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Lisa Jasa
University of Nebraska-Lincoln, ljasa1@unl.edu

CROP WATCH

University of Nebraska Cooperative Extension
Institute of Agriculture and Natural Resources

No. 2003-11
May 23, 2003

Despite temperatures dropping to the mid 20s

Most wheat expected to do well

Much of western Nebraska's wheat and alfalfa crop isn't likely to suffer major yield losses from lows dipping into the 20s to 30s early Tuesday morning; however, there are likely to be isolated areas of significant injury.

While the lowest temperatures were in the northern and far western Panhandle, areas as far east as North Platte had temperatures around 30°F for several hours May 20. Temperatures at Alliance, as recorded by the High Plains Climate Center, dropped and then hovered with readings of 30°F at 3 a.m., 28°F at 5 a.m., 27°F at 7 a.m. and 28°F at 8 a.m. At Valentine, lows dropped from 30.9°F at 6 a.m. to 26.1°F at 7 a.m. and 8 a.m.

Temperatures as low as 21°F were reported in some of the Panhandle and varied with altitude and exposure; however, generally widespread lows were believed to be closer to 30°F. Fortunately, the vast majority of wheat in the Panhandle had not yet reached the heading stage, when freezing temperatures of 30°F for two hours may cause severe damage to grain yield by killing pollen and preventing seed set. A sizeable portion of the Panhandle winter wheat crop was in the boot stage (the time from when the head passes the third joint or node until the head emerges). Symptoms caused by freeze at this stage include: trapped heads that have difficulty emerging from the boots, bleached or yellow heads, sterile heads, damaged stems resulting in stem breakage later in the season, and leaf discoloration. Temperatures in the wheat canopy need to drop to 28°F or lower for two hours for this injury to occur.

At the boot stage, frequently only the male parts (anthers) of the flowers in the heads are killed. Since wheat is mostly self-pollinated, sterility caused by freeze injury causes poor kernel set and a low grain yield. Injury can be detected by examining the anthers inside each floret. Anthers are normally light green and turgid when young and become yellow about the time they are extruded from the florets after flowering (anthesis). Freeze injury causes anthers to be white and shriveled and might prevent them from being extruded from the florets.

Freezing temperatures that are severe enough to injure leaves and lower stems are nearly always fatal to male flower parts, but less severe freezing may cause male sterility without any symptoms appearing on plant vegetative parts (leaves and stems).

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Inside

State drought rating improves, but subsoil, reservoirs still low

Normal to above normal precipitation during the last 30 days across much of the state has improved soil moisture prospects, reduced drought severity, helped improve pastures significantly, and in many areas, delayed planting. Appearances can be deceptive, however, and the hydrological aspects of the current drought remain strong and are not likely to improve significantly during the upcoming growing season. Educators report that while there is topsoil moisture, fields are still short of subsoil moisture in many areas.

The latest water supply summary for reclamation reservoirs in Nebraska was released May 16 and paints a bleak picture throughout the Republican River Valley. Enders Dam recorded 6.59 inches of precipitation (174% of normal) during the first four months of 2003. However, storage in Enders on April 30 was the lowest ever re-

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Updates

Ronald Seymour, Extension Educator in Adams County: Corn planting is almost complete and about 25% of the crop has germinated. Soybean planting is underway with about 40% of the crop in the ground. Winter wheat looks very good with about 70% of the fields headed out. A few wheat fields had the beginning of a rust infestation. Pasture grasses continue to grow well in response to recent rain, but subsoil moisture is still minimal.

Paul Hay, Extension Educator in Gage County: Significant progress was made over the weekend on soybean planting. Many farmers are done with corn, 70% of the soybeans are planted and 40% of the milo is planted. The first cutting of hay is underway with reports from 0.8 tons per acre to 2.6 tons per acre, depending on the year of the stand and the moisture situation in the field. There have been reports of flea beetle, chinch bugs, and cutworm, but nothing widespread. Wheat is heading and looks quite good at this point.

Ralph Anderson, Extension Educator in Buffalo County: A 0.5- to 1.5-inch rain Sunday night stopped the planters in the fields until at least mid-week. Corn is 50-100% planted with a county average of about 85%. A few soybean acres have been planted but few, if any milo acres. Severe alfalfa aphid numbers have been reported, with early harvest as the preferred management strategy. Pastures are getting some growth and soil moisture levels are improving. Severe grasshopper numbers are being seen in parts of the county and the treatment window for control for the over-wintering species will be here soon. The spring hatch is expected to be visible soon.

Gerald Hopp, Extension Educator in Richardson County: Gentle rains on May 19 kept worked wonders on plant development; however field work is sporadic because of wet soil conditions. Corn flea beetle has been pressuring some fields. Alfalfa weevil was scouted and many of those fields had an insecticide application.

A weed, being identified as field pansy, is showing more aggressiveness in no-till fields. With recent heavy rains, no-till fields are keeping soil in place. The same cannot be said for fields which were thoroughly tilled. Wheat fields are all headed and very lush with foliage. Risk of chinch bugs seems remote now.

