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Entomology

INSECTICIDES DO NOT CONTROL WHEAT STEM SAWFLY

Wheat stem sawfly populations are reported to be high again in wheat fields in southwest North Dakota. Some producers are justifiably nervous from the yield losses that they suffered from last year. Thus, producers are interested in spraying insecticides for control of adult sawflies. However, before you waste your time and money, read this article!

In 2009, NDSU Extension Entomology conducted a large plot (25-acre) insecticide trial near Mott where we sprayed three times with a pyrethroid for sawfly control. We found that three applications of a pyrethroid insecticide timed for the beginning, peak and end of sawfly flight reduced infested stems by half compared with the untreated check. However, the yield gain was not significant and only a 3.3 bushels per acre in the insecticide-treated plot versus the untreated check. The estimated cost of the insecticides was $30 per acre (or $10 per acre per insecticide application). If wheat is valued at $5 per bushel, the gross revenue increase due to yield is $16.50 per acre. This results in a net loss of $13.50 per acre ($16.50 minus $30), in spite of the three applications of insecticides!

NDSU Extension Entomology also studied insecticides and spray timings for control of wheat stem sawfly at Hettinger and Makoti in 2009. The following treatments were evaluated: 1) untreated check, 2) foliar insecticide at the 4-6 leaf stage, 3) foliar insecticide at flag leaf stage, 4) low rate of insecticide seed treatment, 5) high rate of insecticide seed treatment, and 6) low rate of insecticide seed treatment + foliar spray at the 4-6 leaf stage. Cruiser 5FS was used as the insecticide seed treatment and Warrior II (pyrethroid) was used for all foliar insecticide applications. All seed treatments were applied commercially. Results from Makoti are shown (Fig. 1). For percent infested stems, all of the insecticide treatments were comparable except for the low and high rate of Cruiser had a significantly higher percent infested stems than the low rate of Cruiser + Warrior II at the 4-6 leaf stage. Infested stems of the insecticide treatments were not different from the untreated check. As expected, there were no significant yield differences among the different insecticide treatments or between insecticide treatments and the untreated check. The untreated check had the lowest yield, which was probably due to root rot diseases because no fungicide seed treatment was used (bare seed).

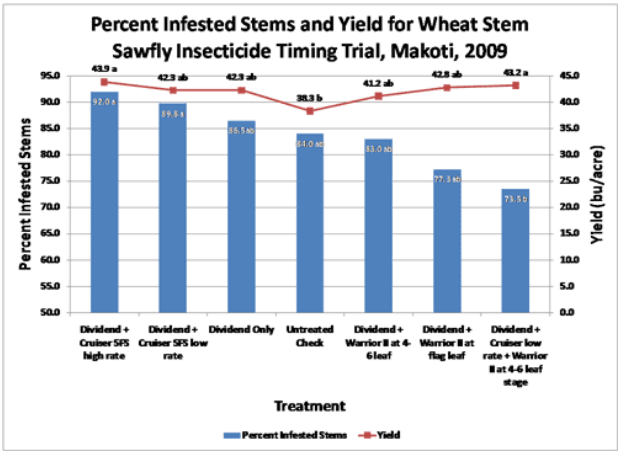

Figure 1. 2009 Wheat stem sawfly insecticide timing trial at Makoti.

Insecticides generally have not been effective against the wheat stem sawfly. The egg, larval and pupal stages are well-protected inside the plant stem. Spraying for adults has not been successful because newly emerged

adults can migrate into a field that was sprayed, the sawfly emergence window is so long and adults that emerge after spraying have reduced exposure to insecticide. The adult has no mouthparts and does not feed or drink water, which minimizes exposure to insecticides. Overall, insecticides are relatively costly for a low-value, large-acreage crop such as wheat; ineffective in controlling wheat stem sawfly; and damaging to beneficial parasitoid populations.

SCOUTING FOR WHEAT MIDGE CRITICAL IN NORTHERN TIER OF NORTH DAKOTA

With the localized hot spots for the wheat midge this year, field scouting will be important. Please see the past issue no. 7 of the *Crop & Pest Report* for 2009 Wheat Midge Larval Soil Survey map and scouting protocol. The current DD map (Fig. 2) indicates that wheat midge emergence is starting in the northern tier.

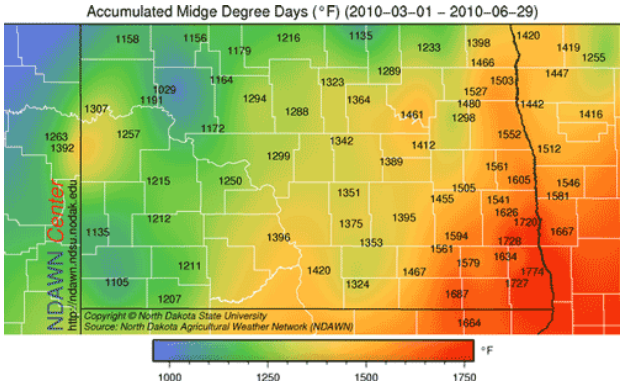

Figure 2. Wheat midge degree day map *(NDAWN)*

Wheat is in the susceptible growth stage (heading to early-flowering) when the wheat midge were at peak emergence in many areas. An insecticide should be applied during heading and when the adult midge density reaches **one midge per four to five wheat heads for hard red spring wheat or one midge per seven to eight heads for durum**. A late insecticide application should be avoided to minimize negative impacts on the parasitoid. Wheat midge larvae feed on the kernel and negatively affect yield, grade and quality.

START SCOUTING FOR SOYBEAN APHIDS

The cool weather has not been optimal for soybean aphid development and this has slowed any field infestations. The current weather forecast is for warming temperatures, and temperatures in the high 70s to low 80s will become more favorable for soybean aphid development. Sixteen soybean fields were surveyed by the IPM Survey scouts last week. Soybean aphids were found in only one field in northern Richland County (Fig. 3). Low population levels (about <10 aphids per plant) were also reported in southwestern Minnesota, northern Iowa and no soybean aphids in South Dakota. So, now is a good times to start scouting soybean fields for soybean aphids.

