



PEST MANAGEMENT & CROP DEVELOPMENT

BULLETIN

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Field Crop Session to Focus on Insects and Exotic Species

Crop producers, agribusiness dealers, and crop scouts are invited to participate in a workshop on July 24 emphasizing field crop insects and exotic weed and insect species. The workshop will be conducted at the Crops Training Center at the Northern Illinois Agronomy Research Center, 14509 University Road, Shabbona, and is sponsored by University of Illinois Extension.

Dr. Kevin Steffey, Extension entomologist, will discuss current developments, the present situation, and the outlook for corn rootworms, European corn borer, soybean aphid, potato leafhopper, and other "insects of the moment." Dr. Rob Wiedenmann, Illinois Natural History Survey, will address exotic and invasive species, including garlic mustard, buckthorn, purple loosestrife, and others. Traditional and new biological control methods for these pests will be discussed.

The workshop will include classroom sessions and in-field demonstrations. Continuing education credits for Certified Crop Advisers have been applied for.

Registration begins at 8:30 a.m., and the workshop will be conducted from 9:00 a.m. to 12:00 noon. The cost is \$20.00 per person, and reservations are due by July 15 to the Quad Cities Extension Center, c/o Dave Feltes, 4550 Kennedy Drive, Suite 2, East Moline, IL 61244; telephone (309)792-2500. A minimum of 25 reservations are needed to conduct the workshop. Brochures are available at Extension offices.—*Jim Morrison and Dave Feltes*

INSECTS

Japanese Beetles Are Coming On Strong in Some Areas

During the past couple of weeks, Japanese beetles have made their presence known in several areas of Illinois, especially in southwestern and east-central counties. Reports of extremely large numbers of Japanese beetles have been common. Several callers have expressed concern about defoliation in both corn and soybeans and the potential for silk-clipping injury in corn. Steve McCoy, with PC LTD., and Shawn Jones, with Pioneer Hi-Bred International, reported extremely high numbers of Japanese beetles in Macon County. In Champaign County, Joe Spencer, entomologist with the Illinois Natural History Survey, reported that populations of Japanese beetles are "ramping up at an amazing pace." Keith Evans, with FMC Corporation, has observed large numbers in Piatt County. During a drive from Darien (DuPage County) to Champaign on June 30, I passed through Will, Grundy, Livingston, and Ford counties and witnessed large numbers of Japanese beetles throughout the countryside. In fact, the beetles were hitting my windshield producing a sound reminiscent of a popcorn popper. In southwestern Illinois, Kelly Roberston, with McNeil Consulting, has observed large numbers of Japanese beetles in Monroe County, especially in field edges.

As I indicated in a previous issue of the *Bulletin* (issue no. 13, June 21, 2002), the large numbers of reports of Japanese beetle grubs in corn this spring prepared us for the current onslaught. The beetles that have emerged are dispersing throughout the landscape, showing up in yards, gardens, and field crops. Homeowners in some areas have already seen Japanese beetles attack roses and other ornamentals, as well as fruit trees. Obviously our attention will be focused primarily on corn and soybeans.

As corn matures, people will have to keep tabs on Japanese beetle activity during the pollination process. In most cornfields right now, Japanese beetles are feeding on leaves. In some fields, they are skeletonizing corn leaves. No yield loss usually occurs as a result of this type of injury.

Over the past few years, several people have reported that Japanese beetle adults were observed feeding almost exclusively on tassels and, presumably, pollen. Although we have little information about the effect of feeding by Japanese beetles on corn pollen, some people within the seed industry and with companies that market high-oil corn believe that Japanese beetles feed preferentially on tassels bearing pollen. As Larry Bledsoe, entomologist at Purdue University, noted in a conversation we had earlier this year, Japanese beetles feed on many flowers, so they naturally would consume pollen as they consumed the flowers on a corn tassel. If Japanese beetles feed preferentially on tassels, as some people speculate, the insects might threaten pollination in high-oil corn where only 9% of the plants shed pollen. This situation probably is more threatening if pollination in a given field is not synchronized with pollination in other fields (i.e., corn planted earlier or later than nearby fields). Unfortunately, no threshold or treatment guideline has been developed for such a situation. I recommend that people develop their own “nominal” (based on experience) thresholds or rely on the threshold for

Japanese beetles in seed corn, suggested by extension entomologists at Purdue University: To protect against silk clipping and interference with pollination, control of Japanese beetles in seed corn may be necessary if the silks on 20% of the plants have been clipped to a length of 3/4 inch or less, pollination is still taking place, and beetles are still present.

