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

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Double rootworm treatment may have long-term implications; consider rotation

Some people are considering spraying for rootworm beetles in fields treated earlier this year with a soil insecticide. Their concern is that otherwise rootworm populations will be too high to be controlled with soil insecticides next year.

There are several reasons why this isn’t a good idea. First is the potential development of insecticide resistance. Some of the fields in question are in the Holdrege area, where there are populations of western corn rootworms with high levels of resistance to several organophosphate and carbamate insecticides. Based on our laboratory studies, there seems to be similarity in resistance mechanisms among larvae and adults. Resistance development is directly related to the frequency of insecticide application (selection intensity). In general, if you treat twice as often, resistance will develop twice as fast.

Another concern is that there may be a misunderstanding about what soil insecticides are supposed to do. Soil insecticides protect corn roots and may allow survival of some rootworm larvae. The insecticides are applied infurrow or in a 7-inch band; rootworm larvae may survive outside the treated zone on corn roots. Research over several years by USDA-ARS scientists at Brookings, South Dakota, indicated that <50% (16-81% range) reduction in adult numbers may occur from soil insecticides applied at planting. The variability is due to efficacy of different products and environmental conditions (particularly soil moisture). Beetle emergence is not a good measure of soil insecticide efficacy. (See page 146 for a guide on using the 1-6 root rating scale).

A better approach would be to target fields with high numbers of beetles for crop rotation next year. Crop rotation also has the added benefit of reducing selection for insecticide-resistant rootworms. The problem seen in the eastern corn belt (Illinois and Indiana) where western corn rootworms have begun to lay eggs in soybeans and then cause damage the next year in corn is not a concern in Nebraska.

If rotation is not an option for a producer, you still may be better off relying on a soil insecticide next year if corn will be planted again. Overwinter mortality of rootworm eggs is variable (low overwinter mortality this year), but in many years a high percentage of eggs die over winter due to weather or biological control agents. High beetle numbers do not necessarily mean high larval populations next year. If there is still a concern about soil insecticide performance, scouting for larvae and use of rescue insecticide applications, if needed, is also an option. Even against resistant rootworms, several soil insecticides should provide effective control. In 1997 field studies against resistant beetles at Holdrege, planting time applications of Counter 15G, Counter 20CR and Lorsban 15G resulted in root injury ratings (1-6 Iowa scale) of 2.50-2.65 where the untreated check was 4.55. (See Larval Western Corn Rootworm Insecticide Resistance in Nebraska, NebFact 98-366, for more information.)
Paul Hay, Extension educator in Gage County: Wheat harvest has been completed with above average yields. The number of incidents of pesticide spray drift seems to have increased somewhat this year. Farmers need to be very aware of this and avoid high risk application methods and times.

There has been significant use of the herbicide Paramount for grass control in milo. Farmers need to scout field margins and waterways for grasshoppers; there are very high numbers in some areas. Pay special attention to fields where alfalfa and wheat will be planted this fall.

Dewey Teel, Extension educator in Antelope County: We have received many very nice rains the past few weeks and the crops are in very good condition. Some low areas were under water. It has been a challenge to put up hay with all the moisture and high humidity.

Terry Gompert, Extension Educator in Knox County: On June 30, 70,000 acres of crop and pasture sustained 70% damage from hail. On July 7 very high winds destroyed many grain bins and several pivots. Greensnap was common.

Noel Mues, Extension Educator in Furnas County: There has been no improvement in the drought situation in southwest Nebraska. Parts of Furnas and Red Willow counties received about 1/2 inch of rain last weekend, however it didn’t provide any relief to growing crops and pasture. Governor Ben Nelson is scheduled to tour the drought stricken area to assess the need for assistance.

Producers have been pleasantly surprised with wheat yields and quality. Some reports are in the 60-70 bushel range for summer fallow wheat with reports in the 40 bushel range for continuous wheat. Corn and soybean producers are spending most of their time irrigating while alfalfa producers are busy putting up the second cutting.

Steve Pritchard, Extension Educator in Platte County: Crops in the Platte Valley are progressing very well. Field corn started tasseling this past week. Operators have started harvesting the second cutting of alfalfa. They have been satisfied with both the quality and quantity of the harvest.

