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# CropWatch No. 2002-16, July 12, 2002

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# CROP WATCH

University of Nebraska Cooperative Extension
Institute of Agriculture and Natural Resources

No. 2002-16
July 12, 2002


*Yield losses of up to 8 bu a day*

## Corn enters critical period for soil moisture

In recent weeks as temperatures extended into the 90s, the stress to the state's corn crop became evident. While corn often can adjust and survive minimal drought stress during the early stages of plant development, a lack of precipitation and soil moisture as the plants enter pollination is likely to limit yield.

In some areas unusually high temperatures earlier in the season than usual have pushed crop development ahead of normal, moving the crop into pollination just as the fields are running out of water. However, there may be a ray of light for those fields where tassels aren't visible yet. If plants shut down due to high temperatures prior to tasseling, they may be able to wait out the heat a little longer until rains come.

For most of the state, the next few weeks will be critical to corn yields.

Robert L. Shaw of the Department of Climatology and Meteorology at Iowa State University, reviewed many drought-stress experiments and summarized the data (*see Figure 1, page 149*). He found a 3% reduction in yield per day of stress early in growth. In some experiments that same rate of yield loss occurred throughout the season (lowest line of shaded curve), but on average (middle line) there was a pronounced increase in corn's sensitivity to drought starting around the time of silking and continuing for about two weeks. Yield losses can jump to 8% per day of stress during that period.

As temperatures soar and with tasseling in progress, we should be concerned about pollen viability and silk receptivity. Pollination is a critical period for corn development and yield.

Pollen shed occurs over a two-week period. For kernels to develop, silks must emerge and be fertilized by viable pollen. Silks grow about 1 to 1.5 inches a day and will continue to elongate until fertilized. Temperatures greater than 95°F with low relative humidity will desiccate exposed silks but not impact silk elongation rates greatly. Pollen is killed by temperatures in the mid 90s or greater, especially with low relative humidity. Fortunately, pollen shed usually occurs from

*(Continued on page 149)*

**Inside**



## Salvaging poor corn yields for forage, haying or grazing

In some areas of central and eastern Nebraska, producers of dryland or water-limited irrigated corn are looking at low yields, projected harvest costs, and the potential benefits of haying, grazing or harvesting corn fields as forage.

Before making any changes in their operation plan, producers with crop-insured acres should contact their insurance provider for an appraisal of the crop's value and to request a release of the crop. If the crop is reduced or removed as forage, erosion protection will still need to be maintained. Producers should check with their local Natural Resources Conservation office to determine the amount of residue that needs to be left to achieve the level of erosion protection specified in their farm operation plan.

Leaving standing residue also can pay longer term benefits for next year's crop by reducing wind

*(Continued on page 152)*

# Updates

## Management tips

## July 12 - July 26

• **Are you irrigating soils less than one percent organic matter?** Test the irrigation water for sulfur as well as nitrate-N. It may have more than enough sulfur to meet the needs of your crops.

• **Wheat which has been cut for hay that now has regrowth can serve as an over-summer host for wheat streak mosaic.** This re-growth should be killed as soon after wheat harvest as possible.

• **Turfgrass seed harvest is in full swing.** This is the time to be planning for quick removal of the residue and an early burn to allow good regrowth going into the winter.

• **We are rapidly approaching the last opportunity for weed control in proso millet.** With the dry conditions and recent spike in proso prices, weed control can pay large dividends.

• **A change to more humid conditions could spur ascochyta blight in chickpeas** so be prepared, while celebrating a little rain, to start scouting.

## Field update

**Andy Christiansen, Extension Educator in Hamilton County:** Field borders are being treated for grasshoppers. The western bean cutworm flight has been large and very similar to 2000 when we had many acres treated and damaged by this insect. The dryland corners are drying up and alfalfa and pastures are not producing. Fields began tasseling the week of July 7.

## *Farm bill information and updates*

Several sources are available on the Web to provide further information about the 2002 farm bill. They include:

• For Nebraska producers, University of Nebraska agricultural economists have developed a web site with case studies for various crops and operations at *http://farmbill.unl.edu/*

• USDA site, a collective effort by all USDA agencies to explain the new farm bill provisions and their implementation. This site is updated as new material becomes available. Also includes calls for nominees to national agricultural boards. The site is at *http://www.usda.gov/farmbill/*

• House Ag Committee, a site also offering a variety of information resources on the farm bill, including links to a Q&A site, an invitation to email questions directly to the USDA, and a list of county loan rates for 2002 crops. The site is at *http://agriculture.house.gov/farmbill.htm*

## Earworms damaging whorl stage corn

I have received several reports of corn earworms feeding in whorl stage corn in York, Adams, and Buffalo counties, with 5% to 25% of the plants affected. Corn earworm larvae are variable in color, from green to brown to pink. They are over 1.5 inch in length at maturity. A key characteristic visible with a hand lens is the presence of microspines, giving the skin a coarse appearance.

