Wisconsin Crop Manager

Volume 14 Number 9 --- University of Wisconsin Crop Manager --- May 3, 2007

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Online copy available at http://ipcm.wisc.edu/wcm

Did Your Alfalfa Weather the Cold?

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The cold early April has taken a toll on some alfalfa stands. Across southern MN and WI, stands that looked good initially after breaking dormancy in late March need another closer look. The untimely cold snap appears to have caused "winter" injury and even kill in some stands that looked OK just two weeks earlier.

In some areas (southern MN and WI, lighter soils, and south-facing slopes), **alfalfa had begun to grow and shoot tips were frosted**. If the entire shoot tip including the terminal bud was killed by the frost, that stem is done growing. This is usually evidenced by the tip turning brown and bending over like a "shepherd's crook." With less severe frost injury, terminal leaves are damaged but not the bud. In this case, the frozen leaves wilt and turn brown but the shoot keeps growing and puts out new leaves above the frozen area. Where terminal buds were killed, the alfalfa crown will put out new shoots if the plant is healthy. First cutting will be delayed and reduced, but later cuttings should be near normal.

One of the most evident results of winter injury is that **stands are slow to green up**. If other fields in the area are starting to grow and yours are still brown or only slightly green, check those stands for injury or death. The best way to diagnose winter injury or kill is to dig up random plants (4 to 6 inches deep) and examine their roots. Healthy roots should be firm and white with little evidence of root rot.

Figure 1 Frost injury to alfalfa taproot

Winter killed roots become gray and water-soaked initially after soils thaw. Then after water leaves the root, the tissue becomes brown, dehydrated, and stringy (see Figure 1 at right). If the root is soft and water can be easily squeezed from it, or if it is brown, dry, and stringy; it is likely dead.

If 50% or more of the root interior is blackened from root rot, the plant will likely die during spring green up or later in the year. See UW Extension Publication A3620 for more details on evaluating root health.

Figure 2 Rotting alfalfa taproots

If the root is rotted off, the plant may put out shoots but will likely die before first cutting, so the stand should be replaced.

It is important to walk fields and see if stands are good enough to keep. Some plants were damaged but had enough reserves to fuel some early growth before dying. The kill and injury is being reported primarily in 3 and 4 year-old stands that were late-fall harvested. Determine if, on average, at least 5 healthy plants are present per square foot. More importantly, at least 55 stems per square foot are needed to be in an optimal yield range. Fewer stems per square foot mean lower yields (See graph).

For more information about diagnosing and managing winter- and frost-damaged alfalfa stands, refer to the University of Wisconsin's Team Forage web site (http://www.uwex.edu/ces/crops/teamforage/index.html).

Managing winter injured alfalfa stands (that you've decided are worth keeping)

Allow injured alfalfa plants to mature longer before cutting. Allowing alfalfa to mature to early or mid bloom will help the plants restore needed carbohydrates for subsequent production. How long and during which cutting depends on the extent of winter injury. For severely injured stands, allow alfalfa to reach nearly full bloom before first cutting, and early flower in subsequent cuttings. This will gives these stands the best chance at survival. Stands with less injury can be harvested at somewhat earlier stages depending on the extent of the injury. Stands with only mild injury should be allowed to reach 10 to 25% bloom for one cutting during the season. It's often best to choose second or third cutting for these stands, as the first cutting is usually the largest.

Increase cutting height when alfalfa is harvested at or later than 25% flower. This is particularly important for the first cutting. New shoots that will form the 2nd crop begin to emerge as alfalfa begins to flower. Close cutting of well-flowered alfalfa will remove the next crop's shoots. Removing these shoots will further weaken the plants as they attempt to produce new shoots.

Inter-seed thin haylage stands with non-heading Italian ryegrass at 10 to 15 lb/ac, and plan on terminating these stands after this growing season. Annual ryegrass or Italian ryegrass that heads in the seeding year may be a better choice on hay ground since they wilt a little more rapidly, but quality will be somewhat lower. Legume credits from alfalfa should be adequate to meet nitrogen needs for at least the first two cuttings of these alfalfa-ryegrass mixtures. ■

Alfalfa Weevil Larvae Will be Active Soon

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The first alfalfa insect pest of the year to be aware of is alfalfa weevil. Alfalfa weevils overwinter as adults in plant debris, woodlots, ditch banks along field margins and other protected areas. While some adults lay eggs in the fall, the majority do so in spring. Alfalfa weevil eggs require 300 degree days to hatch. Alfalfa weevil larvae have four instars and one generation per year. By using degree days (accumulated above a base temperature of 48F for alfalfa weevil), we can predict egg hatch and development of the four larval instars.

Mature larvae (4th instar) are about 3/8-inch long, green with a white stripe down the back and a black head. Alfalfa weevil may be confused with clover leaf weevil which is larger, with a light brown head, and usually a white strip lined with pink. Clover leaf weevil rarely causes economic yield loss. As alfalfa weevil larvae grow, the amount of foliage consumed increases. While late instar larvae and adult feeding can be a concern in second crop regrowth, alfalfa weevil is primarily a pest of first crop.

