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PHYTOTHERAPEUTIC EFFECT OF SOME PLANT LEAVES ON *MELOIDOGYNE JAVANICA* INFECTING TOMATO PLANTS

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Summary. Phytotherapeutic effect of some plants leaves, viz., *Calotropis procera*, *Ricinus communis* and *Azadirachta indica* and their paired combinations on the growth of tomato and *Meloidogyne javanica* infection showed that the plant growth (height and weight) in all the treated plants increased significantly over control with subsequent reduction in the nematode population. However, castor (40 g/kg soil) was the most effective in reducing *M. javanica* in tomato over control (gall index, second-stage juveniles, number of egg masses/g root and eggs/egg mass).

Various plant tissues have been shown to suppress nematode populations and improve crop production (Siddiqui and Alam, 1987; Singh and Sitaramaiah, 1967; Nandal and Bhatti, 1983, 1986). This paper presents the results of experiments in which the chopped leaves of 'aak' (*Calotropis procera* [(Ait) R. Br.], castor (*Ricinus communis* L.) and 'neem' (*Azadirachta indica* A. Juss) were used alone or in combination for the control of *Meloidogyne javanica* (Treub.) Chitw. infecting tomato.

Materials and methods

Fresh leaves of each of the plants were chopped and 40g were mixed with autoclaved sandy soil in 15 cm diam pots (20 g of each plant in pots containing the two species). NPK fertilizer and zinc sulphate were added in solution and the pots were watered daily to hasten the decomposition of the leaves. Ten days later, each pot was inoculated with 4,000 eggs of *M. javanica* and planted with a 35 - day - old tomato cv. HS-101 plants. The treatments (Table I), including controls, were replicated eight times and arranged randomly in a screenhouse. After 35 days, in half of the pots in each treatment, nematodes were extracted from the soil and counted; the root knot index, number of egg masses/g root and number of eggs/egg mass were calculated and measurements were made of plant height and fresh and dry weights. However, at 35 days the nematode had not completed its life cycle and juveniles and egg masses were not present. Similar data were obtained in the remaining pots after 60 days and in addition the yield of tomato fruits was measured. N, P, K of the plant leaves was determined on the basis of dry weight.

Results and discussion

The growth of tomato plants increased in all the treatments compared with the inoculated and uninoculated controls (Table I). This could have been due to control of the nematode or to the nutritional effect of the treat-

TABLE I - *Effect of plant leaves on the control of* Meloidogyne javanica *and the growth of tomato plants (35 days after transplanting).*

Treatment	Plant height	Plant weight (g)		Gall index
		Fresh	Dry	
Aak	33b	27.1c	3.3b	8.0c
Castor	24e	11.0f	1.2cd	1.1e
Neem	28d	13.6e	1.7c	8.7bc
Aak + Castor	35a	29.5b	4.1a	4.4d
Aak + Neem	32bc	21.2d	3.1b	9.2ab
Castor + Neem	31cd	32.6a	4.2a	8.7bc
Inoculated only	21f	4.7g	0.7e	9.7a
Untreated	26e	6.5g	1.0de	–

Figures within each column followed by a common letter did not differ significantly (P = 0.05); gall index = 0-10 after Barker, 1985.

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ments, or both. Improvements in plant growth over the uninoculated control suggest that the amendment treatments had a nutritional effect, although the castor treatment was an exception as plant height and weight, 35 days after transplantation was less than in the other treatments despite its providing the best nematode control. Castor was initially phytotoxic as noted for other organic amendments (Khan *et al.*, 1973; Siddiqui *et al.*, 1976).

Plant growth at 60 days continued to be significantly superior over the controls indicating a continuing nutritional effect of the treatments (Table II). Yield (g/pot) of fruit was significantly increased in all treatments compared with the inoculated control, and was maximum in 'aak' and castor combination treatments.

The gall index was significantly much lower in the castor treatment and its efficacy against *M. javanica* is also indicated by the relatively few juveniles extracted from the soil, the number of egg masses and the number of eggs/egg mass.

'Neem' alone or in combination with 'aak' and castor appeared comparatively less effective in reducing gall index and number of egg masses. In 'neem' treated pots, although tomato sustained a high nematode population, the plant growth and yield remained unaffected.

Total N, P, K leave content of these plants (Table III) showed that castor is nutritionally superior to others if their availability to plants is uniform.

Castor gives best nematode control and provides best nutrition, hence of the three plants used it is best, even taking into account its initial phytotoxic effect.

TABLE II - *Effect of plant leaves on the control of* Meloidogyne javanica *and the growth of tomato plant (60 days after transplanting).*

Treatment	Plant height (cm)	Plant weight (g)		Yield (g/pot)	Gall index	J2/pot	Egg masses/ g root	Eggs/egg mass
		Fresh	Dry					
Aak	37b	40.0c	6.9bc	27.2bc	7.9abc	1970bc	184b	555b
Castor	37b	56.4ab	9.4ab	17.0d	2.0e	58d	35d	416c
Neem	36b	50.2bc	8.8ab	21.0cd	8.4abc	2730b	242a	564b
Aak + Castor	39ab	51.1bc	8.1b	44.2a	6.2d	945c	105c	503bc
Aak + Neem	38ab	40.1c	7.4bc	28.0bc	6.9cd	1500c	129c	532bc
Castor + Neem	42a	67.5a	10.8a	32.0b	8.7ab	1165c	120c	599b
Inoculated	26d	13.8e	2.1d	7.5e	9.4a	6090a	273a	776a
Untreated	31c	25.8d	4.8c	27.4bc	–	–	–	–

Figures within each column followed by a common letter did not differ significantly (P = 0.05).

TABLE III - *Total nitrogen, phosphorus and potassium (µg) content in 40 g leaves of aak, castor and neem.*

Plant	Dry weight of 40 g fresh leaves (g)	N	P	K
Aak	5.40	4.32	41.71	72.36
Castor	10.35	10.55	75.29	103.50
Neem	13.40	9.38	36.85	93.80

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