Plant Protection Programs University of Missouri

Integrated Pest & Crop Management

Corn Growers — Don't Let Aflatoxin Ruin Your 2010 Corn Harvest

By Allen Wrather

Corn harvest will soon begin in the upper Mississippi delta region, and I want to warn farmers to take precautions to minimize aflatoxin contamination of their grain. Farmers in this region have not had serious problems with aflatoxin since 1998; there have been a few isolated problems but not region wide. Unfortunately, problems with aflatoxin contaminated corn may develop this year because drought and earworm injury were greater this year that in recent years, and damage to corn by drought and earworm can enhance the development of the mold on corn kernels that produces aflatoxin. All corn farmers even those that irrigated their crop and sprayed for earworm or planted varieties with resistance to earworm should take some precautions to avoid problems with aflatoxin.

Here is the situation. The problem occurs when a mold named Aspergillus flavus feeds on the starch inside corn kernels and produces aflatoxin. This mold gains access to the starch through openings in the kernel hull due to drought caused stress cracks and injury due to ear worm feeding. I don't know the reason this mold produces aflatoxin as it feeds, but it does. Aflatoxin will be produced as long as the mold feeds and more will be produced when the mold grows rapidly.

Aflatoxin is a poison to humans and animals. Since it is so toxic to humans and animals, the Food and Drug Administration designed methods to protect us and animals from contaminated corn and corn products. One of the methods designed by FDA to protect us is to prevent grain merchants from buying corn containing 20 parts per billion or more aflatoxin. This is good because it minimizes availability of aflatoxin contaminated products that we eat such as corn meal and minimizes the availability of contaminated corn beef, and poultry farmers purchase.

This mold can grow on corn kernels in the field and on corn kernels stored in a truck or grain tank. The mold prefers to grow on 18-20% moisture corn kernels at around 85° F. It grows slowly on 15% moisture corn and will not grow or grows very slowly on 13% moisture corn. To reduce growth of this mold and aflatoxin production on stored corn, farmers should dry freshly harvested corn to 15% moisture within 24 hours of harvest. Farmers should dry corn to 13% for long term storage to stop growth of the mold and aflatoxin production.

What should farmers do this year? I suggest they first harvest some dryland corn and have the grain tested for aflatoxin. If it is not contaminated with aflatoxin, then the irrigated corn will probably not be contaminated. If the dryland corn is contaminated, farmers should then harvest some irrigated corn and test it for aflatoxin. If the irrigated corn has no aflatoxin, farmers should first harvest and sell the healthy corn or store it in separate bins and then harvest the contaminated corn and store it separate from the healthy corn. Don't blend contaminated and toxin free corn in a truck or grain bin because this may result in contamination of the entire truck load or bin of corn.

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Diplodia Ear Rot of Corn

By Laura Sweets

Questions related to Diplodia ear rot of corn have been prevalent during the past week. Diplodia ear rot of corn was unusually widespread and severe on corn throughout most of Missouri during the 2009 season. Since the primary source of inoculum for the disease is diseased corn debris left in the field, planting corn in a field which had high levels of Diplodia ear rot in 2009 greatly increases the risk of the disease occurring in 2010 corn. The risk for Diplodia ear rot will also be influenced by weather conditions after silking with the risk being greatest if wet weather occurs after silking. Reports of Diplodia ear rot of corn are primarily from southwest and west central Missouri. The following article covers symptoms, factors favoring disease development and management options for Diplodia ear rot of corn.

Pathogens: Diplodia ear rot may actually be caused by two different species of the fungus *Diplodia*: i.e. *Diplodia maydis* and *Diplodia macrospora*. Although the genus name of the fungus has recently been changed from *Diplodia* to *Stenocarpella*, the disease is still commonly referred to as Diplodia ear rot.

Symptoms: If infection occurs soon after pollination, Diplodia ear rot may be evident as a bleaching or light straw coloration of the ear leaf and husks on the ears of infected plants. The bleached ear leaf and husks stand out against the green leaves on the rest of the plant making these symptoms obvious even from a distance.

The most characteristic symptom of Diplodia ear rot is seen when the husks are peeled back revealing a dense white to grayish-white mold growth matted between the husks and the ear and between the rows of kernels. Symptoms often start at the base of the ear. Severely infected ears may be shrunken, light weight and completely covered with grayish-white to grayish-brown mold growth. These ears may be completely rotted.

Individual kernels may appear normal, may have some mold growth adhering to the kernel or may be dull gray to brown in color, rotted and very light weight.

