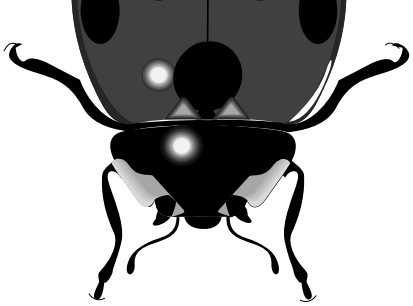

PEST MANAGEMENT & CROP DEVELOPMENT

BULLETIN

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In This Issue

INSECTS

Captures of Black Cutworm Moths Increase Dramatically

The weather front that brought significant rains into Illinois during the weekend of April 12–14 also brought in a horde of black cutworm adults. Many people reported dramatic increases in their captures of black cutworm males in pheromone traps. Higher numbers of black cutworm moths captured in pheromone traps do not always result in subsequent heavy infestations of black cutworm larvae. However, the arrival of the moths in Illinois before much of the corn has been planted should place people on alert for potential problems when corn begins to emerge. We should be able to offer some predictions about the first signs of cutting activity in next week's issue of the *Bulletin*.

Ron Hines, senior research specialist at the Dixon Springs Agricultural Center, reported the following numbers of black cutworm males captured in traps at his four sites in southern Illinois:

- Massac County—18 moths captured on April 14
- Pope County (upland site)—4 moths captured on April 13, 20 moths captured on April 14
- Pope County (bottomland site)—8 moths captured on April 14
- Pulaski County—22 moths captured on April 13, 13 moths captured on April 14

Matt Montgomery, Sangamon/Menard Extension unit educator in crop systems, reported that Tom Harms and Jerry Harbour, with Lincoln Land FS, had captured very high numbers of black cutworm moths. A handful of phone callers from southern and central counties also phoned in "intense captures" (nine or more moths captured over a 1- to 2-day period) but did not provide any numbers.

Traps in northern Illinois also began to capture black cutworm moths, although the numbers were not high. Kevin Foreman, with Crop Production Services in Galesburg, captured two black cutworm males in his trap near Fairview in Fulton County on April 12. Jim Morrison, Extension educator in crop systems at the Rockford Extension Center, captured his first black cutworm moth on April 15 in Stephenson County.

So, black cutworm adults have been captured, from extreme southern to extreme northern Illinois, and corn planting has barely begun. Keep in mind that corn has been planted very early during the past couple of years, so the arrival of black cutworm moths before corn planting occurs is not unusual. But further delays of corn planting, coupled with continued captures of black cutworm moths, will begin to make people nervous.

In 2001, we projected that cutting of corn seedlings could have begun as early as April 20 in southern Illinois and the first week of May in central Illinois. The projection for southern Illinois last year was based on an intense capture on April 3. Intense captures of black cutworm moths this year occurred as early as March 30 and 31. Overall the dates of intense captures in 2001 and 2002 are equivalent. However, the patterns of temperatures on the days after the captures in 2001 and 2002 have been different, so projected cutting dates may not be equivalent. So, all we can suggest right now is that any grower who has planted corn already should watch emerging seedlings carefully for early signs of cutworm feeding (pinholes in the leaves) and for plants that have been cut off by larger larvae.

If you are planning to scout for cutworm larvae, you should focus first on "high-risk" fields, primarily fields or areas of fields in which early-season weeds were growing at the time moths flew into the area. If tillage or herbicides eliminate weeds 1 to 2 weeks before planting, any black cutworms that had been present probably starve to death. The presence of weeds only a few days before planting increases the likelihood of cutworm damage if larvae are present in the field.

Check fields for leaf feeding, cutting, wilting, and missing plants every 3 to 4 days when "cutworm season" begins. You may miss significant feeding damage if you scout only once per week, especially if temperatures have been high and cutworm larvae are developing rapidly. You should plan to examine a minimum of 250 plants (50 plants in each of five locations) in a field. When injured plants are found, dig around the bases of the plants to look for live cutworms. When you find cutworms, determine the average instar (stage of larval development) of a sample of cutworms to estimate how much longer the larvae will feed. For example, if most of the cutworms are fourth instars, the larvae will feed for approximately 25 days if the average temperature is 70ºF.

