

## CONTENTS

Effect of bio-fertilizers <i>Azolla</i> and <i>Azospirillum</i> on root-knot nematode, <i>Meloidogyne incognita</i> and plant growth of okra- S. Ramakrishnan, C.R. Gunasekaran and Sivagami Vadivelu	--	127
Studies on the biology of mermithid parasite, <i>Romanomermis manjeerensis</i> n.sp. from <i>Anopheles</i> sp. larvae in Manjeera reservoir of Andhra Pradesh- Y. Narshi Reddy and A.V. Rajashekhar	--	131
Utilization of green leaves of neem and eupatorium for the management of soil organisms in bhindi and cowpea - K. Ajith and M.S. Sheela	--	139
Effect of leaf extracts on growth of blackgram inoculated with vesicular arbuscular mycorrhiza ( <i>Glomus fasciculatum</i> ) and root-knot nematode ( <i>Meloidogyne incognita</i> ) -C. Sankaranarayanan and Rajeswari Sundarababu	--	144
Nematicidal activity of some plant extracts -M.V. Chandravadana, Eugene Sebastian, J. Nidiry, N.K. Lella, P. Parvatha Reddy, R.M. Khan and M.S. Rao	--	148
Biochemical evaluation of various metabolites as influenced by root-knot nematode in <i>Abelmoschus esculentus</i> - Widhi Sharma and P.C. Trivedi	--	157
Five new species under sub-family Longidorinae (Nematoda) associated with fruit crops from north and north-eastern India, with comments on the genus <i>Neolongidorus</i> Khan, 1986 - M.S. Singh and E. Khan	--	158
Potential of two nematophagous mites in suppressing root-knot nematode, <i>Meloidogyne javanica</i> on okra -Kum Kum Walia and Sudha Mathur	--	172
Physiological changes with reference to bivalent cations and other minerals on susceptible and resistant cultivars of tomato due to <i>Meloidogyne incognita</i> infection - J. Arthur Jacob, M.M. Haque and D.R. Dasgupta	--	176
Susceptibility of the cockroach, <i>Periplaneta americana</i> to <i>Steinernema carpocapsae</i> : Histopathological changes in the cockroach midgut - Noopur Mathur, S. Khera, Santosh Gandhi and Renu Gupta	--	183
Parasitism of <i>Heterodera cajani</i> by <i>Fusarium solani</i> and other soil fungi - Mohinder Singh, Shashi B. Sharma and Renu Sharma	--	189
Nematodes of fruit plants in Manipur- Five new species of tylenchids (Nematoda: Tylenchida) - R.K. Gambhir and Ch. Dhanachand	--	197
Growth efficiency in wheat against <i>Heterodera avenae</i> - Umarao and Gopal Swarup	--	208
Suppression of <i>Heterodera cajani</i> by <i>Pasteuria penetrans</i> during three successive plantings of cowpea - Bansa Singh and S.C. Dhawan	--	216
An integrated approach for management of rice stem nematode, <i>Ditylenchus angustus</i> in deep water rice in Assam. - P. Das	--	222

(continued on inner cover)

Seasonal variation in the horizontal spatial pattern of the root-knot nematode, <i>Meloidogyne incognita</i> and application of the negative binomial and Taylor's power law models in developing sampling schemes - Jagwant Singh and H.S. Gaur	--	226
---	----	-----

