Plant Protection Programs University of Missouri

Integrated Pest & Crop Management

Wheat Disease Update For June 23, 2008

By Laura Sweets

This has been a difficult year for wheat in many ways. And, unfortunately, the problems continue. Although some wheat fields look remarkably good considering the weather stresses they have encountered this year, in some fields various head problems are occurring. Loose smut is much more evident than it should be. Scab is developing in fields throughout most of the state. *Septoria tritici* causes Septoria leaf blotch but may also cause dark blotches on heads and *Stagnospora nodorum* is actually more common on heads than leaves. Bacterial stripe (leaf disease) and bacterial black chaff are also evident in some fields. And, if the pattern of frequent rain events continues "black" wheat may become a problem as the crop matures.

Loose smut is obvious as heads emerge from the boot and for several weeks after that. The kernels on infected heads are replaced with masses of powdery black spores. So the heads have a very obvious, black, powdery appearance. These spores are eventually dislodged by wind and rain, so later in the season the smutted stems are less evident and only the bare rachis will be left. Spores produced on smutted heads are wind carried to adjacent plants in the field and infect through the flowers. The fungus that causes loose smut survives within the embryo of wheat seeds. If infected seed is planted, the plants growing from those seeds will be infected and develop smutted heads the next season. If seed from a field that has a "small" amount of smut in one season is used for seed, the field planted with that seed may have a substantially higher level of smut. Loose smut is best controlled by planting either disease-free seed or using a systemic fungicide seed treatment.

Scab or Fusarium head blight was discussed in the last issue of the Integrated Pest and Crop Newsletter. Symptoms of scab are evident in fields now. The characteristic symptom of scab on wheat is a premature bleaching of a portion of the head or the entire head. Superficial mold growth, usually pink or orange in color, may be evident at the base of the diseased spikelets. Bleached spikelets are usually sterile or contain shriveled and or discolored seed.

Septoria leaf blotch had not been particularly widespread or severe this season but with scattered pop-up rains and high humidity over the last few weeks this disease has come on more strongly. Foliage symptoms may be evident on the flag leaves and the dark brown to black blotches on the heads are also quite evident in some fields. *Stagnospora nodorum* may also cause leaf lesions but is usually more common on heads- again causing dark blotches on glumes of part or all of the head.

Bacterial stripe or black chaff is a bacterial disease that produces symptoms on both leaves and heads. Water-soaked lesions may develop on young leaves. These develop into reddish brown to brownish-black streaks on the leaves. Glumes and awns show brown-black blotches or streaks. Fungicides are not effective against bacterial stripe or black chaff so the use of resistant or tolerant varieties and crop rotation are the main management options.

The current forecast of frequent showers and high humidity could result in problems with "black" wheat.

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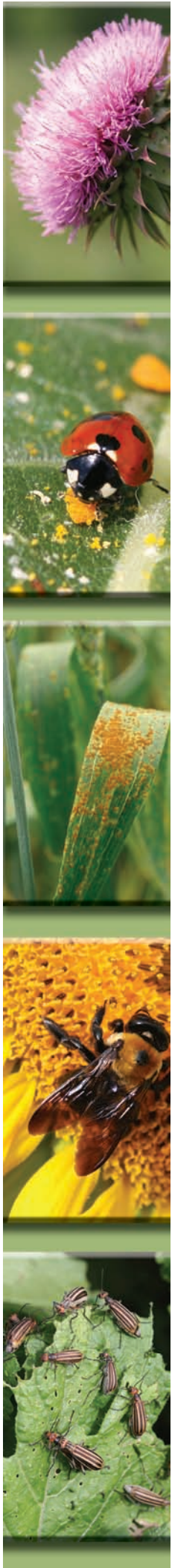

Crazy Top of Corn

By Laura Sweets

Conditions have been favorable for the development of crazy top in corn so a brief discussion of this disease seems appropriate. 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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Soil Samples Show Nitrogen Loss

By Peter Scharf

After a long, wet spring, I'm getting questions about possible nitrogen loss from all over Missouri and even from other states. My column with a 'Nitrogen Loss Scoresheet' in the last issue of the IPCM Newsletter provided one possible tool for evaluating risk and making decisions.