Need to compare labels? Go on-line

What do you do when you can’t find a copy of your pesticide label or you want to take time at home to compare different pesticide labels before placing your order. A publisher’s Web site can provide the answers you need in both situations.

Many pesticide labels are now available at C & P Press’ Web site through an on-line version of their Crop Protection Greenbook. Available at [http://www.greenbook.net/](http://www.greenbook.net/), this free service provides the most

(Continued on page 146)
Insect update: pests numerous and varied

Southeast District

Chinch bugs are present in the outer rows of some sorghum fields in southeast Nebraska that are next to wheat. Initial chinch bug migration appears to be complete and damage is becoming evident. Chinch bug numbers decrease rapidly in infested fields as you move from wheat to sorghum. In some areas corn next to wheat is also infested. In most fields only the outer two to four rows are infested.

The value of controlling border infestations is hard to predict. If chinch bug numbers are high (20 or more per plant), border sprays will reduce the spread of chinch bugs further into the field and will reduce damage to infested plants. This also may help reduce damage from second generation chinch bugs. Chinch bugs are difficult to control because they usually get into protected areas on the plant, behind leaf sheaths, roots, etc. To increase control, apply insecticides in at least 10 to 20 gallons of water per acre, higher if possible, and direct spray to the lower plant.

Insecticides registered for control of chinch bugs on sorghum include: Sevin XLR+, 1-2 qts/acre; Sevin 80S, 1.5-2.5 lbs/acre; Furadan 4F, 1 pt/acre; Warrior 1EC, 3.84 oz/acre; Baythroid 2, 1.6-2.8 oz/acre.

Greenbugs also are appearing. Populations are low in most fields, but greenbug numbers and damage can increase quickly. With fields in the boot to early heading growth stage, treat if greenbug colonies are present on most plants, before an average of one lower leaf has been killed, and if greenbug parasitism (mummies) is less than 20%.

After heading, plants can withstand more damage. Greenbugs can kill up to an average of about two leaves per plant before causing economic yield loss. Make sure any dead leaves are due to greenbugs.

For more information refer to Management of Greenbugs in Sorghum, NebGuide G87-838. Updated information on recommended insecticides and management is available on the University of Nebraska, Department of Entomology Home page at http://ianrwww.unl.edu/ianr/entomol/entdept.htm

Z B Mayo, Extension Entomologist

Panhandle District

The insect situation in the Panhandle is quite buggy — we are seeing the typical insects as well as some quite unusual to this area. Perhaps the most unusual is a stink bug (presumably a stink bug) in cereals. In winter wheat the damage potential is during the milk stage, which has passed, but spring cereals may still be damaged and some melting barley in eastern Wyoming has been treated. The published threshold is three to four stink bugs per 100 sweeps.

A second unusual bug here is the false chinch bug. It is in many crops, and has been found in damaging levels in sugar beets and potatoes. This insect sucks the sap from the plants and if numerous, can cause the plants to wilt and new foliage to die. Some fields have reached an economic level when the insect moves from weeds to the adjacent crop in very high numbers.

We’re also seeing more problems with the usual pests. Grasshopper numbers are at least as high as last year. A substantial proportion of the population has reached the adult stage, spreading damage over a wider area and making control more difficult.

Another concern is the extent of spider mites (specifically, Bank’s grass mites) in corn. No economic populations have been seen, but most fields have mites. Many, however, also have natural predators. As other insecticide treatments are applied for grasshoppers, western bean cutworms, etc., it may be difficult to maintain predator numbers. Flaring mites with insecticides targeted at other insects in corn should be a concern when evaluating the need for treatments.

In dry beans Mexican bean beetle egg laying is beginning and we are seeing significant numbers. Sample egg populations and compare to treatment thresholds in the next week or two.

Potato leafhoppers are present in the Panhandle, but I am not aware of any economic infestations. While their presence is unusual, numbers should still be evaluated in light of the serious problems they caused last year in dry beans and alfalfa.

Some alfalfa growers have reported large numbers of blister beetles and have been concerned with cantharidin poisoning in horses. Most of the blister beetle species I have seen in western Nebraska do not have extremely high cantharidin levels, but caution should be used. The larval stages of these insects are predacious on grasshopper eggs and numbers will be high during grasshopper infestations. Horse owners must be aware of this problem when buying or harvesting alfalfa hay, particularly when grasshopper numbers are high.

