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CropWatch No. 2003-14, June 13, 2003

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CROP WATCH

University of Nebraska Cooperative Extension
Institute of Agriculture and Natural Resources

University of Nebraska Lincoln

No. 2003-14, June 13, 2003

Corn rootworm egg hatch detected; begin scouting for larvae, feeding damage

Corn rootworm egg hatch was detected June 2 at UNL's Agricultural Research and Development Center near Ithaca and on June 3 at the South Central Ag Lab near Clay Center, but may have begun over the weekend. This is within the normal range of occurrence. Hatch will occur later in northeastern and western Nebraska.

Initial hatch is very hard to detect in the field, as newly hatched rootworms are very small. One method to detect hatch is to dig up corn plants, carefully shake off soil from the roots and put roots over a coffee can containing water. A coarse wire screen platform can be placed over the top of the can to hold corn roots. As the roots dry out, rootworm larvae will fall out and drop into the water where they can be more easily seen.

After hatch occurs begin scouting continuous corn fields for corn rootworm larvae and damage, regardless of whether a soil insecticide was applied at planting. This will help determine whether an insecticide is needed, if one was not used at planting, and provide a check of the effectiveness of planting time insecticide applications. In case of poor control, this will allow you to apply a rescue treatment before too much damage occurs.

Larval corn rootworms
(Jim Kalisch, UNL Department of Entomology)

To check for the presence of larvae in a field, dig a 7-inch cube of soil centered on the corn plant. Sample a minimum of two plants at each of five sites in a field. Carefully search through the soil and plant roots for larvae. There are three larval instars

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Inside

Assess hoppers in crop borders; determine need for treatment

Grasshopper nymphs are now hatching in areas around cropland. These grasshoppers are still small -- in the 1st - 3rd instar growth stages -- and at a good point for identifying their species and the potential for damage.

The first step is identifying areas with the greatest potential for serious grasshopper outbreaks, such as crop borders with high weed populations, weedy pastures adjacent to cropland, and areas where there were severe grasshopper infestations last year. Once these problem areas near fields are identified, they should be regularly monitored. Visual counts of grasshoppers should be taken weekly. Control decisions are based on the number of grasshoppers per square yard around a field. The

Migratory grasshopper, one of the most important crop-damaging species in the state.

(Continued on page 134)

Updates

Management tip

June 15 – July 30

If liquid manure is applied by sprinkler irrigation to a growing crop, and the electrical conductivity (EC) exceeds 3 mmho/cm, dilute it with fresh water. Sample the manure, and the mixture if adding water, after pumping several hours.

Grasshopper update

Tom Hunt, Extension Entomologist, Northeast REC: Visits to Knox and Holt counties last Friday confirmed that in areas of northeast Nebraska, particularly in the western counties, grasshopper potential is still very high, especially in pastures and forages. Some fields had 20 or more newly hatched hoppers per square foot. Many fields had a grasshopper hatch over two weeks ago, but much of this first hatch died due to the cool moist weather. (Holt County, which up to Monday had not received as much rainfall as other areas, was an exception.) While some fields in the drier areas are nearing decision-making time, most growers will be able to use the next two weeks to assess populations and make plans. Not every area will have high populations.

Heavy rains on Monday night, June 9, should have killed many 1st and 2nd instar grasshoppers.

Field updates

Ralph Anderson, Extension Edcator in Buffalo County: Crops here are generally in good to excellent condition. Harvesting the first cuttimg of alfalfa has been a challenge and we're seeing a lot of "windrow striping." Some alfalfa weevil were present earlier and we need to contiue to monitor our fields to see that weevil are not slowing regrowth.

We treated several thousand acres of rangeland for grasshoppers and continue to monitor the situation in rangeland. Along roadsides and in rangeland, we're starting to see grasshoppers other than the banded wing grasshoppers that USDA APHIS is treating. Most of these spur grasshoppers are still small (less than 3rd instar) and could be fairly easily controlled.

While wheat and pastures appear to be growing well, the soil probe indicates that there is little reserve moisture in many dryland fields. Fertilizer application and weed control are the main field work concerns of producers this week.

Keith Jarvi, Extension IPM Assistant, Northeast REC: Some areas in southeast and south central Nebraska are reporting cutworm damage to corn. Growth has been slower than normal and some corn is still in a vulnerable stage. If 5% of the plants are cut and cutworms are still less than 1 inch long, there may be an advantage to treatment. Use one of the many pyrethroid insecticides registered (Ambush, Baythroid, Asana, Mustang, Pounce and Warrior) or Lorsban for cutworm rescue treatments. (See *http://entomology.unl.edu/instabls/cutworms.htm* for rates).

