

HOST-RANGE OF THE BURROWING NEMATODE *RADOPHOLUS SIMILIS* (COBB, 1893) THORNE, 1949

BY

P. K. KOSHY and V. K. SOSAMMA

Central Plantation Crops Research Institute, Regional Station, Kayangulam,
Krishnapuram-690533, Kerala, India

Preliminary studies on the burrowing nematode, *Radopholus similis* infesting coconut and arecanut palms in South India have been reported earlier from this laboratory (Koshy *et al.*, 1975). Even though this nematode was already known to occur in Kerala on banana (Nair, 1966) and coconut (Weischer, 1967; Mathen *et al.*, 1970), the physiological race involved has not been identified. The "banana race" of this nematode is known to have a limited host range compared to the very wide host range of the "citrus race" (Poucher *et al.*, 1967). As many as 1275 different kinds of citrus were found to be hosts to varying degrees in Florida (Ford *et al.*, 1960). Besides tubers, vegetables, legumes, fodder crops, etc. grown as intercrops in coconut gardens, weeds of different types may serve as reservoirs and encourage multiplication and spread of the nematode. The objective of the present investigations was to find out the susceptibility of some of these crops and weeds to *R. similis* and to identify the races involved.

Seedlings of 73 species of plants were raised in five replicates in steam-sterilised soil in small earthen pots. *R. similis* collected from coconut roots at Kayangulam were used for inoculating the different plant species at the rate of one nematode per 2 g of soil. The suspension containing the nematodes was introduced on or very near the roots of each plant with a dropper. In the case of coconut alone, a plastic cylinder (5 x 3 cm) was placed around the 1-2 cm long white fleshy plumule of the germinating seedling and filled with moist sterilised soil. *R. similis* (500 in number) suspended in 5 cc water was inoculated on to the plumule. The plants were depotted 3-4 months after inoculation, root system washed free of adhering soil and examined for the presence of lesions and nematodes. The whole root system was cut into small pieces, rubbed on a 10 mesh sieve and left in petri plates containing tap water. After 72 hours, the suspension was passed through a 60 mesh sieve to remove the root debris and then collected on the 350 mesh sieve for observation and counting. On the basis of the presence of all different stages of the nematode (larvae, males and females) in much higher numbers than the initial inoculum, the plants were recorded as hosts or non-hosts. This work was carried out during September to January 1973-1974 and 1974-1975, this part of the year yielding the maximum population of *R. similis*.

Among the 73 plant species tested (Table I), 30 were hosts, of which 13 are new records. Nematode populations from coconut, banana and arecanut roots were inoculated separately on to various species of citrus. This was repeated three times on five seedlings each during September, October and November, 1974. In all cases the nematode failed to infect these citrus plants which confirmed that the population involved was the "banana race" of *R. similis*. DuCharme & Birchfield (1957) identified two physiological races of *R. similis*: the "citrus race" which parasitizes both citrus and banana, and recorded only in Florida, and the "banana race" which parasitizes banana but not citrus. Though there are large number of publications on the host range of *R. similis*, most of them do not record the race involved in the study. Edwards &