Gary Hein, Extension Entomologist
Panhandle REC, Scottsbluff

West Central District

European corn borer larvae in field corn are in the second and third instars. A few fields have been treated but the infestation has not been widespread. We caught our first western bean cutworm moth of the season and found our first rootworm beetles. I have not found any western bean cutworms in the field. Most of the rootworms are still in the ground, in the third instar and pupal stages.

A few corn fields have Banks grass mites on the edges and are beginning to move from adjacent rangeland and wheat fields. Grasshoppers in rangeland were second and third instars. Control efforts should be underway.

We have found stem weevils and false chinch bugs in sunflowers. The stem weevils were in early planted sunflowers and are not yet a problem for most producers. The false chinch bugs don’t seem to be causing a problem but the 30-40 per plant is only a moderate infestation.

Ron Seymour, Extension Assistant, Integrated Pest Management, West Central REC, North Platte
Check corn roots for rootworm injury

Western corn rootworm beetles began emerging in south central Nebraska in late June and early July. Beetle emergence will be somewhat later in northeastern and western Nebraska. The beginning of beetle emergence indicates that rootworm larval feeding is ending. Mid to late July would be a good time to dig roots to evaluate the efficacy of your rootworm management program.

The presence of adult beetles or rootworms in a field is not necessarily an indication of insecticide failure. Soil insecticides are applied in a narrow band to the soil and corn roots grow beyond the treated zone where rootworm larvae may survive. Also, plant lodging may occur without significant rootworm feeding. Dig and wash some roots to check for rootworm injury before assuming that rootworm damage is responsible for lodging.

Rootworm insecticide efficacy can only be reliably evaluated if replicated, untreated check strips are left in the same field as the treatment. Without check strips, you won't know whether the absence of injury is due to insecticide efficacy or the absence of rootworms.

Root damage from rootworm feeding can be rated using the Iowa 1-6 injury rating system (see illustration and NebGuide G92-1108, Evaluating Corn Rootworm Soil Insecticide Performance). Before corn plants can be rated for injury they need to be at a growth stage where at least three nodes of roots are clearly visible. Dig at least 10 randomly selected plants from several areas of a field. Leave a 9-inch cube of soil surrounding the root system, wash the roots to remove soil and rate each plant for injury using the rating scale.

The relationship between root injury rating and yield loss is complex, but usually a root injury rating of 3 or more is needed to cause economic yield loss. The corn plant has the capacity to regrow roots and compensate for some early season injury, especially if soil moisture and fertility are adequate during the regrowth period. If several weeks have passed between the end of rootworm injury and the time of root rating, new root growth may hide the injury. Examine roots carefully to accurately rate them.

Information on scouting for rootworm beetles and thresholds is available in NebGuide G774, Western Corn Rootworm Soil Insecticide Treatment Decisions Based on Beetle Numbers, and also will be discussed in next week's newsletter.

Bob Wright, Extension Entomologist, South Central REC, Clay Center

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Labels on-line
(Continued from page 144)

current versions of product labels and Material Safety Data Sheets (MSDSs) available to C&P Press and allows updates throughout the year. (In June at least 14 new/revised pesticide labels from AgrEvo (5), Monsanto (4) and Novartis (5) were added to the database.) Pesticide labels from at least 32 companies are available.

(Continued on page 152)
Irrigating soybeans: What's best in what situations

Proper irrigation management is critical if soybean yields and irrigation water resources are to be optimized. Irrigation timing is a key to achieving both goals.

It’s important to have adequate water available to the soybean plant during pod development and seed fill. On sandy soils or during dry years on medium and fine textured soils, irrigation also may be required during flowering. If water is applied during flowering, follow it with adequate water during seed fill. Otherwise, more but smaller seeds will develop, causing reduced yields.

The soybean’s root system reaches 5 to 6 feet at maturity on soils that do not have root-restricting layers. Most of the roots and moisture extraction, however, occur in the top 2 to 3 feet so normally irrigation doesn’t need to penetrate below 3 feet.

Irrigated soybean production in Nebraska accounts for about one-third of the state’s production and encompasses a region with diverse soils and climates.

Each year a soybean crop uses 21-24 inches of water through evaporation and transpiration. The plant uses about 65% of this water during the reproductive stages, when it uses an average of 0.25 inches per day. The peak water use rate is about 0.3 inches per day and occurs during pod development. (See illustration, page 148.)

