

Bacterial Blight Update for Cotton on the High Plains
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Bacterial blight, caused by *Xanthomonas axonopodis* pv. *malvacearum*, has been reported from most all cotton production regions around the world. The bacterium is capable of surviving saprophytically on infested crop residue. Dry arid conditions facilitate survival in soil from year to year. Cotton plants are susceptible to infection at all growth stages; however, leaves and bolls are most commonly infected later in the growing season. Conditions that favor disease development consist of moderate temperatures and high humidity. Wounding of leaves by blowing sand or hail may lead to an increase in incidence of the disease. Sprinkler irrigation can increase spread of the pathogen. The population structure of *Xanthomonas axonopodis* pv. *malvacearum* is complicated with numerous races being present in cotton around the world. In the United States, race 18 has been the predominant race of the pathogen for the past several decades. The identification of multiple resistance genes and deployment has led to resistance or immunity in many upland varieties. As a result, Bacterial blight epidemics have been sporadic causing negligible losses. Outbreaks of the disease have recently occurred in parts of the mid-south raising questions about the reemergence of the disease in that region.

Various symptoms are associated with the disease. Initial symptoms consist of small, pinpoint lesions on foliage. As the disease progresses, lesions take on a blocky, angular shape as the bacterium is not capable of crossing veins found within leaves (Fig. 1). Following systemic infections, veins may become necrotic (Fig. 2). Petiole infections result in severe necrosis, which may progress down the limb or branch resulting in a symptom referred to as Blackarm (Fig. 3). Premature defoliation and fruit abortion are often associated with the aforementioned symptoms. Later in the season, the bacterium may infect developing bolls causing a boll rot (Fig. 4). The appearance of these symptoms differs from foliar symptoms. Such lesions have a circular appearance, as there are no veins within the boll to limit growth of the bacterium. These symptoms are characteristic of what has been associated with infections caused by *Xanthomonas axonopodis* pv. *malvacearum*, race 18 over the past several decades.

During the 2015 growing season, subtle differences in symptom expression have been observed when the disease occurs on varieties that were previously documented as being resistant. While angular lesions still occur, the middle portion of the lesion has a distinctly different appearance. Seeming as though the center of the lesion is more degraded and falls out, giving the infected tissue a 'shot hole' appearance (Fig. 5). Furthermore, infected leaves of 'resistant' varieties tend to turn chlorotic more readily (Fig. 6). Recent field observations have shown that most all varieties evaluated exhibited some level of disease (Table 1). Additional ratings can be obtained as they become available.

In order to quantify the frequency, distribution and impact of this disease detailed sampling is needed. We propose that County Extension Agriculture and Natural Resources Agents communicate with producers, consultants and other members of cotton community to identify fields exhibiting Bacterial blight and Bacterial blight-like symptoms. Bacterial isolates obtained from symptomatic tissues will be tested against varieties with a known reaction to *Xanthomonas axonopodis* pv. *malvacearum*, race 18. To determine what changes if any have occurred to populations of the bacterium. An emphasis will be placed to isolates collected from formerly

resistant varieties (such as Partially resistant: DP 1359B2RF, PHY 339WRF; Resistant: DP 1410B2RF, FM 2007GLT and Immune: FM 1830GLT, FM 2334GLT, FM 2484B2F and ST 5289GLT). Samples of leaves expressing Bacterial blight symptoms should be placed in a plastic bag and shipped to the Texas A&M AgriLife Research and Extension Center, 1102 East FM 1294 Lubbock, TX 79403. The following information should accompany samples 1) variety name, 2) estimated level of severity (i.e., low, moderate or high), as well as 3) GPS coordinates of the field (to allow for further monitoring or subsequent sampling). Additional laboratory and greenhouse tests will be conducted to compare and contrast bacterial isolates. If you have any questions regarding the appearance of the disease or need additional information about the sampling please contact either Dr. Wheeler (806-746-6101; twheeler@ag.tamu.edu) or myself (806-632-0762; jewoodward@ag.tamu.edu).



Figure 1. Appearance of angular leaf spot lesions characteristic of Bacterial blight.



Figure 2. Vein necrosis (left) and leaf necrosis (right) associated with Bacterial blight.



Figure 3. Initial blackarm symptom associated with Bacterial blight.



Figure 4. Boll rot symptom associated with Bacterial blight.



Figure 5. Falling out of leaf tissue associated with Bacterial blight-like symptoms on a resistant variety.



Figure 6. Chlorotic appearance of leaves exhibiting Bacterial blight-like symptoms on a resistant variety.

Table 1. Blight incidence ratings in a variety trial for a field near Plains, TX suspected of having a new bacterial problem, or a possible mixture of a new bacterium plus our standard Bacterial blight pathogen²

Variety	% of plants with blight symptoms	Rating from trials with race 18 of normal bacterial blight
DP 1549B2XF	60.00	No data yet
DP 1321B2RF	48.75	Susceptible
PHY 495W3RF	43.75	No data yet
BX 1531GLT	42.50	No data yet
FM 1830GLT	42.50	Immune
BX 1634GLT	37.50	No data yet
BX 1635GLT	37.50	No data yet
FM 2322GL	37.50	Susceptible
DP 0912B2RF	33.75	Susceptible
DP 1558NRB2RF	32.50	No data yet
PHY 487WRF	32.50	No data yet
FM 2007GLT	31.25	Resistant
DP 1359B2RF	30.00	Partially resistant
BX 1637GLT	28.75	No data yet
DP 1410B2RF	27.50	Resistant
PHY 444WRF	27.50	No data yet
PHY 575WRF	27.50	No data yet
FM 2484B2F	26.25	Immune
NG 1511B2RF	26.25	Susceptible
DP 1555B2RF	22.50	No data yet
NG 5007B2XF	21.25	No data yet
PHY 417WRF	21.25	Susceptible
PHY 339WRF	20.00	Partially resistant
FM 2334GLT	17.50	Immune
PHY 499WRF	17.50	Susceptible
ST 6182GLT	17.50	No data yet
DP 1538B2XF	16.25	No data yet
FM 1320GL	16.25	Susceptible
PHX 3003-04WRF	13.75	No data yet
DP 1441RF	10.00	Susceptible
DP 1553B2XF	8.75	No data yet
ST 5289GLT	8.75	Immune
DP 1311B2RF	3.75	Susceptible
DP 1454NRB2RF	3.75	Susceptible
BX 1532GLT	2.50	No data yet
BX 1633GLT	2.50	No data yet

²Differences between varieties were not significant at P=0.05.