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## SEQUENTIAL DEVELOPMENT OF DEAMINASES IN RESISTANT AND SUSCEPTIBLE TOMATO VARIETIES INFESTED WITH ROOT-KNOT NEMATODE, *MELOIDOGYNE INCOGNITA*

U. N. MOTE<sup>1</sup>, D. R. DASGUPTA<sup>2</sup> AND A.K. GANGULY<sup>3</sup>

Division of Nematology,  
Indian Agricultural Research Institute,  
New Delhi - 110012

**Abstract :** Investigations on sequential development of chlorogenic acid (CGA), phenylalanine ammonia-lyase (PAL) and tyrosine ammonia-lyase (TAL) were undertaken in two tomato varieties, viz., "Pusa Ruby" and "SL-120" inoculated with the root-knot nematode, *Meloidogyne incognita*. Varieties Pusa Ruby and SL-120 were observed to be susceptible and resistant respectively to *M. incognita*. The resistance response of SL-120 to *M. incognita* was characterized by delayed and reduced larval penetration and retarded life cycle of the nematode which corresponded with cell necrosis and hypersensitive reaction.

The content of chlorogenic acid and activities of PAL and TAL were higher in inoculated than uninoculated root and shoot samples and the values for resistant variety were considerably higher than for the corresponding samples from the susceptible variety.

Chlorogenic acid, PAL and TAL increased progressively and consistently at a faster rate with time in inoculated resistant variety over their respective controls. In inoculated susceptible variety similar trend was observed for certain period, and thereafter, percent increase was reduced to a greater extent. In general, chlorogenic acid contents as in shoots were higher than that for root.

The analytical and semi preparative polyacrylamide gel electrophoretic analysis of PAL showed two anionic bands for any given interval in uninoculated Pusa Ruby and SL-120 and inoculated Pusa Ruby plants, while two new PAL isozymes having different electrophoretic mobility were resolved in the root extracts from nematode inoculated resistant variety. The first newly synthesized isozyme appeared between 24-72 hrs after inoculation as a response to nematode infestation and the second new PAL component appeared between 8-14 days during postinfection period. Activity of TAL appeared to be lower than that of PAL, and only one TAL component was resolved from all the four samples.

**Key words :** Phenyl alanine ammonia-lyase, tyrosine ammonia-lyase, chlorogenic acid, *Meloidogyne incognita*, tomato varieties.

## **INTERACTION OF MELOIDOGYNE JAVANICA AND RACE-1, RACE-2, RACE-3 OF M. INCOGNITA WITH PSEUDOMONAS SOLANACEARUM ON A FEW BRINJAL CULTIVAR/LINES\***

N.G. RAVICHANDRA, K.KRISHNAPPA AND K.G.H. SETTY

Department of Plant Pathology, Agricultural College, UAS  
G.K.V.K., Bangalore-560 065

**Abstract:** Few popular cultivars and promising lines of brinjal were evaluated for their reaction to the two species of root-knot nematode, *Meloidogyne javanica* and the three races of *M. incognita* with the wilt bacterium, *Pseudomonas solanacearum* individually and in various combinations. A local brinjal cultivar 'Gulla' showed high degree of resistance to race 1 and 2 of *M. incognita* as well as *P. solanacearum* when inoculated alone. However, other brinjal lines were susceptible to all the four populations of the nematode and also to the bacterium.

**Key words :** Interaction, *Meloidogyne javanica*, *M. incognita* race 1,2 and 3. *Pseudomonas solanacearum* and brinjal.

## STUDIES ON AVOIDABLE LOSSES IN MUNG BEAN (*VIGNA RADIATA*) DUE TO ROOT-KNOT NEMATODE, *MELOIDOGYNE JAVANICA* AND ITS CONTROL UNDER FIELD CONDITIONS

D.C. GUPTA AND K.K. VERMA

Department of Nematology,  
Haryana Agricultural University, Hisar-125004

**Abstract :** In mung bean (*Vigna radiata*) avoidable losses under field conditions due to *Meloidogyne javanica* ranged from 42.1 to 93.4 per cent by use of carbofuran applied @ 1, 2 and 4 kg a. i./ha. Out of 34 genotypes screened for resistance to *M. javanica*, none exhibited resistant response. Control of *M. javanica* by seed treatment alone, soil treatment alone, or a combination of both practices showed that the yield per plot and plant height were maximum when seed treatment with carbosulfan (Posse 25 ST) @ 1% a. i. (w/w) + soil application with phorate (Thimet 10G) @ 1.0 kg a.i./ha were combined.