Full-season or growth-stage irrigation

Recent soybean irrigation research has focused on comparing full-season irrigation to growth-stage irrigation to evaluate the effects of delayed irrigation on grain yield and water use efficiency.

Four irrigation treatments were evaluated across Nebraska at Tyrnon, North Platte, Clay Center and Mead:

- Full-season. If necessary, irrigation began prior to flowering to supply water according to the evapotranspiration of the crop. Available soil water was maintained above 50% in the active root zone.

- Flower. Irrigation began when a flower opened at a node immediately below the uppermost node on the main stem with a completely unrolled leaf. During both flowering and pod elongation, a maximum of 3 inches of water was applied in two weeks. During bean enlargement, a maximum of 4.5 inches of water was applied in three weeks. Irrigation amounts were adjusted each week for rainfall.

- Pod Elongation (Pod). Irrigation began when a pod was 0.75 inches long at one of the four uppermost nodes on the main stem with a fully developed leaf. During pod elongation, a maximum of 3 inches of water was applied in two weeks.

Figure 2. Relative yields for soybean with respect to full season irrigation. (Continued on page 148)
Irrigating soybeans (Continued from page 147)

weeks. During bean enlargement, a maximum of 4.5 inches of water was applied in three weeks. Irrigation amounts were adjusted each week for rainfall.

**Dryland.** Water was applied only if needed for stand establishment.

The graph on page 147 illustrates the average relative yields by location and water treatment.

Dryland relative yields were greater at Mead and Clay Center than the two more westerly locations. More precipitation before and during the growing season at the eastern locations may have increased the dryland yields. Relative yields from the pod treatments decreased from the eastern to the west-central locations. Soil water storage and rainfall were not enough to produce maximum yields from the pod-elongation treatment at the west-central locations; although, the pod-elongation treatment showed a positive yield response due to late season water application at all locations.

As a result of this and other research, irrigation water management recommendations that accommodate Nebraska's intrastate variability of soil texture, climate, and precipitation were developed.

**Recommendations**

Coarse textured soils such as fine sands, loamy sands, and fine sandy loams, generally have a low (less than 1.5 in/ft) water capacity. The combination of low available water capacity and shallow rooting results in a small soil water reservoir. Allow no more than 50% depletion of the available soil water in the top 2 feet during flowering and in the top 3 feet after full flower. Combine the appearance-feel method with soil water-balance calculations using reliable evapotranspiration estimates. You also can use a fixed frequency schedule, such as irrigating every three to seven days during the reproductive stages, depending on rainfall.

Deep-medium and -fine textured soils generally have an available water capacity of more than 1.5 inches per foot. In the top 3 feet, the available soil water at field capacity is 4.5-6.0 inches. For maximum yields irrigate when the available soil water is depleted to 50% in the top three feet of the root zone after the full flower stage. The same methods mentioned for the sandy soils can be used to estimate soil water in these soils.

The simpler growth-stage scheduling approach will work on deep-medium and deep-fine textured soils if the soil water reservoir is at or near field capacity to 5 feet at planting time. In eastern Nebraska this usually occurs if the soils were irrigated during the previous season or there is sufficient off-season precipitation. When soybeans are from full flower to full seed fill they require 10-11 inches of water to reach maturity. Effective irrigation plus rainfall should equal about 3 inches during both the full flower and pod development stages, and 4.5 inches during seed fill. With

(Continued on page 151)
Controlling weeds after wheat harvest

The 1998 winter wheat crop varies from poor to excellent. Some fields suffered from winter injury that reduced stands and made them less competitive with weeds. The drought made many tillers abort and the reduced height of this year’s crop kept the canopy open, which provided ideal conditions for weed germination and establishment when the rain finally came. The density of weeds in many of these fields is extremely high. In some areas there are few weeds because of the drought but new weeds will appear when it rains.

Controlling these weeds after winter wheat harvest will be a challenge. Surveys taken after winter wheat harvest 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. This year many of the broadleaf weeds such as lambsquarters, morningglory, common sunflower, Russian thistle, kochia, and wild buckwheat will also be problems to control after winter wheat harvest.

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. Other 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.

