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NDSU CROP MANAGEMENT FIELD SCHOOL AT CARRINGTON

As a reminder, a crop management field school will be offered Thursday, June 19, from 9 a.m. to 4:30 p.m. at the NDSU Carrington Research Extension Center.

For further details and preregistration information, contact the Carrington center at (701) 652-2951 or go to http://www.ag.ndsu.nodak.edu/carringt/. A completed preregistration form and $50 fee is requested by June 16 ($75 after June 16).

Entomology

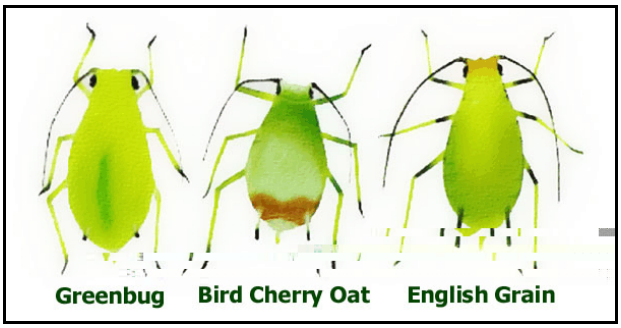
GET READY TO SCOUT FOR CEREAL APHIDS

Cereal aphids have been reported in South Dakota on winter wheat. These aphids will be migrating into North Dakota soon. The greenbug, English grain aphid and bird cherry oat aphid are the principal species that cause problems in North Dakota small grains.

These aphids transmit the disease barley yellow dwarf virus (yellowing from the tip of the flag leaf - see photograph). When aphid populations are high, the disease can spread quickly through small grain fields. At greatest risk are later-planted fields, which attract migrating aphids that are moving from more mature fields.

Barley yellow dwarf virus

Descriptions:
Greenbug - pale green with dark stripe down back.
Bird Cherry Oat Aphid - olive green, brownish patch at bases of cornicles.
English Grain Aphid - bright green with long black cornicles.



When to Scout: For wheat, field scouting should begin at stem elongation and continue up to the heading stage.

Thresholds for Small Grain Aphids: ***English Grain, Bird Cherry Oat, Greenbug***

To protect small grains from yield loss due to aphid feeding, three different treatment thresholds are available:

- 85% of stems with at least one aphid present prior to complete heading.
- 12-15 aphids per stem prior to complete heading
- 100 aphid days prior to complete heading (=0.6 bu/acre yield loss)

If you averaged 10 aphids per stem and had 12 days to reach heading, you would have 120 aphid days (10 aphids x 12 days). This is above the 100 aphid day threshold and an insecticide should be applied to prevent yield loss. On the other hand, if you averaged only one aphid per stem and had 12 days to reach heading, you would only have 12 aphids days (1 aphid x 12 days). Thus, no control action would be necessary.

Susceptible Crop Growth Stage:

Crop growth stage also affects its susceptibility to aphids. **Vegetative to boot stages are the most susceptible stages to aphid feeding and subsequent yield loss.** For example, in the 4-6 leaf stage, injury caused by aphids is stunting, decreased number of kernels per head, and decreased kernel weight. In the boot stage, only kernel size and kernel weight are affected by aphid feeding (not number of kernels per head). By heading, only kernel weight is affected. After flowering, small grains are less susceptible and producers are discouraged from spraying.

Natural Controls:

Lady beetles, aphid lions, syrphid fly, and parasitic wasps play a major role in reducing aphid populations. When natural enemies are present in large numbers, and the crop is well developed, farmers are discouraged from spraying fields.

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SUGARBEET ROOT MAGGOT: LOW FLY ACTIVITY NOW, PEAK POSSIBLE IN 10 DAYS

Degree-day (DD) accumulations for development of sugarbeet root maggot (SBRM) populations this year are running about 7-10 days behind normal. This, combined with frequent events of windy, rainy weather during the past several days, has resulted in very little SBRM fly activity thus far. NDSU Entomology, in cooperation with American Crystal Sugar Cooperative, MinnDak Sugar Cooperative, and Pembina County Extension, is monitoring fly activity using sticky stakes in 40 grower fields throughout the Red River Valley (RRV) this summer. As of June 9, only 8 flies have been captured in the entire program.

Fly activity is not likely to increase significantly during the next 3 to 4 days because rainy and breezy weather is expected to persist. However, a rapid increase in fly activity could occur if warm, dry, and low-wind conditions develop in the next week or so.

Peak fly activity usually occurs shortly after the accumulation of 600 DD. It is important to note that warm weather (around 80° F), and calm to low-wind conditions are most conducive to fly activity. Flies will remain relatively inactive in cool, rainy, or windy conditions.

An extended forecast of anticipated DD accumulations and associated peak fly activity dates is presented in Table 1. Depending on location, peak fly activity in current-year beet fields should occur shortly after the third week of June, depending on location. The forecast is based on site-specific extended weather forecasts through June 17. Actual peak dates will vary somewhat from these estimates.

