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SPECIAL WHEAT STREAK MOSAIC ISSUE

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***May 10th West Ky No-Till Association 2000 No-Till Small Grain Tour -
Russellville***



WHEAT STREAK MOSAIC EPIDEMIC

Don Hershman, Extension Plant Pathologist
Doug Johnson, Extension Entomologist

Beginning last week we started to receive samples and phone calls which suggested that wheat streak mosaic had reared its ugly head again in Kentucky. The last and only recorded epidemic of this virus disease in Kentucky was in 1988. Current information indicates that the greatest incidence of wheat streak mosaic is across the southern portion of the state, extending from east of Bowling Green all the way to Fulton County. However, the full extent of the epidemic has yet to be determined. It is likely that additional counties will report the disease as crop development continues.

Wheat streak mosaic virus is transmitted by the wheat curl mite. This association and why we believe that wheat streak is a problem this spring will be addressed later in this article.

Symptoms: Severely diseased plants are fairly distinctive. Plants will be severely stunted; leaves will be small and will have a “spiked” appearance. Lower leaves and tillers may turn brown and die. Plants may have a flaccid look about them and may look like they are having difficulty standing. Leaves will show extensive yellow streaking, especially from the middle of leaves towards the tips. The typical discontinuous yellow streaks in leaves may be so extensive that leaves will have a yellow, “bleached out” appearance. Some leaves will have a mosaic symptom.

Severe symptoms, such as described above, indicate that infection occurred in the fall or early winter. The prognosis for severely diseased plants is not very good and 75% or greater yield loss can be expected. Fields that have large percentages of severely diseased plants are candidates for destruction and replanting to alternate crops. In some cases, only portions of fields may be severely diseased. In those instances, it may only be necessary to destroy a portion of those fields.

Although, currently, many fields do have a high percentage of severely diseased plants, many other fields are just now beginning to show yellowing and streaking, but are not stunted. If symptom expression occurs early, such as prior to flag leaf emergence, then expect those plants to deteriorate rapidly. However, if plants are in the boot stage or beyond when symptoms begin to be expressed, then expect only moderate to light yield effects. In fact, based on information provided to us by Kansas State University Extension Plant Pathologist, Dr. Bob Bowden, most plants which show late symptoms will have reduced test weight, but that is about it. These fields are certainly NOT candidates for destruction, but they may also not be good candidates for adding additional inputs, such as foliar fungicides or insecticides. Basically, the impact of late-appearing wheat streak mosaic symptoms depends upon the incidence of diseased plants in a field. Obviously, the greater the number of diseased plants, the more impact there will be on crop test weight and, thus, profitability.

So, now to the key questions. Why is wheat streak severe this year, could it have been prevented and what can be done to reduce future occurrences? These are all very important questions, but we need to start by first piecing together why we have this problem, in this place, in this season. After all, it has been twelve years since a wheat streak mosaic epidemic has occurred in Kentucky. So, let's see if we can construct a

usable model to provide an explanation for this event.

We do not intend to provide a complete life history of this mite at this time. You can find this information by obtaining a copy of Entfact:117 - Wheat Streak Mosaic Virus and the Wheat Curl Mite. You may get a copy of this from your county agent or from the Entomology Web site at:

<http://www.uky.edu/Agriculture/Entomology/enthp.htm> When you reach the site, select "ENTFACTS" then "FIELD CROPS" and look for Entfact-117 Wheat Streak Mosaic Virus and the Wheat Curl Mite. You may also wish to see: Sloderbeck, P.E. 1995. Wheat curl mite. Entomology Wheat Insects (L. D.). This can be found on the Kansas Coop. Ext. Service.

Web site:

<http://www.oznet.ksu.edu/library/entml1/wheatcur.pdf> I am sure there are others.

You will, however, need to understand a few specific facts about the wheat curl mite and how it moves the wheat streak virus.

