown. Rhizoctonia root and crown rot may kill plants in small areas in a field – sometimes a few acres - but rarely warrants replanting. Fields with a history of severe Rhizoctonia root and crown rot should be planted with tolerant varieties.

Sugarbeet plants that are in warm, wet soils may be affected by Aphanomyces root rot caused by Aphanomyces cochlioides. Optimum condition for infection occurs in wet soils at ambient temperatures of 72 to 82°F. Aphanomyces can be devastating in the seedling stage, and can also cause serious root rot later in the season. Infected plants turn a sickly yellow green and tend to wilt in the afternoons of hot and sunny days. Assessment of fields should therefore be done on hot sunny days since it would be easy to identify infected plants. Aphanomyces may infect a few plants to entire fields. Some plants may die; those that survive have their roots easily dislodged at harvesting. Plants that survive infection have reduced root yield, lower sucrose content, and higher impurities. Diseased roots have much, much, higher respiration rates compared to healthy roots. As a result, the quality of storage piles can be reduced significantly when diseased roots are stored with healthy roots. Aphanomyces can be managed by using tolerant varieties; using Tachigaren pelleted seeds; planting early when possible; keeping the soil dry by cultivation and enhanced drainage; controlling weeds; and avoid spreading of contaminated soil from infected fields to disease free fields. Fields with a history of Aphanomyces should be planted with tolerant varieties approved for the particular factory district. In addition, seeds should be treated with Tachigaren to provide additional protection, especially since North Dakota and Minnesota are in a wet cycle, with conditions favorable for Aphanomyces occurring most years.

Wet soils and a temperature of 77°F also favors the protozoan Polymyxa betae that transmits Beet Necrotic Yellow Vein Virus (BNYVV) that results in the disease ‘Rhizomania’. Characteristic symptoms of Rhizomania include translucent yellow-green leaves that may have longer stalks and narrower blades, and stunted taproots with proliferation of secondary roots giving a bearded appearance and hence its name Rhizomania – ‘crazy root’ or ‘root madness’. The best way to manage Rhizomania is to plant resistant varieties early in the season and use longer rotations with non-host crops such as wheat, corn, and soybean.

HOW LONG CAN SUGARBEET BE IN FLOODED FIELDS AND SURVIVE?

After the heavy rainfall, growers are wondering how long can sugarbeet be in flooded fields and still survive. We know from experience that sugarbeet can tolerate flooded conditions better than most other crops. However, there is little research data to provide definitive answers. Greenhouse research was done at NDSU to determine how long various stages of sugarbeet could be in flooded conditions and survive. The research indicated (data shown below) that larger beets (4-leaf and 6-leaf) survived well even after 4 days (96 hr). Seed germination was good after 48 h (not significantly different from check); similar to field conditions after 72 h of submergence; poor after 96 h of submergence. Beets in the cotyledonary and 2-leaf stage did not survive as well as 4-If and 6-If beet. It is possible that in fields, plants may survive longer if the water is moving, and in cooler conditions compared to the greenhouse temperature that ranged from 75 to 82°F.

<table>
<thead>
<tr>
<th>Treatments</th>
<th>Survivors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Germi-Submergence (hr)</td>
<td>nation (%)</td>
</tr>
<tr>
<td>24</td>
<td>81 ab</td>
</tr>
<tr>
<td>48</td>
<td>76 ab</td>
</tr>
<tr>
<td>72</td>
<td>66 b</td>
</tr>
<tr>
<td>96</td>
<td>41 c</td>
</tr>
<tr>
<td>Check</td>
<td>84 a</td>
</tr>
<tr>
<td>LSD</td>
<td>4.8</td>
</tr>
</tbody>
</table>

Mohamed Khan
Extension Sugarbeet Specialist
mkhan@ndsuext.nodak.edu
TOP-DRESSING N FOR SMALL GRAINS

Timing issues-

For yield, top-dressing should be conducted using streamer bars or nozzles before jointing. Not only should the application be made prior to jointing, however, rainfall must move the N into the soil so that the roots can take it up prior to that growth stage. Use of extra N past that growth stage will often result in increased protein, but not yield increases.

