Plant Protection Programs University of Missouri

Integrated Pest & Crop Management

Tips for Troubleshooting Field Crop Problems

By Allen Wrather

Farmers, consultants, and university extension agronomists will all agree that problems with crop growth will develop in most 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.

To assure plant health and subsequent yield, the cause(s) of these problems should be diagnosed quickly so action can be taken to reduce the problem from becoming worse this year or prevent it from developing 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*, 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 on fertilizer placement and the depth of planting and other recently completed cultural practices.

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

Continued on page 70

Table of Contents

Weed of the Month: Asiatic Dayflower

By Kevin Bradley

Asiatic dayflower (*Commelina communis*) is an annual monocot but has a growth habit and flower that more closely resembles that of a dicot plant. Asiatic dayflower is a native of Asia that was introduced into the U.S. as an ornamental and has escaped cultivation to become a weed of no-till agronomic crops, landscapes, and other horticultural crops.

Asiatic dayflower can have an erect growth habit but more commonly creeps along the ground and is capable of rooting at the nodes. The leaves occur alternately along the creeping stem and are ovate to lanceolate in outline, as much as 5 inches long and 2 inches wide. All leaves and stems are hairless, and each leaf has a membranous sheath which encircles the base of the leaf and stem. The flowers of Asiatic dayflower consist of two, very distinctive large blue petals with one white petal below (Figure 3). Asiatic dayflower generally blooms from mid- to late-summer in Missouri, with each flower blooming for a single day (thus the name). Several authors have found that the seed of Asiatic dayflower are capable of germinating throughout the growing season and that the seed can also remain viable in the soil for more than 4 ½ years.

Figure 1. Asiatic dayflower seedlings are often mistaken as a grass soon after emergence but have much wider leaves with distinct parallel veins.

Figure 2. Asiatic dayflower in a no-till corn field.

Figure 3. Asiatic dayflower flowers. Notice the two blue petals above and one white petal below.

Asiatic dayflower has become more noticeable in recent years in no-till fields throughout Missouri. It forms dense colonies that can cause severe yield losses in both corn and soybean. Few herbicides provide acceptable control of Asiatic dayflower in soybeans. Recently, weed scientists at Iowa State University have conducted a number of trials to identify treatments for the management of this species. This research has revealed that in soybeans, Firstrate, Sencor, and the Authority products are some of the only herbicides that will provide acceptable Asiatic dayflower control when applied as a preemergence treatment. Similarly, Firstrate or Cobra are some of the only conventional herbicides that will provide acceptable control of this species when applied as a postemergence treatment in soybeans, but applications must be made before this species reaches six inches in height. Glyphosate at standard rates in Roundup Ready soybeans or corn will usually only provide a minor degree of suppression.

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Field Crop Disease Update - May 17, 2010

By Laura Sweets

Wheat: We still have not received many calls or questions on wheat diseases in part because of the low number of wheat acres in Missouri this year. Symptoms of wheat spindle streak mosaic and wheat soil-borne mosaic have been reported from some fields in southwest Missouri. With the cool temperatures over the last two weeks the symptoms of these virus diseases may be evident for longer than normal. Symptoms typically fade as temperatures increase in May and June. Symptoms of barley yellow dwarf virus have been reported from fields in several areas of the state. Symptoms are primarily on the flag leaf.

It might be possible to see symptoms of Fusarium head blight or scab on wheat in southeast or southwest Missouri that has already flowered. For central and northern Missouri wheat that is beginning to flower or flowering is at risk from this disease. The May 5 issue of the *Integrated Pest & Crop Management Newsletter* contained an article on Fusarium head blight of wheat which describes symptoms, conditions which favor the development of this disease and management options.

There have been a few reports from west central Missouri of rust on wheat. Scouting for leaf rust and stripe rust would be recommended. Other foliage diseases on wheat have been very slow to develop thus far this year. This may be due to cooler than normal conditions even though rain has been plentiful. See the April 20, 2010 issue of the *Integrated Pest & Crop Management Newsletter* for information on the various foliage diseases of wheat in Missouri.