The best way to determine the instar of a black cutworm larva is to use a head-capsule gauge. The width of a cutworm's head capsule increases as it molts from one instar to the next. Figure 1 shows head-capsule widths for fourth-, fifth-, sixth-, and seventh-instar cutworms, as well as approximate days left to feed and potential number of plants that may be cut. To use the head-capsule gauge, grasp a cutworm larva tightly behind the head and squeeze to force the head forward. (Squeeze gently, folks; you don't want to pop the head off like a champagne cork.) Hold the head flat against the gauge, first at the top of the scale (fourth instar). Move the head down the scale until the width of the head matches the width of the bar. The number corresponding to that bar is the instar of the cutworm. Based on the instar, you can determine the approximate days left to feed and the potential number of 1-leaf, 2-leaf, or 4-leaf plants that will be cut. Cutworm larvae will cut more 1-leaf-stage plants than 4-leaf-stage plants.

Rescue treatments for control of black cutworms were listed in Table 3 in last week's *Bulletin* (issue no. 3, April 12, 2002). We will provide some suggestions about soil conditions and control of cutworms in a future issue of the *Bulletin*. In the meantime, growers can concentrate on getting corn in the ground first, and worrying about cutworms after.—*Kevin Steffey*

Add Warrior to the List of Products for Cutworm Control

In last week's *Bulletin* (issue no. 3, April 12, 2002), I forgot to include Warrior in Table 2, preventive insecticides registered for control of black cutworms in corn. The oversight occurred because the language regarding cutworm control appears under "General Directions for Use" rather than in the spray recommendations for corn. Nonetheless, the label states: "For cutworm control, Warrior Insecticide with Zeon Technology may be applied before, during, or after planting. For soil incorporated applications, use higher rates for improved control." The recommended rates of application are 1.92 to 3.2 oz per acre. We also forgot to include preplant and preemergence applications of Warrior in Table 2 of Chapter 1 of the *2002 Illinois Agricultural Pest Management Handbook*. I regret the oversights.—*Kevin Steffey*

Larval instar	Head capsule width	Approximate days left to feed	Potential number of plants that may be cut		
			1 leaf	2 leaf	4 leaf
4		25	4	3	1
5		21	4	3	1
6		14	4	3	1
7		5	1	1	1

Figure 1. Head-capsule gauge to determine black cutworm instars, developmental times, and potential damage.

Identifying Cutworm Larvae Accurately Will Become Important Soon

Although most of the attention on cutworms focuses on the black cutworm, *Agrotis ipsilon*, a few other species of cutworms also can be found in cornfields. Although some of these other species can damage corn, others cause very little, if any, economic damage. Consequently, it's important to be able to distinguish among the species you find so that accurate control decisions (including a decision not to apply an insecticide) can be made. As I indicated in last week's *Bulletin* (issue no. 3, April 12, 2002), excellent photos of a few cutworm species can be found in an issue of Iowa State University's *Integrated Crop Management* newsletter at http://www.ipm.iastate.edu/ipm/icm/2000/5-8-2000/cutworm2000.html. Following is some information about a few of the species of cutworms that are found in Illinois (excluding the black cutworm, discussed elsewhere).

Claybacked cutworm, *Agrotis gladiaria*. We haven't seen many claybacked cutworms in recent years, but when they occur, they can be just as destructive as black cutworms. Because they overwinter as partly-grown larvae, claybacked cutworms can cause significant damage early in the spring. Their feeding habits and appearance are similar to those of black cutworms. A broad, yellow-brown stripe on the back of the larva explains the common name of this cutworm. The rest of the body is pale gray and translucent, and the head is gray-brown with bars on the front of the face. A full-grown larva is 1 1/3 inches long.

Dingy cutworm, *Feltia ducens*. Dingy cutworms are common in Illinois, and they frequently are mistaken for black cutworms. However, they rarely cause economic damage to corn. Like claybacked cutworms, dingy cutworms overwinter as partially grown larvae, so fourth instars often are present in cornfields at planting time, particularly in weedy fields or in corn planted into pasture or alfalfa. Dingy cutworm larvae are pale gray to brown, tinged with red. A faint, dark V-shaped marking appears on the back of each abdominal segment. The head is pale brown-gray. Tubercles (knotlike protuberances) along the top of the abdominal segments are equal in size (on the same segment), in contrast to the unequal-sized tubercles on the back of the black cutworm. Tubercles become larger toward the posterior segment.

