SCREENING COTTON VARIETIES FOR REACTION TO FUSARIUM WILT (RACE 1) IN THE SOUTHERN HIGH PLAINS

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Abstract

The Southern High Plains of Texas produces one third of the total cotton production in the state. Root knot nematode (*Meloidogyne incognita*) is one of the most important cotton pathogens in the area. Root knot nematode can cause a disease complex with Fusarium wilt. *Fusarium oxysporum* f. sp. *vasinfectum* (FOV) causes vascular necrosis and wilting in cotton directly reducing cotton stands and yield. FOV race 1 requires the root knot nematode in order to cause infection. However, root knot resistance does necessarily translate into Fusarium wilt resistance. Thus, our objective was to screen commercial varieties for resistance to the Fusarium wilt/Root-knot nematode complex. Three different locations (Gaines, Dawson and Hall counties) were used to conduct field trials. Forty-seven different varieties were screened in at least one of these sites based on % plants that died after initial emergence, root knot nematode density and yield. The Dawson county test averaged 757 lbs. of lint/a, with an average root knot density of 3,386/500 cm^3 of soil, and average plant death of 19%. The Gaines county test yield averaged 223 lbs./acre, with an average of 3,284 root knot/500 cm^3 soil and average plant death of 43%. Finally, the Hall county test yield averaged 1,802 lbs./acre, with an average of 3,406 root knot/500 cm^3 soil and average plant death of 8%. The top three yielding varieties in Dawson county were ST 4946GLB2, FM 1621GL, and PHY 480W3FE with root knot densities of 1,390; 4,510 and 165 per 500 cm^3 soil and plant death of 14, 3, and 24%. Respectively. In Gaines county, ST 4946GLB2, DP 1851B3XF, and NG 4792XF were the top yielding varieties, while the root knot population were 1,145; 2,125 and 4,025per 500 cm^3 soil, and plant death of 38, 33, and 29%, respectively. In Hall county top yielding varieties were PHY 500W3FE, DP 1840B3XF, and PHY 580W3FE, with nematode densities of 80, 827 and 107 per 500 cm^3 soil, and plant death of 0, 8, and 23%, respectively. It had been observed previously, that DP 1454NRB2RF and DP 1558NRB2RF were resistant to root-knot nematode, but highly susceptible to Fusarium wilt. One objective of this project was to compare the newer Deltapine root-knot nematode resistant variety, DP 1747NRB2XF to the Fusarium wilt recommended variety ST 4946GLB2. The percentage of plants that died from Fusarium wilt for DP 1747NRB2XF at Hall, Dawson, and Gaines county were 20, 26, and 34%, respectively. The percentage of plants that died from Fusarium wilt for ST 4946GLB2 in these same trials, was 2, 14, and 38%, respectively. Under severe Fusarium wilt pressure (Gaines county), both varieties had high plant death due to Fusarium wilt. Under less Fusarium wilt pressure, ST 4946GLB2 had a least numerically fewer plants dying due to the disease. Stunting of plants was common in these Fusarium wilt fields. It did appear that the root-knot nematode resistant varieties had a yield advantage because of less stunting, even if plant death was similar with root-knot nematode and susceptible varieties. The two components: plants dying due to Fusarium wilt and plant stunting due to the complex of both FOV1 and root-knot nematode, must be considered when evaluating germplasm. ST 4946GLB2 was recommended to producers for Fusarium wilt management prior to conducting these tests. No varieties were identified with better performance in Fusarium wilt fields. Unfortunately, under significant disease pressure, high plant losses occurred even with this variety. Resistant varieties are the most sustainable, cost-effective and efficient way to manage diseases. However, better FOV1/Root-knot nematode resistant varieties are still necessary to reduce losses to this disease complex.

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