Plant Protection Programs University of Missouri

Integrated Pest & Crop Management

Black Cutworm Damage To Corn Predicted For Week Of May 11

By Wayne Bailey

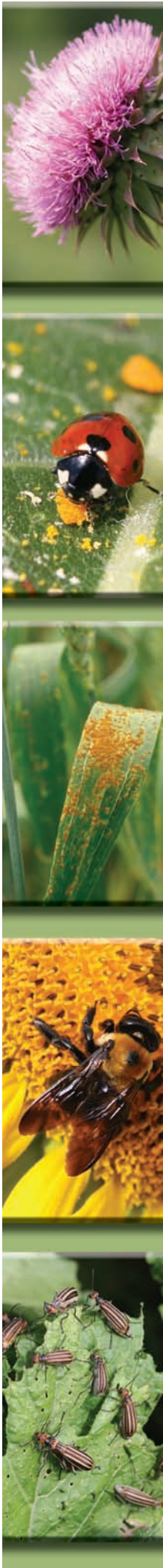
Corn producers in north and central Missouri regions should be aware of the potential for black cutworm larval damage to late planted field corn. The presence of large larvae and small corn often lead to severe stand loss of seedling corn. Although black cutworm infestations can occur anywhere in the state, MU's computer pest model predicts the potential for economic infestations of black cutworm larvae to begin cutting about 11 May below interstate 70 and approximately 15 May in areas north of the interstate. Based on moth capture information, the highest risk of black cutworm infestations will occur in northeast Missouri counties and westward to US route 65. However, other areas of the state also may experience damage from this pest to a lesser degree. Scouting for black cutworm larvae and their damage should occur from first emergence of corn plants and continue through the 5th leaf stage of plant development. Producers are encouraged to scout several plants in an area and determine the percent of plants cut by black cutworm larvae. Damage from small larvae (1st – 3rd instars) is generally minimal and expressed as minor leaf feeding on the edge of seedling corn leaves. Cutting damage is caused by 4th and larger instars (worm stages) with plants cut either at or below ground level. *Treatment of pest infestations is justified when 1-2 percent or more of seedling corn plants have been cut.* This economic threshold range of cutting by black cutworm larvae has been reduced this past week after extension entomologists from several states reviewed our traditional thresholds. The high price of corn is the driving force in reducing Missouri's black cutworm threshold to the new range. Seedling corn plants cut below ground often experience more severe damage and should be treated at the lower range of the economic threshold. Damage from this pest may occur for several days once cutting begins.

More specific information about pest infestations, scouting, economic thresholds and pest management strategies can be found in the Integrated Pest and Crop Management newsletter. The newsletter is available free of charge online or by subscription for print. Visit ppp.missouri.edu/newsletters/ipcmindex.htm. For more information on the black cutworm predictive model and the counties currently monitoring for black cutworm, please visit our Web site at: http://ppp.missouri.edu/pestmonitoring/bcw/index.htm

Wayne Bailey
573-864-9905

Black cutworm larva (Agrotis ipsilon) lying next to the damage it caused to a young corn plant. Frank Peairs, Colorado State University, Bugwood.org

Table of Contents



Troubleshooting Field Crop Problems Can Be A Pain

By Allen Wrather, Professor Division of Plant Sciences

I was recently listening to some old men talk about stuff that old men talk about. I understand that you may think me mentally off for sitting around listening to old men, but I find it easier to do now that I have become one of these old men. As usual, the first story told by an old man never has a chance because other old men will tell stories to top the first. The best story this particular day was about the freeze on Mother's Day one year that killed all the crops and was so severe the radiators in some tractors froze and broke. There of course were some doubts among the other old men about the validity of this story. Most old men can't agree on much. However, these old men were farmers, and they all agreed that all farmers will experience problems with crops in some fields this year. These problems will most likely be caused by too much or too little fertilizer, too much or too little water, temperatures too high or low, crust over the planted row, insects, diseases, herbicide drift or carry over, and other things.

Producers should get the cause of crop problems diagnosed so action can be taken to reduce the problem from becoming worse this year or prevent it from developing again next year. Diagnosis of crop problems can sometimes be easy, but it is more often difficult. This article is a brief summary of the material in University of Missouri Extension Guide G4050 that describes a six step process to help farmers and crop consultants diagnose the cause(s) of field crop problems. This guide titled, *Troubleshooting Field Crop Problems*, was written by Laura Sweets, Andy Kendig and myself, and it is online at http://extension.missouri.edu/explore/agguides/crops/g04050.htm.

