2000

*Crop Watch* No. 2000-15, June 30, 2000

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Corn rootworms emerging early

Western corn rootworm beetles emerged in south central Nebraska June 26 and should will be emerging from now to early July in southeastern and south central Nebraska. Areas with high beetle numbers last year are likely to experience high numbers this year, since the winter weather was not severe enough to greatly reduce overwintering egg survival.

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. 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 to apply an insecticide, especially in seed production fields.

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 available; however, not all continuous corn fields have economic infestations of corn rootworms. Weekly scouting of adult rootworm beetles in July and August will provide the 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 the silks, so care is required to observe all beetles present. An alternative method is to 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...

(Continued on page 127)

Research indicates effects of rootworm silk clipping on corn

In July there frequently are questions about whether to control rootworm beetles to reduce damage from silk clipping. Following is a review of research on this question.

Capinera et al. (1986) conducted field studies for four years in Colorado with hybrid field corn under irrigated conditions. In green silk stage corn, a nylon mesh bag was placed over individual ears, and 1-20 field collected western corn rootworm beetles were added. Control bags with no beetles added were also included in the study. Additional studies were conducted by mechanically clipping green silks either to a length even with the ear sheath tip, or pulling the ear sheaves back and clipping to the ear tip.

At maturity various measurements were made including a damage rating and total number of...

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Field updates

Gary L. Hein, Extension Entomologist, Panhandle REC:
Serious thrips problems have been seen in dry beans and alfalfa. The most serious alfalfa problems were in southwest Nebraska. Damage to alfalfa is extremely unusual and has been stopping growth and reducing regrowth in severely infested fields. Damage has been showing up as distorted or puckered upper leaves on the plants. Slow growth or regrowth of alfalfa should be investigated as to the cause.

Grasshopper numbers are increasing rapidly in many areas of the Panhandle, with extreme populations in some areas. Size of the grasshoppers is varying widely, from small second to third instars up to adults. Damage will be increasing rapidly over the next few weeks and control will be getting more difficult as more grasshoppers become adults. In rangeland situations the timing for economic control efforts has passed; however, growers needing to protect hay, alfalfa or other crops should consider their options while efforts will be most worthwhile.

Gary Hall, Extension educator in Phelps and Gosper counties:
Irrigators are busy getting water to the crop, realizing there is little subsoil moisture to sustain the crop. Rains have been spotty and there are still areas of drought in the Phelps/Gosper area. Wheat harvest has begun with a very small crop to harvest. One crop consultant has raised a concern about the lack of nodulation of soybeans on corn ground. (See story, page)

Gary Zoubek, Extension Educator in York County: We’ve continued to have considerable wind and spotty rainfall in the York County area. On June 25 areas received 3-5 inches of rain, while other parts of the county received 0 inches. We also had considerable wind and some green snap. I’ve had reports of 0-17% of the plants snapped with considerable leaf stripping due to the wind and some hail. I know of at least three center pivots that were tipped over. Some fields have received adequate rain while other dryland areas are surviving day to day.

Ray Weed, Extension educator in Kimball/Banner counties: Rain in this area last week ranged from none to about 1 inch. The area south of I-80 remains the driest here. Our wheat harvest will be early, and the first fields may be ready to harvest by July 1 which is at least one week earlier than usual. Of course, dryland corn and sunflowers still need moisture. Some millet still has not been drilled because growers are waiting for a rain to have at least some soil moisture for germination and emergence.

Jim Peterson, Extension educator in Washington County:
Heavy rains this past weekend (June 23-25) have really helped the moisture situation in Washington County. Blair received over three inches on Friday and Sunday. Crops look extremely good although I am hearing reports that the second cutting of alfalfa is very short. Corn is doing well; however, it is reaching the growth stage where water requirements become much greater.

(Continued on page 128)
Rootworm scouting  (Continued from page 125)

plant population per acre. The number of beetles per plant to equal a threshold level should be adjusted for different plant populations (see accompanying table or NebGuide 86-774, Western Corn Rootworm Soil Insecticide Treatment Decisions Based on Beetle Numbers). When using the ear zone method divide these thresholds in half, since on average only 50% of the beetles on a plant are counted using this method.