Application deadlines

Crop disaster aid. Producers can now file requests for aid under the Crop Disaster Program created under the Agricultural Assistance Act. Eligible producers can choose to receive aid for losses in either 2001 or 2002. The program was authorized to provide some $2 billion in aid for producers suffering from natural disasters. The CDP has no funding limitation but each producer is limited to $80,000, according to a USDA press release. The closing date for applications has not been set yet, but for more information, visit the USDA Disaster Assistance Web site at *http://disaster.fsa.usda.gov/*

Non-StarLink claims. The deadline for corn growers to file a Non-StarLink Farmer Settlement "Corn Loss Proof of Claim" has been extended to July 31. For more information, visit the Nebraska Corn Board's web page on *How to Access Non-StarLink Website & Submit Claim Forms* at *http://www.nebraskacorn.org/StarLink.html*

CROP WATCH

cropwatch.unl.edu

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Lisa Jasa, Editor; Email: ljasa1@unl.edu

Rootworms *(Continued from page 131)*

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 and Elliot, 1988, *Environ. Entomol.* 17:166-171.

(stages). The greatest amount of damage is done in the last stage. Degree-day accumulations needed to complete development of different stages are shown in *Table 1, page 133*. The first instars are about 1/16 inch long and difficult to find without magnification.

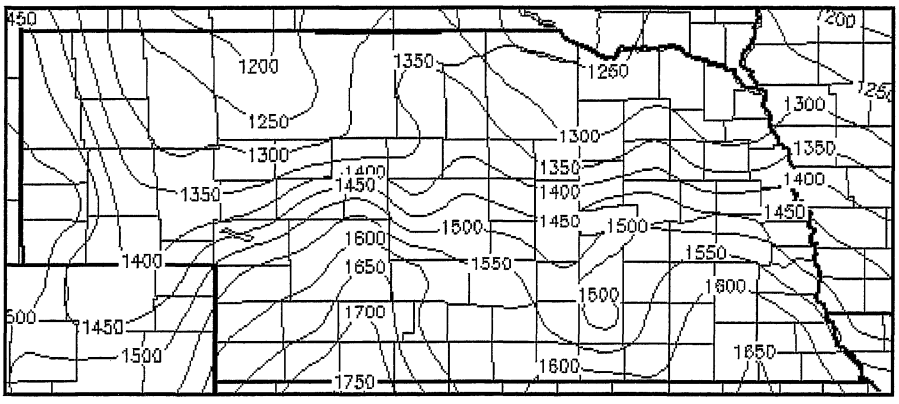
Often the first detected rootworms are second instars. Corn rootworm larvae are slender, cream-colored, with brown heads and a dark plate on the top side of the tail, giving them a double-headed appearance. Mature larvae are 1/2 inch long. Search through the soil and roots over a sheet of black plastic to make it easier to find the small white worms. There is no established treatment guideline for corn rootworm larvae, but some consultants advise treating if there are two or three rootworms per plant. The usefulness of this guideline depends on your ability to find rootworm larvae in the soil.

If needed, cultivation time treatments should be applied soon after egg hatch begins. Cultivation time applications of insecticides are an effective means of reducing injury to corn plants from rootworm feeding damage. Most granular soil insecticides for corn rootworms (except for Aztec and Fortress) that are labeled for application at planting time also are labeled for use at cultivation. Incorporate granules with 1-2 inches of soil after application; effectiveness may be decreased unless the insecticide is incorporated.

Other options include the use of Furadan 4F and the use of chemigation treatments with Lorsban 4E. Control with Furadan 4F will generally be improved if the treatment is cultivated into the soil, unless sufficient rainfall occurs after application to move the insecticide down into the root zone. Lorsban 4E applications should be timed for the first appearance of second instar corn rootworms. Additional information on suggested insecticides, rates and restrictions is available at *http://entomology.unl.edu/instabls/crwlarv1.htm*

For an indepth look into corn rootworms, see EC1563, *Corn Rootworm Management*, available at *http://www.ianr.unl.edu/pubs/insects/ec1563.htm*

Bob Wright
Extension Entomologist
South Central Ag Lab

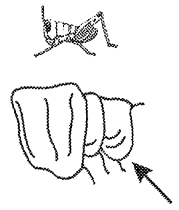


Common stalk borer

Accumulated growing degree days as of June 11, using a 41°F base. Producers should begin scouting for common stalk borers when 1,300-1,400 growing degree days have accumulated. See full story on stalk borer management in the May 23 *CropWatch* available on the Web at *http://cropwatch.unl.edu/archives/2003/crop03-11.htm#corn_stalk_borer.* (Map courtesy Al Dutcher, NU State Climatologist)

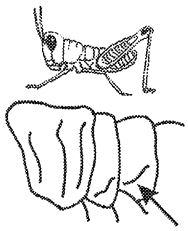
Grasshoppers in cropland *(Continued from page 131)*

Grasshopper nymph development



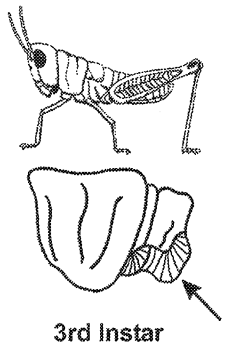
1st instar

Wing pads rounded, with no distinct venation and no visible bulge at apex.



