8-20-1999

CropWatch No. 99-21, Aug. 20, 1999

Lisa Brown Jasa
University of Nebraska-Lincoln, ljasa@unlnotes.unl.edu

Follow this and additional works at: http://digitalcommons.unl.edu/cropwatch
Part of the Agriculture Commons

http://digitalcommons.unl.edu/cropwatch/202

This Article is brought to you for free and open access by the Extension at DigitalCommons@University of Nebraska - Lincoln. It has been accepted for inclusion in Crop Watch by an authorized administrator of DigitalCommons@University of Nebraska - Lincoln.
Hailed areas in western Nebraska a serious threat to 2000 winter wheat crop

Severe hail storms in Cheyenne County and surrounding areas in late June resulted in devastating damage to the 1999 wheat crop. Now growers in these areas face a major threat to their 2000 wheat crop from wheat streak mosaic and high plains viruses which can be transmitted by the wheat curl mite.

Growers should remember the devastating losses in 1993 when about 23,000 acres in Cheyenne County were plowed down as a result of these viruses. Based on the greater area of hail-damaged wheat this summer, we might expect the potential for losses in this area could exceed the 1992-93 level by several times. Because of the extensive amount of volunteer wheat now in these areas, growers must maximize their efforts to manage this disease before they plant.

In order for wheat curl mites to move into the fall planted winter wheat crop they must survive in significant numbers on an over summering host. Wheat curl mites are found on winter wheat from fall until maturity the next summer. The mites are not capable of surviving for very long off green plants so there must be 'green bridge' hosts during the summer.

The most effective green bridge is volunteer wheat resulting from hail prior to wheat maturity and harvest. Kernels shelled out by the hail fall to the ground and in the presence of high moisture the seeds germinate rapidly and volunteer wheat begins to grow. Wheat curl mites in the wheat heads move to this new volunteer wheat as the headed wheat dries down and matures. Infestations of mites establish colonies and transmit the viruses to the volunteer. If this volunteer is not destroyed before the wheat crop emerges in the fall, the mites will then move from the volunteer to the new wheat crop and transmit the viruses. Monitoring of mite population movement this summer has shown a high incidence of mite activity in Cheyenne County through mid July.

Several points need to be emphasized in controlling the volunteer wheat to minimize the (Continued on page 185)

Protecting next year’s wheat crop from diseases

Wheat farmers should take steps now to limit the risk of serious disease occurrences in next year’s wheat crop. These preventive measures include selecting disease tolerant varieties, eliminating volunteer wheat and other weeds from stubble fields, planting at the proper date and treating the seed with a fungicide before planting.

Selecting disease resistant/tolerant varieties: In eastern and south central Nebraska leaf rust and soilborne wheat mosaic are important diseases. Planting varieties that are at least moderately resistant to both as part of the variety complimentation package helps lessen the risk factor in next year’s crop. In the west central and Panhandle, wheat streak mosaic and tan spot are serious disease threats; resistance or tolerance to both helps prevent losses.

Eliminating volunteer wheat and weeds in stubble fields: Hail + volunteer wheat = wheat streak mosaic; it’s simple mathematics. One hail storm can cost growers two wheat crops i.e. direct loss from the (Continued on page 185)
Ray Weed, Extension educator in Kimball and Banner counties: There is a great concern here regarding presence and spread of the wheat curl mite and associated wheat streak mosaic virus in winter wheat (see story, page 183). Growers need a two week window between killing volunteer wheat in hailed fields and emergence of the new crop. They also need to make a community effort since neighboring fields also can be affected.

Our dryland sunflowers, proso millet, and corn are in excellent condition due to timely rains. We'll hope for a late freeze for late planted.

Gary Hall, Extension educator in Phelps County: The abundant rains we have had the past couple of weeks have really helped in developing the crop. Temperatures have been fluctuating wildly, but the crops seem to be handling them well.