Yellow sticky traps also may be used with scouting. Research conducted in Iowa identified an unbaited Pherocon AM trap as the best trap among several tested. Attach traps to the corn plant at ear height and leave in the field for a week. Use 12 traps per field, spread out over the whole field. If beetle counts exceed an average of six beetles per trap per day, this is equal to the treatment threshold. If beetle counts are below this level, continue sampling until the threshold is exceeded or beetle activity stops.

Advantages of using traps rather than visual examination include:

1) traps catch beetles over several days and average out variation due to time of day or weather; and
2) counts are not influenced by the experience or skill of the sampler.

Traps are available from the manufacturer, Trece (408-758-0204), or from Great Lakes IPM (517-268-5693) or Gemplers (800-382-8473) and cost about $1 each.

Rotating the field out of corn or using an insecticide at planting or cultivation time also would help prevent economic damage. Fields remaining below the threshold level do not need to be 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 beetle to emerge are mostly male, and females require at least 10-14 days of feeding before they 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 is available in the UNL publication, Adult Corn Rootworm Management (MP63) by UNL Entomologist Lance Meinke.

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

Rates and restrictions of registered insecticides for adult corn rootworm control can be found on the label or at the UNL Entomology Home Page http://www.ianr.unl.edu/ianr/entomol/fldcrops/fldcrops.htm

Bob Wright
Extension Entomologist
South Central REC

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

<table>
<thead>
<tr>
<th>Plants per acre</th>
<th>Per plant</th>
<th>Per ear zone</th>
<th>Per plant</th>
<th>Per ear zone</th>
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<tr>
<td>14,000</td>
<td>1.28</td>
<td>0.64</td>
<td>0.96</td>
<td>0.48</td>
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<tr>
<td>16,000</td>
<td>1.12</td>
<td>0.60</td>
<td>0.84</td>
<td>0.42</td>
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<tr>
<td>18,000</td>
<td>1.00</td>
<td>0.50</td>
<td>0.75</td>
<td>0.37</td>
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<tr>
<td>20,000</td>
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<td>22,000</td>
<td>0.81</td>
<td>0.40</td>
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<tr>
<td>24,000</td>
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<td>0.37</td>
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<td>0.28</td>
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<td>0.34</td>
<td>0.52</td>
<td>0.26</td>
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<tr>
<td>28,000</td>
<td>0.64</td>
<td>0.32</td>
<td>0.48</td>
<td>0.24</td>
</tr>
<tr>
<td>30,000</td>
<td>0.60</td>
<td>0.30</td>
<td>0.45</td>
<td>0.23</td>
</tr>
<tr>
<td>32,000</td>
<td>0.56</td>
<td>0.28</td>
<td>0.42</td>
<td>0.21</td>
</tr>
</tbody>
</table>

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

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

3Use 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).
Silk clippings (Continued from page 125)

kernels and weight from the four quarters of the ear (from base to tip of the ear). The number of beetles was correlated with the damage ratings. Rootworm adults up to 20 per ear did not significantly reduce grain yield under the conditions of this study. There was some evidence of compensatory grain production in the presence of rootworm feeding injury. Mechanically clipping silks to a length even with the ear sheath tip had no significant effect on grain yield, but clipping down to the ear tip significantly reduced grain yield.

This is why our recommendations for field corn do not focus on the number of beetles, but rather on the degree of silk clipping early in the pollination process. Control may be necessary if beetles are present and the silks are being clipped to within ½ inch of ear tip before 50% pollination has occurred.

Culy et al. (1992) studied the effect of silk feeding on three corn inbreds in Indiana seed production fields over four years. Similar procedures were used as in the previous study; known numbers of rootworm beetles were caged on ears in the field at the green silk stage, and then grain was harvested at maturity. Total seed weight and size were evaluated. A range of beetle densities from 1-5 beetles per plant were evaluated. As few as 1-3 beetles per plant reduced the number of kernels per acre and kernels per kilogram, increased round kernel fractions and decreased flat kernel fractions in all three inbreds. Comparing results over years, the effect of beetle feeding was greatest under conditions of drought and heat stress. This was thought to be related to reduced silk extension and regrowth when plants were under drought or heat stress. In a year with more normal growing conditions, significant yield reductions occurred only with five beetles per plant. The authors noted that because beetles were caged on the ear, the number of beetles per plant causing economic injury is probably somewhat higher under field conditions when they have access to feeding on other plant parts.