For protein enhancement, extra N applied before heading using stream technology not incorporated into increased yield will be used for protein. However, a better approach would be to wait until just after heading and apply a foliar application of 10 gal/a (30 lb N) as 28%, mixed ½ and ½ with water at the watery-ripe stage of kernel development (right after pollination, but before starchy has formed). This would be applied as a foliar application during the cool of the day. Sometimes despite best efforts there is some leaf burning, although if the precautions previously mentioned were taken, the effects will not normally be severe.

It is highly recommended that no fertilizer N be applied during small grain heading. Often, scab fungicides are applied at this time for maximum effect. Fertilizer should not be applied during a heading application.

Product issues-

There have been questions regarding use of other liquid N products besides 28%. 28% has been know to result in foliar burn sometimes, so alternatives have been suggested. One alternative is 25-0-0, a manufactured urea solution. Some studies have shown this material to be less likely to burn foliage than 28%. However, it is often more expensive to use, so the pros and cons of using this product should be weighed.

Is it possible to make a homemade 25-0-0? On paper, yes. However, when urea dissolves in water it absorbs heat. The sides of the container turn frosty, and unless the solution is heated the full amount of urea doesn’t dissolve. Manufacturers sometimes add sulfuric acid or anhydrous ammonia to the solution to generate enough heat for the urea to fully dissolve. In my own experience, a 14-16% solution is possible on a home-made basis, but the results will probably not be consistent unless a heavy duty liquid fertilizer blender is available. Considering all the trouble and extra expense of alternatives, 28% is a good choice.

Dave Franzen
Extension Soils Specialist
701-231-8884

ERRATUM - LATE HERBICIDE APPLICATIONS IN SMALL GRAINS

In last week’s Pest Report it was reported that Silverado should be applied prior to jointing. Bayer has received labeling allowing Silverado to be applied up to 55 days before harvest or up to the boot stage of HRS and durum wheat.

APPLICATION WINDOW FOR PUMA AND SILVERADO

Application window for Puma is 60 days before harvest and Silverado is 55 days before harvest. In looking ahead, 60 days from now would be around August 15 which is the normal time for small grain harvest. The wet weather may delay harvest one or two weeks but we are nearing the end of the application window for Puma and Silverado for a mid-August harvest.

SECTION 24(c) FOR AERIAL APPLICATION OF CALLISTO

The Department has received several calls over the past few days concerning the recent heavy rains in the state and the inability to get into fields using ground pesticide application equipment. In particular, this concern was voiced by corn growers who have limited postemergence broadleaf weed herbicides that are labeled for aerial application.

To address this need, the NDDOA has issued a Section 24(c) Special Local Needs (SLN) registration allowing aerial applications of Callisto Herbicide on corn. This SLN registration is good for this season only and expires on July 15, 2005.

Supplemental labeling for this SLN registration has been posted on the Department’s pesticide registration database and on the NDSU Pesticide Program page.

Have a copy of the SLN supplemental labeling in your possession during application, and to follow all directions, precautions, and restrictions on both the full Callisto label and the SLN labeling.

SECTION 18 FOR REFLEX ON DRY BEAN

The ND Section 18 application for Reflex on dry bean submitted to the EPA has not been approved. Jim Gray from the ND Dept of Ag has been encouraging EPA to review this package and approve for use. The Section 18 division of EPA has only 4 people to review all Section 18 submission for the entire country. One of the four people is dedicated to reviewing all Sect. 18 submissions for soybean rust which leaves only three people to handle the others. We hope action will be taken shortly.

Richard Zollinger
NDSU Extension Weed Specialist
r.zollinger@ndsu.edu
RAIN INTERFERENCE WITH POSTEMERGENCE HERBICIDE APPLICATION

The 2005 North Dakota Weed Control Guide, page 69, lists the minimum interval between herbicide application and rain for maximum herbicide uptake and efficacy.

Herbicide uptake by weeds and crops is most rapid immediately after application and significant herbicide uptake can occur even when the rain event begins sooner than the listed minimum interval. So, herbicides should not be automatically reapplied when rain falls sooner than the minimum recommended interval between application and rain.