Small, black fungal fruiting bodies (pycnidia) of the fungus may be scattered on husks or embedded in kernels and cob tissues.

Diplodia can also cause a stalk rot of corn. Several weeks after silking, leaves on plants affected with Diplodia stalk rot may wilt, become dry and appear grayish green as though damaged by frost. Plants may die suddenly. Diplodia stalk rot may begin as a brown to tan discoloration of the lower internodes. Stalks become spongy and are easily crushed. The pith disintegrates, leaving only the vascular bundles. Mats of white fungal growth may be evident on affected tissues. The small, black fungal fruiting bodies (pycnidia) may be embedded in the mold growth or stalk tissues.

Factors Favoring Disease Development: The primary source of inoculum is diseased corn debris left in the field. The small, black fungal fruiting bodies embedded in stalk, cob and kernels left in the field contain spores of the fungus and these spores can be released the following season to cause infection of the current season's corn crop. Wet weather favors spore release and spread. Splashing water may spread the spores to silks where the spores germinate and the fungus grows down the silks into the ears. The fungus may also penetrate the husk at the base of the ear. With husk infection, the fungus appears to grow between the ear shoot and the stalk or between the ear shoot and the sheath of the ear leaf.

Ears are most susceptible for three weeks after silking as silks start to senesce. Wet weather after silking favors the development of Diplodia ear rot. Bird and insect damage to the ear tips may also predispose plants to infection.

Management Options for Diplodia Ear Rot:

Crop rotation is extremely important in attempting to lower the risk of Diplodia ear rot. Because of the high level of fungal fruiting bodies which may remain in infested corn debris left in the field, the disease may be much more severe if corn follows corn which had Diplodia ear rot.

Hybrids differ in their susceptibility to Diplodia ear rot. Few companies publish Diplodia ear rot ratings but after 2009 and 2010, most companies should have a good idea of susceptible and more resistant hybrids. Visit with your seed dealer about the reaction of their hybrids to Diplodia ear rot, especially if it is necessary to plant corn on corn in 2011.

Diplodia ear rot is not listed on the majority of foliar fungicides labeled for use on corn. The few labels that do include Diplodia ear rot list suppression rather than control of the disease. Timing of application in relation to stage of growth and weather conditions would be crucial for fungicides to provide suppression. If Diplodia ear rot is already present, the benefit of a fungicide application may be lower than if the fungicide had been applied prior to infection. Also, good coverage of the ears may be difficult to achieve. Generally, fungicide applications are not going to provide acceptable control of Diplodia ear rot.

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Field Crop Disease Update - August 3, 2010

By Laura Sweets

Corn

The corn foliage disease situation hasn't changed much since July 19. Descriptions of the **corn foliage diseases** were given in the June 21, 2010 issue of the *Integrated Pest & Crop Management Newsletter*. Although much of the state has been unusually wet this spring and summer, the development of corn foliage diseases has been sporadic. There have been a few reports of moderate levels of gray leaf spot and common rust but in most cases the severity has not increased dramatically over the last two weeks. There are also fields in which it is difficult to find either disease. There have been some reports and confirmations of southern rust in the southwest and western parts of the state. Anthracnose leaf blight was prevalent and in some fields severe early in the season. At that time it was very evident on the first 3-5 leaves on the young corn plants. Most of the leaves have been sloughed off and anthracnose leaf blight may be difficult to find at this point in the season in many fields. Very little Stewart's bacterial wilt has shown up so far this year. If making a decision on whether or not to apply a foliar fungicide for disease control this year, it would certainly be prudent to scout fields for presence and severity of diseases first.

Reports of Diplodia ear rot are coming in from the southwest and west central regions of the state. See accompanying article on Diplodia ear rot.

Soybean

Descriptions of the **soybean foliage diseases** were given in the June 21, 2010 issue of the *Integrated Pest & Crop Management Newsletter*. Thus far there have been few reports of problems with soybean foliage diseases. Septoria brown spot may be evident on lowest leaves in the canopy but doesn't seem to be moving up in the canopy. With the heavy rains and wind driven rains, bacterial blight could be showing up. Generally symptoms of bacterial blight are evident 3-5 days after wind-driven rains, hail storms, etc.