Corn: With the cool, wet conditions reports of poor corn stands are coming in from many regions of the state. Environmental conditions may be a key factor in these poor stands but seed decay and seedling blights may also be contributing to the problem.

Early planted corn that has survived may be prone to crazy top or downy mildew. See article in this issue for additional information on crazy top of corn.

This is also the time of year when the first symptoms of Stewart's bacterial wilt may be evident on young corn seedlings. Flea beetles which vector this disease have not been prevalent yet so Stewart's wilt symptoms are not prevalent.

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Black Cutworm Problems Scattered Across the State

By Wayne Bailey

The potential for black cutworm problems continues in fields where emerging and seedling corn plants are present. Although widespread problems with this pest have not occurred this year, some fields across the northern and central regions of the state have required rescue applications of insecticides. The potential risk from this pest depends on where the migrating moths laid their eggs, on the number of larvae produced from the eggs, and the growth stage of the corn seedlings when larger black cutworm larvae are present. Corn plants are typically susceptible to "cutting" damage through the 4th leaf growth stage. Although most corn fields in the state will not experience black cutworm problems this year, some fields will become infested with economic populations of larvae. Corn just emerging at this time is most at risk as large larvae may be present in fields. Other fields with black cutworm infestations may have larvae of differing sizes. This indicates that larvae may cause damage for an extended period of time in contrast to a limited period of damage when all larvae are in the same growth stage. Although wet conditions may limit scouting activities for this pest, it is recommended that corn fields be scouted at least weekly from seedling emergence through the 4-leaf stage of growth.

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Crazy Top of Corn

By Laura Sweets

This has been another difficult year for corn planting. Wet conditions have delayed planting. Some corn that was planted early is being replanted because of poor stands. However, some of the early planted corn is being left and these fields might be ones in which crazy top may become evident. Crazy top of corn is caused by the downy mildew fungus, *Sclerophthora macrospora*. The causal fungus is a soilborne fungus which causes infection when young plants are subjected to saturated soil conditions or water accumulating in whorls or leaf sheaths.

In corn, crazy top is likely to occur when young corn plants are subjected to saturated soil conditions for 24- 48 hours from planting to about the five-leaf stage of growth. Accumulation of soil and water in the whorl of small plants may also result in infection. The disease causes a deformation of plant tissues including excessive tillering, rolling of leaves, proliferation of the tassel until it resembles a mass of leafy structures and stunting of corn plants. Leaves of infected plants may be narrow and straplike in shape, leathery in texture and yellow or yellow striped in color.

In seasons with wet springs or rains after corn has emerged, young corn plants subjected to saturated soil conditions may show symptoms of crazy top. Occasionally a band of affected plants may encircle a drowned out spot in a field. Some hybrids may be more susceptible to crazy top. This disease is seldom severe enough to cause significant losses.

The downy mildew fungus which causes crazy top of corn (*Sclerophthora macrospora*) has been reported on more than 140 species of perennial and annual grasses. In addition to corn, downy mildew occurs on wheat, barley, rice, oats, sorghum, crabgrass, green foxtail, barnyard grass and numerous other grasses. In addition to surviving in various grass hosts, the fungus produces survival structures called oospores which can persist for months in infested crop residues and in the soil.

Losses from crazy top are seldom severe enough in corn to warrant control. Furthermore practical management options for crazy top are very limited. Improving soil drainage or water management may be beneficial. Rotation to nongrass crops may help may also be of some benefit.

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IPM Publications, Information You Can Use! IPM 1007: Practical Weed Science for the Field Scout - Corn and Soybean

By Steven Kirk

Crop scouting provides field-specific information on pest pressure and crop injury, as well as information essential to the appropriate selection and application of pest management procedures. Because crop losses from weeds can be costly for Missouri's farmers, scouting can be an essential part of an Integrated Pest Management (IPM) program that can help reduce these losses.