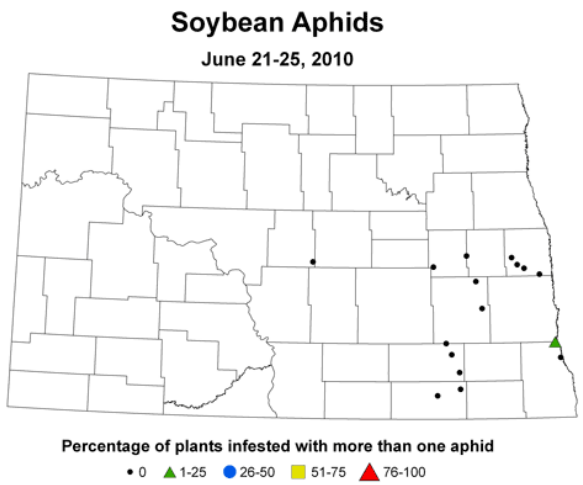

Figure 3. Soybean aphid IPM map *(J. Walker, NDSU)*

Regular scouting (once a week) is important to determine which fields have economic population levels of soybean aphids. Fields near buckthorn, the overwintering host, may be colonized at emergence and require earlier scouting. In areas without buckthorn, winged aphids migrate from other areas in mid-season. Late July and early August infestations in North Dakota have been strongly influenced by migrating aphids from soybeans south and east of the region. Check 30 to 40 plants per field. Examine the entire plant, particularly new growth. **Use an action threshold of 250 aphids per plant if populations are actively increasing on 80% of the field for plants in late vegetative to R1 (beginning bloom)-R5 (beginning seed) soybeans.**

Avoid early-season application of insecticides for control of sub-economic populations of soybean aphids. Why? Here's four good reasons to avoid spraying early: 1) kills beneficial insects like lady beetles, lacewings, nabids that keep aphid populations low and below economic threshold levels; 2) increases secondary insect pest outbreaks, like spider mites. Early spraying of pyrethroids for aphids causes mite populations to flare; 3) requires second insecticide application to control aphids and/or mites increasing input costs; and 4) increases the risk of aphids developing insecticide resistance due to unnecessary applications of insecticides.

BANDED SUNFLOWER MOTH EMERGENCE STARTING

Emergence of the banded sunflower moth is underway as the first moth was trapped in a pheromone trap in Mapleton, Cass County, ND.

UPDATE ON DEGREE DAYS FOR COLLECTING LEAFY SPURGE FLEA BEETLES

The accumulated growing degree days (AGDD) for sunflower (base of 44 F) can be used as a guide to determine when to begin scouting for adult flea beetles. Begin scouting for adult flea beetles when the AGDD approaches 1,000. **Flea beetles should be collected between 1,200 and the 1,600 using the sunflower GDD from NDAWN.** Most of North Dakota has accumulated between 1,200 and 1,600 AGDD, except the northwest corner (Fig. 4).

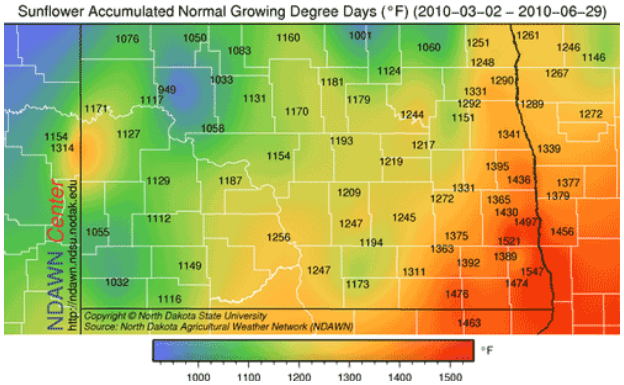

Figure 4. Leafy spurge flea beetle degree day map *(NDAWN)*

FUN INSECT QUESTION

What is this bright yellow fly that is common in sunflower and other crops near sunflower fields? Is it a major insect pest?

Figure 5. Mystery insect *(NDSU Extension Entomology)*

I've been getting many questions on what this common, showy yellow fly is and is it a pest. This is one of the Sunflower Maggots, *Strauzia longipennis* (Wiedemann) (Diptera: Tephritidae). This sunflower maggot is the only tephritid species found in the stalks of cultivated sunflower. It is a widespread species, occurring in most areas of the United States and many Canadian provinces. The yellow adult (Fig. 5) has a wing span of about 0.5 inch (13 mm) and a body length of 0.25 inch (6 mm). The wings bear broad dark bands that form a fairly distinct F-pattern near the wing tip. The adult fly is very active during the day and is present in fields until late July.

Damage: Economic loss due to larval feeding has not been documented for this species, even though larvae are commonly found in up to 100% of sunflower stalks. Feeding is confined to the pith, which acts as a supporting structure, and is not critical to plant nutrition. Secondary fungal infections are also associated with tunneling by the larvae within the stalk. Stalks are not weakened and seed yield is not reduced even with severe pith destruction. Insecticide use has not been warranted for control of sunflower maggot and no scouting methods or economic thresholds have been established.

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plant pathology

MANAGING PASMO DISEASE IN FLAX

Pasmo disease in flax, caused by the fungus *Septoria linicola*, can cause significant yield loss when conditions are favorable. Recently, a fungicide label was granted for Headline fungicide. This article discusses pasmo management and summarizes a fungicide trial conducted at the Langdon Research Extension Center in 2009.

Pasmo overwinters on the flax stubble, spores are splashed or blown to plants, and infection can occur on all the above ground plant parts. Symptoms include dark brown to black lesions on leaves and dark brown to black bands on the stems resembling a barber pole appearance (Figure 1). Small black bumps can be observed in lesions.

Figure 1.

Infections may start early in the season and are favored by warm weather with some rain events throughout the growing season. The disease is very common in our region. In Manitoba, Dr. Khalid Rashid conducts regular diseases surveys; pasmo was observed in 60-100% of the

fields surveyed between 1996 and 2009, with disease incidence ranging from 20% to 80% plants infected and disease severity ranging from 10% to 40% stem and leaf area affected.

Treatment plots (cv. CDC Bethune) were inoculated with pasmo by spreading infected straw collected from 2008 in the center of each plot 6-8 days prior to flowering. An impact-type sprinkler system was installed to wet the residue and to create a favorable environment for disease development. Treatments included different rates and timings of the Headline (Pyraclostrobin, BASF) and a non-treated control (Table 1). Pasmo disease was assessed on leaves on August 19th and 31st . The leaves and stems were assessed using the 1-9 scale with 1 = no sign of disease and 9 = high disease severity resulting in leaf or plant death.