USDA Nebraska Agricultural Statistics Service: For the week ending May 18, limited rainfall and drier soils provided producers the opportunity to move ahead with spring planting.

Corn planting moved ahead last week to 77% complete. Last week's drying weather allowed crop growth to catch up some so that now it's less than a week behind last year at 91% and the average of 89%. Thirty-one percent of the fields had emerged, compared with 47% last year and 50% average.

Soybean planting also made good progress and is 22% complete. This is also slightly less than a week behind 41% reported last year and the 46% average. Three percent of the fields had emerged, compared with 8% last year and 13% average.

Sorghum planting was underway in several areas of the state with 8% of the acreage seeded. This compares with 18% last year and 25% average.

Wheat condition rated 8% poor, 31% fair, 44% good, and 17% excellent, above last year and the five-year average. Ninety-one percent of the crop had jointed, a week ahead of last year at 77% and average at 80%. Wheat fields were heading out across the southern third of the state with 10% headed statewide. This is behind the 15% last year and 19% average.

Alfalfa conditions rated 2% very poor, 5% poor, 27% fair, 47% good, and 19% excellent. First cutting activities have begun.

Pasture and range: Pasture and range condition rated 10% very poor, 20% poor, 42% fair, 24% good, and 4% excellent.

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Lisa Jasa, Editor; Email: ljasa1@unl.edu

Frosted wheat *(Continued from page 101)*

Table I. Temperatures that cause injury to wheat at spring growth stages and symptoms and yield effect of spring freeze injury.

Growth stage	*Approximate injurious temperature (two hours)*	*Primary symptoms*	*Yield effect*
Tillering	12 F	Leaf chlorosis; burning of leaf tips; silage odor; blue cast to fields	Slight to moderate
Jointing	24 F	Death of growing point; leaf yellowing or burning; lesions, splitting, or bending of lower stem; odor	Moderate to severe
Boot	28 F	Floret sterility; head trapped in boot; damage to lower stem; leaf discoloration; odor	Moderate to severe
Heading	30 F	Floret sterility; white awns or white heads; damage to lower stem; leaf discoloration	Severe
Flowering	30 F	Floret sterility; white awns or white heads; damage to lower stem; leaf discoloration	Severe
Milk	28 F	White awns or white heads; damage to lower stems; leaf discoloration; shrunken, roughened, or discolored kernels	Moderate to severe
Dough	28 F	Shriveled, discolored kernels; poor germination	Slight to moderate

It's difficult to know the actual air temperatures in the wheat canopies of individual fields. Since it takes several days of warm weather for freeze injury to become apparent, wait five days or so after a freeze and then assess plant damage.

In the West Central District, temperatures were a little warmer although they were still low enough to cause potential injury, such as in poor stands of wheat. While the air temperature may drop for several hours, the actual microclimate of the crop may be several degrees warmer and create a "cushion" of protection to help moderate temperature swings. Factors beside air temperature affecting the potential for damage include

1) crop condition – the current growth stage and lush state of the wheat crop with its dense canopy helps create a warmer microclimate;

2) soil moisture – generally the topsoil is moist and helps limit temperature changes (Several years ago where there was a hard freeze in the Republication Valley in June, the cultivated corn with dry top soil suffered significantly more damage than the non-cultivated corn); and

3) duration of the chill – research indicates that temperatures would have to drop blow 28°F for more than two hours to damage wheat at its current growth stage.

The many factors influencing freeze injury to wheat — plant growth stage, plant moisture content, and duration of exposure — often make it difficult to predict the extent of injury too quickly. This is complicated further by differences in elevation and topography among wheat fields and between the fields and official weather stations. It is not unusual, for instance, for wheat growers to report markedly lower temperatures than are recorded at the nearest official weather station.

Areas that may have been particularly susceptible to the temperatures are low field areas, thin stands, and dry soil.

Alfalfa

In some areas temperatures may have been cold enough to have caused alfalfa tops to wilt and droop over. If the stems turn brown and the tops don't improve, the growing point may have been injured. The best option is to go ahead with the first cutting as soon as possible.

This year a number of people are grazing their alfalfa due to pasture shortages or to defer rangeland or other grass pastures. A freeze dramatically increases the potential for bloat from feeding alfalfa and cattle should be removed from the alfalfa for a week.

We will have a better estimate of the extent of the wheat and alfalfa injury by next week.

For more information on how to assess freeze injury in winter wheat, see *CropWatch* on the Web at *cropwatch.unl.edu* or check the NU Cooperative Extension publication, *Freeze Injury to Nebraska Wheat* (EC94-132). It is available from your local Cooperative Extension office or on the Web at *http://www.ianr.unl.edu/pubs/fieldcrops/ec132.htm*

Drew Lyon, Extension Dryland Crops Specialist
Panhandle REC
Jerry Volesky
Extension Range Specialist
Panhandle REC
Bob Klein, Extension Cropping Systems Specialist
West Central REC

Drought rating (Continued from page 101)

corded for the month and inflows are the lowest on record. The recent precipitation is being absorbed by soil profiles, but is not making its way into the runoff component. With similar reductions in inflows, the Frenchman Valley and H&RW Irrigation districts have decided not to deliver water this year.