**Key words :** *Meloidogyne javanica*, losses, *Vigna radiata*, control.

## POPULATION BEHAVIOR AND DISTRIBUTION PATTERN OF *TYLENCHORHYNCHUS ZEA* AND *HOPLOLAIMUS INDICUS* IN CULTIVATED SOIL RECEIVING INDUSTRIAL POLLUTANTS

M.C. MUKHOPADHYAYA AND P.K. SARKAR

Department of Zoology, University of Burdwan, Burdwan 713 104, W.Bengal

**Abstract** : Field population of *Tylenchorhynchus zae* and *Hoplolaimus indicus* was estimated in a sewage-fed field and compared with that of a non-sewage-fed field having the same cropping sequence and their pattern of distribution was studied with the help of Taylor's Power Law (Taylor, 1961). *T. zae* was the numerically dominant species and was recovered maximum from sewage-fed paddy and minimum from non-sewage-fed mustard. Sewage-fed field supported nematode population several times more than the non-sewage-fed field.

*Tylenchorhynchus zae* showed least aggregation in the crop-containing sewage-fed field;  $b$  value of Taylor's Power Law being 1.14. Aggregation was maximum in the non-sewage-fed plot lying fallow  $b=2.0$ . Similarly, *Hoplolaimus indicus* showed least aggregation in the sewage-fed crop field, giving a  $b$  value of 1.33 while during fallow, the value reached as high as 3.2. Thus, the distribution pattern tended to be random at higher population densities.

**Key words** : *Tylenchorhynchus zae*, *Hoplolaimus indicus*, Industrial pollutants, Population, Distribution pattern.

**A NEW BACTERIAL STRAIN OF PASTEURIA PENETRANS, ITS HOST RANGE AND EFFECT OF TEMPERATURE ON SPORE ATTACHMENT TO SECOND-STAGE JUVENILES OF PIGEON-PEA CYST NEMATODE, HETERODERA CAJANI**

BANSA SINGH\* AND S.C. DHAWAN

Division of Nematology, Indian Agricultural Research Institute, New Delhi -110 012

**Abstract :** The occurrence of a new strain of *Pasteuria penetrans* parasitic on *Heterodera cajani* is reported. Host range studies revealed that out of seven species of phytoparasitic nematodes tested, spore attachment was only observed on the cuticle of second-stage juveniles of *H. avenae*, while *H. sorghi*, *H. graminis*, *H. mothi*, *Rotylenchulus reniformis*, *Tylenchulus semipenetrans* and *Pratylenchus thornei* were found free of spores. Temperature studies made on spore attachment to second-stage juveniles of *H. cajani* showed significantly greater number of spores attachment at 25°C than 15 or 35°C.

**Key words :** Bacterial parasite, *Pasteuria penetrans*, *Heterodera cajani*, *H. avenae*, *H. sorghi*, *H. graminis*, *H. mothi*, *Meloidogone incognita*, *Tylenchulus semipenetrans*, *Rotylenchulus reniformis*, *Pratylenchus thornei*, host range, temperature.

## INFLUENCE OF SOIL CHARACTERS ON REPRODUCTION AND PATHOGENICITY OF *XIPHINEMA BASIRI*

RAJESWARI SUNDARABABU AND T.S. MUTHUKRISHNAN

Department of Nematology,  
Tamil Nadu Agricultural University, Coimbatore-641 003.

**Abstract:** Three types of soils compared with pot mixture were tested to determine their effect on multiplication of *Xiphinema basiri*. Maximum population of nematodes was found in pots which had pot mixture followed by red soil or sandy loam. The soil temperature at the time of taking sample showed that at the temperature range of 23.5 to 26.0°C, the nematode population was high, but when temperature increased beyond 26°C there was perceptible decrease in population level. High moisture level favoured the multiplication of *X. basiri*. The nematodes could survive long at pH from 5 to 7.

**Key words:** *Xiphinema basiri*, soil, temperature, moisture, pH.

## SURVEILANCE OF PLANT PARASITIC NEMATODES OF DIFFERENT CROPS IN HOMESTEADS OF KERALA

SHEELA, M.S., ARTHUR JACOB, J. AND JOHN KURIYAN, K.

College of Agriculture, Vellayani, Kerala.

