1 Calder, C. C., Narayanaswamy, V. and Ramaswamy, M. S., *Rec. Bot. Surv. India*, 1926, **11**, 1.
2. Razi, B. A., *Rec. Bot. Surv. India*, 1959, **18**, 1.
3. Nayar, M P. and Ramamurthy, K., *Bull. Bot. Surv. India*, 1973, **15**, 204.
4. Nayar, M P. and Karthikeyan, S., *Rec. Bot. Surv. India*, 1981, **21**, 129.
5. Hora, H., Stern, W. T. and Williams, I. H. J., *An enumeration of the flowering plants of Nepal*, Vol. I, Trustees of the British Museum (Nat. Hist.) London, 1978, p. 49.
6. Banerji, M. L. and Pradhan, Prabha, *The orchids of Nepal Himalaya*, J. Cramer, F. L., 9490, VADUZ, Germany, 1984, p. 82.

SOME RABI WEEDS—NEW HOSTS FOR *MELOIDOGYNE JAVANICA*

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DURING 1983–84, some Rabi weeds (*Dill* sp, *Lucas aspera*, *Rumex acetocella*, *Sisimbrium irio* and *Sonchus asper*) in the farmers' field were found to be having root-knot galls with numerous brownish pin head shaped egg masses. A large number of glistening white females of root-knot nematode was teased out under stereoscopic microscope and identified, on the basis of perineal pattern, as *Meloidogyne javanica*. The egg masses collected from these roots when kept at 25 ± 2° C for 24 hr gave out a large number of second stage juviniles of this nematode.

This is the first report of *Meloidogyne* on *Dill* sp, *L. aspera*, *S. irio* and *S. asper* in India or elsewhere, however *Meloidogyne* is recorded first time on *R. acetocella* in India.[1–3]

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1. Goodey, J. B., Franklin, M. T. and Hooper, D. J., *The nematode parasites of plants catalogued under their hosts*, Farnham Royal, England, Commonwealth, *J. Agric. Bur.*, 1965, p. 214.
2. Stoyanov, D., *Nematologica*, 1967, **13**, 173.
3. Sitaramaiah, K., *Plant parasitic nematode of India*, Today & Tomorrow's Printers and Publishers, New Delhi, 1984, p. 292.

INFLUENCE OF ROOT-INFECTING FUNGI ON DEVELOPMENT OF *GLOMUS MOSSEAE* IN GROUNDNUT

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INTERACTIONS between vesicular-arbuscular mycorrhizal (VAM) fungi and other soil microflora have been reported to occur[1]. In general, mycorrhizal plants that are attacked by pathogens suffer less damage and the incidence of disease decreases or the development of the pathogen is inhibited[2–4]. Some reports also indicate an increase in disease severity under the influence of VA mycorrhizal fungi[5,6]. However, there is very little information on the mycorrhizal development under the impact of root-infecting fungi.

Glomus mosseae (Nic & Gerd) Gerd & Trappe was shown to occur as a predominant VAM fungus in the laterite soil from our University campus[7]. Also, the root system of groundnut (*Arachis hypogaea* L) harbours two dominant root-infecting fungi, *Fusarium solani* and *Rhizoctonia solani*[8]. In the present study, therefore, an attempt has been made to determine the influence of *F. solani* and *R. solani* on the development of *G. mosseae* in groundnut.

The soil used was a latosol with 8.1 pH. The potting medium, consisting of a 2:1 soil:sand mixture, was taken in 20 cm earthen pots and autoclaved. This mixture was inoculated with *F. solani* and *R. solani*, and the mycorrhizal fungus *G. mosseae*. The root-infecting fungi, in the form of oatmeal-sand inoculum (2%, w/w) and the mycorrhizal inoculum (0.1%, w/w) in the form of dried and powdered groundnut roots colonized by *G. mosseae*, were mixed with the potting medium. The final inoculations were: *G. mosseae* alone; *G. mosseae* + *F. solani*; and *G. mosseae* + *R. solani*. Clean seeds of groundnut (cv TMV-2) were sown in all the pots. Three pots with a minimum of ten plants in each were retained for treatment. The plants were raised in open shade at an average temperature of 29 ± 4° C.