According to Seed Corn Pest Management Manual for the Midwest, Purdue University, IPM-2, “control may be necessary if the silks on 20% of the plants have been clipped to a length of 3/4 inch or less, pollination is still taking place and rootworm beetles are still present.”

Field updates (Continued from page 126)

Nebraska Agricultural Statistics Service: The winter wheat crop improved slightly last week as the crop moved quickly toward harvest. Condition rated 19% very poor, 37% poor, 30% fair, and 14% good. As of Sunday, about 56% of the crop was ripe, two and a half weeks ahead of the 5% average. Harvest was underway in several districts with 21% cut to date, compared with none at this time last year and 1% harvested for the five-year average.

Corn condition was rated 5% very poor, 12% poor, 32% fair, 41% good, and 10% excellent. Irrigated corn was rated at 62% good to excellent while dryland corn rated 36% good to excellent. A few fields in the southeast and east central districts were in the silking stage.

Soybean condition rated 4% very poor, 14% poor, 36% fair, 37% good, and 9% excellent. Nine percent of the crop had bloomed as of Sunday, about one and a half weeks ahead of average.

Sorghum condition showed improvement last week due to the recent rains with the crop rated 6% very poor, 17% poor, 42% fair, 34% good, and 1% excellent.

Oat condition improved and rated 12% very poor, 16% poor, 24% fair, 35% good, and 13% excellent. Heading was well ahead of average at 88%, compared to 81% last year and 68% average. Harvest had begun in several districts with 3% cut to date.

Dry bean condition rated 5% very poor, 12% poor, 42% fair, 35% good, and 6% excellent.

Alfalfa harvest for the first cutting was nearing completion. Condition of the crop rated 19% very poor, 25% poor, 28% fair, 27% good, and 1% excellent.

Plant and Pest Diagnostic Clinic

Corn diseases diagnosed in the last week were Anthracnose leaf blight (Hamilton County) and Sudden/Sandblasting (Adams, Hamilton, Holt, and Kearney counties).

Soybean diseases present were Rhizoctonia stem and root rot from Colfax and Buffalo counties.

Jane A. Christensen
Plant and Pest Diagnostic Clinic

References

Capinera, J. L., N. D. Epsky and D. C. Thompson. 1986. Effects of adult western corn rootworm ear feeding on irrigated field corn in
Colorado. J. Econ. Entomol. 79: 1609-1612.


Bob Wright
Extension Entomologist
South Central REC
Crop ETs highest on record; schedule irrigations accordingly

Crop consultants were on the phone a lot during June, questioning whether there was a fluke in the University of Nebraska’s crop water use data.

"There wasn’t. “We’re on a record pace here,” said Ken Hubbard, director of NU’s High Plains Regional Climate Center.

A rainfall shortage since fall, high spring temperatures and hot winds all mean Nebraska crops are using much more water than usual. Plant roots take up water, which carry nutrients and moisture throughout the plant, until plant leaves release the remaining moisture into the atmosphere. The amount of water released to the atmosphere is called evapotranspiration.

If consultants and irrigators haven’t been paying attention to ETs before, they need to now.

“Well watered crops will continue to use more water while the dry, windy conditions persist, so irrigators will be faced with more irrigation than they’re accustomed to,” Hubbard said. However, this year will be critical for producers to apply the right amount of water at the right time, because the subsoil moisture wasn’t replenished by winter and spring precipitation. In addition, fuel costs for diesel engine pumps are approaching twice as much as last year. Plus, with everyone pumping more water, some water levels could decline much earlier in the season.

Hubbard said ET for the first three weeks in June is 2 inches above what has been typical in recent years. For example, during the first three weeks in June, the potential ET for alfalfa at Clay Center in south central Nebraska was 6.99 inches, compared to 5.21 inches, the 10-year gradient between the leaf surface and the atmosphere decreases. This means the plant loses less moisture to the atmosphere, thus reducing plant stress. Paradoxically, humans are uncomfortable in hot and humid conditions because as they perspire, evaporation from the skin surface decreases, which in turn, reduces the body’s ability to control its internal temperature.