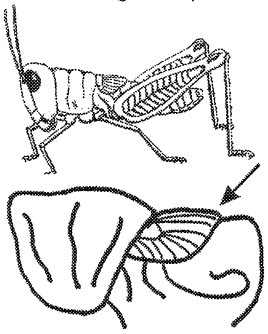
2nd instar

Wing pads rounded, with no distinct venation and slightly visible bulge at apex.



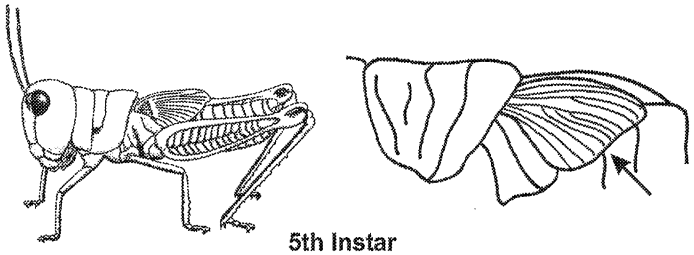
3rd instar

Wing pads with venation, more sharply triangular and pointed downward.



4th instar

Wing pads blunt, directed backward, but not extending beyond the first abdominal segment.



5th instar

Wing pads more pointed, directed backward and extending beyond the second abdominal segment.

recommended method for sampling grasshoppers is described in detail in the May 16 *CropWatch* and in the newly revised NebFact, *A Guide to Grasshopper Control in Cropland*, NF97-329, available at local Extension offices or on-line at *http://www.ianr.unl.edu/pubs/insects/nf329.htm.*

Basically, producers need to count the number of grasshoppers in a square foot area, repeat the count 18 times, and divide the resulting number by two. This is the number of grasshoppers per square yard. This procedure should be repeated in several areas of the field. Compare the average number of grasshoppers per square yard with the thresholds in *Table 1*. If sample numbers exceed the threshold, consider applying an insecticide.

After potential problem areas are identified, grasshoppers need to be collected from these areas to determine age and species composition. This is best done with a sweep net. Make slow, close-to-the-ground sweeps to ensure that small grasshoppers are collected. Place these grasshoppers in a plastic bag in the freezer for one hour. Then check the growth stage and species of each grasshopper and record your results.

More than 100 species of grasshoppers are common to Nebraska, but generally only four cause significant damage to crops. They are the migratory, twostriped, differential and red-legged grasshoppers, all of which are classified as spurthroated grasshoppers. Spurthroated grasshoppers have a rounded head and a body spur between their front legs. Other grasshoppers also are likely to be found in a given area, including slant-faced or other spurthroated grasshoppers. Identification of the common species in field borders is important because these other grasshoppers may be abundant but usually do not move to the crop area.

Producers can use a magnifying glass to help identify the grasshopper nymphs they've collected. Any grasshopper with a slanted face should be considered a pest of pasture and not a concern for field crops. Any grasshopper with a rounded headed should be turned over to determine if there is a spur between its front legs. If so, check its body color and markings.

Migratory grasshopper nymphs are tan or gray. Their heads have a black strip behind the eyes and a narrow pale yellow crescent below the eyes, both of which continue across the pronotum (the structure right behind the head).

Twostriped grasshopper nymphs are green or tan with two light yellow stripes running down the top of the head and pronotum. The side of the head has a dark horizontal band above a light stripe from the eye across the pronotum.

Visit *CropWatch* at *cropwatch.unl.edu* for color photos of the four most damaging species.

Differential grasshopper nymphs are pale green, yellow or tan. The side of the pronotum has two dark horizontal stripes divided by a light stripe.

Redlegged grasshopper nymphs are yellow with black markings. The side of the head has a pale yellow crescent band that continues across the pronotum to the front of the abdomen. With a little practice producers will be able to identify these species, particularly when the grasshoppers are almost 1/2 inch long.

Grasshoppers are much easier to control when they are small. As grasshoppers grow, their larger size makes them more resistant to insecticides and their newly developed wings allow them to move in a series of short flights up to about 1/4 mile. In mid summer when food

Grasshoppers in cropland (Continued from page 131)

sources become limited due to plant drydown, mowing operations or because they were completely consumed, grasshoppers often move to new feeding areas .