If a single herbicide application was intended, assess the situation after the full effect of the herbicide can be observed but do not wait too long for a needed reaplication. Waiting may allow the target weeds to become too large for good control and the crop stage may become too advanced for safe herbicide application. Look for early indications of weed regrowth to indicate poor control. Marking weeds for reobservation may help determine if regrowth is occurring. If multiple herbicide applications were planned, the planned interval usually can be maintained, but if the rain was intense and started soon after herbicide application, the interval before the next application should be shortened.

Rain intensity and amount can influence the effect of rain on herbicide phytotoxicity. A light mist after application may sometimes even increase weed control while an immediate brief heavy rain may wash off much of the herbicide. Phytotoxicity of herbicides to weeds that are easily controlled generally will be less affected by rain after application than phytotoxicity to weeds that are difficult to control.

Rain may interfere with an on-going herbicide application resulting in a partial sprayer tank load of unused herbicide solution. Problems may occur as the spray solution sets in the tank waiting for the field to dry enough so the remainder of the spray can be applied. Some herbicides degrade slowly as they set in a water solution but most formulated herbicides will retain most of their activity over a few days. The exact amount of degradation is affected by water temperature, water pH, and the active ingredient in the tank so predicting the rate of degradation is very difficult and not precise.

Some herbicides and herbicide combinations may settle out of suspension with time so gentle agitation may be needed to prevent the herbicide from forming a layer on the bottom of the tank. The micro-rate of sugarbeet herbicides should be agitated very gently since over-agitation will increase the formation of precipitate.

Adding fresh water and herbicide to a sprayer with old spray solution is not a good idea if the herbicides in the sprayer are among those which may plug screens and nozzles after setting for a time. Dealing with a partial load of a plugging problem is much better than dealing with a full load.

Finding a way to apply an aged spray solution to a registered crop is always better than dumping the herbicide solution. Most of the benefit of the herbicide will still be realized even if some degradation has occurred so the total value of the herbicide will not be lost. Removal of the screens at the nozzles and increasing spray pressure will nearly always allow application of an aged spray solution, especially if it was kept in suspension by gentle agitation. Increased spray pressure will increase application rate, but this will be partially offset by the reduction in activity of the herbicide. Increasing spray pressure from 40 psi to 60 psi will increase spray volume by about 20% and increasing spray pressure from 40 psi to 80 psi will increase spray volume by about 40%. The amount of increase in spray pressure can be adjusted based on estimated herbicide degradation, label limits on herbicide rates and the amount of precipitate in the spray solution.

Rain during or right after herbicide application can cause problems, but management and planning can usually maintain most of the value of the herbicide treatment or remaining spray solution.

LEAFY SPURGE CONTROL IMPROVED WITH PICLORAM (TORDON) MIXTURES

Research at North Dakota State University has shown that herbicide mixtures can provide improved leafy spurge control compared to a single herbicide alone. The long-term standard treatment in the state has been Tordon at 1 pint plus 2,4-D at 1 quart/A. This treatment provides control similar to Tordon at 1 quart/A alone and is more cost-effective. Recently, research has shown that mixtures of some newer herbicides labeled for leafy spurge can increase long-term control compared to the Tordon plus 2,4-D treatment.

For instance, leafy spurge control is dramatically improved when diflufenopyr is applied with picloram (Tordon). Diflufenopyr is an anti-auxin that seems to increase translocation of auxin and auxin-like herbicides such as Tordon and Banvel (dicamba) in perennial weeds, which results in increased root kill. Diflufenopyr is only available to land managers in a combination with dicamba in a product called Overdrive.

In general, the addition of Overdrive to Tordon has doubled leafy spurge control compared to Tordon applied alone. For instance, leafy spurge control 12 MAT (months after treatment) averaged 95% with picloram at 4 oz/A (1 pint/A Tordon) plus Overdrive at 4 oz/A compared to only 40% to 60% control with picloram at 4 oz/A applied with 2,4-D at 1 qt/A. With picloram at 6 oz/A (1.5 pints/A Tordon) plus Overdrive at 4 oz/A, leafy spurge control averaged 99% 12 MAT. In contrast, picloram at 8 oz/A (1 qt/A Tordon) alone averaged 60% control 12 MAT. Tordon plus Overdrive at 1 pint plus 4 oz/A should be applied with a methylated seed oil (MSO) or non-ionic surfactant and costs approximately $25/A, so
land managers need to consider both the increased cost and the improved control gained from this combination treatment.

