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INTERACTION OF *MELOIDOGYNE INCOGNITA*
AND *ROTYLENCHULUS RENIFORMIS* ON TOMATO

by

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Antagonism between two or more nematode species infesting the same host has been investigated by several workers with varying results. *Meloidogyne incognita* (Kofoid *et* White) Chitwood inhibited the infection of soybean by *Heterodera glycines* (Ichinohe) Skarbilovich (Ross, 1964) or tomato by *Pratylenchus penetrans* (Cobb) Filipjev and Schuurmans St. (Estores and Chen, 1972), but in studying the interaction of *M. hapla* Chitwood, *M. incognita* and *P. brachyurus* (Godfrey) Goodey, on tobacco, Johnson and Nusbaum (1970) found that the reproduction of *M. incognita* was decreased in the presence of *P. brachyurus* whereas that of *M. hapla* was unaffected by either of the other species. On bentgrass, *Tylenchorhynchus agri* Ferris but not *P. penetrans* inhibited *M. naasi* Franklin multiplication (Sikora *et al.*, 1972). Recently, Chapman and Turner (1975) found that the egg laying of *P. penetrans* on red clover or alfalfa was decreased in relation to the number of *M. incognita* present.

Materials and methods

One month old tomato seedlings, *Lycopersicon esculentum* Mill. cv. Ace, were transplanted into steam sterilized sandy soil in 10 cm diameter plastic pots. The pots were then inoculated with nematode suspensions in distilled water to provide three treatments 1) *Meloidogyne incognita* (M), 2) *Rotylenchulus reniformis* Linford *et* Oliveira

(R) or 3) both nematode species (MR). The inoculum for each pot was 1,000 second stage larvae of *M. incognita* or 1,000 fourth stage larvae of *R. reniformis* or both, using nematode populations cultured on tomato cv. Ace. Each treatment was replicated three times and the whole experiment was repeated once under conditions similar to the first.

The inoculated pots were kept in a glasshouse at a temperature of 22-25° C, with water and nutrients applied at levels to provide plant growth. About one month after inoculation the plants were cut at soil level and each pot soaked for two hours in a bucket half full of water. Roots were then stained in lactophenol acid fuchsin (Franklin, 1949) and nematodes in the soil suspension extracted using an Oostenbrink elutriator (Goodey, 1957). The resulting suspension was then transferred to a Baermann-pan fitted with soft tissue paper and left for about 48 h to separate active nematode from fine soil particles. Nematodes in each root system were counted using a stereoscopic microscope. The number of nematodes in the soil suspensions were assessed with a Hawksley counting slide. Ten gravid females of each species in the three treatments were separated from the roots and the number of eggs counted in each female to provide an estimate of fecundity.

Results

The numbers of *M. incognita* in the roots at the end of the experiments were significantly less in pots where *R. reniformis* was present than in pots where *M. incognita* was alone (Table I). In mixed populations (MR) the percentage of unswollen females (fourth stage larvae) of *M. incognita* was higher than in the single population (M) suggesting that the rate of development had been retarded by the presence of *R. reniformis*. Reproduction of *M. incognita* was decreased in the presence of *R. reniformis*, the mean number of eggs per female being 250 in the (M) treatments compared with 100 in the (MR) treatment.

R. reniformis appeared to be unaffected by the presence of *M. incognita*. At the end of the experiment the numbers of *R. reniformis* in (MR) and (R) treatments were similar both in roots (Table I) and in the soil. Towards the end of the experiment a large number of eggs appeared to have hatched and similar large numbers of second

Table I - *Developmental stages of M. incognita and R. reniformis alone or concomitant within tomato roots.*

Developmental stages	Nematode species							
	M. incognita				R. reniformis			
	alone		concomitant		alone		concomitant	
	No/root ¹	DS%	No root	DS%	No/root	DS%	No/root	DS%
Unswollen females	88	16.0	86	27.0	0	0	0	0
Non egg-laying females	365	67.1	198	62.0	0	0	0	0
Egg-laying females	91	16.9	34	11.0	264	100	262	100
Total stages	544*	100	318	100	264	100	262	100
Egg/eggmass	250		100		49		56	

* Significant at 5% level of probability.

Ds = Developmental stages.

¹ Average of calculated means of 3 pots per treatment in each of two experiments.

stage larvae were extracted from (R), (1025 larvae/pot) and (MR), (1100 larvae/pot) treatments.

Discussion

The results clearly demonstrate that root penetration by larvae of *M. incognita* was adversely affected by the presence of *R. reniformis*, and it is concluded that the latter competed more effectively for entry sites on tomato roots. The development and growth rate of *M. incognita* within the roots was also affected when *R. reniformis* was present and in the experiment relatively few *M. incognita* reached the adult stage in mixed populations (MR) compared with pure populations (M). The results also suggest that each female *M. incognita* laid fewer eggs in mixed infestations.

LITERATURE CITED

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