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CROP WATCH

University of Nebraska Cooperative Extension
Institute of Agriculture and Natural Resources

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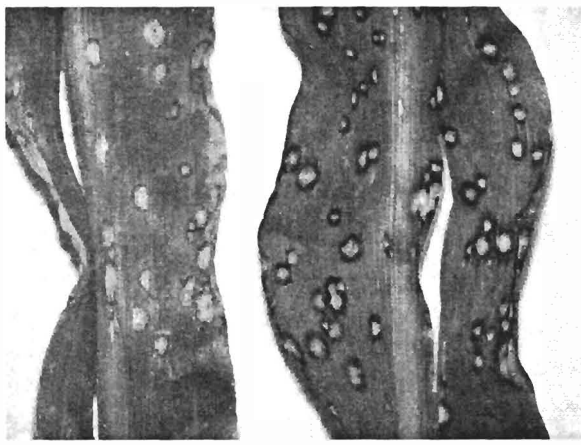
No. 2005-16, July 1, 2005

Eyespot identified in Nebraska corn fields

Eyespot of corn, caused by the fungus, *Kabatiella zeae*, was confirmed in Nebraska last week. Damage is seldom severe, but it can cause plant death in severe cases. Losses of up to 9% have been reported when it developed on young plants.

Disease symptoms include small circular tan lesions (1-4 mm in diameter) that are surrounded by a brown or purple ring and a yellow, translucent halo (Figure 1) that can be seen when held up to sunlight, giving lesions the appearance of eyespots. The appearance of these lesions will vary by hybrid. They generally develop on lower leaves first and can fuse to cover the entire leaf. The pathogen survives on corn debris, so reduced tillage and continuous corn create a high-risk environment for development of eyespot, especially if there is heavy residue and a history of it in that location.



Corn leaves exhibiting eyespot symptoms of yellow lesions with brown or purple borders. When held up to sunlight, a yellow halo may appear around the spot.

A few producers apply fungicides to control it, but you should carefully consider the economics of this decision, especially yield potential, crop value, associated costs of fungicide application, and the weather forecast. This disease is favored by cool, humid weather, like that experienced in many parts of Nebraska up until three weeks ago. The recent development of hot, drier weather will help slow the progression of this disease. Hybrids are available with resistance to eyespot and should be considered when you plant corn in that location again.

Tamra Jackson
Extension Plant Pathologist

Inside

To conserve limited water supplies

Fine-tuning furrow irrigation

Gravity irrigation, by its nature, is somewhat inefficient. Runoff and deep percolation are realities that furrow irrigators must manage to keep irrigation application costs at a minimum. Application efficiency for furrow irrigation depends on soil type, slope, and texture, but is in the range of 50%. When water is limited, as it is in many parts of Nebraska, deep percolation and runoff should be eliminated.

The first irrigation of the season is typically the least efficient. Often the crop roots have only penetrated 18 to 24 inches. Crop water use is at minimal levels so the depletion of water in the soil is minimal at deeper depths. Although the soil surface is likely to be dry, usually 2 to 3 inches of water is needed to refill the soil profile. The amount of water applied during the first

(Continued on page 141)

10 WAYS 20 DOLLARS

(This is one of the topics presented through the Extension Program, 10 Easy Ways to Boost Profit by $20 an Acre.)

Ag briefs

Tom Dorn, Extension Educator in Lancaster County: Soybeans have five to seven trifoliate leaves and are still quite short (10-15 inches). Most fields are blooming at several nodes, but there is no pod development yet (R2 growth stage). Brown spot is common on lower leaves, but we aren't seeing disease above second trifoliate leaf. No major insects have been detected. Corn development is somewhat more variable. Most corn ranges from the 8- to 12-leaf stage (leaf collar exposed). Some fields are quite uneven in height due to slow germination or arrested development due to cold weather during early growth stages. Wheat is mature and harvest is just beginning in a few fields. Yields will be lower than in 2004.

Keith Glewen, Extension Educator in Saunders County: Both the soybean and corn crops are progressing at a fast pace. Corn is at the stage where early season problems with stand establishment and uniformity are now being hidden by the stature of the corn. Dryland corn is rooting at the three foot depth and, even with high temperatures and lack of precipitation, it is looking good. Areas that missed the earlier rains will need precipitation soon. Adequate subsoil moisture going into the growing season plays an important role during these stressful days. The weather is pushing many irrigators to start watering sooner than they would like. Some irrigated corn and soybean growers were disappointed with profits last year due to high pumping costs. With rising fuel prices, profit margins may again be narrow.

F. John Hay, Extension Educator in Pierce, Madison and Wayne counties: The rain keeps falling and the weeds keep growing. Moisture has slowed weed control, but few are complaining. Hail hit western Pierce County and caused multiple corn and bean fields to be replanted, with some beans going in where corn had been. Oats are coming out for silage in a few places. Insect pests have been slow so far, but there is still a long way to go.

Andy Christiansen, Extension Educator in Hamilton County: This week I found soybean aphids in low numbers near Aurora. Also, western bean cutworm moths were found Saturday, for the first time this year, in a light trap in Aurora. This occurrence is about normal, but a little later than last year.