Deep soil samples provide a more accurate and specific answer, but are hard work to get and require waiting while the lab work is getting done. Larry Mueller has worked with me to sample some producer fields for nitrogen over the past week or two. The results show that anywhere from 40 to 180 lb N/acre have been lost from the sampled fields.

Eight fields were sampled to a depth of three feet. Available N (nitrate and ammonium) was measured and totaled for this depth.

Normally, about 50 lb available N/acre will be found in unfertilized fields. If no N had been lost, we would expect to find this 50 lb plus whatever fertilizer the producer applied. For example, if a producer applied 160 lb N/acre and none was lost, we would expect to find 210 lb N/acre in our soil samples.

From this expected total, we subtracted what we actually found to estimate the amount that had been lost.

The amount of N that had been lost ranged from 40 to 180 lb N/acre, with an average of 95 lb N/acre. At least some of the fields were selected due to conditions that would favor N loss, so I would expect that losses are smaller on an average corn field in Missouri.

The largest losses were seen on fields with well-drained soils and fall-applied N. Not all fields in this category had severe N loss (some had lost as little as 65 lb N/acre), but I suspect that most fields in this category would give hefty responses to additional N applications.

About a month ago, Ron Catlett from Central Missouri Agri-Services in Blackburn (west of Marshall) took deep soil samples from a number of fields and found N loss ranging from 40 to 100 lb N/acre. That agrees fairly well with our more recent samples, except that the top end of our N loss range was higher, probably due to consistent additional rains in the meantime.

The short message is that there are probably a large number of corn fields in Missouri where yields will be limited by nitrogen availability unless additional fertilizer is applied. Factors that make serious N loss more likely include:

1) fall application,
2) early spring application of N sources other than anhydrous ammonia,
3) well-drained soils, and
4) multiple days of saturation after May 15.

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Drainage Installation Field Day To Be Held In July

By Peter Scharf

Producers, landowners, and crop advisors who are interested in the possibility of installing drainage will get a chance to see the process in action on July 17 and 18.

With an unusually wet spring in 2008, row crop producers have struggled to get their crops planted. It seemed that every time the soil dried enough to plant, another rain would arrive within a day. Planting progress has been the slowest in over a decade, and planting is still not complete as I write this on June 23.

Frustration with planting difficulties may increase producer and landowner interest in subsurface drainage. Many fields in Missouri have subsoils that restrict water flow, pond water and dry slowly. Subsurface drainage can greatly reduce the time from a saturating rainfall event until field operations can begin, and help producers to get their planting done in a wet year.

High crop prices will also contribute to an increased interest in drainage. Kelly Nelson's research in northeastern Missouri has shown substantial yield increases for both corn and soybean in drained plots compared to nearby non-drained plots. Those yield benefits are worth a lot more dollars now than they were a few years back. Drainage gives the crop a better early-season environment, especially in wet springs, by reducing seedling disease, oxygen deprivation and stand loss. It also increases soil temperature, getting the crop off to a quicker start.

The University of Missouri and the Missouri Land Improvement Contractors' Association will co-sponsor two field days in July to demonstrate drainage installation. Field days will be held at the University of Missouri's Bradford Farm east of Columbia. A morning program will include presentations on MU research on drainage and subirrigation, an NRCS presentation on drainage survey and design, and a producer's perspective on drainage. After lunch there will be a demonstration of drainage installation equipment. Various stages of the installation process will be shown. Control structures to use drainage lines for subirrigation will also be demonstrated. For producers with limited water, this option will probably deliver water more efficiently than a pivot.

On Thursday, July 17, the field day will start at 9:30 am and conclude by 3 pm. The same program will be repeated at the same times on Friday, July 18. Lunch will be provided to the first 100 people each day to get on the 'Lunch List'. Reserve your lunch by emailing HubbardV@Missouri.edu ('lunch' on the subject line) or by calling (573) 884-7945 (ask for Thresa). Give your name and which day you're coming

The flyer for the field day will be posted on the MU Plant Sciences Web site: www.plantsci.missouri.edu and will include a detailed map showing the location of the field day.For Certified Crop Advisors, a total of 4.5 Soil & Water Management CEUs have been applied for.