**Abstract :** A multistratified random survey of the nematodes with reference to the cropping patterns in the homesteads of Trivandrum District of Kerala was conducted during 1984. The most widely distributed nematode was *Helicotylenchus* sp. and it was followed by *Meloidogyne incognita*, *Radopholus similis* and *Rotylenchulus reniformis*. *Heterodera oryzae* was observed in three homesteads only. Among these *M. incognita*, *H. oryzae*, *R. reniformis*, *Helicotylenchus* sp. and *Tylenchorhynchus* sp. had reached Economic Threshold Levels (ETL) in 1,1,1,5 and 2 homesteads respectively among 100 homesteads covered in the survey. Population of *R. reniformis* and *Helicotylenchus* sp. were significantly higher in homesteads planted with coconut alone than in combination with other crops. The populations of *R. reniformis* and *Helicotylenchus* sp. associated with coconut were significantly higher in August than in May and December respectively. August population was the highest in the case of *R. similis* and *Helicotylenchus* sp. associated with banana. Populations of *Helicotylenchus* sp and *Tylenchorhynchus* sp. associated with coconut were significantly higher in red soil than in sandy soil but the latter was on par with that of laterite soil.

**Key words :** Economic threshold level, *M. incognita*, *R. reniformis*, *H. oryzae*, *Helicotylenchus*, *Tylenchorhynchus*

## HOST RANGE AND MORPHOLOGICAL STUDIES ON FOUR ISOLATES OF *APHELENCHOIDES BESSEYI* CHRISTIE

RAJAN, ARJUN LAL AND V.K. MATHUR

Plant Quarantine Division, National Bureau of Plant Genetic Resources, IARI Campus, New Delhi-110 012

**Abstract :** Studies were carried out on host range (fungal hosts) and morphometrics of four geographically isolated populations of *Aphelenchoides besseyi*. The comparison of morphometric data showed significant differences between populations. Cuttack population (from eastern India) and Pune population (from western India) formed one group while Hyderabad (from southern India) and Philippines isolates formed another group on the basis of certain similarities. Differences in morphometrics were also observed between populations of these isolates obtained from fungal cultures raised under similar conditions. In differential host test studies-only Hyderabad isolate multiplied on *Curvularia clavata*, but it failed to multiply on *C. andropogonis* and *Phoma tropica*, suggesting thereby the occurrence of atleast two physiological races in *A. besseyi*.

**Key words :** Host range, morphometrics, *Aphelenchoides besseyi*

## **INTERACTION BETWEEN *MELOIDOGYNE INCOGNITA* AND THE FUNGUS *FUSARIUM* SP. ON BLACK PEPPERVINE (*PIPER NIGRUM*.L)**

M.S. SHEELA AND T.S. VENKITESAN

College of Agriculture, Kerala Agricultural University, Vellayani, Kerala

**Abstract :** The interaction between the root-knot nematode *Meloidogyne incognita* and the fungus *Fusarium* sp. was studied in hybrid cultivar, Panniyur- 1. in pot culture condition. The result showed that the effect of this nematode in combination with the fungus enhanced the suppression of growth of plant which is more pronounced than that of the fungus alone. Inoculation of the nematode and fungus revealed a synergistic effect on growth retardation of the plants. The fungal infection in stem portion was more in plants inoculated with nematode first followed by fungus inoculation (83%) than in simultaneous inoculation, and fungus inoculation followed by nematode. (66%)

**Key words :** *Meloidogyne incognita*, *Fusarium*, blackpeppervine, interaction

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## **SEASONAL FLUCTUATIONS OF NEMATODE POPULATION IN BANANA**

B.N. CHOUDHURY AND P.N. PHUKAN

Department of Nematology, Assam Agricultural University Jorhat-13

**Abstract :** Plant parasitic nematodes recorded in banana cultivar 'Jahazi' (AAA Group Cavendish), attained an annual peak in the month of March, and declined in the month of December.

**Key words :** Seasonal fluctuations, temperature, rainfall.

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## PLANT PARASITIC NEMATODES ASSOCIATED WITH SUNFLOWER IN KARNATAKA\*

B.S. AMARANATHA AND K. KRISHNAPPA

Department of Plant Pathology, University of Agriculture  
Sciences, G.K.V.K., Bangalore-560065.

**Abstract :** Fifty one soil and root samples collected from eight major sunflower growing districts of Karnataka indicated the presence of plant parasitic nematodes in varying numbers. Major nematode genera encountered include *Rotylenchulus reniformis*, *Meloidogyne incognita*, *Aphelenchus avenae*, *Helicotylenchus multicinctus*, *Tylenchorhynchus dubius*, *Aphelenchoides* sp., in addition to *Hoplolaimus*, *Pratylenchus*, *Tylenchus* and *Xiphinema* which were present in small numbers considered as minor nematodes. Among all the nematode genera *Rotylenchulus reniformis* was the most predominant associated with sunflower in Karnataka.

