8-14-1998

CropWatch No. 98-20, Aug. 14, 1998

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Planning late season management

Bean leaf beetle numbers up for 2nd round

A mild winter and increased survival of the overwintering bean leaf beetle adult may be leading to increased bean leaf beetle activity over the next few weeks. There is renewed feeding as the true second generation of beetles emerges and feeds on leaves and developing pods. Following is a review of the biology of the beetle and management suggestions.

Life cycle

Two generations of bean leaf beetles develop in Nebraska. The second generation overwinter as adults. These beetles are the ones seen early in the year feeding on seedling soybeans. These beetles feed, mate, lay eggs and die in early to mid June. There is usually a distinct period from mid June to early July when few if any beetles are present 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. With the generations overlapping, beetles will be present at some level from mid-July until the end of the growing season. During this period it's important to monitor beetles regularly to deter-

(Continued on page 178)

Calendar highlights

A variety of field days and educational opportunities are available over the next few weeks.

Aug. 15, Specialty Crops Field Day, Lincoln, (see CW, 98-19, for details).

Aug. 19, 1 p.m. Dry Edible Bean Field Day, Panhandle Research and Extension Center, Scottsbluff (see page 181 for details).

Aug. 19, 7-9 p.m. Growing Wheat Well videoconference (see page 176 for details).

Aug. 25, 8:15 a.m. Late Season Diagnostic Clinic: Intensive Training for Agricultural Professionals, UNL Agricultural Research and Development Center near Mead. Topics include: late season crop management; plant disease diagnostics; observation of crop diseases; European corn borer management; yield monitors, calibration and combine dynamics, and integrating site specific information and soil problems. For more information or to preregister call (402) 624-8030 or visit the clinic web site at http://iarw.unl.edu/ianr/arcd/CMDC.htm. Preregistration cost is $125. Certified crop advisors will receive at least five CCA-CEU's for the clinic.
Satellite program focuses on wheat issues

Results of the 1998 wheat variety tests will be among the many topics to be discussed during "Growing Wheat Well," a satellite videoconference on all aspects of wheat production in Nebraska. It will air Aug. 19 for viewing at host sites across the state or on your own home television.

The free University of Nebraska Cooperative Extension program offers an in-depth look at total wheat management. It will run from 8 to 10 p.m. central time (7-9 p.m. mountain time).

The conference is designed for wheat producers, seedsmen and decision makers interested in learning more about improving wheat production and increasing profits. Sharron Quisenberry, head of the UNL Entomology Department, will moderate the conference. Speakers will include specialists in production, cropping systems, marketing, variety development and pest management.

The workshop will highlight 1998 wheat variety performance data from NU trials across the state. Topics also will include selecting a wheat production system; Russian wheat aphid-resistant varieties; management of wheat pests (weeds, diseases and insects), keys to successful marketing, plus new varieties/hybrids and the future of hard white wheats.

During the broadcast viewers can call in toll-free to ask questions or share their perspectives. Telephone lines also will be open for 30 minutes after the workshop for area-specific questions. A moderator will direct calls to a panel of specialists.

Satellite coordinates are Galaxy 9, transponder 2. Home viewers can call (800) 562-1571, and those in the south central and southeast Nebraska can call (800) 562-1576.

For more information, contact a Cooperative Extension office or the Nebraska Crop Improvement office at (402) 472-1444. For a directory of host sites, see the July 24 Crop Watch, page 164.

Roger Hammons, Manager
Steve Knox, Field Services
Nebraska Crop Improvement Association

average yields in the 1998 non-irrigated wheat variety trials ranged from 54 to 69 bushels per acre with top varieties providing 80-81 bushels per acre.

Irrigated wheat yield in the Cheyenne County trials ranged from 72 to 125 bushels per acre. The average of all irrigated fields in this trial was 96 bushels per acre.

Get the details of how different varieties fared at different production sites in the conference materials.
Check crop maturity before irrigating

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>
</tr>
</thead>
<tbody>
<tr>
<td>Date</td>
<td>Growth stage</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)

If Line 4 is greater than or equal to Line 1, stop irrigating.

Table 1. Normal water requirements for corn, grain sorghum, and soybeans for 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>
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<td>Full dent</td>
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<tr>
<td>Soybeans</td>
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<tr>
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Table 2. Available water capacity for various soil types and minimum allowable balances at crop physiological maturity.

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<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>
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<td>Silty clay loam</td>
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<td>Very fine sandy loam</td>
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<td>Sandy loam</td>
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<td>Find sands</td>
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<td>1.6</td>
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</table>

*Based on depletion of 60% of the available water.
Most economic loss from bean leaf beetles occurs when they feed on pods.

mine population shifts and to aid in management decisions.