John Wilson, Extension Educator in Burt County: Crops are growing rapidly with warmer temperatures this week. There's been some corn curling, but it comes out of it overnight. Good subsoil moisture, but not all crops are rooted down to it yet. Surface moisture conditions are drying out rapidly. Scattered showers this past week were not enough to provide relief from recent hot, dry weather. Insect problems are minimal, but we're finding some potato leafhoppers in soybeans. So far, they haven't gotten bad enough to hurt new alfalfa seedings. Second cutting alfalfa is underway. Pastures still looking good. Things just look pretty darned good right now, but we'll need a good soaking rain soon or crop conditions will decline.

Paul Hay, Extension Educator in Gage County: Wheat yields in southeast Nebraska are across the board. From 25 bu/ac to 80 bu/ac and everything in between. Many operators have been pleasantly surprised that yields are a bit better than expected. We should end up a bit above the 42 bushel average. Crops are in need of rain, but still look quite good. The insect and disease situation is calm.

Doug Anderson, Extension Educator in Nuckolls and Thayer counties: Wheat harvest is underway and yields are going to be average but variable between some very good fields and some not so good fields. Test weights look good. Corn is getting ready to tassle, but beans look small. We haven't seen anything major yet in the way of insects or disease.

Gary Lesoing, Extension Educator in Nemaha County: Wheat harvest is just getting started. With limited rainfall and temperatures in the 90s, corn is now showing stress. The northern part of the county was on the southern edge of the storm that dumped 0.75-1.00 inch of rain in Cass County Monday night while most of the county only received light showers. Last week most of the soybeans were sprayed and hay was harvested.

CROP WATCH

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Furrow irrigation *(Continued from page 139)*

irrigation is usually the largest of all irrigation events. This is due to the rough soil surface, clods, and residue in the furrow that slow water advance. After the first or second irrigation, the furrow surface is smooth and water advances at a much faster rate. Therefore the greatest savings of fine-tuning furrow irrigation sets will result from the first irrigation or two.

One challenge that faces most furrow irrigators is how to balance the amount of runoff that leaves the field and the amount of water that percolates below the active root zone. One management tool to improve efficiency is to use the *Target Cutoff Ratio.* This is the ratio of the time required for water to advance to the end of the furrow divided by total set time.

Cutoff Ratio =

Average Advance Time/Set Time

Research has been conducted to determine the "best" cutoff ratio for various types of furrow irrigation systems and soil types. Choosing the appropriate cutoff ratio depends on soil factors and irrigation system configuration. The cutoff ratio helps the furrow irrigator to minimize deep percolation and runoff. *Table 1* lists the target cutoff ratios for several irrigation system/soil texture combinations.

By looking at the target cutoff ratios, you can see that for coarse soils, smaller ratios are recommended. Smaller ratios indicate a faster advance time so that the top end of the field would have a similar infiltration time as the lower end of the field. Smaller advance times would limit deep percolation that is inherent with coarse textured soils. Conversely, with finer texture soil, a larger advance time would encourage less runoff, since advance time and set time are similar.

The reason that systems with reuse systems have such a low cutoff ratio (faster advance time) is that when the water runs out of the field, it is collected and used to irrigate the same or a nearby field. Pumping water from a reuse pit to another field is less expensive than pumping water from under the ground. By having fast advance times, deep percolation will be virtually eliminated and water that leaves the field in the form of runoff will be used again, at a smaller cost.

Table 1. Target cutoff ratio based on soil and system considerations.

	Sandy soils	*Loamy soils*	*Clayey soils*
Without reuse	0.50	0.70	0.90
With reuse	0.20	0.40	0.50
Blocked ends	0.70	0.85	0.95

The one telltale sign that indicates many furrow irrigators do not use the cutoff ratio is flags that mark furrow numbers at the end of the field. If irrigators use the cutoff ratio, even on clayey soils without reuse, water should advance to the end of the field in under 11 hours, on a 12-hour set time (12 hours x 0.90 cutoff ratio = 10.8 hours). If water was advancing in under 11 hours, there would not be a need to count rows (i.e. no need for flags) and leave gates open that have not advanced to the end of the field.

To use the cutoff ratio effectively, calculate an actual cutoff ratio. Take observations in the field and keep track of the amount of time it takes for half of the rows to reach the end of the field, this is the advance time. Divide this number by the total set time, typically 12 or 24 hours. If the observed cutoff ratio is greater than the recommended cutoff ratio from *Table 1*, open fewer gates on the next set. This will cause more water to enter each furrow, and will likely have a faster advance time.

With the proper cutoff ratio and gross water application, you can achieve uniform application and minimize both deep percolation and runoff. Experiment with different combinations of furrow stream size and set time to find the optimum settings for a particular irrigation in a particular field. The best combination is one that moves water to the end of the furrow within the requirements of the cutoff ratio, is less than the maximum non-erosive stream size and results in gross applications that are not excessive.