It's important to determine the age of grasshopper nymphs to decide the best time for control. To determine the growth stage, examine the general size and wing pad development. As a grasshopper nymph grows, the pads become longer and venation becomes evident. Most grasshopper nymphs should be controlled when they are in the 3rd or 4th instar nymphal stage (*see figure*). Nymphs of crop-damaging grasshoppers range from 1/2 to 3/4 inch long in these stages.

The wing pads of third instar nymphs are short, have venation and are pointed down. The wing pads of 4th instar nymphs have venation, are blunt, and are directed backward but do not extend beyond the first abdominal segment. At this growth stage, if the population exceeds the threshold of 20 grasshoppers per square yard, control measures should be initiated.

Table I. Treatment guidelines based on number of grasshoppers (nymphs and adults) per square yard.

Grasshopper infestation	*Population*		*Treatment necessary?*
	Field	*Field Margin*	
Non-economic	0-2	5-10	No
Light	3-7	11-20	Questionable
Moderate	8-14	20-40	Probably
Abundant	14+	40+	Yes

Insecticide applications are the best method for controlling nymphs. Several products are registered for non-crop, pasture and crop areas. Heavily infested ditches bordering crops should receive complete coverage; however, large non-crop areas or pastures often may be successfully treated using the reduced area agent treatment (RAATs). With this program, insecticides are applied with 50% coverage in alternating strips. For example, with an aerial application of Dimilin insecticide, the area immediately adjacent to the crop up to about 60 feet should be treated. Depending on the border size, a 60-foot strip should be left untreated followed by another 60-foot treated strip. This pattern of alternating treated and untreated strips may be repeated for up to 1/4 mile. This procedure works well for grasshoppers in the nymph stage only and should result in sufficient protection from later infestation unless populations are extreme. Crop margin areas should continue to be monitored regularly to ensure that reinfestation doesn't occur.

Ron Seymour, Extension Educator in Adams County
Gary Hein, Extension Entomologist, Panhandle REC

Controlling weeds postemergence in soybeans

By now, soybeans have been planted throughout much of the state and producers are gearing up for their summer weed management strategies. For some producers, the choice will be easy as they have planted herbicide-resistant crops and will likely choose the corresponding herbicide when the time comes. For others, the choice may not be as easy with the many products on the market controlling various weeds at different stages.

Producers who used a preemergence herbicide this year may have more flexibility in their postemergence weed management strategy. Generally they'll be able to wait longer before applying postemergence herbicides or cultivating.

Several other strategies include the use of an early postemergence herbicide with residual such as Roundup + Pursuit (or Extreme) tank mix, a timely postemergence application followed by cultivation or two separate postemergence applications timed roughly 20-30 days apart, letting the weed growth stage dictate application timing.

Regardless of which strategy you use, timing of weed removal is critical. An article in the June 6 *CropWatch* explained why soybeans should be kept free of weed competition from the 2nd trifoliate to beginning bloom. The weed management strategy you choose should keep this in mind and yet be flexible enough to allow for removal during this critical time. Management strategies will largely be based on the time constraints of individual producers. Selecting a strategy that fits into your schedule will help you maintain optimum weed management in fields this year.

Growers should consider several issues when choosing a postemergence herbicide, including safety. Many soybean herbicides utilized for broadleaf control are cell membrane disrupters. Herbicides such as Blazer, Cobra, Resource, and Flexstar will do well on many broadleaf weeds, especially waterhemp, but also will cause some burning on the soybean leaves. Research has shown there is little to no yield impact from this burn in early growth stages of soybeans. Once soybeans begin blooming avoid spraying these cell membrane disrupter herbicides.

Grass control is not a problem with soybeans as herbicides such as Poast, Fusion, Fusilade, and Select will easily control annual grasses. One slight problem, however, is that these grass herbicides require crop oil and when tank mixed with cell membrane disrupters for broadleaf control, things can really heat up. In addition, grass control will often be slightly reduced when one of these grass products is tank mixed with a broadleaf herbicide.

(Continued on page 136)

