

No. 4

May 25, 2006

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## 2006 AG PROFESSIONAL FIELD SCHOOL

### July 18-19 - UMore Park, Rosemount, MN

This year marks the 20<sup>th</sup> year of the Ag Professional Field School offered by the University of Minnesota Extension Service. UMore Park, located at Rosemount, Minnesota, will be the host site for the two-day Field School on July 18-19. Enrollment will be limited to 120 people.

The Field School offers a hands-on, in-field learning environment emphasizing crop and pest management diagnostic skill building in field crops. This program is targeted towards agronomists, technical and sales staff, crop consultants, Extension Educators, agriculture government agency personnel, farm managers, and summer crop scouts. Participants will have the opportunity to enhance their troubleshooting and crop management skills in specially designed plots that display actual cropping situations. A key feature of the Field School is the small group settings where students are guided by experienced instructors in diagnosing crop problems.

The Field School will offer 12 CEUs for Certified Crop Advisers. The specific CEU categories offered will be: PM-7, CM-2, NM-2, and SW-1. The Crop Diagnostic section will address foliar diseases on important row crops grown in Minnesota. Additionally, if soybean rust appears to be an imminent threat to Minnesota this summer, pertinent information will be discussed at the Field School.

Registration details and other information about the Field School can be found on the Institute for Ag Professionals website: <http://iap.umn.edu>. The registration fee is \$325 per individual. A group registration fee is available for \$300/individual for five or more people employed by a single company or agribusiness. Online registration is available at the IAP website and will require a credit card for payment. Individual and Group Registration forms can be downloaded from the IAP website. Registration deadline for the Field School is July 11, 2006.

Questions about the 2006 Field School can be directed to Kevin Cavanaugh at (612) 625-2778; Email: [cavan008@tc.umn.edu](mailto:cavan008@tc.umn.edu).

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## MANITOBA INSECT AND DISEASE UPDATE

Another weekly pest update newsletter of interest is the "Manitoba Insect and Disease Update" from entomologist, J. Gavloski, and plant pathologist, D. Kaminski, of Manitoba Agriculture, Food and Rural Initiatives. Producers, agents, ... located in northern counties of North Dakota will especially be interested. Observations on insect and disease activity or control are reported for Manitoba. Please see website below:

<http://www.gov.mb.ca/agriculture/news/insect/index.html>

**FLEA BEETLE FEEDING ACTIVITY INCREASING IN CANOLA**

Flea beetle feeding injury increased this past week with the warmer weather. In seed treatment company trials, the untreated checks are above economic threshold levels (25% defoliation). Prosper 400 (Bayer CropScience) and Helix xtra (Syngenta Crop Protection) seed treatment had significantly lower injury rating at the research extension centers located in Carrington and Minot.

Some differences in control is being observed in the field based on variety and seed treatment. Injury ratings and yield from 2005 seed treatment company trials located in Carrington, Minot, and Langdon indicated that both seed treatments provided good protection against flea beetles feeding injury and higher yield than the untreated check.

Treatment	Minot 30 DAP <sup>a</sup> Injury Rating <sup>b</sup>	Minot Yield lb/acre	Carrington 30 DAP <sup>a</sup> Injury Rating <sup>b</sup>	Carrington Yield lb/acre	Langdon 30 DAP <sup>a</sup> Injury Rating <sup>b</sup>	Langdon Yield lb/acre
Untreated check	4.0	1493	2.1	2023	2.5	2514
Helix lite	2.0	1802	1.1	2073	1.6	2623
Prosper 400	1.6	1769	1.1	2090	1.1	2632
Helix Xtra	1.5	1817	1.3	2012	1.1	2773
<b>LSD (P=0.05)</b>	<b>0.7</b>	<b>252</b>	<b>0.6</b>	<b>NS</b>	<b>0.6</b>	<b>NS</b>

<sup>a</sup> DAP = Days After Planting

<sup>b</sup> Injury Rating: 1= 0-3 pits per seedling, 2= 4-9 pits per seedlings; 3= 10-15 pits per seedling; 4= 16-25 pits per seedling; 5= >25 pits per seedling; and 6= dead seedling.