First, determine the variety and the age of the plant

An investigator should identify the plant variety because some are more resistant or susceptible to certain diseases, insects and herbicides, and this information may be very useful when diagnosing the cause of the problem.

Second, identify all the symptoms affecting the leaves, stems, roots and fruit

An investigator should observe all parts of abnormal plants when troubleshooting a field crop problem including the leaves, stems, fruit and roots as well as the tissue inside roots and stems. Frequently, the point of injury to the plant is not where the symptoms appear. For example, leaves on one or several branches may be discolored and withered because of a canker on a lower branch or a borer in the stem. Nutritional deficiencies and injuries from herbicides may damage both roots and leaves. Examine individual plants in detail and determine the location of symptoms on the plant. Are symptoms on old or young leaves, upper or lower stems, or perhaps on one side of the plant? Look for insects and insect feeding damage. Cut stems to check for discoloration inside the stem and for insect feeding. Hold leaves up to the light to check for mosaic, other viral symptoms, or the presence of webbing and mites. Investigators should look for leaf abnormalities in color, size, shape and texture. Also, carefully dig up roots and examine them. Check for galls, rot, abnormal root color and feeder root condition, and assess root growth. While probing the soil, check for soil compaction, soil structure, texture and organic matter, and the presence and depth of hardpans. Also take note of odors, insects, fertilizer placement and the depth of planting.

Third, estimate the percentage of plants damaged in the affected part of the field

Were all plants in an area or only 10 percent affected? Symptoms of injury due to insects and disease may appear on every plant in an area, but this is unusual. Symptoms of injury due to herbicides, improper placement of fertilizer and lightning will usually appear on every plant in an area.

Fourth, determine the distribution or pattern of the problem in the field

Look at the entire field to determine where the problem appears. Determine the distribution of the problem in the field as it relates to field characteristics such as areas with light soil and drainage patterns. Is the problem only in wet areas? Take notice of whether the problem is associated with certain rows or areas of lower or higher elevation.

Fifth, evaluate whether the crop and weeds in the field share similar symptoms

Examine the weeds in the area and in nearby fence rows where the crop is injured. Symptoms caused by nutritional disorders are usually not plant specific. For example, most plants growing in low-pH soils, including crops as well as weeds, will be stunted. However, diseases are usually plant specific, and weeds in the area are normally not affected by the same diseases that can attack corn or soybean.

Sixth, determine the history of the problem

Ask when the problem was first noticed and whether crop problems were observed in the same area during previous growing seasons.

The answers to these questions may provide a clue that could be useful in diagnosing the causes of field crop problems. Following these suggested procedures will give field crop consultants and producers a better chance of diagnosing the cause of field crop problems during 2008.

Allen Wrather
Professor Division of Plant Sciences
WratherA@missouri.edu

What Can A Preemergence Soybean Herbicide Do For You?

By Kevin Bradley

Not long ago, I wrote an article in this newsletter about the increasing cost of glyphosate and how this situation makes preemergence herbicide applications in soybean more feasible. Even if this weren't the case, I think there are still some reasons to consider the use of preemergence residual herbicides.

First, residual herbicides may be a good option for you simply from an "insurance" or yield protection standpoint. Often, a properly timed early postemergence glyphosate application to weeds that are 4- to 6-inches tall turns into an application where the weeds have reached 10- or 12-inches tall and the soybeans are barely noticeable. Without fail, I see this in some Missouri fields each year. Regardless of the reason, when this type of situation occurs some yield has already been lost. To see the effects of increasing weed sizes and weed competition on soybean yield loss for yourself, go to http://weedsoft.unl.edu/weedsoftApps.htm and use the WeedSOFT yield loss calculator. This is a tool developed by a number of university weed scientists that enables you to estimate the season-long yield loss, as well as the yield loss that has already occurred, for soybeans that are at a particular stage of growth and infested with specific weed species. It will also estimate the additional yield loss that may occur if you delay treatment.

Table 1. Influence of preemergence herbicide treatments on grass and broadleaf weed density at the time of the postemergence glyphosate treatment (Columbia, MO 2007).

