Crop Solutions that Work

April 3, 2015

SOUTH WINDS BRING BLACK CUTWORMS

South winds early in the spring usually bring a few black cutworms into the area, while southerly storm systems can bring in thousands of moths. A very few black cutworm moths may successfully overwinter in the corn belt when winter weather is mild, but most migrate into the area. A look back at winter suggests that few black cutworm moths would have survived here.

- ***The recent change in weather is likely to result in black cutworm moth arrival.***

Black cutworm moths are weak migrants in their own right, but they can hover or remain suspended in the updrafts of storm fronts for many hours. As wind currents shift, or the moths tire, they sprinkle out of these weather systems. The distribution pattern of the arriving black cutworm moths is somewhat random. This is why the pheromone traps offer useful information, specific to the individual field or local area.

Female black cutworm moths are selective about where they deposit their eggs. Preferred crop sites include fields that were in soybeans in the previous year, especially when chickweed, dock, or other winter annual weeds are present. Since corn is really not a preferred host, fields of emerged seedling corn are seldom targeted. (This is ironic, considering the amount of damage caused to corn each year.) Wet areas of fields are also often chosen for egg laying, as long as there isn't standing water present.

WINTER SURVIVAL OF NITROGEN-FIXING BACTERIA

- ***This past winter is unlikely to have affected survival of nodulating bacteria in the soil.***

Bradyrhizobium japonicum is the nitrogen-fixing bacteria specific to soybeans. Other species colonize roots of different legumes. These bacteria infect roots, taking on a mutually beneficial relationship with the host plant to help convert atmospheric nitrogen into ammonium compounds that are needed by the host.

Good news! In general, the cold soil conditions of this winter are unlikely to greatly reduce survival of nitrogen-fixing bacteria. While these bacteria prefer temperatures between 40 and 80 degrees, Fahrenheit, normal winter cold temperatures generally have little effect unless soils are also extremely dry. Conversely, high soil temperatures, like those experienced in 2012, have been shown to adversely affect *Bradyrhizobium* survival.

Environmental conditions that negatively impact *Bradyrhizobium* bacteria populations include the following:

- Low pH (Acid Soils)
- High Temperatures
- Extremely Dry or Extremely Wet Soil Conditions
- Low Organic Matter
- Certain Crop Protection Products (Limited Data)

It has become clear that some strains of *Bradyrhizobium japonicum* are more persistent in the soil than other strains. In order to be certain that the best strains of nitrogen-fixing bacteria are available to colonize soybean roots, it is recommended that soybean seed be inoculated frequently, particularly if stressful environmental conditions exist in any field.

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AGRONOMY™

ALFALFA WINTER INJURY EVALUATION & MANAGEMENT

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- ***Here are quick tips for evaluating and managing alfalfa stands.***

How to evaluate the alfalfa stand: It has proven to be preferable to use stem density per square foot, rather than plants per square foot, to evaluate the stand. If the stem density is greater than 55 stems per square foot, yield has not been limited. If the stem density is between 40 and 55 the yield potential has been limited. Stem densities of less than 40 per square foot may severely limit yield and you should consider replacing the stand. Alfalfa plants that have frost heaved will not survive long, but one or more cuttings may be salvaged, depending on extent of injury. Count affected plants as lost to the stand.

Managing a winter injured alfalfa stand:
Allow plants to mature to the early, mid or full bloom growth stage will help the plants restore carbohydrates for continued production. Severely winter injured stands should be cut at full bloom. Stands with less injury could be harvested earlier depending on the extent of the injury.

Increase the cutting height – This is particularly important when allowing plants to flower before cutting. Cutting high can also help salvage one or more cuttings of frost heaved alfalfa, in order to avoid damage to the elevated crown.

Fertilize according to crop needs – Soil test and apply needed fertilizer prior to first cutting if possible.

Control weeds – Herbicide applications to control weed competition will help the stand by eliminating weeds that compete for moisture, light and nutrients.

Avoid late fall cutting – If the producer intends to keep the alfalfa stand for 2016 then he should not take a cutting after September 1, 2015 to allow for the buildup of food reserves prior to winter.