**ADULT GRASSHOPPERS ALREADY?**

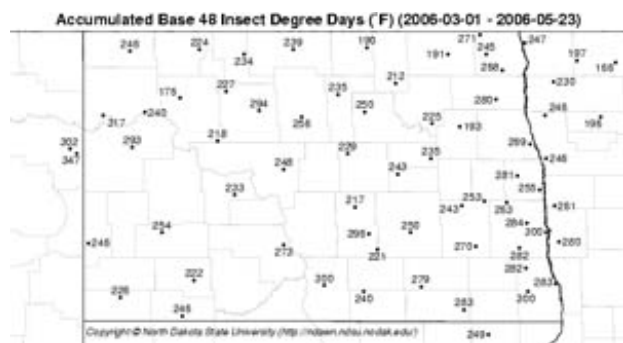
Adult grasshoppers present in field now are **rangeland** species of grasshoppers and not the species of cropland grasshoppers which attack our agricultural crops. Some of the rangeland grasshoppers overwinters as late maturing nymphs and are ready to molt into adults as soon as temperatures warm up in spring. Examples of these rangeland grasshoppers are the Velvet-striped grasshopper (*Eritettix simplex* (Scudder)), speckled-winged grasshopper (*Arphia conspersa* Scudder), green-striped grasshopper (*Chortophaga viridifasciata* (DeGreer)). Rangeland grasshoppers feed primarily on grasses of the rangeland and not crops. Cropland grasshoppers overwinter as eggs and are just starting to emerge as tiny young nymphs about the size of a wheat kernel. A grasshopper website for North Dakota can be found at:

[http://www.ndsu.nodak.edu/entomology/hopper/orthopter\\_a\\_home.htm](http://www.ndsu.nodak.edu/entomology/hopper/orthopter_a_home.htm)

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**START LOOKING FOR ALFALFA WEEVILS**

Alfalfa weevils overwinter as adults in plant debris, woodlots, and ditches. As temperatures warms up adult migrate to alfalfa field to lay eggs. By using degree days with a base of 48 , the life stages of alfalfa weevil can be predicted (see degree day table). Go to the insect section in the NDAWN website, <http://ndawn.ndsu.nodak.edu/insectdd-form.html> and select the degree day base of 48F to determine the accumulated degree days for your location. See map of North Dakota for alfalfa weevil degree day accumulations.



Stage of Development	Degree Days Required to Complete Indicate Life Stage	Accumulated Degree Days (base 48 )
egg	300	300
1 <sup>st</sup> instar	71	371
2 <sup>nd</sup> instar	67	438
3 <sup>rd</sup> instar	66	504
4 <sup>th</sup> instar	91	595
pupae	219	814

Scout fields by sampling 10 plants in 5 random locations (50 total plants) and walking in a M-shaped or similar pattern throughout the field. Small alfalfa weevil larvae are slate-colored. As larvae mature, their color changes to bright green with a white line running down their back and a black head capsule, and about 3/8th of an inch (see photo).



Source: Clemson University - USDA Cooperative Extension Slide Series, [www.insectimages.org](http://www.insectimages.org)

Management of weevil infested alfalfa stands depends on when the infestation occurs. If the infestation occurs relatively late, when the alfalfa has reached 20 to 25 inches in height, consider taking an early harvest. Small alfalfa weevil, those less than 1/4 inch in length, will drop to the soil and generally die if the soil is dry. If the infestation occurs early, when alfalfa is 10 to 15 inches in height, chemical treatment may be necessary. Insecticide treatment is recommended if two live larvae per stem occur at this stage and 35 to 40% of the plants are showing tip feeding. In general, if alfalfa is 7-10 days out from harvest and 35-40% tip feeding is present, use an insecticide treatment. North Dakota insecticide recommendations for alfalfa are listed at the following website:  
<http://www.ag.ndsu.nodak.edu/aginfo/entomology/entupd>

ates/ICG\_06/05a\_ForageCropInsects06.pdf

Remember to check the preharvest interval as these restrictions vary according to the insecticide used and the rate applied. Other factors to consider when selecting an insecticide is its price, potential hazards to honey bees and whether or not it is a restricted use insecticide.

If weevils infest an alfalfa field, be sure to scout the field following harvest for re-infestation of the second harvest. Major feeding by the alfalfa weevil will occur from 430 to 595 growing degree days (2<sup>nd</sup> - 4<sup>th</sup> instar). At greater than 600 growing degree days feeding normally stops and adult emerge. This will occur usually during the second harvest unless the first is taken late. If the following the first harvest, your scouting show 8 or more larvae per square foot or larvae are suppressing regrowth, chemical treatment is recommended.

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### CUTWORMS IN SUGARBEETS

There have been reports of cutworms in sugarbeet in Moorhead, Crookston, Hillsboro and MinnDak. This is the expected timing for Red-Backed and Dark-Sided cutworms in beets; both occur in the Red River Valley and they have similar life cycles. They both over-winter as eggs laid by the adult moths in cultivated fields at the end of summer. The following late May/early June, the eggs hatch and the caterpillars move onto seedling crops.