- The mite is only about 1/100 of an inch long so you are unlikely to notice it.
- Epidemics are always associated with a "Green bridge".
- This mite MUST have green tissue to live on. It can survive only a few days off the host.
- In general, the mite moves by being blown about by the wind.
- There are host plants other than wheat and they grow in Kentucky, but wheat is by far most important.
- There is no known effective pesticidal control for this mite.

So, the real question is: What is different about this growing season? We very probably have the mite, the virus and alternate hosts for the mite and virus present in Kentucky every year, but we rarely have an epidemic.

On Tuesday, April 18, 2000, we met with several county extension agents, producers, consultants, farm store managers and technical representatives. These “meetings” took place in infected fields in and around Logan and Warren Counties. We were able to view the severity and distribution of affected fields, and more importantly, gather background information from people involved in local crop production. While we were not able to solve the problem, we do think we can now explain what has probably occurred.

Wheat is the ideal host for both the virus and the wheat curl mite. The mite can live on some other grasses, but does not do well. Since we do not ordinarily have a wheat streak mosaic problem, our wild hosts are obviously not sufficient to provide an epidemic. In looking at the literature and talking with people from Kansas, they always see the disease when wheat from a previous cropping season is allowed to live continually through to the next wheat season. This can happen in several ways. Wheat from shattered heads at harvest will germinate in the field and then may grow continuously to the next planting. Wheat may live continuously in abandoned fields and, of course, when spillage occurs along roads etc. The point is that whether in or near production fields, problem areas have wheat growing throughout the time between wheat crops. This allows the mites and virus to survive, move about and increase in number. This is the “green bridge” we are searching for.

However, our production system is quite different from those out west. We usually have several months (during the summer) between wheat harvest and planting when wheat is generally not present. So how do we get this Green Bridge? And what was peculiar to the 1999-2000 season? The answer to these questions became very apparent when talking with the local individuals. Because of the drought stress of the summer of 1999, the soybean crop (especially double crop) did very poorly. As a result, producers were

unwilling to provide the additional weed control that normally would have controlled volunteer wheat and other grasses in the soybean crop. This was especially true for fields planted to Roundup Ready soybeans since they may not have had any herbicide applied. As a result, the area currently suffering from Wheat Streak Mosaic had quite a lot of volunteer wheat. Hence our green bridge! This is most likely the core of the problem. However, the long warm fall and very mild winter certainly allowed the mites to remain active for much of the growing season.

Once everyone was aware how the mite/virus movement and survival was associated with volunteer wheat in abandoned soybean fields, then it was easy to find examples where this was occurring. This does not explain every individual case, but it does explain the core reasons why we are seeing this epidemic, this year, in this area.

One of the more difficult questions to answer was how to account for fields that are very evenly infested and do not appear to be near areas of volunteer wheat? Our best explanation for this is to use scattered rain storms as a model. Once mites get into the air they may simply “rain down” in an area. This movement would probably be of a longer distance and provide a rather even dispersal on an individual field. In addition, it would be a matter of chance as to where they might settle out. You might get rained on and you might not!

So what is to be done? From all the information we currently have, it appears that this pest is very difficult to detect and can not be controlled with insecticides. The only real remedy is to stop the formation of the green bridge. If we return to normal production practices, this problem may take care of itself. If, however, it appears that fields are going to be abandoned or if other cropping practices evolve that allow volunteer wheat to prosper, we will have to address the “green bridge”

issue specifically, in order to get this wheat disease under control. Any effort will have to be an area wide basis. Just doing the right thing on your farm will not be enough. Everyone needs to understand that wheat growing during the off season is a threat to commercial production.

Without the cooperation of a large number of individuals working in wheat production, we probably would not have been able to sort out this puzzle. We thank all those people that were willing to participate. We also need further help. We are developing a small survey tool to collect data on this mite/disease outbreak. We ask that you take note of any field in your area that has Wheat Streak Mosaic and try to find out as much as you can about the field. Following this article please find a survey. Please complete and return one for each field. We need to gather as much information as possible about the extent of the problem and its contributory causes. This could be very helpful and important to the wheat growing community.