Information about subscribing to ET rates from the NU Institute of Agriculture and Natural Resources via the World Wide Web is available at http://hpcc.unl.edu, or by calling Hubbard at (402) 472-6706. The data is collected from 50 weather stations statewide. Crop Watch News, the Web version of this newsletter, features daily updates of GDD, ET and precipitation data for 18 Nebraska sites, as provided by the High Plains Climate Center.

Cheryl Alberts
IANR News Writer

Precipitation in inches (% = % of normal)

<table>
<thead>
<tr>
<th>City</th>
<th>Jun 20- Jun 26</th>
<th>Apr 1-Jun 26</th>
<th>Sep 1-Jun 26</th>
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<tr>
<td></td>
<td>Actual %</td>
<td>Actual %</td>
<td>Actual %</td>
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<tr>
<td>Ainsworth</td>
<td>.87&quot; 105</td>
<td>8.19&quot; 93</td>
<td>11.48&quot; 71</td>
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<tr>
<td>Alliance</td>
<td>.00&quot; 0</td>
<td>6.02&quot; 88</td>
<td>9.97&quot; 87</td>
</tr>
<tr>
<td>Beatrice</td>
<td>3.00&quot; 312</td>
<td>7.05&quot; 68</td>
<td>9.61&quot; 44</td>
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<tr>
<td>Concord</td>
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<td>12.17&quot; 118</td>
<td>13.11&quot; 63</td>
</tr>
<tr>
<td>Elgin</td>
<td>1.89&quot; 204</td>
<td>8.07&quot; 81</td>
<td>9.37&quot; 48</td>
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<tr>
<td>Grand Island</td>
<td>.45&quot; 50</td>
<td>5.93&quot; 60</td>
<td>7.50&quot; 40</td>
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<tr>
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<td>.40&quot; 48</td>
<td>2.47&quot; 28</td>
<td>3.93&quot; 25</td>
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<tr>
<td>York</td>
<td>.83&quot; 89</td>
<td>5.55&quot; 55</td>
<td>7.63&quot; 38</td>
</tr>
</tbody>
</table>

This year potential crop water use may be as much as 26% higher than an average of the last 18 years, due to four factors:

-- temperatures are higher than normal;
-- solar radiation is as much as 11% higher than normal;
-- relative humidity is as much as 13% below normal; and
-- wind speed is 12% higher above normal.

All this in a year when plants are already facing limited subsoil moisture and below normal precipitation, and are developing earlier than normal. We haven’t seen potential ET rates this high since 1988.

Al Dutcher
NU State Climatologist

In addition, fuel costs for diesel engine pumps are approaching twice as much as last year. Plus, with everyone pumping more water, some water levels could decline much earlier in the season.

Hubbard said ET for the first three weeks in June is 2 inches above what has been typical in recent years. For example, during the first three weeks in June, the potential ET for alfalfa at Clay Center in south central Nebraska was 6.99 inches, compared to 5.21
Rains help, but higher temps expected

Despite recent heavy rains and flooding, the drought is far from over, and the state's subsoil moisture supply still remains at a significant deficit, just as soil moisture needs are escalating for the state's corn and soybean crops.

Rains June 20-27 ranged from minimal in western Nebraska to 4.69 inches at Nebraska City, with isolated areas receiving 6-8 inches. Reports of greater rainfalls in eastern Nebraska were likely overestimated, said Al Dutcher, NU state climatologist, due to Doppler radar picking up on the reflectivity of spotty hail events in the area. In addition, the storms often brought high winds and hail, stripping already stressed corn plants and causing greensnap in some central Nebraska fields.

Although welcome, the heavy rains in eastern Nebraska fell on ground so dry and hard that a substantial portion of the moisture ran off, overflowing some creeks and sloughs. While topsoil moisture conditions improved slightly, subsoil moisture continued to decline. It's estimated that 75% of the state's subsoil moisture is rated at short to very short, Dutcher said. Surface waters, too, gained little from the hard rains. The Nemaha River went from historical low readings to a historical high daily reading literally overnight, but was expected to return to a below-normal flow rate within a week.

