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Department of Nematology Tamil Nadu Agricultural University, Coimbatore-641 003 India

# INTERACTION OF *GLOMUS FASCICULATUM* WITH *MELOIDOGYNE INCOGNITA* INOCULATED AT DIFFERENT TIMINGS ON BLACKGRAM (*VIGNA MUNGO*) [1]

by
C. SANKARANARAYANAN and RAJESWARI SUNDARABABU

**Summary**. Inoculation of blackgram (*Vigna mungo* L.) with *Glomus fasciculatum* 15 and 20 days earlier than inoculation with *Meloidogyne incognita* controlled the nematode population and also increased biomass production. But when *G. fasciculatum* was applied five days earlier than the nematode VA mycorrhizal colonization and spore production were reduced.

Protection of plants against nematode infection by establishing VAM (Vesicular arbuscular mycorrhizae) fungi on the roots has been repeatedly investigated. Application of VAM followed by nematode inoculation was more effective in reducing nematode infestation than simultaneous application of VAM and nematodes or nematodes before VAM (Suresh and Bagyaraj, 1984; Thomas *et al.*, 1989).

The effect of early establishment of *Glomus fasciculatum* (Thaxter *sensu* Gerd) Gerd *et* Trappe with *Meloidogyne incognita* (Kofoid *et* White) Chitw. on blackgram (*Vigna mungo* L.) was investigated and is reported here.

## Materials and methods

Two seeds of blackgram cv Co 5 were sown in 2 kg earthern pots containing a sterilized mixture of red soil: sand: farm yard manure 2:2:1. After germination the plants were thinned to one seedling/pot.

Treatments were inoculation of *G. fasciculatum* substrate containing fungus and spores in the root zone, 10 g inoculum/seedling, one week after germination and inoculation of second stage *M. incognita* juveniles, one nematode/cc of soil in the pots, 5,10,15 and 20 days after inoculation with VAM. There were five replicates for each treatment.

Data on biometrics, nematode reproduction gall index recorded according to Heald *et al.* (1989), spore count and percent mycorrhizal colonization were recorded after 70 days. VAM root infection levels were assessed from randomly selected root material after cutting the entire system into 1 cm pieces. Roots were cleared in KOH and stained in trypan blue (Phillips and Hayman 1970). Percent root colonization was determined as observed by Giovannetti and Mosse (1980). The total P content in the plant material was estimated by Vanadomolybdate method in the nitric acid system (Jackson, 1973).

## Results and discussion

Of the five treatments, VAM alone significantly increased all growth parameters compared to other treatments (Table I). Nematode inoculation 20 days after the VAM resulted in higher shoot lengh, shoot weight, number of branches and pod yield compared to nematode inoculation five days after VAM but was similar to nematode inoculation 15 days after VAM inoculation. Nematode numbers were highest in treatment where nematodes were inoculated five days after VAM. Minimum numbers of nematodes were observed in the treatment where nematodes were inoculated 20 days after VAM. VAM inoculated alone produced significantly higher number of mycorrhizal colonization and spores than other treatments, followed by VAM and nematode inoculation 20 days later. The minimum numbers of spores were recorded in VAM + nematode 15 days and minimum mycorrhizal colonization was recorded with nematodes five days after VAM treatment. VAM treatment alone gave the highest per cent of shoot and root phosphorus content followed by VAM + nematode 20 days later. VAM inoculation and nematodes five days after recorded minimum phosphorus content.

Nematode inoculation 20 days after VAM inoculation gave the best results in containing the disease than when

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TABLE I - *Interaction of* Glomus fasciculatum *with* Meloidogyne incognita *on blackgram.*

| Treatment | Shoot lenght (cm) | Shoot weight (gm) | Root weight (gm) | Pod No. | Pod yield g/plant | Gall [a] index | Nematode population 100g soil | Spore population 50g soil | Mycorrhizal coloniza-tion (%) | Total P content (%) shoot | Total P content (%) root |
|---|---|---|---|---|---|---|---|---|---|---|---|
| VAM alone | 34 | 33 | 13 | 22 | 7 | 1 | 0 | 173 | 65 | 0.56 | 0.17 |
| VAM-Nematode 5 days later | 23 | 17 | 4 | 9 | 4 | 3.6 | 422 | 145 | 39 | 0.45 | 0.33 |
| VAM-Nematode 10 days later | 26 | 20 | 4 | 11 | 5 | 3.2 | 363 | 139 | 42 | 0.47 | 0.36 |
| VAM-Nematode 15 days later | 30 | 25 | 5 | 15 | 5 | 2.4 | 266 | 137 | 50 | 0.52 | 0.41 |
| VAM-Nematode 20 days later | 32 | 26 | 6 | 17 | 6 | 2.0 | 188 | 155 | 54 | 0.52 | 0.42 |
| | | 1.27 | 1.1 | 2.6 | 0.73 | 0.5 | 21.8 | 7.44 | 2.58 | 0.02 | 0.02 |

[a] gall index: no galls, 2- 1-25% galls, 3- 26-50% galls, 4- 51-75% galls, 5- >75% galls.

nematode was inoculated five days after the inoculation of VAM. This might be related to the time factor for the establishment of the mycorrhiza in the root cortex. A period of five days for the establishment of VAM fungi was too short to prevent the development of nematodes. It is well known that mycorrhiza establish in the root cortex by about 15 to 20 days. This supports earlier findings with *Rotylenchulus reniformis* in tomato (Sitaramaiah and Sikora, 1982). High phosphorus content in VAM plants results in reduced nematode population. This might be related to the high mycorrhizal colonization in the VAM infected plants.

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