

Department of Nematology, Haryana Agricultural University, Hissar, India

EFFECT OF *MELOIDOGYNE JAVANICA*  
ON THE YIELD OF BRINJAL AND TOMATO

by

R. K. JAIN and D. S. BHATTI

Although root-knot nematodes are a major problem in nurseries and vegetable growing in India, there is little information about yield losses in vegetable crops. Prasad (1960) reported infestations of the order of 83% for tomato (*Lycopersicon esculentum* Mill.), brinjal (*Solanum melongena* L.) and okra (*Hibiscus esculentus* L.) in the Delhi area and Sadykhov (1970) also observed similar infestations in tomato and brinjal crops. Gunasekaran and Kalyanaraman (1970) found that tomato suffered maximum losses when inoculated with 10,000 *M. incognita* (Kofoid *et* White) Chitw. larvae per pot. The present study was undertaken to evaluate yield losses in brinjal and tomato infected with *M. javanica* (Treub) Chitw. under screenhouse and glasshouse conditions.

MATERIALS AND METHODS

Seedlings of tomato cv HS101 and brinjal cv Pusa Purple Long were raised in clay pots in mid-August (brinjal) or late September (tomato). The pots were drenched with 0.2% PCNB and difolatan to protect the seedlings against damping-off disease. In addition to normal watering procedures the pots also received Hoagland's nutrient solution (A) at the rate of 250 ml per pot on alternate days.

*M. javanica* were obtained as egg masses from pot cultures on tomato. The egg masses were incubated at  $24 \pm 2^\circ$  C and larvae hatched after 24-48 hours. The second-stage larvae were then added in a loga-

rithmic series (0, 10. — .10<sup>4</sup>) to the pots containing six-week old tomato or brinjal seedlings. There, were six replicates of each treatment which were randomized. Hoagland's solution was added on alternate days as before and the plants were sprayed with 0.75% endosulfon at 10 day intervals for protection against insect pests. The pots were brought into a glasshouse during the winter (Nov. - Feb.). Yields of fruit were recorded together with fresh shoot and root weights.

## RESULTS AND DISCUSSION

There was a significant reduction in fruit yield and fresh shoot and root weights of brinjal and tomato plants grown for 16 weeks from the time of initial inoculation with *M. javanica*. Losses were evident at all levels of inoculum, compared with controls, but maximum losses occurred with an inoculum of 10,000 larvae (Table I, II). Nematode populations had increased in all the pots by the end of the experiment, except at the highest inoculum (10,000 larvae) where a decrease was recorded (Table III).

In both crops there was a significant negative association between the population density of nematodes measured at the end of the experiment and yield, fresh root and shoot weight. The greatest correlation was with fresh root weight (—0.877), with —0.865 for yield and 0.766 for fresh shoot weight in brinjal; value for tomato were 0.741 for fresh shoot weight, —0.656 for yield and —0.646 for fresh root weight.

Nandal and Bhatti (1977) found that an inoculum level less than 1,000 larvae per brinjal plant did not cause appreciable damage during eight weeks exposure in which the nematodes would have been multiplying could have resulted in damage to the plants. Wallace (1971) reported that top growth was stimulated by low numbers of *M. javanica* larvae. The present study indicates that an inoculum of 10 larvae per plant produced some stimulatory effect on the early stages of plant growth, resulting in earlier setting of flowers and fruit. Later stages of growth were adversely affected at all levels of inocula with significant decreases in yield, and of fresh weights of shoots and roots. These observations are in general in accordance with those of Gunasekaran and Kalyanaram (1972).

Table I - *Effect of Meloidogyne javanica on yield and growth of brinjal.*

Inoculum (larvae/pot)	Mean fruit yield (g)	Mean fresh shoot weight (g)	Mean fresh root weight (g)
0	201.2	55.4	13.0
10	143.5	46.5	10.5
100	104.5	35.1	8.2
1000	81.3	27.8	5.7
10,000	46.0	23.5	3.6
C. D. at 5% level	16.7	2.8	0.7

Table II - *Effect of Meloidogyne javanica on yield and growth of tomato.*

Inoculum (larvae/pot)	Mean fruit yield (g)	Mean fresh shoot weight (g)	Mean fresh root weight (g)
0	164.9	60.6	16.6
10	139.6	55.2	15.9
100	46.8	34.8	6.0
1000	22.6	21.9	5.1
10,000	8.8	17.0	3.2
C. D. at 5% level	13.1	4.5	0.6

Table III - *Initial and final population densities of Meloidogyne javanica on brinjal and tomato.*

Initial population per pot	Mean final population per pot	
	Brinjal	Tomato
0	0	0
10	210	94
100	817	1668
1000	3372	4200
10,000	6580	6372

## L I T E R A T U R E   C I T E D

- GUNASEKARAN C.R. and KALYANARAMAN V.M., 1970 - Studies on the root-knot nematode *Meloidogyne incognita* (Kofoid and White, 1919) Chitwood, 1949, on tomato. *Madras Agric. J.*, 57: 25.
- GUNASEKARAN C.R. and KALYANARAMAN V.M., 1972 - Studies on root-knot nematode, *Meloidogyne incognita* (Kofoid and White, 1919) Chitwood, 1949, on tomato. *Madras Agric. J.*, 59: 276-280.
- NANDAL S.N. and BHATTI D.S., 1977 - Pathogenecity of root-knot nematode *Meloidogyne javanica* on brinjal (*Solanum melongena* L.). *Haryana J. Hort. Sci.*, 6: 96-98.
- PRASAD S.K., 1960 - Plant parasitic nematodes observed at Indian Agricultural Research Institute Farm. *Indian J. Entom.*, 22: 127-128.
- SADYKHOV D.M., 1970 - Testing of some new chemical preparation for the control of the root-knot nematode on Apsheron. Baku: Izdal'ELM'. pp. 149-154.
- WALLACE H.R., 1971 - The influence of the density of nematode population on plants. *Nematologica*, 17: 154-166.

---

Accepted for publication on 30 September, 1978.