Irrigation continues, but farmers should be considering when to shut down for the season. (See story, page 191)

Tom Dorn, Extension educator in Lancaster County: Research has shown that you can remove about 60% of the available moisture in the soil profile at physiological maturity (black layer) without harming corn yields. Adjust irrigation schedules to achieve maximum drawdown at black layer to minimize expense and leave the soil as dry as possible for harvest. Medium season corn varieties on upland silty clay loam soils in eastern Nebraska will need a full 4-foot soil profile when about one-third to one-half of the kernels are dented to carry the crop through to maturity without additional rain or irrigation. What if the profile is not full? To see the crop through to black layer without yield limiting stress, one will need to add the moisture required to bring it up to field capacity in the form of additional rainfall or irrigation.

For more information refer to NebGuide G82-602, Predicting the Last Irrigation for Corn, Grain Sorghum and Soybeans (http://ianrwww.unl.edu/pubs/irrigation/g602.htm), and story on page 191.

Ralph Anderson, Extension educator in Buffalo County: Kearney weather data shows 3.98 inches rain since August 1 and crop water use of 2.86 inches. If that is valid, and we ignore the water balance on Aug 1, we have a positive water availability of 1.08 inches. That means we probably will need to irrigate once more before we can pick up the pipe, unless we receive further rains.

Gray leaf spot has spread rapidly in many fields, but the corn is mostly past dough stage. Lots of rusts and other leaf spots are on the plants. One seed corn representative reported seeing many shallow kerneled ears, but I think that we may still have a chance to fill those out.

Terry Gompert, Extension educator in Knox County: Crops are starting the dry up. One more rain will produce exceptional yields. No rain will produce average yields.

Keith Jarvi, Extension Assistant, Integrated Pest Management: Nebraska wheat producers need to consider the potential impact of Hessian fly infestations when planning to plant.

Late summer is the best and perhaps only time to battle the (Continued on page 190)
**Hailed wheat (Continued from page 183)**

risk of disease:
- The volunteer wheat must be destroyed **completely** at least two weeks before the new wheat crop emerges; working up only the outside border of a volunteer field will be of no use if mite populations are high.
- Volunteer wheat can be controlled with tillage or herbicides but it must be **completely** dead; significant mite numbers can live on plants with only a small amount of green tissue and tilled plants that are allowed to re-root and grow will have limited impact on reducing mite numbers.
- Volunteer wheat emerging after harvest will have reduced risk of mites, but in a year like this with lots of background mite numbers, the risk is greater. Not controlling this volunteer wheat or saving it for grazing cattle later in the fall will create additional risk of virus spread, not only for your wheat, but for your neighbor's wheat as well. In this situation, even a small percentage of plants that had emerged before harvest could result in heavy mite populations in the late emerging volunteer. It is very difficult for a grower to determine if no volunteer emerged in a field before harvest or if the volunteer wheat does not contain mites.

Corn and foxtail millet also can serve as a 'green bridge' because the mites will move to these crops when they leave wheat and then move back to the new wheat crop as these crops mature early in the fall. The ability of these crops to serve as a significant bridge is not fully understood, but is impacted by environmental conditions and the maturity and condition of the bridge crop when wheat is emerging. Plants with only rank or mature growth will have reduced potential for buildup of mite populations and movement when wheat is emerging in the fall. Other potential 'green bridges' include secondary volunteer wheat which is that volunteer that emerges after harvest and weed and other grass hosts for the mites. Significant populations of mites will only build in these 'green bridge' sources when summer conditions are favorable for mite movement and mite buildup. This summer we would expect both mite movement and mite buildup to be quite good as the general background populations of mites is expected to be high.

Another cultural practice that reduces the potential for severe virus disease is to avoid early planting of winter wheat. Early planting allows for a shorter 'green bridge' period, and allows a longer period of time for mites and virus to build up in the winter wheat in the fall. Plant at agronomically practical dates, and if fields are at an increased risk from mite infestation (i.e. next to uncontrolled volunteer, corn, foxtail millet etc.), plant these fields last or as late as possible.