Corn earworms are known to feed in the whorl. This feeding will produce ragged holes in the leaves as they emerge. Earworms may also feed on the developing tassel in the whorl. In field corn they would rarely need to be treated unless 50% or more of the plants were damaged and had live worms present.

**Bob Wright**
**Extension Entomologist**
**South Central REC**

## Hot off the Press

Released this week: "Stewart's Wilt of Corn In Nebraska," University of Nebraska NebGuide G1462.

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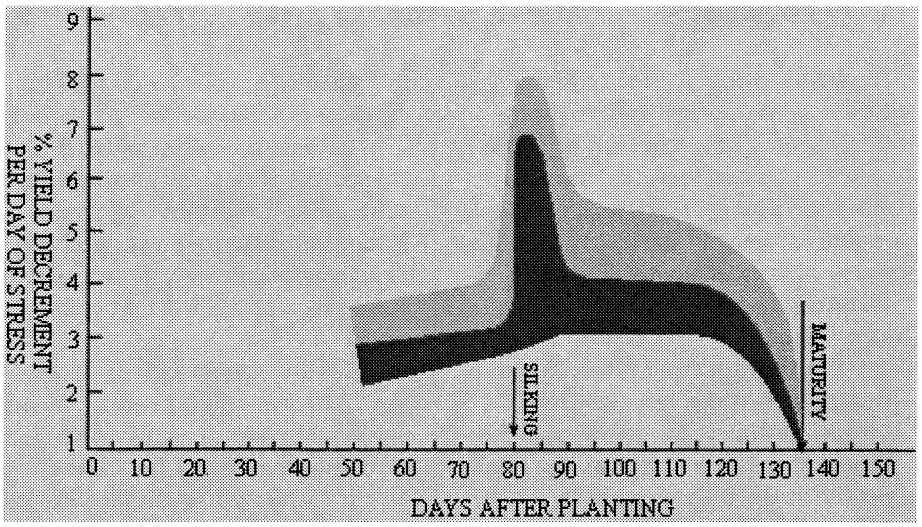
## Corn development *(Continued from page 147)*

early to mid-morning when temperatures are lower.

Drought stress slows silk elongation but accelerates pollen shed. This can result in pollen shed occurring before silk emergence. This lack of synchrony occurs because the plant's machinery for producing and shedding pollen is slightly less drought sensitive than the silks. A good supply of water is needed for the silks to push themselves past the ear and out through the husk. Any stress such as inadequate water, low soil fertility, or too thick of a planting rate can delay silking two or more weeks and reduce seed set if pollen is not available. This is potentially a major problem although we've not heard of it happening often. The fact that pollen from one plant in ten is sufficient to pollinate a field provides a degree of compensation and improves the opportunity for fertilization in stressful environments.

When poor pollination does occur, it can lead to spotty kernel set. The kernels that pollinate properly often grow extra-large in the absence of neighboring kernels. Even if pollination is 100%, drought stress can reduce the number of kernels set by the crop.

After seeds are pollinated, plants seem to decide how many seed they can support and then abort the extra, starting with kernels at the end of the ear and moving toward the base. The rate of plant photosynthesis during that period appears to be the deciding factor. Low photosynthesis per plant leads to high kernel abortion. Other stresses also can cause corn to react in the same way: nutrient deficiencies, temperatures too high or too low, populations too high, and low solar radiation can affect yields by reducing photosynthesis and thereby increasing kernel abortion.




Roger Shaw, ISU, covers the range of most of the research results of short-term drought stress on corn yield observed in a series of field experiments. The shaded area shows the range of yield losses possible when short-term stress occurs at different growth stages. Yield losses range from 3 bushels per acre for each day of soil moisture stress during the early stages of plant development to 8 bushels per acre for every day of moisture stress during pollination. (From "Corn and Corn Improvement," Agronomy Monograph 18, 1988.)

This phenomenon has been an active area of research for crop physiologists in recent years. The table summarizes how drought stress at different points in the life cycle can influence corn yield. At harvest, to find out how drought stress may have shaped your yield, check the components of yield: note the stand (plants/acre), ears/plant, kernel-rows/ear, kernels/kernel-row (spotty? or kernels lost at tip?), and weight/kernel. These yield components often reflect the plant's stress history throughout the season.

The bottom line is that high temperatures will not severely stress corn if soil moisture is adequate. Obviously we don't have to tell farmers to keep up with irrigation at this time of year. It is one of the best ways to reduce the impacts of high temperatures on corn pollination and fertilization.

Rain-fed fields are more of a concern. Drought stress with high temperatures at pollination and silking can have serious effects. If the current dry-hot conditions continue, we would expect to see major differences among fields based on management practices and hybrids.

Practices that conserved soil moisture this spring or last year such as no-till or reduced till will improve a crop's performance during drought. Early-season hybrids probably will do better than other hybrids if pollination occurred before temperatures soared or moisture reserves were depleted. Full-season hybrids with good stress tolerance may do better than others with less stress tolerance."