A few people have discovered dingy cutworms already this spring, so be aware of the differences between dingy and black cutworms. Accurate identification could save someone some money.

Glassy cutworm, *Apamea devastator.* The glassy cutworm prefers sod as a host, so it is more often a pest in crops planted after sod or pasture. It constructs subterranean burrows to feed on underground portions of host plants, including corn. This species also overwinters as a larva. The glassy cutworm has a green-white body that appears translucent or glassy. Full-grown larvae are 1 1/2 inches long.

Sandhill cutworm, *Euxoa detersa*. This species of cutworm can be very destructive in fields planted in sandy soils. Like glassy cutworms, sandhill cutworms construct subterranean burrows to feed on underground portions of host plants. This species overwinters as a partially grown larva. The larva is white to pale gray. Pulsations in the blood vessel along the back can be seen through the cuticle ("skin"). Faint, chalky-white stripes are evident on the back and sides, and the head is dull red-brown. A full-grown larva is about 1 1/3 inches long.

Variegated cutworm, *Peridroma saucia*. This pest caused quite a bit of damage in some soybean fields in Illinois in 2001, often being mistaken for armyworms. It also is found in cornfields, although it seldom causes serious economic damage. Like black cutworms, variegated cutworms do not overwinter in Illlinois. The moths fly into the Midwest during the spring. Females deposit eggs in pastures; fencerow grasses; low, densely growing weeds; and debris in fields that have not been tilled. Larvae develop through six instars, feeding primarily at night. The caterpillar's color varies considerably. However, a narrow line of pale yellow dots along the middle of the back is almost always present. A full-grown larva is 1 1/2 inches long.

Happy cutworm hunting! Let us know what you find as you begin to scout corn for signs of early-season insect injury.—*Kevin Steffey*

Captures of a Few Armyworm Moths Deserve Attention

The armyworm outbreak of 2001 is still a fairly vivid memory for some people, so captures of armyworm adults in traps this spring deserve some attention. We have always known that armyworm moths fly into Illinois at the same time that black cutworms arrive, but this time we should be more vigilant to watch for their arrival.

Ron Hines, senior research specialist at the Dixon Springs Agricultural Center, has captured a few armyworm moths in his traps in southern Illinois, although the numbers captured this year are far fewer than the numbers captured last year. From April 9 to 16, Ron captured 3, 1, 3, and 11 armyworm moths at the Massac County, Pope County (upland), Pope County (bottomland), and Pulaski County sites, respectively. Lee Townsend, Extension entomologist at the University of Kentucky, reported (April 15, 2002, issue of *Kentucky Pest News*) some armyworm captures at the UK Research and Education Center in Princeton. He mentioned that the first-week catch this year was 37 moths, compared with 213 moths captured during the comparable time in 2001.

Wheat fields and grass hay fields and pastures will be the focus of our attention for armyworms soon. The females deposit their eggs on the leaves of

grass hosts, and the young larvae begin developing after they hatch. We will want to be on the lookout for the small, green larvae and evidence of minor leaf feeding early this year, just so we don't get caught unaware. Although leaf feeding by young instars is not economic, it's a signal to watch for more serious defoliation in the near future.

I'll provide more specific information about armyworms in wheat and grass fields in next week's issue of the *Bulletin*.—*Kevin Steffey*

EPA Has Approved the Use of Higher Rates of Fortress Insecticide

I learned last week that the U.S. Environmental Protection Agency approved the use of higher rates of Fortress 2.5G and 5G insecticides for control of insect pests of corn. Fortress 2.5G can be applied at 6 to 7.5 ounces per 1,000 feet of row for control of cutworms, seedcorn maggot, white grubs, and wireworms, and at 6 to 9 ounces per 1,000 feet of row for control of corn rootworm larvae. Fortress 5G (applied only through the SmartBox system) can be applied at 3 to 3.75 ounces per 1,000 feet of row for control of cutworms, seedcorn maggot, white grubs, and wireworms, and at 3 to 4.5 ounces per 1,000 feet of row for control of corn rootworm larvae. Before this recent change, Fortress 2.5G and Fortress 5G could be applied at maximum rates of 6 and 3 ounces per 1,000 feet of row, respectively.