Trenton Dam recorded 179% of normal precipitation during the first four months of the year, but like Enders, experienced record lows in amount of water stored from January through March, with April coming in as the second lowest. Currently the Frenchman-Cambridge Irrigation District doesn't plan to deliver water from the Swanson Reservoir this season. In addition, Hugh Butler is 15.5 feet below full and was at the lowest level ever recorded at the end of April. No irrigation water is anticipated to be delivered from Hugh Butler this growing season.

Medicine Creek Dam recorded 4.96 inches of precipitation (128% of normal) during the first four months of the year. Harry Strunk Lake was 4.8 feet below full at the end of April, the lowest ever recorded for the month. Delivery expectations through the Cambridge Canal have been reduced from an expected 8 inches announced in January to 7 inches, compared to a normal season of 12 inches. In addition, Harlan County Lake has risen only one foot since January. The Bostwick Irrigation District now expects to deliver 6 inches, down from the 7 inch estimate announced in January, compared to a normal season of 12 inches.

In the northwest, Box Butte Dam recorded 168% of normal precipitation from January to April. The lake was 14 feet below full. Irrigators in the Mirage Flats Irrigation District can expect only 4 inches of delivered water this season, about half of normal. It appears that full irrigation supplies will be delivered from the Lake McConaughy system. For updated information on the North Platte river basin water supplies, please visit the following web link: *http://www.usbr.gov/gp/wareprts/wsnpmay.htm.*

On a positive note, it appears that there have been some beneficial impacts from the recent trend of above normal precipitation. Merritt, Calamus, and Davis Creek Reservoirs all recorded above normal precipitation during the first four months of the year and all are above normal in terms of storage. Full water deliveries are expected for irrigators serviced by Ainsworth and Twin Loups Irrigation districts.

Reservoir storage, streamflow projections, irrigation restrictions, and irrigation water release estimates will be included in future issues of ***CropWatch***, as state agencies issue updated releases. To view a more complete summary of the information presented in this article, please visit the ***CropWatch*** Web site at cropwatch.unl.edu.

Al Dutcher
State Climatologist

Forecasts look good for late May, less certain for rest of summer

The last 30 days have brought a wide array of weather for Nebraska including snow, flooding, severe storms, heat, and freezing temperatures. Above normal precipitation was recorded in much of the state, with the heaviest amounts in east central and northeast Nebraska.

As of May 22, the U.S. Drought monitor indicates that there is no longer any area of the state classified as experiencing either extreme or exceptional drought. The area of severe drought has been reduced to include most of the Platte River Valley from Kearney to Scottsbluff. Moderate drought is confined to most of remaining western two-thirds of the state and an area 1.5 counties wide along the Kansas-Nebraska border in south central and southeast Nebraska. The remainder of the state is classified as either in abnormally dry or normal. (View the map at *CropWatch.unl.edu.*)

Short-term precipitation indicators used by the U.S. Drought Monitor authors are showing normal to above normal conditions across the state. Most locations have ample moisture for newly emerging crops.

At present the only remaining drought tag is the hydrological (H) indicator. This tag is supported by the fact that 3.5 year deficits in the worst areas of the state indicatethey have lost almost a full year of normal precipitation. Even with the normal to above normal precipitation during the last 30 days, streamflow rates, reservoirs, and stock ponds have shown little significant recovery. If normal precipitation occurs during the growing season, the hydrological drought will neither deteriorate nor show significant improvement.

Weather patterns appear favorable for producers through the end of May. Although models indicate chances for moisture May 24-30, they don't indicate widespread organized storms, but rather scattered precipitation. This may cause local planting delays, but should not stop planting across the state, as happened earlier this month.

Unfortunately, the May 18-19 precipitation events brought unseasonably cool weather to the western third of the state. Low temperatures May 20 ranged from 25°F to 30°F across the Panhandle, far western counties of the southwest, and the western half of the Sandhills. A hard freeze, with temperatures less than

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Weather

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28°F occurred across the northern half of the Panhandle and western Sandhills.