"We're a long way from out of the woods," Dutcher said, noting that the drought situation is getting progressively worse in the western two-thirds of Nebraska.

In eastern Nebraska the recent gains from rains may be short-lived, however, if current forecasts hold true and temperatures climb to the mid to upper 90s next week. Corn normally uses about 10 inches of water in July, which is 300% of normal precipitation. Even with the recent rains, an additional 6 to 8 inches of moisture will be needed to maintain a healthy crop, Dutcher said. To put this year's situation into perspective, he pointed out that prior to these rains, the period from Sept. 1, 1999 was the driest on record for 112 years. After the rains, it's still one of the top 10 driest periods, and ranks right in there with several years in the 1930s.

How will expected highs affect corn pollination and soybean development?

Corn

Many areas of Nebraska are experiencing hot, dry weather. With temperatures expected to soar into the 90s next week and with tasseling to occur soon in some areas, pollen viability and silk receptivity are likely areas of concern for producers. Pollination is a critical period for corn development. The following summarizes information from several sources on how stress affects corn at these critical growth stages.

Pollen shed occurs over two weeks. Silks must emerge and be fertilized for kernels to develop. Silks grow about 1 to 1.5 inches/day and will continue to elongate until fertilized. Temperatures greater than 95°F with low relative humidity will desiccate exposed silks but not greatly impact silk elongation rates. Pollen is killed by temperatures at or above the mid 90s, especially with low relative humidity, but fortunately, pollen shed usually occurs from early to mid-morning when temperatures are lower. Fresh pollen is available every morning until pollen shed is complete.

Drought stress slows silk elongation but accelerates pollen shed. This can result in pollen shed occurring before silk emergence. Any stress such as inadequate water, low soil fertility, or a too dense planting rate can delay silking two or more weeks, reducing seed set if pollen is not available.

This is potentially a major problem although I have 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.

The bottom line is that high temperatures will not severely stress corn if soil moisture is adequate. Irrigators in Nebraska have some control over this. 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 hot, dry conditions continue, I 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.

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Soybean (Continued from page 133)

High temperatures forecast for the next few days may be detrimental to soybean development and yield. The impact is potentially worse now than earlier because soybeans are in the early reproductive stages of growth.

We know that dry and hot conditions during vegetative growth will reduce plant heights and slow canopy closure rates. Indeed, in some situations, crop canopies may not close at all. If so, late-season weed competition may become a serious problem. Determinate soybean variety productivity will suffer more than that of indeterminate varieties when subjected to dry conditions during vegetative growth.

The impact of hot, dry conditions during reproductive stages will be even worse. Optimum temperatures during flowering range from 72°F to 77°F and for seed formation, from 70°F to 74°F. High temperatures (>86°F) during flowering may increase pod abortion rates. Abortion rates are exceptionally high when temperatures are near 104°F. Fortunately soybeans normally produce more pods than necessary for optimum yields. Remember that some degree of flower and pod abortion is normal (20-80% depending on variety). Rain-dependent soybeans in one of our studies in a hot, dry year (1983) had a 65% abortion rate while those with sprinkler irrigation beginning at pod elongation and flowering were 56% and 42%, respectively. Yields increased with decreasing flower abortion rates; however, we applied more irrigation water in the flowering treatment than in the pod elongation treatment.

Seed and pod numbers may be reduced by high temperatures. All this coupled with low soil moisture reserves could reduce yield significantly. I would expect narrow rows in these situations to perform worse than wide rows, and I would expect indeterminate varieties to fare better than determinate varieties given these conditions.

On the positive side, soybeans can recover and growth will resume if stress is relieved prior to seed fill. In this sense, soybeans are more like grain sorghum than corn.

Roger Elmore
Extension Crops Specialist
South Central REC

Corn leaf aphids reported; treat, if necessary, before tassel

Corn leaf aphids have been reported in southeastern Nebraska, and may be found in other parts of the state over the next few weeks. Last year some fields were damaged by corn leaf aphids, and individual plants had greatly reduced grain production. Often corn leaf aphids are more abundant in dry years, and if corn plants are water stressed, the potential yield loss from corn leaf aphids is increased.

