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SELF INTERACTION OF THE ROOT-KNOT NEMATODE, *MELOIDOGYNE INCOGNITA*, ON TOMATO

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Most studies on the effect of a pathogen on a plant host have been made with single inoculations, although usually with several inoculum levels. In nature, however, plants are subject to invasion (infestation) by pathogens on several occasions during their period of growth, and this is certainly so with root-knot nematodes. Moreover, the effect of the secondary infestation is likely to be modified by the first. Jatala and Jensen (1976) investigated self interaction of *Meloidogyne hapla* and *Heterodera schachtii* on *Beta vulgaris* and concluded that neither pathogen produced any form of immunity in the host which would interfere with the secondary infestations. We have studied the effect of repeated inoculations of *Meloidogyne incognita* (Kofoid *et* White) Chitw. on the growth of tomato and the development of the nematode populations.

Materials and methods

Three-week old seedlings of tomato (*Lycopersicon esculentum* Mill.) cv. Pusa Ruby raised in autoclaved soil were transplanted singly into 15 cm clay pots containing 1 kg autoclaved soil- manure mixture. Forty eight hours later each pot was inoculated with freshly hatched 2nd stage juveniles of *M. incognita*. A second inoculation was made 15 days later. Thus, a range of nematode densities was established, together with a control without nematodes (Table I). Each treatment was replicated six times.

Sixty days after the first inoculation the plants were uprooted and placed singly in 250 ml capacity Erlenmeyer flasks containing a known amount of water. Six flasks containing same amount of water and without seedlings were also kept as a control. After 12 hours the plants were taken out of the flasks and the amount of water loss determined. Amount of water lost from the flasks having no plants was deducted from the amount of water lost from the flasks having plants. The difference gave the actual amount of water absorbed and transpired by the plants (Alam *et al.*, 1974). Measurements were taken of the length and weight of shoots and roots of each plant and galling caused by *M. incognita* was determined on 0-5 scale (Taylor and Sasser, 1978). Final populations of nematodes in the soil were determined by Cobb's sieving and decanting method and modified Baermann funnel technique (Southey, 1986). Data were statistically analysed for critical differences (C.D.) at P = 0.05 (Sukhatme and Amble, 1978).

Results and discussion

Single inoculations of *M. incognita* at all inoculation levels caused significant reductions in the growth of tomato plants as measured by length of shoots and roots, and their weight. Reduction increased with increase in inoculum level and early inoculations caused greater reduction in growth than later ones (Table I). Larger root-knot indices and nematode densities were also associated with the early inoculations, which is understandable as the nematodes had more time of association with the host plant. Moreover the age factor of the plant might have also played some role.

Two inoculations of nematodes on the same plant caused a greater reduction in growth than a single early inoculation of approximately the same magnitude (Table I). The quantum of loss in plant growth was nematode-density dependent.

The decrease in plant growth was greater, when the inoculum level was in two split doses, than a single inoculum of the same density. Nematode multiplication and root galling were also greater in the split inoculum treatment.

At all inoculum levels reduction in water absorption was correlated with the degree of plant damage (Table I).

Literature cited

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TABLE I - *Self interaction of* Meloidogyne incognita: *effect on nematode multiplication, plant growth and water absorption efficiency of tomato roots.*

Inoculation[2]		Plant length (cm)[1]		Plant weight (g)[1]		Root-knot index[1]	Final population[1]	Reproduction factor[1, 3]	Water absorbed per plant in 12 hr[1] (g)
I	II	Shoot	Root	Shoot	Root				
0	0	36.7	24.1	23.5	14.0	—	—	—	16.5
50	0	34.6	21.5	22.4	13.3	0.8	892	17.8	16.0
500	0	31.5	18.0	19.5	11.5	1.5	8452	16.9	14.8
5000	0	25.0	13.5	16.3	9.3	4.0	16660	3.3	11.2
0	50	34.8	22.3	22.6	13.0	0.5	780	15.6	16.2
0	500	32.0	18.3	20.5	12.3	1.5	8004	16.0	15.7
0	5000	27.0	14.5	18.0	10.5	3.8	16250	3.3	12.5
50	50	32.0	20.0	20.0	12.3	1.5	1255	12.6	15.5
50	500	28.0	15.5	16.2	10.0	3.0	10680	19.4	13.0
50	5000	24.0	12.0	13.0	8.5	4.0	17896	3.5	10.0
500	50	29.0	16.0	18.0	11.0	2.5	9000	16.4	13.5
500	500	26.5	13.3	16.3	9.5	4.0	15140	15.1	12.2
500	5000	21.5	11.0	13.5	8.0	4.0	18322	3.3	10.0
5000	50	23.5	12.0	15.0	8.6	4.0	17540	3.5	9.5
5000	500	20.0	10.5	12.8	7.0	4.0	24508	4.5	8.0
5000	5000	15.5	9.0	9.5	5.8	4.0	32200	3.2	6.5
25	25	33.5	20.0	20.5	12.5	1.3	1192	23.8	15.8
250	250	29.0	15.4	16.3	10.2	3.0	9280	18.6	14.0
2500	2500	22.5	11.5	13.2	7.5	4.0	18647	3.7	12.2
C.D. (P = 0.05)		1.7	0.8	1.1	0.7	0.5	308.1		2.2

[1] Each value is an average of six replicates.
[2] Double inoculations were made at 15 days interval.
[3] Reproduction factor (R) calculated by dividing final population (Pf) by the initial population (Pi).

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