

## Screening of arecanut cultivars and hybrids for resistance to *Radopholus similis*

P. SUNDARARAJU and P. K. KOSHY\*

Central Plantation Crops Research Institute, Kasaragod-670124, Kerala, India

The burrowing nematode, *Radopholus similis* is known to cause lesions and rotting of roots of arecanut palms in South India. Koshy *et al.* (1979) and Sundararaju & Koshy (1982) reported on the susceptibility of 31 and 10 *Areca* collections against *R. similis* respectively. In the present study the reaction of ten hybrids of exotic types, five exotic cultivars and four indigenous types against *R. similis* is reported.

Arecanut seedlings were raised in earthen pots that contained sterilized soil. After one year, ten seedlings each of uniform growth were selected from all groups and transplanted individually in earthen pots (35 cm) filled with 5 kg of sandy loam soil fumigated with methyl bromide in August, 1985. In November, 1985 five seedlings each of all hybrids and cultivars were inoculated with 2000 axenic *R. similis* population reared on carrot discs. The remaining five seedlings were maintained as control. Seedlings were maintained in a randomised manner in the green house where the ambient temperature ranged from 24° to 29°C. and watered daily with boiled and cooled water. The experiment was terminated in September, 1986, and data on length and weight of shoot and root, girth at collar region and number of leaves were recorded. The extent of infection on the roots was rated in the scale of 0 to 5 based on the formation of lesions and rotting (Koshy &

Sundararaju, 1983). Final nematode population in root and soil were also estimated.

The data presented to Table 1 indicate that five seedlings of VTL-11 × VTL-17 showed resistance to *R. similis*. Low record of root lesion indices and nematode populations occurred in hybrids VTL-11 × VTL-12 and Mohitnagar × VTL-11 were graded as moderately resistant to *R. similis*. It is interesting to note that the cultivars Andaman-3 (VTL-29c) Andaman-4 (VTL-29d) and Andaman-5 (VTL-29e) though recorded high root lesion indices and nematode populations, the reaction of plant growth parameters was minimal which prove that they possess a high degree of tolerance to the nematode infestation. Rest of the hybrids and cultivars were found susceptible to *R. similis*, but differed in their degree of susceptibility. The present studies indicate the existence as well as tolerance in arecanut hybrids/cultivars against *R. similis*, which can be exploited in breeding programme after its assessment in field.

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\*Division of Nematology, CPCRI Regional Station, Kayangulam, Krishnapuram-690 531, Kerala.

TABLE 1. Reactions of arecanut hybrids/cultivars to *Radopholus similis* (Mean of 5 replications)

S. No.	Hybrid/cultivars	Per cent reduction of growth characters over control										Host specification
		Shoot length (cm)	Shoot weight (g)	Root length (cm)	Root weight (g)	No. of leaves	Collar girth	Root lesion index	Nemas/g of root			
1.	VTL-3 × Dwarf	38.8	40.2	35.8	44.6	25.0	27.3	4.5	665	HS		
2.	Dwarf × VTL-3	46.8	47.4	38.8	37.4	20.0	32.5	4.6	756	HS		
3.	VTL-11 × VTL-12	13.7	12.2	17.5	13.3	6.0	7.6	1.2	35	MR		
4.	VTL-12 × Dwarf	37.5	35.4	36.5	41.6	40.0	24.5	4.0	578	HS		
5.	VTL-17 × Dwarf	21.7	29.6	20.0	34.8	20.0	12.8	2.4	146	LS		
6.	VTL-11 × VTL-17	2.5	4.3	3.8	3.2	2.0	4.5	0.0	0	R		
7.	Thirthahalli × VTL-12	28.6	32.8	33.9	38.2	40.0	31.6	3.6	638	HS		
8.	Andaman & VTL-12	26.6	26.2	23.5	21.9	20.0	17.5	1.8	125	LS		
9.	Mohitnagar × VTL-11	15.3	11.4	15.3	18.2	20.0	10.2	1.2	42	MR		
10.	Dwarf × VTL-12	35.3	27.5	32.9	45.3	40.0	28.5	3.8	612	HS		
11.	VTL-26 (Fiji)	21.3	25.1	40.7	39.2	21.4	25.4	3.8	612	HS		
12.	VTL-26c (Saigon-3)	5.1	23.9	29.7	6.3	7.1	16.3	4.0	88	LS		
13.	VTL-29c (Andaman-3)	17.3	10.1	20.8	19.2	4.2	8.9	4.2	200	T		
14.	VTL-29d (Andaman-4)	13.8	12.8	16.1	19.0	3.6	10.4	3.2	408	T		
15.	VTL-29e (Andaman-5)	4.5	4.8	47.3	17.0	4.0	4.9	3.6	384	T		
16.	Mangala intersee	28.3	25.0	19.3	19.5	30.0	16.5	2.6	164	LS		
17.	Kumpta	25.0	13.3	12.3	33.8	20.0	14.6	2.0	118	LS		
18.	Sagar	35.5	46.2	36.6	39.1	40.0	36.5	3.0	412	HS		
19.	Sirshi	24.3	15.2	20.6	28.6	20.0	21.5	2.8	205	S		

HS — Highly susceptible; S — Susceptible; LS — Less Susceptible; R — Resistant; MR — Moderately resistant; T — Tolerant.

## REFERENCES

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### Histopathology of arecanut roots infected with *Radopholus similis*

P. SUNDARARAJU\* and P. K. KOSHY

Nematology Laboratory, Central Plantation Crops Research Institute, Regional Station, Kayangulam, Krishnapuram-690533, Kerala.