Although Fortress can be placed either in a band or in furrow, we recommend the in-furrow placement for control of corn rootworms, seedcorn maggot, white grubs, and wireworms. The band placement is preferable for control of cutworms.

Both formulations of Fortress are restricted for use by certified applicators. Please follow all label directions and precautions.—*Kevin Steffey*

Alfalfa Weevils Are Active Throughout Southern and Central Illinois

Although I have received little information about alfalfa weevil activity in southern Illinois, entomologists in Indiana, Kentucky, and Missouri are reporting that some fields in their states are heavily infested. According to Wayne Bailey, Extension entomologist at the University of Missouri, some fields in southwestern Missouri were treated with insecticides during the week of April. Overwintering eggs in those fields were continuing to hatch.

Figure 2 shows actual degree-day accumulations (base 48ºF), from January 1 through April 15, 2002. (Welcome back to Bob Scott, Illinois State Water Survey, who developed the maps.) Assuming alfalfa weevil larvae become noticeable after 200 degree-days have accumulated, people should be able to find larvae in central Illinois. Indeed, Matt Montgomery, Sangamon/Menard Extension unit educator in crop systems, has been finding small (~1/8-inch) larvae in the tips of alfalfa plants.

Figure 3 shows projected degree-day accumulations (base 48ºF), from January 1 through April 29, 2002. Based on these projections, alfalfa weevils will be active in northern Illinois by the end of the month. Alfalfa growers in parts of southern Illinois will be well on their way to getting through "alfalfa weevil season." Keep in mind that the record warm temperatures we have experienced will accelerate alfalfa weevil development. If you use projected degree-day accumulations to estimate when scouting for alfalfa weevils should commence, you may want to schedule your scouting trips a bit early.

In last week's *Bulletin* (issue no. 3, April 12, 2002), I provided a table (Table 4) of economic thresholds, based on the numbers of alfalfa weevil larvae per stem, mediated by plant height and value of the hay. Table 1 offers economic thresholds, based on

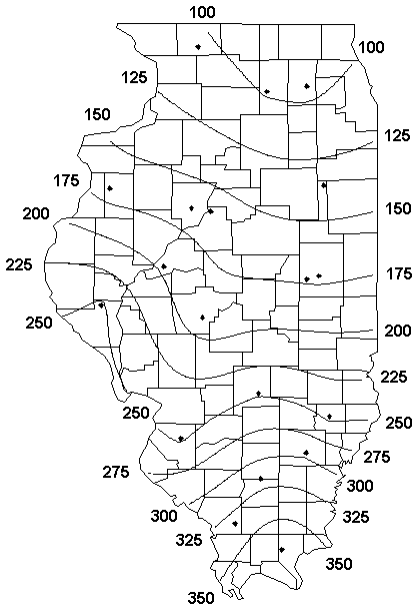

Figure 2. Actual degree-day accumulations (base 48ºF) from January 1 through April 15, 2002. (Map courtesy of Bob Scott, Illinois State Water Survey.)

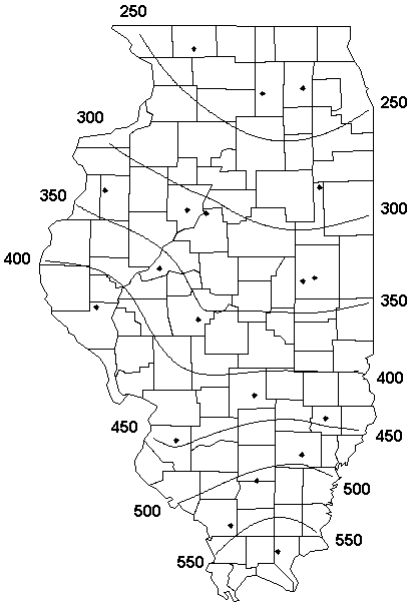

Figure 3. Projected degree-day accumulations (base 48ºF) from January 1 through April 29, 2002. (Map courtesy of Bob Scott, Illinois State Water Survey.)

Table 1. Economic thresholds for alfalfa weevils. (Adapted from *Pest Management of Alfalfa Insects in the Upper Midwest*, 1999, Leopold Center for Sustainable Agriculture, Iowa State University, Ames.)