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Missouri Cotton Growers — Beware of Root-Knot Nematodes

By Allen Wrather

Crop-threatening levels of root-knot nematodes (RKN) are present in some, but not all, cotton fields in southeast Missouri. During a recent survey of Missouri cotton fields by University of Missouri scientists, root-knot nematodes were found in 20 percent of the New Madrid County fields, 27 percent of Pemiscot County fields, and 43 percent of Dunklin County fields. This nematode is also present in some fields in Scott County.

These nematodes can cause severe injury to cotton and will reduce yield. Symptoms of root-knot nematode injury are stunted cotton plants, and these plants may wilt more quickly than healthy plants during a hot afternoon. Plants injured by these nematodes will also have galls, swollen areas, visible on infected roots. These symptoms will usually be visible 6-8 weeks after cotton emerges. Cotton planting this year was delayed for some producers due to wet weather, and symptoms of injury due to RKN may not be visible until late-June to early-July.

Be cautious about diagnosing the cause of stunted cotton and wilting leaves because other factors such as low soil pH and drought may cause these symptoms. Ask your scout to tell you about areas in your fields where they observe these symptom and then determine the cause of the stunting and wilt. Growers suspicious of cotton problems due to RKN should dig up roots soon after harvest and the stalks are shredded and look for galls on the roots.

Nothing can be done this year to protect cotton against these nematodes, but growers can take precautions to avoid this problem next year. There are no cotton varieties highly resistant to root-knot nematodes, but some will yield better than others in areas with RKN. Growers should also consider planting seed treated with Avicta, or Aeris, or using Temik at 3.5-5.0 pounds per acre infurrow when planting, or treating RKN infested areas of fields with Telone.

Following these suggested procedures will give cotton farmers a better chance of producing higher yields and greater profits. For more information contact Allen Wrather at the University of Missouri Delta Center (Phone: 573-379-5431, E-mail: wratherj@missouri.edu) or check the Delta Center Web Page (aes.missouri.edu/delta).

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Black Cutworms Keep Pressure On Late-Planted Corn Soybeans Now At Risk In Se Missouri; Scouting Needed

By Tamsyn Jones

COLUMBIA, Mo. - After a brief lull, black cutworm moth activity has resumed in northeastern Missouri, and southeastern Missouri reported its first intensive cutworm capture, said University of Missouri entomologists.

"Farmers still need to get out there and look at their crops," said Wayne Bailey, MU Extension entomologist. "Burrower bugs are starting to show up in soybean fields, and it's getting late enough that we could start having other pests, like green cloverworm, fall armyworm and corn earworm."

Black cutworms have been prolific this year due to wet weather, heavier weed cover and delayed planting. Late-planted corn is most at risk in northeast Missouri, while late-planted soybeans are most at risk in southeast Missouri.

"There's still a good bit of soybean planting going on," said Kelly Tindall, MU field crop entomologist at the Delta Research Center in Portageville, Mo. "In the Mississippi and New Madrid river bottoms, we were under water for six weeks in some places. So what should have been planted in April or May didn't get in until late May or early June."

Over a three-day period, 91 black cutworm moths were captured in traps by MU Extension field staff at the MU Delta Center, Tindall said. "It's not unusual for us to get them, but it's unusual to get them so late in the year."

Bailey said recent moth flights are probably late flights from the first generation of overwintering black cutworms.

"What we have left are larvae from that original generation that will cut for the next two weeks, and then their threat to corn and soybeans will diminish," he said. "The second generation rarely goes to field crops, but typically goes to other crops like vegetable crops. The third generation will do the same. It's really only the first one that goes to corn and soybeans."

The traditional economic threshold for black cutworm in soybeans is when 20 percent of the plants are cut, plant stand gaps are greater than 12 inches, and live larvae are present.

"But with higher commodity prices right now we can't stand for much damage," Bailey said. "Farmers may want to treat their plants earlier. The treatment will be different for every stage of growth."

When scouting, bear in mind that black cutworms are nocturnal and may be hard to spot in the field. "You may just see plants cut, and then if you dig in the soil you'll see them," Tindall said.

Signs of damage often show up on field edges first. "If you can find where they moved in, you can do an isolated treatment and you may be able to save some money that way," she said.

The predicted cutting date in northeast Missouri is June 24, while cutting is predicted for June 30 in southeast Missouri.