Twentyfive arecanut seednuts, variety 'South Kanara', were sown in sterilised sand, contained in earthen pot (30 cm). On germination, the nuts were removed carefully from the pots and a red silken thread was tied loosely on the main root, 2.5 cm above the root tip. The seedlings were then transferred to small earthen pots (10 cm) and placed horizontally, in moist sand filled to a depth of 8 cm. More dry sand was added just to cover the root except the marked

portion. Small quantity of sand was sprinkled on to the marked portion and few drops of water were added to fix this portion on sand surface that remained partially covered and visible. Water suspension, containing about 500 active *R. similis* from axenic culture, was pipetted on to the region between the thread knot and root tip. After inoculation, the pots were filled with sand and sprinkled with water. The control plants received only sterile

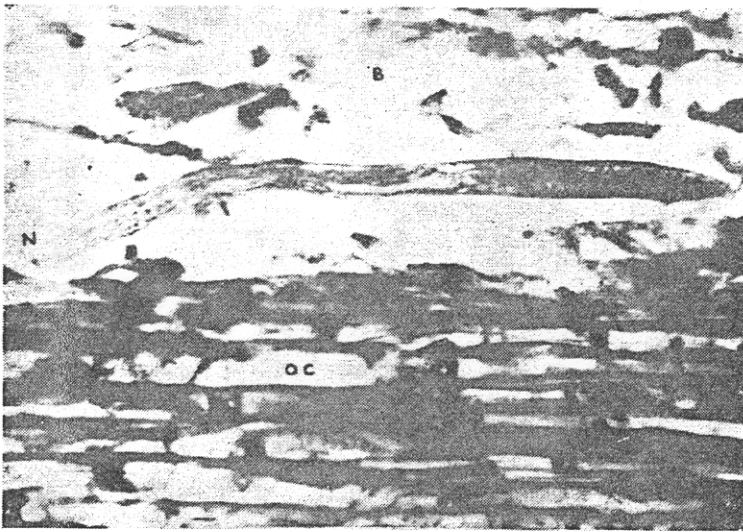


FIG. 1. Longitudinal Section of an arecanut root inoculated with *Radopholus similis* showing the orientation of nematodes in the cortical tissue.  
B — Burrow, N — Nematode, OC — Outer cortex

\*Present Address: Section of Nematology, Central Plantation Crops Research Institute, Kasaragod 670124, Kerala.

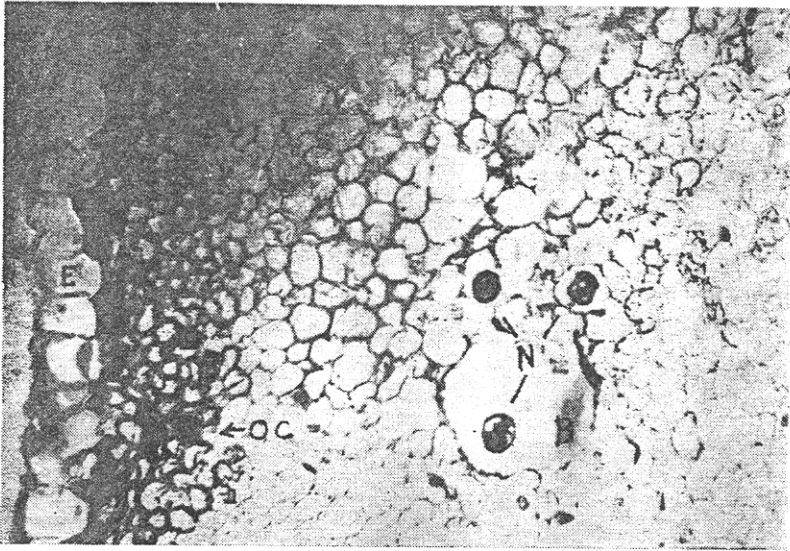


FIG. 2. Transverse section of arecanout root inoculated with *Rodophohus similis* Nematodes are located in the cortical burrows.  
 B — Burrow, E × Epidermis, N — Nematode, OC — Outer Cortex

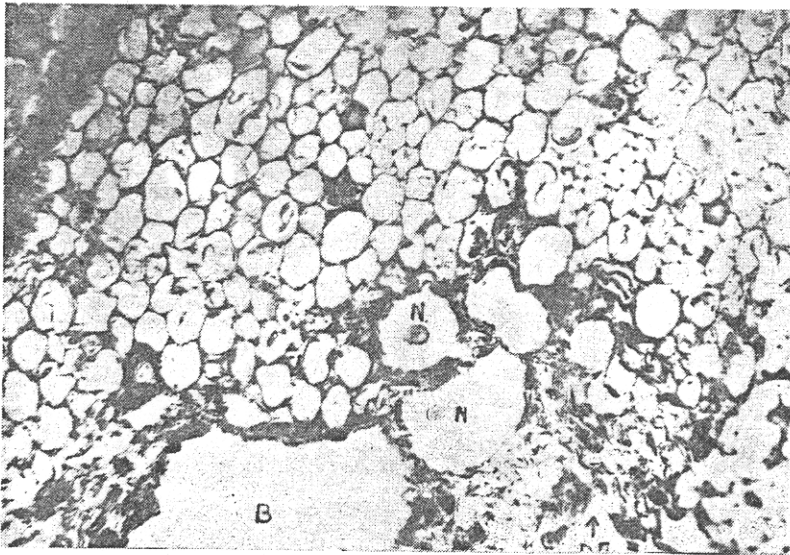


FIG. 3. Transverse section of infected root showing the formation of burrows and extent of tissue damage  
 B — Burrow, DC — Damage cortex, N — Nematode