The potential for millions of dollars of losses to these viruses exists in the hailed areas of western Nebraska. Because of the extensive area of hailed wheat in and around Cheyenne County, it will be important for the entire 'community' to make a maximal effort to reduce the risk of virus disease developing. Growers must make every effort to minimize the occurrence of this disease by controlling their volunteer wheat and adjusting their planting dates.

**Gary L. Hein, Entomologist**
**Panhandle REC, Scottsbluff**

**Wheat disease (Continued from page 183)**

hail in the current crop and indirect loss from wheat streak mosaic in next year's crop. In my 24 years in Nebraska, I have seen this occur too often simply because of the failure to control volunteer wheat that provided the summer bridge for curl mites carrying the wheat streak mosaic virus.

**Planting at the proper date:** Early planting favors development of wheat streak mosaic, barley yellow dwarf, soilborne mosaic and root and crown rots. Approximate planting times are based on geography: early September for the Panhandle, mid-September for the west central and late September for the south central and southeast. Planting at the proper time doesn't eliminate the threat of disease, but it shortens the window of opportunity for disease to occur in the fall.

**Treating the seed with a fungicide:** The two main advantages of treating seed with a fungicide are control of the smut diseases (common bunt and loose smut) and improved stand emergence and seedling health, particularly for bin-run seed or seed that is not of the highest quality. Some seed treatment products can be applied to seed in the drill box where others need to be applied commercially or with a separate seed treatment device. Good uniform coverage of the seed is important to maximizing the fungicide effectiveness.

**John E. Watkins**
**Extension Plant Pathologist**

**Foundation seed available**

The Foundation Seed Division of the UNL Department of Agronomy is now accepting reservations for seed for a variety of crops for planting this year or early next year. Seed is available for oats, soybeans, winter wheat, field beans, sorghum, grasses, alfalfa, barley and millet.

The work of the Foundation Seed Division is developmental research, the last step of plant breeding. For more information on what seed is available and how to reserve seed, contact UNL Foundation Seed, 3115 N. 70th St., Lincoln, NE (402) 472-4290.
September is rapidly approaching and with it comes wheat planting season. If you haven’t already formulated your fertilizer plan, now is the time to do it. As with all crops, sound fertilizer management begins with a reliable soil test. Nitrogen and phosphorus are the two primary nutrients required for profitable winter wheat production, but soil test results may occasionally indicate a need for other nutrients such as potassium, zinc, sulfur, or chloride.

**Nitrogen**

Nitrogen may be applied either just prior to planting or as a top dressing next spring. Spring-applied nitrogen is usually more effective at increasing grain yield than fall-applied nitrogen because it is less susceptible to off-season losses and does not promote excessive fall growth. Moreover, applying nitrogen in the spring allows for adjusting application rates based on stand and soil moisture levels. On the other hand, preplant application of nitrogen allows producers to use anhydrous ammonia as a nitrogen source rather than the more expensive dry or liquid carriers required for spring top dressing. Anhydrous ammonia also may be applied in conjunction with normal tillage operations, eliminating the cost of application. Another advantage to preplant application is that the work schedule may be less hectic and the weather more favorable in the fall than in the spring. In ecofallow rotations fall-applied nitrogen may be preferable because it usually produces more straw than spring-applied nitrogen. However, if nitrogen is applied prior to seeding, it is important that wheat not be seeded too early. Early planting with high nitrogen availability may deplete soil water and increase the probability of yield depression.

**Phosphorus**

Unlike nitrogen where spring application is an option, phosphorus must be applied in the fall if it is to benefit this year’s crop. Because it is quite immobile in the soil, phosphorus needs to be placed either with the seed or incorporated into the root zone for the plant roots to access it. Experiments indicate that band applications (in the seed row or in the anhydrous knife band) are more effective than broadcast applications when applied at equal rates, especially at low phosphorus soil test levels. However, broadcasting allows the option of using less expensive dry formulations and this together with other factors such as equipment availability, personal preference, etc. may make this option the most economical in some situations.