For more information consult NebGuide G97-1338, *Managing Furrow Irrigation Systems, available at local Extension offices or on the Web at ianrpubs.unl.edu/irrigation/g1338.htm*

Chuck Burr, Extension Educator in Phelps County

Learn how to get the most from your water

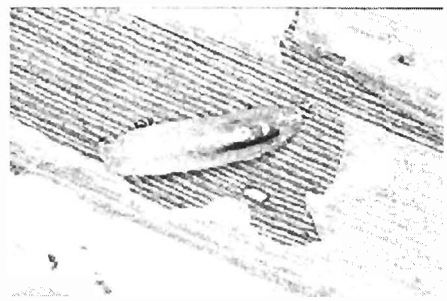
Mark your calendars for the first **Great Plains Conference on Improving Crop Water Productivity** to be held Aug. 10-11 at the UNL West Central Research and Extension Center in North Platte.

Speakers will provide information, recommendations and the tools necessary to help participants fine-tune their production strategies to get the most benefit from available water. The next issue of *CropWatch* will feature more details or visit *CropWatch* on the Web.

Corn blotch leafminers in central Nebraska

Corn blotch leafminers are reported to be causing injury to whorl stage corn in York County and other areas of central Nebraska. The corn blotch leafminer is an immature stage of a fly. It tunnels inside corn leaves, leaving hollowed out whitish tunnels where it has fed. High populations may kill several of the lower leaves of whorl stage corn.

There are several generations per year in Nebraska, but typically the first generation on corn does the most injury. Field observations indicate that this first generation is



Corn blotch leafminer larvae

near the end of its feeding. As corn matures the leaves thicken and the maggot tunnels in only the lower or upper half of the leaf, causing less damage.

Foliar insecticides are not recommended for these insects. The adult flies emerge over several weeks and would be difficult to economically control with insecticides. The egg and immature stages are inside the leaf and protected from insecticides.

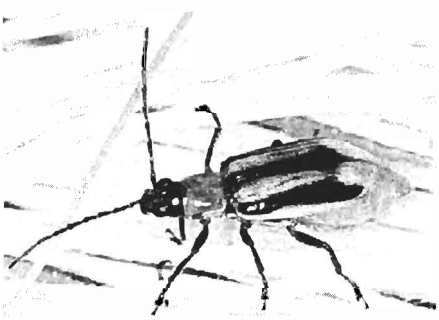
For more information see NebFact 374, *Corn Blotch Leafminer,* available at your local Extension office or on-line at *ianrpubs.unl.edu/insects/nf374.htm*

Bob Wright
Extension Entomologist

Rootworm beetles emerging in south central area

I found adult western corn rootworm beetles at Clay Center on Wednesday, June 29. Adult emergence should begin soon in southern and central Nebraska.

I have received some calls



Western corn rootworm beetle

concerning how long rootworm larvae will feed. The table summarizes duration of immature stages of rootworms at constant temperature.

Regular scouting of rootworm beetles during late July and August, which corresponds with their egg-laying period, provides information on the potential for damage in that field if it is planted to corn next year. I will discuss rootworm beetle scouting recommendations fully in the next issue of *Crop Watch.*

Be aware that rootworm beetles emerging before silks are available will feed on the corn leaf surface by scraping away the green surface tissue, producing a window-pane appearance on the leaf. This is not an economic concern.

As silks emerge beetles will concentrate in the first silking fields to feed on silks and pollen. Complete information on rootworm beetle scouting and thresholds is available in *Corn Rootworm Management* (EC 1563).

Bob Wright
Extension Entomologist

Table 1. Duration of immature stages of western corn rootworm at constant temperatures

	Days to complete stage (male/female) at different constant temperatures (°F)			*Degree days to complete stage (48.2°F base)*	
Stage	*64.4*	*69.8*	*75.2*	*Males*	*Females*
1st instar larva	8.1/8.6	5.6/6.2	4.8/5.3	70.4	77.7
2nd instar larva	6.8/7.1	4.9/5.4	4.3/4.9	61.7	70.6
3rd instar larva	15.0/15.5	11.2/11.9	9.4/10.4	140.5	149.2
Pupa	13.5/13.8	10.1/10.1	7.8/8.4	122.2	125.1
Hatch to adult emergence	43.4/45.0	31.8/33.6	26.3/28.9	394.8	422.6

Source: Jackson & Elliot, 1988, Environ. Entomol. 17:166-171.

Visit this week's ***CropWatch*** on the Web at *cropwatch.unl.edu* for stories on the two-week precipitation forecast (don't stop irrigating), soil moisture in western and southeastern Nebraska, and an announcement from the Indy Racing League that its racing vehicles will use 100% ethanol fuel beginning in 2007.

Scouting for and managing soybean aphids

The soybean aphid is now well known to Nebraska farmers. We have had the aphid since 2002, and quite a few soybean fields required treatment for the pest in 2003 and 2004. Although the aphid has been found in almost all soybean production areas in Nebraska, the most severe infestations have been in northeast Nebraska.

We have learned much about the insect, including two things which stand out as important to Nebraska farmers:

1) the seasonal occurrence of the soybean aphid has been different in Nebraska than in much of the rest of its range; and

2) late season infestations can cause significant yield loss.

Begin scouting soybean fields once or twice a week in late June to early July. The current recommended threshold for late vegetative through R5 stage soybeans is 250 aphids per plant (field average) with 80% of the plants infested and populations increasing.

