

PLANT DISEASE AND INSECT ADVISORY



Entomology and Plant Pathology
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Vol. 5, No. 6

Website: <http://entopl.okstate.edu/Pddl/advisory.htm>

Apr 24, 2006

Wheat Streak Mosaic and High Plains Viruses Appearing in Oklahoma Bob Hunger, Extension Plant Pathologist

During the past 7-10 days several wheat samples submitted to the Plant Disease and Insect Diagnostic Laboratory exhibited symptoms indicative of wheat streak mosaic virus (WSMV - Figure 1, L.) and/or the high plains virus (HPV - Figure 1, R.). Both viruses are transmitted by



Figure 1. Symptoms of wheat streak mosaic virus (L) and high plains virus (R) on wheat (photo of high plains virus courtesy of Dr. Stan Jensen, University of Nebraska).

the wheat curl mite (WCM - Figure 2). WCMs have a wide host range including wheat, corn, and many grassy weeds. Mites that have survived the summer on volunteer wheat, corn, or weeds spread to emerging wheat in the fall, feed on the young wheat, and transmit WSMV/HPV to the wheat. Only rarely are symptoms of WSMV/HPV (see Figure 1) seen in the fall, but as soon as temperatures begin to warm in the spring, symptoms begin to appear. Symptoms follow the infestation path and severity of the mites, which spread by the wind. Often fields are infected from a fence row, so infected plants are more common near that fence row and become less as one walks deeper into the field. On occasion, I have seen consistent infection over large fields (Figure 3). In these cases, the source of the mites was always an adjacent field where volunteer wheat or corn was present over the

summer, and this field served as a source of mites to infect the emerging wheat over a long period of time in the fall. In cases where WSMV infection occurred in the fall, that wheat will yield nothing or very little; however, yield losses due to WSMV also can be significant when infection occurs in the spring. Yield losses from HPV in wheat are less clear because (as far as I know) in Oklahoma we have only found HPV in combination with WSMV.

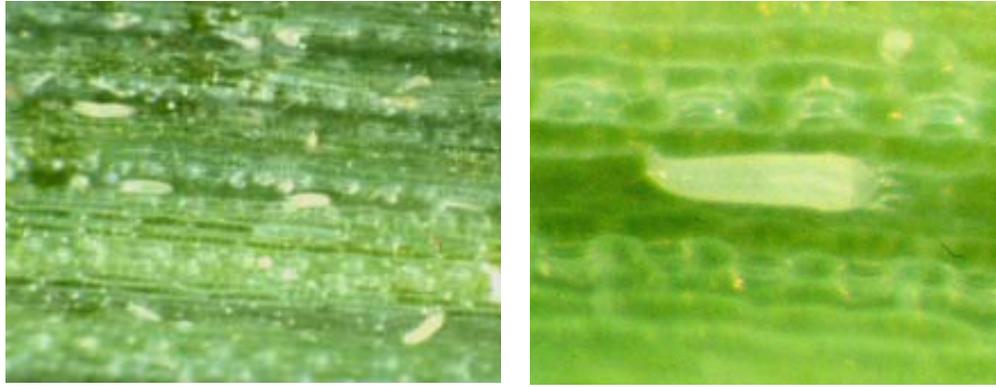


Figure 2. Wheat curl mites that transmit wheat streak mosaic virus and high plains virus (L. 10X magnification and R. 63X magnification).

There is very little, if any, difference in reaction of commercial wheat varieties to WSMV/HPV. Hence, control of WSMV/HPV depends on limiting the over-summering and fall infection of emerging wheat by the WCM. Planting late in the fall helps to achieve this, but to some extent the effectiveness of late planting is also related to the severity of the winter, that is, late planting will not help as much in a year with a mild fall and winter. Another control that helps to reduce WSMV/HPV is to control volunteer wheat. The WCM has a life span of about two weeks. Hence, destroying volunteer wheat at least two weeks prior to emergence of seedling wheat will help to reduce the infestation of emerging wheat with WCMs. This also applies to planting wheat in a field where corn has been grown, that is, be sure at least 2 weeks (3 weeks is better) elapse between the time when the corn is completely dead and the time when the seedling wheat emerges.



Figure 3. View of widespread infection of wheat streak mosaic virus and high plains virus in the early-planted, dryland field in the foreground. Compare to the wheat in the late-planted, irrigated field in the background. Photo courtesy of Dr. C. Rush, Texas A&M, Bushland, TX.

Other diseases: On a trip I took on April 18th, I saw wheat as far along as 1/3-1/2 berry in plots near Perkins, OK. Plants here were extremely stressed with flag leaves curled-up. About the same thing was observed here at Stillwater and in the Kingfisher variety trial, but the wheat was not quite that far along. At Lahoma, it also is dry, but the flag leaves are still fairly flat. I saw no rust of any kind on any of the wheat I looked at either in research plots or in fields I stopped and examined. Symptoms indicative of barley yellow dwarf virus were seen at most locations. Additionally, powdery mildew was observed on lower leaves at most of the locations. However, all flag leaves and F-1 leaves were clean.

In terms of samples sent to the lab and phone calls:

- Additional reports and samples have come in that continue to show Fusarium (dryland) root rot.
- Wheat samples also have been received that had symptoms of wheat streak mosaic virus (WSMV) and/or high plains virus (HPV). Brian Olson (Plant Disease Diagnostician) tested these samples and found them to be positive for the presence of WSMV and HPV. Three of these samples were from Beaver County and tested positive for both viruses.
- A few samples also have tested positive for barley yellow dwarf virus, and I have seen symptoms of BYDV at several locations in the state including plots located near Stillwater, Perkins, Kingfisher, and Lahoma.

Reports from Kansas: (Jon A. Appel, Plant Pathologist, Kansas Department of Agriculture) 21-April-2006: I just saw leaf rust for the first time this season. Trace (a few pustules) in Harper and Sumner counties in south central Kansas. Wheat is under extreme drought stress and at head to early flower. No other rusts observed. Nothing last week in southeast Kansas.

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Issued in furtherance of Cooperative Extension work, acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture, Robert E. Whitson, VP, Dean, and Director for Agricultural Programs, Oklahoma State University, Stillwater, Oklahoma. This publication is printed and issued by Oklahoma State University as authorized by the Dean of Agricultural Sciences and Natural Resources.