While scouting, keep an eye out for other pests like burrower bugs, which are related to stinkbugs, Bailey said. "These pests will work on soybeans up to the tri-foliate leaf stage. Farmers just need to keep scouting."

For pest questions or help identifying pest problems, contact your local MU Extension office.

Source: Wayne Bailey, 573-882-2838; Kelly Tindall, 573-379-5431

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Use Shock Chlorination To Disinfect Contaminated Wells

By Curt Wohleber

COLUMBIA, Mo. - Heavy rains and rising rivers may flood wells. "Wells could be contaminated with bacteria, viruses or parasites that can make you ill," said Bob Broz, an MU Extension water quality specialist.

Water from a flooded well should not be used for drinking or food preparation until the well and plumbing system have been disinfected and the water has been tested for safety.

In addition to dangerous pathogens, floodwater can carry abrasive sediment, debris and other contaminants that can damage well equipment, Broz said.

If you must use the water, check with your local health department for recommendations on how long to boil water before using. Consider using alternative water sources such as bottled water.

If your well does have run-in water, you should take steps to ensure the safety of the water and minimize damage to the well.

Turn off the electricity to the pump and inspect the well and pumping system for run-in and signs of damage. If the well cap is missing or is not watertight, debris or sediment may have entered the well. Starting the pump under such conditions could damage the pump. If necessary, have a certified well installer look at the well and have an electrician examine the wiring and power unit for the well.

"Choosing not to check and clean flooded wells can do damage to the equipment and could lead to health concerns," said Broz.

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Wheat Disease Update For June 23, 2008 *continued from page 73*

Wet or humid weather as the crop matures may lead to black wheat, i.e. both heads and entire plants turning black or dark-colored in the field.

A number of saprophytic or weakly parasitic fungi can grow on wheat plants in the field. *Alternaria*, *Cladosporium*, *Aureobasidium* and other species are frequently found on these discolored or black plants. Since the affected plants may have a sooty appearance there fungi are sometimes called sooty molds. These sooty molds or secondary fungi tend to develop on plants or heads when wet or humid weather occurs as the crop is maturing or if harvest is delayed because of wet weather. Typically these fungi come in on heads that are shaded, undersized, weakened or prematurely ripened and on senescing foliage. Plants that are lodged or that have been stressed by nutrient deficiencies, plant diseases or environmental conditions may be more severely affected. Although many of these fungi produce dark or black mold growth, the color of the mold growth can range from dark or black to olive-green or even pink or white.

These secondary fungi tend to develop on senescing plant tissues but under favorable conditions can cause infection in the seed. Infected seed might show a black discoloration. If possible do no save seed from fields with high levels of sooty molds. If seed from fields with sooty molds must be used for planting, seed should be cleaned thoroughly to remove all lightweight and shrunken kernels, a sample should be submitted for a germination test and the use of a fungicide seed treatment should be considered.

Grain from fields with high levels of sooty molds should also be treated with care if it is stored. Again, grain should be thoroughly cleaned to remove lightweight, damaged or broken and moldy kernels. Grain should be stored at the proper moisture content and temperature and checked on a regular basis during storage.

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Use Shock Chlorination To Disinfect Contaminated Wells *continued from page 76*

You can disinfect contaminated well water through a process called shock chlorination:

1. With the electricity off, remove as much sediment from around the well casing as possible. Clean the well cap and the outside of the casing with a solution of 1 ounce of laundry bleach in 2 gallons of clean water. Rinse with clean water and make sure that the casing and pumping system are completely dry before continuing.

2. Once everything is dry, turn on the electricity to the well pump. If the pump works, open an outside faucet and run water onto the ground for 15 to 60 minutes or until the water runs clear. Check each faucet in the home until it runs clear. Close all faucets and turn off the electricity to the pump.

3. Disconnect any household water filters or water softeners and drain the water heater. If you have a gas water heater, put out the pilot light. If your water heater is electric, turn off the power to the heater. Open the well by removing the well cap or the threaded plug in the cap.

4. Prepare a solution of household bleach and water. If your well is 3 to 4 inches in diameter, mix 2 quarts bleach in 10 gallons of clean water. For a well 5 to 6 inches in diameter, mix 1 gallon of bleach with 10 gallons of clean water. Be sure to use eye protection and rubber gloves when mixing.