Description

The aphid is light green to pale yellow, less than 1/16 inch long, and has two black-tipped cornicles (cornicles look like tailpipes) on the rear of the abdomen. It has piercing-sucking mouthparts and typically feeds on new tissue near the top of the soybean plant on the undersides of leaves. Later in the season aphids can be found on all parts of the plant. Its identification is often simplified by one fact — it is the only aphid in North America that forms colonies on soybean.

Aphid life cycle and crop injury

The seasonal life cycle of the soybean aphid is complex with up to 18 generations a year. It requires two species of host plant to complete its life cycle: common buckthorn and soybean. Buckthorn is a woody shrub or tree and is the overwintering host plant of the aphid. Soybean aphids lay eggs on buckthorn in the fall. These eggs overwinter and hatch in the spring, giving rise to wingless females. These females reproduce without mating, producing more females.

After two or three generations on buckthorn, winged females are produced that migrate to soybean. Multiple generations of wingless female aphids are produced on soybeans until late summer/fall, when winged females and males are produced that migrate back to buckthorn, where they mate. The females then lay eggs on buckthorn and the eggs overwinter, completing the seasonal cycle.

Soybean aphid populations can grow to extremely high levels under favorable environmental conditions. Reproduction and development is fastest when temperatures are in the 70s to mid 80s. The aphids do not appear to do well when temperatures are in the 90s, and are reported to begin dying when temperatures reach 95°F. When populations reach high levels during the summer, winged females are produced that migrate to other soybean fields. Like a number of other insect species (e.g. potato leafhoppers), these migrants can be caught up in weather patterns, moved great distances, and end up infesting fields far from their origin. These summer migrants were most likely the major source of infestations in Nebraska during the last couple of years.

Soybean aphids injure soybeans by removing plant sap with their needle-like mouthparts. Symptoms of soybeans infested by soybean aphid may include yellowed, distorted leaves and stunted plants. A charcoal-colored residue also may be present on the plants. This is sooty mold that grows on the honeydew that aphids excrete. Honeydew in itself makes leaves appear shiny. Soybean plants are most vulnerable to aphid injury during the early reproductive stages.

Soybean aphids in Nebraska

In much of the soybean aphid's range, significant aphid infestation has occurred in the early vegetative stages. These infestations then undergo rapid population growth to reach high populations during the flowering stages (R1, R2). During the last three years in Nebraska, however, very few aphids have been found during the vegetative stages. We find a few in late June and early

(Continued on page 143)

For more information . . .

on soybean aphid scouting and management, see:

1) **UNL Department of Entomology Web site** at *entomology.unl.edu*

2) ***Soybean Aphid Management in Nebraska*** (NF 04-599) found at Extension offices or on-line at *http://ianrpubs.unl.edu/insects/nf599.htm*

3) **Soybean Aphid Management on-line video** with Extension Entomologist Tom Hunt. Using Real Player, view the video by typing in the following address in your Web browser: *http://g2.unl.edu:8080/ramgen/programs/misc/soybean-aphid.rm*

Soybean aphid *(Continued from page 143)*

July, but it is usually mid-July, while soybeans are entering or in R3 (beginning pod stage), before we begin to regularly find aphids. During 2003 and 2004, most aphid populations in Nebraska reached economically damaging populations in mid to late August, while soybeans were in the mid-reproductive stages (R4-R5). During 2004 aphid populations peaked in many fields in late R5 (beginning seed) to early R6 (full seed). Can these late populations cause significant yield loss? Yes, it appears they can.

A soybean yield trial was conducted at the Haskell Agricultural Laboratory at Concord in northeast Nebraska in 2004. It was part of a North Central Soybean Research Program Project that has been repeated in several states. In this study 16 soybean plots (irrigated) were infested with very low numbers of soybean aphids on July 23 and allowed to increase in population. Four additional plots were kept aphid-free.

The aphid populations peaked on approximately August 30, with average peak populations ranging from 952 aphids per plant to 3,634 aphids per plant. The results indicate that late season infestations can result in at least 20% yield loss (see graph). The major portion of the population curves and all population peaks occurred in soybean stage R5 to beginning R6. The data also indicate that the economic injury levels (EILs) would be approximately 1000 aphids per plant, depending on various factors including management costs and crop value. Because a farmer's goal should be to keep the aphid populations from reaching the EIL, the economic threshold will be lower than the EIL and should allow the farmer time to set management tactics in motion.

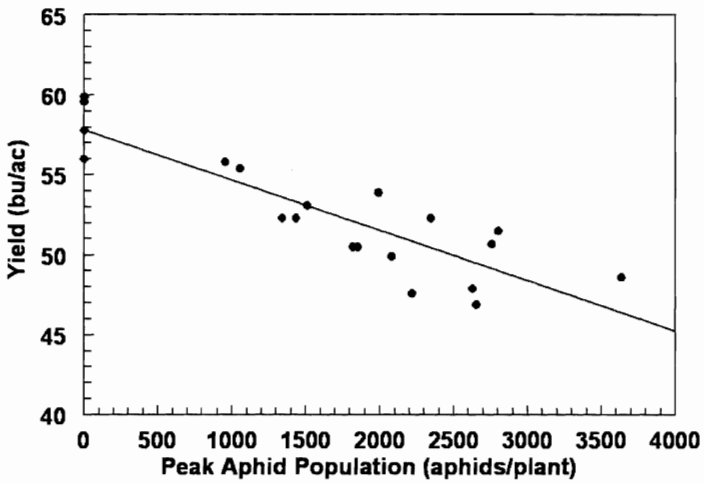


Figure 1. Yield loss by peak population, 2004, UNL Haskell Ag Lab.