Suggested phosphorus application rates based on soil test levels are summarized in Table 1. Application rates are lower for seed row application than for broadcast application due to the greater effectiveness when phosphorus is placed close to the seed. When placed in the seed row, the fertilizer is immediately available to the germinating seedling, resulting in enhanced early growth commonly referred to as a “pop-up” effect. A small amount of nitrogen is usually included with seed row-applied phosphorus. While excessive amounts of nitrogen placed with the seed may damage germinating seedling, a small amount is usually beneficial because it helps enhance phosphorus uptake. For typical 10- to 12-inch row spacings, 10 to 15 pounds of nitrogen per acre applied with the seed will not reduce yield.

**Other nutrients**

Most of our winter wheat is grown on fine-textured soils and there is little evidence that supplemental sulfur increases yields on these soils. If you grow irrigated wheat on sandy soils and the irrigation water contains less than 6 ppm SO₄²⁻, you may want to apply 10-15 pounds per acre. The sulfur source used and method of application are important considerations when applying sulfur. Sulfur in the thiosulfate form can severely injure wheat seedlings when placed in contact with the seed. Consequently, ammonium thiosulfate solution (12-0-0-26S) may be broadcast. If sulfur is placed in the seed row, it should be in the sulfate form.

Recent research has shown that chloride (usual source 0-0-60) may enhance wheat yields, but Nebraska...
Wheat seed book released

The Nebraska Certified Quality Seed Book for 1999 fall planted crops is now available from the Nebraska Crop Improvement Association. It lists sources of certified seed, which varieties are complementary, and characteristics of each. Because there is no single perfect variety, using several complementary varieties enables you to offset the potential weaknesses (production limitations) in each variety with the strengths of other varieties.

The book is available from local Cooperative Extension office or the NCIA, Plant Sciences Hall, Box 830911, Lincoln, NE 68583-0911.

Fertilizing winter wheat
(Continued from page 186)

research has shown only limited response. Recently summarized research from Kansas (Great Plains Soil Fertility Conference, 3/5/98) has shown that response is variety dependent and that soil chloride levels must usually be less than 20 lb/a in a 2-foot sample. Chloride applications of 25-30 lb/a have been adequate to improve yields where response has been noted.

Research has shown that when soil zinc levels are less that 0.5 ppm (DTPA Test) wheat may respond to supplemental zinc. The soil test level can be increased by broadcasting 10 to 15 lb of zinc per acre as zinc sulfate, but this is usually not economical. Adding zinc to a 10-34-0 starter, however, is a good way to provide a small amount of zinc that will be readily available. One pound of zinc per acre should be sufficient. Many good zinc sources lend themselves to application with 10-34-0. These include zinc oxide, zinc sulfate, and zinc-ammonia complexes.

W. Bart Stevens
Soils Research Associate
West Central REC

Protect grain quality when storing on the farm

Commercial grain storage may be tight again in 1999 and many producers may still be storing their 1998 harvest.

On-farm grain storage may be needed this year to protect grain until it can be moved into more permanent storage or sold. The length of storage depends on the grain’s moisture content and temperature, and whether aeration can keep the grain from heating.

Corn needs to be less than 15% moisture to be stored for an extended period without aeration. Aeration keeps grain from heating and cools the grain mass to slow the formation of molds. If sufficient volumes of air can be constantly pushed through the grain mass,

higher moisture grain may be stored for a time.

Corn at 16% moisture held at a constant 50°F can be safely stored about six months. The shelf life decreases about one month for every point of moisture above 16%, (with sufficient airflow to maintain the grain at a constant 50°F).

