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FOCUS on South Plains Agriculture

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Cotton Disease Update

Diseases are possible in any agricultural setting; however, certain conditions must be met for severe epidemics to occur. One of the most important principals in plant pathology (the study of diseases in plants) is the "Disease Triangle". This concept is used to discuss the importance of factors (host, pathogen and environment) and their interactive effects on disease development. This concept clearly illustrates many of the problems we have been experiencing throughout much of the High Plains cotton crop this season. As cotton is the predominant crop grown in the region, the first piece of the puzzle is (a susceptible host) is most always in place. With this being said, it is important to identify fields with a history of disease problems or to correctly diagnose diseases within a field so that the proper varieties can be placed in these areas. Identification of diseases causing pests also provides insight into the second vortex of the triangle (the pathogen). Attributes of the pathogen such as species, abundance as well as aggressiveness will determine disease severity. It is possible for a susceptible cotton variety to be planted in a field infested with a pathogen, but disease fails to develop. This could result from a lack of conducive environmental conditions being experienced during this time.

Take for example the relatively low occurrence of Verticillium wilt the past three years. The fungus *Verticillium dahliae*, causal agent of Verticillium wilt, prefers cooler

temperatures and wet soil conditions, and was negatively affected by the hot dry conditions experienced. An exception where the disease was observed would be in areas with high irrigation capacity. In this case, the environmental conditions within the soil were changed due to the application of high amounts irrigation. Leaves of plants exhibiting symptoms of the disease appear wilted and exhibit a yellowing between the veins before becoming necrotic. As the disease progresses, stems of infected plants will have a discoloration of the vascular system. Infected plants will also appear stunted and in some cases may defoliate prematurely and death may occur. Symptoms will intensify during boll maturation.

Cool temperatures experienced during late June and most of July in conjunction with rainfall, slight amounts of hail, overcast conditions and high relative humidity generally favor the development of other cotton diseases such as Bacterial blight, Seedling disease and Fusarium wilt. While seedling disease is common in west Texas cotton, final stands are generally achieved by the 4-5 leaf stage. The cooler temperatures experienced this season suppressed cotton growth and prolonged exposure to *Rhizoctonia solani*, *Thielaviopsis basicola* and *Pythium* spp. which are common seedling disease pathogens, as well as less common *Fusarium* spp. No new reports of seedling disease have been made over the past 2 weeks, which I attribute to the return of warmer weather.

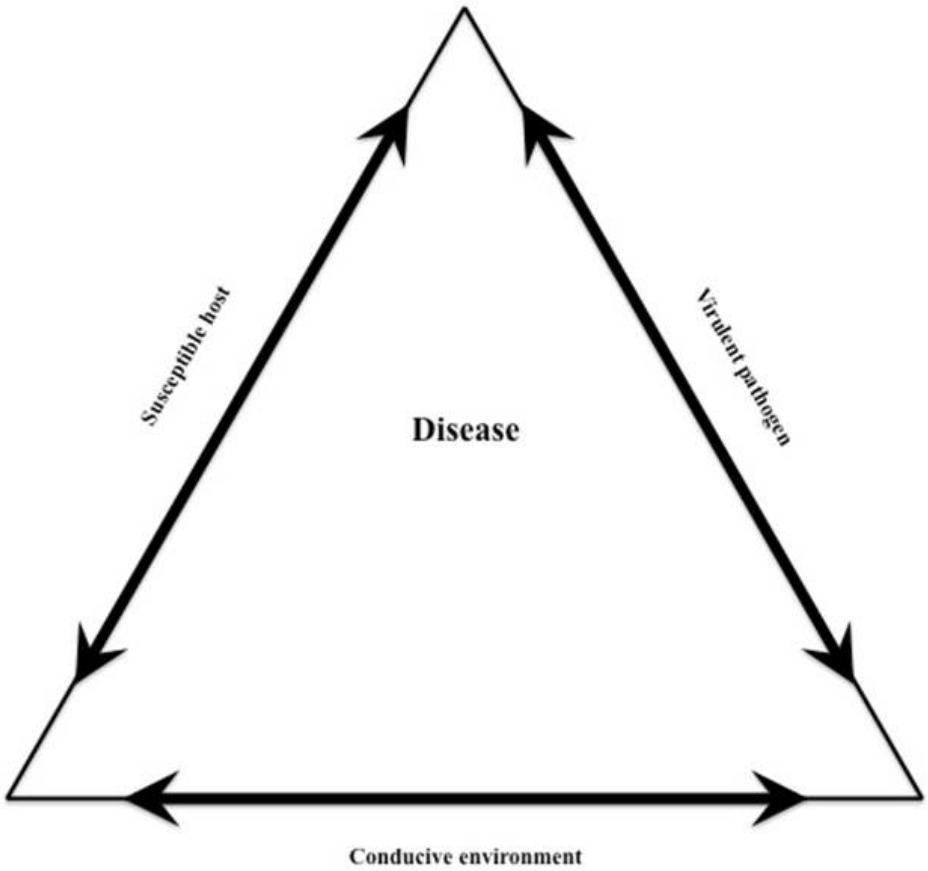
Bacterial blight, caused by *Xanthomonas axonopodis* pv. *malvacearum*, has been observed on a number of different varieties throughout the region. Furthermore, reports of the disease have been made from the Rolling Plains, Central Texas, as well as the Coastal Bend. Bacterial blight is a common disease that occurs annually in the High Plains; however, the disease typically comes in late in the growing season following periods of rain or high humidity. Cotton plants are susceptible to infection at all developmental stages. Symptoms include small, dark green, water-soaked spots that are first visible on the underside of leaves. These lesions, which have an angular appearance and are delimited by the veins, later become present on the upper leaf surface. As the disease progresses, a second leaf symptom can be observed along the main vein and petiole. As individual lesions coalesce and become necrotic, infected leaves will defoliate prematurely. In addition, water-soaked lesions can develop on infected bolls, resulting in a boll rot. There are no chemical management options available for Bacterial blight. The disease is currently managed through the use of resistant or immune varieties.