Soybean aphid management

Begin scouting soybean fields once or twice a week in late June to early July. Check 20 to 30 plants per field. Aphids are most likely to concentrate at the very top of the plant, although they will move onto stems and within the canopy as populations grow and/or the plant reaches mid to late reproductive stages. As the season progresses, aphid numbers can change rapidly. (Populations can double in two to three days).

The current recommended threshold for late vegetative through R5 stage soybeans is 250 aphids per plant (field average) with 80% of the plants infested and populations increasing. This gives you about seven days to schedule treatment before populations reach damaging levels (if populations do not increase during these seven days, you may be able to eliminate or delay treatment). Determining if the aphid population is actively increasing requires several visits to the field. Factors favorable for aphid increase are relatively cool temperatures, plant stress (particularly drought), and lack of natural enemies.

Look for natural enemies such as lady beetles, green lacewings, and other insect predators. Aphid "mummies" (light brown, swollen aphids) indicate the presence of parasitoids. These predators and parasitoids may keep low or moderate aphid populations (under 200 aphids per plant) in check. The presence of "fuzzy" aphid carcasses indicates fungal pathogens are active, which can lead to dramatic reductions of aphid populations.

Look for winged aphids. If most aphids are winged or developing wings, the aphids may soon leave the field and treatment can be avoided.

If plants are covered with honeydew or sooty mold or are stunted, an insecticide treatment may help, but the optimum treatment time has passed.

Good insecticide coverage and penetration is required for optimal control of soybean aphid, as many aphids feed on the undersides of the leaves and within the canopy. Use high water volume and pressure. Aerial application works well when high water volume is used. (Five gallons of water per acre is recommended).

Several insecticides are labeled for soybean aphid. A list of registered insecticides, rates, preharvest intervals, and grazing restrictions are on the UNL Department of Entomology Web site at *entomology.unl.edu/instabls/soyaphid.htm*

Pyrethroids have a relatively long residual. Chlorpyrifos has a fuming action and may work well in heavy canopies or high temperatures. Dimethoate is least effective.

If soybean rust is present and being sprayed when soybean aphid thresholds are met, a fungicide/insecticide tank mix should be effective.

Tom Hunt, Extension Entomologist
Haskell Ag Lab
Keith Jarvi, IPM Assistant, NEREC

Western bean cutworm

Light trap catches signal need for scouting

The first western bean cutworm moths of the season were caught late last week in light traps across the state. Moth numbers will continue to increase until mid to late July and then will decrease. There have been many reports of increased numbers of these pests in the region, with infestations reported throughout northeastern Nebraska and into South Dakota, Minnesota and Iowa. Infestations can be cyclical in eastern Nebraska and at this time appear to be increasing.

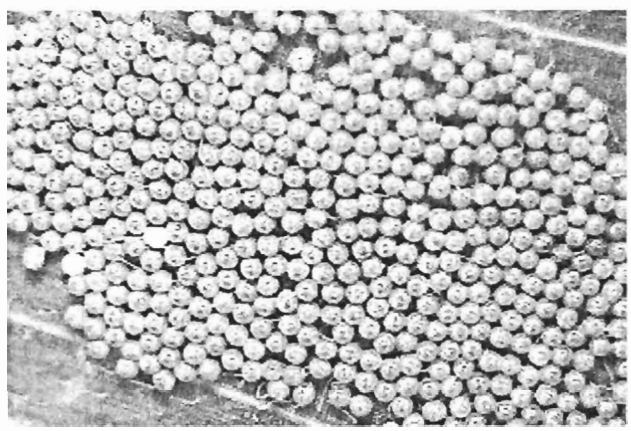
Since the moth overwinters as a prepupa in the soil, pupates in the soil and emerges from the soil as a moth, areas with heavier soils and rains may see a smaller moth population than in recent years since it is harder for the moth to make its way out of the soil in a wet year. As moth numbers increase, mating will commence and the females will begin to lay eggs on corn.

The appearance of the first moths provides a signal that farmers and crop consultants should begin to scout fields for the white, dome-shaped eggs. Western bean cutworm moths lay eggs in clusters of five to 200 on the top surface of the upper most leaf of a corn plant and on any leaf surface of dry beans. The eggs require five to seven days to develop, during which time the egg color changes to tan and then to purple immediately before they hatch.

After the small, dark brown larvae hatch on corn plant, they move to the whorl or tassel to feed on the tender yellow leaf tissue or on the tassel itself. Once the tassel emerges or if it has already emerged when the eggs hatch, the larvae will move to the green silks. The developing larvae will feed on the green silks moving down the silk channel until they reach the ear tip. The larvae will feed in the ear tip until they are fully developed. If the infestation on one ear tip is so great that the larvae become crowded, a few individuals may move outside the ear and begin to feed on the side of the ear.