Table 1. Degree-day (DD) accumulation forecast and predicted peak activity dates for sugarbeet root maggot flies in Red River Valley

Site	Degree Day forecast (for June 17)	Peak activity forecast*
Baker, MN	537	June 21 + 80° day
Ada, MN	582	June 19 + 80° day
Grand Forks, ND	586	June 18 + 80° day
St. Thomas, ND	517	June 22 + 80° day

*Peak fly activity in current-year beets is most likely on the first calm or light-wind day to reach 80°F after the required 600 air DD are accumulated.

Fly emergence and movement into beet fields can be accelerated quickly following a major increase in air temperatures. Growers in high-risk areas for SBRM infestation should consider applying a postemergence insecticide, especially if a low or moderate rate of an at-plant soil insecticide was applied. Growers preferring granular products should apply them immediately or as soon as soil moisture conditions allow. It is better to err on the early side of peak activity when applying granules. Postemergence liquid insecticides should be applied within 3 days of the expected peak (before peak is best). This will provide control of both adults and larvae.

For more guidance on postemergence control strategies, consult the "Insect Control" section of the ***2008 Sugarbeet Production Guide*** or the "Sugarbeet Insects" section of ***2008 Field Crop Insect Management Recommendations***. Online versions of these publications are located at:

www.sbreb.org/Production/production.htm
and
www.ext.nodak.edu/extpubs/plantsci/pests/e1143w1.htm

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plant science

WET FIELD CONDITIONS IN THE RED RIVER VALLEY

During the end of May and beginning of June a number of rain events changed the Red River landscape from being without visible water in the ditches to high water levels in the rivers, ditches and some standing water in lower areas of the fields. Excess moisture can cause overland flooding, waterlogged conditions, and high water tables. This excess soil moisture can result in changes in physical and chemical properties in the root zone. The respiration of plant roots, soil micro-organisms and fauna leads to rapid exhaustion of soil oxygen. Whenever the plant faces prolonged (>3–4 days) excess soil moisture conditions, the plant roots suffer extreme oxygen stress. The extent of damage due to excess moisture stress varies between crops and also depends on the developmental stage of the crop. Just emerging plants are more susceptible than established plants. Dry beans are very susceptible to excess moisture. Corn is susceptible to excess moisture stress during the early seedling to tasseling stage. Soybeans have been somewhat tolerant to short periods of excess moisture.

As most crops are still in the early stages of development, producers will soon be anxious to go back into the field for crop management purposes. However, there is a danger for soil compaction, which may occur when pressure from farm equipment on the surface of wet soils forces air out of pore spaces in the soil. Wet soil has much less resistance to compaction than dry soil. When the soil is just dry enough to go into the field the potential for compaction is greatest. Low pressure tires, large flotation tires, or dual wheels may help reduce surface compaction. However, any machinery traffic on a waterlogged field will cause subsoil compaction – the heavier the load, the greater the impact. Compacted soil reduces root growth and the movement of water and air through the soil. Once the soil is compacted it is difficult to get it back in good shape. Prevention of compaction is easier than trying to manage compact soils.

CULTIVATION OF ROW CROPS

Due to the high cost for seed a number of producers have gone back to seeding soybeans in rows. Cultivation is a tool to use in controlling weeds. Sunflower, corn, soybean , dry bean crops and weeds compete for soil moisture and nutrients. Early season competition causes greater yield losses than at any other time during the growing season. Early cultivation when annual weeds are small is most effective. Use a cultivator which is set shallow to control weed sprouts as they emerge and start to grow. A shallow cultivation operation will also limit crop root pruning and avoid bringing new weed seeds to the top. Cultivating too deeply can cause the dilution of previously applied preemergence herbicides and therefore reducing the effectiveness of the herbicide. Shallow cultivation can be repeated to control any newly germinating weeds. Avoid excessive ridging of the rows especially in soybeans, navy and pinto beans which need level ground at harvesting.

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COOL WEATHER FURTHER DELAYS CORN DEVELOPMENT

That the weather this spring is cool is not news, but now that we are six weeks into the corn growing season the magnitude of the lag in corn development is becoming a concern. Based on a May 1st planting date, we are now running between 80 and 143 corn growing degree days (GDDs) behind the long term average, depending on the region of the state (see following table). Since GDDs typically accumulate at the rate of 13 per day in early June, this means that we are currently about six to seven calendar days behind normal corn development. Furthermore, this means that corn is 1.0 to 1.5 leaves behind normal (about 85 GDDs are required for each new leaf that develops). It is still early in the season and there is certainly potential for crops to catch up if temperatures during the remainder of the season are above normal. Nevertheless, if temperatures remain normal, the current delay in crop development will translate into wetter grain at harvest. From research we conducted last year, we found that a deficit of 80 GDD at harvest could translate into about 2% more moisture in the grain for an adapted hybrid if fall temperatures are normal and harvest is planned for before November 1st.

Accumulated corn growing degree days (AGDDs) for selected locations in North Dakota for the period 1 May to 10 June, departures from normal for the same period, and typical daily GDDs for early June (data from NDAWN- http://ndawn.ndsu.nodak.edu/).

