

# Integrated Pest & Crop Management

## Wheat Viruses

By Laura Sweets

Wheat fields in various parts of the state are somewhat slow in greening up this spring. There are several factors which may be contributing to this problem. Wet conditions last fall in some areas delayed soybean harvest and thus delayed wheat planting. Late planted wheat may have been smaller than normal going into the winter months and may be taking longer to begin growth this spring. In many areas of the state winter conditions were not ideal for wheat, temperatures fluctuated between above normal and below normal with minimal snow cover. We have not received many complaints about stands being killed by winter conditions but have been receiving calls related to fields that are slow to green-up or that don't seem to be responding to spring fertilizer applications. Sustained warmer weather may correct some of these problems. However, this is also the time of the year when symptoms of wheat spindle streak mosaic, wheat soilborne mosaic and barley yellow dwarf may be quite evident in winter wheat fields.

So far only one sample exhibiting virus-like symptoms has been received from southwest Missouri. Symptoms on the plants in that sample were suggestive of wheat spindle streak and/or wheat soilborne mosaic. Both wheat spindle streak mosaic and wheat soilborne mosaic tend to be more severe when wet conditions occur after planting in the fall or in the late winter/early spring months. Cool spring temperatures also enhance symptom development of both wheat spindle streak mosaic and wheat soilborne mosaic. It is difficult to predict how widespread and severe wheat spindle streak and wheat soilborne might be this season. Although there are no rescue treatments for wheat virus diseases, it is still a good idea to scout fields for plants showing virus symptoms and to send in samples to identify the virus or combination of viruses that are present so that proper preventative management measures can be used the next time wheat is planted in that field.

Descriptions of the wheat virus diseases most likely to occur on winter wheat in Missouri are given in the following paragraphs.

Symptoms of wheat spindle streak mosaic appear in early spring as yellow-green streaks or dashes on the dark green background of the leaves. These lesions usually run parallel to the leaf veins and tend to be tapered at the ends giving the lesions a spindle shaped appearance. Foliage symptoms are most obvious when air temperatures are

about 50°F. As temperatures warm-up, foliage symptoms of wheat spindle streak mosaic tend to fade. Plants may be slightly stunted and have fewer tillers than normal. Wheat spindle streak mosaic tends to be more prevalent in lower, wetter areas of a field. The virus which causes this disease is soilborne and is spread by the soil fungus *Polymyxa graminis*. Wet falls tend to favor outbreaks of wheat spindle streak mosaic the following spring.

Wheat soilborne mosaic causes light green to yellow green to bright yellow mosaic patterns in leaf tissues. Symptoms are most evident on early spring growth, and warmer temperatures later in the season slow disease development. Symptoms of wheat soilborne mosaic are not always particularly distinctive and might occur as a more general yellowing similar to that caused by nitrogen deficiency. Infected plants may be stunted. This

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# USEPA Proposes Greenhouse Gas Monitoring Program

By John Lory and Joe Zuloich

USEPA has released a draft version of a greenhouse gas monitoring program for public comment. The rule would require a wide range of industrial sources of greenhouse gases to report their annual contribution to USEPA.

Most farmers will not be directly affected by this greenhouse gas monitoring program. The monitoring rule excludes greenhouse emissions from agricultural activities such as tillage and burning residue on crop fields. It also excludes agricultural sources such as composting not associated with confined animal feeding operations and emissions from agricultural soils.

A preliminary version of this rule had suggested what had been dubbed a "cow tax" on cows and other ruminant animals for methane released during digestion. The proposed rule specifically excludes methane directly released by ruminant animals from monitoring requirements.

The one agricultural greenhouse gas source specifically targeted by the greenhouse monitoring rule is losses of methane and nitrous oxide from manure storage facilities. The proposed rule requires operations with manure storage facilities that emit more than 25,000 metric tons of carbon dioxide equivalents to report under the terms of the rule. An initial assessment of the rule implies that this standard, if adopted, would have the potential to affect the largest animal feeding operations (Class IA operations), particularly operations using anaerobic lagoons.

Many industries are specifically required to report emissions in the rule. The full implications of the rule are not yet clear. The sheer size of the proposal (over 1400 pages) means that it will take some time for everyone involved to read and understand the proposal.

This rule does not propose any type of tax or limit on greenhouse gas emissions. It is a proposal to monitor greenhouse gas sources. That said, monitoring is viewed by many as a logical first step to implementing some type of greenhouse gas emission limits.

The proposal will be published sometime within the next month in the Federal Register. A 60-day period for public comment on the rule is anticipated starting on the Federal Register publication date.