By the 19th of Aug, high rates of Headline were managing disease more effectively than low rates. Similarly, late bloom applications and multiple applications were managing pasmo better than early single applications. Post bloom timings were most effective in reducing disease severity at the 31 Aug assessment date. Stem infection was managed best by later application timings and Headline rates 6 fl oz/acre or greater. All treatments increased yield and test weight except Headline at the 3 fl oz/acre. Oil concentration was increased over the non-treated with split fungicide applications of Headline, and by 9 and 12 fl oz rates of Headline at early and late bloom.

Recommendations

Fungicide application is an appropriate management strategy to protect flax plants if pasmo disease is present. Headline is labeled at the 6 to 12 fl oz/A (max 24 oz/A season) and off-label rates (3oz) were demonstrated in this trial to not be effective. The label is recommends application at mid-flowering (7 to 10 days after flower initiation) and a second application is if the disease persists or if conditions are conducive for disease development. This data generally support the label recommendations for effective management of the disease. Trials at the Langdon and Carrington REC's are being conducted again this year. Always follow complete label instructions.

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Table 1. Effect of different application timings and rates of Headline for management of pasmo disease of flax in Langdon, 2009. Leaf and stem disease severity, yield, test weight and oil concentration presented.

			Pasmo Disease Severity					
	Fungicide	Application	Leaves		Stem	Yield	Test Weight	Oil
Fungicide	Rate	Timing	19-Aug	31-Aug	31-Aug	(bu/a)	(lb/bu)	%
untreated			9	9	7	50.9	51.1	46.2
Headline	3 fl oz	early bloom	8.3	8.8	4.8	53.5	52.1	47.5
Headline	3 fl oz	herbicide	8.8	9	6	55.2	51.1	47.4
Headline	9 fl oz	early bloom	7.5	8.8	3.8	56.8	52.7	48.2
Headline	12 fl oz	late bloom	3.8	4.8	1	56.9	52.8	48
Headline and	3 fl oz and	herbicide and						
Headline	6 fll oz	early bloom	6.8	8.8	3	57.4	52.3	48
Headline	12 fl oz	post bloom	5.8	5.8	1	59.2	52.6	47.4
Headline	6 fl oz	early bloom	6.5	8.3	1.8	59.3	52.7	47.4
Headline	12 fl oz	early bloom	5.8	7.5	1.3	59.4	52.5	48.7
Headline	6 fl oz	late bloom	7.3	8.5	1.3	59.5	52.5	48.3
Headline	9 fl oz	post bloom	6	6.3	1	60.4	53.4	48
Headline	9 fl oz	late bloom	4.8	7.5	1.3	60.9	52.9	48.8
Headline	6 fl oz	post bloom	6	7	1.5	61.5	53.1	47.7
$LSD_{(P=0.05)}$			1.7	1.6	2.3	6	0.6	1.4
%C.V.			19.2	14.7	62.1	7.3	0.8	2

FUNGICIDE AND HAIL DAMAGED PEAS

In this past week I have received numerous calls about the potential for the fungicide Headline to positively impact hail-damaged peas. To my knowledge, NDSU (or any other University in the U.S.A. for that matter) has no data on hail damaged peas and any fungicide.

Fungicides are excellent tools that have been developed for disease management and/or prevention. Recently, an interest has increased in fungicide applications in the absence of disease -for physiological plant effects - (i.e. Plant Health). In NDSU trials, yield increases *have* been observed in the absence of disease in some crops and environments, but a yield increase has been inconsistent and hard, if not impossible, to predict. Statistically significant yield increases have occurred only in the minority of trials we have conducted at NDSU. Additionally, to the best of my knowledge, the trials NDSU has conducted in the past have been on non-hailed crops.

We do not have any data on the effects of fungicides on a hail damaged crop, and as such could not support spraying hail damaged peas with a fungicide. Fungicides are very good at managing diseases. However, when hail occurs on pea fields the most frequently observed disease is bacterial blight; fungicides will not have a meaningful effect on bacteria. There *could* be an increase in mycosphaerella or ascochyta, but it would be a stretch to make a recommendation on the potential *increase* in disease pressure. Additionally, yield potential in hailed fields can be reduced, and it seems illogical to put another input into a crop that may be significantly impaired.

DOWNY MILDEW IN SUNFLOWER APPEARING

Downy mildew is starting to appear in sunflowers. The disease is more common when soils are wet, so the appearance of the disease is no surprise. The disease causes a thickening of the leaves and stunting of the plant (Figure 1). The upper side of the leaves will become yellow from the stem outward (Figure 2), and on the undersides of the leaves you may see a white cottony appearance (spores) (Figure 3). An extension publication with detailed information and numerous photos of downy mildew is available at www.ag.ndsu.edu/pubs/plantsci/rowcrops/pp1402.pdf

The pathogen is soil-borne, and the infection takes place through the roots. No foliar fungicide application will rescue a plant from downy mildew. Downy mildew infected plants will usually have significantly reduced yield. However, since downy mildew plants are usually stunted and unthrifty, nearby non-infected plants may compensate. The biggest yield losses are observed when large patches of sunflowers are infected.

Many downy mildew resistance sunflower hybrids are available and widely used. However, a new race that can overcome the resistance was identified last year. It is unlikely the race is widespread, but if a downy mildew resistant hybrid has symptoms, the new race may be present. Dr. Tom Gulya is will be coordinating a survey effort this summer to try and assess the geographic distribution of the new race. However, if you observe downy mildew in a resistant hybrid, your help in this process would be greatly appreciated. If possible, please place sporulating leaves (leaves with the white cottony growth) leaves in a zip lock bag, keep cool, and mail as soon as you are able to Tom Gulya at the address below.

Dr. Tom Gulya, Research Plant Pathologist
USDA,ARS,NCSL; 1307 18th St. N.; Fargo, ND 58102-2765
Thomas.Gulya@ars.usda.gov

Figure 1. Healthy (left) and downy mildew infected (right) sunflowers, note stunting.

Figure 2. Downy mildew infected plant with chlorotic leaves.

Figure 3. Downy mildew infected leaf with white-cottony sporulation on underside of leaf.

We thank you for help.