Speaking of preferential feeding, Shawn Jones shared an observation made by Pioneer’s research group in southwestern Indiana over the past two to three years. They have witnessed preferential feeding by Japanese beetles on different hybrids. I have received similar comments from several other people during the past few years, so I suspect there is truth to this observation. However, no one knows why this occurs. Consequently, we’d like to hear from you if you observe this in your area. The more information we gather, the more likely we will be able to answer questions in the future.

Thresholds for Japanese beetles feeding in commercial hybrid corn, as well as in soybeans, were provided in last week’s *Bulletin* (issue no. 14, June 28, 2002). Insecticides registered for control of Japanese beetles in both crops were listed in the same article. Please note that Mustang (restricted-use insecticide) also is labeled for control of Japanese beetles in corn (2.9 to 4.3 ounces per acre) and soybeans (3 to 4.3 ounces per acre).—Kevin Steffey

Continued hot, dry weather does not bode well for crops when grasshoppers are numerous. As the nymphs consume noncrop hosts and these plants dry out, they will move into adjacent fields of corn and soybeans, potentially causing serious defoliation. Monitoring noncrop areas near crop fields and watching for injury along the field margins will be vital during the next few weeks. As the grasshoppers grow, they consume more food, so the amount of damage can increase dramatically in a relatively brief time.

As I indicated in last week’s *Bulletin* (issue no. 14, June 28, 2002), you can control grasshopper nymphs in noncrop areas before they move into adjacent crops, or you can control them when they begin to invade crop fields. Although I provided economic thresholds, I will yield to some sage advice from a couple of seasoned entomologists. Marlin Rice, extension entomologist at Iowa State University, and Kevin Black, with Growmark, have pointed out the futility of trying to count grasshoppers per square yard. (It’s possible that these guys simply can’t count very high, but we’ll assume that counting grasshoppers is just too difficult to do.) Both of them urge common sense for making decisions about controlling grasshoppers. I concur. Insecticides suggested for control of grasshoppers in alfalfa, corn, and soybeans are presented in Table 1. Please follow all label directions and precautions.—Kevin Steffey

Reports of Large Numbers of Grasshoppers Are Common

People throughout Illinois and in adjacent states have taken note of very large numbers of grasshopper nymphs in roadsides, ditch banks, grass waterways, and, in some instances, crop fields. Larry Martin, with Monsanto, observed many grasshopper nymphs in Wayne and Fayette counties. In one field in Wayne County, the grasshoppers were “deep into the field,” despite lush waterways and fencerows.

Western Corn Rootworm Adults Are Emerging

During the weekend of June 29–30, Joe Spencer, with the Illinois Natural History Survey, reported finding four western corn rootworm adults in a small plot of corn near Thomasboro (Champaign County). He also observed significant rootworm larval damage to the roots in some plots close to campus. John Obermeyer, entomologist at Purdue University, found a western corn rootworm male on June 28 in Tippecanoe County,

Table 1. Insecticides suggested for control of grasshoppers in alfalfa, corn, and soybeans in Illinois.

Product	Amount of product per acre
Alfalfa	
*Baythroid 2	2 to 2.8 oz
dimethoate	See product label.
Imidan 70W	1 to 1 1/3 lb
*Lorsban 4E	1/2 to 1 pt
*Mustang	3 to 4.3 oz
Sevin XLR Plus	1/2 to 1 1/2 qt
*Warrior	2.56 to 3.84 oz
Corn	
*Asana XL	5.8 to 9.6 oz
*Capture 2EC	2.1 to 6.4 oz
dimethoate	See product label.
*Lorsban 4E	1/2 to 1 pt
*Mustang	2.9 to 4.3 oz
*PennCap-M	2 to 3 pt
Sevin XLR Plus	1/2 to 1 1/2 qt
*Warrior	2.56 to 3.84 oz
Soybeans	
*Asana XL	5.8 to 9.6 oz
dimethoate	See product label.
*Lorsban 4E	1/2 to 1 pt
*Mustang	3.4 to 4.3 oz
*PennCap-M	2 to 3 pt
Sevin XLR Plus	1/2 to 1 1/2 qt
*Warrior	3.2 to 3.84 oz

* Use restricted to certified applicators.