Higher temperatures also will reduce shelf life. At any given moisture content, the “shelf life” is less than half as long for every 10°F increase in temperature. Comparing corn at 16% moisture content, the shelf life (with aeration) is 186 days at 50°F, 81 days at 60°F, and 45 days at 70°F.

(Continued on page 192)
Numbers higher than usual

Managing late season bean leaf beetles

Last year’s mild winter favored survival of overwintering bean leaf beetle adults, leading to increased numbers feeding on soybean seedlings earlier this summer. Now a second generation of beetles is emerging and feeding on leaves and developing pods. With a lot of beetles available for reproduction early in the year there may be quite a bit of bean leaf beetle activity in the next few weeks. Following is a review of the biology of the beetle and management suggestions:

Two generations of bean leaf beetles develop in Nebraska. The second generation overwinter as adults and in early June of the next year feed, mate, lay eggs and die. There is usually a distinct period from mid-June to early July when few if any beetles are in the field, before the first generation emerges. Total developmental time from egg to adult can range from 25 to 40 days. Because of this range of development, it is common to see adults from the first generation and the second generation in the field at the same time. In other words, the generations overlap and beetles will be present at some levels from mid-July until the end of the growing season. Because of this overlap it is important to monitor beetles regularly to determine shifts in population and to better plan management.

Bean leaf beetles will feed on soybean leaves throughout the season, but leaf feeding seldom causes yield loss. Most damage (economic yield loss) occurs when beetles feed on developing pods. This yield loss occurs in several ways. Pods may be clipped from the plants, but this is not the primary cause of yield loss. Many flowers and pods are aborted naturally and to blame pod loss on bean leaf beetle feeding may be a costly mistake. Beetles normally injure soybean pods by feeding on the outside layer of the pod, leaving a thin layer of tissue still covering the seed. They usually do not eat into the developing seed, however this may occur on very small pods. Fungal pathogens may enter the pod from the feeding sites, causing seeds to appear shrunken, discolored, and moldy, resulting in dockage at the elevator. After full pods are formed and seeds begin developing, soybeans are most susceptible to yield loss from pod feeding.

The best time to sample is before significant pod feeding occurs, but after second generation beetles have emerged. Second generation bean leaf beetles should be emerging and beetle numbers should be approaching their highest levels for the summer. Beetle numbers will slowly decline as beans continue to mature and beetles will move to overwintering sites. Now is the time to assess bean leaf beetle pod feeding.

Economic thresholds have been developed for both drop cloth (beetles per foot of row) or sweep net (beetles per sweep) sampling.

Perhaps the most accurate way to sample beetles is with a drop (or shake) cloth. A drop cloth is a 3 x 3

(Continued on page 189)
Bean leaf beetles (Continued from page 186)

an application in 30-inch row beans or 1.59 or more beetles per foot of row in 7-inch row beans.

Table 3 indicates the economic thresholds in beetles per sweep for bean leaf beetles on stage R6 soybeans, assuming an expected yield of 36.6 bushels per acre, on 30-inch rows. Numbers in parenthesis are for beans drilled in 7-inch rows.

Because the price of beans is so low, you may need to raise the thresholds by one beetle per sweep. For example if management costs were 10 dollars an acre, it would take seven beetles per sweep in 30-inch rows or six per sweep for 7-inch rows.

R6 is defined as a green seed filling the pod cavity in one of the four uppermost nodes with a fully developed leaf (seeds touching).

Sweep at least five randomly selected sites, walk through the field at an even pace, performing about 25 sweeping arcs. The best sweeping action for bean leaf beetle is a consistent upward motion through the foliage, using as much force as needed to move the net smoothly through the foliage. Bean leaf beetle activity varies during the day. Activity patterns suggest the best times to sample are around mid-morning or in the afternoon. Try to maintain a similar sampling time in each field to eliminate variability.