Sam Markell
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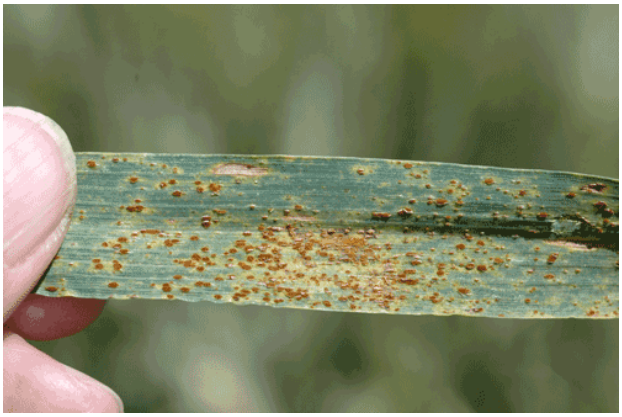
RECENT WHEAT RUST OBSERVATIONS

Stem rust was observed (M. McMullen) for the first time in ND this year, on Yellowstone winter wheat, at the Casselton Seed Farm on June 29. Incidence was 50%, severity was 5% on the flag leaves, with a only a very few pustules seen on the stems. No stem rust has been observed in any commercial winter wheat field. Samples from this variety will be sent to the Cereal Disease Lab for race identification, to determine which common race it is.

Stem rust pustules on the underside of the flag leaf on Yellowstone winter wheat.



Stem rust pustules on the upper surface of the flag leaf on Yellowstone winter wheat.

Stripe rust continues to be detected in winter wheat plots across ND, with the most recent observation of severe stripe rust in Darrell winter wheat at the North Central Research Extension Center, Minot, observed by Sam Markell. Stripe rust evaluations at the Hettinger Research Extension Center, by NDSU field scout Dixie Denis, on June 29, indicated that stripe rust was found in 14 of the 23 lines in variety plots, with the highest incidence (78-90%) and severity (5-8%) in Jagalene, Hawken and Darrell, followed closely by Striker (76% incidence, 4% severity). Stripe rust severities of >40% were observed in Hawken in Cass Co. on June 29. Most of the varieties are in the soft dough stage now.

Stripe rust also was observed (McMullen) at the Carrington Research Extension Center in a few spring wheats on June 24, mostly in RB07, but at very, very low levels. Most of the stripe rust has been observed in winter wheat and spring wheat varieties not commonly grown in ND.

Stripe rust on Hawken winter wheat, Cass Co.

Common leaf rust is rarely seen so far this year in spring wheat. Low levels have been observed in Jagalene, Darrell, and a few other winter wheats.

FUSARIUM HEAD BLIGHT (SCAB) RISK

The Fusarium head blight risk maps indicate a moderate to high risk of infection today (June 30), but the www.wheatscab.psu.edu website indicates that the risk will go down dramatically over the next few days, primarily because of the high winds and high temperatures that are occurring today, and predicted for July 1-2.

For producers who have wheat just starting to flower, I recommend that they re-assess the risk this Friday through Monday (July 2-July 5), as the wind speeds decrease and chance of showers returns. Infection is not occurring during these days of high winds and temperatures, as even night time dew periods and relative humidities are low. When night time relative humidities are above 80% for extended times is when infection is more likely.

Producers also should not try to spray when winds are high, as this is against ND pesticide laws and also won't do any good, as the fungicide won't reach its target. If infection doesn't occur within the next few days, and it shouldn't, then, if risk returns because of return to heavy dews and low winds, producers can still apply fungicides to heads that have been flowering for a few days.

NDSU IPM SURVEY RESULTS, JUNE 25th

NDSU IPM scouts looked at 97 wheat fields the past week, with the average growth stage of these crops at boot, but ranging from 5 leaf up to soft dough. As in previous reports, **tan spot** infection is by far the most common disease observed. Only a few commercial wheat fields have shown symptoms of stripe rust, none were reported with leaf rust, and a few had powdery mildew symptoms and a few with loose smut infections.

Bacterial stripe also is common in some fields, especially in winter wheats that had tender flag leaves several weeks to a month ago.

Bacterial stripe infection close up (shiny leaf appearance and dried bacteria on leaf surface, plus some stripe rust infections).

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POTATO LATE BLIGHT UPDATE

The wet spring conditions across North Dakota and Minnesota have been favorable for the development of Potato Late Blight, a disease caused by the fungal-like organism *Phytopthora infestans.* Late blight has been confirmed in a potato field from Dickey County in southeastern North Dakota as well as in western and central Manitoba. No late blight has been reported in Minnesota.

Late blight attacks the leaflets, petioles, and tubers of potato plants and thrives when warm days and cool nights are combined with high relative humidity. Late blight lesions (Figure 1) will generally occur 3 – 5 days after infection, and sporulation (Figure 2) will soon follow with favorable conditions. Fields should be scouted as often as possible to increase the chance of early detection. Samples should be placed in a plastic bag, kept cool, and brought to the Plant Pathology Department at NDSU for confirmation. Areas within fields that provide a favorable environment for late blight development include:

- Low-lying areas
- Areas next to shelter belts
- The inner span of pivots
- Areas around pivot tracks
- Under the corner system on a pivot
- Areas around power lines

To aid growers in their blight fight, fungicide recommendations and current late blight severity values can be found on the Late Blight Hotline at http://www.ndsu.edu/potato_pathology/ or by calling 1-888-482-7286.

Figure 1. Late blight lesions on upper part of leaf. (Note the lesions cross the midrib of the leaflets and the yellow halo surrounding the lesions)

Figure 2. Late blight lesion on the underside of a leaflet. (Note the white "fuzzy" material around the lesion. This is late blight sporulating)

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soils

MICRO-NUTRIENTS DON'T INCREASE WHEAT PROTEIN

Recently, it has come to my attention that some ag suppliers are promoting foliar applications of micro-nutrients like magnesium, iron, copper, manganese to increase wheat protein. I know of no studies to support this application. There is no logical reason to believe that application of micro-nutrients should increase wheat protein. On the other hand, there are many studies to support the application of the 10 gal / acre, 28% application post-anthesis to increase protein. I would encourage growers and suppliers not to use micro-nutrients to increase grain protein, but to follow the proven recipe described in the last three crop and pest reports.