Alfalfa weevil larva

Clover leaf weevil larva

Photo Credit: Marlin Rice, Iowa State University

The *WI-MN Cooperative Extension Agricultural Weather* website is a convenient place to track daily degree day accumulations for alfalfa weevil.

http://www.soils.wisc.edu/wimnext/

Click on "Crops"

Click on "ALFALFA: Alfalfa Weevil Development"

Finally, click on the link to "Alfalfa Weevil"

A color coded alfalfa weevil degree-day accumulation map of Wisconsin is updated daily at about mid-day. For the period between January 1 and May 1 2007, southwestern Wisconsin had reached 270 alfalfa weevil degree days, and the rest of the state ranged between 120 DD and 240 DD. By the time this article is posted, it is expected that south central, southwest and northwestern Wisconsin will have reached 300 DD. Please visit http://www.soils.wisc.edu/wimnext/ for real time updates.

Freezing temperatures in April slowed insect development. In an accompanying article in this week's *Wisconsin Crop Manager*, Extension Agronomist Dan Undersander assesses alfalfa winter injury or winter kill from the cold spring temperatures. Alfalfa weevil eggs are deposited in stems of the growing alfalfa. Plant injury or death likely also caused mortality to a portion of the alfalfa weevil population.

Neighboring states south of Wisconsin reported impacts of the April freeze on alfalfa weevil larvae. In south-central Illinois, where 300 DD had accumulated when the cold snap occurred, Kevin Steffey, University of Illinois Extension entomologist, reported "dead (brown and shriveled) third instar alfalfa weevils in an alfalfa field in Montgomery County, and it's likely that freezing temperatures caused the mortality" (*the Bulletin* April 20, 2007 http://www.ipm.uiuc.edu/bulletin/article.php?id=686). Last week, Marlin Rice, Iowa State University Extension entomologist, reported that extension field crop specialists found no live alfalfa weevils in fields they inspected. "Most plants were brown and dead from the freeze, so any larvae that had hatched would be in the terminals and exposed to the cold" (*Integrated Crop Management*, April 23, 2007 http://www.ipm.iastate.edu/ipm/icm/2007/4-23/freezeweevil.html).

The cold temperatures occurred before 300 alfalfa weevil degree days (base 48F) were reached in Wisconsin, and any mortality factors would have impacted primarily the egg stage. We do not know how much of a suppressive effect the cold had on the alfalfa weevil population, and any mortality will vary by region and microclimate. Therefore, initiate scouting for alfalfa weevil larvae at 300 DD. First instar larvae will move to alfalfa terminals (tip feeding) or areas on the plant where leaves are packed together to feed. Table 1 provides a guide to the number of degree days required for each developmental stage of the alfalfa weevil (base 48F).

Table 1. Alfalfa weevil developmental stage by degree days.

Stage of Development	Degree Days Required to Complete Indicated Life Stage	Accumulated Degree Days
Egg	300	300
1st instar	71	371
2nd instar	67	438
3rd instar	66	504
4th instar	91	595
Pupa	219	814

Alfalfa Weevil Scouting

Start monitoring alfalfa stands in fields with south-facing slopes or sandy knolls since these areas dry and warm up faster, accelerating temperature-dependent larval development relative to lower, colder spots in the field.

Scout alfalfa fields by collecting groups of 10 plants at 5 random locations throughout the field (50 random stems total). You want these plants to be representative of the field, so walking an M-shaped or similar pattern and avoiding sampling from field edges is recommended.

Smaller alfalfa weevil larval instars are slate-colored, but they become a bright green by the time they are full grown at 3/8 of in inch length. Later instar alfalfa weevils are clearly distinguished by their green color, a white stripe running down the back and black head capsule.

Count all stems that show signs of tip feeding damage and divide that number by 50 (total number of stems initially collected) to determine percentage tip feeding. Management action is recommended when 40% or more of the stems show signs of alfalfa weevil larval feeding.

Alfalfa Weevil Management

Biological control: A number of natural enemies (parasitic wasps) were introduced during the 1980s to establish a level of alfalfa weevil biological control, and resulted in five parasitoid species becoming widely established in the Midwest. A feature article on alfalfa weevil biological control can be accessed at the Biological Control News archives at http://www.entomology.wisc.edu/mbcn/mbcn407.html

Cultural control: Early cutting, is an option if alfalfa weevil larval threshold is reached within 7-10 days of planned harvest, and will provide alfalfa weevil larval control without the cost of an insecticide application or compromise to first crop quality. Watch alfalfa re-growth to make sure larvae are not suppressing re-growth.