Postemergence herbicides labeled for soybeans

Herbicide	Action	Rate per acre	Application timing	Additives
Assure II	Grass	7-8 oz	Grass 4" shattercane & corn 12-18"	NIS 1 qt/100 gal**
Basagran	Broadleaf	1-2 pt	Broadleaf < 4"	COC 1 qt/A**
Classic	Broadleaf	0.5-0.75 oz		NIS 1 qt/100**
Extreme	Broadleaf + grass	3pt	Grass and broadleaf <12"	NIS 1 pt/100 + Fert. or AMS
First Rate	Broadleaf	0.3 oz	Broadleaf <10"	NIS 1 pt/100**
Flexstar	Broadleaf	1 pt	Broadleaf < 4"	NIS 1 qt/100**
Fusilade	Grass	6-12 oz	Grass 2-12"	NIS 1 qt/100**
Fusion	Grass	6 oz	Grass 4" ,shattercane & corn 12-18"	NIS 1 qt/100**
Generic glyphosates*	Broadleaf +grass	See May 24 *CropWatch*	Grass and Broadleaf <12"	AMS 1-2%
Harmony GT	Broadleaf	.083 oz	Broadleaf 2-8"	NIS 1 qt/100 + UAN 2-4 qt/A
Pheonix	Broadleaf	8-12.5 oz	Broadleaf <6"	NIS 1qt/100**
Poast Plus	Grass	18-24 oz	Grass 4", shattercane & corn 12-18"	COC 1 qt/A**
Pursuit	Broadleaf + grass	1.44 oz		NIS 1 qt/100 + UAN 1-2 qt/A**
Raptor	Broadleaf + grass	5 oz	Broadleaf <4"	NIS 1 qt/100 + UAN 2-4 qt/A**
Reflex	Broadleaf	1 pt		NIS 1 qt/A**
Reliance STS*[a]	Broadleaf	0.5 oz	Broadleaf <6"	COC 1 qt/A**
Resource	Broadleaf	4-8 oz	Broadleaf <4"	COC 1 qt /A**
Roundup UltraMax*	Broadleaf + grass	13-26oz	Grass and broadleaf <12"	AMS 1-2%
Select	Grass	6 oz	Grass 4", shattercane 6-18", corn 12-24"	COC 1 qt /A**
Stellar	Broadleaf	5 oz	Broadleaf 2-6"	NIS 1 qt/100**
Storm	Broadleaf	1.5 pt	Broadleaf 2-6"	NIS 1qt/100**
Synchrony STS*	Broadleaf	0.5 oz	Broadleaf <6"	COC 1 qt/A**
Touchdown w IQ	Broadleaf + grass	1–2 pt	Grass and broadleaf <12"	AMS 1-2%
Ultra Blazer	Broadleaf	1-1.5 pt		NIS 1 qt/100**

[a]May use non-STS when mixed with NIS + ammonium fertilizer instead of COC
*Requires herbicide resistant soybeans
**More than one additive is labeled

(Continued from page 135)

The following recommendations address management strategies for some particularly difficult weeds postemergence in soybeans.

Black nightshade

Problematic in many soybean stands mid to late season, black nightshade usually can be controlled with Pheonix at 8-12.5 oz/a, UltraBlazer at 1-1.5 pt/a, Reflex/Flexstar at 1 pt/a, Pursuit DG at 1.44 oz, a, Raptor at 5 oz/a and Roundup WeatherMax in RR soybeans at 22 oz/a or glyphosate at 32 oz/a. Because nightshade moves in late in the season, cell membrane disrupters may not be a feasible treatment, especially during blooming.

Kochia

Roundup WeatherMax in RR soybeans at 22 oz/a or glyphosate at 32 oz/a. Herbicides offering less control, in the 80% range, include Basagran at 2 pt/a, Pursuit DG at 1.44 oz/a, Raptor at 5 oz/a, and Synchrony in STS soybeans at 0.5 oz/a. Remember that many areas have ALS-resistant kochia, meaning herbicides such as Synchrony, Pursuit, and Raptor will not provide control.

Velvetleaf

Control can be had with cell membrane disrupters including UltraBlazer at 1-1.5 pt/a, Pheonix at 8-12.5 oz/a, Reflex/Flexstar at 1 pt/a, as well as Basagran at 2 pt/a, Classic at 0.5-0.75 oz/a, Pursuit DG at 1.44 oz/a, Raptor at 5 oz/a, Resource at 4 oz for velvetleaf <4 inches, Synchrony in STS soybeans at 0.5 oz/a, Roundup WeatherMax in RR soybeans at 22 oz/a or 32 oz/a of glyphosate, and Stellar at 6 oz/a.

Waterhemp

Waterhemp can be difficult to manage so strive for control before it's 6-8 inches tall. No herbicides work well on 12- to 18-inch waterhemp. Because much of the waterhemp is ALS-resistant, only a few herbicides provide satisfactory control. These include cell membrane disrupters such as UltraBlazer/Status at 1-1.5 pt/a, Pheonix at 10-12 oz/a, Reflex/Flexstar at 1 pt/a, Stellar at 6 oz/a and Roundup WeatherMax at 22 oz/a or glyphosate at 32 oz/a in RR soybeans.

Brady Kappler, Weed Science Educator

Numbers low, but problems still possible

Scout for European corn borer moths

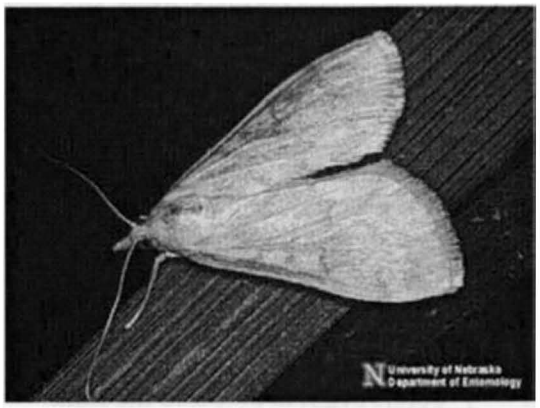
First generation corn borers prefer taller plants for egg laying, so the earliest planted fields are more likely to have higher populations. Scout these fields first.