Indiana. He, too, observed plenty of third-instar rootworms feeding on roots in plots. Although John found no pupae during his digging, he indicated that feeding was almost over with.

These observations of the first western corn rootworm adults of the season are a little later than they were last year, but it was only a matter of time. After the cooler temperatures during May and early June slowed larval development, the recent hot temperatures sped up larval development, and it's likely that adult corn rootworms will begin emerging rapidly now. Japanese beetles have captured most of our attention thus far, but adult corn rootworms should be monitored carefully during the next couple of weeks.

When cornfields are not silking or pollinating when corn rootworm adults begin seeking food, the beetles will feed on corn leaves. Both western

and northern corn rootworms will feed on the epidermal layer of corn leaves and partially or totally strip the leaves of green tissue. This type of injury seldom is economically important, but it may look fairly ugly. (As indicated in a previous article, Japanese beetles cause the same type of injury.) Northern corn rootworm adults also will feed on the blossoms and pollen of many species of weeds.

When cornfields begin to pollinate, adult corn rootworms will congregate on silks. As they feed on and clip silks, they might interfere with pollination. This type of injury is especially critical in seed production fields. In seed corn, treatment is justified if the silks on 20% of the plants have been clipped to a length of 3/4 inch or less, pollination is still taking place, and rootworm beetles are present. In commercial field corn, treatment may be justified if you find five or more beetles per plant, pollination is not complete, and silk clipping is observed.

Most people are familiar with corn rootworm adults, but it's always a good idea to review their emergence patterns, their morphological features, and some of their behaviors. Western corn rootworm males emerge from the soil first, followed by western corn rootworm females. After emergence and mating, about 14 days elapse before the females begin laying eggs. Adult western corn rootworms are approximately 1/4 inch long. The background color for both males and females is yellow, but the two sexes differ somewhat in their markings (Figure 1). On males, much of each wing cover is black; only the tips of the wing covers are yellow. Females usually are slightly larger and have three distinct black stripes on the wing covers, one on the outside of each wing cover and one in the middle.

Adult northern corn rootworms emerge soon after emergence of adult western corn rootworms begins. Northern corn rootworms also are about 1/4 inch long, but they have no distinct markings. Newly emerged

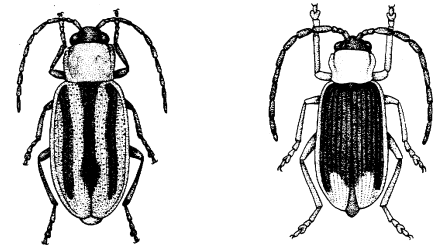


Figure 1. Adult western corn rootworm female (left) and male (right). (From Handbook of Corn Insects, Entomological Society of America, Lanham, Maryland.)

northern corn rootworms are cream or tan in color; they become green as they age. The females are slightly larger than the males.

Watch for adult corn rootworms and Japanese beetles ganging up on corn silks when they emerge. People in areas where both pests occur may have their hands full for a while.—Kevin Steffey and Mike Gray

European Corn Borers Inside Stalks in Most Areas

First-generation European corn borer larvae have tunneled into stalks in most areas of Illinois, and moths that will lay eggs for the second generation will be emerging soon. In fact, if you want to keep track of development of the second generation, you can consult Table 2. To use the table, you will have to have some record of the initial capture of moths this spring, and you'll have to keep track of degree-day accumulations above a base temperature of 50°F. In the future, we intend to provide this information to you in an interactive fashion on the Web.

For the most part, infestations of first-generation European corn borers in Illinois this year were not economic. However, whorl-feeding injury was significant in some fields in northeastern Illinois. Randy Kline in Kane County scouted one field that had 80% whorl feeding. Kevin Black, with

Table 2. Accumulated degree-days (development threshold of 50°F) from initial capture of moths in the spring to first occurrence of life stage activity of second-generation European corn borers. (From *European Corn Borer: Ecology and Management*, NCR Publication No. 327, Iowa State University, Ames.)