MU Extension is working with other agencies and stakeholders in Missouri to understand the implications of this rule on Missouri farmers. We will be providing more analysis on the proposed rules in the coming weeks. For links to the proposed rule and more information visit the web site [http://nmplanner.missouri.edu/regulations/greenhouse\\_gas.asp](http://nmplanner.missouri.edu/regulations/greenhouse_gas.asp)

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disease may be more severe in low lying, wet areas of a field. The soilborne wheat mosaic virus survives in the soil and is spread by the soil fungus *Polymyxa graminis*. Again, wet falls tend to favor outbreaks of wheat soilborne mosaic the following spring.

Barley yellow dwarf is an extremely widespread virus disease of cereals. Symptoms include leaf discoloration ranging from a light green or yellowing of leaf tissue to a red or purple discoloration of leaf tissue. Discoloration tends to be from the leaf tip down and the leaf margin in towards the center of the leaf. Plants may be stunted or may have a rigid, upright growth form. Symptoms are most pronounced when temperatures are in the range of 50-65°F. The barley yellow dwarf virus persists in small grains, corn and perennial and annual weed grasses. More than twenty species of aphids can transmit the barley yellow dwarf virus. Symptoms may be more severe and yield losses higher if plants are infected in the fall or early in the spring. Infections developing in late spring or summer may cause discoloration of upper leaves but little stunting of plants or yield loss.

The other virus disease likely to occur on winter wheat in Missouri is wheat streak mosaic, but symptoms of this disease are not usually evident until later in the season when air temperatures increase. Wheat streak mosaic causes a light green to yellow green mottling and streaking of leaves. Symptoms may vary with variety, virus strain, stage of wheat growth when plants are infected and environmental conditions. Plants may be stunted. As temperatures increase later in the spring, yellowing

of leaf tissue and stunting of plants may become more obvious. The wheat streak mosaic virus is spread by the wheat curl mite. Symptoms are frequently found along the edges of fields where the mite vector first entered the field. Both the wheat streak mosaic virus and the wheat curl mite survive in susceptible crop and weed hosts. Thus, the destruction of volunteer wheat and weed control are important management options for wheat streak mosaic.

A management program for virus diseases of wheat should include the following steps.

- Plant good quality seed of resistant varieties.
- Avoid planting too early in the fall to minimize opportunity for insect vectors to transmit viruses to young plants.
- Destroy volunteer wheat and control weed grasses.
- Maintain good plant vigor with adequate fertility.

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# Grazing Schools in Missouri - 2009 Season

By Craig Roberts

Northwest Region		
Town	Date	Contact
Kidder	September 11-12 (Friday 4:00 p.m.–9:30 p.m./Saturday 9:00 a.m.–4:30 p.m.)	<b>Curt Walker</b> - Phone: (816) 232-6555, Ext. 139 • E-mail: curt.walker@mo.usda.gov <b>Jim Humphrey</b> - Phone: (816) 324-3147 • humphreyjr@missouri.edu
Clearmont	September 15-16	<b>Curt Walker</b> - Phone: (816) 232-6555, Ext. 139 • E-mail: curt.walker@mo.usda.gov <b>Jim Humphrey</b> - Phone: (816) 324-3147 • E-mail: humphreyjr@missouri.edu

East Central Region		
Warrenton	April 1-2	<b>Sarah Szachnieski</b> - Phone: (636) 456-3434, Ext. 3 • E-mail: sarah.szachnieski@mo.usda.gov

Central Region		
Rolla	April 16-17	<b>Phelps Co. SWCD. Paula Wade</b> - Phone: (573) 364-6202, Ext. 3
Gasconade County	May 14-15	<b>Gasconade Co. SWCD. Diana Mayfield</b> - Phone: (573) 437-3478, Ext. 3
Maries River Wtshd.	September 17-18	<b>Osage Co. SWCD. Cindy DeOrnellis</b> - Phone: (573) 897-3797, Ext. 3
Hartville	May 13-15	<b>Missy Wollard</b> - Phone: (417) 741-7341, Ext.3 • E-mail: missy.wollard@swcd.mo.gov <b>Ted Probert</b> - Phone: (417) 741-6134 • E-mail: ProbertT@missouri.edu
Houston	July 22-24	<b>Sandy Wooten</b> - Phone: (417) 967-2028, Ext. 4 • E-mail: sandra.wooten@swcd.mo.gov <b>Robert Rouse</b> - Phone: (417) 967-2028, Ext. 4 • E-mail: robert.rouse@mo.usda.gov
Squires Ozark/Douglas County	August 3-5	<b>Stacy Hamblton</b> - Phone: (417) 778-7490 • E-mail: hambltons@missouri.edu <b>David Harrison</b> - Phone: (417)-683-4816 or 1-800-434-0366, Ext. 3 • E-mail: david.harrison@mo.usda.gov
Willow Springs	September 1-3	<b>Bill Doig</b> - Phone: (417) 256-2391 • E-mail: DoigW@missouri.edu <b>Jamie Kurtz</b> - Phone: (417) 256-7117, Ext. 3 • E-mail: jamie.kurtz@mo.usda.gov