**Bob Caldwell**
**Extension Cropping Systems Specialist**
**Southeast and Northeast REC**
**Roger Elmore**
**Extension Crops Specialist**
**South Central REC**

# Be prepared to irrigate soybeans earlier; consider plant need, irrigation system capacity

With above normal temperatures and below normal precipitation in June, irrigators are urged to carefully assess their soil moisture situation and their irrigation system's capacity to supply enough water at critical stages of growth, and initiate soybean irrigation accordingly.

"Although most research has shown little or no response to irrigation during the early growth stages, this is based on having a full profile at the beginning of the season," said Roger Elmore, extension cropping systems specialist at the South Central Research and Extension Center at Clay Center. "This was not necessarily the case this year in a number of situations in central and western Nebraska."

While April and May precipitation may have been close to average in many areas, the lack of precipitation in June has set records. In response, in some areas of the state soybeans have stopped growing due to lack of soil moisture.

"Irrigating soybeans now in dry situations (where there is 50-70% soil moisture depletion in the top foot of soil) may indeed enhance root and stem growth," said Jose Payero, irrigation specialist at the West Central Research and Extension Center at North Platte. "Plus, it will get weeds growing, which will aid in herbicide effectiveness."

"Effective weed control is critical during the early stages since weeds deplete soil moisture," Elmore said.

"Even though it looks like soybeans are less sensitive to stress during the early stages, there is a limit to how much stress the crop can stand," Elmore said. "During the early stages, keeping the soil moisture at a 70% depletion instead of the usual 50% depletion may be the way to go."

Elmore recommended that producers consider the following:

1. Were the soil profiles full at planting? If not, the assumption of scheduling irrigation on growth stage probably does not apply and delaying irrigation to reproductive stages may result in yield reductions.

2. How much water is in the top 12 inches of the profile? Where is it relative to the root systems?

"In research at Clay Center, North Platte and Tryon (see the June 29, 2001 issue of CropWatch) scheduling irrigation using the 50% moisture depletion did not reduce yields on medium textured soils and in fact increased yields on coarse textured soils relative to irrigating according to growth staging systems."

(A typical irrigation schedule for most crops would suggest irrigating to keep the soil moisture level above 50% most of the time.)

In addition to increasing production costs, adding unnecessary water during vegetative stages can increase plant height and lodging, Elmore said. Their research, however, didn't show any negative effects on yield.

The start of irrigation also may depend on the type of system being used. While sprinkler systems may be started soon, use of gravity (gated pipe) systems must be delayed until soybeans are large enough to hill.

The irrigation needs of a given field depend on soil water content and current and projected crop water use. Several methods are available for estimating soil moisture content. Crop water use depends on the stage of crop development and the prevailing climatic conditions such as air temperature, wind speed, solar radiation, and relative humidity, all of which are above normal this season. ( To estimate crop water needs, check the projected maximum evapotranspiration rates updated daily on the *CropWatch* web site at *http://cropwatch.unl.edu/weather.html.*)

Dutcher reports that both average air and soil temperatures are 5-8 degrees above normal across the state this summer, leading to higher evapotranspiration rates earlier in the growing season. In addition, unless rains develop and help lower soil temperatures, soil temperatures are likely to be higher deeper into the soil than usual.

Given these factors, UNL climatologists estimate that the projected daily water use for soybeans which emerged in south central Nebraska in mid May can be as much as 0.30-0.45 inch a day, provided that adequate water is freely available in the soil for plant use. With minimal rain in June and a typical silt-clay-loam soil able to hold 8 inches in the top four feet, soil moisture may be depleted from the root zone in some areas, requiring that irrigation start earlier to avoid further plant stress, Elmore said.

**Irrigation system capacity**

Producers also should consider the capacity of their irrigation systems to provide enough water to refill the soil profile and provide for plant water needs at the critical period from late July to early August. If sufficient soil moisture is not available during this period, yields can be limited. In some areas of the state where low capacity irrigation systems are typical, irrigation may need to begin sooner than normally recommended just to be able to provide enough water at this critical period.

*(Continued on page 151)*

## Irrigating soybeans *(Continued from page 150)*

"Most irrigation systems used in Nebraska are not designed to meet the peak water needs of the crop," said Dean Eisenhauer, IANR irrigation specialist. "They rely on having an adequate level of soil moisture to help meet the plant's peak needs. This soil moisture is usually provided through off-season and early season rainfall."

Bill Kranz, extension irrigation specialist at the Northeast Research and Extension Center at Norfolk, agrees.

"Soybeans are estimated to be using 0.25 inches per day or more and most [sprinkler] systems can apply a net of about 0.3 inches a day," Kranz said. "If the soil water content is 2 inches down when irrigation starts, it would take 30 days to catch up to near field capacity if the system runs continuously. Low capacity wells might only be capable of applying a net of 0.2 inches per day. They will never catch up."

The situation is even worse on sandy or fine-grained soils which have less capacity to hold soil moisture. Kranz recommends that these fields be irrigated as soon as necessary to keep the soil moisture level above 50%.