If only large broadleaf weeds are present after harvest (and these were not controlled with a harvest aid treatment), Gramoxone Extra plus atrazine should be applied soon after harvest. A mixture of Gramoxone Extra + atrazine offers good control of both small and mature barnyardgrass, but is less effective on medium or large plants. Control of barnyardgrass is poor with Gramoxone Extra + atrazine when sprayed during the tillering to boot stage. However, once barnyardgrass has headed, the mixture again provides good control. Spraying after the grass has headed allows seed production. In addition, the longer the weeds grow, the more soil water is used.

Several options are available for using nonsel ective 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 gallon of spray solution if using less than 20 gallons of carrier. Sufficient surfactant is included in Roundup Ultra and Landmaster BW. With Roundup Ultra or Landmaster BW, add ammonium sulfate (spray grade) at 1 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.

One cannot easily recognize stress to weeds; therefore, it is wise to always add ammonium sulfate. Improve control by increasing the rate of Roundup Ultra or Landmaster BW. Allow at least six hours for the Roundup Ultra or Landmaster BW 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 Roundup Ultra or Landmaster BW.

Our research and field surveys suggest that atrazine combined with either Gramoxone Extra, Roundup Ultra, or Landmaster BW is an effective treatment if applied before weeds are too large. Use Roundup Ultra or Landmaster BW + atrazine on grasses from tillering to the boot stage. Atrazine antagonizes glyphosate so glyphosate rate must be increased to at least 28 oz/A. If barnyardgrass is present increase the glyphosate rate when mixed with atrazine. If weeds are mature, use the Gramoxone Extra + atrazine combination. Do not use Roundup Ultra or Landmaster BW on days that it will rain or when temperatures reach 95°F.

Split treatments have been especially effective. With the split treatment, apply Roundup Ultra or Landmaster BW alone as the first application in July or early August. A second application in September should contain at least 1/2 pound per acre of atrazine and possibly Gramoxone Extra depending on the amount and size of volunteer winter wheat, downy brome or jointed goatgrass present. The atrazine rate varies with soil and rainfall patterns. In southwest Nebraska use at least 2 quart per acre of atrazine, but in the Panhandle, 1/2 quart per acre is often the maximum in one season. Be careful not to exceed the label rate for atrazine with the two combined treatments. 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 wheat streak mosaic disease. Using one quart or less of atrazine before September 10 allows one to plant winter wheat 12 months later in most areas. If sufficient soil water is available the following spring one could plant corn or if moisture is limited, fallow and plant winter wheat in the fall.

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

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Wipers and bean bars still viable herbicide application methods

In a few short weeks, wiper bars will be a primary mode of herbicide application for many soybean growers across the state. This method allows the user to apply a non-selective herbicide, such as Roundup or Touchdown, to weeds in soybeans without injuring the crop. Weeds should be at least 10 inches taller than the crop. Roundup is used at a concentration of 33% and Touchdown at a concentration of 25% in water to control most broadleaf and grass weeds.

When wiping Roundup or Touchdown over soybeans, use weed density and species as a guide for application. If large broadleaf weeds such as sunflower or pigweed are present in dense stands, two passes in opposite directions across the field will be required. Many growers have opted to use herbicide-resistant varieties such as Roundup Ready soybeans. If so, late postemergence application will not injure the crop. Broadcast applications of non-selective herbicides over herbicide resistant crops should provide excellent weed control and ease of application.

The primary drawback to bean bars is that some crop damage occurs as the non-selective herbicide contacts the crop. Several selective herbicides are available for this method offering reduced risk of crop injury. Assure, Basagran, Blazer, Classic, Fusilade, Pinnacle and Poast provide good weed control with less crop injury. These herbicides are mixed at the per acre rate of herbicide and surfactants in 25 gallons of water. As with any herbicide application, read the label before use. Be aware of preharvest intervals with these treatments.

Alex Martin
Extension Weed Specialist

Jeff Rawlinson
Extension Weed Science

Weed control in wheat
(Continued from page 149)

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, proper seeding, planting during the optimum time, selecting a competitive winter hardy winter wheat variety, and weed control 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 winter annual grasses such as jointed goatgrass or rye are a problem and a winter wheat-fallow rotation is being used, till immediately after harvest to plant these weed seeds and ensure maximum weed germination during the fallow period, where control options are available.