Accumulated degree-days after January 1[a]	*Percentage tip feeding damage threshold*[b]	*Decision*
150–300	<25%	If less than threshold, reevaluate in 3–7 days.
300–400	25–50%	If damage threshold is reached, determine the number of larvae per stem and the plant height.
400–500	50–75%	If damage threshold is reached, determine the number of larvae per stem and the plant height.
500–600	75–100%	Refer to economic thresholds based on plant height.
600–harvest	75–100%	Refer to economic thresholds based on plant height.

[a] Degree-day accumulation above 48°F from January 1.
[b] Percentage of stems with feeding from 30–50 stem sample, when alfalfa weevil larvae are present.

percentage tip-feeding damage and accumulated degree-day information. These thresholds appear in P*est Management of Alfalfa Insects in the Upper Midwest,* published in 1999 by the Leopold Center for Sustainable Agriculture, Iowa State University, Ames. If you are keeping track of accumulated degree-days (base 48ºF) from January 1, you should be able to anticipate when the percentage of tip-feeding damage might reach an economic level.

Refer to Table 5 in issue no. 3 (April 12, 2002) of the *Bulletin* for a list of insecticides suggested for control of alfalfa weevil larvae.—*Kevin Steffey*

PLANT DISEASES

Recognizing Corn Nematode Problems

Corn nematode damage may become evident 2 to 4 weeks after seedling emergence but is most pronounced in late May and June. Aboveground symptoms usually include plant patches that are yellowed, stunted, or both. Symptoms of drought or nutrient deficiency may occur first in nematode-damaged areas during periods of water stress, high temperatures, or both. Because nematodes can damage corn without showing aboveground symptoms, they may be overlooked. A gradual decline in corn yield over a period of years may indicate a nematode problem. When plants are dug up, the roots may appear discolored; lateral roots may be short, stubby, and lacking fine feeder roots; and overall root systems may be reduced. Root symptoms caused by needle and dagger nematodes often resemble dinitroaniline herbicide injury. Table 2 lists nematodes that may be associated with corn, the types of damage they cause, and other host plants.

In Illinois, nematode damage to corn has been more severe where corn has been cropped continuously for 3 or more years on sandy soils. Needle, dagger, and lance nematodes are

Table 2. Nematodes associated with corn in Illinois.

Genus	*Importance**	*Type of damage*	*Other host plants*
Pratylenchus (Root-lesion)	1-B	Smaller-than-normal root system, darkened and discolored roots, moderate stunting	Grasses, cereals, legumes, vegetables, tree fruits, strawberry, pines (host range varies for different species of root-lesion nematodes)
Hopololaimus (Lance)	2-B	Reduced root system, darkened and discolored roots, moderate stunting, and chlorosis	Grasses, legumes, tomato, pepper, pines, many others
Xiphinema (Dagger)	2-B	Severe stunting, chlorosis, few fine feeder roots	Grasses, legumes, ornamentals, strawberry, trees, many others
Helicotylenchus (Stunt)	1-C	Smaller-than-normal root system, moderate stunting, chlorosis	Grasses, cereals, legumes, tomato, many others
Longidorus (Needle)	2-A	Severe stunting, chlorosis; severe root pruning; root system consists mainly of short, stubby, thickened side roots that appear somewhat swollen	Members of the grass family, potato, grape, and many others
Trichodorus (Stubby-root)	3-A	Stubby lateral roots, coarse roots, excessive upper roots, severe stunting, chlorosis	Grasses, legumes, tomato, potato, beet, ornamentals, many others

*The number indicates how commonly the genus is involved in nematode problems in Illinois: 1 = very common; 2 = occasionally; 3 = rarely. The letter indicates its potential for damage: A = very damaging; B = moderately damaging; C = damaging only at high populations.

favored by these conditions. When nematodes are suspected, soil and root samples must be analyzed to confirm the problem. *Report on Plant Disease* No. 1100 gives detailed information on how to collect and ship soil samples for nematode analysis.