Location	AGDDs 2007	Departure from Normal	Normal daily GDDs for early June
Carrington	320	-143	14
Dickinson	306	-91	13
Langdon	244	-104	11
Mandan	320	-90	13
Minot	304	-92	13
Prosper	369	-85	14
Williston	350	-80	13

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plant pathology

MANAGING APHANOMYCES ROOT ROT OF SUGARBEET

Sugarbeet plants in wet and warm soils may be affected by Aphanomyces root rot caused by the pathogen *Aphanomyces cochlioides*. Optimum conditions for infection occur in wet soils at temperatures of 68 to 86°F. Aphanomyces can be deadly in the seedling stage, and can also cause serious root rot later in the season. Infected seedlings typically have roots and hypocotyls that become black and shrink to a dark, slender thread. Infected plants have light green leaves with older leaves becoming yellow. Plants tend to wilt in the afternoons of hot and sunny days in dry conditions. Assessment of fields should therefore be done in the afternoons of hot sunny days. However, fields of surviving plants with severe root infections have reduced root yield, lower sucrose content, and higher impurities. Diseased roots have much higher respiration rates compared to healthy roots. As a result, the quality of storage piles can be reduced when diseased roots are stored with healthy roots.

Fields with a history of Aphanomyces should be planted with tolerant varieties approved for the grower's factory district. Many high yielding Aphanomyces tolerant varieties are available. Seeds should be treated with Tachigaren® to provide additional protection, especially since sugarbeet growing areas in North Dakota and Minnesota are in a wet cycle, with conditions favorable for Aphanomyces occurring annually. Planting should be done as early as possible to facilitate early and vigorous growth in conditions unfavorable to the pathogen. Field drainage should be improved since the pathogen needs adequate free moisture to germinate and cause infection. Fields with a history of severe Aphanomyces should be treated with about 10 tons of factory spent lime per acre. Research shows that plots treated with spent lime results in a significant reduction in Aphanomyces disease severity and higher yields.

SUGARBEET – LOOKOUT FOR DISEASES

Rhizoctonia solani can infect sugarbeet at all growth stages and results in wilting and death of plants. The fungus causes infection when soil moisture range from somewhat dry to wet and soil temperatures above 68ºF. The fungus typically causes damping-off, and crown and root rot of sugarbeet. Damping-off occurs at the seedling stage when the fungus infects the hypocotyls resulting in rapid collapse of seedlings before soil emergence or post-emergence. Damping-off affects the plant population and ultimately reduces the yield. Crown and root rot infection occurs in older plants when the pathogen infects the petioles or the roots. Characteristic symptoms of Rhizoctonia include sudden wilting of leaves, and petioles of outer leaves are blackened at the point of attachment to the crown. The crown rot extends to the roots causes root rot. Crown and root rots, separately or collectively, are the most damaging phase of the disease and reduces yield significantly. The disease may also produce dry rot cankers on the root surface.

Fields with a known history of heavy Rhizoctonia should be planted to a tolerant variety. There are only a few good Rhizoctonia tolerant varieties available. Crop rotation with non-hosts such as wheat, early planting, avoidance of throwing soil at cultivation into crowns of plants will assist in managing the disease. The use of the fungicides Quadris® or Proline® at the 4 to 6 leaf stage or when the soil temperature at the four inch depth is about 65ºF will also help to control Rhizoctonia crown and root rot.

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NEW AND REVISED PLANT PATHOLOGY EXTENSION PUBLICATIONS AVAILABLE

Ascochyta Blight of Chickpea. Ascochyta blight, caused by the fungal pathogen *Ascochyta rabiei*, is the most significant disease on chickpeas (also called garbonzo beans) in North Dakota. In 2005, the Ascochyta blight pathogen became resistant to the QoI class of fungicides (FRAC group 11, also called strobilurins), which include Headline® and Quadris®. Fungicide resistance to these products reduces management options for the disease in chickpeas.

A new extension publication discussing Ascochyta blight of chickpea is now available. Included are numerous pictures and discussions of biology and management techniques. The publication is available online at:
www.ag.ndsu.edu/pubs/plantsci/smgrains/pp1362.pdf, and is currently being printed. Printed copies should be available at the time of Pulse Days this summer.

Blackleg of Canola. Blackleg is a serious disease of canola in North Dakota. Recently, new pathogenicity groups (PG's) have been identified in the state, which may challenge some of the resistance currently used in hybrids in the future. A publication of the same name was originally authored by Dr. Art Lamey in the mid 1990's. This new publication incorporates some of the original information from Dr. Lamey, and includes new information about PG groups, disease prevalence and management, and numerous new photos of symptoms. This publication is available at:
http://www.ag.ndsu.edu/pubs/plantsci/crops/pp1367.pdf, and is currently in print. Printed copies should be available at Canola Days this summer.

Rust Diseases of Wheat. Three rust diseases have the ability to infect wheat in North Dakota. Leaf rust currently is the most important of the three, but stem rust has been problematic in the past, and stripe rust may appear in cool summers. This publication (PP-1361) is a revision of PP-589 Wheat Leaf Rust, most recently revised in 2002, but the three major wheat rusts are included in the new publication with symptoms, life cycle, and management discussed.

This publication is available at:
www.ag.ndsu.edu/pubs/plantsci/smgrains/pp1361.pdf.

It also is currently being printed and will be available through the NDSU County Extension offices and through the NDSU Ag. Communication's Distribution Center.