A herbicide mixture, which has become popularly known in the state as the “North Dakota three-way” is an alternative to Tordon plus 2,4-D applied in spring and early summer. The treatment includes the long-term standard of Tordon at 1 pint plus 2,4-D at 1 quart/A combined with Plateau at 4 oz/A plus a MSO. This three-way mixture averaged 98% leafy spurge control 12 MAT and 73% control 24 MAT, compared to Tordon plus 2,4-D which only provided 81 and 45% control, respectively. The three-way treatment costs approximately $23/A compared to $12/A for Tordon at 1 pint plus 2,4-D at 1 quart/A.

Tordon applied either alone or with 2,4-D has been the most widely used herbicide treatment for leafy spurge control in North Dakota for many years. However, combinations of Tordon with Overdrive or Plateau have shown improved long-term leafy spurge control compared to Tordon or Tordon plus 2,4-D alone. Also, the combination treatments may reduce the number of herbicide applications required to maintain satisfactory control and should be considered in a long-term management program.

Rod Lym
NDSU Research Weed Science
Noxious/Perennial Weeds
rod.lym@ndsu.edu

USING AERIAL APPLICATORS AFTER THE STORMS

The disagreeable weather we have had to contend with during this crucial stage of the growing season means than many folks will be turning to aerial applicators to get the job done. And they will, for the most part, get it done in a professional and workman like manner. There will be turbulence along the way so here are some things to consider:

• The demand for pesticide aerial application will be enormous for the next several weeks at least, so remember, everyone is calling and the pressure will be enormous. Be patient and be reasonable.
• Prioritize your requests. Aerial applicators will be short handed and short on good flying weather so examine your spray job(s) carefully. Perhaps a bit of pesticide application triage is in order. (Some crops may be too far gone to save, others many benefit from reasonably quick action, and still others can wait for treatment.)
• Be clear about your job description. If you have not used an aerial applicator in recent years, do not assume that he knows the lay of the land. Be absolutely precise about what you want him to do.
• Be really clear about your job description. Many applicators are being brought in from surrounding states as well as from Oklahoma, Texas, and Louisiana. Many will be working under the supervision of home grown operators, but they still don’t know North Dakota, so be really precise about your job description.

• Be wary of fly-by-night aerial applicators. Do business with the locals. They know the neighborhood and will be there when the dust settles. If problems arise, as they surely will, you will be in a much better position to reconcile with them rather than some one who speaks deep Louisiana Creole.
• Be neighborly. Try to settle misapplication issues without bring in the North Dakota Department of Agriculture. They will have their hands full and will take a dim view of someone who is wasting their time with a complaint because they will not even try to talk things out.
• Aerial applicators have had a reputation of being rouges. But that is no longer the case. The majority are professionals. If you want to see how far the aerial application industry has come, consider this: in 1999 they were 51% of the complaints NDDA handled. In 2004 they were responsible for 26% of pesticide complaints. No other group of commercial applicators in North Dakota can point to this record of achievement. They can be trusted to get the job done, and they will!

Andrew A. Thostenson
Pesticide Program Specialist
NDSU Extension Service
Andrew.Thostenson@ndsu.edu

North Central ND

CUTWORMS INJURY IN SUNFLOWERS

There been several reports of cutworms causing stand loss to sunflowers in the North Central Region of North Dakota. In one instance, a 500-acre sunflower field had to be replanted due to cutworms near Harvey (source: D. Anderson). Continue to scout fields for cutworms through June. Foliar insecticides should provide good control with the current moist soil conditions as this causes them to feed closer to the soil surface. Watch your fields for any cut plants and dig up any cutworm larvae located under cut plants. The red-backed, Exoa ochregaster, is a common cutworm in sunflowers. Remember, early scouting and detection is critical for effective cutworm control. Treatment is warranted when one cutworm or more is found per square foot or there is a 25 to 30% stand reduction observed assuming a typical plant population of 15,000 to 25,000 plants per acre for oilseed
FIRST DETECTION OF SMALL GRAIN APHIDS SOUTH OF MINOT

Very low levels (1-3% incidence) of small grains aphids were detected on wheat south of Minot in McLean County this past week. Late-planted small grains fields will be more susceptible to aphid infestation and the barley yellow dwarf virus, which is vectored by the aphids. To protect small grain fields from yield loss to aphid feeding, the treatment threshold is 85% stems with at least one aphid present, prior to complete heading.