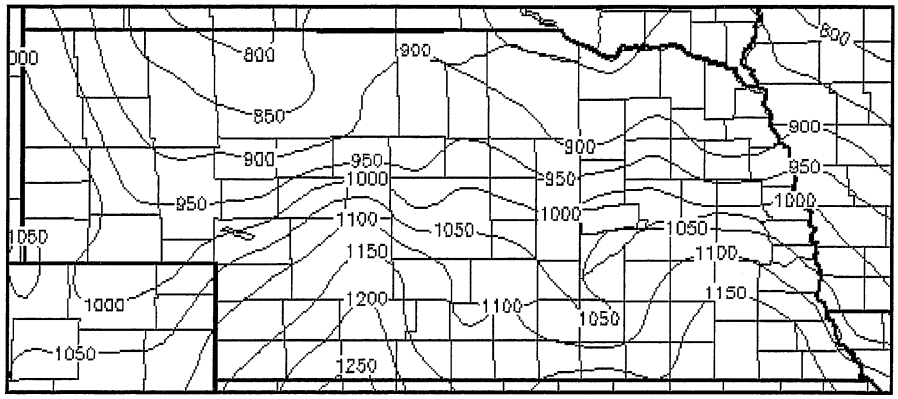
Long-term forecasts

As we look forward through the growing season, there is considerable uncertainty about upcoming weather conditions. Last month, long lead outlooks indicated that all regions of the continental United States, except the Pacific northwest, would have a tendency toward above normal temperatures throughout the growing season. The highest probabilities for above normal temperatures were forecast for July and August; however, the May 15 release limited above normal temperatures to the southern quarter of the United States.

In the short-term, the western high pressure ridge that dominated our weather last year doesn't appear to be strengthening. Low pressure in the Gulf of Alaska has been persistent since the onset of the major Colorado snowstorm nearly two months ago. As long as this pattern continues, Nebraska should receive normal precipitation. So far this pattern has not shown signs of abating, but statistically should begin to have less of an impact as we progress through June.

Another positive for western Nebraska producers is that the snowpack in Colorado and Wyoming should not disappear before mid June and may last until early July if temperatures cooperate. This should help limit the northward extent of the ridging pattern that develops in the southwestern U.S. at this time of year. The moisture evaporated into the atmosphere during snow melt should provide for front range thunderstorm development, which generally has a positive impact for the western half of Nebraska.

Al Dutcher
State Climatologist



Accumulated growing degree days as of May 21, using a 41° F base. Producers should begin scouting for common stalk borers when 1,300 - 1,400 growing degree days have accumulated. (*Map courtesy Al Dutcher, NU State Climatologist*)

Begin stalk borer scouting

The common stalk borer (Paipema nebris) life cycle begins in the fall when moths lay their eggs on grassy plants and ragweed. Often these are in fence rows, grass waterways or terraces bordering crop fields. These eggs hatch in late April or early May and larvae bore into the grasses or other weeds such as ragweed and begin feeding. As the stalk borers grow or if the plants are mowed or burned down with herbicides, they move into adjacent corn plants to complete their development.

Common stalk borers are rather distinctive in appearance, with three white stripes on a background brownish-purple coloration. The two stripes on the side stop just behind the three pairs of true legs, then continue about half-way down the length of the caterpillar. Stalk borer feeding may kill the growing point if the caterpillar bores into the base of the stalk or it may produce ragged feeding holes in the leaves, if feeding starts in the whorl and then moves down into the stalk.

As of May 21 900-1150 degree days (base 41°F) had accumulated since Jan. 1 (*see map*). Based on research at Iowa State University, stalk borer egg hatch begins at about 575 degree days and should be complete by 750 degree days. Scout corn for common stalk borers when about 1,300-1400 degree days have accumulated. Updated degree day maps will be published in future issues of ***CropWatch***.

Check corn plants bordering grassy areas. Examine several sets of 10 plants. Look for feeding damage and insect damaged plants to see if live larvae are present. If weedy grasses were common throughout the field in the previous year, the whole field may need to be scouted for common stalk borers. Use the tables on page 106 to determine the economic injury level.

To be effective, insecticides must be applied before common stalk borer larvae enter the stalk. In cases where stalk borers begin feeding on grassy weeds or other vegetation in field edges, control is most effective if timed between 1400 and 1700 degree days, which corresponds to the first half of the period when stalk borers are migrating from weedy hosts into corn. If the infestation is restricted to the field margin, use a border treatment.

In cases where there is a history of fieldwide stalk borer damage at a site, insecticides applied to corn and timed for egg hatch may reduce damage. The disadvantage of this approach is that there is no effective way to sample for stalk borers at this time, so treatments are made without knowing whether they would be profitable that year.

Insecticides may be mixed with fast-acting herbicides being used to

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Stalk borer

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burn down early season weeds, or applied several days after use of slower-acting herbicides. Check the label for compatibility of different insecticide and herbicide mixtures.

A variety of foliar insecticides are labeled for control of common stalk borers in corn, including Ambush 2E (6.4-12.8 oz per acre), Asana XL (5.8-9.6 oz per acre), Baythroid 2 (1.6-2.8 oz per acre), Lorsban 4E (2-3 pints per acre), Pounce 3.2EC (4-8 oz per acre), Capture 2EC (2.1-6.4 fl. oz per acre), Mustang Max (2.72-4 oz per acre) or Warrior 1EC (2.56-3.84 oz per acre).

For a list of products, visit the UNL Entomology Web site at *http://entomology.unl.edu/instabls/stalkbor.htm* For more information see NU NebGuide G521, *Common Stalk Borer in Corn.*

Bob Wright
Extension Entomologist
South Central Ag Laboratory

Table 1. Common stalk borer economic injury levels (% injured plants) (Assumes 80% insecticide efficacy, and $2 bu/acre grain value).

