Black Cutworm Migration Report

Black cutworm moths continue to be caught throughout much of Illinois. Intense captures of moths (nine or more moths caught per trap during a 1- to 2-day period) were reported from April 12 to 18 in the following counties, with projected cutting dates in parentheses: Alexander (May 6), Clark (May 16), Franklin (May 13), Hancock (May 17), Macon (May 18), Monroe (May 9), Randolph (May 6), and Vermilion (May 20). These projected cutting dates are for the most recent intense captures. Recall that in earlier issues of this Bulletin, we indicated that cutting could become evident in southern counties as early as the last week of April. We have had sporadic intense flights for about 1 month for several areas south of Interstate 70. Bottom line—growers should check fields for black cutworm leaf feeding; don’t wait for cutting to begin before you start to give this insect some respect. Also, please refer to last week’s Bulletin (issue no. 4, April 18) for more management details.

Mike Gray, Extension Entomology, (217)333-6652

Areawide Corn Rootworm Project Update

In 1997, entomologists from the University of Illinois and Purdue University will cooperate in a joint program to manage densities of corn rootworms in a 16-square-mile area. Because you likely will hear more about this research effort over the next several years, the following questions and answers may help familiarize you with this large undertaking.

Where is the 16-square-mile area located? The study area is just south of Sheldon, Illinois, and is bordered by Highway 24 to the north, Indiana blacktop 71 to the east, and county roads 1300N and 2900E, to the south and west, respectively. The experiment crosses the state line and will be located partially in Iroquois County in Illinois and Newton and Benton counties in Indiana.
I’ve heard this is an effort to eradicate western corn rootworms. Is this true? No. The objective of the program is to cooperate with about 40 growers in the area in an effort to lower the density of corn rootworms to a level that is not economically threatening. The primary management strategy will be control of rootworm adults to prevent them from laying eggs, rather than application of soil insecticides at planting to prevent larval injury to roots. Cornfields will be scouted frequently, and when critical densities of beetles are reached, a treatment will be applied. By targeting insecticide applications at the egg-laying beetles, we predict that the overall density of corn rootworms in the 16-square-mile area can be lowered to a noneconomic level. This is not an attempt to eliminate beetles from the area.

Are similar efforts under way in other parts of the country? Yes. Three other corn rootworm areawide management projects also will begin this season. One study will be located in Kansas and involves close cooperation among scientists at Kansas State University and the University of Nebraska. Another experiment will take place in northwestern Iowa and involves cooperation among entomologists at Iowa State University, South Dakota State University, and the University of Minnesota. The third site is in Texas, but entomologists there will focus upon managing the Mexican corn rootworm, a species related to our western and northern corn rootworms.

Has areawide management of insects ever been successful? Yes. The most famous example of successful areawide management focused upon the screwworm, a potentially devastating insect pest of livestock. Dramatic success was achieved with the sterile male release strategy for screwworms in Florida and areas of the southwestern United States. Because the area in the Southwest is very large and nonisolated, constant reinfestations of the screwworm have prevented total eradication of the screwworm. Some success also has been achieved with areawide management of boll weevils in the southeastern United States and areas of Arizona and California. Insecticide use for control of boll weevils declined significantly, while an expansion of cotton acreage occurred at the same time in these states.

Has an areawide management approach for corn rootworms ever been attempted? Yes. In the late 1960s, researchers in Nebraska attempted to suppress densities of adult corn rootworms within 16 square miles by applying ULV malathion in August of 1968, 1969, and 1970. Densities of adult rootworms were reduced by 39, 54, and 72%, respectively, for the three seasons. The Nebraska researchers concluded: “The program was successful to the extent that no economic infestations occurred in the treated area during any year following adult control, while use of soil insecticides was virtually abandoned in that area.”