In another experiment, mycorrhizal inoculum was added during sowing but the root-infecting fungi were

incorporated into the soil seven days after sowing, finally providing the same treatments as described above. After 40 and 50 days of plant growth, five plants from each treatment were harvested for determining the percentage of root segments showing the mycorrhizal fungus and the number of vesicles or spores per one cm root in a random root sample of 20 to 30 (one cm) bits[7]. The data on per cent colonization and the average vesicle/spore number were statistically analysed employing test for equality of proportions and test for equality of means respectively as mentioned earlier[9].

The plants infected with *G. mosseae* alone exhibited greater mycorrhizal formation (table 1). When the mycorrhizal fungus and *F. solani* were inoculated simultaneously, no significant reduction in root colonization was observed. But, at the end of 50 days of plant growth, sporulation by the fungus was significantly affected under the influence of the pathogen. On the other hand, both colonization and vesicle and/or spore formation by the mycorrhizal fungus were inhibited significantly due to the impact of *R. solani*, even by 40 days. Thus, the antagonistic effect of this fungus led to only about half the development of mycorrhiza compared to that observed with only *G. mosseae* inoculation.

The development of mycorrhiza was not affected when the two fungi were introduced separately into the soil after inoculation with *G. mosseae*. It was reported earlier that *G. mosseae* colonized the roots of groundnut after eight days of sowing[10]. The present investigation clearly shows that the root-infecting fungi do not exert any antagonistic effect on the mycorrhizal endophyte once the latter colonizes and establishes in roots.

Table 1 *Impact of F. solani and R solani inoculation on the development of mycorrhiza in groundnut*

Inoculant	Mycorrhizal development (days after plant growth)			
	Experiment 1		Experiment 2	
	40	50	40	50
Glomus mosseae	42[a](4 9)[b]	48 (5.3)	38 (4.1)	42 (4 6)
G mosseae + *F. solani*	28 (2.6)	32 (3.0)*	36 (3 9)	38 (4 3)
G mosseae + *R. solani*	24*(2 1)*	28*(2 5)*	34 (3 6)	38 (4 0)

VAM fungus and the root-infecting fungus were introduced simultaneously in experiment 1; VAM fungus was introduced one week earlier than the root-infecting fungus in experiment 2

[a]Per cent root segments showing the VAM fungus, [b]Number of vesicles or spores per one cm root

*Significantly different ($P < 0.05$) from the corresponding value with *G. mosseae* inoculation alone

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1. Mosse, B., *Annu. Rev. Phytopathol.*, 1973, **11,** 171.
2. Baltruschat, H. and Schonbeck, F., *Phytopathol. Z.*, 1972, **74,** 358.
3. Dehne, H. W. and Schonbeck, F., *Phytopathol. Z.*, 1979, **95,** 105.
4. Zambolin, L. and Schenck, N. C., *Phytopathology*, 1981, **71,** 267.
5. Ross, J. P., *Phytopathology*, 1972, **62,** 896.
6. Davis, R. M., Menze, J. A. and Zentmeyer, G. A., *Phytopathology*, 1978, **68,** 1614.
7. Parvathi, K., Venkateswarlu, K. and Rao, A. S., *Curr. Sci.*, 1984, **53,** 1254.
8. Parvathi, K., Ph.D. Thesis, Nagarjuna University, 1984.
9. Parvathi, K., Venkateswarlu, K. and Rao, A. S, *Trans. Br. Mycol. Soc.*, 1985, **84,** 29.
10. Parvathi, K., Venkateswarlu, K. and Rao, A. S., *Proc. Indian Acad. Sci.*, 1984, **93,** 105.

SHIKIMATE-SENSITIVE ISOZYME OF 3-DEOXY-D-ARABINOHEPTULOSONATE-7-PHOSPHATE SYNTHASE IN THE CYANOBACTERIUM *NOSTOC LINCKIA*

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THE regulatory isozymes of 3-deoxy-*d*-arabino-heptulosonate 7-phosphate synthase from the cyanobacterium *Nostoc linckia* were studied. One isozyme was sensitive to shikimic acid, and the other two isozymes were sensitive to phenylalanine and tyrosine respectively. No inhibition of DAHP synthase activity was observed in the presence of tryptophan. The observed inhibition of DAHP synthase activity by shikimate was due to the shikimate-sensitive isozyme and not due to the intermediate metabolite in the biosynthesis of aromatic amino acids