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EFFECT OF INTEGRATION OF *CALOTROPIS PROCERA* LEAF AND *GLOMUS FASCICULATUM* ON THE MANAGEMENT OF *MELOIDOGYNE INCOGNITA* INFESTING TOMATO[1]

by
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Summary. Studies involving the inoculation of Vesicular Arbuscular Mycorrhizal (VAM) fungus *Glomus fasciculatum* in root-knot nematode, *Meloidogyne incognita*, infested nursery beds amended with calotropis (*Calotropis procera*) leaf, indicated their synergistic effect on the growth of tomato seedlings. The interactive effect of these components resulted in a significant reduction of root-knot galls and significant decrease in number of eggs per egg mass. Colonization of mycorrhiza was significantly higher on the roots of tomato seedlings in the treatments where *G. fasciculatum* was inoculated in nursery beds amended with calotropis leaf, indicating their complementary interaction.

The vesicular arbuscular mycorrhizal fungus (VAM) *Glomus fasciculatum* reduces the infestation by root-knot nematodes (Sikora, 1979; Cooper and Grandison, 1986; Bagyaraj *et al.*, 1979; Rao *et al.*, 1992) and soil amendments with various plant materials also is similarly effective (Mankau, 1962, Rao *et al.*, 1992; Patel *et al.*, 1992). The combined effect of VAM [*Glomus fasciculatum* (Thaxter) Gerd *et* Trappe] and calotropis [*Calotropis procera* (Ait) R. Br] was investigated in relation to the management of *Meloidogyne incognita* (Kofoid *et* White) Chitw. in nursery beds of tomato (*Lycopersicon esculentum* Mill.) Cv. Pusa Ruby.

Materials and methods

Experiments were conducted at the Indian Institute of Horticultural Research in raised nursery beds, 1 m^2, infested with *M. incognita* at the rate of 122 ± 11 J_2 per 100 g of soil. Four hundred grams of chopped fresh leaves of calotropis were incorporated into the soil in 6 nursery beds and after 15 days 3 of these were inoculated with 500 g of *G. fasciculatum* containing 25/30 chlamydospores per g of inoculum placed 2 cm below the soil surface. Another three beds were inoculated with *G. fasciculatum* inoculum alone and a further three beds without calotropis leaves or VAM fungus acted as controls. All the beds were sown with rows of tomato Cv. Pusa Ruby.

Nematode populations were assessed in the nursery beds 15 days after amendment with calotropis leaves and after uprooting the seedlings at 50 days from the start of the experiment by sampling 200 cc of soil from five different places in each bed. Five seedlings (30 day old) were randomly selected from each bed for observations on height/and weight of the seed-

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lings and colonization of the mycorrhizal fungus. Colonization of *G. fasciculatum* on roots was ascertained by clearing the roots with 10% KOH and then staining with tryphan blue (Phyllips and Hayman, 1970). A further ten seedlings (30 day old) were uprooted at random from ten different places from each bed to record the number of galls on the roots. Because no egg masses were present at 30 days, ten more seedlings were uprooted at 50 days from ten different places from each bed to assess number of eggs per egg mass. Number of eggs per egg mass, were estimated from two egg masses from each of ten seedlings (uprooted from each nursery bed) and treated with 1% sodium hypochlorite for 3-4 minutes.

Results and discussion

The data presented in Table I reveal that *G. fasciculatum* and calotropis leaf treatment alone and in combination significantly increased the height of the seedlings. Significant increase in the growth of tomato seedlings, significant reduction in root-knot galls, J_2 population in beds and decrease in the number of eggs per egg mass were observed in the *G. fasciculatum* plus Calotropis leaf treatment (Tables I and II).

Some colonization of VAM fungus was observed on roots of the seedlings in control and calotropis only treatments because of a native population (not identified) of VAM in the nursery beds (Table I). However, in the *G. fasciculatum* plus calotropis treatment there was a significant increase in the colonization of *G. fasciculatum* on the roots compared with the *G. fasciculatum* only treatment indicating the favourable effect of calotropis leaf amendment of the soil on the growth of *G. fasciculatum*. The growth of seedlings was also greater in the combined *G. fasciculatum* and calotropis treatment which also has the lowest soil population of *M. incognita* and the fewest eggs per egg mass (Table II).

Earlier experiments conducted by us in a screenhouse using sterilised soil also indicated the increase in colonization of *G. fasciculatum* and increase in the chlamydospore density of this mycorrhiza when mycorrhizal seedlings of tomato were planted in calotropis amended soil (Unpublished). Hence, it can be concluded that inoculation of *G. fasciculatum* in calotropis leaf amended nursery beds facilitates the effective management of *M. incognita* and results in improved mycorrhizal infection of seedlings of tomato.

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TABLE I - *Effect of integration of* Glomus fasciculatum *and* Calotropis procera *leaf on growth of tomato seedlings,* Meloidogyne incognita *infection and mycorrhizal colonization on roots.*

Treatments	Seedling height (cm)	Seedling weight (g)	No. of galls/10 seedlings	*G. fasciculatum* colonization (%) on roots
G. fasciculatum	21.5	2.0	57	42
Calotropis leaf	19.2	1.9	32	6
G. fasciculatum + Calotropis leaf	26.3	2.8	26	59
Control	15.0	1.2	74	4
C.D. 5%	2.4	0.32	3.6	3.3

TABLE II - *Effect of integration of* G. fasciculatum *and* C. procera *leaf on* J_2 *of* M. incognita *in nursery beds and on eggs/egg mass produced in tomato seedlings.*

Treatments	No. J_2/200 cc soil after 15 days of amendment	No. J_2/200 cc soil after uprooting 50 days old seedlings	No. of eggs/egg mass
G. fasciculatum	94	125	335
Calotropis leaf	42	72	384
G. fasciculatum + Calotropis leaf	44	57	273
Control	91	163	544
C.D. 5%	9.42	12.56	42.2

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