In addition to the aforementioned diseases, the root-knot nematode (*Meloidogyne incognita*) can be found in many fields. Symptoms of nematode damage include low vigor, stunting and a reduction in bolls. Infected plants may also exhibit nutrient deficiency-like symptoms, as nematode feeding disrupts root functions. Spherical galls or ‘knots’ may be present on the tips of tap and feeder roots. Nematode damage is more severe where higher population occur, thus soil sampling may be needed to properly estimate populations. There are multiple varieties which possess partial resistance to *M.*

incognita. Research is currently underway examining different management tactics to utilize in combination with resistant varieties.

Fields infested with root-knot nematodes could also experience problems with Fusarium wilt. The causal agent of this disease is a soilborne fungus (*Fusarium oxysporum* f. sp. *vasinfectum*), that is capable of negatively affecting stands and greatly reducing yields. Symptoms associated with this disease include wilting of leaves early in the day, as well as chlorosis or necrosis on the margins of leaves in the lower canopy. Wilt symptoms are more severe on hot, dry days when the plants demand for water is high. Such symptoms occur because of clogging of the vascular system caused by infection. Mortality can occur in young plants. Discoloration, which is continuous, can be seen when examining the inside of the root system or lower stem.

If you have any questions regarding these or any other cotton diseases, please contact Jason Woodward @ 806-632-0762, or via e-mail jewoodward@ag.tamu.edu. JW



The disease triangle

Verticillium wilt

Fusarium wilt

Bacterial blight

Root knot nematode

Corn Disease

Goss's Wilt in Corn Arrives on Southern High Plains

Goss's wilt and leaf blight, caused by the bacterium *Clavibacter michiganensis* pv. *nebraskensis*, was first identified in the Texas Panhandle in September 2009. Confirmation of the pathogen was performed by the University of Nebraska-Lincoln Plant and Pest Diagnostic Clinic from leaf samples collected in Dallam County. To date, the occurrence of the disease has been mostly isolated to areas north of Interstate 40, occurring only sporadically. Symptoms of the disease consist of long, necrotic lesions with wavy, water-soaked margins and may be confused with other diseases. Subtle differences in the appearance of these symptoms can be used to diagnose Goss's wilt. The appearance of an exudate or 'ooze' can be used to distinguish this bacterial disease from some more common fungal diseases. In severely infected plants, the pathogen can systemically infect the vascular system, resulting in a discoloration of the xylem and eventually a rotting of the stalk. Several samples from Castro, Hale, Hockley, Lamb, and Swisher counties exhibiting these symptoms have been submitted for diagnosis this week. Examination of infected tissues under the microscope has revealed oozing of bacterial cells. According to Ron French, Extension Plant Pathologist at Amarillo, many other samples have also tested positive for the pathogen, using commercially available detection methods. Disease severity in the field varies by field and among hybrids. It is too early to tell how yields will be affected; however, yield reductions will be experienced in fields that are severely infected. Studies conducted in corn producing regions of the Midwest have shown that the bacterium can survive for long periods of time on crop residue, posing a threat to corn crops in subsequent years. As of now, the severity and distribution of the disease is not fully known; however, corn that was planted later in the season may be at risk. Recommendations for curative products are unavailable, as information in Texas is lacking. The performance of products tested in Indiana and other corn producing states is inconsistent. If you have any questions regarding Goss's wilt in corn contact Jason Woodward (Lubbock) at 806-632-0762, jewoodward@ag.tamu.edu, or Ron French (Amarillo) at rdfrench@ag.tamu.edu. JW

