

**IDENTIFICATION AND ENHANCEMENT
OF RESISTANCE TO RENIFORM NEMATODE
IN COTTON GERMPLASM**

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Abstract

Two diploid species, *Gossypium herbaceum* (A₁) and *G. arboreum* (A₂) were widely cultivated in Asia and Africa beginning at least 5000 years ago. The wide geographical distribution of the diploid cottons under primitive or traditional cultivation has provided opportunity for the development of extensive diversity in biotic resistance.

The reniform nematode, *Rotylenchulus reniformis* Linford & Oliveira, is a root parasite with a very wide host range. It is a significant problem in the southern and mid Mississippi Delta cotton production areas. Currently grown cultivars of upland cotton do not have significant resistance to this nematode, however, a few accessions of diploid cottons with resistance have been reported. With the indication that the Asiatic cottons may have reniform nematode resistance, we surveyed approximately half of the NPGS Asiatic Cotton Collection for resistance to this nematode. In addition we reevaluated the reported immunity of *G. longicalyx* to the reniform nematode.

Seeds were germinated in moist paper towels, and uniformly germinating seeds were planted in 10 cm pots containing fine sand (500 cm³) in a greenhouse. Primary screens had 5 replications while confirming evaluations tested 10 plants. After 7 days, a water suspension containing approximately 1800 nematode vermiform were applied to the pot. Plants were watered and fertilized regularly for 7-8 weeks. Nematodes (all forms) were recovered from the soil and roots by sieving and sucrose centrifugation.

A-genome cottons as a group are less suitable hosts for the reniform nematode than upland cottons. Ninety percent or more of the accessions supported less reproduction of the nematode than 3 upland genotypes. Great variability was observed among accessions for reaction to the reniform nematode. Based on reproduction measured as nematodes recovered, a few of the accessions were highly susceptible, but, significantly, others were highly resistant and supported less than 5% of the reproduction that occurred on the *G. hirsutum* checks. The immunity of *G. longicalyx* was reconfirmed.

Strategies to transfer the resistance to *G. hirsutum* include: 1) generation of a 6X hybrid of cotton and the resistant diploid followed by backcrosses; 2) generation of a synthetic allotetraploid between the resistant line and a wild diploid D genome species which is then crossed with cotton; and 3) generation of a 4X triple hybrid by crossing the resistant diploid with a 2(ADD) 6X genetic stock. Each of these strategies is being used in a multiple approach to transfer reniform resistance to elite cotton lines.