"To determine how much to irrigate, add together the amount needed for crop growth for the next two to three weeks and the soil moisture deficit," Eisenhauer recommended.

"For example, you might want to provide one inch of water for depleted soil moisture and three inches for crop growth. With a 125-acre field, using an irrigation system providing 600 gallons per minute and running at 85% efficiency, it would take approximately 18 days to replace 4 inches of moisture. With a system providing 800 gallons of water per minute, it would take about 14 days for 4 inches," he said.

For further information on testing soil moisture, see "Estimating Soil Moisture by Appearance and Feel," NebGuide G690.

For further information on irrigating soybeans, see "Irrigating Soybeans," NebGuide G1367, and adjust recommendations for this year's soil moisture and growing conditions.

**Lisa Jasa**
**CropWatch Editor**

## New crop disease publications to help with field scouting

The extension plant pathology team has developed two new publications to help with field scouting. The publications are entitled, "Corn Disease Profiles (EC1883)" and "Soybean Disease Profiles (EC1882)". These are single page publications printed on heavy weight paper with full color pictures of the top diseases of the prospective crop on one side and descriptions of the diseases on the back.

These are the first in a series of publications to provide color photos of common diseases for Nebraska crops. These are intended to be used with another Cooperative Extension publication, "Diseases of Nebraska's Field Crops" (EC1880), which provides further details. Contact your local Cooperative Extension Office to get your copy. Each publication costs $1.

**Loren J. Giesler, Extension Plant Pathologist**

## 36 counties okayed for CRP haying, grazing

Thirty-six Nebraska counties have been approved for emergency haying and grazing of Conservation Reserve Program acreage, according to the Nebraska Farm Services Agency office.

Counties receiving approval are: Arthur, Banner, Blaine, Box Butte, Brown, Buffalo, Chase, Cheyenne, Custer, Dawes, Deuel, Dundy, Franklin, Frontier, Garden, Gosper, Greeley, Hayes, Hitchcock, Hooker, Keya Paha, Keith, Kimball, Knox, Lincoln, Logan, McPherson, Morrill, Perkins, Red Willow, Rock, Scotts Bluff, Sheridan, Sioux, Thomas and Webster. In addition, applications have been filed for Boyd, Furnas, Holt and Nemaha counties and applications for additional counties are in process.

USDA will notify local Farm Service Agency offices when additional counties are approved. Haying is authorized until Aug. 31, 2002, or until disaster conditions no longer exist, whichever comes first. CRP participants who do not own or lease livestock may rent or lease the haying privilege to an eligible livestock producer in an approved county.

Generally, to be approved for emergency haying and grazing, a county must have suffered at least a 40% loss of normal moisture and forage for the preceding four-month qualifying period. At least 50% of the CRP contract acreage must be left unhayed for wildlife. Hay harvested from CRP acreage may not be sold.

USDA offers other programs to assist drought stricken producers, including emergency farm loans, federal crop insurance, the emergency conservation program and the noninsured crop disaster assistance program. Since the beginning of the year, areas of 16 states have been declared drought disaster areas, making farmers in those areas eligible for emergency farm loans. For more information, producers should contact their local FSA office or visit FSA's website at: *http://www.fsa.usda.gov.*

## Salvaging corn *(Continued from page 147)*

Check insecticide label before switching intended crop use to haying, forage or feed. *See story, page 156*

For information on understanding nitrate test results and storing silage to maintain quality, see this week's issue of *CropWatch* on the Web at *http://cropwatch.unl.edu*

erosion, limiting weeds, helping conserve moisture and capturing snowfall.

Corn can be harvested as hay (much like cane hay, with a thick, slow drying stalk that can be difficult to windrow), as silage, or grazed.. The producer=s choice of use may be affected by the amount of nitrate present in the crop. Many times drought or hail stressed crops contain high levels of nitrates. If nitrate levels are high, the field may need to be harvested differently than originally planned or feed rations may need to be mixed differently.

These fields have the potential to solve much of the forage/feed shortage caused by the current drought, although getting corn forage to the animals or bringing animals to the forage remains a logistics challenge.

### Haying

Harvesting corn for hay presents several challenges, which the producer should carefully consider:

1) **mechanics of harvest --** cutting may be especially difficult and bale integrity often is less desirable than with other forages (especially in round bales); it can be difficult to determine when slow drying stems are ready to bale;

2) **nitrates --** testing for high nitrate levels is a must; cutting stubble at taller heights may help limit levels in the harvested hay;

3) **feed value/feeding --** grinding may be needed to limit refusal and waste of stems.

Forages that contain high nitrate levels can be diluted in the diet with grains or with other forages low in nitrates. Energy from the grain apparently helps complete the conversion of nitrate to bacterial protein in the rumen.

### Greenchop

Greenchop is very effective at harvesting most of the feed nutrients available from the crop and making it immediately available. Greenchop is the most hazardous feed to use, though, when nitrates are high. Never allow greenchop to sit in feed bunks or feed wagons and heat. Nitrates get converted into nitrites during this heating process, and nitrates can be as much as 10 times more toxic than nitrates. Thus, only chop and feed what the animals will eat in one single meal. To further minimize nitrate risks, leave a tall stubble in the field.