'IPM1007: Practical Weed Science for the Field Scout - Corn and Soybean' authored by Kevin W. Bradley, MU Extension Weed Specialist; Bill Johnson, Department of Botany and Plant Pathology: Purdue University; Reid Smeda, MU Division of Plant Sciences; and Chris Boerboom, Department of Agronomy: University of Wisconsin; is designed to be a practical reference and educational tool for use in scouting corn and soybean fields for the presence of weeds. The information in this manual will help to identify whether a rescue treatment or crop response to herbicide activity is necessary.

IPM1007 is divided into two main sections. The first section details weed identification, scouting, and mapping procedures and is accompanied by an identification key and color photographs of weeds common to Missouri. The second section provides information on the identifying causes and conditions and diagnosis of herbicide injury. It is accompanied by an index, tables and color photos.

The MU Plant Protection Programs publishes a series of IPM manuals and guide sheets that focus on a wide variety of topics important to individuals engaged in making sound pest management decisions. IPM publications are free to view online: (http://ppp.missouri.edu/ipm/pubs.htm) and copies can be printed for your convenience. Print copies of most IPM publications can be purchased for a nominal fee. To order copies of our IPM publications online go to: (http://extension.missouri.edu/publications/order.aspx). To order print copies by phone with a credit card, call: 573-882-7216 or 800-292-0969.

Because Missouri's citizens are concerned about pesticide use, pest managers need to put social and environmental considerations at the forefront of their decision making process. IPM strives to safeguard our natural resources, and protect our environment by reducing pollution that can affect human health, nontarget organisms and food safety.

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Time to Scout for Potato Leafhopper in Alfalfa Fields

By Wayne Bailey

Around May 5 each year potato leafhopper adults generally migrate into Missouri. In most years these adults and their offspring will build in number and may severely damage alfalfa plants. Potato leafhopper adults are about 1/8-inch in length, wedge shaped, and greenish-yellow in color. They are very mobile and quickly move sideways, jump, or fly when disturbed. This is a native insect which migrates into Missouri each spring from more southern states and Mexico. The potato leafhopper is often transported into the state by early spring storms which move in a northeast direction. The leafhoppers are thought to actively fly into the storms and be carried great distances by low level winds (jets) which approach 100 mph in speed. Arrival of leafhoppers is usually associated with strong thunderstorms containing hail. After a storm passes, high numbers of leafhoppers can often be found in the trail of the storms. The arriving adults may feed initially on several tree species before moving to alfalfa to feed and reproduce. Immature leafhoppers, called nymphs, look very similar to the adult stage except they possess wing pads instead of functional wings. Two to three generations of potato leafhopper are often produced each year with economic damage generally occurring on alfalfa following removal of first harvest. Damage is caused when both adult and nymphal (immature) leafhoppers use their piercing-sucking mouthparts to penetrate alfalfa leaflets and stems. They remove plant juices and often cause yellowing of established plants, stunting of plant growth, and possible mortality of seedling alfalfa. Both forage quality and quantity are reduced by this alfalfa pest. Alfalfa plants damaged by potato leafhopper feeding will often turn yellow as sugars from photosynthesis are trapped in the plant foliage and cause the change in color to yellow, commonly referred to as "hopper burn". Scouting for this pest is best accomplished using a 15-inch diameter sweep net. Take 10 pendulum sweeps at five random locations in the field. If the average number of potato leafhoppers per sweep (adult + nymphs) reach or exceed the economc threshold numbers listed below, treatment is justified. The economic threshold for potato leafhopper in alfalfa depends on the height of the alfalfa and whether the alfalfa is a potato leafhopper resistant variety or a traditional alfalfa variety. Most alfalfa varieties sold in Missouri in recent years are PLH resistant, although it is best to check the seed label. Alfalfa fields containing a companion grass are often less susceptible to potato leafhopper infestations than fields of pure-stand alfalfa.