Scouting – Early detection is important with this insect. Cutworms feed mostly in the evening and at night and so are sometimes difficult to locate in the daytime. Their feeding, usually at or below ground level, causes wilting, death and sugarbeet seedlings are often cut off near ground level. Scouting for these worrisome worms is best done by looking for wilting or dying plants and then looking in the top 1"-2" of soil at the base of these plants.

Thresholds & Treatment – An economic return on treatment can be expected when 4% - 5% of beets seedlings are cut in a field. Pesticides are best applied in the evening as this results in high levels of insecticide being present during the cutworms' period of greatest activity. High humidity, dew and light rains (mist) can carry the insecticide over the plant surfaces and into the soil to increase contact with the insect. For the same reason, liquid formulations tend to be more effective against cutworms. To assist in delivering the insecticide to the caterpillars, break up severe soil crusting prior to, or during application. For more information, go to the Red River IPM site at:  
<http://www.nwes.umn.edu/ent/redent.html>

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For more information about cutworms, please see the article in issue 1 (May 6, 2006) of the Crop & Pest Report.



### SUNFLOWER SEEDING IN DRY SOILS

Reports are that it is getting dry in western areas of North Dakota and depth of seeding of sunflower questions have been raised in recent days. When seedbed conditions are dry then its best to seed deeper into moist soil. The seed should be placed at least into ½ to ¾ inch into moist soil. Recommended maximum seeding depths for oilseed sunflower are dependant on seed size and are as follows: 3 inches for # 2 size seed, 2 ½ inches for # 3 and 4 size seed and 2 inches for # 5 size seed. **Note: The larger the seed number the smaller the seed!!** Time to maximum emergence will increase as planting depth increases. Deeper planting depths will increase days to flowering but generally will not effect seed weight, plant height, yield, or seed oil concentration.

Higher seeding rates than normal are recommended when seeding deep. If rain is received and a crust is formed, deep seeded plants will have a particularly difficult time breaking through the crust. Harrowing the crust before the emerging seedlings reach to within one half inch of the soil surface will improve emergence. Percent emergence will decrease as planting depth increases especially for smaller seed sizes. Generally, one can expect at least a twenty percent stand loss when planting large seed ( #2 ) 3-4 inches deep.

### ROLLING SOYBEANS AND PEAS

The objective of rolling soybean and field pea fields is to push rocks and large soil clods down to the soil surface and level the soil to allow a low combine cutter bar height during harvest. This will reduce harvest loss by cutting soybean and pea stems below pods instead of cutting above or through low pods and leaving seeds in the field. Soybean fields are rolled after planting, either preemergence (PRE) or postemergence. Advantages with rolling before the crop has emerged are low potential for plant injury and improved seed-to-soil contact. Disadvantages are increased potential for soil-surface crusting and soil erosion.

Rolling soybeans after the crop has emerged will potentially cause plant injury including crushed leaves and cracked or broken stems. Plants will die if the stem is broken below the cotyledon leaves, due to loss of all growing points. Injured plants may be more susceptible to lodging and disease. NDSU research and farmer testimony indicates that rolling between the cotyledon and first trifoliolate stages of soybean should limit injury potential. Also, rolling during the warmest part of the day on less turgid plants may reduce injury potential. Afternoons are better than mornings. Soybean rolling

trials were conducted three years (2001, and 2003-2004) at the NDSU Carrington Research Extension Center. There was a trend of plant population decline as rolling was delayed from PRE to the first or second trifoliolate stage. Untreated soybean and pre-merged soybeans rolled showed no visible injury. Rolling soybeans that were <50% cotyledons emerged, cotyledon stage and 1<sup>st</sup> trifoliolate stages showed injury of 5% or less. Early morning rolling at the 3-4 trifoliolate stages caused the most visible injury after 4 weeks compared to all other treatments. Seed yield was similar among the unrolled check and the rolled treatments.

Rolling field peas can be done later than soybeans. The reason for rolling peas is that the stones or soil lumps on the soil surface interfere with pea harvesting. Rolling allows for higher speeds when swathing or direct combining, and reduces guard and sickle section breakage. Peas can be rolled after harrowing or harrow packing if conventional tillage is used or after seeding if direct seeded. Heavy or excessive rolling with wet, heavy soils causes crusting which will interfere with emergence. In such cases, post emergent rolling prior to the 5 leaf stage should be used. All rolling should be carried out on dry days to lessen the spread of disease.