Leaf lesion

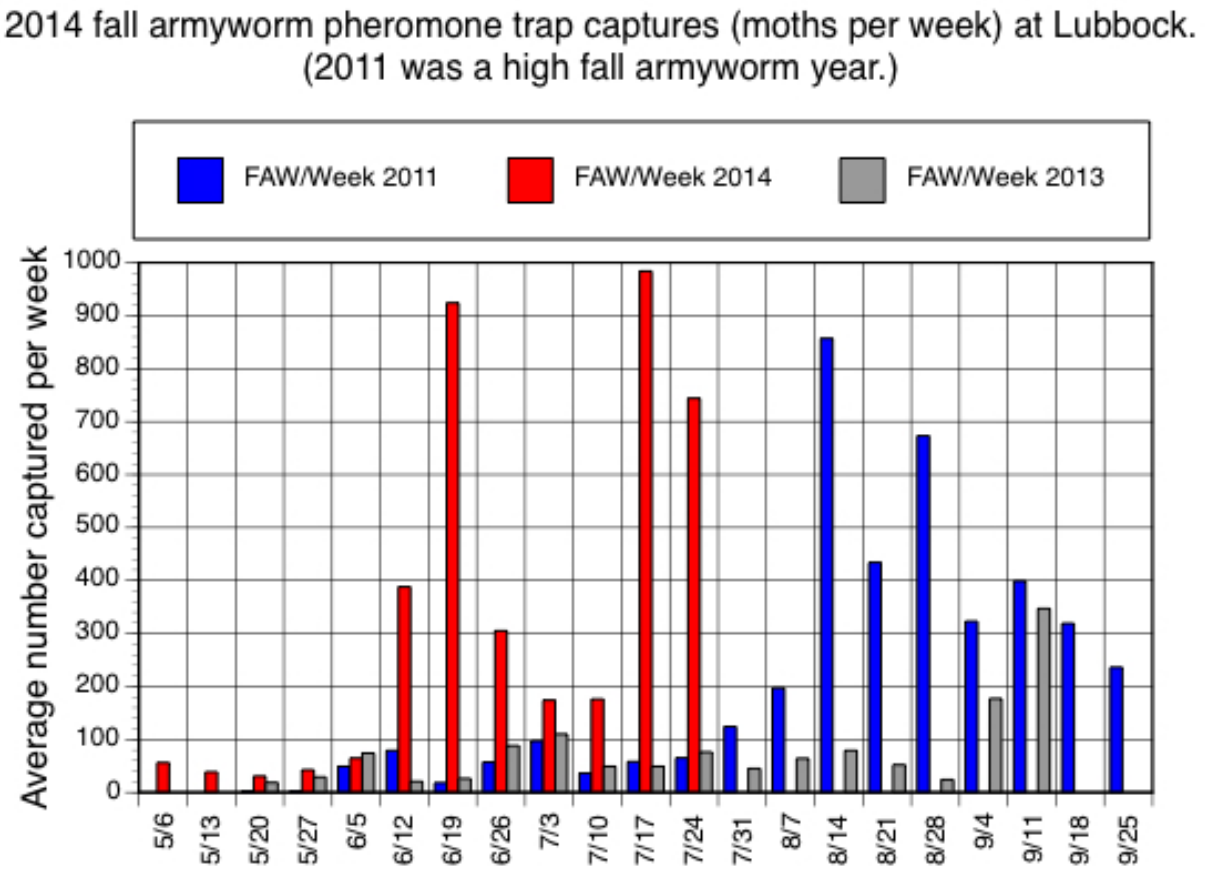
Water-soaked margin of lesion

Severely affected leaves with oozing

Severity down the row

Appearance of severely infected field from the turn row

Heavy fall armyworm flight still underway



As the graph shows, we are still experiencing a large flight of fall armyworm moths. The good news is that the flight seems to be winding down. However, if things go as usual between generations, the August flight will be severe. RPP

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SEND US A COMMENT BY E-MAIL

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Useful Web Links

Water Management Website, TAMU, Irrigation at Lubbock, IPM How-To Videos, Lubbock Center Homepage, Texas AgriLife Research Home , Texas AgriLife Extension Home, Plains Cotton Growers

County IPM Newsletters

Castro/Lamb, Dawson/Lynn, Crosby/Floyd, Gaines, Hale/Swisher, Hockley/Cochran, Lubbock, Parmer/Bailey, Terry/Yoakum

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