Fields which received significant rain during the several weeks after planting may be more prone to **Phytophthora root rot** and to **sudden death syndrome** (SDS). Phytophthora root rot could have been evident as a seedling blight but may also show up later in the season as plants move into reproductive stages of growth. Individual plants may turn off-color, yellow and die prematurely. Foliage symptoms of SDS tend to show up in August but in some years could appear by mid-July. Initial symptoms would be the development of yellow blotches between the veins of the leaves. Yellowing of the interveinal tissue with the yellow tissue turning brown follows. There are no rescue treatments for these diseases.

There have also been calls about "yellow" soybeans. There are numerous causes for yellowing of soybean plants. Yellowing may refer to entire plants turning yellow or to various patterns of yellowing on individual leaflets of plants. When checking fields with yellow soybean plants it is important to carefully dig plants and to examine their root systems. With the cool, wet conditions this spring and the continued wet conditions through the season in many parts of the state, soybean plants may have very poor root systems. The root mass or volume may be poor, the root system very shallow with lateral roots close to the soil surface and running almost parallel to the soil surface and tap roots may be very small to virtually non-existent. Plants with such poor root systems may be unable to take up available nutrients so might be exhibiting nutrient deficiency symptoms. With high temperatures and drying winds, plants with poor root systems may scorch out very quickly. In some cases Rhizoctonia may be evident as a reddish brown discoloration of the lower stem or upper tap root. Cooler temperatures with adequate moisture would help this situation.

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Corn Growers — Don't Let Aflatoxin Ruin Your 2010 Corn Harvest *continued from page 109*

What should farmers do in the future to avoid aflatoxin problems? I suggest they plant corn in fields that can be irrigated and treat growing corn for earworm if necessary. They may also consider planting varieties resistant to earworm such as SmartStax, YieldGard VT Triple PRO, or YieldGard VT PRO.

Again, corn farmers should beware of this problem and always dry corn to 15% moisture within 24 hours of harvest.

Following these suggested procedures will give corn farmers a better chance of producing aflatoxin-free corn during 2010. For more information, you may call me at 573-379-5431 or visit the web at http://aes.missouri.edu/delta/croppest/aflacorn.stm.

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Weed of the Month: Maypop Passionflower

By Bryan Sather and Kevin Bradley

Maypop Passionflower (*Passiflora incarnata*) is a fast-growing perennial vine that is often planted as an ornamental due to its attractive, showy flowers. In recent years, maypop passionflower has escaped cultivation to become a problematic weed in many areas such as no-till agronomic crops, pastures, hay fields, and roadsides. Maypop passionflower is also known as wild passionflower, purple passionflower, or white sarsaparilla, and is a native of the southeastern United States.

Figure 2. Mature maypop passionflower growing in a pasture.Image from Iowa State University.

Maypop passionflower seedlings have cotyledons that are very thick and have a waxy appearance along with the first true leaf, which is often heart-shaped (Figure 1). Seedlings are rarely encountered, however, as new maypop passionflower sprouts more commonly arise from the underground perennial rootstocks. After the first true leaves have emerged, the remaining leaves are arranged alternately along the stem, are about 2 ½ to 6 inches in length and 5 to 6 inches in width, and are typically divided into three to five lobes that each originate from a common point (Figure 2).

The stems of passionflower are green and can be either smooth or covered in short hairs. Stems also have tendrils that help the plant to climb onto and over nearby objects. The heights of the stems vary greatly depending on what structure is supporting the plant.

Maypop passionflower has showy flowers that are white to bright pink or purple in color and usually 2 to 3 inches in diameter (Figure 3). Numerous flowers emerge from the leaf axils and in Missouri, flowers can occur from July to September.

The fruit of maypop passionflower are also very distinctive. The fruit are generally egg-shaped to round in outline, ranging in size from slightly larger to a hen's egg to the size of a baseball.

Figure 1. Maypop passionflower seedling.

Figure 3. Flowers of maypop passionflower.

Initially the fruit are green in color but become yellowish-red with maturity. Some claim the name "maypop" comes from the popping sound the immature fruit make when you step on them.

Due to their thick, deep rhizomes, mechanical or cultural control of maypop passionflower can be very difficult. With

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Figure 4. Maypop passionflower fruit.

perennial species that have deep underground rootstocks and/or rhizomes, tillage often serves to break up the perennial rootstocks which can then regenerate and ultimately produce a larger infestation. This is certainly the case with maypop passionflower; Wehtje et al. (1985) found that approximately 80% of rhizomes that were cut into 1-inch segments were able to regenerate and form brand new plants.

