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CONTROL OF ROOT-KNOT NEMATODE *MELOIDOGYNE INCOGNITA* USING FUNGUS *PAECILOMYCES LILACINUS* GROWN ON DUNG

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Under Indian agro-climate, the fungus *Paecilomyces lilacinus* (Thom) Samson was used to control root-knot nematode *Meloidogyne incognita* for the first time. Dungs of chicken, goat and buffalo, having fungal growth over them was used. It was observed that root-shoot lenght, fresh and dry weight of the shoot were more in Dung (D) + Nematode (N) + Fungus (F) treated plants compared to Dung (D) + Nematode (N) or nematode (N) alone combinations. Final nematode population was less in D+N+F treatment compared to D+N or N alone. Twenty gm dose was found to be more effective than 10g. Maximum control was observed in D+N+F combination having chicken dung.

Keywords : Biocontrol; *Meloidogyne incognita; Paecilomyces lilacinus.*

India as an agricultural country faces imbalance in the agriculture economyy chiefly due to problem of the pests and diseases. Nematodes are abundant in sandy soils of Rajasthan and cause heavy losses to the crops. The root-knot nematodes are very common in sandy soils of Jaipur and adjacent areas and cause 50-75% loss to vegetable crops.

Fungus *Paecilomyces lilacinus,* a member of hyphomycetes regarded as a good competitor in most soils particularly in warmer regions[1] acted as chitin degrador[2], showing proteolytic property[3]. Exhibiting potentiality as biocontrol agent to check *Meloidogyne incognita,* fungus *P. lilacinus* acted better that any commonly used nematicides under field infestations[4]. Fungus *P. lilacinus*, in artificial inoculation lowered the root galling better than that of the addition of organic matter to the substration and use of nematicides under pot trials[5]. They collected 80 percent fungus infected egg masses from the plant including 54.7 percent destroyed ones. The study was undertaken to exploit the fungus *P. lilacinus* under Indian agro-climatic conditions to conrol *Meloidogyne incognita* in brinjal plant.

Experiment was set up under pot trials. Three week old seedlings of *Solanum melongena* were transplanted into pots containing 1 Kg steam sterilized soil and inoculated with 1000 freshly hatched juveniles of *M. incognita.* Pure culture of *M. incognita* was maintained on roots of Pusa Purple Long variety of the brinjal plant.

One hundred gm of well moist dung of chicken, goat and buffalo was taken separately in 500 ml flasks followed by inoculation with 5 ml spore-water suspension of fungus *P. lilacinus* cultured in tubes having Potato Dextrose Agar Media. Proper moisture and temperature conditions were maintained. Flasks were shaken thoroughly for proper mixing and normal growth of the fungus. Seven days after inoculation, dungs with well grown fungus were transferred to experimental pots. Two dosages viz., 10 and 20 gm were used. Two months after nematode inoculation, plants were depotted. Following sets were used in the experiment :

1) Dung (D) + Nematode (N) + Fungus (F)
2) Dung (D) + Nematode (N)
3) Nematodes (N) alone.

The root-shoot length, fresh and dry weight of the shoot increased in D+N+F treated plants. Final nematode population decreased in D+N+F treatment as compared to D+N or 'N' alone. Twenty gm dose of the dung substrate having fungal growth over them was found to be more effective than 10 gm. Goat dung D+N+F combination treatment was found to be most effective in controlling root-knot nematodes, *Meloidogyne incognita* population among all the three dungs used (Table 1).

Dungs were reported to be rich source of predaceous fungi[6]. A satisfactory control of plant parasitic nemotode was made by using dungs[7,8]. Use of the dung as manure has been regarded as one of the oldest practice in the Indian agriculture because of its effective role in producing healthy palnts.

Occurrence of nematophagous fungi on dungs suggested and gave an idea to grow the fungus on dungs. Hence, three kind of dungs viz., that of chicken, goat and buffalo were used to grow the fungus *Paecilomyces lilacinus.* Reduction in nematode growth and development was checked both by dung as well as the fungus. After amendment of soil with organic matter like dung, there appeared changes like (a) reduction in host proneness to infection through change in the physiology of the root, (b) improvement in vigour of the host, (c) reduction in number of larvae and eggs through effect on their developement in host tissues (d) toxic effect of

Table 1. Biocontrol of *Meloidogyne incognita* using fungus *Paecilomyces lilacinus*.
(Observations are mean of four replicates)

Dung			Length (cm)		Fresh weight (gm)		Dry weight (gm)		Final Nematode
			Root	Shoot	Root	Shoot	Root	Shoot	Population
Chicken	10 gm	DNF	49.2	26.2	16.680	21.270	1.640	2.675	2215
		DN	26.1	19.4	13.400	1.920	1.890	1.475	4230
		N	16.3	10.7	21.500	8.300	2.345	1.095	5837
	20 gm	DNF	52.2	30.1	14.900	22.100	1.725	2.850	1220
		DN	28.0	21.2	19.200	14.900	1.937	1.620	4130
		N	16.3	10.7	21.500	8.300	2.345	1.095	5837
Goat	10 gm	DNF	48.9	25.7	16.850	20.175	1.585	2.565	2325
		DN	25.8	19.1	19.670	13.370	1.875	1.400	4375
		N	16.3	10.7	21.500	8.300	2.345	1.095	5837
	20 gm	DNF	51.3	29.6	16.330	21.380	1.315	2.675	1487
		DN	27.1	20.3	19.170	14.750	1.815	1.960	4216
		N	16.3	10.7	21.500	8.300	2.346	1.095	5837
Buffalo	10 gm	DNF	35.7	25.7	18.450	14.750	1.375	1.985	2615
		DN	21.2	18.1	20.250	11.730	1.950	1.435	4423
		N	16.3	10.7	21.500	8.300	2.345	1.095	5837
	20 gm	DNF	36.4	26.1	17.240	16.750	1.870	2.090	2593
		DN	22.7	19.7	19.880	12.200	1.945	1.575	4285
		N	16.3	10.7	21.500	8.300	2.345	1.095	5837
SEM ±			2.110	3.098	0.027	1.600	0.003	0.026	20.26
C. D. at 5%			4.120	6.59	0.066	3.102	0.020	0.091	4.402
C.D. at 1%			5.188	8.275	0.071	4.158	0.015	0.132	5.302

D = Dung; N = Nematode; F= Fungus.

decomposed product on larvae hatching and (e) reduction in growth and development of nematode due to occurrence of natural enemies of nematode in the dung.

The fungus *Paecilomyces lilacinus* grew on dungs checked the nematode population and development of the larvae in the host and the soil as well, due to (I) Eggs were found to be surrounded by the fungus and it suggested the role of intermingled fungal hyphae to check hatching of the juveniles. (2) Intermingled and overcrowded fungal hyphae checked development of the larvae. (3) Nematotoxic effect of fungal extract present in the soil due to the decay of hyphae. The use of dung could be preferred over the chemical control because (i) It is easy to handle, (ii) Local availability of the material, (iii) No pollution hazards. In Rajasthan chicken, goat and buffalo dungs are commonly used as a source of manure which unknowingly also chekced nematode population. Hence, there is an additional effect of dung besides the use of fungus for the control of *M. incognita*. The use of dung with the fungus *Paecilomyces lilacinus* could be safely recommanded for field application so as to control the nematode.

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