### HARROWING FOR WEED CONTROL

Populations of shallow emerging weed seedlings such as green and yellow foxtail, kochia, Russian thistle, pigweed and certain nightshades can be severely reduced by timely harrowing. Harrowing won't reduce wild oat, volunteer grains or sunflowers and perennial weeds very much due to their deeper emergence. However, control will be higher if they have not yet emerged and are near the soil surface. Extremely wet soil conditions will not allow good weed kill by harrowing.

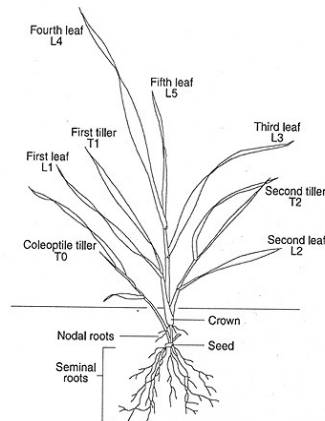
Harrows should be set shallow and angled back to reduce the potential of crop injury. Light spring tooth type harrow should be used and not the heavy harrows designed for vigorous tillage operations. It's best to harrow wheat and barley at the two leaf stage and no later than the three leaf stage to minimize injury potential. Wheat can be harrowed twice while barley should be harrowed only once. Corn can be harrowed between the one and four leaf stage, and sunflower, 2 to 6 leaf stage. Soybeans and dry beans can be harrowed between the 1 to 2 trifoliolate stage. It's advised not to harrow canola, mustard, crambe or flax seedlings before or after emergence.

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## EARLY GROWTH STAGING SMALL GRAINS

Winter wheat and early planted spring small grains are developing rapidly with the arrival of warmer weather. Winter wheat is in the jointing to boot stage and early spring planted crops are in the 4 to 5 leaf stage and will soon begin jointing. The optimum and/or the legal timing of a number of management practices (i.e. herbicide and fungicide applications) is frequently determined by the growth stage of the crop. Therefore, correctly “growth staging” a crop is important in the crop management process. There are a number of different scales (i.e. Feekes, Haun and Zadok) that have been developed to classify the growth stages of small grains. The Haun scale, for example, is an output of NDAWN, which will be describe in more detail later. These growth stage scales are commonly used by researchers when describing experimental methods and results in scientific publications but less so in communicating recommendations to farmers. The timing of management recommendations are most commonly based on leaf numbers or other visible characteristics of the plants. Therefore, in this article I will focus on how to assess these various characteristics and will not delve into the details of growth scales.

When growth staging your crop you should begin by obtaining a representative sample of plants from the field or part of the field of interest. To give you a good feel for an “average” plant, use ten plants selected at random away from the edges of the field. Remove any soil attached to the plant so that you are able to observe the roots and crown. Leaf stage is the most common physical feature used to describe early development of small grain crops. Leaf stage is defined by the number of leaves that have visible collars on the main stem. Care must be taken to ensure that the earliest leaves are included when counting. The first leaf is small and is frequently lost from the plant during normal growth. It has a characteristically blunt tip. Look for the sheath remnants at the crown of the plant if you suspect that the first leaf (or second for that matter) is missing. Count only the leaves on the main stem, which is the tallest and most leafy of the stems. Include only those leaves that have a collar. The plant in Figure 1, for example is in the four leaf stage. Note that a fifth leaf is visible but it is excluded as it has not yet developed to the point of having a leaf collar. When staging plants include all leaves, even those that have been damaged by hail or frost. The total number of leaves that a plant will developed is more or less fixed for a given variety; leaves that are striped from the plant will not be replaced by additional new leaves.



**Fig. 1.** Wheat plant in the 4 leaf stage with two tillers

Each tiller produced in addition to the main stem is numbered when it becomes visible. There are two types of tillers: those arising from a crown leaf axis and those arising from the coleoptiler node. Only tillers arising from a crown leaf axis are counted when staging. When present there will only be one coleoptiler tiller. The plant in Figure 1 has two tillers and a coleoptiler tiller.

The North Dakota Agricultural Weather Network (NDAWN) can also be used to give you a rough estimate of the growth stage of your crop. Go to the application section of the NDAWN home page <http://ndawn.ndsu.nodak.edu/> and select wheat degree days/growth stage, then enter your planting date and select the NDAWN station nearest your farm. Data on the number of wheat degree days and the approximate growth stage of your crop will be provided as output. This tool can be particularly useful if leaves have been lost to frost or hail damage.