Accumulated degree-days	First occurrence of stage or event	Days to first occurrence ^a	General activity
0	First spring moth		
1,404	Egg hatch (first instar)	8.2	Pollen and leaf axil feeding
1,510	Second instar	4.1	Leaf axil feeding Sheath, collar, and midrib boring
1,627	Third instar	4.3	
1,759	Fourth instar	5.1	Stalk boring
1,984	Fifth instar	9.0	Stalk boring

^a Average number of days of development to reach the first occurrence of the stage or event since initiation of the previous stage listed. For example, it takes about 4 days to develop to second instar after egg hatch. The number of days varies if temperatures are cooler or warmer than average.

Growmark, observed fields in north-eastern Illinois with 100% whorl feeding. Among all crop reporting districts in Illinois, the Northeast Crop Reporting District had the highest overwintering population of corn borer larvae during the 2001–2002 winter.

If European corn borers survived through the first generation, we will have to watch carefully during development of the second generation. Our records indicate that a large second generation may develop during the summer after seemingly small populations of first-generation borers occurred during the spring. The survival of European corn borers will depend on weather and the effects of natural enemies and disease organisms. With other insect concerns right now, let's hope Mother Nature helps us out a bit here.—Kevin Steffey

Spider Mites in Corn in Southern Illinois

Omar Koester, Extension unit assistant in crop systems in Monroe County, found a fairly severe infestation of spider mites in a cornfield near Waterloo. Leaves were “fired” from the ground to the ear, but symptoms of injury (yellowing of leaves) were visible all the way to the top of the plants. Spider mites and eggs were found on all leaves sampled. One cutting of orchardgrass hay had been taken from the field across the road.

We are more familiar with spider mite problems in soybeans, but spider mites can injure corn if the weather is hot and dry, allowing numbers of mites to build up to injurious levels. Two species of spider mites may be found in corn in Illinois—Banks grass mite, *Oligonychus pratensis*, and twospotted spider mite, *Tetranychus urticae*. They are difficult to tell apart. Both are extremely small (adult females are about 0.45 millimeters long) with either six legs (larvae) or eight legs (protonymphs, deutonymphs, adults). Protonymphs and deutonymphs are pale to bright green. Characteristics used to distinguish between the two species in the field include the copious webbing produced by twospotted spider mites and location of the food balls of the adult females. In Banks grass mites, green food balls accumulate around the periphery of the abdomen; in twospotted spider mites, the food balls concentrate in two spots on either side of the abdomen. Eggs are pearly white and spherical.

Feeding by spider mites on corn causes localized cell damage and eventually a loss of water and chlorophyll. Banks grass mite injury begins as concentrated chlorotic areas along the midrib and folded areas of the leaf. Chlorosis can spread, particularly on the basal half of the leaf. Chlorotic areas resulting from feeding by twospotted spider mites are less concentrated and more evenly distributed across the leaf.

I write this article simply to alert you to the possibility of spider mites in corn. Thus far, I have received only the one report. However, if the weather remains hot and dry, spider mites may become troublesome in both corn and soybeans. Watch the edges of fields first; symptoms of spider mite injury usually show up first at field margins.

If control of spider mites in corn becomes necessary, the best choice for control is Capture 2EC (restricted-use product) applied at 5.12 to 6.4 ounces per acre. Although dimethoate is labeled for control of spider mites in corn, it cannot be applied during the pollen shed period. Please follow all label directions and precautions.—Kevin Steffey

Findings of Soybean Aphids Continue

We are in the period when soybean aphid populations are increasing throughout the Midwest, so observers continue to report finding them. At some point in the near future, the focus will shift from distribution to population size. However, right now it's important to share some of the information about where soybean aphids have been found.

In Illinois, soybean aphids have been verified in Boone and Kane counties (along with the other northern Illinois counties indicated in the previous two issues of the *Bulletin*). More recently,

soybean aphids were found in Sangamon and Champaign counties. On June 28, David Voegtlin, Illinois Natural History Survey, found aphids on V3-stage soybeans in a field on the outskirts of Springfield. He found 6 aphids on one plant and 32 aphids on another plant, the latter suggesting that colonies are increasing in size. Ron Estes, Department of Natural Resources and Environmental Sciences, found two aphids in a field on the outskirts of Champaign on July 1. So, the presence of soybean aphids is confirmed in central Illinois.