How damage occurs

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 the developing pods. This yield loss can occur 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 do not usually eat into the developing seed but this may occur on very small pods. Fungal pathogens may enter the pod from the feeding sites, causing seeds to appear shrunked, discolored, and moldy, which can result in dockage. After full pods are formed and seeds begin developing, soybeans are most susceptible to yield loss from pod feeding.

Scouting

The best time to sample is before significant pod feeding occurs, but after second generation beetles have emerged. By this time, beetle numbers should be approaching their highest levels for the summer. Beetle numbers will slowly decline as beans continue to mature and beetles move to over-wintering 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 easiest (and best) way to sample beetles is with a drop (or shake) cloth. A drop cloth is a 3 x 3 foot piece of muslin or plastic attached on each side to dowel rods. Hold one rod against the base of the plants and lay the cloth between the rows. Shake the plants against the cloth to knock off the insects and count the beetles. Remember to estimate the number per row foot, so if you use a three-foot cloth divide your total by three. Also, sample through the field in several areas to get a good estimate of the population.

In narrow row beans you can still sample with a drop cloth but the procedure is slightly different. Set the rod at the base of the row of plants you want to sample and lay part of the cloth on the ground and hold the rest of the cloth upright or over the opposite row to be sampled. Shake the soybeans against the upright cloth, and then count the beetles knocked down on the bottom of the cloth.

Management thresholds

Drop cloth thresholds are based on the number of beetles needed per foot of row, which varies according to total application cost and the crop value per bushel. These threshold numbers are the same for any yield goal since the formula is based on the reduction of seed weight per beetle.

The tables on page 179 show economic thresholds for beans in 30-inch and 7-inch rows. To use the tables find the number that fits both crop value and application costs. For example, if you set the value of your soybeans at $6 per bushel and your application costs would be $9 per acre, you would need 6.8 or more beetles per foot of row to justify an application in 30-inch row beans, or 1.59 or more beetles per foot of row in 7-inch row beans.

Sweep net thresholds (Table 3) are for 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. 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

(Continued on page 179)

<table>
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<tr>
<th>Crop value</th>
<th>Pest management costs per acre</th>
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Table 3. R6 Economic thresholds (beetles per sweep). Numbers in parenthesis are for drilled soybeans with 7-inch row spacing.
Bean leaf beetles  (Continued from page 178)

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. Fields with higher yield potential would have lower threshold numbers (more economical to treat fewer beetles).

(Continued on page 180)

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Collaborators needed for further research

Map weed problems to pinpoint control efforts

A map of the weed populations in a grower’s field is like a picture, worth a thousand words. The same applies to field maps of soil type and organic matter. There is a tremendous opportunity to improve weed control by using the information from these maps to fine-tune your weed control strategy. The following is one approach to managing weed populations using spatial information. The Weed Ecology group at the University of Nebraska in Lincoln is currently studying this and other approaches.

A large number of corn and soybean acres in Nebraska are treated with soil-applied herbicides at planting. The recommended application rate varies with soil texture and organic matter content. A higher rate is usually recommended when a field has a high silt content and/or high organic matter content, and a lower rate is recommended when the field is sandy or has a low organic matter content.

Three categories of soil texture and organic matter content are listed in the Guide to Herbicide Use for Nebraska:

1) sandy loam and <1% organic matter,
2) silt loam and 1-2% organic matter, and
3) silty-clay loam and >2% organic matter.

The different rates listed provide the same amount of available herbicide under different soil conditions. Similar concentrations are available in the soil for uptake by the roots or emerging weed seedlings.

Many individual fields may have two of the three soil types. The types of soil in a given field may have been determined through knowledge of that field or through soil survey maps. Such information may be from historical knowledge of the farm or double-checked with the Soil Survey maps of the county. In the last several years, growers in Nebraska have had fields systematically sampled for fertility and organic matter content. Soil type and organic matter information can easily be combined on a hand-drawn map or brought into a simple spreadsheet program. The next step is to mark out management areas where the appropriate herbicide dose needs to be applied. Many cooperatives have the computer technology to convert that information into treatment maps for use in variable rate custom applicators.

A few dealers have tried this out for the first time this past spring. Herbicide doses were adjusted based on changes in organic matter content across the field. There is a great potential to reduce herbicide inputs while maintaining good weed control.

Another aspect of using spatial information is to place weed control practices only where the weed populations are. Recent research confirmed what many growers have observed in their fields for many years. Annual grasses tended to occur on sandy knolls while broadleaf weed species like velvetleaf and common sunflower were found in low-lying high organic matter soils in fields in the central Platte River Valley. With this knowledge, portions of the field could be treated with only grass herbicides while other areas are treated with appropriate broadleaf products. Additionally, scouts could be directed to those parts of the field to confirm if those species are occurring.

The UNL Weed Ecology Group

Bean leaf beetles (Continued from page 179)

Bean leaf beetles can be controlled by several insecticides. Be aware that most have 14-day or higher pre-harvest intervals (phi).