Scouting tip

Don't forget to scout Bt hybrids for western bean cutworms. Only Herculex™ I Bt corn hybrids which contain the Cry 1F Bt gene have efficacy against western bean cutworms. Other Bt hybrids contain different Bt genes and do not have efficacy



Western bean cutworm eggs.

Even though field scouting for western bean cutworm in field corn should begin when the first moths are caught, control decisions should be made shortly after the moth flight peaks. The moth flight usually peaks between July 10 and July 24. Current light trap data are available at *entomology.unl.edu/fldcrops/index.htm* When scouting for western bean cutworms in corn, check 20 plants in at least five areas of each field. Look for eggs on the top surface of the upper most leaf or look for larvae in the tassel. If 8% of field corn plants, 5% of seed corn plants or 5% of popcorn plants have egg masses or larvae, consider applying an insecticide. Herculex varieties appear to control the larvae very well, although not perfectly, and should not need treating.

Western bean cutworm moths prefer to lay eggs in corn plants that are in the late whorl stage compared to those that have completely tasseled. Pay particular attention to later planted fields or those with uneven development. Western bean cutworm eggs that hatch when corn plants are in the whorl stage of growth have a high rate of survival. The larvae are well protected in the whorl or tassel.

If an insecticide treatment is warranted in corn, it should be made when 95% of the plants in a field have tasseled. This timing of the application increases the chance that the worms will be exposed to the insecticide, resulting in better control.

Chemigation has provided good control of this insect, even at lowest labeled rates. Asana, Ambush, Baythroid, Pounce, Lorsban, Capture, Mustang, Penncap-M, Warrior, and Seven are all labeled for control of western bean cutworm.

Bob Wright
Extension Entomologist
Ronald Seymour, Extension Educator in Adams County
Gary Hein, Extension Entomologist Panhandle REC

Begin scouting for sunflower insects

Last week we received several calls about numerous butterflies in sunflower fields. The butterflies are the painted ladies, the adults of the thistle caterpillar. The butterflies were numerous in April and early May and the current flight is the result of the first generation that developed mainly on Canada thistle over the last two months. The larvae of this insect will feed on sunflower and soybeans, but severe damage is not common; however, because of the extensive flights of the adult insect this year, it is important for growers to watch for potential damaging populations.

Sunflowers can tolerate a good deal of defoliation prior to bud formation without significant damage. At the V9-V11 stages, defoliation levels up to about 50% will result in only about 5% yield loss. This level of damage would be economic for irrigated flowers or dryland flowers with a good yield potential. Defoliation thresholds would be lowered dramatically after the flowers have started into the reproductive stages. From R1 (first bud) through R5 (flowering) defoliation levels of 15-25% will result in 5% yield loss. Treatment decisions for the thistle caterpillar should be based the size (stage) of the larvae that are present and on level of defoliation that has occurred. Treatments should be targeted at preventing defoliation from reaching these significant levels. Once larvae are close to 1 1/4 inch in length, they will soon stop feeding and treatments would not be necessary.

Another important sunflower insect that is becoming more important in the areas where sunflowers have been grown regularly in the past is the spotted sunflower stem weevil. This small weevil (about 1/8 inch long) is grayish-brown with white spots. It is perfectly camouflaged for concealment on the soil surface. Because of its small size and coloring it is very difficult to scout for.

The weevil lays eggs on the sunflower stems, and the larvae develop within the stem, weakening the stem and increasing the potential for lodging and the development of stem diseases. The potential for damaging populations is increased in areas where flowers have been grown in the past, especially if stem weevil infestations have been a problem in these areas.

Management of the stem weevil must rely on scouting for the adults during the V8-V14 stages in late June and early July. Sampling consists of counting the number of weevils on a number of plants across the field. Care must be taken not to disturb the weevils while counting as the weevils will drop from the plants if disturbed. Consider treatment if weevil counts average one insect for every three plants during the V8-V14 period.

Insecticide options for stem weevil are listed on the UNL Department of Entomology Web site at *entomology.unl.edu* or the High Plains Integrated Pest Management Web site at *highplainsipm.org*.

Gary Hein
Extension Entomologist
Panhandle REC

Eastern redcedar

The second part of a story on managing eastern redcedar will be featured in the July 15 print edition of *CropWatch*. (The first part was featured in the June 24 newsletter.) To get a sneak peek, check out this week's online *CropWatch* at *cropwatch.unl.edu/archives/2005/crop05-16.htm#redcedar*

Consider sunflowers when replanting

If you have a field with a crop population or condition that's not what you expected and you're looking at replanting, consider what sunflower has to offer.

We are past the optimum planting window and are in the replant or "catch crop" area. If forage does not fit and you want a grain, look at short season oils (Group 2). Growers in the Panhandle have extended the planting window until July 10 for seed products targeted for the bird seed market. One could assume the chance for success would increase going east and south. Sunflower can survive down to 26°F for two hours.

If you're looking at a current sunflower stand and trying to decide whether to replant, one "rule of thumb" is that if you are within 25% of your yield goal, stay with what you have.