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RECENT RAINS BRING INCREASED DISEASE RISK

Recent rains have increased the potential for leaf and head diseases of small grains across many areas of the state. The NDSU small grains disease forecasting site indicates a more frequent number of favorable infection periods for tan spot of wheat in the past week at many NDAWN locations, and the Fusarium head blight (scab) risk has also increased. *The Fusarium head blight risk should be of concern for producers with winter wheat, as many winter wheat fields are now in the heading stage.*

As mentioned in previous NDSU Crop and Pest Reports, the NDSU disease forecasting site provides information on risk of tan spot, Septoria leaf blotch, leaf rust, and Fusarium head blight (scab), and is available at: http://www.ndsu.edu/scabforecast. The leaf disease predictions are obtained with choosing leaf stages of the crop, while the forecast for scab risk is only found by clicking on the flowering stage.

As mentioned in the May 21st NDSU Crop and Pest Report, another scab forecast site, giving information across many states, is found at: http://www.wheatscab.psu.edu/. At this web site, provided through several universities and the US Wheat and Barley Scab Initiative, a person clicks on the spring or winter wheat model, then the state, and the scab risk is provided in a colored map.

The mathematical models used for the NDSU web forecast site and the one provided through Penn State Univ. are the same, but the information sources for the weather that goes into the model are different. The forecast (for most states) provided through the Penn State web site is based on RTMA, a mathematical model that estimates weather from a number of computerized sources. In ND, the model predictions are based on the NDAWN weather station data PLUS the RTMA data.

I find both scab forecasting sites very useful. The NDSU site provides both leaf disease risk and scab risk data plus it is exclusively based on current local weather. The Penn State site is useful because it provides a broad look at multiple states and allows some 24-48 weather forecasting predictions, as well. Both sites allow the user to choose the scab susceptibility of the cultivar for spring wheat.

EARLY SEASON FUNGICIDES FOR WHEAT AND BARLEY

Many producers have recently applied fungicides for early season disease control, often in a tank mix with herbicides. In some cases, some injury has occurred with these applications on the very succulent, thin leafed cuticle, wheat and barley. In previous years when this type of symptom was observed, the new growth generally looked good and we did not see yield reductions, but did see yield increases with these treatments. In 2003 at NDSU, we did a number of fungicide + herbicide combination treatments and did not have any injury, a year in which we had a little warmer, sunnier June than we've had so far this year.

FUNGICIDE UPDATE

The May 15 issue of the 2008 NDSU Crop and Pest Report contained information on fungicides recently registered for wheat and barley producers. Growers contemplating using fungicides for scab control in the near future should be considering using either Folicur®, Orius®, Tilt®, Proline 3+3®, or Caramba®, as these products are triazoles with the best and safest activity against scab. In NDSU field tests, the Proline 3+3® or the Caramba® have consistently given the greatest scab and DON (vomitoxin) reductions.

Bayer CropScience just announced the registration of **Prosaro**® fungicide, a pre-mix of prothioconazole and tebuconazole (the same active ingredients of Proline® and Folicur®). Although Prosaro® just got registered in wheat and barley, Bayer will continue to market the Proline 3+3 (prothiconazole + tebuconazole, not pre-mixed) program for the 2008 growing season, and Bayer says they will transition to Prosaro® in 2009.

Prosaro® is labeled for wheat and barley for multiple leaf and stem diseases, as well as suppression of Fusarium head blight (scab). The use rate will be from 6.5 to 8.2 fl oz/acre, with 2 applications per season possible, but not to exceed 8.2 fl oz.

DISEASE AND INSECT SURVEY-June 6

NDSU IPM Field Scouts scouted some wheat and barley fields the past week, but need a return to sunnier, drier conditions to increase number and area of fields scouted. Of wheat and barley fields surveyed last week, winter wheat was showing some tan spot, up to the leaf below the flag leaf, and some barley fields in the northwest area had a low level of fungal leaf spots. Additional reports of abundant tan spot infections in spring wheat planted into wheat residue have been received. Wheat leaf rust has not yet been detected by the survey scouts.

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soils

TOP-DRESS/SIDEDRESS SEASON

Most areas of the state have received rain lately. There are some small grains growers who delayed N application until they could see that yield was possible in drier areas of the state. Although yield is not yet guaranteed, the prospect of at least some yield in these areas is brighter than a couple of weeks ago. With small grains at least at tillering stage, the time is right for top-dressed N applications.

The N application should be applied separately of fungicide or herbicide application using stream-bars. Low-rate, slow-release N products have been tested at NDSU for several years for their ability to increase yield and protein at 1-3 gallon rates (2-10 lb N/acre) and so far the results have not supported their marketing campaigns. Research continues this year on rates and products, but results will not be available until this fall.

Top-dress rates need to be based on about 75% of "table" rates found in our recommendations. The 75% factor is because of the high cost of N right now compared to costs of N when tables were constructed. Higher N costs (28% right now is about 75 cents/lb N) makes full N recommendations not as profitable as our table rates suggest. Applications followed by rain before the small grains mature past 6-leaf stage usually result in maximum yield for the environment. Application and rain after this time may increase protein, but will have little impact on yield.

Side-dress for corn should be made anytime that the applicator can practically be in the field. When corn is small, there is potential for covering up the plants with soil, so applications are usually made between 5-leaf and 10-leaf corn. Corn higher than this may require a liquid applicator equipped with drop hoses and orifices to dribble 28% between the rows on the soil surface and hope for rain.

