

ROOT-KNOT NEMATODE TOLERANCE AND SEEDLING DISEASE IN Acala COTTON LINES

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Abstract

California Planting Cotton Seed Distributors has strived for many years to develop cotton (*Gossypium hirsutum* L.) varieties with higher yields and tolerances to cotton diseases. This has been a cooperative effort with the United States Department of Agriculture, the University of California, and San Joaquin Valley cotton growers, involving both greenhouse and field trials. Most work in developing new California Acalas has centered on developing varieties with higher lint yields that meet the state's quality standards. These varieties usually included high tolerances to verticillium wilt. A need for Acala varieties with higher tolerances to the pathogens involved in the seedling disease complex, the fusarium wilt/root-knot nematode complex, and the verticillium wilt has been recognized.

An important aspect of this research is the preliminary evaluation of lines developed from root-knot nematode (*Meloidogyne incognita*)(Kofoid & White)(Chitwood) tolerant parents. These evaluations are conducted in soils infested with the root-knot nematode to help identify lines with the most outstanding agronomic and fiber characteristics. Following harvest, roots are dug and evaluated by the weighted nematode rating (WNR) system for nematode galling.

In 1997 the WNR of 130 of the new lines were compared to those of four approved lines. A WNR greater than 10 is considered high enough to require nematicide treatment in nematode infested soils. Acala Maxxa, the most widely planted variety in California's San Joaquin Valley, was evaluated at 63 WNR in contrast to Acala NemX, the most root-knot nematode tolerant commercial variety, at 8 WNR. The best of the new 1997 lines under evaluation had low WNR ratings of 0.5 to 3.5 and it was encouraging to find some of these lines virtually free from root-knot nematode galling. These lines with the lowest WNR evaluations will be tested in 1998 along with approved varieties for their relative tolerances to other cotton diseases and yield potential.

Lines selected in 1995 and 1996 were reevaluated in 1997 trials for their seedling disease complex tolerances, WNR,

and yield potentials. They were compared to several commercial varieties including Acala Maxxa and Acala NemX. Acala Maxxa had the highest WNR of 34, a seedling emergence of 92% and a lint yield of three bales per/acre, while Acala NemX had a WNR root evaluation of 3.0, a seedling emergence of 93 percent, and a lint yield of 3.9 bales. Of the 1995-96 lines four had seedling emergences between 60 and 74 percent with low WNR between 2.9 and 11.4 and very high lint yields from 4.1 to 4.9 bales per/acre, and five of them had high lint yields above four bales per/acre, but with higher seedling emergence of 81 to 94 percent, and WNR between 3.6 and 8.3.