In 1991, 16 square miles near Brookings, South Dakota, were used to examine more closely the feasibility of suppression of corn rootworms. The South Dakota effort differed from the research conducted by Nebraska scientists in the late 1960s in the type of insecticide used. In the South Dakota experiment, a semiochemical-based bait (COMPEL, Scentry, Inc., Billings, Montana) was applied aurally to cornfields. The formulation consisted of biotac (45.5%, nontoxic adhesive), dried and ground roots of buffalo gourd (50%), and carbaryl (4.5%). The treatment was applied at a rate of 0.89 pound per acre to those fields that exceeded an economic threshold of one beetle per plant. The amount of active ingredient (carbaryl) applied was only 10 grams per acre, 98% less toxicant than the amount of toxicant in a typical application of a soil insecticide. Although densities of beetles were suppressed, evaluations of root injury the following season were not conducted. Thus, some critics of the areawide management approach for corn rootworms remain skeptical.

Why are corn rootworms being targeted in an areawide management program? If we accept the premise that pesticide reduction, specifically fewer “pounds in the ground,” is one reason to examine areawide management more closely, then corn rootworms are an attractive candidate for this type of program. In the north-central United States, more than 60 million acres of corn are produced. Where corn is grown continuously (not rotated), a large percent of these acres is treated prophylactically (no scouting input) with a soil insecticide each spring. Not surprisingly, the total amount of soil insecticide applied by producers each spring captures the attention of many agricultural and environmental policy makers. Proponents of an areawide management program for the corn rootworm complex see the potential for tremendous reductions in insecticide load across the Corn Belt if rootworm populations could be managed more effectively by integrating several tactics and not focusing solely on soil insecticides as a management tool.

Why was the Illinois and Indiana site chosen as one of the three pilot studies? The site was chosen primarily for the unique situation that exists with western corn rootworm beetles laying at least some of their eggs in soybean fields. Currently, this unique behavioral adaptation of the western corn rootworm is found only in certain areas of the eastern Corn Belt. The 16-square-mile study site is situated in the “heart” of the problem area. Due to the uniqueness of western corn rootworm egg-laying behavior in eastern Illinois and western Indiana, an insecticide will be applied to corn when a threshold is exceeded to prevent beetles from leaving the cornfield and laying eggs in nearby soybean fields.
What insecticide will be used in the Illinois/Indiana areawide project? The name of the product is SLAM. It is available commercially from BASF Corporation and consists of cucurbitacin, carbaryl, and nontoxic carriers. Cucurbitacin is a very bitter compound, derived from roots of buffalo gourd, that causes corn rootworm beetles to feed compulsively and arrest their movement. When cucurbitacin is used in conjunction with an insecticide like carbaryl, very little of the toxin is required to kill beetles. So, growers need only an ounce of carbaryl per acre instead of 1 pound of carbaryl, the typical application rate for products like Sevin XLR Plus.

What are some possible disadvantages with an areawide management approach for corn rootworms? One immediate concern is the potential for the development of resistance. Soil insecticides have been very good resistance-management tools in the battle with corn rootworms. Because soil insecticides are applied in a narrow band during planting, only a portion of the corn rootworm larval population is exposed to the toxin. In an areawide program, broadcast applications of SLAM will be directed against beetles. Over time, broadcast applications that target the entire population could select for insecticide resistance more quickly. For instance, in Nebraska, entomologists believe that growers in certain counties have selected for corn rootworm beetles that are resistant to Penncap-M (methyl parathion) through repeated (over many years) broadcast applications of this product aimed at the egg-laying adults.

There will be more questions as this areawide project in Illinois and Indiana moves forward. We will keep you informed as this effort unfolds and we begin to see results.

Mike Gray and Kevin Steffey, Extension Entomology, (217)333-6652

**Update on Alfalfa Insects**

Very little alfalfa weevil activity has been reported this spring. Densities of the larvae in alfalfa fields have been quite low, and thus far we have received no reports of significant levels of injury. On April 15, Steve Roberts, research entomologist with the Illinois Natural History Survey, sampled a couple of alfalfa fields in St. Clair and Clinton counties and found an average of 0.27 and 0.4 larvae per sweep, respectively. Please note that these are numbers per sweep, not per stem. The treatment guideline is two to three larvae per stem, so the densities detected were far below an economically damaging level.