		Weed Density at Postemergence Application[a]	
Treatments[b]	Rate	Grasses	Broadleaves
	product / A	#/m^2	
Intrro*	2 qts	26	20
Prowl H2O*	2 pts	22	20
Valor*	2 ozs	54	16
Valor XLT*	3 ozs	58	18
Authority First**	3.22 ozs	52	10
Prefix**	2 pts	4	14
Boundary*	1.5 pts	2	18
Canopy*	3 ozs	60	16
Gangster FR+V**	0.3 + 1.5 ozs	46	8
Untreated	-------	48	47

[a]Grass weeds included foxtails and large crabgrass. Broadleaf weeds included waterhemp, morningglories, cocklebur, and prickly sida.

[b]Single asterisk (*) indicates treatments that required a glyphosate treatment on June 26th. Double asterisks (**) indicates treatments that required a glyphosate treatment on July 3rd.

Another reason you might want to consider the use of a residual herbicide in Roundup Ready soybeans is due to the increasing number of glyphosate-resistant weeds that are being identified in Missouri and throughout the U.S. Almost exclusively, these weeds have been discovered in continuous Roundup Ready cropping systems where glyphosate has been used as the sole active ingredient for weed control. In Missouri, perhaps the most concerning development is the increasing number of acres that have glyphosate-resistant waterhemp. Results from surveys we conducted last year indicate that glyphosate-resistant waterhemp now occurs on approximately 200,000 acres of soybean in this state. One of the best ways to prevent these kinds of situations from developing is to rotate to herbicides other than glyphosate that act at an alternate site of action, such as with preemergence residual herbicides.

If you have decided to apply a preemergence residual herbicide in soybean, I think there are two primary factors you should consider in order to choose which product will work best for you. The first is obviously price. The products listed in Table 1 range in price from about $8 or $9 to about $15 or $16 per acre, so the product you choose can have a big impact on net income. The second consideration is whether the preemergence residual herbicide you choose will match the spectrum of weeds that you have in your field. As illustrated in the results from an experiment we conducted last year (Table 1), many of the preemergence residual herbicides available provide good suppression of broadleaf weeds, but little control of grass weeds. If you have heavy grass weed pressure, you may need a product that provides suppression of both grass and broadleaf weeds prior to the planned postemergence glyphosate application.

It is important to note that the results in Table 1 are only from one year of research and that we will be conducting similar research over the next few seasons to understand this issue better. However, another thing that I think the results in Table 1 illustrate is that few, if any, preemergence residual herbicides provide season-long control of the common weeds we encounter in soybean production in Missouri. These programs are designed to buy you time and eliminate the need for the first pass of glyphosate from the traditional 2-pass glyphosate program. Our research indicates that following these preemergence residual herbicide treatments with a postemergence glyphosate treatment when needed will usually provide excellent season-long weed control and optimize soybean yields.

Kevin Bradley
BradleyKe@missouri.edu

Controlling Water Is Almost Everything

By Bill Casady

I don't wield control over water. It's not that I don't want to control water, but it's a process that takes time and money. Still, even the best drainage and irrigation systems don't always provide enough control to optimize water for best planting, growing and harvesting. I'd love to be able to turn the rain on and off at just the right moments, but that just isn't possible. While we can't control the weather, it certainly does control us. It is because we don't control the weather that we sometimes don't get started planting until May.

As difficult as this may be, this wet spring is a good time to make notes about where we need better drainage and better control of runoff and erosion. Drainage is the most important factor to control. Most fields come with either too little or too much drainage or some combination of both. Too little drainage results in standing water that ruins seedlings and stunts root growth. Poor root development in low lying areas is a major cause of crop failure when drought conditions persist throughout a growing season.

Too much surface drainage allows large rains to move both residue and soil. For such fields, drainage structures such as terraces provide places for small amounts of water to collect and to drain through tile to water ways. Terraces also reduce the total volume of water that is allowed to collect on a given area of a field and reduces or eliminates catastrophic gullies from the largest rain events.

Other fields may receive water from natural waterways or streams when they overflow their banks. No-till certainly helps reduce erosion, but it doesn't guarantee that there won't be some major soil movement, especially in fields following soybean. Tilled soil has moved considerably this spring, while some no-tilled fields with considerable residue have been overwhelmed by flash flooding, resulting in clumps of unevenly distributed residue. This is especially true in low-lying areas that receive overflow water during some of those 100-year rain events. Residue that has moved should be spread however possible before planting.