For more information on factors to consider when deciding whether to replant any crop, as well as factors that make sunflower a good option, see this week's *Web CropWatch* at *cropwatch.unl.edu/archives/2005/crop05-16.htm*

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Nematodes

(Continued from page 148)

effective management recommendations for lesion nematodes.

- **Lance** (*Hoplolaimus* spp.) Although this nematode is large, it can be found in both silt loams and sand. The lance nematode has several species and a wide host range that includes both corn and soybean. This nematode can cause significant yield loss, particularly if it damages seedlings early in the season.

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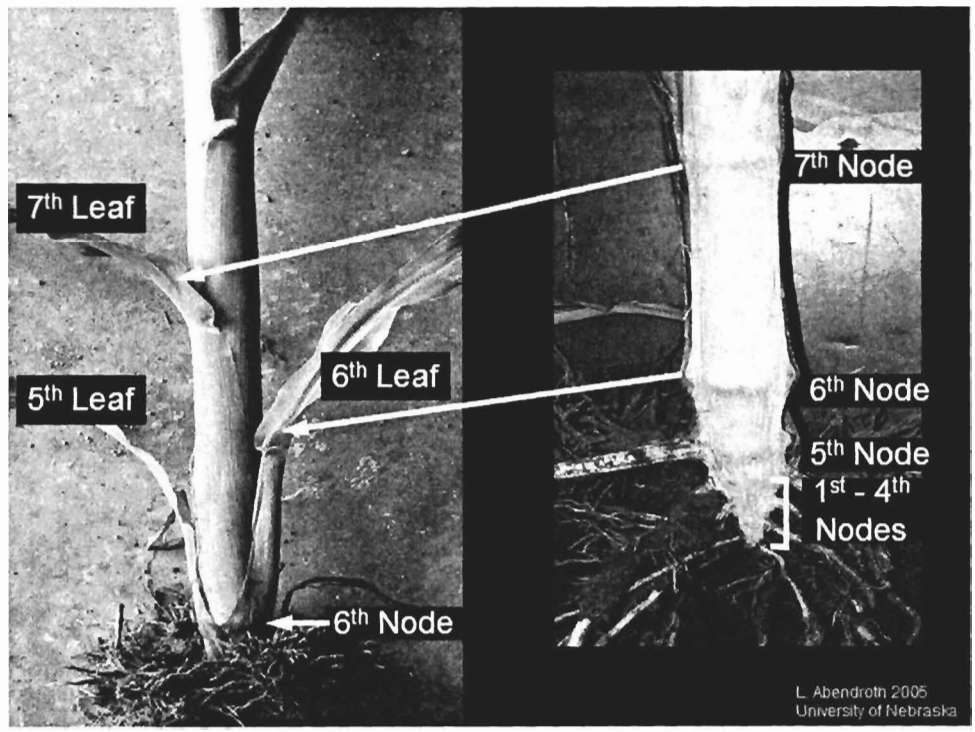
Growth stages to watch in assessing plant stress

In the April 8, 2005 issue of *CropWatch* we discussed the importance of accurately staging the growth of early season corn (VE to V6). This week we'll look at growth stages V7 (7th leaf) to VT (tasseling); a later *CropWatch* article will discuss the reproductive stages (R1 to R6).

Similar stresses can have very different effects on final yield depending on when they occur in the development of the corn plant. Therefore, it's important to be able to identify the growth stage to properly assess the impact a stress may have on the crop. Learning how to identify growth stages is also important in determining if the crop is developing normally.



Staging corn by the leaf collar method requires splitting the stalk lengthwise. Noting growth stages and plant stressors now can provide valuable clues at harvest if yield levels *are not as expected.*

The leaf collar method is most often used in determining the developmental stage of corn. With this method, growth stage is determined according to the uppermost leaf with a visible collar. The collar is where the leaf blade visually breaks away from the sheath and the stalk. We still use this method at this point in the season, except it becomes more difficult since the first leaves have sloughed off. Now, the lower stalk must be split lengthwise to see the earlier nodes (see *Figure 1*). Each node appears as a line across the stalk. The first four nodes are condensed and cannot be distinguished from one another; they are located at the base of the crown. Approximately 1/4 to 1/2 inch above this condensed area will be the 5th node. In the figure you can see the 6th node is right above the ground; this is where the 6th leaf is attached.

Corn is in a rapid elongation phase right now and new leaves appear about every two days. The plant is increasing its rate of nutrient and dry weight accumulation now until R6. Between V8 and V12, the ear girth or the *number of rows* around the ear is determined. Once this is set it can only be reduced by later stresses. A reduction in the number of rows can be easily observed since they will be reduced part way up on the ear. The number of *kernels per row* or ear length will be determined from V12 until approximately one week before silking.

Corn hybrids will vary in the number of leaves they have, usually from 16 to 18. The final vegetative stage is VT. This occurs when the entire tassel is visible. The plant will not increase in vegetative stages once VT is reached. This stage occurs about two to three days before silks appear.