Robert N. Klein, Extension Cropping Systems Specialist
Gail A. Wicks
Extension Weeds Specialist
Drew J. Lyon, Extension Dryland Cropping Specialist
**Irrigate alfalfa to encourage deep rooting**

Hot, windy days cause alfalfa fields to dry up quickly. Irrigation helps, but it can stimulate weeds and actually weaken alfalfa stands if not done properly.

Alfalfa uses a lot of water — up to 40 inches a year and sometimes over one-third of an inch in one day. It's no wonder that irrigators find it difficult to keep up with these water demands. As a result, we often irrigate from the moment hay is removed from the field until the moment we start the next cutting.

But, constant watering has costs besides fuel and depreciation. Constant watering encourages grassy weeds like foxtail and perennial grasses like bluegrass to invade alfalfa. Constant watering also weakens alfalfa plants by encouraging root diseases and by reducing oxygen content of the soil.

How can you avoid weakening your alfalfa and strengthening the weeds with irrigation? Modify your irrigation management to encourage deep rooting of alfalfa and dry surface soils during harvest.

Stop irrigating a couple days before harvest to allow the surface to dry out and become firm. Then do not irrigate after harvest until alfalfa regrowth is three to four inches tall. That way, shallow rooted weeds like foxtail and bluegrass will be unable to grow until the alfalfa already has a head start. But to be sure the alfalfa regrows rapidly, deep watering is needed when you do irrigate so there will be deep water available that your alfalfa roots can get to that the weeds can’t reach.

By putting on a little more water a little less frequently, your alfalfa can be cleaner, healthier, and more productive.

Bruce Anderson
Extension Forage Specialist

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**Irrigating soybeans** *(Continued from page 148)*

Normal rainfall, optimum yields will be obtained with two 3-inch irrigations (typically at full flower or pod elongation and beginning seed fill). In dry years, an additional 3 to 5 inches may be required. If irrigation is started during the flower stage it is especially important that adequate moisture be available during the remainder of the growing season. If you are limited to one 3-inch irrigation during the season, you will get the maximum benefit if it is applied during pod development. If rainfall is below normal during the vegetative and flower stages, a yield reduction may occur.

With furrow irrigation systems, to avoid extremely dry furrow conditions and problems moving water through the field, don’t wait until pod development to irrigate.

Because precipitation and stored soil water decrease from east to west across Nebraska, a full soil water reservoir may not exist at planting time in western Nebraska. In this region delaying irrigation until the pod elongation stage may cause yield reductions when compared with full-season irrigation. On coarse textured soils in semi-arid west central Nebraska, full-season irrigation should be based on soil water depletion and evapotranspiration demand.

**In a nutshell: soybean irrigation recommendations**

When irrigating soybeans in Nebraska:

1. Limit growth-stage irrigation scheduling to deep-medium to deep-fine textured soils. If the soil water is at field capacity at planting, irrigations can be delayed until full flower.
2. If one or more of the conditions listed below exist, schedule irrigations according to soil water depletion. Depletions should not exceed 50%.
   - Soil texture is sandy loam or coarser
   - The root depth is impeded (shallow, limits available soil water reservoir size)
   - Irrigation system capacity is 1.5 inches per week or less.
   - Scheduling irrigation based on a crop’s growth stage is convenient and may work well for a crop like indeterminate soybeans, which respond well to water during the later growth stages. The use of growth-stage scheduling, however, should be limited when soil texture and climate are not favorable to it.

Brian Benham, Water Management Engineer, South Central REC
Joel Schneekloth, Extension Educator, West Central REC, North Platte
**Labels on-line** (Continued from page 146)

Visit the site, try it out, and then remember to bookmark it to save time and exasperation later. A 16-page pesticide label (198K) took only one minute to download with a 28,800 bps modem. Users can view the label on-screen, save it to a hard disk or print it. Reading the labels requires the Adobe Acrobat Reader, which is available free at http://www.adobe.com/prodindex/acrobat/readstep.html.

A related subscription service also offered at the site provides full search capabilities by brand and company name, site use (crops, plants, etc.), pest (weeds, insects, diseases, etc.), common name (active ingredient), and product category. Individuals can register for a free trial of the subscriber service.

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**Larry Schulze**

Extension Pesticide Coordinator

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### GDD and Crop Water Use Data

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Growing degree days required for Type 3 maturity class for the following crops: corn, 2750; soybeans, 2450; and sorghum, 2369.