Corn leaf aphids are a blue-green or gray aphid. They may be winged or wingless. The legs and cornicles (“tail-pipes” at the end of the body) are black. Adults and nymphs are often seen in the whorl or on the upper leaves of corn plants.

The best time to scout and decide whether to treat corn leaf aphids is before corn tassels. Most yield loss is caused by feeding within the whorl before tasseling, although often infestations are not noted until after tassel emergence. Typically infestations decline rapidly after tasseling, due to being washed off by rainfall, and the action of natural enemies. However, last year corn leaf aphids remained abundant in some field after tasseling, and the feeding appeared to cause death of the tissues fed upon.

Purdue University entomologists recommend the following scouting and treatment guidelines for field corn and seed corn. Randomly select 50 plants per field, pull the whorl, and count the number of live aphids. Refer to the treatment thresholds in the table.

If abundant aphids feeding on the tassel may interfere with pollen shed through the secretion of sticky honeydew. If more than 50% of the tassels are covered with aphids and honeydew before 50% completion of pollination, treatment may be needed.

Insecticides for control of corn leaf aphid on corn include:

- Lorsban 4E, 1-2 pt/A
- dimethoate 4EC, 2/3-1 pt/A
(donot apply during pollen shed if bees are present)
- Malathion 57EC, 1.5 pt/A
- Penncap-M, 2-3 pt/A
(donot apply during pollen shed if bees are present)

Bob Wright
Extension Entomologist
South Central REC

<table>
<thead>
<tr>
<th>Days before tasseling</th>
<th>Crop condition</th>
<th>Avg. no. aphids per plant</th>
</tr>
</thead>
<tbody>
<tr>
<td>21</td>
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<td>15</td>
</tr>
<tr>
<td>14</td>
<td>Normal</td>
<td>30</td>
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<tr>
<td>21</td>
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June 30, 2000

CROP Watch 131
Seedling diseases reported in soybeans

Several soybean producers have reported seedling problems even though it has been dry in many areas. The main problem is Rhizoctonia root rot, with heat canker also being reported in some areas.

Rhizoctonia root and cortical rot is caused by a fungus that is a common soil inhabitant. It survives in soil as sclerotia or resting mycelium and is quite happy on many hosts, which allows it to survive for many years in the absence of soybeans. Common symptoms of Rhizoctonia root and cortical rot are decay of lateral roots and localized brown to reddish-brown lesions on the hypocotyls and lower stem at the soil line. This lesion will not extend up the stem and branches as Phytophthora infections do. The damage is limited to the cortical layers and does not extend into the interior portions of the roots system. Lesions may girdle the stem and can cause lodging later in the season. Symptoms usually are detected early in the season when warm dry weather is present. This is primarily due to the fact that the root system has been compromised. Diseased patches in the field may be elongated, following the tillage direction.

There are several reasons why we have seen a lot of Rhizoctonia problems this year even though it’s been dry in many areas. Rhizoctonia root rot is more severe during warm, dry weather or during periods of stress, such as with herbicide injury or soybean cyst nematode. Rhizoctonia is favored by sandy and light soils and pH greater than 6.6. This pathogen is reduced by high soil moisture in contrast to Pythium spp. which is favored by high moisture. This may explain, in part, why this is occurring on many hillsides or hilltops. There also have been large differences in maximum and minimum daily air temperatures this spring, resulting in heavy condensation in many fields. The combination of drought stressed plants, moisture from condensation, and high temperatures has resulted in the abundance of Rhizoctonia problems.

Why is this disease occurring in fields where seed applied fungicides were used?

Several seed-applied fungicides are labeled for control of Rhizoctonia on soybean, however, the duration of time when these products are active and their mode of action will affect the plants protection. Most products used for Rhizoctonia are contact fungicides. Contact fungicides are only active around the actual seed or spermosphere. These compounds will not be active once the seedling is developing and grows out of the zone where the chemical is applied (the seed). Other products will be systemic fungicides and will have activity through the developing seedling. The most common example of a systemic fungicide used in soybeans is Apron which is active only against Pythium and Phytophthora. Systemic fungicides used for Rhizoctonia management are carboxin (Vitavax) and thiabendazole (one of the three compounds in Rival). While the systemic fungicides will protect the plant during early development, most products are used at an early season control rate, which is less than 21 days in most cases. In most cases, the disease is now developing after the window of protection has passed. This is why some of you who tried early planting this year may be having a problem in your early planted beans, but not in the most recently planted ones.