Do not broadcast spray liquids, or broadcast spread dry fertilizer over the top of corn. The leaves of corn act like a funnel and you will burn the corn plants badly if this is done. Last year a few novices did this and I think they won't do it again.

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weeds

PREPARE FOR WEEDS AFTER PREEMERGENCE HERBICIDES

Successful preemergence herbicide programs require two key components. First, the programs need dry weather (with limited wind) in order to have the preemergence herbicides applied. Second, the programs generally need 0.5 to 1 inch of rainfall to activate the herbicide after the application, which moves the herbicide from the soil surface into the zone where weeds are germinating. Earlier this year, we struggled to get dry weather to get into fields to do tillage, plant, and apply herbicides. After that tough start of the season, it seemed inappropriate to hope for rain, but we need rain now to activate these herbicides. In eastern ND, after getting many of our trials planted and sprayed, we didn't received the necessary rain for good herbicide performance. The same was true in other areas of the state.

As a consequence, weeds have emerged through preemergence herbicides treatments. The rain received since the latter part of May may activate some of these herbicides and reach back to control some of these weeds, depending on the species, their size, and the herbicide. However, the following actions may be very appropriate.

Action 1: Scout corn fields to determine how well preemergence herbicides were activated.

Action 2: Be prepared to apply a postemergence herbicide or cultivate if control is not satisfactory. Rotary hoeing would also be an option if done while the weeds are still emerging, but many growers may no longer have access to this technology.

RESOURCE FOR WEED CONTROL IN VEGETABLE CROPS

University of Wisconsin provides an on-line resource for pest control in most vegetable crops. See the following web site.

Wisconsin Vegetable Crop Update June 5, 2008, Issue #3
http://ipcm.wisc.edu/WCMNews/tabid/53/EntryID/548/Default.aspx

EXPRESS ON EXPRESS SUN SUNFLOWER

In the 2008 North Dakota Weed Control Guide page 35 it shows Express®, in both formulations - DF/WP and the new SG can be used for weed control in Express Sun sunflowers. Technically, the older DF or XP formulations, which are 75% ai, are not labeled for use on Express Sun tolerant sunflowers; only the newest Express® SG formulation is labeled, which is a 50% active material.

NEW 2008 HERBICIDE PRICES AVAILABLE

The new 2008 herbicide price list is now posted in the Weed Guide portion of the NDSU Weed Science - address is listed on the front and back of the weed guide.

Remember the prices are for small quantities and are averages of several retail sources. The prices also do not reflect any "program" offerings. Some prices will be higher and some lower than what you may get them for.

Most prices are the same or higher by a similar percent as other years. In general and as expected glyphosate prices are much higher than last year. Other herbicides prices increased more than expected, including atrazine, Basagran®, Callisto®, Pursuit®, and Raptor®. Prices of generic clethodim product varied widely.

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horticulture

TENT CATERPILLARS IN NORTH DAKOTA

Three species of tent caterpillar occur in North Dakota: eastern tent caterpillar (*Malacosoma americanum*), forest tent caterpillar (*M. disstria*), and prairie tent caterpillar (*M. californicum* ssp. *lutescens*). Host plant damage by these moth species is caused by the larvae, or "caterpillars." Several hardwood hosts may be used, depending on the species.

Eastern tent caterpillar prefers chokecherry, though occasionally it will use other hardwood species. Larvae of eastern tent caterpillar are gregarious and construct tent-like nests of silk in the forks of branches and smaller trees (see photograph). Tents are used as shelter or as resting places.

Larvae forage during the day in new foliage on nearby branches. Larvae feed for 6 to 8 weeks and are about 2 inches long when mature. Larvae (see photograph) are black and rather hairy, with a whitish-yellow stripe down the middle of the back, narrow broken orange stripes just to either side of the whitish mid-stripe, and lateral white and blue markings.

Larvae disperse when mature and spin cocoons in sheltered places. Adult moths appear in late June and early July. Females lay eggs in a band-like cluster of 150 to 350 eggs around a small twig and cover the eggs with a frothy excretion called spumaline. Eggs overwinter and larvae emerge in the spring; thus, there is one generation per year. Larval feeding disfigures ornamental plants but usually does not result in permanent damage unless the feeding is severe. Tents and masses of larvae are unsightly. Eastern tent caterpillar populations usually peak every 10 years.

Forest tent caterpillar utilizes a wide variety of hosts, including ash, aspen, basswood, birch, cottonwood, elm, maple, and oak. Larvae emerge in the spring from overwintered eggs. Emergence coincides with the flush of host plant foliage. Larvae feed for 5 to 6 weeks and are about 2 inches long when mature. Larvae are identified by keyhole-shaped spots along the midline of the back and by broad bluish lateral bands. Unlike other tent caterpillars, forest tent caterpillar does not form a tent.

Instead, larvae gather and spin silken mats on branches. Larvae tend to feed in wandering masses. Mature larvae form silken cocoons and adult moths emerge about 10 days later. Females deposit 150 to 200 eggs around small twigs and cover them with spumaline. Light defoliation has little effect on tree growth, but severe feeding can affect growth and cause twig mortality. In North Dakota, outbreaks of forest tent caterpillar typically last for 2 to 4 years.

