

Effect of Vermiwash on *Radopholus similis* on Coconut Seedlings

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INTRODUCTION

The burrowing nematode, *Radopholus similis* (Cobb, 1893-Thorne, 1949) is the most important nematode parasite of coconut in Kerala. On infestation, it produces small, elongate, orange coloured lesions on tender orange to white roots (Fig. 36.1) and cause extensive rotting of the roots (Koshy *et al.*, 1975). *Eudrilus* sp is the only earthworm currently available in the country with the capacity to convert lignin rich (31%) coconut leaf biomass into humus rich granular odourless vermi-compost. In view of environmental and health concerns, a determined effort is necessary to reduce and rationalise use of nematicides and vermiwash was used to manage nematodes effectively.

One year old WCT coconut seedlings raised in methyl bromide fumigated soil in earthen pots were used for the study. Vermiwash was prepared from vermi-compost made in big earthen pots using coconut leaf waste and with earthworm *Eudrilus* sp. a native isolate (Fig. 36.2) collected from decomposing coconut biomass. Vermiwash was collected (Fig. 36.3) and diluted six times and one liter each of the diluted wash was introduced into each pot of the treatments wherever required.

For laboratory screening, different dilutions of vermiwash collected from coconut leaf compost viz. undiluted (UD), 1:5, 1:10 and 1:20 were used. Sterile water alone served as control. To study the nematicidal effect of vermiwash, suspensions of 100 active specimens of *R.similis* collected from coconut root was used. 2 ml of nematode suspension containing 100 nematodes was placed in 90 mm diameter Petri dish in which two ml of solution of double concentration of vermiwash was added so as to get a final dilution of

