Nematol. medit. (1984), 12: 155-158.

* *Institute of Agriculture and Animal Science (IAAS/MUCIA)*
Rampur, Chitwan, Nepal
** *Swiss Association for Technical Assistance*
Box 113, Kathmandu, Nepal

ROOT-KNOT NEMATODES OF CHITWAN DISTRICT OF NEPAL

by
L. N. BHARDWAJ *([1]) and C. H. HOGGER **([2])

In Nepal, occurrence of root-knot nematodes, *Meloidogyne* spp., was first reported by Amatya and Shrestha (1969) on tomato, eggplant, okra, and chilli from Illam, Pokhara and Yagyapuri during their preliminary survey of plant-parasitic nematodes. In and around Rampur, Chitwan district, root-knot nematodes reduce yield and quality of crops because effective control measures are not applied by farmers on their small holdings on which vegetables provide an important part of the daily diet and a source of income. Control of root-knot nematodes by crop rotation and/or through the use of resistant cultivars is possible only if the species and races to be controlled are known. Therefore investigations were undertaken to identify the species of root-knot nematodes associated with different crops in the vicinity of the research farm of the Institute of Agriculture and Animal Science, Rampur, which is typical of the soil type and farming practice in the Terai region of Nepal.

Root samples were collected from September 1981 to February 1982 mostly from winter season crops and in a few cases from rainy season crops. The adult females taken out from the root galls were preserved in 1.5% NaCl solution. Identification was made on the basis

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([1]) Present address: Dept. of Plant Pathology, HPKVV, College of Agriculture, P.O.: Nauni, Solan - 173230, Himachal Pradesh, India.
([2]) Present address: Swiss Federal Research Station for Agronomy, 8046 Zurich, Switzerland.

Table I - *Species of root-knot nematodes identified from different hosts collected from IAAS research farm.*

Host crops	Nematode species	Severity of infestation (1)	Gall size (2)
Tomato (*Lycopersicon esculentum* Mill.)	*Meloidogyne incognita* *M. javanica* *M. arenaria*	+++	M, L
Okra (*Abelmoschus esculentus* Moench)	*M. incognita* *M. javanica*	+++	M, L
Egg plant (*Solanum melongena* L.)	*M. incognita* *M. javanica*	+++	M
Potato (*Solanum tuberosum* L.)	*M. incognita* *M. javanica*	++	M
Carrot (*Daucus carota* L.)	*M. incognita* *M. javanica*	++	S
Radish (*Raphanus sativus* L.)	*M. incognita* *M. javanica*	+	S
Cabbage (*Brassica oleracea L.* var. *capitata*)	*M. incognita* *M. arenaria*	+	S
Chinese cabbage (*Brassica chinensis* L.)	*M. javanica* *M. arenaria*	+	S
Cauliflower (*Brassica oleracea* L. var. *botrytis*)	*M. incognita*	+	S
Broccoli (*Brassica oleracea* L. var. *italica*)	*M. incognita*	+	S
Lettuce (*Lactuca sativa* L.)	*M. incognita*	+++	M
Pigeon pea (*Cajanus cajan* Mill.)	*M. javanica*	+++	S
Broad bean (*Vicia faba* L.)	*M. incognita*	++	M
Gram (*Cicer arietinum* L.)	*M. incognita*	+++	M
Lentil (*Lens esculenta* Moench.)	*M. incognita* *M. javanica*	++	M
Pea (*Pisum sativum* L.)	*M. incognita*	+++	M
Chilli (*Capsicum annuum* L.)	*M. incognita* *M. javanica*	+++	M, L
Ginger (*Zingiber officinale* Rosc.)	*M. javanica*	++	S
Turmeric (*Curcuma longa* L.)	*M. incognita*	++	S
Anise (*Pimpinella anisum* L.)	*M. arenaria*	++	M
Coriander (*Coriandrum sativum* L.)	*M. incognita* *M. javanica* *M. arenaria*	++	M, L
Tobacco (*Nicotiana tabacum* L.)	*M. javanica*	++	M
Banana (*Musa sapientium* L.)	*M. incognita*	++	S
Papaya (*Carica papaya* L.)	*M. incognita*	+++	L
Jute (*Corchorus capsularis* L.)	*M. javanica*	+++	L
Rape (*Brassica campestris* L. var. *tori*)	*M. javanica*	+	S
Common vetch (*Vicia sativa* L.)	*M. incognita* *M. javanica*	+++	M
Hairy vetch (*V. hirsuta* L.)	*M. incognita*	+++	M
Black nightshade (*Solanum nigrum* L.)	*M. incognita*	+++	M

(1) + = low infestation
++ = Moderate infestation
+++ = Heavy infestation

(2) S = Small size of root gall
M = Medium size of root gall
L = Large size of root gall

of perineal patterns (Taylor *et al.*, 1955 and Eisenback *et al.*, 1981).

Three species of root-knot nematodes, namely *Meloidogyne incognita* (Kofoid *et* White), Chitw. *M. javanica* (Treub), Chitw. and *M. arenaria* (Neal), Chitw. were found associated with 26 economically important crops, out of the total of 29 host plants examined (Table I). Of these species, *M. incognita* was predominant and was found on 76% of the plant specimens. *M. javanica* was found on 60% and *M. arenaria* on 17% of the plant samples. Multiple infection with more than one species of root-knot nematodes was observed and there was no apparent difference in the size of galls produced by different species.

Nematode control by crop rotation is difficult since all major vegetables are damaged by one or the other species of the 3 root-knot nematodes (Table I) and the vegetable plots are traditionally kept near the house in the same place for security. These plots are never used for small grains. Nematicides cannot yet be recommended as they are untried in Nepal, supplies of all imported agricultural chemicals are uncertain and the people are generally careless when handling pesticides. Therefore, selection and seed multiplication of resistant varieties (Sasser and Kirby, 1979) and improvement of horticultural practices are the only realistic control measures for the near future. The personnel and financial resources are not available for successful breeding programmes of several vegetables. Resistant varieties from other parts of the world will be tested and it is hoped that agronomically and culinarily acceptable varieties can be identified for local use.

Extension work has shown that improved horticultural practices can give immediate results. Seedlings can be produced in relatively uncontaminated soil, e.g. from rice fields. The tradition of not growing small grains in the garden should be changed so that vegetables could be rotated with non-hosts.

Acknowledgement: The authors are grateful to Dr. H. D. Foth (Plant Science Advisor, MUCIA) and Dr. J. N. Sasser (NCSU) for reading of the manuscript.

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Accepted for publication on 21 November 1983.