Prairie tent caterpillar can utilize a variety of hardwood host, though chokecherry is its preferred host. Prairie tent caterpillar is the most common tent caterpillar species in North Dakota. Prairie tent caterpillar overwinters in the egg stage and larvae emerge in the spring with the flush of their host plant foliage. Larvae feed for 6 to 8 weeks and are about 2 inches long when mature. Larvae are black with a white mid-line stripe broken into dashes and light blue lateral stripes also broken into dashes. Like eastern tent caterpillar, larvae of prairie tent caterpillar form silken tents in the forks of branches and small trees and feed on nearby foliage. Mature larvae spin cocoons in curled leaves or in leaf litter. Adult moths emerge in mid-summer. Females lay eggs near the base of the host plant in the ground. Damage by larvae is similar to that of eastern tent caterpillar.

Control of all tent caterpillar species should target larvae. Actively feeding larvae are easily controlled with conventional foliar insecticides including acephate, carbaryl, imidacloprid, or any of several pyrethroids. Biorational treatments include *Bacillus thuringiensis* (Bt), insecticidal soap, and pyrethrin. Boiling water can also be poured directly on tents that contain larvae. Tents also may be physically removed and destroyed.

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FOLIAR DISEASES OF TREES

With the extended cool, wet period experienced in Fargo and other areas around the state, foliar diseases of trees are expected to appear. Common foliar diseases that are favored by cool, wet weather include Rhizosphaera needle cast and Stigmina needle cast on spruce, anthracnose diseases on several deciduous hosts (such as ash, oak), and others.

On spruce, needle cast diseases cause symptoms that include premature loss of inner needles (never the current season's growth, and typically not the last two year's of growth, except in severe cases). Needle cast diseases on spruce must be diagnosed accurately, since other non-disease (abiotic) factors can cause similar symptoms. Without an accurate diagnosis, a management strategy that is ineffective might be recommended. Below is a standardized report compiled by the NDSU Plant Diagnostic Lab that you might receive if you submit a spruce that is diagnosed with Rhizosphaera needle cast disease:

"The spruce that you submitted has been evaluated. This tree is infected with Rhizosphaera needle cast of spruce, caused by the fungus *Rhizosphaera kalkhoffii*. This disease can lead to extensive loss of interior needles, with 1-3 years worth of needles only present at the ends of the branches. Affected trees are typically closely planted in windbreaks or in multiple plantings in yards. Early symptoms of the disease are yellowing, brown, red-brown, or purple-brown interior needles. Fungal fruiting bodies on infected needles can be seen with a magnifying glass or hand lens. The fruiting structures are black and grow through the normally white, circular stomates in rows on the needles. New, current year needles become infected in June and July and typically discolor the following spring. These fruiting bodies resemble another fungus (*Stigmina lautii*) that reportedly causes another needle cast on spruce, so differentiating between these two diseases is important since management strategies may differ. On this particular sample, only fungal bodies of *Rhizosphaera kalkhoffii* were detected.

Rhizosphaera needle cast usually develops in protected areas of the tree where the humidity level is higher than in exposed trees or parts of trees. If not controlled, the disease may spread up the entire tree over a period of years, as long the environment continues to be conducive for disease development.

Control of Rhizosphaera needle cast with a fungicide may be warranted if the infection is severe and if the tree is a highly valued specimen. Effectiveness of protective fungicides depends on two properly timed applications per year for two consecutive years. The first application should occur when the new shoot growth is 1/2 to 2 inches in length or when needles are 50% their normal length, followed by a second application three to four weeks later or soon after needles are fully elongated. The application of fungicide must be repeated for two consecutive years to be effective. If not, no control will occur.

Research conducted by James Walla (NDSU forest pathologist) indicates that the fungicide chlorothalonil (sold as Daconil 2787® or Bravo®) provides good control for this disease. Properly timed application of the fungicide, as described above, with sufficient coverage over a two year period can result in eradication of the fungus that is present on the tree."

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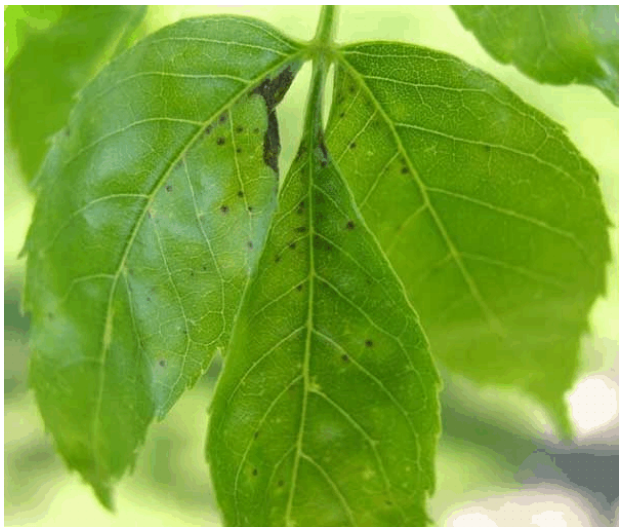
forestry

ASH ANTHRACNOSE FINALLY OBSERVED

I normally receive calls in mid-to-late May regarding ash trees that are losing their leaves. The cause is ash anthracnose, a fungus that is common during cool, wet weather. This past week, we finally observed it in Fargo and it is likely being seen through much of eastern North Dakota. Besides leaf loss, additional symptoms include black leaf margins, distorted leaves and/or small brown dots in the middle of leaves (see photos). The brown dots within the leaves are where the fungus has entered wounds created by ash plant bugs feeding on the leaves.