Table 1. Economic Threshold for Potato Leafhopper in Alfalfa

Alfalfa Stem Length - inches	*Ave # PLH/Sweep (traditional variety)*	*Ave # PLH/Sweep (PLH Resistant Variety)*
< 3	0.2	0.6
6	0.5	1.5
8-10	1.0	3.0
12-14	2.0	6.0

Table 2. Recommended Insecticides for Potato Leafhopper Adult and Nymphs in Alfalfa

Chemical Name	*Common Name*	*Rate of Formulated Material*	*Preharvest Interval*
Beta-cyfluthrin Chlorpyrifos plus	*Baythroid XL	0.8 to 1.6 fl oz/acre	7 days
gamma cyhalothrin	*Cobalt	7 to 13 fl oz/acre	7-14 days
Dimethoate	Dimethoate	see specific label	10 days
Chlorpyrifos 4E	*Lorsban 4E *numerous products	1 to 2 pts/acre see specific labels	7 - 14 days 7 - 14 days
Malathion	numerous products	see specific labels	0 - 7 days
Methyl Parathion	*numerous products	see specific lables	15 days
Zeta-cypermethrin	*Mustang Max	2.24 to 4.0 fl oz/acre	3 days
Permethrin	*numerous products	see specific label	7 - 14 days
Gamma-cyhalothrin	*Proaxis	1.92 to 3.2 fl oz/acre	1 day forage/7 day hay
Carbaryl	Sevin 4F	1 qt/acre	7 days
Carbaryl	Sevin XLR Plus	1 qt/acre	7 days
Lambda-cyhalothrin	*Warrior	1.92 to 3.2 fl oz/acre	1 day forage/ 7 day hay
Lambda-cyhalothrin	*Numerous products	see speciic labels	***1 day forage***
			7 days hay

Read and follow all label direction, precautions, and restrictions.
**Designated a restricted use product.*

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Tips for Troubleshooting Field Crop Problems *continued from page 65*

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 where the crop is injured and in nearby fence rows. 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 clues that could be useful in diagnosing the causes of field crop problems. Following these suggested procedures will give field crop consultants and farmers a better chance of diagnosing the cause of field crop problems during 2010.

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Plant Diagnostic Clinic Clients and Other Interested Parties:

I am writing to let you know that we are temporarily suspending the activities of the University of Missouri Extension Plant Diagnostic Clinic, effective immediately, until we have identified a new Clinic Director. We understand how important the clinic is to you and apologize for any inconvenience this action may cause. However, we also recognize that, in the absence of a diagnostician, we cannot provide the level of service that clinic clientele have come to expect. Approval to proceed with the search for a new diagnostician has been received and advertisements have been posted nationally. Such searches can take several months to complete but we will alert you promptly when we have identified the Diagnostic Clinic's new director.

The University of Missouri Clinic is part of a national network called the National Plant Diagnostic Network. Below you will find links to the network web page and to the North Central Regional network that is part of the larger group.

North Central Plant Diagnostic Network: http://www.ncpdn.org/DesktopDefault.aspx
National Plant Diagnostic Network: http://www.npdn.org/

Please feel free to pass on any comments or questions you may have.
My e-mail address is collinsmic@missouri.edu.

Mike Collins, *Director*
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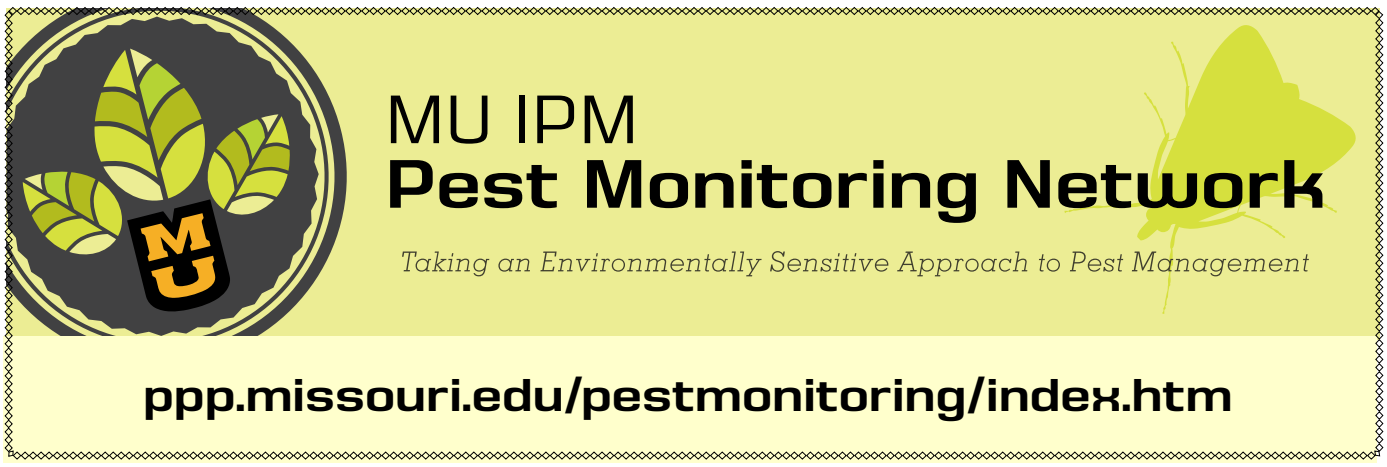
MU IPM
Pest Monitoring Network
Taking an Environmentally Sensitive Approach to Pest Management
ppp.missouri.edu/pestmonitoring/index.htm