Growers, consultants, and dealers should continue to monitor alfalfa fields for signs of alfalfa weevil injury and the presence of larvae. Critical heat-unit accumulations (above a base temperature of 48°F) from January 1 are as follows: 200—egg hatch; 325—early peak of third-stage larvae from overwintering eggs; and 575—second peak of third-stage larvae from spring-deposited eggs. Figure 1 shows the actual heat-unit accumulations from January 1 to April 21, and Figure 2 shows the projected heat-unit accumulations from January 1 to May 4. The limited activity in southern Illinois thus far this spring suggests that survival of overwintering eggs was not great. Consequently, alfalfa growers may want to be more aware of the time of occurrence of the peak of larvae from spring-laid eggs this year.

If enough adults survived the winter and egg-laying conditions were suitable this spring, the peak of third-stage larvae from spring-deposited eggs could be more important. If this is the situation in southern Illinois, a slightly early harvest that does not sacrifice yield will likely be a more appropriate strategy than insecticides to control an economic infestation of alfalfa weevils. Because alfalfa weevils don’t lay many eggs in the fall in northern Illinois, growers in northern counties typically contend with only one peak of third-stage larvae.

Figure 1. Actual heat-unit accumulation (base 49°F) from January 1 to April 21, 1997.

Figure 2. Projected heat-unit accumulation (base 49°F) from January 1 to May 4, 1997.
By the end of the first week in May, we should have a pretty good idea if alfalfa weevils will cause any economic problems in most of the state. Eggs should have hatched virtually everywhere in the state (see Figure 2), and time for the second peak of third-stage larvae will have occurred in the southern four tiers of counties. We’ll keep you posted.

As an add-on note, Steve Roberts also found the first potato leafhopper of the season on April 15 in St. Clair County. He found only one leafhopper in 200 sweeps, but his find occurred on one of the earliest dates in recent years.

Kevin Steffey, Extension Entomology, (217)333-6652

Cereal Leaf Beetles May Appear Soon in Wheat Fields

Scouts may start finding cereal leaf beetles in wheat fields soon as the adults emerge from overwintering quarters and move to wheat, where they feed before they begin laying eggs. An adult cereal leaf beetle is hard-shelled, about 3/16-inch long, with metallic blue wing covers and head, and red-orange legs and prothorax (the area just behind the head). Recently deposited eggs are elliptical, yellow, and smaller than a pinhead. Just before hatching, they turn almost black. Eggs are deposited singly or in rows of three or four, but never in clusters. They usually are found close to the midrib on the upper surface of a leaf. The larva resembles a slug or a small glob of mud. This “glob” is an accumulation of fecal matter carried around by the immature cereal leaf beetle. This behavior probably is a defensive mechanism that discourages some predators and parasitoids from attacking the larval stage of this pest. However, at least three parasitic wasps are natural enemies of the larvae. Another small wasp parasitizes cereal leaf beetle eggs, lady beetles prey on the eggs, and one tachinid fly parasitizes the adult. Consequently, natural enemies occasionally prevent densities of cereal leaf beetles from exceeding the economic threshold (see below).

Adult cereal leaf beetles feed for about 2 weeks before they laying eggs. Eggs hatch in about 5 days, and larvae usually require 10 days to become full grown. After the larvae finish feeding, they move to the ground, pupate in the soil, and emerge as beetles after 2 to 3 weeks.

The larvae feed upon the green epidermal tissue of leaves, causing injured leaves to appear silver. Severely damaged fields look “frosted.” The potential for yield loss depends upon the stage of growth of wheat plants, location of larvae on the plants, and the density of the pest. Severe damage to the flag leaf can reduce yields by 25 to 30%. An insecticide treatment may be justified when the combination of eggs and larvae averages three or more per stem. Larvae feeding on the flag leaf causes more yield loss than larvae feeding on lower leaves of the plant.

The following insecticides are suggested for control of cereal leaf beetles in wheat: *Furadan 4F at 1/2 pt per acre; Sevin XLR Plus at 2 pt per acre; and *Warrior 1EC at 2.56 to 3.84 oz per acre. Products preceded by an asterisk (*) are restricted for use by certified applicators. Furadan 4F should be applied before heads emerge from the boot.