Is treatment necessary? Usually, ash anthracnose does not cause enough damage to stress trees. Trees can lose up to 25% of their foliage without major consequences. If trees are heavily defoliated consecutively for 3 or more years, then they will be stressed and susceptible to other pests that could kill them. Fungicides are only effective as preventative treatments as leaves are expanding. However, fertilizing trees that have lost a large amount of leaf tissue could help them refoliate, reducing stress. Since the fungus overwinters in leaves and seeds, raking and destroying these tissues in the fall helps to reduce disease pressure the following spring.



Note the dead leaf margins and distorted growth in the first photo. The second photo shows a dead leaf margin plus small dots where the fungus has entered the leaves through wounds created by feeding of the ash plant bug.

SOME OBSERVATIONS ON ELMS

1 – I have received two calls this week regarding American elm trees losing leaves. In both cases, twigs with a small cluster of 6-10 leaves have been found lying on the ground. The ends of the twigs usually appear to be cut at a sharp angle, though occasionally they are more jagged. The cause? We believe that the culprits are squirrels. Yes, squirrels. Elm trees produce seeds in the spring and in many parts of the state this year, the seed crop is heavy. In the process of eating and gathering seeds, the squirrels are cutting the twigs and causing a mess. Tree health is likely unaffected. Trees can lose up to 25% of their leaves without much loss in photosynthesis.

2 – Siberian elm trees in Bismarck and elsewhere in central North Dakota appear to have a very heavy seed crop this year. Accompanying this prolific seed crop are trees with fewer leaves and smaller-than-normal leaves. It seems that the trees have placed most of their energy reserves into reproductive growth – seeds – leaving very little for vegetative growth – leaves.

Why would trees grow this way? Our hypothesis is that these trees are highly drought-stressed, and they're putting most of their energy into reproduction before they presumably die. However, a heavy seed crop by itself doesn't necessarily mean that trees are doomed. For example, in 2003, Colorado blue spruce trees through much of North Dakota had heavy seed crops, but this was not followed by a massive die-off of spruce. Recent rainfall through much of the state will likely limit drought-related mortality, though it will be interesting to observe the Siberian elm trees this year.

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diagnostic lab

UPDATE FROM THE PLANT DIAGNOSTIC LAB

The tables below summarize samples received and processed by the NDSU Plant Diagnostic Lab for the past week (June 4 - June 11, 2008).

Table 1. No. of Sample Submissions by Sample Category

Sample Category	No. of Samples
Phytosanitary/Seed Health	23
Woody ornamental - evergreen	7
Field crops	6
Woody ornamental - Deciduous	3
Soil	1
Annual	1
Total	41

Table 2. Diagnoses by state, county, and host

State-County	Host	Diagnosis
ND-Bowman	Wheat - winter (*Triticum aestivum*)	WSMV
ND-Cass	Blue Spruce (*Picea pungens*)	Stigmina needle blight
ND-Cass	Plum (*Prunus* spp.)	Excess water
ND-Cass	Wheat - spring (*Triticum aestivum*)	WSMV
ND-Mclean	Juniper (*Juniperus* spp.)	Cedar rust (*Gymnosporangium* spp.)
ND-Mclean	Spruce (*Picea* sp.)	Sawfly injury

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around the state

Northwest ND

During the past two weeks (May 26-June 9), the region received rain ranging from 0.4 inch in Williston to 1.31 inches near Crosby, based on NDAWN sites. Rains have been spotty and the region is very dry. Producers are questioning their hay production and have started selling or relocating a portion of their cattle herd.

Winter wheat is jointing while many of the small grains are at the 4 leaf stage and above. Winter wheat stands have been reported as average to slightly poor stands. The same holds true for many of the crops in the region. In the irrigated Yellowstone Valley, many of the fields had to be irrigated which made for poor stands in all crops as well. Field pea leaf stages have been reported up the 7-9 node stage. Other warm season crops are just getting a good start. Alfalfa harvest should begin within the next 10 days if wanting the good quality hay.

Cutworm infestations in small grains and legume crops have been reported throughout the region. Small grain herbicide applications have been going for the past couple of weeks.

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South-Central ND

During the past week (June 4 to 10), the region received rain ranging from 0.9 inches at Harvey to 2.5 inches at Edgeley, based on NDAWN (North Dakota Agricultural Weather Network). Rainfall during the past two weeks has helped maintain good yield potential in small grain and other cool-season crops, and significantly helped plant stands of row crops.

Winter wheat is beginning to head, and spring wheat and barley are in the 4-leaf to jointing stages. Corn development continues to be slowed by cool temperatures. For example, corn planted on May 1 at Carrington is behind about 150 growing degree day (gdd) units compared to the 5-year average while gdd units at Oakes are about 50 less.