Very little information has been published on the control of maypop passionflower with herbicides. In a pasture or hay field setting, some research has shown that higher rates of 2,4-D (sold as a variety of trade names), triclopyr (in Remedy, Garlon, PastureGard, and Crossbow), picloram (in Tordon, Grazon P+D, and Surmount) and dicamba (in Banvel, Clarity, Weedmaster, etc.) should provide good control of maypop passionflower. In fencerows, landscapes, or other areas where spot spraying is acceptable, a 1 to 5% solution of glyphosate should also provide good control of maypop passionflower.

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IPM Publications, Information You Can Use!
IPM 1025, Cotton Pests: Scouting and Management

By Steven Kirk

Missouri ranks in the top-ten cotton producing states in the country. Cotton production is concentrated in a seven-county area located in southeastern Missouri. Several factors are involved in optimal cotton production, including temperature, solar radiation, water and healthy root systems which make Missouri's 'Bootheel' region, with its deep-alluvial delta soils, ideal for growing this economically important crop.

Missouri's cotton producers are encouraged to use all practical integrated pest management (IPM) practices to maximize crop production while minimizing economic and environmental costs. IPM1025 Cotton Pests: Scouting and Management, authored by Michael L. Boyd, State Extension Entomology Specialist; Bobby J. Phipps, State Extension Cotton Specialist; J. Allen Wrather, Field Crop Disease Management; is one of a series of Integrated Pest Management (IPM) manuals prepared by the MU Plant Protection Programs. This publication is designed to provide Missouri's cotton growers with vital information needed for making timely and accurate decisions in crop and pest management.

IPM1025 Cotton Pests: Scouting and Management provides information to help farmers and consultants with vital instructions on scouting for potential insect, weed and disease problems and provide important management strategies to help reduce crop losses and increase yields.

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, non-target organisms and food safety.

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Weather Data for the Week Ending August 2, 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.	July 1 - July 31	Departure from long term avg.	Accumulated Since Apr. 1	Departure from long term avg.
Corning	Atchison	91	74	96	71	82	+6	4.87	-0.11	2459	+399
St. Joseph	Buchanan	89	72	94	69	80	+4	4.39	-0.19	2371	+312
Brunswick	Carroll	88	71	93	68	79	+3	7.76	+3.55	2490	+393
Albany	Gentry	90	69	95	64	79	+3	3.05	-1.96	2351	+311
Auxvasse	Audrain	88	69	92	66	78	+1	10.86	+6.90	2469	+349
Vandalia	Audrain	87	69	91	66	78	+1	11.26	+6.79	2461	+381
Columbia-Bradford Research and Extension Center	Boone	88	70	92	67	78	0	8.03	+3.85	2428	+243
Columbia-Sanborn Field	Boone	89	72	94	69	80	+2	10.90	+6.67	2633	+384
Williamsburg	Callaway	88	69	92	66	78	+2	6.69	+2.35	2504	+439
Novelty	Knox	87	69	91	66	78	+2	12.85	+8.75	2303	+255
Linneus	Linn	88	69	92	66	78	+2	7.16	+2.38	2330	+329
Monroe City	Monroe	87	69	90	67	78	+2	10.00	+6.18	2413	+320
Versailles	Morgan	92	71	98	66	81	+3	7.69	+3.53	2635	+406
Green Ridge	Pettis	90	72	96	67	80	+7	9.36	+5.40	2521	+440
Lamar	Barton	92	73	98	71	81	+2	6.61	+2.15	2640	+326
Cook Station	Crawford	92	68	95	65	79	+1	9.24	+6.05	2497	+254
Round Spring	Shannon	93	69	96	67	79	+3	6.08	+2.35	2518	+379
Mountain Grove	Wright	94	72	99	70	81	+4	3.67	-0.42	2530	+433
Delta	Cape Girardeau	91	71	93	64	80	+1	2.82	-0.38	2843	+340
Cardwell	Dunklin	92	74	96	71	82	+2	4.79	+1.11	3105	+378
Clarkton	Dunklin	93	72	98	67	82	+2	3.52	-0.08	3029	+343
Glennonville	Dunklin	93	74	96	69	82	+2	2.56	-1.05	3065	+390
Charleston	Mississippi	93	73	97	66	82	+3	1.95	-2.01	3005	+506
Portageville-Delta Center	Pemiscot	*	*	*	*	*	*	*	*	*	*
Portageville-Lee Farm	Pemiscot	93	74	97	69	83	+3	2.63	-1.03	3173	+496
Steele	Pemiscot	93	74	98	71	83	+3	3.56	-0.18	3241	+537

* 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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