European corn borer moths have been flying for a couple weeks in southern Nebraska and about a week in northeast Nebraska. Current information on black light trap catches for several sites in Nebraska can be found at *http://entomol/fldcrops/fldcrops.htm*. While there hasn't been a bumper crop of moths this year, we should not be complacent about the European corn borer in non-Bt cornfields.

Timely and accurate scouting is the key to managing European corn borer in standard (non-Bt) corn hybrids. Remember that conditions are localized and fields must be individually scouted to make accurate decisions.

Corn borer larval survival depends on several factors. High humidity and warm temperatures are ideal for establishment of larvae in the whorl. The white egg masses, which each have 5 to 40 eggs, are laid on the underside of leaves near the midrib. The masses look like fish scales flattened against the leaf. In four to seven days the heads of the developing larvae will be visible, and the eggs will appear spotted. This is the "blackhead" stage, and these eggs normally hatch within 24 hours. As the larvae enter the whorl to feed on the developing tissue, the feeding scars (shot-holes) appear as the leaves emerge from the whorl. Larvae will remain within the whorl for 7 to 14 days before boring into the stalk.

Corn that is below a 16-inch extended leaf height (distance from the tip of the leaf pulled up vertically to ground, about six-leaf stage) is unlikely to support young larvae because of the presence of a substance known as DIMBOA, a natural resistance factor. As the plants grow, the level of DIMBOA decreases. Plants above the 16-inch extended leaf height generally will support corn borers. First generation corn borers prefer taller plants for egg laying, therefore, the earliest planted fields are more likely to have higher populations. Scout these fields first, but don't neglect other fields because any cornfield is a potential target and should be scouted.



Female European corn borer moth.

Now that Bt corn is being planted widely, be sure you know whether the field you are scouting was planted to Bt corn. In Bt corn, corn borer injury to whorl stage plants should be limited to a few tiny pin-holes where larvae initially fed before ingesting a lethal dose of Bt toxin. However, seed lots may contain a small percentage of off-type seed (typically less than 4%) which does not produce sufficient toxin levels to kill corn borer larvae. If greater than 4% of plants show significant leaf feeding damage in a Bt cornfield, confirm whether it's corn borer causing the injury. (Other caterpillars such as corn earworms or common stalk borer are not controlled by current Bt corns.) If you believe that corn borer is causing the injury, contact your seed company representative to investigate the situation more completely.

To determine the need for treatment, scout at least 20-25 consecutive plants in at least 4-5 places in the field (100 plants minimum per field). The scouting locations should be randomly selected and representative of the field as a whole. At each scouting location, randomly select the first plant that will be sampled. If you do not and always start sampling at an infested plant, the counts may be inflated by up to 5%. Count the number of plants showing shot-hole feeding and determine the percent of infested plants. Next, pull the whorls from at least two randomly selected infested plants in each set of 20-25 plants. Unroll the leaves and count the number of larvae in the whorl and determine the number of larvae per infested plant. Young corn borers usually suffer from 60% to 85% or higher mortality due to natural enemies, weather and disease, so try to wait to make treatment decisions until most of the borers are second instar to take advantage of natural larval mortality.

(Continued on page 136)

Worksheet for first generation European corn borer

To estimate the cost/benefits of applying an insecticide for European corn borers, you also need to know the cost per acre of the insecticide application ($/acre), the anticipated price of grain ($/bu), and yield potential (bu/acre) of your hybrid. Assume 5% yield loss/borer/plant and a proportion of larval population reduction by insecticide application of 0.75.

Average number of larvae/plant _____ larvae/plant
(percent of injured plants X number of larvae/injured plant)

Potential yield loss if all larvae survive _____ % loss
(number of larvae/plant X 5% loss/borer/plant)

Potential bushel loss _____ bu/acre
(potential yield loss X yield potential)

Potential dollar loss _____ $ loss/acre
(potential bushel loss X estimated price of corn)

Preventable loss _____ $/acre
(potential dollar loss X proportion of larval population reduction)

All of the above numbers are variable and are unique to each field and farm management operation. Use the formula several times using different figures for yield, price, and cost of application to see how each one affects the outcome. Use the figures closest to your situation to make the final determination.