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WEEDS

Management of Waterhemp in Corn and Soybeans

In the last issue of this Bulletin, we provided some information on the biology and growth habits of common and tall waterhemp. For control programs to be effective, this basic information of how waterhemp grows and develops can be helpful. In this issue, we provide some information on waterhemp control programs in corn and soybean production systems.

There are several soil-applied and postemergence herbicide programs that can provide good control of waterhemp, but each type of application timing has some basic considerations that can influence the degree of success achieved.

Considerations with soil-applied programs

There are numerous soil-applied herbicides that possess good activity on waterhemp and other small-seeded species. Time of application can have a significant impact on the success of soil-applied herbicides for waterhemp control. A common practice in no-till systems is to apply the herbicide several weeks before planting to receive sufficient precipitation for incorporating the herbicide. Keep in mind, however, that the earlier a herbicide is applied, the earlier within the growing season that the level of weed control begins to decline. Waterhemp does not appear to have much difficulty emerging well after the time that most other summer annual species have emerged. If the herbicide has been on the ground for several weeks, there may not be enough herbicide remaining to control emerging waterhemp.

What can be done to extend the length of control afforded by soil-applied herbicides? Three possible options include:

- If allowed by label, increase the rate when applications are to be made several weeks ahead of planting.
- Apply the herbicide in a split application (generally two-thirds early, with the remaining one-third at planting).
- Apply the herbicide closer to planting time.
In our research, we have had better and more consistent results with soil-applied herbicides that were applied within 1 to 2 weeks of planting or at planting, compared with the same herbicides applied several weeks (up to 5 weeks) before planting. It’s not likely that all soil-applied herbicides can be applied immediately before planting due to constraints of time and equipment, but fields with a significant waterhemp problem would be excellent candidates for applications just prior to planting.

Considerations with postemergence herbicides

Similar to soil-applied programs, there are several postemergence herbicides that are very effective on waterhemp. The factors governing the effectiveness of postemergence herbicides are critically important when dealing with waterhemp. Herbicide rate, application timing, and spray additive all influence how well postemergence herbicides perform.

Often, producers like to wait as long as possible to apply postemergence herbicides, especially those that lack any significant soil-residual activity. Because waterhemp can germinate and emerge for an extended period of time, there typically exists a wide range of plant sizes by the time postemergence herbicides are applied. This can present problems with spray interception by smaller plants under the protective canopy of larger plants. Adjustments in spray volume and pressure can help to overcome some of the problem with coverage. Spray volumes of 20 gallons per acre with application pressures of 40 to 60 pounds per square inch generally provide a very uniform coverage of the target vegetation.

The following outline lists chemical families and representative members that we have evaluated for waterhemp control. Rates should be based upon label recommendations; when attempting to control waterhemp, reducing rates below those on the respective label is generally not advisable.

Whatever program you decide to use, keep in mind that the most consistent program to control waterhemp includes an integrated approach using soil-applied herbicides, postemergence herbicides, and mechanical cultivation.

Control programs for field corn

The most consistent control programs for field corn are those that combine a soil-applied herbicide with either one or more cultivations or the application of a postemergence herbicide.

Soil-applied

**Triazines:** atrazine and metribuzin applied no earlier than 2 weeks before planting.

**Chloroacetamides:** alachlor, metolachlor, acetochlor, and dimethenamid. Even though these herbicides are primarily for grass control, they afford some control of waterhemp. By themselves, however, they generally do not provide sufficient residual control. Selection of these herbicides likely should be based upon the need for grass control: All have performed similarly with respect to controlling waterhemp.

**Growth regulators:** Dicamba or dicamba + atrazine can be used as soil-applied treatments, but these products usually perform more consistently on waterhemp when applied postemergence.

**ALS-inhibiting herbicides:** These herbicides should be used as premixed or tank-mixed treatments because of the presence of waterhemp biotypes resistant to this class of herbicides.