Economic thresholds for reproductive stage soybeans other than R6 are probably higher (more beetles are needed to justify a treatment). This is because pods on plants past R6 are maturing and there is less green pod tissue available for beetle feeding, and plants in earlier reproductive stages have greater yield compensation potential than those in R6 or older. Higher yield potential fields would lower threshold numbers (make it more economical to treat fewer beetles).

Keith J. Jarvi
IPM Extension Assistant

Insecticides registered for bean leaf beetles

Bean leaf beetles can be controlled by several insecticides. Be aware that most have 14 day or more pre harvest intervals (phi). Here is a table of insecticides for bean leaf beetle control.

Table 3. R6 economic thresholds (beetles per sweep). Numbers in parenthesis are for drilled soybeans with 7-inch row spacing.

<table>
<thead>
<tr>
<th>Crop value, $/bu</th>
<th>Pest management costs per acre</th>
</tr>
</thead>
<tbody>
<tr>
<td>$6</td>
<td>$8 $10 $12</td>
</tr>
<tr>
<td>$5.00</td>
<td>4 (3) 5 (4) 6 (5) 8 (5)</td>
</tr>
<tr>
<td>$6.00</td>
<td>3 (2) 4 (3) 5 (4) 6 (5)</td>
</tr>
<tr>
<td>$7.00</td>
<td>3 (2) 4 (3) 4 (3) 5 (4)</td>
</tr>
<tr>
<td>$8.00</td>
<td>2 (2) 3 (2) 4 (3) 5 (3)</td>
</tr>
</tbody>
</table>

morning or in the afternoon. Try to maintain a similar sampling time in each field to eliminate variability.

Economic thresholds for reproductive stage soybeans other than R6 are probably higher (more beetles are needed to justify a treatment). This is because pods on plants past R6 are maturing and there is less green pod tissue available for beetle feeding, and plants in earlier reproductive stages have greater yield compensation potential than those in R6 or older. Higher yield potential fields would lower threshold numbers (make it more economical to treat fewer beetles).

Keith J. Jarvi
IPM Extension Assistant
Hone your skills or network with peers at upcoming workshops

Field Diagnostics and Precision Farming

A Late Summer Diagnostic Clinic and a Precision Farming Field Clinic will be held at the University of Nebraska Agricultural Research and Development Center near Mead this month. Sponsored by the University of Nebraska Cooperative Extension, both clinics offer CEU-CCA credits.

An Aug. 24 clinic will cover intensive crop disease diagnostics in corn, soybeans, and dry edible beans; using a digital camera as a diagnostic tool; impact of fall tillage on soil moisture; compaction identification and remediation; fall fertilization and soil sampling techniques. Corn diseases to be covered include gray leaf spot, anthracnose, smut, Goss’s wilt and management using fungicides such as Tilt and Quadris. Diseases of dry edible beans and soybeans will be covered, including sclerotinia stem rot, white mold, rust and common blight. Six credits will be awarded.

Learn how to get the most out of your precision farming investment or for those still considering different options, learn more about the equipment and software and what you would use in your operation at the second upcoming clinic.

The Precision Farming Field Clinic on Sept. 8 will cover hands-on field calibration of a yield monitor (growing season permitting); computer systems needed to support GPS/GIS software; understanding and using digital soil surveys as part of a site specific management system; transforming data from a yield monitor to a map; getting as much from a yield map as possible; and using remote sensing to identify agronomic problems in the field. Six CCA-CEU credits will be awarded for this clinic.

Both full-day clinics begin at 7:45 a.m. at the ARDC’s Research and Education Building, which is on Hwy. 63 on the south side of the road approximately 6 1/4 miles east of Hwy 77. Participants should park in the west parking lot.

For more information or to register call the ARDC at (402) 624-8030. Costs are $135 including a workbook and $115 without one.

Barbara Ogg
Extension Educator
Keith Glewen
Extension Educator

Women in Ag

LINCOLN — Nebraska farm and ranch women interested in improving their business management skills will want to attend the 15th annual Women in Agriculture and ranch management conference Sept. 16-17 in Kearney.