Use the information gathered from field scouting to complete the accompanying worksheet. This takes you through the calculations needed to estimate the preventable loss if an insecticide is used. Compare the preventable loss to the total cost of insecticide application. An insecticide application is economically justified if preventable loss exceeds the total cost of insecticide application. An interactive version of the worksheet is available at *http://ianrwww.unl.edu/forms/forms.skp/ecb_1st.html*

Treatments will be effective only if borers are still feeding in the whorl. Treatments made after corn borers begin to bore into the stalk (when they are about half grown) will not be effective. Based on research data, the best control is achieved with aerial or ground applied granular formulations or liquid applications through sprinkler irrigation systems, which provide the best penetration of insecticide into the whorl where the corn borer larvae feed.

Many insecticides are registered for control of first generation European corn borers and most will do a good job if applied properly at the right time. The Bt-based insecticides Dipel, Condor, M-Peril and others are effective and do not reduce populations of corn borer natural enemies. Refer to *http://entomology.unl.edu/instabls/ecb1st.htm* for a list of suggested insecticides.

Additional information on first generation European corn borer management is available in *First Generation European Corn Borer Scouting and Treatment Decisions*, NebFact 98-364. This publication is available from your local cooperative Extension office or at *http://entomol/ecb/ecb1.htm*

Tom Hunt, Extension Entomologist, Northeast REC
Keith Jarvi, IPM Extension Assistant, Northeast REC

North Platte Valley water canal releases down about 50%

Snow pack was average this year and certainly better than last year, but the North Platte Valley will still not see a full supply of water for irrigation in 2003. Most irrigation districts are not planning to deliver any water until June 15-25. By not making deliveries until then, there should be about 50% of normal water supply available through September 1. Runoff forecasts are down compared to a month ago, but it is hoped that the projected water supply will not drop further.

On the positive side, precipitation in the Panhandle is running from slightly below normal to above normal. Row crops are well established and should have adequate soil water for the next couple of weeks. This week's temperatures in the mid 80s have allowed plants to grow without having to endure the high temperature stress likely to

(Continued on page 140)

Distinguish the many product faces of glyphosate to select what you need

To no one's surprise, each year several new glyphosate products enter the market. In comparing products and selecting a herbicide, it's important to understand that all glyphosate products are *not* created equal. Their chemistry may be very similar to Roundup's, but their formulations and surfactants may be different. If the price on the generic glyphosate seems too good to be true, it probably is.

When comparing glyphosate products, first examine the formulation. This is presented in terms of active ingredient and acid equivalent. Glyphosate is an acid formulated as a salt to improve performance and handling. Two formulations may contain the same amount of acid equivalent but different amounts of active ingredients because the salts are of different weights. Three salts of glyphosate are being marketed: isopropyl amine, ammonium and diammonium salt.

Isopropyl amine is the salt in Roundup and other generic glyphosate products. Ammonium salt of glyphosate is the active ingredient in Roundup UltraDry. Diammonium salt is the active ingredient in Touchdown with IQ. Since different salts can have different weights, formulations are expressed on an acid equivalent basis. *Table 1* compares some common Roundup and Touchdown formulations.

In comparing various glyphoste products, consider whether the product includes surfactants. Products like Roundup Ultra include a surfactant while other products do not. A 4 lb formulation of a generic glyphosate with no surfactants needs 0.5% volume/volume of a 70%+ active ingredient non-ionic surfactant. This translates into approximately an additional $1 per acre. If a surfactant with less than 70% active ingredient is used, the recommended rate of non ionic surfactant increases to 1% and the cost also increases.

Some companies recommend adding AMS while others have included AMS or equivalents in the surfactant systems. Adding 8.5 lbs of AMS per 100 gal of water at the 10 gallon carrier rate will cost about $0.15 per acre and be an economical addition to the spray mix. UNL research has shown that regardless of whether the water is hard enough to require AMS, glyphosate activity is usually increased by adding it.

Rates also vary with different formulations. *Table 2* looks at the difference between the common Roundup and Touchdown formulations.

In addition all generic glyphosate products are not labeled for Roundup Ready™ crops. The bottom line is to know what you are buying and what is in it including surfactants, the quality of surfactant and the presence or absence of AMS and it's quantity.

Finally, we have included another table that will list *many* of the new glyphosate products that are available and registered for use in Nebraska on Roundup Ready corn and soybeans. *Table 3* on *page 140* lists the product name, distributor, formulation, acid equivalent, and the use of surfactants. This is not an all-inclusive list, but a representative table of available products. Remember that glyphosate herbicides respond positively to the addition of AMS, especially in hard water.