### Silage

Harvesting the field for silage is an excellent choice for reducing nitrate problems -- an average of one-third of nitrates are neutralized during fermentation. Using silage too quickly after chopping, however, can be deadly. During the first few days of early fermentation the chopped forage begins to heat, converting nitrates into nitrites. Nitrites are as much as 10 times more poisonous to cattle than nitrates. These nitrites are then converted into other compounds that make them less toxic.

To avoid feeding high nitrate or high nitrite silage, wait four weeks after chopping before feeding. Crops normally have lower nitrate levels at maturity, so harvest when the crop is as near maturity as possible. If the corn or sorghum field being harvested as silage has been identified as or is suspected of having high nitrate concentrations, raise the cutter head to selectively avoid stalk bases that have the highest nitrate concentration.

Even in dry fields, moisture may be a problem and may delay harvesting the field for silage. The stalk retains moisture and may remain too wet for a long time. To overcome the moisture problem, wait until the crop dries to desired 65% moisture before chopping. Another option is to windrow it and allow field wilting to reduce moisture. A final alternative is to mix wet chopped stalks with dry feeds like corn grain or chopped hay.

Silage does not transport well, so it makes for a poor cash crop unless livestock are near.

### Grazing

Nitrate poisoning is less of a concern with grazing than with the other options, but it can still be a problem, depending on how completely animals are forced to eat the lower stalks. Providing fencing and adequate water may be bigger hurdles with grazing corn fields. Grazing management, such as strip grazing, will be needed if efficient use is desired, otherwise cattle will trample and waste a huge portion of the crop. A single electric wire often is all that is necessary to restrict animal access to a limited area if animals are trained and familiar with electric fence. Cows should receive only as much corn as they will finish in two or three days, then be given a fresh strip. Dairy cattle or stockers should receive fresh corn to graze every day or two.

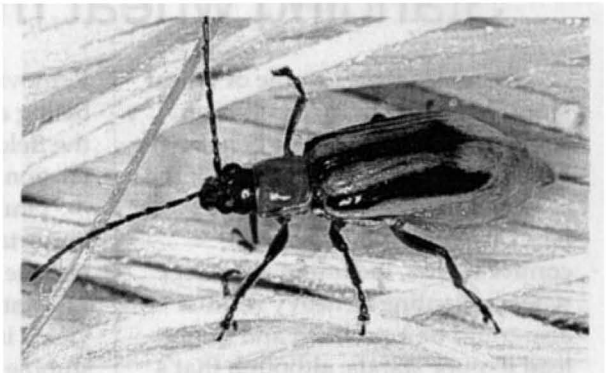
Nutritionally, this drought damaged corn should be adequate for beef cows, dry or with suckling calves, and for replacement heifers and steers. TDN will be around 65 and crude protein about 12%. Small calves may struggle some with grazing without the cow and eating unground hay.

**Bruce Anderson**
**Extension Forage Specialist**

# Corn rootworm beetles emerging; begin scouting

A generally mild winter has favored the survival of western corn rootworm beetles in many parts of the state. These beetles began emerging in late June and early July in southeastern and south central Nebraska. Beetle emergence will be somewhat later in northeastern and western Nebraska.

Beetles emerging before silk emergence may feed on corn leaves. They feed by scraping the surface tissue, leaving a white parchment-like appearance. Once silks emerge this is the favored food. The earliest silking fields in an area often are most heavily damaged as beetles move around in search of green silks. There are no thresholds for silk-clipping damage based on beetle numbers because damage levels are not correlated well with beetle densities. Usually an average of at least 10 beetles per ear are required to seriously affect pollination. Severe silk feeding at 25%-50% pollen shed may indicate the need for an insecticide, especially in seed production fields. See the Department of Entomology web site at *http://entomology.unl.edu/instabls/crwadult.htm* for a list of insecticides labeled for adult rootworm control.



**Corn rootworm beetle**

During late July and August these beetles will be laying eggs in corn fields. These eggs overwinter in the soil, hatch into rootworms in the spring, and feed on corn roots if continuous corn is grown. However, not all continuous corn fields have economic infestations of corn rootworms. Weekly scouting of adult rootworm beetles in July and August will provide you with information to decide whether a rootworm insecticide is needed next year. People using adult beetle control programs should base the decision to treat and spray timing on information from field scouting.

Begin scouting for corn rootworm beetles soon after beetle emergence begins and continue scouting weekly until threshold levels are exceeded or beetle activity stops. Examine 50 plants per field, taking samples from each quarter of the field. Sampled plants should be several paces apart, so that examining one plant doesn't drive beetles off of the next plant to be sampled. The most reliable method is to examine the whole plant for beetles. Beetles may hide behind leaf sheaths or in silks, so care is required to observe all beetles present. An alternative method is check for beetles only in the ear zone (the area including the upper surface of the leaf below the primary ear and the under surface of the leaf above the primary ear).