Postemergence

**Growth regulators:** dicamba, dicamba + atrazine, 2,4-D. These herbicides usually provide the most consistent level of waterhemp control with respect to postemergence corn herbicides. Many ALS-inhibiting herbicide labels recommend tank-mixing reduced rates of dicamba to enhance control of waterhemp. The rate of dicamba used in the tank mix should be high enough to control waterhemp if it were being applied alone.

**Triazines:** Atrazine and metribuzin are the two available options. Both of these contact herbicides provide better control when applied to waterhemp under 4 inches in height. Atrazine must be applied before corn reaches 12 inches in height, and metribuzin must be applied with a tank-mix partner.

Control Programs for Soybeans

The most consistent control programs for soybeans are those that combine a soil-applied herbicide with either one or more cultivations or the application of a postemergence herbicide.

Soil-applied

**Dinitroanilines:** pendimethalin and trifluralin. Pendimethalin may be surface applied without subsequent incorporation, whereas trifluralin requires mechanical incorporation. If pendimethalin is surface applied (no earlier than 2 weeks before planting in waterhemp fields) and no precipitation is received between application and planting, a shallow incorporation may prove beneficial.

**Chloroacetamides:** alachlor, metolachlor, dimethenamid. These herbicides can provide some control of waterhemp in soybeans, but use rates are sometimes lower than those used in corn.

**Triazines:** metribuzin applied within 2 weeks of planting.

**Phenylureas:** linuron applied preemergence (after planting).

**ALS-inhibiting herbicides:** These herbicides should be used as premixed or tank-mixed treatments, due to the presence of waterhemp biotypes resistant to this class of herbicides.

Authority Broadleaf and Canopy XL have attracted a great deal of attention as new soil-applied options for waterhemp control. Both of these premixes...
contains Authority and Classic at equivalent ratios. The Authority component will contribute the most toward control of waterhemp, especially in fields containing ALS-resistant biotypes. Based on our limited experience evaluating these premix products in fields with a significant waterhemp population, we would recommend these products be applied no earlier than 2 weeks before planting.

Cover is a product marketed by DuPont for use in STS soybeans. This prepacked product contains Authority alone and Synchrony STS. The Authority component is soil-applied for control of nightshade and waterhemp.

Postemergence

**Diphenyl ethers:** lactofen, fomesafen, acifluorfen. These herbicides have provided consistent control of waterhemp. Best control is achieved when applications are made to waterhemp less than 4 inches in height. With all these herbicides, crop injury should be expected and is generally more severe under conditions of high temperature and relative humidity and when crop oil or 28% UAN solution is included.

**Glyphosate:** Roundup Ultra only on soybeans designated as Roundup Ready. Rates of Roundup Ultra should begin at 1 quart per acre and be increased when large waterhemp is present. We would caution producers not to wait too long after crop and weed emergence to make postemergence applications of Roundup Ultra.

**ALS-inhibiting herbicides:** These herbicides should be used as premixed or tank-mixed treatments, due to the presence of waterhemp biotypes resistant to this class of herbicides.

The key points to remember for effectively managing waterhemp are

- When using soil-applied herbicides, do not apply these products several weeks before planting. Reducing the interval between application and planting can often increase the length of control.
- When using postemergence herbicides, do not wait too long after crop and weed emergence to make the application. The variable growth habit of waterhemp usually ensures that a wide range of plant sizes are present when postemergence herbicides are applied.

For those interested in obtaining further information on waterhemp, a color brochure has been developed through a collaborative effort between the University of Illinois and the USDA/ARS. *Waterhemp Management in Agronomic Crops* (publication number X855) is available for purchase ($2 per copy) from Vocational Agricultural Services, Information Services, College of Agricultural, Consumer and Environmental Sciences, University of Illinois, 1401 S. Maryland Dr., Urbana, IL 61801; fax, (217)333-0005; phone, (217)333-3871.

**Wheat Fungicides**

Because many fields in southern Illinois are at or approaching flag-leaf emergence (Growth Stage 8), this is the time to consider fungicide applications. Fungicides are available that are systemic or protectant, and producers need to be aware of which kind they are applying. Systemics provide some curative action if infestations are light to moderate. Materials such as Tilt (Novartis) provide broad-spectrum activity but may be limited in the number and timing of applications. Protectants such as mancozeb (numerous companies) must be applied prior to infection to prevent pathogen entry. They are usually less expensive than systemics but may not be as effective, particularly if rains occur shortly after application. Always use a spreader-sticker with wettable powders.