The use of crop rotations or nematicides will be of little value for corn already planted. However, an awareness of corn nematode problems is essential for planning control strategies for the next growing season. For planted corn, try, if possible, to maintain optimum growing conditions; nematode damage is greater on plants stressed by other factors. Damage can be reduced greatly by providing plants with adequate moisture (especially on sandy, irrigated soils), nutrients, and soil aeration at all times. Controlling other diseases and insects also reduces plant stress. For more information on corn nematodes, see *Report on Plant Disease* No. 1103 and No. 1106, available for $1.00 each from the Department of Crop Sciences, University of Illinois, N-533 Turner Hall, Urbana, IL 61801, (217)333-8375.—*Dale I. Edwards*

Be Aware of Aphanomyces Root Rot of Alfalfa Caused by Different Races of *Aphanomyces* in Illinois

Over the past year, I have delivered information on Aphanomyces root rot of alfalfa via newsletter articles and meetings in Illinois. This disease can be severe, and alfalfa growers should be aware of it. Many growers have suggested that this disease may be a problem in their fields after they have seen a description of this disease and symptoms. Aphanomyces root rot has been known to be an important alfalfa disease in the Midwest for only about 15 to 20 years. It has been known to be an important disease of processing pea and snap bean for much longer. We have no reason to suspect it is a new disease of alfalfa, but it is likely that it has been one of the diseases causing serious damage to seedlings, as well as reduced yields in established stands, for many years.

A problem with Aphanomyces root rot is that it is difficult to diagnose in the field. This disease is caused by the soilborne fungal-like pathogen *Aphanomyces euteiches,* which infects alfalfa roots in slowly drained fields and during extended periods of rain. This disease is typically most damaging to seedlings. It can dramatically reduce stands and can reduce vigor and yield of plants that survive infection.

How can you know if Aphanomyces root rot is causing damage in your fields? Aphanomyces root rot is not the only disease that causes poor growth of seedling alfalfa. Phytophthora root rot and Pythium seed and root rot are other diseases caused by similar pathogens that occur in wet or poorly drained soils and often appear first in low areas in fields. Look for symptoms of Aphanomyces root rot, conditions that favor this disease, and other clues related to alfalfa cultivar and seed treatments.

Plants infected with *Aphanomyces* usually become stunted and chlorotic (yellow) before they wilt and die. Cotyledons usually turn yellow first, and seedlings often develop a purple tint before they die. The similar pathogens *Phytophthora* and *Pythium* tend to kill seedlings quickly before plants become severely chlorotic or discolored. Other diseases that affect seedlings (such as Rhizoctonia seedling rot) are not as strongly associated with wet conditions. You can also help narrow down the problem to Aphanomyces root rot by looking at your alfalfa variety and seed treatments. Most certified varieties have resistance to Phytophthora root rot, while many don't have resistance to *Aphanomyces*. Futhermore, this is made even more complex due to different races of the Aphanomyces pathogen, as described below. In addition, determine if you have planted seed treated with fungicides such as Apron-FL, Apron XL, or Allegiance-FL. These fungicides will reduce early seedling rot and damping-off caused by *Pythium* and *Phytophthora,* but they do not control *Aphanomyces*. Thus, if you have wet or slowly drained soil conditions, seedlings dying and with symptoms typical of *Aphanomyces,* and you planted treated seed of a variety with resistance to *Phytophthora,* then Aphanomyces root rot may be causing damage. Final confirmation can obtained by laboratory diagnosis if samples are sent to the University of Illinois Plant Clinic in Urbana, (217)333-0519, http://www.cropsci.uiuc.edu/research/clinic/clinic.html.

A year ago we did not know anything about the distribution or characteristics of *Aphanomyces* associated with alfalfa root rot in Illinois. This disease had been confirmed to be a serious problem in nearby states, including Wisconsin, Iowa, and Kentucky, but it had not been studied in Illinois. I initiated a research project on Aphanomyces root rot in Illinois last summer, and we know a bit more now than we did last year at this time—and we will know much more in 6 months. We suspected that this disease is a problem in Illinois fields, and we have preliminary evidence to suggest that this is true. We now know that *Aphanomyces* is widely distributed in Illinois, and race 2 of this pathogen appears to be common in some areas.