ASH PLANT BUGS IN GREEN ASH TREES

Reports of ash plant bug feeding injury to green ash trees have been report in the Minot area. Adults are tan colored with pinkish markings on the back and are about ½ inch long. Green to tan nymphs emerge in spring and feed on the undersides of leaves. Plant bugs pierce host tissues and suck plant sap causing yellow spotting of leaves of green ash. Severe infestations cause leaf mottling, deformed leaves, and sometimes premature leaf drop. Trees usually tolerate ash plant bug damage and it is normally not severe enough to cause defoliation or warrant control. However, control is justified when injury is common throughout canopy or on young trees with repeated injury.

YELLOW-HEADED SPRUCE SAWFLY EMERGED IN SHELTERBELTS OF NORTH CENTRAL REGION OF NORTH DAKOTA

The first spruce sawflies have been reported in shelterbelts located near Bowbells, Burke County (source: D. Folske). The yellow-headed spruce sawfly is a native defoliating insect of spruce in Canada and the Northern United States. Although it feeds on all species of spruce, feeding preference varies geographically. Eggs are laid on current year’s foliage during the last week of May through the first week of June. After about 10 days, larvae emerge from these eggs and begin feeding on the new growth. Initially larvae are 1/8 inch long and have olive green bodies with reddish heads. Mature larvae may eventually reach a length of ¾ inch. The larvae feed on the young needles first and then move to older foliage to continue feeding. Larvae stop feeding in mid to late summer, drop to the ground and spin cocoons. The sawfly will spend the winter in these cocoons and emerge the following spring as adults. There are many parasites and predators that help to keep sawfly populations in check however localized outbreaks may occur periodically. The damage to spruce trees caused by the sawfly can be substantial. Repeated defoliation causes reduced growth and at times tree mortality. Branches defoliated by the sawfly will not re-grow needles. Generally spruce trees require 5 to 7 years of needle retention for optimal growth and survival. Needle loss from sawfly defoliation reduces the trees ability to convert sunlight into energy. This stress may exacerbate other pest problems or if severe enough, can kill the tree outright. Early detection and timing are the keys to successful yellow-headed spruce sawfly management. Chemical controls may need to be incorporated if many trees are infested and the potential for damage is high. Unfortunately, most people do not notice sawfly damage until mid to late summer when defoliation has already occurred, the larvae are absent, and insecticides are ineffective. Insecticides are most effective if used to target early larval stages. Targeting the early larval stages in mid June can reduce the population before significant defoliation occurs.

(SOURCE: Michael Kangas, NDSU Extension)

Janet Knodel
Area Extension Specialist
North Central Region Extension Center
jknodel@ndsuet.nodak.edu

South-Central ND

During the past two weeks (June 1 to 14), the south-central region’s rainfall ranged from 2.7 inches at Tappen to 7.8 inches at Edgeley as recorded at NDAWN (North Dakota Agricultural Weather Network) sites. Areas north of I94 and west of Hwy 281, and south of I94 and west of Hwy 3 generally have less challenges with excessive soil moisture compared to other areas in eastern ND. Growers continue struggling with completion of crop planting and timely herbicide application. Also, hail recently damaged crops in Emmons and McIntosh counties.

The region’s cool-season crop fields generally continue to have good to excellent plant stands and yield potential. Canola planted in April is in or nearing the flowering stage. The region’s abundant moisture is increasing the possibility of white mold in canola. The majority of the region’s spring wheat crop is in the jointing stage (1-2 nodes present), while early-planted wheat (first-half of April) is in or nearing the flag-leaf stage. Wheat growers should consider early-flowering stage fungicide application for scab suppression and protection from leafspot disease. Growers also are considering foliar N application for increasing wheat protein content. Small grain aphids are becoming more easily found. Soybean stands generally are adequate and the crop is in the unifoliate to 1-2 trifoliate growth stages.

Greg Endres
Area Extension Specialist/Cropping Systems
NDSU Carrington Research Extension Center
gregory.endres@ndsu.edu