Elsewhere in the Midwest, Marlin Rice, extension entomologist at Iowa State University, reported a finding of soybean aphids in far western Iowa. It's probably only a matter of time before the aphids are found in Nebraska. Doug Johnson, extension entomologist in Princeton, Kentucky, reported an unconfirmed finding of soybean aphids in Ballard County, the far western county of the state near where the Ohio and Mississippi rivers converge. To our east, Keith Waldron, with the New York State Integrated Pest Management Program, observed soybean aphids in central New York on June 20 and 27. Although he found only 1 or 2 aphids per leaflet on most plants, a few leaflets had more than 20 aphids. One plant had numerous very recently born aphid nymphs.

As you scout for the many other pests that may show up in soybean fields during July (e.g., bean leaf beetle, grasshopper, twospotted spider mite), keep watching for the buildup of soybean aphids. Actually, you spot the other pests as you sample for soybean aphids. Regardless, now more than ever, scouting in soybeans is critical. As the soybeans become reproductive, they will be vulnerable to insect and mite injury. Stay alert.—*Kevin Steffey*

Imported Longhorned Weevil in Soybeans

Matt Montgomery, Extension educator in crop systems in Springfield, has found a pest of soybeans that we don't encounter very often in Illinois. He

found imported longhorned weevils in a field of soybeans in Sangamon County. This insect rarely causes economic damage to soybeans, but it can cause considerable injury in early vegetative stage soybeans when a large population is present.

The imported longhorned weevil adult is small (about 4 millimeters long) with a broad snout, wide pronotum ("neck"), and swollen elytra (wing covers) covered with rows of short, stiff hairs. It is mottled gray with 20 shallow grooves extending the length of the elytra. The antennae are elbowed near the middle.

These weevils eat leaf tissue and smaller veins, which results in a ragged leaf bordered with a scalloped edge. Injury usually is most prevalent along field margins. As you scout for grasshoppers and twospotted spider mites, look for the imported longhorned weevil, too. An insecticide would be warranted only if damage along the field margin is severe.—*Kevin Steffey*

PLANT DISEASES

Corn Leaf Diseases and Fungicides for Their Management

As we near July 4, much of the corn crop in Illinois is growing rapidly because of the recent warm weather. Much of the crop is doing relatively well in spite of the excessive rain and late planting this spring. Now it's time to consider corn leaf diseases, and initial reports of leaf diseases have begun to come in. We cannot predict if leaf diseases will be a significant problem this year. Incidence and severity will be determined to a great extent by rainfall, humidity, and temperature over the next 2 months, but it is time to begin scouting. Corn leaf diseases can cause greater yield losses if infection occurs early in the growth stages of the plant. Because much corn in Illinois is behind normal development stages at this date because of late planting and poor growing conditions

in May, this year the potential for increased risk of losses from foliar diseases is greater.

Although many corn leaf diseases occur in Illinois, some common diseases in one or more areas of the state are rust, gray leaf spot, eyespot, northern leaf spot, and northern corn leaf blight. This article will provide a brief description of the first three of these diseases; factors contributing to their development; and management tactics, including fungicide options for susceptible inbreds.

Common rust (caused by *Puccinia sorghi*) was a significant problem in parts of Illinois in 2000 but not in 2001. Occurrence of rust depends on cool temperatures and timely introduction of rust spores via wind and rainstorms from southern areas (this pathogen does not overwinter in Illinois), usually from mid-June to mid-July. Infection occurs primarily during conditions of high humidity, with over 6 hours of moisture on the leaves and temperatures between 60°F and 76°F. Young leaves are more readily infected than older mature leaves. According to some reports, 10% total leaf area infected can result in yield reductions of 3 to 8%. Common rust is managed with resistant hybrids and/or appropriate applications of fungicides.

Gray leaf spot (caused by *Cercospora zea-maydis*) may be the most damaging corn leaf disease across the Midwest. It was found in southern Illinois last week. Gray leaf spot (GLS) caused minimal yield losses across Illinois in 2001 but was widely found near the end of the season when it was too late for it to cause significant yield losses. This may indicate that there may be much GLS inoculum in corn residue in many fields this season. Spore production usually begins on infested residue in June, and if spores are spread to leaves on the new crop a 1- to 2-week lag period may occur before lesions become visible. GLS requires high humidity (>95%) for 24 hours, warm temperatures (75°F to 85°F), and susceptible inbreds or hybrids to occur at significant levels.