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weeds

CONTROLLING ESTABLISHED ALFALFA

From time to time I get phone calls about the best herbicides to control alfalfa. It appears data is limited but below is a summary from a study conducted at NDSU and several compiled studies from SDSU. Most application were made to 6 to 10 inch alfalfa .

Control of established alfalfa (1993) - Rich Zollinger - NDSU. Treatments were applied to 8 inch alfalfa on May 11, 1993

	Rate Lb ai/A	------ % kill ------		
		6/2	6/21	8/31
Glyt + NIS + AMS	0.75	63	68	48
2,4-D e	1	81	96	64
2,4-D	2	88	98	84
Landmaster BW	54 fl oz/A	88	95	68
Dicamba	0.25	55	79	11
FallowMaster	3.25 pt/A	83	92	39
Curtail	4 pt/A	80	98	94
Untrt		0	0	0
LSD		10	8	11

Summary of SDSU data: (Spring applications). Multiple numbers are from separate studies. Numbers are from evaluations made 1 to 2 months after application and does NOT reflect final alfalfa control due to regrowth that might possibly occur.

	Rate	% kill
2,4-D	1 qt	85, 55
	3 qt	88, 80, 85
Dicamba	1, 2, 4 and 8 pt	98-99
2,4-D + dicamba	0.75 pt + 4 fl oz	82
2,4-D amine + atrazine	0.5 pt + 1 pt	93
Distinct + oil adj + N	6 oz	83, 97
	16 oz	94
Glyphosate + AMS	0.75 lb ae/A	43, 98
	1.25 lb ae/A	50
Glyphosate + 2,4-D + AMS	0.75 lb ae/A + 1 pt	99
Stinger	0.33 pt	55
	0.67 pt	99, 96
Curtail	2 pt	77, 92
	4 pt	96
WideMatch	1.33 pt	98
Hornet + NIS	5 oz	97
Starane + MCPA e	0.66 pt + 0.5 pt	90
Starane + Aim + NIS	0.5 pt + 0.5 oz	70
Bronate Advanced	0.8 pt	81
	1.2 pt	83
Bronate Adv + Starane	0.8 pt + 0.33 pt	96

Summary of SDSU data (Fall applications and evaluations made spring the next year).

	Rate	% kill
2,4-D	1 qt	10, 35
	2 qt	97, 97
2,4-D + dicamba	0.75 pt + 4 fl oz	85
Glyphosate + AMS	0.75 lb ae/A	70
	1.25 lb ae/A	86
Glyphosate + 2,4-D + AMS	0.75 lb ae/A + 1 pt	68, 69
Stinger	0.5 - 0.75 pt	70, 99
Curtail	1-2 pt	64, 98
Distinct + NIS + N	6 oz	30
Distinct + 2,4-D e + NIS + N	3 oz + 1 pt	97

CHEMICAL ANALYSIS OF PLANT TISSUE AND WATER

I have received several calls of crop damage from drift, tank contamination, and carryover of residual herbicides. Folks have asked where the plant tissue or water can be sent to have it tested for herbicide concentration.

Page 111 in the 2010 ND Weed Control Guide lists several labs to choose from. Contact the labs before sending any material to make sure they can analyze the chemical in question and proper method to send the material. Here is an abbreviated list from the weed guide:

Laboratories That Analyze For Pesticide Residue in soil, water, and plant samples. For links to labs in each state see AGLABS website: http://aglabs.sdstate.org

A & L Great Lakes Lab
3505 Conestoga Drive, Fort Wayne, IN 46808
(219) 483-4759, http://www.algreatlakes.com

Agvise Laboratories
Northwood, ND
(701) 587-6010, johntlee@polarcomm.com

Analytical Laboratory
McCall Hall, PO Box 173620
Montana State University, Bozeman, MT 59717
(406) 994-3383, Heidi Hickes
Developed the most sensitive test available for Oust.

Harris Laboratories
621 Rose Street, P.O. Box 80837, Lincoln, NE 68501
(402) 476-2811, http://www.mdsharris.com

Hazelton Environmental Services
525 Science Drive, Madison, WI 53711
(608) 232-3300

Midwest Laboratories
13611 B Street, Omaha, NE 68144
(402) 334-7770, http://www.midwestlabs.com

Minnesota Valley Testing Laboratories, Inc.,
326 Center Street, New Ulm, MN 56073
(507) 354-8517, (800) 782-3557

Minnesota Valley Testing Laboratories, Inc.,
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CONTROLLING VOLUNTEER TREES IN CROPS

Several people have called asking for the "secret" recipe for controlling elm and other woody tree species in cropland from shelterbelt and tree plantings. Unfortunately, there is no secret recipe. Tree seedlings are perennial and, as such, are affected most by the herbicides we use to control perennial species - 2,4-D, dicamba, Tordon, glyphosate. Volunteer trees are very difficult to control relying only on chemical control and without tillage. The trees would be even be more difficult to control in non-Roundup Ready broadleaf crops (like dry edible beans and sunflower) where systemic, growth regulator herbicides cannot be used. Page 66 in the 2010 ND Weed Guide shows control options in pasture, rangeland, and noncopland. With the exception of the GR herbicides listed above, herbicide are mostly ineffective. Glyphosate is not effective after tree seedlings get much size (become perennial).

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horticulture

CHECK SPRUCE TREES IN SHELTERBELTS FOR YELLOWHEADED SPRUCE SAWFLY

The yellowheaded spruce sawfly, *Pikonema alaskensis* (Hymenoptera: Tenthredinidae) has been observed feeding on spruce in western North Dakota (Morton and McKenzie Counties). It is primarily a pest of shelterbelt and ornamental plantings.

Description/Biology: Adults are reddish-brown in color and about 8 mm long. Sawflies overwinter as pupae in cocoons. In late May to mid-June, adults emerge and mate and females begin to lay eggs. A single egg is deposited at the base of a needle. Eggs hatch in five to10 days. Larvae are about 4 mm long when they first emerge. Mature larvae are almost 2 cm long and dark glossy green with a light lateral stripe and reddish brown head (Fig. 1). Larvae feed for 30 to 40 days consuming new foliage first and then older needles. Mature larvae drop to the ground and spin cocoons for overwintering. There is only one generation per year.