TABLE I

List of plants tested for host range of *R. similis*

- Family ANONACEAE: *Anona squamosa* L. (custard apple); *A. reticulata* L. (bullock's heart).
- CAPPARIDEAE: *Cleome monophylla* L.; *C. viscosa* L.
- STERCULIACEAE: *Theobroma cacao* L. forestro (cacao).
- RUTACEAE: *Citrus reticulata* Blanco (orange); *C. maxima* (Brun) Merrill (pumelo); *C. aurentifolia* Swingle (lime); *C. sinensis* L. (sweet orange); *Citrus pennivesiculata*.
- ANACARDIACEAE: *Mangifera indica* L. (mango).
- LEGUMINOSAE: *Crotalaria juncea* L. (sunn-hemp); *C. striata* DC; **Cymopsis tetragonoloba*** (cluster bean); *Dosmodium tortuosum*, E. C. 28875*; *Glycine max.** varieties PLSO 41, Improved polican, Bragg, Lee & Punjab (soyabean); *Clitoria ternata* L. (shankupushpam); *Phaseolus atropurpureus*; *P. lathyroides* L.; *P. calcaratus* Roxb.** (rice bean); *Cajanus cajan* L.* (pigeon pea); *Pueraria javanica*; *Vigna sinensis* L.* (cowpea); *V. unguiculata**; *Arachis hypogaea* L.* (ground nut); *Cassia tora*; *Lathyrus sativus* L.** (khesari); *Mimosa pudica* L. ('touch-me-not').
- MYRTACEAE: *Eugenia caryophyllata* Wight (clove).
- CUCURBITACEAE: *Momordica charantia* L.* (bitter gourd).
- COMPOSITAE: *Eclipta alba* Hassk (kyonni); *Cosmos sulphureus*; *Blainvillea latifolia* DC.; *Tridax procumbens* L.; *Eupatorium odoratus*.
- APOCYNACEAE: *Vinca rosea*.
- ASCLEPIADACEAE: *Hemidesmus indicus* Br. ('narunanti').
- CONVOLVULACEAE: *Ipomaea batatas* Lamk.* (sweet potato).
- SOLANACEAE: *Solanum nigrum* L.* ('mulaku thakkali'); *S. melongena* L. (brinjal, egg plant); *Lycopersicum esculentum* Miller* (tomato); *Physalis minima* L.** ('njodi-njotta'); *Capsicum frutescens* L. (chilli).
- SCROPHULARINEAE: *Scoparia dulcis* L.
- LABIATAE: *Leucas aspera* Spreng ('thumba'); *Coleus parviflorus* Benth.**
- AMARANTACEAE: *Amaranthus viridis* L.** (green amaranth); *Gomphrena globosa* L. (globe amaranth).
- PIPERACEAE: *Piper nigrum* L.* Panniyur-I (black pepper).
- MYRISTICACEAE: *Myristica fragrans* Houtt.** (nutmeg).
- EUPHORBIACEAE: *Hevea brasiliensis* Muell. (rubber); *Manihot utilisima* var. H-91, H-224, H-165 (cassava, taphoca); *Euphorbia heterophylla* L.
- URTICACEAE: *Artocarpus integrifolia* Lamk. (Indian Jack tree); *A. hirsuta* Lamk. (jungle jack tree).
- SCITAMINEAE: *Curcuma longa* L.** (turmeric); *Zingiber officinalis* Rosc.* (ginger); *Musa paradisiaca* L.* (plantain).
- DIOSCOREACEAE: *Dioscorea alata* ("Peruvallikachil"); *D. esculenta*.
- LILIACEAE: *Allium cepa* L.** (onion).
- PALMEAE: *Areca catechu* L.* (betelnut palm, arecanut palm); *Caryota urens* L. ('chundapana'); *Cocos nucifera* L.* (coconut); *Elaeis guineensis* Jacq.** (oil palm).
- AROIDEAE: *Amorphophallus companulatus* Blume (elephant foot yam); *Xanthosoma sagittifolia***
- BROMELIACEAE: *Ananas sativus* Schutt (Pineapple).
- CYPERACEAE: *Cyperus rotundus* L. (nut grass).
- GRAMINEAE: *Oryza sativa* Lamk.** (rice); *Saccharum officinarum* L. CO 48 (sugarcane); Hybrid napier** (*Pennisetum purpureum** *P. typhoides*) (grass); *Zea mays* L.* (maize).

*Host. **New host records.

Wehnut (1971) tested the host status of *R. similis* in Panama and Honduras, and indicated that more than one "banana race" might be involved in Central America. The banana race of Kayangulam is different from the "banana race" of Honduras in that it can parasitize sugarcane and sweet potato. It differs from the Panama isolate in its capacity to infest *Vigna sinensis* though it is similar to both Honduras and Panama isolates with *Vigna unguiculata* as a common host and *Crotalaria striata*, *C. juncea* and *Cyperus rotundus* as non-hosts.

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PRELIMINARY STUDIES ON SOME GRAMINACEOUS PLANTS FOR
THEIR SUSCEPTIBILITY TO THE MAIZE CYST NEMATODE,
HETERODERA ZEA KOSHY ET AL., 1970

BY

A. N. SRIVASTAVA and GOPAL SWARUP

Division of Nematology, Indian Agricultural Research Institute, New Delhi, India

Heterodera zea is known to be widely distributed in the maize growing areas of Rajasthan, Punjab, Uttar Pradesh, Bihar and Madhya Pradesh (Koshy et al., 1970; Koshy & Swarup, 1971).