One problem often confused with Rhizoctonia is heat canker. Heat canker occurs at temperatures above 95°F and results in girdling of the hypocotyl at or just above the soil line. Symptoms of heat canker include shriveled, reddish brown tissue (much like Rhizoctonia) with tissue surrounding the area appearing healthy. Typically, plants with heat canker will shrivel, wilt, and die within a few days of the injury. This injury may also be mostly on the side facing the sun and it will typically not occur during overcast conditions. It is also different from Rhizoctonia in that the symptoms will not spread in the field as days pass, unless they are very hot days. The other point of heat canker is that you typically, will not see heat canker injury after a canopy is established to protect the hypocotyls region of the plant.

So what can be done?

If you have a field with a Rhizoctonia problem, there is little you can do at this time. In most cases there is not a high enough percentage of the field affected to warrant replanting at such a late date. Resistance to Rhizoctonia is not available. Maintain the best overall plant health by avoiding herbicide stress and controlling insect damage. Most of the problem has already occurred, but you may see affected areas of the field prematurely senescing this fall. The soybean disease compendium suggests midseason cultivation to promote new root growth. I would hold back on any unnecessary cultivation given the dry conditions. Consider a seed-applied fungicide with systemic Rhizoctonia activity for next year if a field was severely affected in this season.

Loren J. Giesler
Extension Plant Pathologist

The July Market Journal satellite conference will include info on calculating your basis, marketing grain, and keeping good ag employees. See ruralroutes.unl.edu
Thrips damaging dry beans

The warm dry winter and spring have resulted in high thrips populations in grasses and wheat. Now as the grasses and wheat are drying down rapidly the thrips are moving out and causing problems in other crops, notably alfalfa and dry beans. Serious infestations have been seen in both crops and growers need to evaluate the potential for damage. The most serious infestations have been in southwest Nebraska and northeast Colorado where both beans and alfalfa have been damaged. Serious infestations also have been identified in dry beans in the Panhandle. The severity of infestations in dry beans results from thrips infesting beans at a younger stage than in most years. The earlier dry-down of wheat has resulted in thrips invading beans at much younger stages.

Several species of thrips may be found in these crops and multiple species may be involved in these infestations, but much of the problem appears to be due to onion thrips which are moving out of the maturing wheat and other grasses and into these crops. Adult onion thrips are about 1 mm long, cigar-shaped and very active. They feed in the plant by puncturing the plant surface and sucking up the plant sap. Damage symptoms will be a stippling of the leaf surface. Dry bean leaves will appear frosted on the underside where the thrips feed, and severe plant damage will result in a cupping of the bean leaves. Perhaps the most obvious symptom of thrips damage is the presence of tiny black fecal deposits left on the leaf surface where they have been feeding.

A threshold for thrips in dry beans has been established at 15 thrips per plant and observable damage should be present. Populations of 50-100 thrips per plant have been seen on unifoliate beans. Unifoliate and first trifoliate beans are the most susceptible; however, extreme populations may damage larger beans. Thrips numbers can be determined by directly counting them on the plant or by pulling a bean plant and rapping the plant against a piece of paper and counting the thrips on the paper.

An important consideration in determining the need to treat for thrips relates to environmental conditions. Moisture stress will magnify the impact of thrips on the plants. Reducing moisture stress may allow beans to better tolerate thrips damage. Also, heavy rains, especially when occurring with strong winds, can reduce thrips populations and eliminate the need to treat. Thrips infestations can be sporadic and moderate thrips populations do not necessarily build up to greater populations to require treatment. Therefore, fields with marginal or subeconomic populations need to be monitored for thrips population buildup and plant damage.