Corn leaf stage	*125 bu/acre yield potential*		
	Control costs/acre		
	$7	*$10*	*$13*
1	7	9	12
2	8	11	15
3	10	14	18
4	11	16	20
5	11	16	21
6	22	32	41
7	100	100	100

Corn leaf stage	*150 bu/acre yield potential*		
	Control costs/acre		
	$7	*$10*	*$13*
1	5	8	10
2	7	9	12
3	8	12	15
4	9	12	16
5	9	13	17
6	18	26	33
7	100	100	100

Seedling disease problems in corn and soybean

While the recent rain is great in a predicted drought year, it may be rather untimely for some of the state's corn and soybean fields. In many areas, corn stands are much thinner than planned, planting has been delayed, and earlier planted soybeans are not looking too good. With all the rain over the last couple of weeks, seedling diseases are going wild. (Sorry, the pathologist in me brings the term "wild" into the picture.)

For both corn and soybeans, the seedling disease most common with cool, wet spring conditions is Pythium. Pythium is very common in Nebraska. It can be found in both corn and soybean fields and is supported by the common rotation of the two crops.

Pythium is favored by high moisture availability and can be active in a diverse range of soil temperatures, depending on the species.

One factor that contributes to seedling disease is temperature. When temperatures are cooler than optimum for growth and development, the seedlings will be stressed and more susceptible to infection. The most common Pythium problems in Nebraska are during cooler conditions when soils are between 50°F and 60°F degrees and excess moisture is available. This year's spring conditions have been perfect for this pathogen.

Another wet weather pathogen in Nebraska is Phytophthora. *Phytophthora sojae* is only a problem in soybeans and cannot infect corn. This is the only soybean seedling disease for which resistant varieties are available. In our surveys of Nebraska fields, we have found pathotypes or "races" which can infect the most commonly marketed resistance genes in Nebraska. If you have a field with a severe stand loss each year you have a wet spring with soybeans in the field and your corn does well under similar conditions, there is a good chance you are dealing with Phytophthora. Growers should note the varieties and resistance sources they are using in the field to determine if they can use currently marketed resistance.

Recommended treatments

The most common protection recommended for seedling disease is a seed treatment fungicide. Most corn seed is already treated with fungicides with approximately 80% of the market treating with MaximXL and the other 20% treating with a combination of Captan and Allegiance.

For Pythium, the mefenoxam in Maxim XL and the metalaxyl in Allegiance are the compounds with activity. For soybeans, seed treatment usage is not as great due to shorter shelf life of soybean seed. The main products with activity against Pythium in soybean will be Apron Maxx, ApronXL, Allegiance, Stiletto and Warden (See *Seed Treatment Fungicides for Soybeans* at *http://www.ianr.unl.edu/pubs/plantdisease/nf411.htm).* Each of these products will have either metalaxyl or mefenoxam.

These same products also will work with Phytophthora, but the rates need to be increased to be effective (See *Management of Phytophthora Diseases of Soybeans* at *http://www.ianr.unl.edu/pubs/plantdisease/nf518.htm).* Another indication of Phytophthora in soybeans is the lack of efficacy with standard rates of seed treatment fungicides.

Even in some cases where the corn or soybean seed was treated, you still may see problems. Seed treatment fungicides can only be

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Seedling disease

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expected to achieve a certain level of control. As soil continues to be saturated with more rain, the chemical is diluted and eventually (depending on timing) the crop will not be protected. While mefenoxam and metalaxyl are systemic, they must be taken up before continual rainfall occurs to have maximum efficacy potential.

Also, in some cases Pythium isolates specific to one field may be more aggressive (able to infect more) than the isolates from another location. In fields with very aggressive isolates, it may be necessary to increase the rate as with Phytophthora in soybean.

Bottom line: While we are all thankful for the rain, in some cases the fungi may be showing the most gratitude and in ways we'd rather not see!

Loren Giesler
Extension Plant Pathologist

Documentary explores swine industry changes

"Rural Battleground," a 30-minute documentary about how an evolving pork industry is affecting rural communities will be shown May 30 on "Market Journal Extra."

"Rural Battleground" reveals the root causes of the conflict between large-scale animal confinement operations and the people who live near them. The impact of these operations on the environment, local economies, and people is at the heart of the debate.

Most of the battles to either block or win approval for large-scale animal operations in Nebraska have been fought at the county level. Zoning laws have been applied and tested by both sides, and legal challenges to zoning rulings have been both numerous and contentious.

To view the show, contact your local Cooperative Extension Office or visit marketjournal.unl.edu

Stripe rust expected in wheat

A recent survey of wheat in the Nebraska Panhandle revealed minimal disease activity. A few pockets of wheat streak were found, but nothing widespread. The condition of the wheat ranged from good to fair to poor and was closely related to fall moisture. The worst wheat apparently didn't receive sufficient fall moisture which resulted in spotty stands. The dry seedbeds exacerbated a blowing problem which filled furrows with soil.