Karnal Bunt: The Saga Continues

There is still a lot of confusion and concern relating to exactly how damaging Karnal bunt disease is throughout the United States. Recently, surveys have shown that many of the suspected infestations are not Karnal bunt but a ryegrass smut or bunt that closely resembles Karnal bunt when viewed under a microscope. Only through laboratory testing can the two fungal spores be differentiated. It turns out that many of the positive samples in the southern states were actually spores produced on ryegrass, which is commonly found in southern wheat-producing areas and not true Karnal bunt. So, the true extent of the infestation beyond the original areas of the Southwest is still not fully known.

We will continue to sample during this season. However, the program will be scaled back considerably because we did not detect Karnal bunt this past year. However, the USDA will sample states for at least another season to collect more baseline data on this disease and determine the best method of managing Karnal bunt infestations. Plant pathologists do not consider this pathogen to represent a major threat to wheat production when compared to our common diseases.

**PLANT DISEASES**

Walker Kirby, Department of Crop Sciences, (217)333-3414
To control common wheat diseases, the following fungicides are suggested:

<table>
<thead>
<tr>
<th>Common name</th>
<th>Trade name</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>benomyl</td>
<td>Benlate</td>
<td>Do not use Benlate alone. Use only in combination with nonbenzimidazole fungicide. Combine with Bayleton or a mancozeb product, depending on diseases present. Time application to keep flag leaf free of diseases.</td>
</tr>
<tr>
<td>mancozeb</td>
<td>Manzate</td>
<td>Do not make more than three applications per season, and do not apply within 26 days of harvest. Do not graze livestock in treated areas prior to harvest. Start applications at onset of disease and repeat at 7- to 10-day intervals. Add surfactant to improve performance.</td>
</tr>
<tr>
<td>triadimenol</td>
<td>Bayleton</td>
<td>Limited to 16 oz/acre/season and a 21-days-to-harvest restriction. Rotational crops cannot be planted for 35 days following last application. Do not allow livestock to feed or graze on treated plant materials. Future status of Bayleton for wheat is changing. Bayer has announced it will not seek reregistration on wheat for this product. Currently labelled materials can be applied throughout this season.</td>
</tr>
<tr>
<td>propiconazole</td>
<td>Tilt</td>
<td>One application/acre/season is permitted at flag-leaf emergence (Feekes Stage 8). Do not graze or feed livestock the treated forage or cut the green crop for silage. After harvest, the straw may be used for bedding.</td>
</tr>
</tbody>
</table>

Walker Kirby, Department of Crop Sciences, (217)333-8414

**CROP DEVELOPMENT**

**Micronutrient Needs in Illinois**

We have received reports of someone recommending boron, copper, and zinc for corn and soybeans. Research has shown that the potential for zinc deficiency is low in Illinois, and that the potential for copper and/or boron deficiency is even less. Because there is a possibility that applying boron could cause seedling damage and there is no evidence of response, use extreme caution in following any boron recommendation for corn and soybeans. Boron is needed on alfalfa. Be sure to watch for deficiency symptoms, and apply if the need develops.

As with any nutrient, make sure that you know that you have the problem before using the product. Remember that soil tests for the micronutrients are not very reliable predictors of deficiency. If your test shows a high reading, you can be confident that you do not have a problem; but, if the test is medium to low, you may or may not have a problem.

Robert Hoeft, Department of Crop Sciences, (217)333-4424

**Urease Inhibitors**

AgrotaiN, a urease inhibitor, was introduced into the marketplace recently. This product has been shown to be effective in reducing the potential for urea loss when either urea or UAN solutions are surface applied without incorporation. Ammonium thio-sulfate has also been proposed as a urease inhibitor. However, data collected in several states have not shown it to have either urease- or nitrification-inhibitor properties.

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