Figure 1. Yellowheaded spruce sawfly larva *(E.B. Walker, VT Dept Forests, Park & Recreation, Bugwood.org)*

Figure 2. Spruce tree damaged by yellowheaded spruce sawfly *(J. Knodel)*

Damage/Symptoms: Defoliation is caused by larval feeding. Heavily infested trees appear ragged, especially near the top (Fig. 2), and can be completely stripped of foliage. Severe infestations over one to several years can kill trees directly or make trees susceptible to attack by other insects or adverse weather conditions.

Control: Open grown trees that are five to nine years old are more vulnerable to yellowheaded spruce sawfly damage than are older trees or trees in dense stands. Although rodents will feed on pupae, and birds on sawfly larvae and adults, these predators, in addition to various parasites, are not always effective in keeping yellowheaded spruce sawfly populations at acceptable levels. If infestations are light, adequate control may be achieved by simply removing young larvae by hand. When an isolated ornamental tree is infested, spraying young larvae off of the tree with a strong jet of water will often be effective in reducing insect numbers. Yellowheaded spruce sawfly tends to attack the same trees repeatedly; therefore, chemical control often becomes necessary as a sawfly population increases. Acephate, carbaryl, imidacloprid, malathion and several pyrethroids (like tempo) are labeled for use against sawflies. Since most yellowheaded spruce sawflies are believed to overwinter very near the soil surface, removing the duff beneath infested trees may reduce the impact of this insect. Biorational treatments include azadirachtin, horticultural oil, insecticidal soap, pyrethrin and spinosad.

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around the state

North Central ND

Small grains:

Wheat Streak Mosaic Virus in Spring Wheat: Wheat streak mosaic virus (WSMV) symptoms were observed in spring wheat fields in the Kenmare (NW Ward County) and Sawyer (McHenry County) areas. The fields in the Sawyer area had flag leaf infections and the Kenmare field was in the jointing stage. Similar to Barley yellow dwarf virus, yield loss is approximately 5% with infections at the flag leaf stage and 20% at the jointing stage (Marcia McMullen, Extension Plant Pathology).

The wheat curl mite that spreads this virus completes an entire life cycle in as little as 7 days when temperatures are in the 70's. The combination of the warm weather and a maturing winter wheat crop increases the likelihood of the virus being spread from field to field. As green wheat tissue turns brown, the wheat curl mite moves out of protected areas of the wheat plant to volunteer wheat or adjacent wheat fields. The wheat curl mite is primarily spread by wind. Although mites can be spread by wind distances greater than one mile, the highest risk is to adjacent fields one-quarter to one-half mile from severely infected fields. Insecticides registered on wheat are not an effective tool for wheat curl mite management. Mites are in protected areas of the plant and reproduce rapidly so populations recover quickly from insecticides and miticides that are well below the 100% efficacy necessary for control. The best management practice for reducing the spread of WSMV is to eliminate the volunteer wheat food source for the mites through herbicide use or tillage. In addition, avoiding wheat on wheat rotations will reduce the spread of WSMV from one season to the next.

Wheat Midge:

The counties in our area are at or near the start of wheat midge flight. Burke, Divide, Mountrail, Rollette, and NW Ward counties are at 1150-1200, Bottineau, Renville, and Williams counties are at 1200-1250, and McHenry, McLean, Pierce, and central Ward county are at 1300-1350 midge degree days (http://ndawn.ndsu.nodak.edu). Wheat is at greatest risk when it is at heading to early flowering during peak emergence (1475 degree days). For more information on thresholds and risk, see Jan Knodel's article in the June 24th Crop and Pest Report or refer to the wheat midge section in the 2010 Field Crop Insect Management Guide (www.ag.ndsu.edu/pubs/plantsci/pests/e1143w1.htm).

Peas, Lentils, and Chickpeas:
Peas and Lentils are in bloom in the region. Fields should be scouted during full bloom for pea aphids and Lygus bugs. Pea aphid and Lygus bug numbers are increasing but are not yet above threshold in the fields we have observed. Ascochyta has been found in commercial pea fields and is best controlled during bloom.

Canola:
Many of the fields in the area are in bloom. The recommended timing for *Sclerotinia* control is at 20 to 50% bloom. Based on the risk maps from June 26th, the highest risk areas are in Bottineau, Burke and portions of Mountrail and Rollette Counties with low to moderate risk in the rest of the area. Updates can be found at http://www.ag.ndsu.edu/sclerotinia/.

Bertha army worm trap catches have remained very low, however, diamond-backed moth (DBM) trap catches have increased recently to as high as 59 moths per week. Trap catches of greater than 100 moths per week are indicative of populations that cause economic damage. Canola is most susceptible to injury from DBM at bloom to early pod development. Insecticide applications are justified when two or more larvae per plant are found throughout a field. Insecticide applications during bloom should be applied early or late in the day when bees are not out actively foraging for pollen. Some studies have indicated a benefit to canola pollination from insects.

Sunflowers:
Sunflower maggot, sunflower receptacle maggot, and sunflower seed maggot flies were observed in sunflower fields in Bottineau and Renville counties. The sunflower maggot is a stem feeder that is common in sunflower fields but does not cause economic damage. The sunflower receptacle maggot is the largest of these three species, but like the sunflower maggot, it is not an economically significant pest. The sunflower seed maggot is the smallest of these three species and tends to hold its wings together unlike the other two species. Of the three sunflower maggot species, the sunflower seed maggot has the most potential for crop injury and economic damage. For pictures and more information please visit:
http://www.ag.ndsu.edu/pubs/plantsci/pests/e1457.pdf.

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South-Central ND

According to NDAWN (North Dakota Ag Weather Network) data, the region received a trace (Fingal) to 1.2 inches (Lisbon) of rain during June 23 to 2. The region's soil moisture continues to be at adequate to excess levels. Hail damaged crops in the southwest portion of this region including Logan and Emmons counties.

Winter wheat is in the seed dough growth stage. April-seeded small grain is in the heading to early-seed development stages. Currently, fungicides for control of scab and leaf disease, and foliar N for increasing protein are the two common inputs being considered or used in spring wheat. Timely-planted corn is in at least the 6-leaf stage, which means the growing point is above ground. Accumulated growing-degree day units for April 25 planted corn to June 29 ranges from +28 units at Fingal to -70 units at Linton compared to the past 5-year average. Some of the region's corn will be waist-to-shoulder high by July 4. Weed spraying continues in row crops. Soybean planting may finally be completed but most timely-planted soybean is in the 3-trifoliate leaf (V3) to early-flowering (R1) stages. Cool-season broadleaf crops are in the flowering to early-pod development stages including canola, field pea, and flax.

