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## MANAGEMENT OF ROOT-KNOT NEMATODE ON EGG PLANT BY INTEGRATING ENDOMYCORRHIZA (*GLOMUS FASCICULATUM*) AND CASTOR (*RICINUS COMMUNIS*) CAKE

by

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**Summary.** Experiments were conducted to study the feasibility of integration of VA mycorrhiza (*Glomus fasciculatum*) and castor (*Ricinus communis*) cake for the management of *Meloidogyne incognita* on *Solanum melongena*. Seedlings colonized with VA mycorrhiza were least infected by *M. incognita* when transplanted in soil which was amended with castor cake. Further significant increases in colonization of *G. fasciculatum* on roots of egg plant and chlamydospore densities of VA mycorrhiza in this treatment indicated favourable effects of castor cake amendment on the growth of *G. fasciculatum*.

Seedlings of crop plants colonized with VA mycorrhiza when transplanted were found to have reduced infection by root-knot nematodes (Sikora, 1979; Bagyaraj *et al.*, 1979; Rao *et al.*, 1995). Amendment of soil with castor cake was reported to reduce the infestation of root-knot nematodes on vegetable crops (Alam and Khan, 1980; Muller and Gooch, 1982; Sitaramaiah, 1990).

There are no reports on the integration of these two eco-friendly components (VA mycorrhiza and castor cake) for the management of nematodes. Hence, this paper examines the integrative effect of VA mycorrhiza - *Glomus fasciculatum* (Taxt.) Gerd *et* Trappe and castor (*Ricinus communis* L.) cake for the management of *Meloidogyne incognita* (Kofoid *et* White) Chitw. infecting egg plant (*Solanum melongena* L. cv. Pusa Purple Round).

### Materials and methods

Experiments were conducted in a screen house, using sterilized alfisol of pH 6; P-6 mg/kg (Olsen) and organic carbon 0.72%, which was fertilized by adding 0.75 g N and 0.5 g K<sub>2</sub>O per 1 Kg of soil in the form of ammonium sulphate and muriate of potash, respectively. Seed pans (30x15 cm) were filled with 3 kg soil. One hundred and fifty grams of inoculum of *G. fasciculatum* containing 30-34 chlamydospores/g of soil were placed 2 cm below the soil surface before sowing the seeds of egg plant. After, 30 days the nursery seedlings were uprooted and tested for colonization of VA mycorrhiza on their roots. These mycorrhizal seedlings were transplanted singly in pots filled with 2 kg of unsterilized soil which had been amended with castor cake, 15 days before

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transplanting at 5 g or 10 g/kg of soil. The soil used contained 1 J<sub>2</sub> of *M. incognita*/g of soil. Mycorrhizal seedlings were also transplanted in unsterilized soil not amended with castor cake for evaluating the individual effect of VA mycorrhiza. Non-mycorrhizal seedlings transplanted in unamended unsterilized soil served as control. Each treatment was replicated ten times.

Two months after transplanting the egg plant seedlings, the experiment was terminated and observations were made on plant growth parameters, root-knot index [on 1-10 scale of Bridge and Page (1980)], number of eggs/egg mass, final (root + soil) population of nematode and number of chlamydo spores in 10 g of soil. Observations on the root colonization of *G. fasciculatum* were made twice (the first after one month and the second two months after transplanting the egg plants) by clearing the roots with 2.5% KOH and staining with trypan blue (Koske and Gemma, 1989). Chlamydo spores density in the soil was determined by wet sieving and decantation technique (Gerdemann and Nicolson, 1963).

## Results and discussions

Results given in Table I show a significant reduction in nematode infestation, nematode population densities both in root and soil, and

significant increase in plant growth parameters of egg plant when the mycorrhiza colonized seedlings were transplanted in castor cake amended soil. Further, there were significant increases in the colonization of *G. fasciculatum* on the roots of egg plants and chlamydo spore density of mycorrhiza in soil when mycorrhiza colonized seedlings were transplanted to castor cake amended soil (Table II).

Colonization of VA mycorrhiza was greater in the seedlings in soil with the higher dose of castor cake (10 g/kg) than the lower dose (Table II). These observations indicate a favourable effect of castor cake amendment on the growth of *G. fasciculatum* in the rhizosphere of egg plant. The combined effect of colonization of *G. fasciculatum* on roots and castor cake amendment in the soil was responsible for the significant reduction of *M. incognita* infestation on transplanted egg plants (Table I). Some colonization of mycorrhiza was observed in the treatment where *G. fasciculatum* was not inoculated because of the negligible amount of local population of VA mycorrhiza (not identified) present in the soil. Results of the present studies on integration of *G. fasciculatum* and castor cake suggest their additive effect on the sustainable management of root-knot nematodes on egg plant facilitating the effective utilization of these two eco-friendly components of management.

TABLE I - Effect of integration of *Glomus fasciculatum* and castor cake on growth of egg plant and population of *Meloidogyne incognita*.

Treatment	Plant height (cm)	Plant (Dry) weight (g)	Root-knot index (1-10 scale)	Final population (root+soil)
<i>G. fasciculatum</i>	76	14.5	6.2	5349
Castor cake - 5 g	67	12.2	5.7	4756
Castor cake - 10 g	71	12.8	5.1	3431
<i>G. fasciculatum</i> + Castor cake - 5 g	83	17.3	4.4	2934
<i>G. fasciculatum</i> + Castor cake - 10 g	87	18.7	4.1	2346
Control	58	10.3	8.3	9398
CD - 5%	11.37	2.13	1.25	814.36

TABLE II - Effect of integration of *G. fasciculatum* and castor cake on colonization of VA mycorrhiza and reproduction of *M. incognita*.

	<i>G. fasciculatum</i> colonization on root (%)		Chlamydospore density in 10 g of soil	Number of eggs per egg mass
	30 days after J <sub>2</sub> inoculation	60 days after J <sub>2</sub> inoculation		
<i>G. fasciculatum</i>	61	32	53	356
Castor cake - 5 g	4	3	2	426
Castor cake - 10 g	5	3	3	458
<i>G. fasciculatum</i> + Castor cake - 5 g	73	35	72	295
<i>G. fasciculatum</i> + Castor cake - 10 g	78	38	80	263
Control	2	—	1	584
CD - 5%	9.95	4.36	10.32	27.52

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