#### SHORT COMMUNICATIONS

Effect of <i>Meloidogyne hapla</i> Chitwood, 1949 infestation on the carotenoid content of carrot ( <i>Daucus carota</i> L.) - M. Sivakumar and Sivagami Vadivelu	--	237
Distribution of root-knot nematodes species and races infecting vegetable crops in eastern Uttar Pradesh - Abrar Ahmad Khan and M. Wajid Khan	--	238
Germplasm screening and control of root-knot nematode ( <i>Meloidogyne javanica</i> ) through seed treatment in okra - R.K. Jain and D.C. Gupta	--	244
Some observations on bacterial parasite ( <i>Pasteuria</i> sp.) infecting <i>Mesodorylaimus japonicus</i> ( <i>Dorylaimida: Nematoda</i> ) - R.K. Walia, Harish K. Bajaj and D.C. Gupta	--	245
Physiological changes in mung ( <i>Vigna radiata</i> ) by <i>Meloidogyne javanica</i> - K.K. Verma, D.C. Gupta and J.K. Sandhooja	--	250
Determination of threshold levels of <i>Meloidogyne incognita</i> and <i>Rotylenchulus reniformis</i> on black gram - Munawar Fazal, Mohd. Yaqub Bhat and Ziauddin A. Siddiqui	--	253
New fungal host records of <i>Aphelenchoides besseyi</i> - Nandini Gokte and V.K. Mathur	--	255
Survey on prevalence of <i>Meloidogyne - Fusarium</i> wilt disease complex of chickpea in Karnataka - V. Krishna Rao and K. Krishnappa	--	257
Interaction of <i>Meloidogyne incognita</i> and <i>Pseudomonas solanacearum</i> on Jute - B. Bhagawati, R. Gogoi and P.N. Phukan	--	259
Management of root-knot nematode, <i>Meloidogyne javanica</i> infecting chickpea ( <i>Cicer arietinum</i> ) - K.K. Verma and D.C. Gupta	--	261
Management of root-knot nematode, <i>Meloidogyne incognita</i> on tomato through soil amendment with various composts - S.K. Sharma, G.L. Sharma and B.L. Baheti	--	263
Occurrence of <i>Helicotylenchus</i> spp. Steiner, 1945 on some ornamentals in Udaipur region of Rajasthan - D.K. Jain, A.U. Siddiqui and Aruna Parihar	--	265
Pathogenicity of root-knot nematode, <i>Meloidogyne incognita</i> on the leguminous cover crop, <i>Pueraria phaseoloides</i> - S. Thankamony, C.R. Nehru and K. Jayarathnam	--	266
Fungi associated with the egg masses of <i>Meloidogyne incognita</i> from different agroclimatic regions in India - B.K. Goswami and Umarao	--	268
<i>In vitro</i> evaluation of a chook-A neem based pesticide against root-knot nematode, <i>Meloidogyne incognita</i> - I.J. Paruthi, R.S. Kanwar and D.C. Gupta	--	270
A report on <i>Heterodera spinicauda</i> from India - K.K. Kaushal	--	272
A new species of <i>Tylenchorhynchus</i> found associated with jasmine, <i>Jasminum grandiflorum</i> - Manish Pathak and A.U. Siddiqui	--	274

**EFFECT OF BIO-FERTILIZERS AZOLLA AND AZOSPIRILLUM  
ON ROOT-KNOT NEMATODE, *MELOIDOGYNE INCOGNITA*  
AND PLANT GROWTH OF OKRA \***

S. RAMAKRISHNAN,\*\* C.R. GUNASEKARAN AND SIVAGAMI VADIVELU

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

**Abstract :** Pot culture experiment designed to study the effect of bio-fertilizers, viz. azolla and azospirillum on root-knot nematode, *Meloidogyne incognita* has revealed that okra plants treated with dry azolla (3%) exhibited enhanced growth of shoot length, fresh and dry weight of shoot and root and pod yield. Maximum reduction in number of adult females, egg masses, eggs per egg mass and soil nematode population was recorded in the plants treated with dry azolla (3%). In general all the treatments having bio-fertilizers differed significantly compared to untreated control in reducing root-knot nematode, and increasing plant growth of okra.

**Key words :** Bio-fertilizers, azolla, azospirillum, *Meloidogyne incognita*, okra.

**STUDIES ON THE BIOLOGY OF MERMITHID PARASITE *ROMANOMERMIS MANJEERENSIS* N.SP. FROM *ANOPHELES* SP. LARVAE IN MANJEERA RESERVOIR OF ANDHRA PRADESH**

Y. NARSHI REDDY AND A.V. RAJASHEKHAR,

Department of Zoology, P.G. College of Science, Osmania University, Saifabad, Hyderabad - 4. A.P.