Badly Thinned Alfalfa Stand

DEALING WITH SOIL COMPACTION

- ***Harvest weather conditions last fall resulted in field ruts and soil compaction. What are the different types of soil compaction we encounter?***

The form of compaction that we are probably most familiar with is the "plow layer." This develops with equipment traffic and use of certain implements, such as the large disk. A well-defined layer develops just below the depth of tillage. Plow layer can be detected with a soil probe, tile rod, or compaction probe. This layer interferes with water infiltration and root penetration. Consequences include wet-soil symptoms or diseases early in the season as water becomes trapped above the compaction layer, followed by drought symptoms later on as the soil surface dries and roots have difficulty penetrating through the compaction layer. Look for a distinctive platy or blocky structure of the soil layer between six and eight inches deep.

Deep compaction is the general compaction that develops below the eight to ten inch depth in the soil. This compaction is usually caused by heavy equipment loads on moist soils. The compaction radiates downward from the point of tire contact with the soil and can sometimes be detected twenty inches deep or more. Note that, while saturated soils may be badly rutted by equipment tires, the compaction in these wet soils is often cushioned or dispersed by water-filled pore spaces. It is the moist, but not saturated soils, which are most subject to deep compaction.

The principle consequence of deep compaction is that crops will approach their yield potential only under ideal seasonal moisture conditions. Look for field growth patterns that follow traffic patterns and tire tracks, even those caused years earlier, but lack evidence of surface compaction. Correction of deep compaction can take many years and often includes deep ripping under dry soil conditions, as well as planting and maintaining alfalfa or other deep-rooted forage crop for several years.

Surface compaction develops when repeated tillage destroys soil structure in the top inches of the soil profile and/or heavy rainfall causes soil particles to settle together into a dense layer. Surface compaction also readily develops in no-till when traffic occurs before soil dries adequately. This general compaction squeezes the pore spaces, reducing oxygen levels in the soil and limiting root growth. Surface compaction may or may not include soil crusting, and it need not be as dense as the plow layer to cause crop problems. Consequences include poor early root development, induced nutrient deficiency symptoms, excessive surface growth of roots, and early appearance of drought symptoms during dry weather. Look for soil that appears to be lacking in pore spaces and will not easily crumble in the hands. Also look for development of blocky or platy structure and soil that fractures along only a few significant lines.

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MANAGEMENT OF MARESTAIL IN SOYBEANS

Bolted marestail—Image: Bryan Young, Purdue University

With the snow melting and warmer temperature among us, it is time to think about weed management plans to control marestail that may have been in the fields all winter. We all know that managing marestail can be difficult in the spring when compared to the fall, so differing techniques may be needed to achieve the desired result. With the lack of herbicides applied last fall due to the delayed harvest, do not be surprised if marestail is prevalent in many geographies. In no-till environments, chemical control will be the only option to mitigate this weed problem.

In the fall, glyphosate + 2,4-D can effectively manage the marestail that has emerged. However, due to bolting in the spring, the fore mentioned mixture may not provide complete control of the tallest marestail. There are many other herbicides that may be used instead of or in conjunction with glyphosate and 2,4-D for burndown activity. Regardless of the herbicide mixture, it is necessary to obtain complete control of emerged marestail prior to soybean emergence. Due to the prevalence of glyphosate- (group 9) and ALS- (group 2) resistant marestail, there are limited options for control postemergence in glyphosate-resistant soybeans.

So how should marestail be managed in the spring?

1. Apply effective burndown herbicides
   - Make sure the plant is actively growing to ensure translocation of systemic herbicides.
   - For contact herbicides, consider ways to increasing coverage like increasing gallons per acre (GPA) or switching to nozzles that produce smaller droplets.
   - Use the proper adjuvant system for maximum control.

2. Include residual herbicides with burndown herbicides
   - Many of the residual herbicides used for management of waterhemp in soybeans are also good options for management of marestail.

3. Start clean
   - Do not plant into fields with emerged marestail. Limited options once soybeans emerge will put us "behind the eight ball" all season long.

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DEALING WITH SOIL COMPACTION

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Sidewall compaction is another familiar form of compaction. In wet soil, the opener disk of the planter smears the side walls of the seed slit or furrow. This creates a dense layer that roots have difficulty penetrating. In many cases, shrinkage of the drying soil causes the seed slit to pull open. The seed, itself, or seedling roots are then exposed in the slit. As the side walls of the seed slit dry, root penetration becomes almost impossible. Consequences include poor seedling growth or a root system that grows like a fan as the roots take the only available path down the slit. Because of the limited root development, drought or nutrient deficiency symptoms may be enhanced. Look for the distinctive seed slit with smeared walls, and roots that grow in a fan shape. (Sidewall compaction may also be created with anhydrous ammonia knives, disk blades, etc.)

Field Badly Rutted During Soybean Harvest