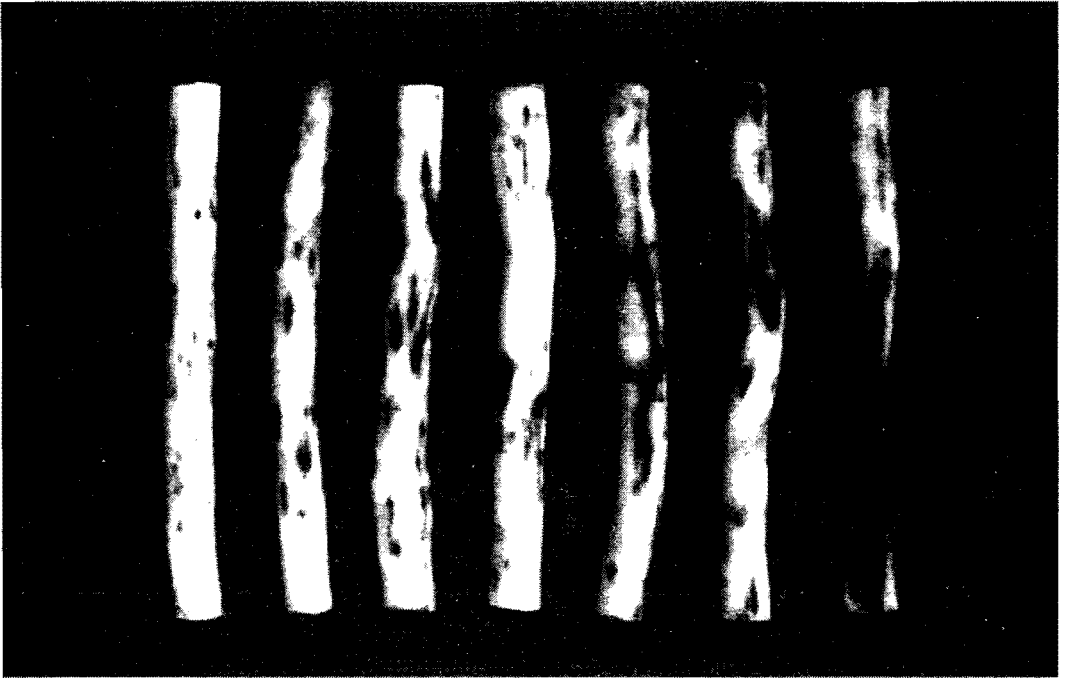


Fig. 36.1. *R. similis* infested coconut roots showing lesions and rotting



Fig. 36.2. Earthworm, *Eudrilus* sp dark in colour



Fig. 36.3 Vermiwash collection

1:5, 1:10 and 1:20. In undiluted vermiwash and picked nematodes were directly introduced. The number of dead and surviving nematodes were counted at 24 hr, 48 hr and 72 hr. The death of the nematode was ascertained after transferring them to water for one hour.

Vermiwash on *Radopholus similis* (burrowing nematode) of coconut seedlings was found to be very effective in suppressing its population (Table 36.1). Study conclusively demonstrated the toxic effect of vermiwash on *R. similis* to varying degrees. In the laboratory studies among the four dilutions, undiluted vermiwash caused maximum mortality followed by 1:5 dilution. No revival of nematodes was noticed in undiluted, 1:5, and 1:10 which clearly indicated the nematicidal property of vermiwash. No mortality was recorded in control where distilled water was used (Table 36.2).

Various decomposed organic amendments and oil cakes had been found toxic to nematodes (Badra *et al.*, 1979) and vermiwash collected from coconut leaf compost was reported to contain phenols (Murali Gopal *et al.*, 2005). Toxicity of phenols to various nematodes was reported. The biochemical analysis of fresh vermiwash produced from actively composting coconut leaves along with *Eudrilus* sp. had a pH of 7 to 8.5. It was found to have total phenol content of more than 10-14 µg/ml (Alka, personal communication). The observed mortality effect could be of significance in reducing nematode population in field by giving initial protection to crops in the field.

Table 36.1. Effect of vermiwash on *R. similis* infested coconut seedlings

Treatments	Girth (cm)	Height (cm)	No. of leaves	Leaf length (cm)	Leaf breadth (cm)	Lesion Index	Rs. Popn.
Control	10.25	167.0	7.25 (2.688)*	81.00	17.50	0.0	0.0(3.162)*
<i>R. similis</i> – 100	9.50	160.0	6.50 (2.540)	75.25	17.00	3.0	876.5(29.692)
<i>R. similis</i> – 100 + Vermiwash	10.60	172.75	7.50 (2.737)	82.75	17.50	2.125	259.0(16.345)
<i>R. similis</i> – 1000	9.0	151.25	5.50 (2.343)	69.00	15.25	4.00	1114.75(33.514)
<i>R. similis</i> – 1000 + Vermiwash	10.5	82.50	6.5 (2.548)	79.00	16.50	3.00	331.25(18.445)
Vermiwash alone	11.0	95.0	8.5 (2.914)	91.25	18.00	0.0	0.0(3.162)
Mean	10.14	171.42	2.63	79.71	16.96	2.02	430.25(17.39)
CD (P=0.5)	NS	15.85	0.24	5.27	1.38	0.43	1.88

*Figures in parentheses are transformed values (SQRT (x+10))

NS = Not Significant

Table 36.2. Effect of vermiwash on mortality of *R. similis*

Vermiwash dilution	24 hr.	48 hr.	72 hr.
UD	45	61	72
1:5	29	42	68
1:10	24	35	56
1:20	14	22	35
Sterile water	0	0	5

References

- Badra, T., Saleh, M.A. & Oteifa, B.A. 1979. Nematicidal activity and composition of some organic fertilizers and amendments. *Revue de Nematologie* 2:29-36.
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- Murali Gopal, Alka, G., Palaniswamy C., Dhanapal, R. and G. V. Thomas 2005. Vermiwash from coconut leaf compost an ecotechnology for improving the crop production efficiency of soil. Paper presented in "International conference on Human Centered Sustainable Development paradigm" held at Chennai Trade Centre during 7-10 August 2005.