David Kohl, professor of agricultural finance and small business management and entrepreneurship at Virginia Tech, kicks off the conference. His “Energizing Your Financial Numbers” is geared to help participants make better decisions to deal with potential changes in interest rates, land values and the general economy.

The conference is presented by NU Cooperative Extension and the Department of Agricultural Economics, both part of the Institute of Agriculture and Natural Resources.

Deb Rood, program coordinator, said the program includes two other general session speakers: Joyce Bryan Strout, an NU alumna and chief executive officer of J.B. Strout and Co., will present Green Acres is the Place for Me, a discussion of growing in families, relationships and creativity; and Jo Bek, an assistant professor at NU’s College of Technical Agriculture in Curtis.

“I think the conference has always had an excellent caliber of speakers,” said Marsha Spiehs of Phillips. Spiehs, who is attending the conference for an eighth time, said she also was looking forward to the fun and camaraderie.

“Seeing old friends and making new ones is one of the highlights. The conference covers so many areas, not only production, but financial,” Spiehs said.

Eighteen conference workshops will be held during four concurrent sessions. Topics include marketing strategies recommended for 2000-2005, tax updates for ag producers, and tools and rules for financial success.

To register, call (800) 535-3456 or e-mail drood@unl.edu. Registration is $55 per person before Sept. 10. After Sept. 10, the fee is $60. Hotel reservations can be made at the Kearney Holiday Inn, (800) 248-4460.

Field updates

(Continued from page 184)

Hessian fly. Generally, chemical controls are not a practical solution so cultural practices are the only means to prevent serious losses. To reduce Hessian fly fall infestations:

1. Control volunteer wheat before planting;
2. Plant Hessian fly resistant or tolerant wheat varieties; and
3. Plant after the fly-safe date.

Check NebGuide G46, Hessian Fly on Wheat, for recommended planting dates for individual counties.
Predicting the last irrigation

Determining when to apply the last irrigation of the season is an important water management decision. While shutting off too early could potentially reduce yield, running later than necessary reduces the room for storing off-season precipitation, increases the potential for leaching nitrogen, and adds to production costs. Balancing between the two requires knowledge of how much water is available in the root zone and how much more water the crop will need to reach physiological maturity.

Water requirements to reach maturity depend on the crop and growth stage. Table 1 gives the approximate number of days to maturity and estimated water use “typical” for south central Nebraska for various growth stages of corn, grain sorghum and soybeans.

The last irrigation usually can be applied two to four weeks before physiological maturity, depending on the water holding capacity of the soil (Table 2). This will leave room in the soil moisture reservoir for storing off-season precipitation. Typically, 60% of the available moisture in the top four feet of the root zone can be depleted at crop maturity without reducing grain yield. Table 2 gives the minimum allowable balance for common soil textures.

Producers should monitor soil moisture to determine if another irrigation is needed. The current soil water status in the crop root zone can be measured or estimated “by feel” and the remaining usable moisture in the root zone can be calculated by subtracting the minimum allowable balance (see worksheet). The need for additional irrigation can be determined if you know the predicted water requirement to reach maturity and the remaining usable moisture.

For more information, see NebGuides G84-690, Estimating Soil Moisture by Appearance and Feel, and G82-602, Predicting the Last Irrigation for Corn, Grain Sorghum and Soybeans, available from your local University of Nebraska Cooperative Extension office.

Paul Jasa, Extension Engineer

Worksheet to determine last irrigation

<table>
<thead>
<tr>
<th>Field</th>
<th>Crop</th>
<th>Soil type</th>
<th>Present stage of growth</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. Water needed to reach crop maturity, in inches (Table 1)
2. Current soil water balance, in inches (estimated in field)
3. Minimum allowable balance, in inches (Table 2)
4. Remaining usable moisture, in inches (Line 2 minus Line 3)
5. Irrigation requirement assuming no rainfall, in inches (Line 1 minus Line 4)

Note: If Line 4 is greater than or equal to Line 1, another irrigation is not needed.

