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17

REACTIONS OF THIRTY-ONE ARECA GERMPLASM COLLECTIONS  
TO THE BURROWING NEMATODE, RADOPHOLUS SIMILIS

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ABSTRACT

Thirty-one Areca germplasm collections were screened against the banana race of Radopholus similis. All of them were susceptible. Lower root-lesion indices and fewer number of nematodes per gram of roots occurred on Singapore, Solomon Islands-2, Solomon Islands-3, Hirehalli, Thirthahalli oval, local varieties of Areca catechu, and Saigon variety of A. calapparia, than on other varieties tested. The varieties Mangaia, Mahuva-B, and Chickmagalore of A. catechu and A. macrocalyx variety New Ireland exhibited higher infection rates and root-lesion indices. Maximum root-lesion indices and moderate nematode infection occurred on A. catechu variety Assam and A. triandra variety Indonesia-I. A. calapparia, A. langiosiana, A. macrocalyx, A. normanbyii and A. triandra are reported as new hosts for R. similis.

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Arecanut (Areca catechu) is an important plantation crop in South India. Yellow leaf disease, a malady of unknown cause, is a serious threat to this crop in certain districts of Kerala and Karnataka. Swamy and Reddy (5), Nair (3), and Weischer (6) reported various nematode species associated with arecanut plantations. Kumar, et al. (2) first reported that Radopholus similis was also present in certain plantations. Koshy, et al. (1) surveyed the healthy and diseased areas and reported 22 genera of plant-parasitic nematodes associated with arecanut. In that study R. similis was reported as the cause of lesions, rotting, and black tip of roots, a primary symptom of yellow leaf disease. It was determined that all available arecanut germplasm should be assessed for possible resistance to the banana race of R. similis.

## MATERIALS AND METHODS

In February 1975, ten vigorously growing three-leaf-stage seedlings from each of 31 different arecanut accessions were transplanted into individual 30-cm earthen pots, each containing 5 kg sterile sandy loam soil. Five pots were inoculated with approximately 1500 *R. similis* extracted from roots of yellow leaf disease-affected arecanut palms. The remaining seedlings were inoculated with the run-out from the 500-mesh sieve used for the above inoculum. In September 1975, the plant roots were washed free of soil and rated visually for severity of symptoms, namely, no infection (0), mild (1.0), moderate (2.0), and severe (3.0). Roots of individual plants were then cut into pieces 1 cm long, and a 10-g sample was stained in boiling acid fuchsin lactophenol for 3 minutes (4), cleared in lactophenol, blended, and nematodes were counted with the use of a stereoscopic microscope.

## RESULTS

Data in Table 1 indicate that the 31 species/varieties of *Areca* were susceptible to *R. similis*, but differed in degree of susceptibility. Root-lesion indices varied from 0.4 in Hirehalli to 3.0 in Assam, Indonesia-I, and New Ireland. Lower root-lesion indices and fewer numbers of nematodes/g of roots occurred on Singapore, Solomon Islands-2, Solomon Islands-3, Hirehalli, Thirthahalli oval (Fig. 1), local varieties of *Areca catechu*, and Saigon variety of *A. calapparia*, than on other varieties tested. The maximum number of nematodes per gram of roots occurred on Mangala (782), Indonesia-6 (776), and Chickmagalore (754). Root-lesion indices were high on varieties Assam (Fig. 2) and Indonesia-I, but these varieties supported low-moderate numbers of nematodes per gram of roots. Root-lesion indices were high on varieties Mangala, Chickmagalore, New Ireland, and Mahuva-B, and these varieties supported large numbers of nematodes per gram of roots. Most of the other varieties were intermediate for root-lesion indices and numbers of nematodes per gram of roots. Root systems of uninoculated control plants exhibited no lesions and yielded no *R. similis*.

*A. calapparia*, *A. langlosiana*, *A. macrocalyx*, *A. normanbyii*, and *A. triandra* are reported as new hosts of *R. similis*.



FIGURE 1. *Radopholus similis*-infested arecanut seedling variety Thirthahalli oval showing lesions and blackening of root tips.

FIGURE 2. *Radopholus similis*-infested arecanut seedling variety Assam.

Table 1. Reactions of germplasm collections of *Areca* to *Radopholus similis*.

Genus-species	Variety	Root-lesion index (avg 5 plants)	Nemas/gram of roots (avg 5 plants)
<i>Areca (Actinorhysis)</i>	Saigon (VTL-27) <sup>a</sup>	1.0	3
<i>calapparia</i>			
<i>A. catechu</i>	Assam	3.0	228
	Ceylon-1 (VTL-5)	2.0	484
	Chickmagalore	2.0	754
	Dapoli	1.8	634
	Fiji (VTL-1)	1.9	232
	Hirehalli	0.4	53
	Indonesia-6 (VTL-11)	1.4	776
	Local (Vittal)	1.0	52
	Mahuva-A	2.0	42
	Mahuva-B	2.1	555
	Mangala (VTL-3)	2.5	782
	Mettupalayam	0.9	253
	Mohitnagar	1.1	155
	Saigon-1 (VTL-12)	1.4	146
	Saigon-2 (VTL-13)	1.6	133
	Saigon-3 (VTL-14)	2.2	324
	Singapore (VTL-17)	1.0	19
	Solomon Islands-2 (VTL-18b)	1.0	56
	Solomon Islands-3 (VTL-18c)	1.2	13
	South canara	1.7	39
	Sreevardhan	1.9	267
	Thirthahalli	1.0	145
	Thirthahalli oblong	2.0	44
	Thirthahalli oval	1.6	8
<i>A. langlostana</i>	Fiji (VTL-33)	1.0	177
<i>A. macrocalyx</i>	New Ireland (VTL-43)	3.0	686
<i>A. normanvillei</i>	Australia (VTL-23)	1.4	624
<i>A. triandra</i>	Indonesia-1 (VTL-6)	3.0	97
	Indonesia-2 (VTL-7)	0.8	575
	Mauritius (VTL-2)	0.4	179
G. M.		1.45	247.87
E		0.49	199.11
CD		0.84*	329.86*

<sup>a</sup>Accession numbers of exotic types of *Areca* germplasm collections maintained at Central Plantation Crops Research Institute, Regional Station, Vittal 574 243, South Kanara, Karnataka, India.

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