Insecticides registered for bean leaf beetles

<table>
<thead>
<tr>
<th>Restricted use</th>
<th>Product name</th>
<th>Rate (formulation/acre)</th>
<th>Pre-harvest interval (days)</th>
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<tr>
<td>Yes</td>
<td>Asana XL</td>
<td>5.8 - 9.6 oz</td>
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</tr>
<tr>
<td>No</td>
<td>dimethoate</td>
<td>1 pt</td>
<td>21</td>
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<tr>
<td>No</td>
<td>Lorsban 4E</td>
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<tr>
<td>Yes</td>
<td>Lannate WSP</td>
<td>1/4 - 1/2 lb</td>
<td>14</td>
</tr>
<tr>
<td>Yes</td>
<td>Lannate LV</td>
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<td>14</td>
</tr>
<tr>
<td>No</td>
<td>Larvin 3.2F</td>
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</tr>
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<td>Yes</td>
<td>Penncap-M</td>
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<td>Yes</td>
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<td>Yes</td>
<td>Warrior 1 EC</td>
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</table>

(Continued on page 181)
Dry Bean Field Day to cover current topics

Production, pest management, and marketing of dry beans will be among the topics featured during the annual Dry Bean Field Day to begin at 1 p.m. Aug. 19. The event is being sponsored by the Nebraska Dry Bean Grower's Association and the University of Nebraska Panhandle Research and Extension Center at Scottsbluff, where it will be held.

The following topics will be addressed by Extension specialists and researchers during the field tour:

- **Market prospects for the 1998 crop.**
- **Bean variety and rhizobial relationships** with Dave Nuland, UNL horticulturist.
- **Future prospects for new varieties** with Dermot Coyne, UNL bean breeder.
- **Evaluation of fertilizer products following hail** with Jim Schild, Extension educator in Scotts Bluff County.
- **Blue plate special — will you have white mold?** with Jim Steadman, UNL plant pathologist.
- **Potentially promising pintos** with Dave Nuland, UNL horticulturist.
- **Desiccant/defoliant options for dry edible beans** with Robert Wilson, Extension weed specialist.
- **Measuring the behavior and impact of western bean cutworm in dry beans** with Gary Hein, Extension entomologist, and Ron Seymour, Extension assistant, integrated pest management.
- **Eliminating soil from the combine during bean harvest** with John Smith, machinery systems engineer.
- **Irrigation frequency and timing under center pivot irrigation**

**Field updates**

**Paul Hay, Extension educator in Gage County:** While gazing up at the “Green Corn Moon” last Friday, I was awed by the thought that the corn is near dent, milo is headed and blooming, and beans are nearing the fill stage with a good profile of moisture on the first week of August.

Now it’s time to look forward to harvest and achieving quality grain storage. Clean-up is the first step.

- *Shovel out bins.*
- *Sweep up bins, including walls.*
- *Spray with premium grade malathion.*
- *Fumigate empty bins to kill weevil and Indian meal moths under aeration floor.*
- *Clean augers.*
- *Clean spilled grain.*
- *Mow weeds around bin sites.*
- *Clean combines.*

**Suggestions sought for Herbicide Guide**

Farmers, Extension educators, industry representatives, and all other users of our *Nebraska Herbicide Use Guide*: now is the time to submit your suggestions for our 1999 edition. We appreciate your previous input. You have helped make the *Nebraska Herbicide Use Guide* a most useful weed control aid for farmers, dealers, applicators, farm managers, consultants, extension educators, and others.

Please send your suggestions for the 1999 Herbicide Guide by **Sept. 1** to the Agronomy Department - Weed Science, Attention: Alex Martin, 362 Plant Science Building, University of Nebraska, Lincoln, NE 68583-0915.

**Alex Martin**
Extension Weed Specialist

**Jeff Rawlinson**
Extension Assistant Weed Science
Alfalfa planted in August establishes well if moisture is available. Be sure to plant early enough so alfalfa has six to eight weeks between emergence and freeze back to develop good cold tolerance. If you are in northern Nebraska, plant immediately if you have enough moisture for seeds to germinate. Any delay is likely to cause poorer stands. Planting after Aug. 31 becomes risky.

Seedbed preparation is crucial for late summer plantings. Good seed-to-soil contact and weed control are critical, both when seeding into prepared seedbeds or into wheat stubble. Conserve soil moisture whenever possible, and put extra effort into getting a firm seedbed.

This August, be especially wary of grasshoppers. They seem to be everywhere, and they love to eat new seedlings.

### GDD and Crop Water Use Data (through 8/11)

<table>
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<th>Station</th>
<th>Crop</th>
<th>Emer. date</th>
<th>Actual GDD</th>
<th>Normal GDD</th>
<th>Water use Past week</th>
<th>Future week</th>
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Growing degree days required for Type 3 maturity class for the following crops: corn, 2750; soybeans, 2450; and sorghum, 2369.