Southeast Region		
Farmington (Mineral Area College)	May 5-6	<b>Patricia Roth</b> - Phone: (573) 883-3566, Ext. 3 • E-mail: patty.roth@mo.usda.gov

Southwest Region		
Mt. Vernon (MU Southwest Center)	May 12-14	<b>Richard Crawford</b> - Phone: (417) 466-2148
Neosho (Crowder C.)	June 23-25	<b>Nathan Witt</b> - Phone: (417) 451-1366, Ext. 3   <b>John Hobbs</b> - Phone: (417) 223-4775
Joplin (Dairy Graz.)	July 8-10	<b>Jennifer Hartwick</b> - Phone: (573) 882-9551 • E-mail: muconf9@missouri.edu
Marshfield	October 6-8	<b>Mark Emerson</b> - Phone: (417) 468-4176, Ext. 3
Bois d-Arc	October 20-22	<b>Mark Green</b> - Phone: (41) 831-5246

Southwest Central Region		
Lowry City (Boy Scouts Building)	April 8-9	<b>Margie Best</b> - Phone: (417) 646-8108
Camdenton (Mid County Fire Station)	September 16-17	<b>Connie Luttrell</b> - Phone: (537) 346-5125

Northeast Region		
Lancaster	May 8-9	<b>Darla Campbell</b> - Phone: (660) 457-3469

Linneus Schools		
Linneus (beginning grazing school)	September 22-24	<b>Joetta Roberts</b> - Phone: (573) 499-0886

**Note:** Schools in the North Central Region are still being scheduled. For more information, visit: <http://agebb.missouri.edu/mfgc/>.

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# Weather Data for the Week Ending March 15, 2009

By Pat Guinan

Station	County	Weekly Temperature (oF)						Monthly Precipitation (in.)		Growing Degree Days‡	
		Avg. Max.	Avg. Min.	Extreme High	Extreme Low	Mean	Departure from long term avg.	March 1- March 15	Departure from long term avg.	Accumulated Since Apr. 1	Departure from long term avg.
Corning	Atchison	46	23	60	11	34	-5	0.94	-0.02	*	*
St. Joseph	Buchanan	47	23	58	12	35	-5	1.95	+1.13	*	*
Brunswick	Carroll	48	25	62	18	37	-4	2.16	+1.07	*	*
Albany	Gentry	46	22	57	13	34	-5	1.47	+0.60	*	*
Auxvasse	Audrain	51	26	67	19	39	-2	0.99	-0.24	*	*
Vandalia	Audrain	51	28	67	19	39	-1	1.10	-0.35	*	*
Columbia-Jefferson Farm	Boone	52	27	68	19	40	-3	1.34	+0.05	*	*
Columbia-South Farms	Boone	52	27	68	19	40	-3	1.43	+0.14	*	*
Williamsburg	Callaway	52	27	69	21	40	-1	0.87	-0.60	*	*
Novelty	Knox	47	24	63	14	36	-4	2.88	+1.73	*	*
Linneus	Linn	48	23	59	15	36	-4	2.99	+1.96	*	*
Monroe City	Monroe	48	25	64	17	37	-5	1.83	+0.62	*	*
Versailles	Morgan	54	29	71	20	40	-3	0.86	-0.41	*	*
Green Ridge	Pettis	52	28	65	19	40	-1	0.89	-0.29	*	*
Lamar	Barton	56	32	73	22	44	-1	0.28	-1.32	*	*
Cook Station	Crawford	57	30	78	24	45	0	0.79	-0.70	*	*
Round Spring	Shannon	58	33	77	27	46	+2	0.80	-0.74	*	*
Mountain Grove	Wright	54	31	73	24	44	+1	0.28	-1.58	*	*
Delta	Cape Girardeau	56	36	74	28	46	0	0.99	-0.66	*	*
Cardwell	Dunklin	56	40	76	29	48	+1	1.19	-0.78	*	*
Clarkton	Dunklin	56	38	76	31	47	0	0.94	-0.84	*	*
Glennonville	Dunklin	56	39	76	32	48	+1	1.01	-0.68	*	*
Charleston	Mississippi	56	39	74	31	47	+1	1.12	-0.48	*	*
Portageville-Delta Center	Pemiscot	56	40	75	32	48	+1	1.04	-0.78	*	*
Portageville-Lee Farm	Pemiscot	57	40	76	32	48	+1	1.10	-0.70	*	*
Steele	Pemiscot	57	41	78	31	49	+2	1.04	-1.01	*	*

\* 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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