**WEST KY NO-TILL ASSOCIATION
2000 NO-TILL SMALL GRAIN TOUR
RUSSELLVILLE, KY
MAY 10 - WEDNESDAY**

Meet at NRCS Office in Russellville at 9 a.m.

Farmers will give a brief background (20-30 minute stops) on each farm's wheat production. University of Ky Extension Specialists, Dr. Jim Martin, Dr. Lloyd Murdock, Dr. Don Hershman, and Dr. Doug Johnson, will be on hand to offer discussion on different aspects of management practices in small grain production.

Farms to be toured include:

| | | |
|-------|---|----------------|
| 9:30 | Allen Chiles | No-Till Barley |
| 10:00 | James Simmons | No-Till Wheat |
| 10:40 | J.P. Robertson | No-Till Wheat |
| 11:30 | Steven Snider | No-Till Barley |
| 12:00 | Lunch provided at Franklin Simpson Community Park | |

For more information, contact Billy Huffines at 270/598-9999.

Wheat Streak Mosaic / Wheat Curl Mite 2000 Incidence Survey

Please complete this form for **EACH** field you are reporting.

LOCATION

County:_____ State (if not KY):_____

CROP

Variety:_____ Planting Date:_____ Tillage:_____ Previous Crop:_____

Would you consider the previous crop (as listed above) to be : Please circle
very good, good, average, poor, very poor, abandoned

Was there volunteer wheat within the field prior to 1999 wheat planting? Yes No

In the crop immediately before your wheat (in the same field), did you skip any herbicide treatments that you would have applied in a normal year? Yes No

If yes, please describe what you would have done _____

Were there soybean fields next to or near (less than 1/4 mile) the current wheat field? Yes No

If yes, Would you consider the soybean crop to be : Please circle
very good, good, average, poor, very poor, abandoned

Was there any volunteer wheat left untreated in these fields? Yes No

In these nearby soybean fields, would you say that there were herbicide treatments skipped that would have been applied in a normal year? Yes No

If yes, please describe what you think would have done _____

SYMPTOMS

When did you first notice symptoms? Date:_____ Crop Stage:_____

Can you relate any increase or decrease in symptoms across a field to any particular direction?

For example - symptoms go from better to worse: east to west, north to south, northwest to southeast Other: _____

Are symptoms: (please circle)

even across the field, worse near the edges, worse in the middle

FERTILITY - Please list date and amount of Nitrogen fertility

Date:_____ Amount (N) _____

Date:_____ Amount (N) _____

Date: _____ Amount (N) _____

PESTICIDES - Please list insecticide and herbicides applied to this field.

| Insecticides | | Herbicides | |
|--------------|--------------|------------|--------------|
| Product | When applied | Product | When applied |
| _____ | _____ | _____ | _____ |
| _____ | _____ | _____ | _____ |
| _____ | _____ | _____ | _____ |
| _____ | _____ | _____ | _____ |

Did you have an unusually large amount of one of the following grass weeds near the field in the summer and fall of 1999? **If yes please circle:** Proso millet, sorghum, jointed goatgrass, Japanese chess, cheat, Downey chess, sand bug, smooth crabgrass, W. wheatgrass.

Will you keep or destroy this field? (Please circle) Keep Destroy

We may need to follow up on some of this information. If you are willing to help us, please provide the following contact information.

Name _____

Address: _____

City: _____ State: _____ Zip: _____

Telephone: _____ FAX: _____ E-mail _____

Please fold so the return address is on the outside, stamp and mail. Thanks for your help!

UK-REC
P.O. Box 469
Princeton, KY 42445-0469

Place
Stamp
Here

Wheat Streak Survey
c/o Ms. Marilyn Hooks
UK-REC
P.O. Box 469
Princeton, KY 42445-0469

For More Information, Contact:

Dottie Call, Wheat Group Coordinator
UK Research and Education Center
P.O. Box 469, Princeton KY 42445

Telephone: 270/365-7541 Ext. 234

E-mail: dcall@ca.uky.edu

Visit our Website:

<http://www.ca.uky.edu/ukrec/welcome2.htm>