Plant Disease and Insect Advisory

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Wheat Disease Update – 23 June 2003

Bob Hunger, Extension Wheat Pathologist

Although I don't have any updates of wheat diseases in Oklahoma, below is some information regarding other states and topics that may be of interest to you.

Information from Oklahoma. Bart Cardwell (Kay County) indicated that at the Newkirk Coop test weights were running from 55-64 lb/bu, with the leaf rust susceptible varieties (for example, Jagger) having the lower test weights and varieties like 2174 and Tonkawa having the higher test weights. He also indicated that test weights from the west side of the county were less variable (including Jagger), and were in the 60 lb/bu range. He also thought that a heavy rain (6+ inches) that fell the first week in June over much of the county (but not the southwestern part) may have contributed to these differences in test weight.

Correction to Common Bunt Information. Dr. Rollie Line (wheat researcher at Washington State University) sent me an e-mail following my last update regarding common bunt (stinking smut) and loose smut. He indicated that Thiram does not control common bunt, that Vitavax is not very effective against soil-borne common bunt (remember, common bunt can be carried on seed coats or in the soil), and that Dividend is probably the most effective. Dr. Line has worked many years with the bunts and smuts, so I greatly appreciate his observations.

Karnal bunt (KB) update. We started to receive grain samples of wheat as part of the national KB testing program late last week. Approximately 70 samples from Oklahoma will be processed as part of the 2003 program. Testing of these samples is needed to help obtain a phytosanitary certificate indicating that wheat in Oklahoma was tested for the presence of KB. If all samples are negative, the certificate is issued that states the wheat was produced in an area not known to be infested with KB. This certificate than allows wheat produced in Oklahoma to freely enter the international market. From what I have heard and seen, only one seed sample has tested positive in Texas (Olney area).

Kansas. Head scab (caused by Fusarium) has developed in the eastern third of Kansas, with the most severe scab seen in the southeastern part of the state. Overall, stripe rust seems to be the most significant disease problem in Kansas.

Tomato Problem Identified as Curly Top - A Virus Disease

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Reports and samples of tomato plants that are severely stunted, pale green, and have curled leaves with purple-colored veins have been pouring in from across the state (**Figs. 1 and 2**). Levels of the problem are very high (>50%) in some plantings in western Oklahoma. About 30% of the tomato variety trial at Bixby is affected. This problem, which resembles a virus disease, has been observed almost every year in Oklahoma since the 1980's, but usually only isolated plants are affected. This year the problem is obviously more severe and widespread. Affected plants do not recover and die or remain stunted without setting additional fruit. For some time now, the problem has been attributed to feeding by the potato (or tomato) psyllid which causes "psyllid yellows". In psyllid yellows, damage is caused by a toxin that the immature psyllids (nymphs) produce as they feed. Reported symptoms of psyllid yellows are very similar to those observed on the affected tomato plants. In previous years, testing of symptomatic plants with a serological screen for several common viruses that affect tomato has been negative. The negative test results for virus have supported the "psyllid yellows" theory. However, careful examination of affected plants this year has revealed no signs of psyllids or their prior presence.

Fig 1. Stunted tomato plants with pale green leaves and upwardly curled leaves caused by beet curly top virus.

The problem also closely resembles "curly top", caused by beet curly top virus (BCTV). BCTV has long been a problem in semi-arid regions of the Western U.S. BCTV is a gemini virus for which available serological tests are not effective. This explains why previous virus testing has not detected BCTV. Using a commercial DNA hybridization test, and a PCR test conducted at

U.C. Davis by Dr. Bob Gilbertson, we have recently confirmed that the problem is indeed curly top, caused by BCTV.

Curly top disease has long been a severe problem on tomatoes in the states of New Mexico, Utah, California, Washington and Oregon. It is considered the most important disease of tomato in many of these areas. The disease has a wide host range, but is particularly severe on sugar beets, tomato, pepper, and spinach. Curly top is caused by beet curly top virus (BCTV). The virus is in the gemini virus group which are DNA rather than RNA-encoded viruses. Most

Fig 2. Purple discoloration of leaf veins on tomato caused by beet curly top virus.

gemini viruses are spread by whitefies, but BCTV is transmitted to from plant to plant by the beet leafhopper, *Circulifer tenellus.* Both the virus and the beet leafhopper have very wide host ranges. Once acquired by the leafhopper, BCTV is carried for the rest of the leafhopper's life, and thus long distance spread is common. Infected plants are usually scattered in a field. The beet leafhopper acquires the virus from infected crop plants or weeds such as wild mustards and Russian thistle. Only brief feeding periods (seconds) are required for the leafhopper to acquire the virus and transmit it to new plants. Plants begin to show symptoms about 7 to 14 days after they are first infected by a leafhopper. Tomato is not a preferred host for the beet leafhopper; however the leafhoppers transmit the virus to tomato while sampling it.