### Predicting Leaf Stages in Small Grains

Sometimes it is useful to be able to estimate or predict when a certain growth stage will be reached. Plant development is closely correlated to the accumulation of heat units or growing degree days (GDD), much more so than calendar days. Based on plant emergence and historic temperature trends, you can fairly accurately predict when a crop will reach a certain developmental stage. Historic growing degree days are readily available for a number of locations in North Dakota using the NDAWN website at: <http://ndawn.ndsu.nodak.edu/application/wheat-app.html>

Wheat requires about 140 GDDs and barley about 100 GDDs to produce a leaf. The actual number of GDDs required can vary between varieties, but these values will give estimates that will be accurate enough for most applications. Be sure to use GDDs that were calculated for small grains which use a base temperature of 32 degrees. Other base temperatures are used for corn and sunflower and certain pests.

As an example, if you wanted to know what stage your wheat crop would be in at the end of the week, you could estimate it by using either historical weather data or predicted weather data. Fargo typically accumulates about 29 small grain GDDs daily during the last week in May and 31 GDDs per day during the first week of June. Using these data, you could expect wheat to produce 1.5 leaves during the last week of May and 1.6 leaves during the first week of June. Barley could be expected to produce 2 and 2.2 leaves per week during these same periods.

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### SMALL GRAIN DISEASE UPDATE, 5/24

Wheat streak mosaic virus was observed in a winter wheat field in Ramsey Co., by Terry Gregoire, Area Extension Specialist. As with other observations of wheat streak this year, symptoms were associated with wheat that had been planted into a field that did still had some infected volunteer winter wheat present at planting.

Tan spot was observed by Joel Ransom, Extension Agronomist, in winter wheat plots in Prosper and by Greg Endres, Area Extension Specialist, in winter wheat at Carrington. The NDSU Disease Forecasting Site (<http://www.ag.ndsu.nodak.edu/cropdisease/cropdisease.htm>) indicated on May 23 that most NDAWN locations did not have favorable weather the past few days for tan spot infections, because of windy, dry conditions.

Many wheat fields in states to our south are suffering from dry conditions and may not be sources of extensive inoculum of the rust pathogens.

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*The following section on Ash Anthracnose is an article that first appeared in the May 29, 2003 issue of Crop and Pest Report. The information is repeated here because it is relevant:*

### LEAF DROP ON GREEN ASH DUE TO ASH ANTHRACNOSE

Green ash trees are losing their leaves. The seemingly healthy leaflets just drop off the trees. Ash leaves are "compound leaves", composed of (mostly) seven to nine leaflets arranged along a stalk or "rachis." In this condition, individual leaflets separate from the rachis and drop, but the leaflets appear a normal healthy green color and don't show browning or yellowing. Close examination may reveal a few tiny spots discolored brown or purple. These spots are especially noticeable on the rachis where leaflets have dropped.

This leaf drop condition is caused by a fungus disease, ash anthracnose, sometimes in combination with feeding by sucking insects. The cool, showery weather of the past several weeks favors infection by the anthracnose fungus. The cool temperatures also slow the development of the ash leaves, giving the fungus a longer time to infect. Once leaves start to fall, it is too late for any fungicide sprays to be effective because infection has already taken place.



### Extreme leaf drop caused by Ash Anthracnose

*Picture taken in Grand Forks, ND, in June. Bob Stack*

If you see this happening to your tree, the first thing to remember is DON'T PANIC! While unsightly and worrisome, a single defoliation by anthracnose will not permanently damage the tree. When warmer weather comes, the tree will make new leaves to replace those lost. Ash anthracnose is not a new disease; it has been recognized in the midwestern states for more than 100 years. Ash anthracnose is one of many tree diseases known to occur in periodic "boom and bust" cycles -- years when it is severe followed by years when it is rare. During the early and mid 1980s, for example, anthracnose was very common in ND, especially in the Red River valley. During that time, several studies were done at NDSU to better understand the disease and how it develops.

What to do about the problem: As mentioned, a single year of anthracnose, even if it causes severe leaf drop, will likely not permanently harm a tree. For the current season, rake up and destroy (burn, bury or compost) leaves to reduce the disease carryover. Prune-out cankered branches and remove twiggy growth to promote air movement within the crown. Fertilize trees in spring to promote vigorous growth.

If your tree(s) see repeated anthracnose damage in successive years, a preventive fungicide treatment may help. These need to be carefully timed to the bud break of the tree to be effective. A fungicide containing the active ingredient chlorothalonil can be used. Contact your county agent or the NDSU Plant Diagnostic Lab (701-231-7854) for current recommendations.