In many cases overflowing banks also deposit woody residue from dead trees into fields. This requires manual cleanup. When all of the large wood has been removed, tillage can help restore some uniformity, but if possible, consider using a mower to help redistribute residue in those areas after heavy woody biomass has been removed. Overflowing streams can be unpredictable, but with some engineering and a little work, these problems can also be alleviated using basins to slow an onslaught of heavy flows that can quickly overwhelm small banks, cut new channels and unevenly redistribute residues.

Having said all of this, I have a lot of work to do myself, but this is just the right kind of year to take special note of these problem areas and to plan to turn profits from a good year into investments for the future that will save the soil, reduce sedimentation and runoff and preserve the land for generations of crops yet to grow.

Bill Casady
573 882-4370

Crop Injury and Diagnostic Clinic

July 22–25, 2008

This clinic is designed to train or update agricultural professionals in the management of crop health and field crop diagnostics. Participants will have the opportunity to fine tune their skills in diagnosing crop production and pest problems. In addition, the Crop Injury Diagnostic Clinic will focus on hands-on training in the following areas:

*** Soil, water and nutrient management**
*** Crop production**
*** Precision Agriculture**
*** Biotechnology and variety development**
*** Soil Conservation**
*** Identification of insects and herbicide injury**
*** Effect of environmental conditions on disease incidents**

This program is sponsored by University of Missouri College of Agriculture, Food and Natural Resources and University Outreach and Extension.

Alfalfa Weevil Problems In Central And North Missouri Counties

By Wayne Bailey

Alfalfa weevil problems, which have occurred in southern Missouri during the past two weeks, are now moving into central and north Missouri alfalfa fields. Larvae from spring laid eggs have moved from feeding sites in plant terminals to more exposed plant surfaces to feed. In several fields surveyed, numbers of small larvae were three to four times over the economic threshold level of an average of one or more larvae per stem. Alfalfa weevil larvae grow through four instars or larval stages with most damage to alfalfa plants caused by the last two instars. These larger instars readily move about the plant and feed on alfalfa foliage. They may consume significant amounts of leaf tissue, which typically results in substantial economic loss of alfalfa yield and forage quality. In addition, heavy defoliation also reduces alfalfa competition with weeds and may result in increased weed populations.

Alfalfa producers should scout alfalfa fields throughout the state as problems can quickly develop and result in substantial loss of forage yield and quality. Scouting for alfalfa weevil is best accomplished using a 3-5 gallon bucket and a sharp knife. Producers are encouraged to sample 10 alfalfa stems at each of five random locations in a field for a total of 50 stems per field. At each of the five locations, the scout should carefully cup the terminal of each alfalfa stem and then cut the stem off near the soil surface. The stem is then carefully placed inside the bucket and vigorously tapped to dislodge any larvae present. It is necessary to cup the terminal with your hand during removal of the stem from of the plant to prevent the larvae from being flipped from the terminal during stem removal. If the alfalfa weevil population has reached the economic level of one or more larvae present per stem of alfalfa (50 or more larvae per 50 stems) and 30 percent or more of the alfalfa stems show feeding damage, then control is justified.

Although several management options are available, applications of foliar insecticides are commonly used. Other options include early harvest of the crop, grazing by livestock, and the presence of biological control agents. In surveys this past week in central Missouri, the fungal pathogen (*Zoophthora phytonomi*) was found in low numbers in alfalfa weevil larval populations. This fungal pathogen is present in most years, but infection rates of this pathogen are most successful in wet years. Infected alfalfa weevil larvae slow their feeding activities, turn from light green to pale yellow in color, and die within a few days of becoming infected by the fungal pathogen. If this pathogen develops early in the season it can decimate larval alfalfa weevil populations. Whether this pathogen builds to endemic levels and causes high larval mortality in the alfalfa weevil larval populations will be determined over the next few days.

See Integrated Pest and Crop Management newsletters for additional information about alfalfa weevil management options and recommended pesticides.

Wayne Bailey
573-864-9905

Planting Time Calls For Extra Safety Precautions

By Robert Thomas

COLUMBIA, Mo.-Planting time is one of the riskiest periods for farm injuries and fatalities-and a time for farmers to develop a professional attitude towards safety, said a University of Missouri farm safety specialist.

"Review equipment manuals. You may be less familiar with seasonal equipment than with equipment you use daily," said Karen Funkenbusch.

As farmers plant this year's crops, they should keep in mind several recommended safety precautions:

Inspect all planting equipment before using. Make sure shields and guards are in place and seat belts work properly.