**Key words:** Geographical distribution, sunflower

## **A METHODOLOGY FOR EVALUATION OF RESISTANCE IN CARDAMOM TO ROOT-KNOT NEMATODE (*MELOIDOGYNE INCOGNITA*)**

SANTHOSH J. EAPEN

National Research Centre for Spices,  
Cardamom Research Centre, Appangala, Madikeri,  
Karnataka-571 201.

**Abstract :** Vegetative suckers of a susceptible line of cardamom were inoculated with 100, 500, 1000 and 5000 *Meloidogyne incognita*. The nematode multiplication and gall formation were assessed at 2, 3, 4, 5 and 6 months after inoculation. Nematode multiplication was inversely proportional to the initial inoculum level. Initial population of 100 and 500 nematodes consistently produced susceptible reactions,  $GI > 2$  and  $R > 1$ .  $GI$  and  $Pf$  at these levels were significantly different from the rest, 3 months after inoculation. Therefore, an initial inoculum of 500 nematodes and an exposure period of 3 months are recommended for evaluation of resistance in cardamom.

**Key words :** Resistance, Cardamom, Root-knot nematode, *Meloidogyne incognita*

## **PATHOGENICITY AND REPRODUCTION OF *HETERODERA* *SORGHI* ON *ZEA MAYS***

A.N. SRIVASTAVA AND GAUTAM CHAWLA

Division of Nematology, Indian Agricultural Research Institute,  
New Delhi - 110012

**Abstract :** Significant reduction in the shoot length and fresh shoot and root weights of maize cultivar Deccan - 103 was observed at an initial inoculum level of 4 J2 of *Heterodera sorghi* /cm<sup>3</sup> of soil and hence, this inoculum level was considered as the minimum damaging threshold level for this host. The cyst population and nematode multiplication increased significantly with the increasing levels of inoculum. Though, the maximum cysts and total nematode populations were recorded at the highest level of inoculum i.e. 16 J2/cm<sup>3</sup> soil, the rate of reproduction of nematode was found to be highest at the lowest level of initial inoculum i.e. 1 J2 /cm<sup>3</sup> soil.

**Key words :** *Heterodera sorghi*, damaging threshold, pathogenicity, reproduction, *Zea mays*, plant growth.

**CEPHALENCHUS INTERMEDIUS SP. N. AND TRICHOTYLENCHUS  
MONOSEXUALIS SP. N. (NEAMTODA : TYLENCHIDA)  
FROM HARYANA, INDIA**

R. S. KANWAR, HARISH K. BAJAJ AND K. R. DABUR

Department of Nematology, Haryana Agricultural University,  
Hisar-125 004

**Abstract :** Two new species of nematode, *Cephalenchus intermedius* and *Trichotylenchus monosexualis* are described and illustrated. Their distinguishing features are *C. intermedius* L=0.65-0.79 mm, a=43-71, b=5.5-8.6, c=2.5-3.2, V=55-58, stylet with anchor-shaped knobs, lateral lines four, vulval flap 3-5  $\mu$ m, excretory pore anterior to hemizonid and tail filiform in both sexes. *T. monosexualis* L=0.68-0.84 mm, a=34-44, b=5.4-6.2, c=11-14, V=53-58, stylet=17-19  $\mu$ m with small backwardly directed knobs, oesophageal glandular overlap variable, vulva in flush with body contour, epitygmata conspicuous, tail terminus usually swollen and annulated, males absent. The validity of *Imphalenchus* Dhanachand and Jairajpuri and *Uliginotylenchus* Siddiqi is discussed.

**Key words :** Grass, *Imphalenchus*, *Uliginotylenchus*, *Saccharum spontaneum*.

## **PENETRATION AND MULTIPLICATION OF *MELOIDOGYNE INCOGNITA* AS INFLUENCED BY *PASTEURIA PENETRANS***

N. SOMA SEKHAR AND J.S. GILL

Division of Nematology, Indian Agricultural Research Institute, New Delhi-110 012

**Abstract :** Spore attachment to second-stage juveniles of *Meloidogyne incognita* increased with the increase in *Pasteuria penetrans* spore density level from 1.5 to 3.5 g parasite preparation/kg sand. Number of nematodes penetrating the roots, gall formation as well as total nematode multiplication decreased significantly with the increase in spore density level, with least nematode penetration and multiplication being at the highest spore density level of 3.5 g of parasite preparation/kg sand.

**Key words :** *Pasteuria penetrans*, spore density levels, *Meloidogyne incognita*, spore attachment, penetration, multiplication.