In continuous corn if beetle counts exceed 0.75 beetle per plant, damaging populations of corn rootworms are possible in that field next year. In first year corn, there is a higher proportion of female beetles, so the threshold is lowered to 0.45 beetle per plant. These thresholds are based on a 24,000 plant population per acre. The number of beetles per plant to equal a threshold level should be adjusted for different plant populations. (See table or NU NebGuide, "Western Corn Rootworm Soil Insecticide Treatment Decisions Based on Beetle Numbers", G86-774.) If you use the ear zone method for scouting, divide the above thresholds in half, since on average only 50% of the beetles on a plant are counted using this method.

To prevent economic damage, rotate the field out of corn or use an insecticide at planting or cultivation time. Fields remaining below the threshold level do not need to be

*(Continued on page 154)*

Average number of western corn rootworm beetles present in cornfields that may produce an economically damaging rootworm population in corn the following year.

| Plants per acre | Average number of rootworm beetles | | | |
|---|---|---|---|---|
| | *Continuous corn*[1] | | *First year corn*[2,3] | |
| | *Per plant* | *Per ear zone* | *Per plant* | *Per ear zone* |
| 14,000 | 1.28 | 0.64 | 0.96 | 0.48 |
| 16,000 | 1.12 | 0.60 | 0.84 | 0.42 |
| 18,000 | 1.00 | 0.50 | 0.75 | 0.37 |
| 20,000 | 0.90 | 0.45 | 0.68 | 0.34 |
| 22,000 | 0.81 | 0.40 | 0.61 | 0.30 |
| 24,000 | 0.75 | 0.37 | 0.56 | 0.28 |
| 26,000 | 0.69 | 0.34 | 0.52 | 0.26 |
| 28,000 | 0.64 | 0.32 | 0.48 | 0.24 |
| 30,000 | 0.60 | 0.30 | 0.45 | 0.23 |
| 32,000 | 0.56 | 0.28 | 0.42 | 0.21 |

[1]Based on a 50:50 ratio of females to males.

[2]Based on a 70:30 ratio of females to males.

[3]Use this threshold for continuous corn fields that did not have larval populations earlier in the season (adult beetles are immigrants, similar to first year corn).

*Short-term solutions may be costly in the long run*

# Standing wheat may offer highest straw value

Determining the value of wheat straw left in the field depends on several factors. It may be beneficial to remove straw from the field if the crop residue was not spread at harvest, making it difficult to control weeds, including volunteer wheat. Planting in heavy residue also could be a problem and might lead to poor stands, although that's not very likely with the small amount of residue produced this year.

Usually, however, it may be worth more to leave it on the field than its value for animal feed or bedding, especially with the limited amount of residue produced this year.

The more residue there is, the more weeds are suppressed and the more wind and water erosion will be reduced. This is especially important, given the small amount of residue produced this year. Removing crop residue, either by baling and/or tillage, could make the fields very susceptible to soil erosion.

Stubble height may be as important as the total quantity of residue remaining in the field.

Kansas research showed corn yields increased 15 bushels with a stubble height of 15 inches compared to a height of 7.5 inches. Both research and field observations over the years have revealed a 20 bushel per acre yield loss when one ton per acre of straw was removed. In one example, where straw was left on the field, the yield was 117 bushels per acre and where it was removed it was just 97 bushels per acre. The additional crop residue also may carry the crop longer before it needs a rain since it reduces evaporation.

Research also has shown that grain sorghum fields with more winter wheat residue are less susceptible to greenbugs. Maximum corn yields are usually obtained with 6000 pounds of evenly spread winter wheat residue, or the amount of residue from a 60 bushel per acre wheat crop.

Let's examine that 20 bushel/acre corn yield decrease resulting from straw removal. If the price of corn is $2/bushel, that amounts to $40/ton for the straw. We also would have the cost of baling and treating if we feed the straw. The value of the straw for feed needs to be compared with hay prices. Summer forage crops may be a better alternative for hay supplies than using wheat straw.

**Robert N. Klein, Extension Cropping Systems Specialist West Central REC**
**Drew J. Lyon, Extension Dryland Crops Specialist Panhandle REC**

## Corn rootworms *(Continued from page 153)*

treated with a rootworm insecticide next year.

Individuals using adult beetle control programs should begin treatments when the beetle threshold is exceeded and 10% of the female beetles are gravid (abdomen visibly distended with eggs). This is an important point since the first beetles to emerge are mostly male, and females require at least 10-14 days of feeding before they are able to lay eggs. Treatments applied too early may be ineffective if large numbers of females emerge after the residual effectiveness of the treatment has dissipated. Continue to monitor fields weekly after treatment for rootworm beetles. If beetle numbers exceed 0.5 beetles per plant, retreatment is warranted. Late maturing fields are particularly susceptible to corn rootworms moving into them from nearby earlier maturing fields. A complete discussion of adult corn rootworm management can be found in the UNL Cooperative Extension publication, "Adult Corn Rootworm Management," MP 63 by UNL Entomologist Lance Meinke.