Never lean or step over a power takeoff while it is operating.

Do not wear loose-fitting clothing around PTO shafts or other moving parts. Keep long hair tied back or under cap.

Shut down equipment, turn off the engine, remove keys and wait for moving parts to stop before dismounting equipment.

Maintain Slow Moving Vehicle (SMV) symbols on all equipment.

Keep bystanders and children away from all equipment.

Always read chemical packaging labels. Information should include proper use and handling of the chemical, safe storage and first-aid treatment.

Obtain material safety data sheets for the crop-protection chemicals that you use. These sheets include health-hazard data, spill or leak procedures and handling information.

Wear personal protective gear specified by the label. These can include chemical-protection goggles and face shields, chemical-resistant gloves, coveralls, boots, hats and aprons.

Keep crop-protection chemicals in locked storage areas. Label the storage area as containing pesticides.

Launder chemical-soiled clothing separately and triple rinse.

Source: Karen Funkenbusch, 573-882-2731

Robert E. Thomas
Information Specialist
573-882-2480
ThomasR@missouri.edu

Weather Data for the Week Ending May 11, 2008

By Pat Guinan

		Weekly Temperature (oF)						Monthly Precipitation (in.)		Growing Degree Days‡	
Station	*County*	*Avg. Max.*	*Avg. Min.*	*Extreme High*	*Extreme Low*	*Mean*	*Departure from long term avg.*	*May 1-11-May*	*Departure from long term avg.*	*Accumulated Since Apr. 1*	*Departure from long term avg.*
Corning	Atchison	70	48	81	40	60	-1	3.15	1.58	209	12
St. Joseph	Buchanan	69	50	79	40	59	-3	2.35	0.62	195	-34
Brunswick	Chariton	69	52	78	45	60	-2	2.34	0.64	235	-3
Albany	Gentry	71	49	79	41	60	-2	1.9	0.08	187	-15
Auxvasse	Audrain	67	50	77	45	58	-4	2.79	0.93	245	5
Columbia	Boone	67	50	76	44	58	-5	3.34	1.51	252	-25
Sanborn Field	Boone	68	51	77	45	59	-4	2.88	1.03	277	-15
Williamsburg	Callaway	67	49	76	43	58	-4	3.3	1.6	249	13
Novelty	Knox	69	49	76	43	58	-4	2.43	0.58	210	-13
Linneus	Linn	70	48	78	41	59	-3	1.73	-0.28	211	1
Monroe City	Monroe	68	48	77	42	58	-5	1.77	0.02	228	-18
Versailles	Morgan	66	51	77	44	59	-4	3.11	1.14	269	-48
Green Ridge	Pettis	66	51	75	43	58	-4	2.83	0.97	235	13
Lamar	Barton	70	52	79	42	60	-3	4.64	2.64	259	-59
Cook Station	Crawford	68	48	81	37	59	-5	2.42	0.55	275	-58
Alley Spring	Shannon	73	48	83	35	61	-2	1.71	-0.3	272	-24
Round Spring	Shannon	72	49	84	36	60	-3	1.99	0.02	271	-26
Mountain Grove	Wright	68	51	80	40	59	-3	1.52	-0.42	237	-33
Delta	Cape Girardeau	71	52	76	45	61	-5	2.57	0.75	315	-79
Cardwell	Dunklin	76	56	80	48	66	-2	1.01	-0.95	405	-68
Clarkton	Dunklin	74	54	79	45	64	-3	1.07	-0.37	364	-95
Glennonville	Dunklin	74	54	78	46	64	-3	1.21	-0.26	379	-83
Charleston	Mississippi	73	53	78	46	63	-2	1.51	-0.27	353	-33
Portageville-Delta Center	Pemiscot	74	56	78	51	65	-2	1.2	-0.55	404	-57
Portageville-Lee Farm	Pemiscot	75	55	79	50	65	-2	1.54	-0.27	405	-49
Steele	Pemiscot	77	56	81	50	66	-1	0.85	-1.13	427	-35

* Complete data not available for report

‡Growing degree days are calculated by subtracting a 50 degree (Fahrenheit) base temperature from the average daily temperature. Thus, if the average temperature for the day is 75 degrees, then 25 growing degree days will have been accumulated.

Pat Guinan
Commercial Agriculture Program
573.882.5908
GuinanP@missouri.edu