Small grain POST herbicide application is nearing completion, while corn treatments are beginning. Wind and rain are currently hampering herbicide application. Tan spot is becoming more common in all wheat due to the current wet period. Farmers still applying herbicides for weed control in wheat may want to tankmix a foliar fungicide. For example, at the Carrington Research Extension Center last year, three trials with an early-season fungicide application averaged 2 bushel/acre (4 percent) greater yield compared to the untreated check. Winter wheat should continue to be monitored for virus and leafspot disease, especially leaf rust; and row crops for cutworms.

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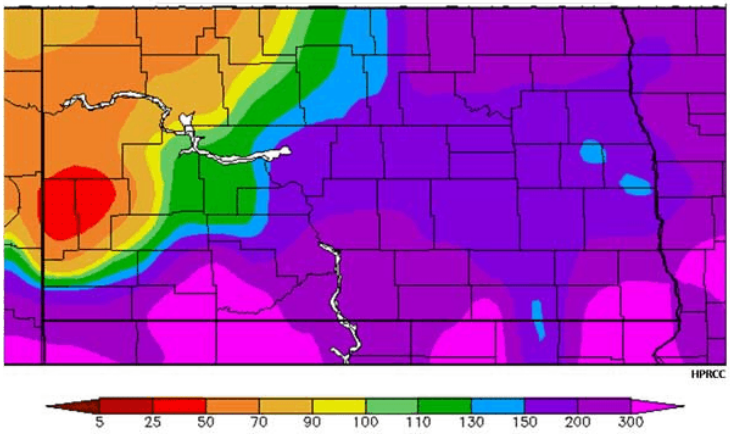
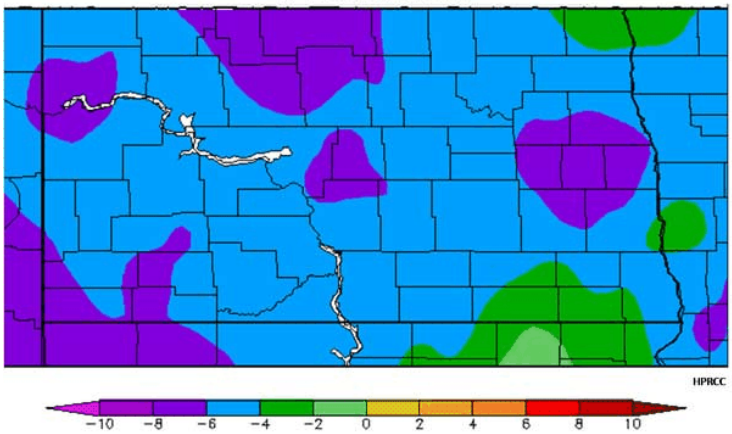
weather

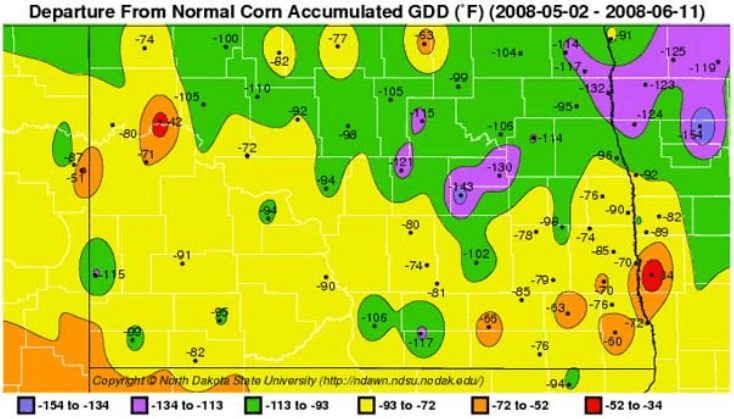
Last 7-Day Percent of Normal Precipitation(%)
6/4/2008-6/10/2008



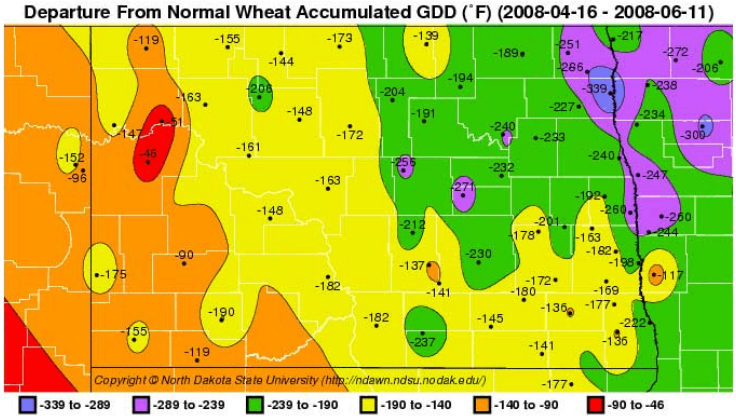
Last 7-Day Departure From Normal Temperature(°F)
6/4/2008-6/10/2008



Departure From Normal Corn Accumulated GDD (˚F) (2008-05-02 - 2008-06-11)



Departure From Normal Wheat Accumulated GDD (˚F) (2008-04-16 - 2008-06-11)



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