Be aware that reduced adult rootworm control with foliar insecticides due to insecticide resistance has been documented in parts of south central Nebraska (see "Adult Western Corn Rootworm Insecticide Resisistance in Nebraska," NebFact 99-367). If you experience poor control with repeated applications of foliar insecticides, and high numbers of beetles are still present, consider rotating that field out of corn next year rather than continuing to treat for beetles.

**Bob Wright**
**Extension Entomologist**
**South Central REC**

## Free weed-loving beetles

Landowners trying to control leafy spurge on their property may be able to use a free biological control effort.

Weed control authorities use leafy spurge flea beetles to control the noxious weed that is found throughout Nebraska and infests irrigation ditches, roadsides, fields, woodlands, shelter belts, rangeland, and sub-irrigated meadows.

Merlyn Carlson, Nebraska's agriculture director, said landowners can buy the beetles, or in some areas, beetles may be available free.

"I urge landowners to contact their local county weed superintendents who may have the necessary resources to find free beetles," Carlson said.

Leafy spurge flowers from May to September and is considered toxic to cattle. The weed is one of seven noxious weeds in Nebraska.

# Controlling weeds after wheat harvest

The 2002 winter wheat crop varied from fair to good in most areas, but there was even some 80 bushel dryland winter wheat. Conditions last fall resulted in good stands and much of the late planted wheat became well established. The late fall also contributed to increased spread of wheat streak mosaic. This spring cutworms were present in many wheat fields.

The lack of rainfall both in the fall and spring plus little moisture from snowfall contributed to shorter wheat and lower yields in much of the state. In addition many fields were cut and baled. These fields will need special care to avoid problems. Some of these fields may be planted back to wheat this fall.

Controlling weeds after winter wheat harvest will be a challenge. Surveys taken after winter wheat harvest in the past in west central and southwest Nebraska usually show barnyardgrass and green foxtail as the leading summer annual grasses infesting winter wheat fields. Other grassy weeds include sandbur, stinkgrass, and witchgrass. Broadleaf weeds such as kochia, lambsquarters, morning-glory, common sunflower, toothed spurge, and wild buckwheat are also present in some fields. However in 2002 many fields have few weeds. Slimleaf lambsquarters is the most common broadleaf weed. Some fields that caught a timely rain have low densities of green foxtail, stinkgrass, witchgrass, and longspine sandbur.

### Challenges to weed control

The effectiveness of post-harvest weed control is influenced by production practices associated with the previous wheat crop, such as winter wheat variety selection, fertilizer practices, row spacing, planting date, and seeding rate. Others factors influencing weed control include: weeds that are too large; cutting off weed tops with the combine; crop rotation; temperature when spraying; rain the day of spraying; streaks caused by sprayers, terraces, dust, straw, chaff, and weed seed distribution. The lack of residue from the winter wheat crop makes this crop less competitive with weeds.

Weeds under moisture stress are difficult to control. If you can wait to spray after a rain, control will improve. It's a general rule with wheat in a three-year rotation that you can wait a maximum of 30 days to spray; however, if wheat was planted without a 11- to 14-month fallow period, it should be sprayed within 15 days after harvest. With one of the driest years on record and only scattered rain, each field should be examined before spraying. The key is to prevent weeds from using soil water and producing weed seeds.

### Split treatments

Split treatments have been especially effective and with the earlier harvest this year their advantages will be even greater. In Kansas there was a 20 bushel increase in corn yields the next year for treatments applied in July vs mid-August. With the split treatment, apply the glyphosate products alone (surfactant if needed plus the ammonium sulfate) as the first application in July. Sufficient surfactant is included in RT Master, Roundup Ultra, Roundup Ultra Max, and Landmaster BW. Many other brands of glyphosate need a surfactant. Check labels. For all brands of glyphosate add ammonium sulfate (spray grade) at 17 lb per 100 gal of spray solution. The ammonium sulfate is the first item put into the spray tank after the water. Ammonium sulfate is especially helpful when stress conditions are present. Liquid ammonium sulfate, with or without a drift retardant, is also available.

It is difficult to recognize weed stress; therefore, it's wise to always add ammonium sulfate. Improve control by increasing the rate of glyphosate. Allow at least six hours for the glyphosate products to become rainfast. Some weeds require more time than others. Barnyardgrass control may require as much as 24 hours without rain for maximum control. A spray volume of 5 to 10 gallons per acre should be used with the glyphosate products. Do not use glyphosate products on days when temperatures reach or exceed 95°F.

A second treatment in September should contain at least 1/2 pound per acre of atrazine and possibly Gramoxone Extra (add surfactant), depending on the amount and size of volunteer winter wheat, downy brome or jointed goatgrass present. Several options are available for using nonselective herbicides with difficult-to-control weeds. With Gramoxone Extra use a minimum of 2 pints of X-77, or equivalent surfactant, per 100 gallons of solution. Use 2 quarts of X-77/100 gallons of spray solution if using less than 20 gallons of carrier. The atrazine rate varies with soil and rainfall patterns. In southwest Nebraska, use at least 2 quarts per acre of atrazine, but in the Panhandle, 1/2 quart per acre is often the maximum in one season.

