ROOT-KNOT NEMATODES INTERACT WITH FOV RACE 4 AND INCREASE DISEASE SEVERITY IN THREE COTTON VARIETIES IN GROWTH CHAMBER ASSAYS

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Abstract

The cotton pathogen *Fusarium oxysporum* f. sp. *vasinfectum* (*Fov*) occurs in most cotton growing areas of the world, can cause significant yield losses, and can remain indefinitely in soils for disease to re-emerge. There are two pathotypes of *Fov* in the United States. The first type (race 1; R1) causes wilt only in the presence of nematodes; the second type (race 4; R4) causes extensive root rot and wilt in the absence of nematodes. To study the molecular basis for the two pathotypes and their interaction with the root-knot nematode (RKN), *Meloidogyne incognita*, we have developed a disease assay where R1, R4, and their interaction with RKN can be tested under the same growth chamber conditions. Three cotton lines, *Gossypium hirsutum* 'Acala 44', *G. hirsutum* 'FM 966', *G. barbadense* 'Pima S4'-B were used as hosts. Six treatments consisted of R1 alone, R4 alone, RKN alone, mock, R1 + RKN, and R4 +RKN. The mock, RKN alone, and R1 alone treatments caused no disease. Disease severity was significantly increased in R1 + RKN treatment compared to controls. Disease severity increased further by R4 treatment, and R4+RKN treatment caused the most severe symptoms. PS4B did not show symptoms following R1 + RKN treatment, and its R4 symptoms were not worsened by the addition of RKN. However, Acala 44 and FM 966 were not as sensitive as PS4B to the R4 alone treatment, and the addition of RKN to R4 caused severe symptoms for the *hirsutum* lines. Thus, this disease assay shows that RKN can be a factor in R4 disease for these *G. hirsutum* lines. We are not aware that anyone has detected R4 disease in RKN-infested soils, but should R4 expand to the Southeast US, this could be a problem.