More information about ash anthracnose is available in the NDSU extension circular #PP697 "Deciduous Tree Diseases" available on the web at:  
<http://www.ext.ndak.edu/extpubs/plantsci/hortcrop/pp697-2.htm>

Kasia Kinzer, with NDSU Plant Diagnostic Lab, adds that conditions for development of ash anthracnose were favorable for the first couple of weeks in May, when weather was cool with prolonged moisture. Ash anthracnose lesions can be seen on the leaflets, either as the type of blotches that deform the leaflets (see image

below) or as distinct, round, purplish brown leaf spots (this type probably didn't develop into blotches because the environment may not have been favorable). Ash anthracnose has been prevalent for the past three years, so protecting smaller trees with the fungicide applications described above may be beneficial in early spring 2007 if those trees have suffered defoliation due to ash anthracnose in 3 out of 5 consecutive years. For this year, if you missed the critical timing recommended for the first fungicide application, some studies suggest that a fungicide application applied after the critical window of time may still benefit affected trees by reducing late-season infections.



**Blotches caused by Ash Anthracnose that lead to deformed leaflets**

*Picture taken May 23, 2006 from an ash tree near Waldron Hall on the NDSU campus in Fargo, ND*

For most trees, applying fertilizer and watering sufficiently to encourage vigorous re-growth of defoliated trees may be the only 'treatments' required for this disease. You can read more about this and other diseases of trees at the following web sites:

<http://www.ext.nodak.edu/extpubs/plantsci/trees/f1192w.htm>  
<http://www.ext.nodak.edu/extpubs/plantsci/hortcrop/pp697-2.htm>

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**NEW DIAGNOSTIC LAB PERSONNEL**

The lab has hired a new, temporary summer receptionist, Ms. Aimee Thapa, who some of you might remember as Aimee Stockman. Ms. Thapa finished her Bachelor's degree in Horticulture Science (with a minor in business) from NDSU earlier this month.

An assistant diagnostician, Ms. Febina Matthew, will also spend a few hours per week in the lab, particularly to help process soybean samples. Ms. Matthew finished her Master's degree in plant pathology in April, and we look forward to having her in the lab this summer.

Of course, even under a well-staffed situation, turnaround time depends largely on the type of sample submitted and the suspected pathogen or other disorder involved. Whenever you submit a sample to the lab, please feel free to call or email with questions on the status of your sample.

**PLANT DIAGNOSTIC LAB UPDATE**

Wheat streak mosaic virus was confirmed on a wheat sample from north central North Dakota submitted to the lab last week. Tan spot symptoms were observed on a wheat sample submitted. A spruce sample was diagnosed with an abiotic problem – probably over-watering. A cottonwood sample has an unidentified leaf blotch that may be due to an abiotic (non-pathogenic) factor. Several turf grass samples remain under evaluation, including a bentgrass sample from a golf green that is suspected to be infected with a *Pythium* disease (no other pathogen was detected).

Home mold inquiries continue to reach the lab, and typically, about 30 mold samples are evaluated each year. To a limited extent, we can evaluate samples with suspected mold contamination. We cannot inspect dwellings or take air-quality samples.

Two inquiries in the past month were related not to home mold, but to a phenom of concrete known as efflorescence. The efflorescence was described by the individuals as white, fluffy, and crystalline. Efflorescence is a deposit that can occur on bricks, concrete, and other masonry in general. It seems it occurs as water or hydrostatic pressure moves through the concrete. The salts may be sodium sulphate, potassium sulphate, sodium carbonate, calcium sulphate, sodium bicarbonate, calcium carbonate, sodium silicate, magnesium sulphate, or others. The efflorescence is usually somewhat water soluble, so a good wash with soapy water may be all that is needed to clean up the unsightly white 'growth'. An acid, such as vinegar, might be needed to help dissolve the substance away.

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 Website: [www.ag.ndsu.nodak.edu/diaglab](http://www.ag.ndsu.nodak.edu/diaglab)  
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### **DELAYED N APPLICATIONS**

Due to high N prices and the rush to seed, some fields are still in need of supplemental N. Top-dress applications are made to solid-seeded crops, while the term side-dress applies to row-crops of all types.

#### **Top-dressing**

In small grains and other solid-seeded crops, the best method of top-dressing is with streamer-bars. These gadgets fit onto the nozzle outlets of a spray boom and branch out into tees, ending in an orifice that allows a straight-stream of liquid to be projected out the end. The straight-stream is preferable to a broadcast liquid because it has much less leaf burn potential and because urea volatilization is minimized due to the concentrated band. The down side to this type of application, and the reason that NDSU does not recommend it as a primary source of N, is that it should be considered a soil and not a foliar application. Because it is a soil application it must have rainfall of some substantial amount in order for roots to pick it up and become useful for the crop. In the case of delayed application, or a need for supplemental application in-season, there is no better choice but to use the top-dress streamer-bar method. Another option would be to broadcast dry urea, however, if substantial rainfall does not fall for a week or more, more of the urea application is subject to loss than the liquid N (28%, UAN) streamer-bar option.