The advantage of split treatments is that they provide excellent control of volunteer winter wheat and other winter annual grasses. Control of volunteer wheat is especially helpful in reducing the spread of wheat streak mosaic disease. Using one quart or less of atrazine before September 10 allows winter wheat to be planted 12 months later in most areas. If sufficient soil water is available the following spring, corn could be planted or if moisture is limited, the field could be fallowed and winter wheat could be planted in the fall.

### Integrating control measures

Many options besides increasing herbicide rates are available for weed control after wheat harvest. It takes a total package to obtain maximum

*(Continued on page 156)*

## Weed control in wheat

*(Continued from page 155)*

weed control. Stands of vigorous winter wheat will compete better with weeds, allowing you to concentrate on weed control in the fallow. Preparing a good firm seedbed, controlling weeds in a timely manner, fertilizing if needed, seeding properly, planting during the optimum time, selecting a competitive winter hardy winter wheat variety, and controlling weeds in the growing wheat offer the best chance of reducing weed population and vigor after harvest. In addition, it's essential that you watch closely and spray at the proper time to control weeds. Most labels state that weeds must be treated before they are 6 inches tall. If weeds are under severe drought stress, wait for rain and spray about a week later.

If downy brome is a problem and a winter wheat-fallow rotation is being used, tillage is usually recommended immediately after harvest to plant the seeds and ensure maximum weed germination during the fallow period. But with the limited amount of crop residue this year, tillage should not be used because of the possibility of soil erosion. Herbicides are available to control downy brome in the growing winter wheat and are best applied early post in the growing winter wheat. If jointed goatgrass and/or feral rye is a problem, use a rotation where wheat is not planted for at least three years under good moisture conditions and even longer under dry conditions.

Herbicide-tolerant winter wheat varieties are available in limited quantities this year for the grower that has a jointed goatgrass or feral rye problem. Beyond® herbicide is then applied in the growing wheat. A grower is required to take training before purchasing this herbicide. Be sure to check the label for additional information.

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# Check insecticide label before switching to forage or feeding

The drought experienced in much of Nebraska has caused forage and feed shortages for many livestock producers. The use of corn, sorghum, or soybean for hay, as silage, or for grazing has the potential to alleviate the forage and feed shortage; however, there are several challenges a producer must consider before taking this option.

One of these challenges is grasshopper control and grazing restrictions. Use of insecticide treated crops for forage and feed is often restricted. Because restrictions vary for different insecticides, producers are reminded to read the insecticide label and discuss grazing restrictions with their chemical dealer.

For example, the following restrictions apply to these common insecticides registered for use in field corn and/or grain sorghum for grasshopper control.

**Asana XL**

*For field corn:* No restrictions listed.

*For grain sorghum:* No restrictions listed.

*For soybean:* Do not feed or graze livestock on treated fields.

**Capture 2 EC**

*For field corn:* Do not graze livestock in treated areas or cut treated crops for feed within 30 days of the last application.

*For soybean:* No restrictions listed.

**Dimethoate 4 EC**

*For field corn:* Do not feed or graze within 14 days of last application.

For *grain sorghum:* Do not feed or graze within 28 days of last application.

*For soybean:* Do not feed or graze within five days of last application.

**Furadan 4 F**

*For corn:* Do not feed forage, cut, or harvest within 30 days of last application.

*For soybean:* Do not graze or feed foliar-treated forage to livestock or cut for silage or hay.

**Lorsban 4 E , Nufos 4 E**

*For corn:* Do not allow livestock to graze in treated areas, and do not harvest treated corn silage as feed for meat or dairy animals within 14 days after last treatment. Do not feed treated corn fodder to meat or dairy animals within 35 days after last treatment.

*For grain sorghum:* The treated crop is not to be used for grain, forage, hay, or silage within 30 days after application of 1 pint of Lorsban-4E per acre or within 60 days after application of rates above 1 pint.

*For soybean:* Do not allow livestock to graze in treated areas or otherwise feed treated soybean forage, hay, and straw to meat or dairy animals.

**Mustang**

*For corn:* Do not apply within 30 days of harvest for grain and fodder (stover) and 60 days for forage (silage).

*For grain sorghum:* Do not apply within 14 days of harvest for grain and fodder (stover) and 45 days for forage (silage).

*For soybean:* Do not graze or harvest treated soybean forage, straw, or hay for livestock feed.

**Penncap-M**

*For field corn:* Do not harvest, cut for forage, or graze within 12 days of application.

*For soybean:* Do not apply within 15 days of harvest or grazing.

Of course other label information (e.g. post harvest intervals for grain, cumulative application limits) also is important for the producer to consider. More information on pesticide labels can be found in the on-line Greenbook at *http://www.greenbook.net/*.

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