How can you manage Aphanomyces root rot, and why does it matter if race 2 is common or not in Illinois? This disease can best be managed by improving drainage or avoiding poorly drained fields, and by using *Aphanomyces*-resistant alfalfa varieties. As noted previously, fungicides are not available for control of Aphanomyces root rot of alfalfa. Races of *Aphanomyces* are important because they determine which alfalfa varieties will be resistant to this disease. Alfalfa varieties rated highly resistant (HR) or resistant (R) to Aphanomyces root rot should be planted where slowly drained soils occur and where *Aphanomyces* may be

a problem. However, most varieties with resistance to *Aphanomyces* are resistant only to race 1, and these can be killed by race 2 of *Aphanomyces*. Thus, if race 2 is common in the soils of your fields, most alfalfa varieties will do little to help you manage this disease. Several commercial alfalfa varieties are available that have resistance to both races of *Aphanomyces*. If resistance to race 2 is not specified for an *Aphanomyces*-resistant alfalfa cultivar, then you can assume it is resistant only to race 1. The potential value of *Aphanomyces* resistance and resistance to race 2 can be most easily seen in side-by-side comparison of resistant and susceptible varieties. The "story" of Aphanomyces root rot of alfalfa in Illinois is continuing to develop. Check back in the *Bulletin* for updates on this disease in the future, and contact me by e-mail or telephone if you want more information at any time.—*Dean Malvick*

WEEDS

Soil-Applied Herbicides

Soil-applied herbicides remain an important part of weed control programs in corn and, to a lesser extent, soybean production systems. Early preplant (EPP), preplant incorporated (PPI), and preemergence (PRE) surface are the most common types of herbicide applications to soil. EPP applications are typically made several weeks prior to planting and are more common in cornfields than soybean fields. PPI applications were once very common but have declined in recent years with the adoption of conservation tillage systems. PRE applications are generally made within 1 week of crop planting. Regardless of when or how a herbicide is applied to the soil, the effectiveness of soil-applied herbicides is influenced by several factors.

For a soil-applied herbicide to be effective, the herbicide needs to be available for uptake by the weed seedling (usually before the seedling emerges, but some soil-applied herbicides can control small emerged weeds under certain conditions). Processes such as herbicide adsorption to soil colloids or organic matter can reduce the amount of herbicide available for weed absorption. Soil-applied herbicides do not prevent weed seed germination; rather, they are first absorbed by the root or shoot of the seedling and then exert their phytotoxic effect. Generally, this happens before the seedling emerges from the soil. For a herbicide to be absorbed by weed seedlings, the herbicide must be in the soil solution or vapor phase (i.e., an available form). How is this achieved? The most common methods for herbicides to become dissolved into the soil solution are by mechanical incorporation or precipitation. EPP applications in no-till systems attempt to increase the likelihood that sufficient precipitation will be received before planting to incorporate the herbicide. If, however, no precipitation is received between application and planting, mechanical incorporation, where feasible, will in most instances adequately move the herbicide into the soil solution. Herbicide that remains on the soil surface following application will usually not provide much effective weed control and is subject to various dissipation processes, some of which are described in subsequent paragraphs.

Many weed species, in particular small-seeded species, germinate from fairly shallow depths in the soil. The top 1 to 2 inches of soil is the primary zone of weed seed germination and should thus be the target area for herbicide placement. Shallow incorporation can be achieved by mechanical methods or precipitation. Which of these two methods is more consistent? Rainfall provides for a fairly uniform incorporation, but mechanical incorporation reduces the absolute dependence on receiving timely precipitation. How much precipitation is needed and how soon after application the precipitation should be received for optimal herbicide performance depends on many factors, but generally 1/2 to 1 inch of precipitation within 7 to 10 days after application is sufficient.

Herbicides remaining on the soil surface or those placed too deeply in the soil may not be intercepted by the emerging weed seedlings. Herbicides on the soil surface are subjected to several processes that reduce their availability. Volatility (the change from a liquid to gaseous state) and photolysis (degradation due to absorption of sunlight) are two common processes that can reduce the availability of herbicides remaining on the soil surface. Volatility potential is determined by several soil properties and properties of the herbicide formulation. For example, the thiocarbamate herbicides are relatively volatile, and most should be incorporated into the soil soon after application to minimize loss. Photolysis is primarily dependent on herbicide properties.

Dry soil conditions may be conducive for planting but may also reduce the effectiveness of soil-applied herbicides. If herbicide applications are made prior to planting and no precipitation is received between application and planting, a shallow mechanical incorporation may help preserve much of the herbicide's effectiveness.—*Aaron Hager and Christy Sprague*

CROP DEVELOPMENT

Thinking About Planting Conditions

A roundabout trip from Champaign to the Quad Cities and back on April 16 showed a large number of fields that looked dry across the top, some of which were being worked (including some spraying in 30-mile-per-hour wind, but that's another topic). Perhaps 1 percent or so of the fields were being, or had been, planted. It is clear that memories of daytime high temperatures in the 40s and 50s are quickly set aside and that it takes only about 2 days of temperatures in the 80s to get people planting. Without doubt, only 2 days of high tempera-

tures do a lot to bring soil temperatures up. They are probably in the 50s at the depth of seeding in most Illinois fields now. And along with this temperature increase comes a large increase in the rate of drying. That's especially true when the wind blows. Surface soil moisture has dropped rapidly.