#### **Side-dressing**

Most side-dressing is made using anhydrous ammonia. It appears from recent industry reports that the cost of anhydrous has dropped substantially from the high of mid-winter pricing. That may result in lower costs to growers, depending on what buying position was taken by the local retail outlet during the turbulent winter/spring period. Regardless, anhydrous is usually the preferred material for side-dressing due to its cost relative to other products and the availability of tools that are easily adapted to between row application. As in preplant applications, the ammonia should be placed at least 4 inches into the soil to prevent leakage to the air. Rates are safe to the crop at least to the maximum recommended, as long as the application knife is located between the rows.

Other side-dressing options include liquid N (28%) between the rows and cultivation of urea. Liquid materials do not need to be placed as deeply as anhydrous. Placing them a couple inches deep using an application knife and some type of slot closure, such as an offset disc or disc pairs will do an adequate job of coverage. Urea can be applied to some row crops broadcast and cultivated in, but not to corn. Some urea will be trapped in the whorl and will burn the corn leaves badly. If cultivating urea for corn, some method of delivery between the rows should be used.

### **OTHER THOUGHTS**

There is no N source available today that has been shown to be more efficient in nutrient delivery than our standard commercially available products. New products are being tested and some have been tested in the past, but for now, I know of no products where a grower can reduce rates and achieve the same results as the products used in the past. Curiosity regarding these products is understandable, but growers should confine their use to small check areas.

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## MOSS AND ALGAE CONTROL IN STOCK TANKS AND STANDING WATER

Algae in stock and nurse tanks can be a nuisance for both animals and for chemical application especially with hard water. Adding copper sulfate to the water will take care of the problem until the tank is refilled with fresh water. The process must then be repeated.

Dissolve 1 ounce of copper sulfate in 1 pint of water in a glass jar. Add 0.25 pt/1000 gallons of water. The copper sulfate will not affect herbicide and weed control. An alternative for nurse tanks is to paint the entire tank black. This eliminates the sunlight requirement which prevents algae growth.

## ABSORPTION OF GLYPHOSATE/SOIL/DUST INACTIVATION OF GLYPHOSATE

Glyphosate passes through plant cuticles slowly as compared to other herbicides (see Glyphosate or Roundup brands in table titled, "Minimum Interval between application and rain for maximum POST weed control" - page 68 in the weed guide). Absorption of glyphosate is low compared to other weed species. Studies with radio-labeled glyphosate show only 20% absorption in some weed species. The labels of some glyphosate formulations give a rainfree period of only 0.5 to 1 hour but at least three weed scientists in the U.S. have shown decreased weed control with simulated rainfall within 4 to 6 hours after application with these formulations. Ammonium sulfate fertilizer applied with glyphosate allows inactivation of antagonizing salts in spray water and forms ammonium-glyphosate which enhances absorption and penetration through plant membranes.

Glyphosate is strongly absorbed to soil constituents and organic matter as evidenced by no soil residual after application. Dust and organic matter on leaf surfaces inactivates glyphosate. If glyphosate absorption is slowed during cold weather by hardening of the cuticle (which may or may not be true) then glyphosate on the plant surface may be susceptible to inactivation from dust especially if the wind blows. This applies also using slough water for spraying. Mud and soil in slough water will inactivate glyphosate. Addition of NIS or AMS will not overcome inactivation from dirt. Glyphosate is strongly and irreversibly absorbed to clay particles and organic matter.

Drs. Jingkai Zhou and Cal Messersmith at NDSU recently completed research on overcoming dust inactivation of glyphosate on eastern black and hairy nightshade. The paper is in review for publication so specific information cannot be given until accepted for

publication but adding AMS or NIS only partially overcame antagonism and petroleum or methylated seed oil adjuvants did not reduced antagonism at all.

Do not add more water to increase spray volume and make spray droplets more dilute. Greater glyphosate efficacy results (with or without dust) in lower spray volume when spray droplets are more concentrated with glyphosate herbicide.

## RESOURCES FOR CONTROL OF OBSCURE WEEDS

I get many calls and emails like the one below each day. As I answer these questions I realize that I use two main publications each time which may be useful to you.

**Resource #1** - Remember the old Green Bibles? Even if you have an old one the good stuff is still in there. There is a certain section that, to me, is the most valuable parts of the book. The section is called the Pest Use Index and is located in the Section F (the section before the individual pesticide labels). The Weeds section comes after the Insect section and in my 2006 edition, the weeds part start on page F104. This section shows all herbicide labels that lists the weed. The herbicides may only suppress the weed or may describe more specific information for control so do not assume it will give complete control and always read each label before use.

