Discolaimus	25.5	7,10,18,20.
Dorylaimoides	27.5	1,6,7,10,13,18.
Dorylaimus	37.5	5,14,20.
Enchodelus	01.5	2,15.
Helicotylenchus	35.0	5,7,10,13,15.
Hemicriconemoides	75.0	2,3,6,7,11,13,14,15,20.
Hemicycliophora	00.5	17.
Hoplolaimus	10.5	5,6,8.
Iotonchus	25.5	3,13,16.
Labronema	01.0	6,13,16,19,20.
Latocephalus	01.0	14.
Leptonchus	02.0	6,18.
Mylonchulus	17.5	3,7,13,15.
Parahadronchus	15.0	5.
Paramylonculus	01.0	6,20.
Paroxydirus	00.5	5,7.
Proleptonchus	0.10	7.
Rotylenchus	14.0	6,8,10,13,14,20.
Sectonema	01.0	20.
Thornenema	10.0	3,6,10,13,14,20.
Trichodorus	91.5	1,2,3,4,5,6,7,13,14,15,16,20.
Xiphinema	62.5	4,6,7,13,18.

* For details, see text.

Effect of *Paecilomyces lilacinus* for the control of burrowing nematode, *Radopholus similis* on arecanut seedlings

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The fungus, *Paecilomyces lilacinus*, is a potential biocontrol agent for the control of plant parasitic nematodes. Sosamma *et al* (1990) studied the effect of *P. lilacinus* as a biocontrol agent against burrowing nematode on betelvine. In the present investigation, an attempt has been made to study its effect against burrowing nematode on arecanut seedlings.

A pot culture experiment was initiated in arecanut seedlings variety Mangala, under green house conditions to evaluate the effect, if any, on burrowing nematode by *P. lilacinus*.

One year old arecanut seedlings, raised in sterilized soil, were transplanted in 45 x 30 cm earthern pots during January, 1991. Each pot contained 3.5 kg of methyl bromide fumigated sandy loam soil and the plants were maintained under green house conditions. There were 7 treatments, each replicated 5 times. The treatments were ;

T1	-	Control;
T2	-	Nematode alone;
T3	-	Fungus alone;
T4	-	Nematode first followed by fungus;
T5	-	Fungus first followed by nematode
T6	-	Nematode and fungus simultaneously

The experiment was laid out in a completely randomised block design and the treatments were imposed after 3 months. The nematode population, multiplied axenically on carrot discs, was used as inoculum source. In all the treatments the nematode inoculum(1000/plant) consisted of larval stages and adult females.

P. lilacinus was grown on wheat grains. For this, 250 g wheat grain was boiled in 250 ml of water, cooled and decanted. The cooked grains were distributed into five 250 ml flasks (50g) autoclaved at 15 lbs for 15 minutes. Upon cooling, the flasks were inoculated with 5 mm discs of PDA grown fungal mycelium (3 days old). Flasks were inoculated at room temperature (30°C) till the grains were completely covered with the fungal growth (4 weeks).

The fungal culture in each flask was divided into 5 parts and mixed with soil in each pot by gently raking and incorporating the fungal growth into it alongwith wheat grains. Nematode inoculum

Table 1. Effect of *Paecilomyces lilacinus* against *Radopholus similis* infesting arecanut seedlings.

(Mean of five replications)

Sl. No.	Treatment	Nematodes/10g root*	Nematodes/250g soil*	Root-lesion index**
1.	Nematode alone	5.1 (23.8)	23.2 (546.0)	3.4
2.	Nematode - fungus	2.5 (6.6)	13.8 (193.0)	2.8
3.	Fungus - nematode	1.0 (1.8)	11.5 (132.2)	1.2
4.	Nematode + fungus simultaneously	3.8 (14.8)	13.8 (193.0)	1.6
5.	Fungus alone	0.0	0.0	1.0
6.	Control	0.0	0.0	1.0
	C.D. (P=00.05	1.01	2.57	0.85

* Transformation used is _/x where x is the nematode count;
Figures in parenthesis are the original values.

** 1 = No lesion; 1 to 2 = Moderate lesions ; 2 to 3 Severe lesions; 3to 4 = Very severe lesions

was also mixed into the pot by gently raking the soil and mixing the nematode suspension into it. The experimental pots were maintained in green house at a temperature range of 27-30°C. Eight months after inoculation, plants were depotted carefully with intact root system and the plant growth parameters alongwith root lesion index were recorded. Both soil and root samples were collected from each treatment. Root samples were processed for assessing the nematode population according to procedures described by Koshy *et. al.* (1975). Soil samples were processed by wet sieving and decanting method followed by modified Baermann funnel method.

The results showed that the inoculation of fungus first followed by nematode significantly reduced *R. similis* population in root compared to other treatments. The same trend was discernible in soil population also. The nematode population was significntly low in treatments inoculated first with the fungus indicating that the fungus affected adversely nematode multiplication as well as root-lesion index. The present findings are in accordance with that of Sosamma *et. al.* (1990) on betelvine.

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Virulence of native entomopathogenic nematodes against black cutworms, *Agrotis ipsilon* (Hufnagel) and A. *segtetum* (Noctuidae : Lepidoptera)

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Entomopathogenic nematodes of the genera *Steinernema* and *Heterohabditis* with the associated symbiotic bacteria are highly pathogenic to several insect pests. Soil is the substratum for these nematodes and hence application in soil results in successful control of various soil pests including cutworms (Morris *et al.*, 1990). These nematodes are effective against different stages of the life cycle viz., larval (Singh, 1993), pupal (Kaya & Hara, 1981) and adult stages (Mannion & Jansson, 1992) of various soil pests. They differ in their virulence due to different foraging activities and hence selecting a virulent strain is highly important for field applicaion to get satisfactory control.

To evolve a virulent strain of entomophilic nematodes and to compare their virulence against stages of 2 species of *Agrotis*, 6 *Steinernema* isolates (*S. bicormutum* PDBC 2.1, 3.1, 3.2; *S. carpocapsae* PDBC 6.11, 6.61 and *Steinernema* sp. PDBC 13.1) and 2 *Heterorhabditis* isolates (*H. indica* PDBC 6.71, and 13.3) were tested against *A. ipsilon* and *A. segetum* larvae and pupae separately. Sand column assay was followed in plastic containers (5x 6 cm). Sterile sand (10% moisture w/w) was filled upto 3 cm and insect stages of each species were added separately to the container. Nematode suspension at a dosage of 200 IJs/stage, was added separately and the container