Table 1. Normal water requirements for corn, grain sorghum, and soybeans between various stages of growth and maturity.

<table>
<thead>
<tr>
<th>Crop growth stage</th>
<th>Approximate days to maturity</th>
<th>Water use to maturity (inches)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corn</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dough</td>
<td>34</td>
<td>7.5</td>
</tr>
<tr>
<td>Beginning dent</td>
<td>24</td>
<td>5.0</td>
</tr>
<tr>
<td>Full dent</td>
<td>13</td>
<td>2.5</td>
</tr>
<tr>
<td>Black layer</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>Grain sorghum</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Half bloom</td>
<td>34</td>
<td>9.0</td>
</tr>
<tr>
<td>Soft dough</td>
<td>23</td>
<td>5.0</td>
</tr>
<tr>
<td>Hard dough</td>
<td>12</td>
<td>2.0</td>
</tr>
<tr>
<td>Black layer</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>Soybeans</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Full pod development</td>
<td>37</td>
<td>9.0</td>
</tr>
<tr>
<td>Beginning seed fill</td>
<td>29</td>
<td>6.5</td>
</tr>
<tr>
<td>Full seed fill</td>
<td>17</td>
<td>3.5</td>
</tr>
<tr>
<td>Beginning maturity</td>
<td>0</td>
<td>0.0</td>
</tr>
</tbody>
</table>

Table 2. Available water capacity for various soil types and minimum allowable balances at physiological maturity.

<table>
<thead>
<tr>
<th>Soil type</th>
<th>Available water capacity (inches/foot)</th>
<th>Minimum allowable balance in top 4 feet of soil profile* (inches)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silty clay loam</td>
<td>1.6</td>
<td>2.6</td>
</tr>
<tr>
<td>Upland silt loam</td>
<td>2.0</td>
<td>3.2</td>
</tr>
<tr>
<td>Bottomland silt loam</td>
<td>2.5</td>
<td>4.0</td>
</tr>
<tr>
<td>Very fine sandy loam</td>
<td>1.8</td>
<td>2.9</td>
</tr>
<tr>
<td>Sandy loam</td>
<td>1.4</td>
<td>2.2</td>
</tr>
<tr>
<td>Fine sands</td>
<td>1.0</td>
<td>1.6</td>
</tr>
</tbody>
</table>

*Based on depletion of 60% of the available water.
Company resolving herbicide complaints

Representatives of Rhone-Poulenc continue to meet with producers who reported crop injury or unusual response from applying Balance.

The herbicide was applied on about 800,000 acres in Nebraska, according to Dave Downing, herbicide and fungicide business manager for Rhone-Poulenc. He estimated that about 7% of those acres had some degree of crop response, ranging from slight to severe.

The active ingredient in Balance is isoxaflutole, a pigment inhibitor that can cause a "bleached" yellow or white appearance in corn.

Company task forces are examining the causes of the damage related to plant physiology and agronomy as well as what could have led to the damage in specific situations.

"Our intent is to make modifications in the label and recommendations for changes in how it might be used in the field to reduce or eliminate this from happening again."

Grain storage

(Continued from 187)

Airflow rates as low as 1/10 cfm/bushel have been successfully used to hold grain at or less than 16% moisture during the cooler part of the year. Operating the fan continuously over long periods will slowly cool grain when outside air temperatures are below grain temperatures.

Greater airflow rates (1/3 to 1/2 cfm/bushel) are recommended to aerate grain stored at moisture contents above 17% or temperatures over 70°F.

Tom Dorn
Extension Educator
Lancaster County

Precipitation

Maps courtesy Al Dutcher, State Climatologist, Agricultural Meteorology

Percentage of normal precipitation, April 1 to August 16