Upcoming crop tours for the general public conducted by the NDSU Carrington Research Extension Center (CREC) and cooperators including county extension agents include:

*Tri-county (Wishek area), July 6, 7 p.m.
*Barnes County (Dazey area), July 7, 6:30 p.m.
*Pulse - primarily field pea (CREC), July 8, 9 a.m.
*Field Day (CREC), July 20, 9 a.m.

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diagnostic lab

NDSU PLANT DIAGNOSTIC LAB UPDATE

Diagnoses (by county) for North Dakota samples completed during this time are summarized in the table below:

County	Host	Diagnosis
Cass	American Plum (*Prunus americana*)	Insect Damage
Grand Forks	Ash *(Fraxinus* sp.)	Environmental stress
Bottineau	Barley (*Hordeum vulgare*)	Nitrogen Deficiency (4 instances)
Cass	Linden (*Tilia* sp.)	Cottony Maple Scale (*Pulvinaria innumerabilis*)
Richland	Blue Spruce (*Picea pungens*)	Environmental stress
Richland	Blue Spruce (*Picea pungens*)	Spruce Needleminers *(Epinotia* sp)
Richland	Blue Spruce (*Picea pungens*)	Winter Injury
Traill	Kentucky Bluegrass (*Poa pratensis*)	Unknown
Mchenry	Bur Oak (*Quercus macropcarpa*)	Anthracnose (*Discula quercina*)
Richland	Corn (*Zea mays*)	Chemical Injury
Ward	Crabapple (*Malus* sp.)	Mechanical Damage
Steele	Apple (*Malus domestica*)	Apple Black Rot (*Botryosphaeri obtusa*)
Cass	Apple (*Malus domestica*)	Cytospora Canker (*Cytospora* sp.)
Walsh	Dry Bean (*Phaseolus vulgaris*)	Chemical Injury
Cass	Pea (*Pisum sativum*)	Bean Leaf Roll Virus
Ward	Pea (*Pisum sativum*)	Pea Anthracnose (*Colletotrichum pisi*)
Cass	Pea (*Pisum sativum*)	Pea Mosaic Virus
Cass	Insect ID Request	Mourningcloak Butterfly (*Nymphalis antiopa*)
Cavalier	Maple (*Acer* sp.)	Growth Regulator Herbicide injury
Cass	Maple (*Acer* sp.)	Iron Chlorosis
Cass	Maple (*Acer* sp.)	Salt Damage
Cavalier	Mugo pine (*Pinus mugo*)	Normal Plant Growth (male cones)
La Moure	Plant ID Request	*Helianthus* sp.
Burleigh	Plant ID Request	Tall Fescue (*Festuca arundinacea*)
Richland	Ponderosa Pine (*Pinus ponderosa*)	Pine Tip Moth injury
Pierce	Potato (*Solanum tuberosum*)	Growth Regulator Effect
Hettinger	Quaking Aspen (*Populus tremuloides*)	Cultural problem
Ward	Juneberry (*Amelanchier alnifolia*)	Powdery Mildew (*Podosphaera* sp.)
Grand Forks	Scotch Pine (*Pinus sylvestris*)	Environmental stress
Richland	Sugar Beet (*Beta vulgaris*)	Fusarium Yellows (*Fusarium oxysporum*)
Cass	Tatarian Maple (*Acer tataricum*)	Physiological leaf spot
Cass	Tomato (*Lycopersicon esculentum*)	Growth Regulator Herbicide injury
Kidder	Tomato (*Lycopersicon esculentum*)	Growth Regulator Herbicide injury
Stutsman	Tomato (*Lycopersicon esculentum*)	Nitrogen Deficiency
Cass	Turfgrass (mixed species)	Fairy Ring (various fungi)

The Great Plains Diagnostic Network continues to sponsor a small grains virus survey for 2010. Nine small grain samples were processed for this survey last Friday, and of these only one spring wheat sample (from Eddy county) tested positive for viruses (WSMV and HPV).

A final summary of North Dakota samples for this survey will be available in the last Crop and Pest Report issue for 2010.