Most of the fields that had been planted looked like they were in fair to good shape for planting. There were some exceptions. The cloddiness at the surface generally indicates that the field was worked when the moisture content of the surface soil was too high. It is likely that some fields that looked better on the surface were worked and planted when the subsurface soil layers were wetter than they should have been. Many of those who want or need to start planting early have learned to set tillage depth and speed to leave a good surface for planting, but at the same time such fields usually have considerable subsurface compaction that could be a detriment to root growth and moisture extraction later, when the plants need it.

On the other hand, there were, as usual, more "powdered sugar" fields—those where the surface has been thoroughly pulverized—than we hope to see. I expect that many of these fields were tilled in the fall with an implement that left them almost ready to plant and then were tilled again in the spring, perhaps even twice. The winter provided enough freezing and thawing to leave surface soils reasonably well granulated. Though tilling twice or more often in the spring probably wastes the cost of at least one trip over the field, emergence should be fine in these fields unless we experience heavy rains, especially if the rains are followed by a period of cool weather. Crusting could take a toll in such fields, but an equal danger is that wet soils with poor structure tend to have very little stored air and seeds or seedling can die quickly from lack of oxygen, often followed by attack of diseases. "Overworked" fields also tend to have planting depth deeper than the planter setting indicates, which can lead to slower emergence and even more problems during germination and emergence.

In general, we should be making a seedbed that leaves the planter to do what it was designed to do—break clods next to the seed furrow, firm the soil around the seed such that seed–soil contact is good, and to place seed at uniform depth. Modern planters have been engineered to do this. Compared to the opener shoes and concave presswheels used 30 or more years ago, planters today do a vastly better job of placing and covering seed. We need to do any tillage with this in mind: *leave something for the planter to do*. Otherwise, we can easily end up with seed in less than ideal conditions to foster rapid emergence.

Corn that we planted here at Urbana on April 5 started spiking through on April 16, and we will be monitoring its emergence on a daily basis. This trial includes some of the polymer-coated seed that I mentioned several weeks ago, and so we will be able to tell how much the coating delays emergence. Of course, the unusually rapid rise in soil temperatures this week will mean that this trial is not very "typical." But few such trials ever are "typical," or at least not "average." These two terms are not really the same. "Typical" is a range, and "average" is a single point within that range. It's useful to keep this difference in mind as we tackle crop production problems, especially those related to weather.—*Emerson Nafziger*

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

Field activity started again on a limited basis in many areas over the weekend and increased by Monday. Fieldwork has focused on anhydrous ammonia application and seedbed preparation. Black cutworm moths have been caught in traps near Freeport and also in Fulton County, but an intense moth capture has not been reported. An intense black cutworm moth capture, as defined in last week's *Bulletin,* is nine or more moths captured over a 1- to 2-day period.

The abnormally warm temperatures this week have contributed to pastures starting to show growth, as well as alfalfa. There have not been any confirmed reports of winter injury to alfalfa or wheat.

Southern Illinois

Field conditions are still quite wet, although warm temperatures and

winds are helping to improve things. Wheat is a little behind, at 6–7 on the Feekes scale, and the alfalfa weevil is still causing damage to first-cutting alfalfa.

West-Central Illinois

Corn planting resumed last weekend in the Springfield area and other parts of the region, but there are no reports of plant emergence. Anhydrous ammonia application and primary tillage are being completed as weather and soil conditions permit.

There have not yet been any reports of insect problems in corn. However, significant moth catches have been observed in several black cutworm traps.

Giant ragweed emergence is progressing rapidly.

Leaf feeding by alfalfa weevil is becoming very evident in some fields.

Wheat fields look good, with very little evidence of disease at this time. Due to wet fields, some farmers still need to apply nitrogen and are considering aerial application.

Pay attention to wind speed and direction when applying pesticides.

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