Stripe rust is present in Kansas and is severe on susceptible varieties such as 2137. Oklahoma reports that the flag leaves of 2137 and other susceptible varieties were prematurely killed by stripe rust. We have received reports of stripe rust in Nebraska, but I have not observed it in any of my surveys or in my fungicide plots at Mead; however, I'm sure it will develop in the next couple of weeks. In deciding whether to spray, consider the following criteria:

- Is the potential yield of the field 45 bushels or greater.
- Is the variety susceptible (*see the attached table*).
- If the field is irrigated or being grown for seed, treatment is advisable on susceptible varieties.

Fungicide options include six products: Quadris, Tilt, Headline, PropiMax, Stratego and the mancozeb-based products. Tilt and Stratego are applied at flag leaf emergence, which has probably already passed. Quadris, Headline and PropiMax can be applied up to full heading emergence. The mancozeb-based products are not systemic and generally two applications, one at boot and another at late head emergence, are required for effective control.

Leaf rust is developing slowly in Oklahoma and Kansas and is not likely to be a major factor in Nebraska. Stripe rust poses the greater threat.

John Watkins
Extension Plant Pathologist

Table 1. Stripe rust severity ratings on June 20, 2001 of the Perkins and Keith county wheat variety tests.

Variety/Line	*Perkins*	*Keith*	*Variety/Line*	*Perkins*	*Keith*
2137	VS	S	Jagger	VL	VL
Akron	M	L-M	Lakin	VS	S
Alliance	VL	L	Millennium	L	L
AP Thunderbolt	L-M	L-M	Niobrara	M	M
Arapahoe	L	L-M	Nuplains	M	MS
Betty	L	VL	Pronghorn	VL	VL
Cougar	L-M	M	Trego	L-M	L-M
Culver	M	M	Turkey	L	VL
GM Golden Spike	L	VL	Scout 66	L	VL
GM10002	L	VL	Vista	L	L
GM10001	VL	VL	Waho	L	VL
Halt	L	L-M	Wesley	VL	VL
Heyne	L	VL	Windstar	M	M

Rating codes for stripe rust severity

VL = Very light rusting
L = Light rusting
L-M = Light to moderate rusting
M = Moderate rusting
MS = Moderately severe rusting
S = Severe rusting
VS = Very severe rusting

Weed specific management tips for pastures

Western ragweed

Western ragweed *(Ambrosia psilostachya)* is a common native weed in northeastern Nebraska's rangeland, prairies and disturbed sites in all soil types. It is a perennial forb from the sunflower family (Asteraceae) that reproduces both by seeds and rhizome. (Rhizome is a horizontal creeping root system growing in the top 5-10 inches below the soil surface.) The plants usually grow in sparse groups (patches or clusters).

The plant stem is very erect, grows up to 3 feet tall, and has many branches and long hairs which give it a coarse feeling. Leaves are alternate on the upper part of the stem, opposite on the bottom, with many divisions and teeth. Like many other plant species, the overall growth and development depends on the amount and timing of rainfall. Western ragweed, in Nebraska, can flower from July to October, with greenish-yellow flowers positioned on the top of the main stem and branches. It produces one inch long bur-like fruits with a single seed in each bur.

Western ragweed provides forage for deer and the fruits are an important food source for upland game birds, wild turkeys and songbirds. Native Americans used the whole plant to make a tea to treat colds and cramps. Western ragweed has almost no value to livestock because of its low palatability. With other forage limited, it may be eaten. Pollen produced in late summer causes hay fever in many people, due to presence of volatile oils, which can also cause skin irritation.

Due to its low value for livestock forage, it is a concern to livestock producers and ranchers. This weed can be controlled by various means. Mowing the plants when they are 4-6 inches tall can reduce the ragweed population considerably for the season. Mowing can be done one or two times per season depending on the amount of rainfall during the season. One mowing in mid June is effective if the season is dry, due to lack of moisture needed for weed regrowth. If the season is wet, an additional mowing is needed in July-August.

Herbicides also can be very effective in providing season long control. Apply herbicides when ragweed plants are 3-5 inches tall. Effective herbicides and their rates per acre include: Salvo (12 oz/acre), 2,4-D-Ester (1qrt/acre), Grazon P+D (32 oz/acre), Weedmaster (32oz/acre), Ally (0.25oz/acre), and Vista (22 oz/acre).

Stevan Knezevic
Extension Weeds Specialist
Northeast REC

Hoary vervain

Hoary vervain *(Verbena stricta)*, also known as wooly verbena or tall vervain, is a common native weed in northeast Nebraska on overgrazed rangeland, prairies and disturbed sites in all soil types. There are several other types of vervain in Nebraska (prostrate, white, and blue), of which most have similar growth forms and habits as hoary vervain.

This perennial forb is from the vervain family (Verbena-ceae) that reproduces by seeds. The taproot (perennial structure) produces individual erect plants. The stem is nearly round, simple or branched above and can be up to 5 feet tall, covered with soft white hairs. Leaves are opposite and leaf blades are ovate with many teeth. Lower surface is pubescent with highly visible veins. Like many other plan species, the overall growth and development depends on the amount and timing of rainfall. Hoary vervain, in Nebraska, can flower from May to September, with blue or purple flowers positioned on the top of the main stem and branches. It produces a two-seeded fruit.