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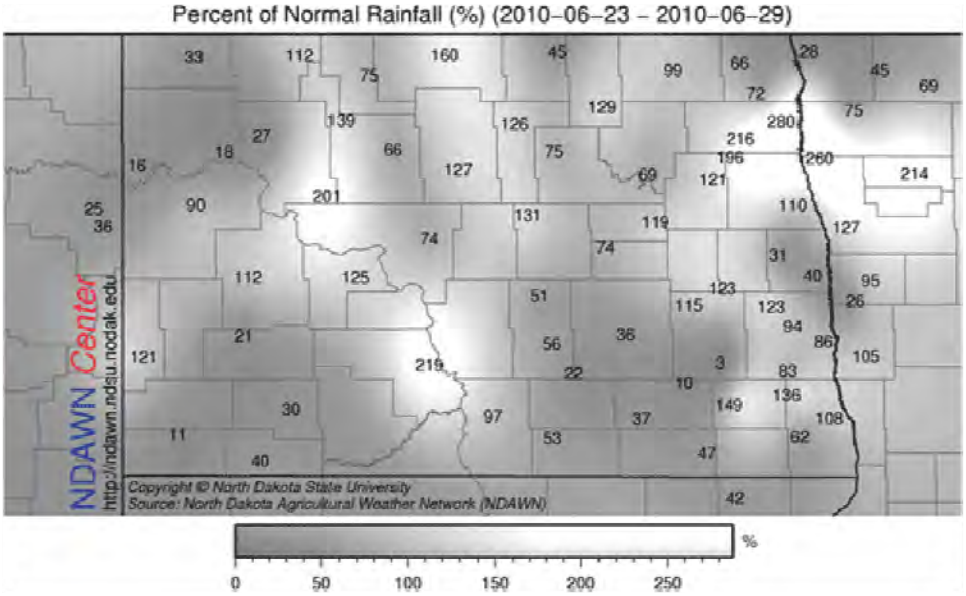
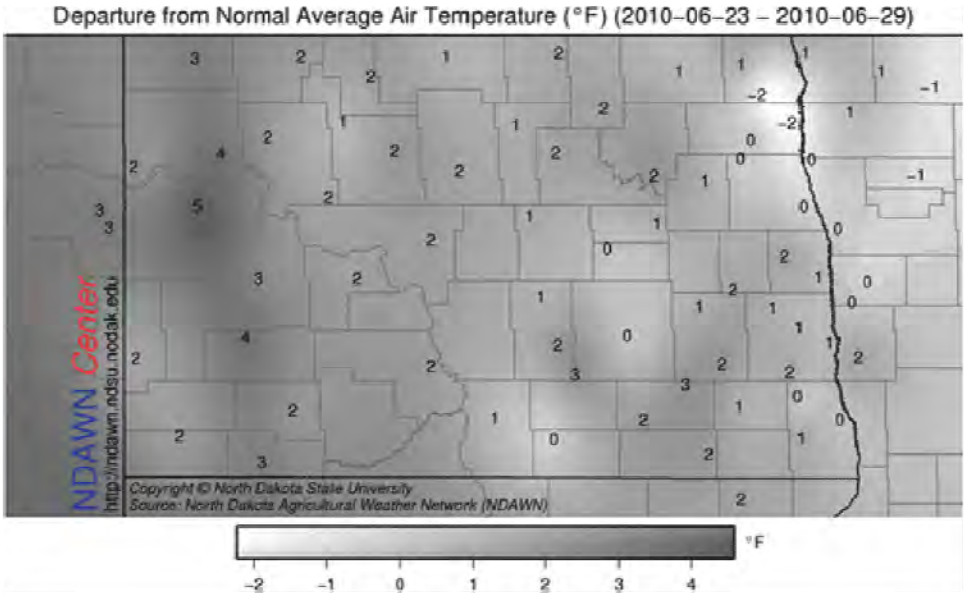
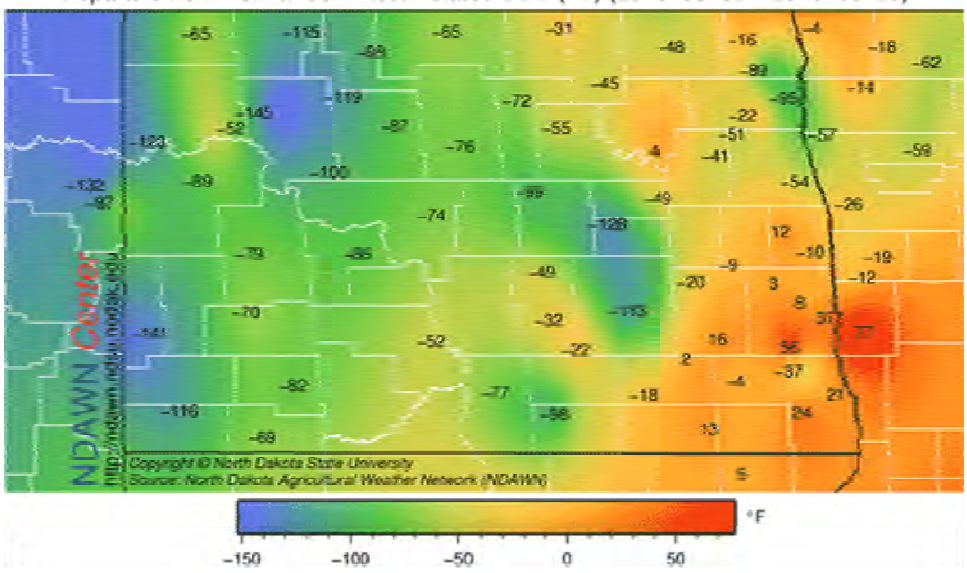
weather

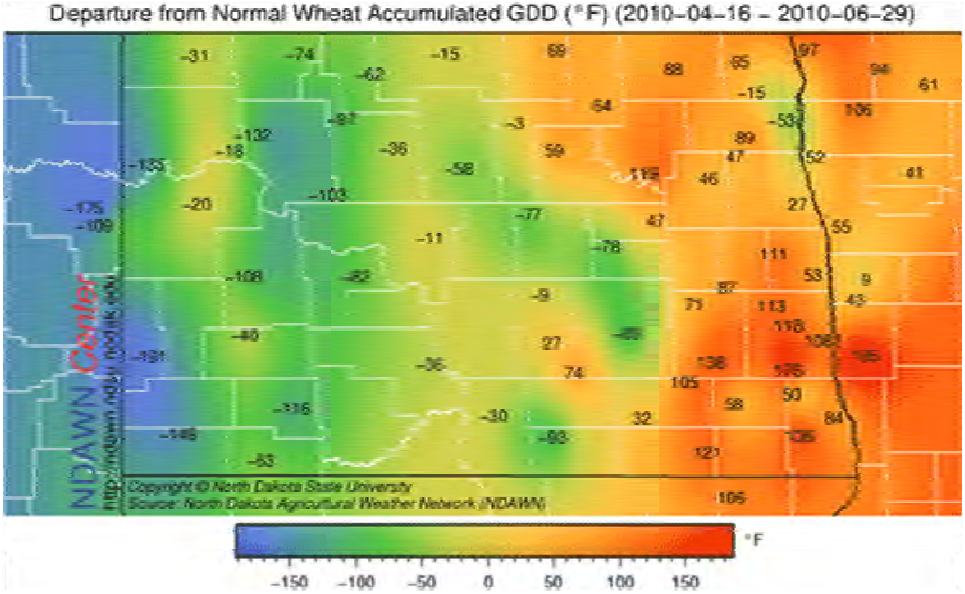

Percent of Normal Rainfall (%) (2010-06-23 - 2010-06-29)
NDAWN Center
http://ndawn.ndsu.nodak.edu
Copyright © North Dakota State University
Source: North Dakota Agricultural Weather Network (NDAWN)
%
0 50 100 150 200 250


Departure from Normal Average Air Temperature (°F) (2010-06-23 - 2010-06-29)
NDAWN Center
http://ndawn.ndsu.nodak.edu
Copyright © North Dakota State University
Source: North Dakota Agricultural Weather Network (NDAWN)
°F
-2 -1 0 1 2 3 4

Departure from Normal Corn Accumulated GDD (°F) (2010-05-02 – 2010-06-29)



Departure from Normal Wheat Accumulated GDD (°F) (2010-04-16 – 2010-06-29)



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