Management of curly top disease is difficult. Efforts to breed resistance to curly top into tomatoes have been largely unsuccessful. All currently available tomato varieties are

susceptible. Spraying tomatoes with insecticides does not control the disease because leafhoppers migrate from distant places and do not reproduce or remain in tomato fields. By the time migrating leafhoppers succumb to an insecticide, they have already transmitted the virus to the tomatoes. When symptoms of curly top become evident in tomatoes, the leafhoppers have long since moved away to other crops or weeds which they prefer. Removing symptomatic plants is probably a good idea, but since the vector does not remain in tomato fields, there probably is little secondary, or plant to plant spread within a field. Other management strategies have focused on using cultural practices that reduce the attractiveness of tomato to the leafhoppers. The beet leafhopper (and most other insect vectors) is attracted to widely spaced, vigorous plants grown in open areas where the plants sharply contrast with the surrounding soil. In areas where curly top is chronic, dense plant spacing, shading, row covers, and intercropping have been reported to reduce levels of curly top.

We are unsure as to what the future hold for this disease in Oklahoma. Even in states where curly top has been a problem for many years, levels of the disease vary greatly from year to year. It is my suspicion that we have had curly top for some time, but it has been misdiagnosed as psyllid yellows. The sporadic nature of this disease is thought to be the result of yearly variation in overwintering leaf hopper populations and their migration pattern. We do not know where the virus-carrying leafhoppers originated, or where overwintering sources of the virus are that affected this year's tomato crop.

Watermelon Disease Update

John Damicone, Extension Plant Pathologist

The rainy and humid weather of late has been favorable for watermelon disease outbreaks. Last week I observed a field in the central part of the state that was severely infested with anthracnose. This field had not been treated with fungicide preventively, and since lesions were present on the stems, it is doubtful that vine death from anthracnose could be avoided in this field. Anthracnose is a splash dispersed disease that is favored by warm, rainy weather. Conditions also have been favorable for downy mildew, but I have not yet seen downy mildew or heard any reports on this disease. The downy mildew forecast program (http://www.ces.ncsu.edu/depts/pp/cucurbit/) continues to show the potential for long distance transport of this fungus into Oklahoma from south Texas. No additional sources (infested fields) have been reported in Texas.

Spray programs utilizing broad spectrum fungicides should be implemented on watermelon if they have not already been. Chlorothalonil (Bravo, etc.) and mancozeb (Dithane, etc) offer good preventive activity against both downy mildew and anthracnose. The addition of thiophanate-methyl (Topsin) is beneficial for additional anthracnose control. The strobilurin fungicides Quadris, Cabrio, and Flint also are effective against anthracnose, but their activity against downy mildew has not been confirmed in Oklahoma. Applications on 14-day intervals are sufficient early in the season, but shorter (7-day) intervals are required under heavy disease pressure. All

of these fungicides except mancozeb have some degree of activity on powdery mildew should that disease also become a problem later in the season. Nova, Procure and sulfur (Microthiol, etc) are very active against powdery mildew, but have no effect on anthracnose or downy mildew.

Plan a Program for Control of Early Leaf Spot on Peanut

John Damicone, Extension Plant Pathologist

State-wide, conditions have been very favorable for the development of early leaf spot in peanut up to this point in 2003. The early leaf spot advisory program (http://agweather.mesonet.org/) is reporting a uniform accumulation of infection hours and last effective spray dates at various locations across the state (Table 1). This is similar to the situation that was reported in June of last year. Remember that in 2002 leaf spot ended up causing damage in many may fields in the state where fungicide applications were not made on a timely basis. While we cannot predict future weather conditions for the remainder of the growing season, we are fast approaching a time when the initial fungicide spray for early leaf spot should be made. Spanish varieties should be first treated 30 days after planting while it is possible to delay the first application on runners to about 40 days after planting. Given a 15 May planting date, we are rapidly approaching a time when the advisory program will also recommend a first spray (last effective spray date on or after 15 May). Ken Jackson has already reported leaf spot symptoms near Erik on volunteer peanuts.

Table 1. Early leaf spot advisory output for peanut as of 23 June 2003.

Location	Cumulative infection hours	Last effective spray date
Altus	122	5 June
Eric	118	5 June
Burneyville	277	9 June
Chickasha	187	7 June
Ft. Cobb	128	4 June
Hinton	175	5 June
Hollis	122	5 June
Mangum	139	5 June
Tipton	109	4 June

Control of the disease during early and mid season is important for protecting against yield losses. Experience tells us those fields free of leaf spot on 1 Sep do not require additional treatment. Timing the first spray is important for achieving that goal. This year we have an additional fungicide, Headline, registered for use on peanut to control early leaf spot. This fungicide is the most effective fungicide we have ever evaluated against leaf spot. Growers can expect up to 3 weeks of protection against leaf spot when other fungicides such as Bravo, Tilt/Bravo, Stratego, and Folicur provide 2 weeks of protection. However, the fungicide will still have to be used on a timely basis for it to be of any benefit. Remember that Headline is a strobilurin class fungicide and resistance management should be implemented to prevent resistance from developing. Growers in Oklahoma have always been smart enough to rotate classes of fungicide to avoid resistance problems that have affected growers in other states.

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