5. Pour the diluted bleach solution into the well. Avoid pouring directly onto the pump wiring if possible. After turning on the electricity, circulate the solution in the well either by placing a garden hose into the top of the well and running the water for 15 minutes or by starting and stopping the pump several times.

6. Open every water outlet on the system one at a time. Run the water until you can smell the chlorine, then close the faucet. Flush the toilets, refill the water heater and allow the chlorine solution to remain in the system for at least eight hours.

7. After eight hours, run the chlorinated water from the system and have the water tested for bacterial safety. Obtain a water test kit from your county health department. You should continue to use an alternative water source or boil your water for a minimum of one minute until the laboratory reports that the water is safe.

8. Once you receive a safe test result, the water can be consumed. You should have the well tested again in about two weeks to make sure that the disinfection has been completely effective. If the water still contains dangerous amounts of bacteria, repeat the shock chlorination process.

For more information on shock chlorination, contact your county health department or your local University of Missouri Extension office. An MU Extension guide, "Bacteria in Drinking Water," which includes detailed guidelines on shock chlorination, is available online at http://extension.missouri.edu/xplor/envqual/wq0102.htm.

MU Extension's Community Emergency Management Program maintains an extensive list of online resources related to flood preparation, response and recovery at http://extension.missouri.edu/cemp/flood.html.

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Weather Data for the Week Ending June 23, 2008

By Pat Guinan

Station	County	Weekly Temperature (Degrees F)						Monthly Precipitation (in.)		Growing Degree Days‡	
		Avg. Max.	Avg. Min.	Extreme High	Extreme Low	Mean	Departure from long term avg.	Jun 1-23-Jun	Departure from long term avg.	Accumulated Since Apr. 1	Departure from long term avg.
Corning	Atchison	84	59	87	56	72	-2	3.49	-0.02	1060	80
St. Joseph	Buchanan	82	61	84	56	72	-2	5.73	2.03	1014	7
Brunswick	Chariton	84	59	85	53	71	-3	3.97	0.01	1066	33
Albany	Gentry	84	58	86	52	71	-3	6.14	2.69	968	-12
Auxvasse	Audrain	82	60	85	54	71	-3	3.54	0.16	1045	6
Columbia	Boone	82	59	85	54	71	-3	3.2	-0.05	1069	-24
Sanborn Field	Boone	83	61	86	55	73	-2	3.82	0.47	1139	10
Williamsburg	Callaway	83	58	85	53	71	-2	2.58	-1.01	1049	44
Novelty	Knox	81	58	84	52	70	-4	3.58	0.61	932	-71
Linneus	Linn	83	57	85	51	70	-3	4.02	0.31	978	13
Monroe City	Monroe	82	59	85	55	71	-3	4.49	1.68	995	-46
Versailles	Morgan	84	60	86	54	72	-2	6.62	3.53	1137	4
Green Ridge	Pettis	83	60	85	54	72	-2	8.01	3.92	1080	27
Lamar	Barton	84	63	89	59	73	-2	8.16	3.63	1156	-23
Cook Station	Crawford	82	54	84	50	68	-6	1.76	-1.43	1092	-71
Alley Spring	Shannon	*	*	*	*	*	*	*	*	*	*
Round Spring	Shannon	85	57	89	53	70	-3	2.53	-0.48	1098	8
Mountain Grove	Wright	81	57	83	52	68	-5	2.55	-0.61	1038	-17
Delta	Cape Girardeau	84	61	88	56	72	-5	1.41	-1.22	1268	-81
Cardwell	Dunklin	86	63	90	56	75	-3	0.68	-1.73	1500	-4
Clarkton	Dunklin	*	*	*	*	*	*	*	*	*	*
Glennonville	Dunklin	85	62	88	56	74	-4	1	-1.48	1418	-51
Charleston	Mississippi	84	62	87	57	74	-2	1.8	-0.9	1361	35
Portageville-Delta Center	Pemiscot	85	64	89	59	75	-3	1.26	-1.89	1484	6
Portageville-Lee Farm	Pemiscot	85	64	90	58	75	-3	1.17	-1.8	1488	25
Steele	Pemiscot	87	65	90	59	76	-2	1.15	-1.83	1561	76

* 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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