Weather Data for the Week Ending May 17, 2010

By Pat Guinan

Station	County	Weekly Temperature (°F)						Monthly Precipitation (in.)		Growing Degree Days‡	
		Avg. Max.	Avg. Min.	Extreme High	Extreme Low	Mean	Departure from long term avg.	May 1-May 17	Departure from long term avg.	Accumulated Since Apr. 1	Departure from long term avg.
Corning	Atchison	63	48	69	41	55	-8	2.28	-0.16	412	+129
St. Joseph	Buchanan	63	49	67	46	55	-8	5.83	+3.12	399	+96
Brunswick	Carroll	64	51	69	47	57	-6	5.20	+2.43	437	+118
Albany	Gentry	63	47	68	40	55	-7	5.00	+2.40	371	+94
Auxvasse	Audrain	65	52	75	48	59	-4	4.16	+1.19	464	+140
Vandalia	Audrain	65	52	75	49	58	-5	4.49	+1.80	448	+152
Columbia-Bradford Research and Extension Center	Boone	67	52	78	48	59	-4	3.51	+0.37	440	+86
Columbia-South Farms	Boone	66	53	79	47	59	-4	4.05	+0.93	474	+121
Williamsburg	Callaway	66	53	75	49	60	-2	3.20	+0.47	491	+179
Novelty	Knox	64	49	68	44	57	-6	4.22	+1.33	377	+79
Linneus	Linn	63	49	68	41	56	-6	5.53	+2.59	380	+91
Monroe City	Monroe	65	51	73	47	57	-6	4.13	+1.34	417	+95
Versailles	Morgan	68	54	80	48	61	-3	4.21	+0.78	519	+121
Green Ridge	Pettis	66	52	80	48	59	-4	3.34	+0.45	467	+138
Lamar	Barton	69	57	79	52	63	-2	3.95	+0.64	534	+129
Cook Station	Crawford	71	55	86	51	63	-2	2.16	-0.85	499	+84
Round Spring	Shannon	74	58	86	54	65	+1	2.48	-0.70	509	+132
Mountain Grove	Wright	73	57	82	52	64	+1	4.59	+1.66	497	+154
Delta	Cape Girardeau	77	61	83	55	68	+1	1.76	-1.42	628	+135
Cardwell	Dunklin	81	64	85	58	71	+2	2.88	-0.11	763	+179
Clarkton	Dunklin	80	63	86	57	70	+2	2.11	-0.28	707	+144
Glennonville	Dunklin	79	63	84	58	70	+2	2.38	0.00	726	+160
Charleston	Mississippi	79	63	84	57	70	+3	2.75	+0.01	708	+221
Portageville-Delta Center	Pemiscot	81	65	87	59	72	+4	5.96	+3.24	778	+206
Portageville-Lee Farm	Pemiscot	81	65	87	59	72	+4	6.36	+3.60	788	+226
Steele	Pemiscot	82	65	87	59	73	+4	6.69	+3.63	807	+231

* 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.

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