If you have correctly identified a weed and want to know what controls it - this is a good place to start!

Lets use the Green Bible to answer the email below.

A producer brought in a plant from his field that we think is Cinquefoil (probably rough or sulfur). He applied 1 qt glyphosate (1 lb/A) + 2 fl oz dicamba per acre in an attempt to control the weed. The mixture shortens the plant and caused some disfiguration of this perennial plant but has not killed it. He has tried for a couple of years to control it but the weed keeps reproducing and spreading to other parts of the field. The operator is a no-tiller so tillage is considered a last resort. Any ideas as to what he might use for the control of this weed would be appreciated.

Answer: On page F111 of the Green Bible under cinquefoil it shows many products including Crossbow, Escort, Milestone, Remedy, Telar, Tordon, and 2,4-D.

I tried to access the information from the <http://www.greenbook.net> web site but required registration and password to get in. Maybe there is a way but this is one time when hardcopy is the easiest way to get the information needed.

**Resource #2** - The other warehouse resource where one could find control of obscure weeds is a publication that started out as a USDA publication (the first edition I could find anyway) Farmers Bulletin No. 2183. "Using Phenoxy Herbicides Effectively" (1962) which is a compilation of the response of about every known plant to 2,4-D, MCPA, dicamba, picloram, and glyphosate. An expert committee revised it since then to fill in the blanks and it now called "Systemic Herbicide for Weed Control". I have made several attempts and inquires to find a web site location but have failed. To remedy this, I will have (by the time this Pest Report is written) added this option on my NDSU Weed Science Web Page - address on the cover of the weed guide (<http://www.ag.ndsu.edu/weeds>).

### HERBICIDE PRICES

Because the ND Weed Guide is printed in December before the new herbicide prices are released for the coming season, the prices in the 2006 weed guide still contain the prices for the 2005 year and do not reflect 2006 prices. The herbicide price list has been updated for 2006 and can be found on the web version of the weed guide found at the NDSU Weed Science web site: <http://www.ag.ndsu.edu/weeds>.

This web address is listed on the cover of the weed guide.

Herbicide prices do not include cost of such additives as surfactants, oils, fertilizer or application costs. Prices may vary depending on area of the state, wholesaler, bulk discounts, seasonal changes, quantities purchased and particular programs the manufacturing company offers. Prices are averages based on statewide dealer survey for small quantities. Producers should consult local agricultural product suppliers for exact price of each product in their area.

For 2006 summary, herbicide prices changed little. It seemed that the herbicides that are less used had a slight price decrease and those that are more popular had a slight price increase. One herbicide, in particular, that a higher than normal price increase was Spartan. But we knew this was going to happen with the phasing out of the DF formulation and replacing it with the 4L formulation.

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### Southwest ND

Rainfall has been scattered through the week at the time this was written (May 23). Nearly all of the NDAWN locations in southwestern North Dakota received less than 0.25 inches of rainfall except for Mandan, 0.39 inches, and Watford City, 0.53 inches for the week. Hettinger and Mott did not receive any rain. Wind the last couple of days has kept herbicide applicators out of the field but expectations are post emergent applications will resume when the weather cooperates.

Small grain plantings are essentially complete and corn is nearly all seeded in all areas of southwest North Dakota. Sunflower seeding began late last week and is continuing into this week. Alfalfa has grown to a height of 14 to 20 inches this past week due to the warm temperatures though in areas where freeze injury occurred two weeks ago, it is about 6 to 8 inches tall. Cool season grasses such as smooth brome and crested wheat are short and beginning to head in some areas.

Emergence problems of wheat have been reported in fields under tilled, reduced till and no-till systems. In tilled systems primarily with later plantings, seed is laying in dry soils even though subsoil moisture conditions are good. Rain is forecast the next few days and this problem may solve itself. In tilled, reduced till, or no-till systems, there have been instances where the seed has rotted. This is found primarily in fields where seedings were made shortly before or after April 17<sup>th</sup> rains. Planting was done before fields had a chance to dry sufficiently and the problem was compounded where a drill tire track occurs. Even in southwest North Dakota, soils can be too wet at times and a little patience is needed to allow excess moisture to drain away so smearing of the soil and compaction can be avoided. Corn emergence has also been reported as slow or erratic in the Beulah-Center-Mandan area in tilled fields due to dry soil conditions and cold temperatures. Pastures are dry and many producers are hoping for a nice rain to solve some of our production issues.

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