Brady Kappler
Weed Science Educator

Table 1. Comparision of Roundup, Touchdown, and typical generic glyphosate formulations

Product	*Company*	*Formulation*	
		Active ingredient	*Acid equivalent*
Roundup WeatherMax	Monsanto	5.5 lb/gal	4.5 lb/gal
Roundup UltraMax	Monsanto	5 lb/gal	3.75 lb/gal
Touchdown w/ IQ	Syngenta	3.7 lb/gal	3 lb/gal
Generic glyphosate	Various	4 lb/gal	3 lb/gal

Table 2. Comparison of Roundup, Touchdown and typical generic glyphosate use rates

Roundup	*Touchdown*		*Glyphosate*
WeatherMax	*Ultra Max*	*TD IQ*	*Generic*
11 oz	13 oz	16 oz	16 oz
22 oz	26oz	32 oz	32 oz

Water

(Continued from page 138)

occur as summer progresses. With a little bit of additional precipitation most row crops in the North Platte Valley should be okay until water comes into the canals and is available for irrigation.

This is not to say everything is in good shape. A significant amount of winter wheat was planted in the valley last fall as a precaution against not having a full water supply this year. Most of the winter wheat crop will not be irrigated in order to save water for other crops. For the most part alfalfa growers have used up winter and spring soil water in producing the first cutting of hay. To get the second cutting growing, most alfalfa fields will need irrigation when water in the canals is released.

Conservation was and will be the key word this year and next. North Platte Valley growers will likely use any stored water this year and will be in the same predicament next year being totally dependent on snow pack in the Colorado and Wyoming mountains. As can be seen this year, with average snow pack and no water carried over from the previous year, irrigation demands cannot be met.

Saving water through irrigation, tillage, residue and crop selection will likely be a key factor again next year.

C. Dean Yonts, Extension Irrigation Specialist Panhandle REC

Crop condition

According to the June 9 USDA Nebraska Agricultural Statistics Service report, corn condition rated 1% poor, 17% fair, 62% good, and 20% excellent. Ninety-six percent of the fields had emerged. Soybean condition rated 1% poor, 18% fair, 67% good, and 14% excellent. Planting was 94% complete; 68% of the crop had emerged, behind 81% last year and an average of 78%.

Glyphosate *(Continued from page 139)*

Table 3. Comparison of common glyphosate products registered in Nebraska.

Distributor	*Product*	*Form lb/gal*	*AE* lb/gal*	*Non-Ionic Surfactant*
Agrilliance	Cornerstone	4	3	May be added
Agrilliance	Silhouette	4	3	May be added
Albaugh	Gly Star	4	3	May be added
Albaugh	Gly Star Plus	4	3	Not required
Chem. Prod. Tech.	Clearout 41 Plus**	4	3	Not required
Cheminova	Glyfos	4	3	May be added
Cheminova	Glyfos Xtra	4	3	Not required
Dow	Glyphomax	4	3	May be added
Dow	Glyphomax Plus	4	3	Not required
Griffin	Glyphosate Original**	4	3	May be added
Micro Flo	GlyFlo	4	3	May be added
Monsanto	Roundup Original	4	3	May be added
Monsanto	Roundup Original II	4	3	May be added
Monsanto	Roundup Ultra	4	3	Not required
Monsanto	Roundup UltraMax	5	3.75	Not required
Monsanto	Roundup UltraDry***	71.4%	64.9%	May be added
Monsanto	Roundup Weathermax	5.5	4.5	Not required
NuFarm	Credit systemic**	4	3	May be added
NuFarm	Debit TMF**	4	3	Required
Syngenta	Touchdown w/ IQ	3.75	3	May be added
UCPA	Gly-4	4	3	May be added
UCPA	Gly-4 plus	4	3	

* Acid equivalent
** Not registered for use on Roundup Ready corn
*** Roundup UltraDry is a dry formulation – 1.2 lbs contains 0.75 lb of glyphosate acid and is equivalent to 1 quart of Roundup Ultra.

Lower temperatures, rains aid western winter wheat crop

Moderate temperatures and precipitation in some areas have benefitted the western Nebraska wheat crop, however, many areas are still short of soil moisture and yields could be diminished, especially if unusually high temperatures return.

Drew Lyon, Extension dryland crops specialist at the Panhandle REC, said many fields could still go either way, depending on weather conditions in the next few weeks. Wheat condition is deteriorating in some areas but at a slower rate than last week.

Bob Klein, Extension crops specialist at the West Central REC, agreed, reporting that in southwest Nebraska the winter wheat is highly variable ranging from poor to good. Some fields have already run out of moisture and yields will be minimal to nonexistant, he said. In other fields, wheat condition is fair to good, depending on recent rain and disease and insect pressures. Localized wheat streak mosaic, wheat stem maggot, and winter injury will limit yields. Moisture continues to be the most determining factor for most wheat in southwest Nebraska.

Statewide, wheat is faring better than last year. Based on June 1 conditions, the crop is forecast at 72.6 million bushels, up 49% from last year and 16% above last month's forecast, according to USDA's NASS.