WILD AND CULTIVATED GRASS HOSTS OF THE SOUTHERN ROOT-KNOT NEMATODE, MELOIDOGYNE INCognITA 1)

BY

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In a greenhouse experiment with 34 species of grasses, 30 species in 20 genera and 6 tribes became galled by Meloidogyne incognita. Nematode reproduction occurred on 27 species; 4 species were entirely free from nematode attack. Sixteen new hosts of M. incognita are reported. Ratio of male nematodes to galls was variable, but was apparently shifted toward production of more males on some hosts. Some abnormal males with two testes were observed.

The importance of the southern root-knot nematode, Meloidogyne incognita (Kofoid & White) in heated greenhouses in Ontario has been reviewed by Davidson & Townshend (1967). These authors found 34 species of weeds, including four grasses, to be hosts which might maintain this nematode in greenhouses and compost piles.

Conflicting reports regarding the resistance of grasses to M. incognita exist in the literature. Colbran (1958) reported infestations of the southern root-knot nematode on Hordeum vulgare and Triticum aestivum as "light", while Sasser (1954) rated both grains as extremely susceptible. Similarly, Gaskin (1958) reported Agropyron repens and Hordeum jubatum as resistant to the southern root-knot nematode, but Goodey, Goodey & Franklin (1956) considered A. repens a host of an unnamed Meloidogyne species, and Davidson & Townshend (1967) found H. jubatum an excellent host of M. incognita. In addition, the four species of grasses tested by Davidson & Townshend (1967) were new hosts not recorded by Goodey, Franklin & Hooper (1965).

Wild or cultivated grasses on compost piles could maintain this nematode during an Ontario summer. The study now reported was established to determine which of these grasses occurring in Ontario might be hosts of M. incognita.

METHODS

Seeds of 34 grass species, representing 20 genera in 6 tribes of wild and cultivated grasses occurring in Ontario, were collected in 1966 and stored air-dry *).

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*) Seeds of some species were obtained from the Canada Department of Agriculture, Phanerogamic Herbarium, Ottawa.
Gray's Manual of Botany (Fernald, 1950) was used to identify most of the species; Fraser & Russell, (1953) was used for those not covered by Gray's Manual.

During the winter of 1966-67, roots of tomato plants heavily infested with *M. incognita* were comminuted in a Waring blender, thoroughly mixed into the loam soil from the tomato planting, and the soil placed in 100 four-inch pots. Each pot contained an average of 3000 *M. incognita* larvae per pound of soil as determined by the Baermann pan method (Townshend, 1963).

After germination on moist paper, the grass seedlings were transplanted to flats of sterilized compost soil. In some cases, rate of germination was enhanced by acid scarification or gibberellin treatment of the seed. Three to 8 weeks after transplanting, the seedlings were planted, one per pot, into freshly prepared pots of the infested root-soil mixture.

Three replicates of each grass species (except *Setaria glauca*, of which only one seedling was available) were randomized on a greenhouse bench. Greenhouse temperature varied from $21^\circ$ C (day) to $15^\circ$ C (night) over the test period. Supplemental lighting was used to maintain daylength at 16 hours.

The plants were removed after 56 days and the roots gently shaken free from soil. A small portion of each root system was preserved in 4% formalin for microscopic observation to confirm by perineal pattern the identity of the nematode producing the galls. The remainder of each root system was placed on a Baermann pan (Townshend, 1963) at $23^\circ$ C. Males and hatched larvae were counted after 2 weeks. The roots were then dried with absorbent paper and weighed, and examined microscopically for galls. Unusual galls or root proliferations were noted at this time. The number of males, larvae and galls per gram of dried root was recorded.

**RESULTS**

The host-parasite reactions fit into the following categories: (1) successful invasion with galling and subsequent nematode reproduction (27 species); (2) successful invasion, with galling but no reproduction of the nematode (3 species); (3) no galling and no evidence of invasion (4 species). Eleven grass species previously recorded as hosts were galled and viable larvae were recovered from the root systems. In addition, sixteen species not previously recorded as hosts were galled and viable larvae were recovered (Table I).

Male *M. incognita* were recovered from 26 grass species in categories (1) and (2). In many instances where males were found, their number was almost half the number of galls on the roots. Microscopic examination of some males revealed that they possessed two testes instead of the normal one.

Some unusual abnormalities of the host roots were noted. About one-third of the plants showed the coalescence of galling of roots typical of *M. incognita* invasions but a few root systems also showed proliferations of roots from galls reminiscent of those caused by the northern root-knot nematode, *Meloidogyne hapla* Chitwood. However, perineal patterns of females from such galls were