Hoary vervain provides forage for deer and its seeds are an important food source for small mammals and upland birds. Native Americans used the leaves to make a tea to treat stomach ache. Hoary vervain has no value to livestock because of its low palatability.

This weed can be controlled by various means. Mowing the plants when they are 3-5 inches tall can reduce the vervain population considerably for the season. Mowing can be done one or two times per season depending on the

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Targeting the most critical period

Timing post-emergent weed control in corn

Competition may be good on the sports field, but it can be devastating in your corn field when weeds challenge your seedling corn, contributing to yield losses or increased input costs. Generally, the longer the weeds compete with the corn, the greater the yield losses, as the weeds compete for light, water and nutrients. The level of loss will depend on environmental variables and

1) weed species composition within a given field,

2) weed density and

3) time of weed emergence relative to the crop growth stage.

To decide whether weed control is economically worthwhile, it's important to understand whether a given weed infestation is likely to reduce yield if left uncontrolled. This establishes the rationale for the concept of **critical period of weed control (CPWC)**. The CPWC is a period in the crop growth cycle when weeds must be controlled to prevent yield losses. Weeds that emerge before or after this period may not present a threat to crop yields. Understanding this period in relation to the crop and weeds present is essential to determining the need for and timing of weed control and in achieving an efficient use of herbicides.

Research at the University of Nebraska has shown that each crop has a CPWC when weeds must be controlled to maintain maximum yields; however, we also concluded that the length of this critical period can be influenced by cropping practices such as the nitrogen level in corn.

CPWC in dryland corn as affected by nitrogen

Studies conducted in 1999 and 2000 at Mead and Concord showed how nitrogen affected the critical period of weed control. Predominant weed species at both locations/years were velvetleaf, common waterhemp and green foxtail, with the densities ranging from 80 to 120 plants per square yard. Nitrogen was applied immediately prior to planting as 46-0-0 and incorporated within one hour after application

Table 1. Critical period of weed control in corn based on 5% yield loss expressed as crop leaf stage (eg.V1) and days after crop emergence as affected by the level of nitrogen fertilizer..

Nitrogen-level lbs / acre	*Time to control weeds Corn leaf stage*	*Time to control weeds Approximate days after crop emergence*
N = 0	V1 - V11	8-45
N = 55	V3 - V10	10-42
N = 110	V4 - V9	15-39
N = 210	V6 - V9	20-39

CPWC in corn was affected by the level of nitrogen fertilizer. Generally, a reduction in nitrogen fertilizer resulted in a longer CPWC, thus corn was less tolerant to weed presence. For example, at zero nitrogen level, CPWC ranged from approximately 1st to 11th leaf stage of corn, based on a 5% acceptable yield loss (*Table 1*). This suggests that when no nitrogen fertilizer is applied, weed control measures should start early in the season (at the 1st leaf stage of corn) and need to be maintained through the 11th leaf stage, approximately the time of crop canopy closure.

This data implies that an increase in nitrogen fertilizer delayed the timing of weed control and increased the corn tolerance to weed presence. From a practical standpoint, insufficient nitrogen can reduce corn tolerance to weeds and widen the CPWC window. Furthermore, from a nitrogen restricted use and regulatory perspective, anticipated restrictions on the level of nitrogen use in corn may require more intensive weed management programs.

Cost of delaying weed control in corn crop

A common question among producers is "how much is it going to cost me if I delay weed control". In order to answer such question we graphed the yield loss data against the crop growth stage at the time of weed removal (*Figure 1, page 110*). In a practical situation you can decide to select a 2%, 5% or 10% yield loss to signify the beginning of the critical period (time of weed removal). This range will allow you to adjust the CPWC depending on the risk you're willing to take. In our study, an arbitrary level of 5% yield loss was used to determine the beginning of CPWC in both crops (*see the 5% yield-loss-line in Figure 1*).

In order to determine the cost of delaying weed control, use the curve above the arbitrarily selected point (the beginning of CPWC). For example, if an arbitrarily selected point of CPWC is 5%, the 5% yield loss will occur if the weeds are removed at the 2nd leaf stage in 0-N-level (*Figure 1*). Delaying weed control to the 3rd leaf stage will cause about 7% yield loss, in essence costing producer a 2% of yield loss. A similar trend is observed for the later leaf stages at each of the four curves (*Figure 1*).

Therefore, we conclude that delaying the time of weed removal,

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CPWC *(Continued from page 111)*

after the starting point of CPWC will cost a producer an average of 2% in yield loss per every leaf stage of delay . This recommendation is applicable up to canopy closure in corn (about 11 fully developed leaves).