Symptoms first appear on lower leaves, and initial lesions appear as small, tan spots, 1 to 3 millimeters long, irregular to rectangular in shape. Lesions turn gray to tan and are rectangular in shape (parallel to leaf veins) as they mature. GLS is managed by avoiding fields that were planted with corn last year, using resistant hybrids, and using timely applications of fungicides to susceptible inbreds.

Eyespot (cause by the fungus *Kabatiella zaeae*) is reported to be a sporadic problem in the northern part of Illinois but can be severe at times. Like GLS, the pathogen overwinters on infested corn debris. Initial symptoms are small (1 to 4 millimeters in diameter), light green, watersoaked, circular lesions with yellow halos. Lesions develop brown/purple rings around them as they age and may coalesce to kill larger patches of leaf tissue. Eyespot is managed with the same tactics as for the management of GLS.

This season another fungicide product option is available for control of corn leaf diseases. In addition to the commonly used Tilt, Quadris, Bravo, and mancozeb-containing products such as Penncozeb, Stratego is now labeled for corn. Stratego from Bayer Corporation received a label in June 2002 for control of leaf diseases of field corn, popcorn, and seed corn. Stratego contains two active ingredients—trifloxystrobin (similar to Quadris) and propiconazole (same as Tilt). Preliminary testing of Stratego in 2001 in southern Illinois suggested that it can be an effective product, along with Quadris and Tilt, for control of gray leaf spot. It also is effective against many corn leaf diseases. Other fungicides, including the products previously named, also can be effective for control of corn leaf diseases. Always read and follow product label recommendations when using any fungicide.

The key time for scouting and application of fungicides is typically about 2 weeks before tasseling and about 1 week after tasseling when lesions have appeared and weather conditions favor disease development. Professor Don White, corn pathologist at the University of Illinois, recommends that dent corn hybrids should not be sprayed with fungicides under most conditions because the odds are low for a favorable return on the fungicide investment. However, seed corn inbreds are a different story, and fungicide applications will frequently result in favorable returns from increased seed yields and quality.

For additional information on control of corn leaf diseases, refer to the University of Illinois *Field Crop Scouting Manual* and the *2002 Illinois Agricultural Pest Management Handbook*. Both books are available through your local University of Illinois Extension office.—*Dean Malvick*

REGIONAL REPORTS

Extension center educators, unit educators, and unit assistants in northern, west-central, east-central, and southern Illinois prepare regional reports to provide more localized insight into pest situations and crop conditions in Illinois. The reports will keep you up to date on situations in field and forage crops as they develop throughout the season. The regions have been defined broadly to include the agricultural statistics districts as designated by the Illinois Agricultural Statistics Service, with slight modifications:

- North (Northwest and Northeast districts, plus Stark and Marshall counties)
- West central (West and West Southwest districts, and Peoria, Woodford, Tazewell, Mason, Menard, and Logan counties from the Central district)

- East central (East and East Southeast districts [except Marion, Clay, Richland, and Lawrence counties], McLean, DeWitt, and Macon counties from the Central district)
- South (Southwest and Southeast districts, and Marion, Clay, Richland, and Lawrence counties from the East Southeast district)

We hope these reports will provide additional benefits for staying current as the season progresses.

Northern Illinois

Hot and dry conditions exist throughout the region. Rainfall would be most welcome. The major activities last week focused on postemergent herbicide applications in soybeans and harvesting the second cutting of alfalfa.

European corn borer activity has been observed, but no reports have been received of insecticide applications. Significant corn rootworm larvae feeding in first-year corn has been observed in a single field in southern LaSalle County. Japanese beetles have been observed in several fields feeding on giant ragweed and could pose a threat to corn silks during upcoming pollination. Alfalfa producers are encouraged to scout for potato leafhoppers particularly as the hot, dry weather continues. The cyst stage of soybean cyst nematodes has been observed in third- to fourth-trifoliate soybeans. Soybean manganese deficiency has been reported as well.

Just a reminder that the annual Twilight Weed Control Tour at the University of Illinois Northern Illinois Agronomy Research Center in Shabbona will be held next Thursday, July 11, beginning at 5:00 p.m. University of Illinois weed scientists and graduate students will discuss some of the more than 40 weed control research studies currently being conducted at the center.

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