We do not have good data on what are the best controls for thrips in dry beans. Lannate, Orthene and Sevin are labeled for thrips control in dry beans. Previous control work in Colorado has indicated that Orthene, even at the low labeled rate, provides good control of thrips. Because thrips are well exposed on bean plants, these control options at the lower labeled rates should provide reasonable control. Check labels for rates and precautions in using these products.

Gary L. Hein
Extension Entomologist
Panhandle REC

Hone your crop management skills at July 13 clinic

Agribusiness professionals and crop producers can learn more about their crop management systems by attending a July 13 crop management clinic at the University of Nebraska Agricultural Research and Development Center here.

The annual Crop Management Diagnostic Clinic will be 7:45 a.m.-5 p.m. July 13, with registration due July 6.

Barb Ogg, program co-coordinator and NU extension educator, said the diagnostic clinic will provide intensive training in a field setting.

The diagnostic clinic will cover management practices that cause incomplete corn pollination, corn rootworm-resistant technology, management practices affecting root system development, herbicide injury/crop disease field diagnostics, environmentally controlled crops and Monsanto's mobile soils lab, early-growing season stresses on corn and soybeans, and grey leaf spot management.

Keith Glewen, also a program co-coordinator and NU extension educator, said this clinic will help participants stay informed about today's challenging field conditions.

"People who attend the clinic give it high marks because they appreciate the opportunity to have an unbiased approach to subject matter topics with trainers who are highly skilled..." Glewen said.

Early registration is $115 until July 6. After that, it's $165. Six CCA credits are expected to be available for soil and water management, 1; pest management, 3.5; and crop production, 1.5.

To register, call (402) 624-8030, ia fax at (402) 624-8010, via e-mail at cdunbar2@unl.edu, or write to NU ARDC, CMDC Programs, 1071 County Road G, Ithaca, Neb. 68033.

Information is on the World Wide Web at ianrwww.unl.edu/anr/ardc/CMDC.htm.
Check for nodules on ‘new’ soybean soils

Soybean fields may look fine right now, but if plants aren’t nodulated they may not look so healthy later. Some south central Nebraska fields that have never had soybeans (‘new soils’) are poorly nodulated. These fields were inoculated at planting and have normal pH soils. The cause of the problem is under investigation.

This is an excellent time to check for soybean nodules and apply a rescue fertilizer treatment if necessary. Two weeks after emergence, a well-nodulated soybean plant should have five to seven red-centered nodules. Since most soybeans have been up longer than that, root systems of carefully dug plants should have that number of nodules or more.

Crop Field Day at Mead July 12

This year’s University of Nebraska Crop Production Field Day will be July 12 from 9 a.m. to 1:30 p.m. at the Agricultural Research and Development Center near Mead. It will feature a half day of crop production “Quick Hitters” covering future soybean varieties, comparison of March-planted soybeans with April and May plantings, Monsanto’s mobile soils lab, grey leaf spot, nitrogen management in corn and management facts affecting corn pollination.

The event is sponsored by the Nebraska Crop Improvement Association, NU Cooperative Extension and Foundation Seed Division, and agri-industry representatives and organizations. Call for more information at (402) 624-8030 or (800) 529-8030.

Preregistration is not required. The meal is free to those who take a tour; cost is $7 for those not attending field day tours.

A field of soybeans in south central Nebraska without well nodulated roots. The light strips are due to differences in residual nitrogen carried over from previous corn crops.

Healthy nodule formation on soybean roots.

Effective nodulation is important for optimum soybean production unless residual nitrogen levels are high. Soon after flowering and pod set, if soil residual nitrogen is low and plants are poorly nodulated, nitrogen deficiency symptoms may appear (see photo of field, above). These symptoms may be in strips or patterns related to residual nitrogen differences. If soil nitrogen residual is high, soybeans may not exhibit nitrogen deficiency symptoms.

If nodulation is poor and soils have low residual nitrogen, nitrogen application probably is necessary for optimum yields. We don’t have a lot of experience with these situations. Nevertheless, applying 50 to 60 pounds of nitrogen to supplement soil nitrogen reserves is suggested. Application should be at or soon after flowering.

If you encounter soybean nodulation problems in your fields, please contact me by phone (402-762-4433) or Email (relmore1@unl.edu)

Roger Elmore
Extension Crops Specialist
South Central REC