To determine the actual economics of the cost of delayed control, the producer will have to convert the percentage yield loss of the actual target yield on his farm. For example, if a target yield for corn is 100 bushels per acre, delaying weed control for every leaf stage of crop will cost producers about 2 bushels per acre of yield (thus 2% of 100 bushels per acre). In terms of actual economic loss, it will be about $4 per acre for every crop leaf stage of delay, assuming a price of $2 per bushel for corn.

Weed size

Weed size at the time of weed control measure is another concern. In the corn study, the weeds were about the same size as the crop at the time of their removal except for the Mead site in 2000. If the weeds are taller than corn they will shade the crop and control should be initiated four to five days (one to two leaves) prior to the beginning of CPWC. If the weeds emerge five to eight days after the crop, control can begin 5-10 days (two to three leaves) after the beginning of critical period, as it is shown with the later start of the CPWC at Mead in 2000.

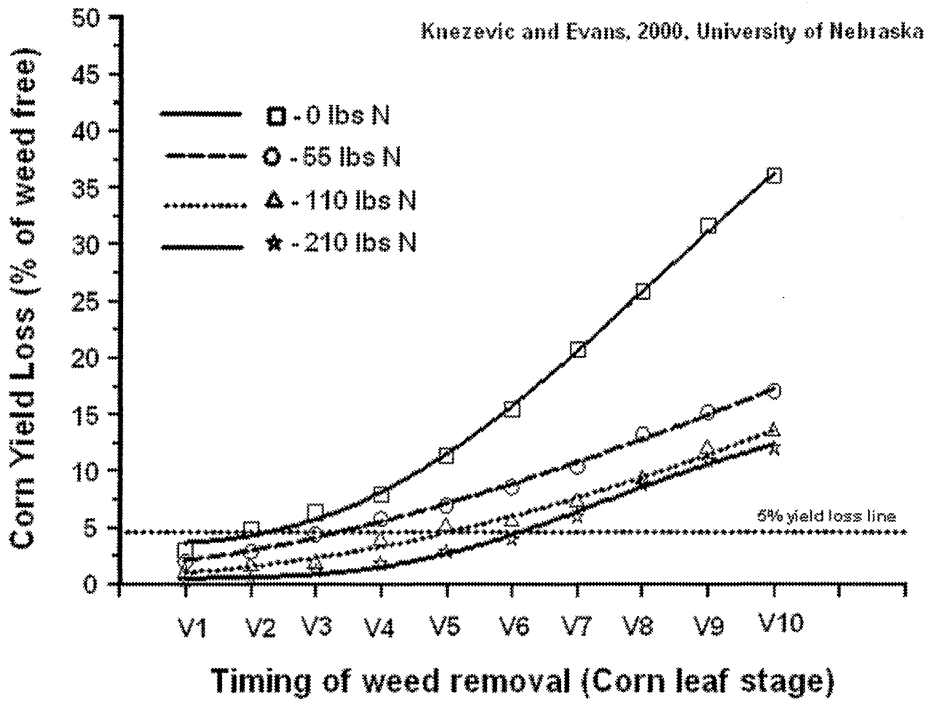

Figure 1: Corn yield loss and beginning of CPWC as influenced by the timing of weed removal and N-rate

The size of weed species will effect the herbicide use rates too, especially rates for Roundup or various generic glyphosates in Roundup-Ready soybeans. It is well known that Roundup has much better activity on grassy rather than broadleaf species. Therefore the rates of 16 to 24 oz should provide control of most common annual grassy species (foxtails, barnyardgrass, field sandbur, woolly cupgrass, panicums) that are 3-8 inches tall. The same rates should control annual broadleaves (velvetleaf, lambsquarters, pigweeds, mustards) that are less than 6 inches tall.

For taller grasses and broadleaf species a full rate (32 oz) will be required. Higher rates of Roundup (40-60 oz) will be needed to control species such as ivy-leaf morning-glory, sweet clover, field bindweed, Venice mellow and various smartweeds (lady's thumb, Pennsylvania smartweed, wild buckwheat, etc).

CPWC and herbicide-tolerant crops

To incorporate use of the CPWC with a herbicide-tolerant crop, for example in Roundup-Ready corn a generally sound strategy would be to apply Roundup tank-mixed with a residual herbicide at the beginning of the critical period, which will provide adequate weed control the entire critical period. In order to select appropriate herbicide mixtures for the weed spectrum at your farm, consult the herbicide efficacy tables from the *Guide for Weed Management in Nebraska* (Extension Publication, EC-130)

Stevan Knezevic
Extension Weed Specialist

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amount of rainfall during the season. One mowing in mid June can be effective (>75% control) if the season is dry, due to lack of moisture needed for weed regrowth. If the season is wet, an additional mowing is needed in July-August.

Herbicides also can be effective in providing season long control. Herbicide application should be conducted when vervain plants are 3-5 inches tall, usually in early June. The list of effective herbicides, their rates and cost per acre includes: Salvo (12 oz/acre, $4), Grazon P+D (32 oz/acre, $8), Weedmaster (32oz/acre, $6), Ally (0.25oz/acre, $8), and Vista (22 oz/acre, $8).

Stevan Knezevic
Extension Weeds Specialist
Northeast REC