Due to the plant's rapid growth rate and the determination of its ear girth and kernel number at this time of year, it is critical that stresses such as water and nutrient deficiencies be limited. Plant water use will continue to increase from now until the plant reaches silking (R1). For more information on this, consult the NebGuide, *Irrigating Corn* (G1354), a valuable resource on corn's seasonal water use and optimal irrigation timing. It is available from local Extension offices or on the Web at *ianrpubs.unl.edu/fieldcrops/g1354.htm.*

In the coming weeks, note the growing conditions in your fields between V8-V12 and V12-VT since these times determine ear girth and ear length, respectively. If final yield is not as expected, you can determine whether the ear girth or ear length was the main inhibiting factor by examining a few ears at harvest. This can help you pinpoint when stresses occurred and serve as a valuable aid in identifying management factors to adjust in 2006.

References

Hanway, J.J. and S.W. Ritchie. 1984. *How a Corn Plant Develops: Special Report No. 48* – Iowa State University.

Flowerday, D. 1995. *Corn Morphology, Development, and Stress Response.* Nebraska Corn Expo.

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Managing corn nematodes common to Nebraska

Recent changes in cultural practices and insecticide chemistries may inadvertently benefit corn nematodes. Planting continuous corn and using reduced tillage practices worsen many diseases, including those caused by corn nematodes. And, the use of transgenic corn and pyrethroid insecticides instead of the traditional organophosphates and carbamates favors nematodes. Only a limited number of chemicals are available for their control, although several companies are exploring new chemical options. The following is a list of corn nematodes that have historically caused significant disease to corn in Nebraska and possible management strategies for them.

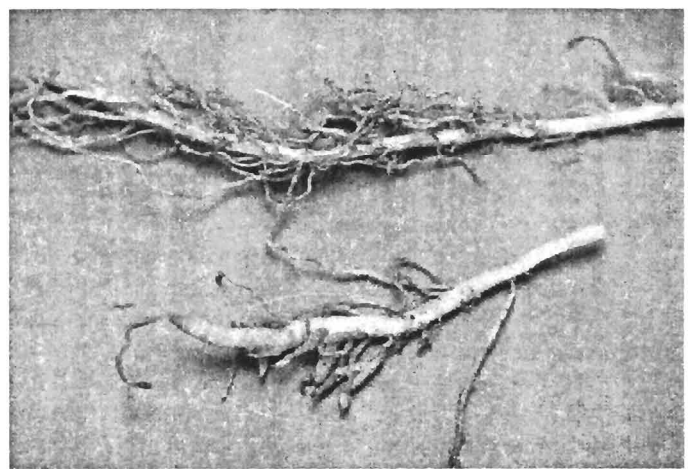
• **Needle** (*Longidorus* spp.) The largest of these, needle nematodes, require sandy soil and are most damaging in soils that are more than 90% sand. They have been reported in the eastern half of the state in the Elkhorn, Loup, Platte, and Republican river waterways. The symptoms they cause can be dramatic (see photos in the June 17, 2005 *CropWatch*) and include root necrosis, pruning, plant stunting, and uneven heights (*Figure 1*). Needle nematode has a relatively narrow host range that includes sorghum, corn, and grassy weeds. There has been no evidence of feeding on soybean. Rotations with soybean or alfalfa and strict weed control can help reduce population densities. This nematode travels deeper into the soil as summer temperatures increase, so sample for it early in the season as soon as symptoms are visible.

• **Sting** (*Belonolaimus* spp.) The sting nematode, also a large nematode, has a wide host range that includes corn, sorghum, soybean, small grains, and numerous weeds, such as morning glory, crabgrass, ragweed, and cocklebur. Some species, however, such as soybean and alfalfa, do not support reproduction as well as corn. Like the needle nematode, sting requires sandy soil to increase to high numbers. It also can cause severe yield loss and travel deep into the soil.

• **Dagger** (*Xiphinema* spp.) Although large, dagger nematodes can be found in silt loams, but tend to cause the greatest damage in sandy soils. Dagger nematodes are most abundant in the upper soil layers and are sensitive to disturbance, making tillage a management option.

• **Stubby-root** (*Trichodorus* or *Paratrichodorus* spp.) These nematodes feed on root tips, causing the development of shortened, thickened roots that have a stubby appearance, as opposed to normal fibrous roots, like the ones in *Figure 2*. Damage is dependent upon which species is present. This nematode has a wide host range that includes soybean, but it favors corn and sorghum, limiting rotation as a management strategy. Stubby-root nematodes can exist deep in the soil, more than 8 inches, so some may be missed during routine soil sampling.

Figure 1. (Above) Uneven stand height typical of corn nematode damage. *Figure 2.* Corn root symptoms caused by stubby root nematode.damage.



The previously described nematodes all spend their lives in the soil on the outside of the root, moving from root to root to feed. However, lesion and lance nematodes are endoparasites, spending most of their lives inside the roots. Therefore, root samples must be evaluated to accurately estimate their population densities.

• **Lesion** (*Pratylenchus* spp.) Lesion nematodes are believed to be the most economically important group of corn-pathogenic nematodes. These nematodes are small so they are not restricted by soil texture, occur in every corn field, and can reach high numbers. They can cause extensive damage and severe lesions by entering the root and migrating through the tissue while they feed. The resulting wounds are easy entry points for other pathogens. Numerous species are known to parasitize corn. Species identification is difficult, but is necessary for

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