Chemical control: If 40% tip feeding occurs more than 7-10 days before harvest, an insecticide treatment is recommended. For insecticides labeled for alfalfa weevil control, consult University of Wisconsin-Extension bulletin number A3646 "Field Crop Pest Management in Wisconsin" which is available from your local county extension office. You can also access the bulletin on-line at UW-Extension publications http://learningstore.uwex.edu/. Pay close attention to pre-harvest intervals. These restrictions vary

according to the insecticide used and the rate at which it is applied. When selecting insecticides, consider price, potential hazards to honey bees and whether or not it is a restricted use pesticide. ■

Western Bean Cutworm and Soybean Aphid Short Course Presentations Available on the Web

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On February 28 and March 6, 2007, entomologists from several states delivered short courses via distance education technology. The course on February 28 focused on western bean cutworms, and the one on March 6 focused on biological control of soybean aphids. Both courses were recorded, and the resulting videos, which synchronize the audio files with the PowerPoint presentations, can be accessed at the North Central IPM Center Web site.

The "Western Bean Cutworm Short Course" videos are available, with presentations by Eileen Cullen (University of Wisconsin), Gary Hein (University of Nebraska), Marlin Rice (Iowa State University), and Kevin Steffey (University of Illinois) on these topics:

Review of the situation (Iowa, Illinois, Wisconsin)

History and biology of the western bean cutworm

Economic impact of the western bean cutworm

Look-alikes--moths and larvae

Managing western bean cutworms

The videos for "Managing Soybean Aphids in 2007: How Will Biological Control Contribute?" are also available. Entomologists from eight states made presentations on these topics:

History and biology of the soybean aphid (David Voegtlin, Illinois Natural History Survey)

Review of the situation with soybean aphids in the Midwest (David Ragsdale, University of Minnesota)

What is biological control, and what do we have to work with in the Midwest? (Bob O'Neil, Purdue University)

Predators, parasitoids, and pathogens (Kelley Tilmon, South Dakota State University)

Practices to conserve and use natural enemies (Matt O'Neal, Iowa State University)

Introducing new natural enemies into the U.S. (Bob O'Neil)

Foreign exploration (Kim Hoelmer, USDA-ARS, Newark, Delaware)

Host specificity testing (George Heimpel, University of Minnesota)

Studies with nontarget aphids (Cory Straub, University of Wisconsin)

Management guidelines and potential for biological control (Chris DiFonzo, Michigan State University, and Marlin Rice, Iowa State University)

Both short courses were facilitated by the North Central IPM Center. The western bean cutworm short course was sponsored by the North Central IPM Center, and the soybean aphid biological control short course was sponsored by the North Central Soybean Research Program. ■

White Cockle Questions

Chris Boerboom, Ext. Weed Scientist

White cockle is a persistent weed in hayfields and no-till corn and soybean fields and it seems to be an increasing problem based on recent questions. I'll start with a few key points about white cockle and end with some management comments.

1. White cockle's name is officially white campion, but you will most likely still see it as white cockle on some herbicide labels if it is listed.

2. White cockle's life cycle is a biennial or short-lived perennial. It grows from the same crown and does not spread by roots. It is very successful in establishing from seed that germinates in either spring or fall.

3. Identification: White cockle seedlings are yellowish-green and soon grow into a rosette with opposite leaves with soft hairs. As plants get older, they may have a grayish-green color because of the hairs. The opposite leaf arrangement is easier to see on the stems that produce the showy white flowers. Flowers have 5 notched petals.

Odd fact: White cockle plants have either male or female flowers. The female flowers swell and develop into the familiar round seedpods.

Important fact: White cockle, like many other weeds in the pink family, is not very sensitive to 2,4-D. Therefore, 2,4-D used alone in burndown treatments or 2,4-D used for weed control in winter wheat is not effective unless mixed with another herbicide.

Management: White cockle generally is not a problem in spring-tilled corn and soybean fields. In no-till fields, herbicides are generally most effective in the fall. In particular, glyphosate will be more effective in the fall and should be used at a minimum of 0.75 lb ae/a (i.e. the old 1 quart rate). In the spring, glyphosate will give good suppression at this rate, but control may not be complete. The addition of Valor to glyphosate in the spring may increase glyphosate's control of existing plants. Valor's residual activity will help to control emerging seedlings. We've been highly successful in controlling white cockle in the spring with Gramoxone plus Sencor on a warm, sunny day, but only had good suppression on a cooler, cloudy day. Sencor is good to add to Gramoxone because it synergizes the Gramoxone. Sencor's residual activity also helps to control emerging seedlings.

If white cockle is not controlled before planting corn or soybeans, many of the plants will likely be starting to or flowering by the time postemergence applications are made. In Roundup Ready soybeans or corn, glyphosate can be used to suppress these plants. However, no herbicide will control white cockle adequately in conventional soybeans. In corn, dicamba-based products (i.e. Banvel, Clarity, Distinct, Status) should suppress larger plants and kill seedlings. A preemergence application of atrazine should also prevent white cockle from emerging in corn in the spring.

Overall, it is probably best to scout fields that might have white cockle in the fall. These fields might be those that previously had cockle or are hay fields going to corn or soybeans. If white cockle is found, a fall treatment of glyphosate should remove many plants and limit the problem the following spring. Also, plan programs that control spring seedlings by using either a residual preemergence herbicide or an effective postemergence herbicide. Otherwise, these little seedlings will develop into the rosettes that are more difficult to control in the fall or the next year. ■