**Abstract :** A new species of mermithid nematode *Romanomermis manjeerensis* parasitizing *Anopheles* sp. mosquito from Manjeera reservoir of Andhra Pradesh has been described and compared with other species of *Romanomermis*. Natural infection by this nematode of mosquitoes in the reservoir was found to be about 17% in the month of October.

**Key words :** *Romanomermis manjeerensis* n.sp., mermithid nematode, *Anopheles* sp., mosquitoes; biological control; *invivo* culture; biology, taxonomy.

## UTILIZATION OF GREEN LEAVES OF NEEM AND EUPATORIUM FOR THE MANAGEMENT OF SOIL ORGANISMS IN BHINDI AND COWPEA

K. AJITH AND M.S. SHEELA

College of Agriculture, Vellayani, Thiruvananthapuram, Kerala- 695522

**Abstract :** Addition of chopped green leaves of neem and eupatorium (15 t/ha) effectively reduced plant parasitic nematodes of bhindi and cowpea and subsequently increased crop yield (94 to 135% in bhindi and 45 to 50% in cowpea during rainy and summer seasons. Also lower dose of neem (7.5 t/ha) suppressed *Helicotylenchus* spp. in bhindi. Biometric characters of plants improved significantly.

**Key words :** Neem, Eupatorium, *Helicotylenchus* spp., *Meloidogyne incognita*, *Rotylenchulus reniformis*.

**EFFECT OF LEAF EXTRACTS ON GROWTH OF BLACKGRAM  
INOCULATED WITH VESICULAR ARBUSCULAR MYCORRHIZA  
(*GLOMUS FASCICULATUM*) AND ROOT-KNOT NEMATODE  
(*MELOIDOGYNE INCOGNITA*)**

C. SANKARANARAYANAN\* AND RAJESWARI SUNDARABABU

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

**Abstract :** The effect of leaf extracts of *Calotropis procera* (CP), *Tagetes erecta* (TE), *Catharanthus rosea* (CR), and *Bougainvillea spectabilis* (BS) and nematicides carbofuran 3G and phorate 10G on *Glomus fasciculatum* (GF) and *Meloidogyne incognita* (MI), infecting blackgram (*Vigna mungo* cv Co5) was investigated under pot culture studies. In general, there was significant increase in all the growth parameters due to the addition of leaf extracts compared to the VAM and nematode combination. VAM effect was significantly superior to other treatments. The chemical treatment along with VAM and nematode produced significantly lesser biomass compared to leaf extracts, and VAM + nematode treatments. Leaf extracts recorded higher spore population and mycorrhizal colonization than chemicals. The chemical treatments recorded less gall index and nematode population than leaf extracts.

**Key words :** Leaf extracts, nematicides, *Glomus fasciculatum*, *Meloidogyne incognita* interaction, *Vigna mungo*.

## **NEMATICIDAL ACTIVITY OF SOME PLANT EXTRACTS**

M.V. CHANDRAVADANA, EUGENE SEBASTIAN, J. NIDIRY, N.K. LELLA\*,  
P. PARVATHA REDDY, R.M. KHAN\*\* AND M. S. RAO

Indian Institute of Horticultural Research, Hassaraghatta Lake P.O., Bangalore - 560 0089

**Abstract :** Twenty-one extracts obtained from twelve plants were screened for nematicidal activity against the root-knot nematode, *Meloidogyne incognita*. The methanol extracts of *Catharanthus roseus* roots and defatted onion seeds and the essential oil of *Pelargonium graveolens* showed significantly high activity. The methanol extracts of *Gloriosa superba* seeds also showed moderate activity. The chemical nature of the active fractions and their possible use in agriculture are discussed.

**Key words :** Nematicidal activity, plant extracts, *Meloidogyne incognita*, *Catharanthus roseus*, *Gloriosa superba*, *Pelargonium graveolens*, onion seeds.

**BIOCHEMICAL EVALUATION OF VARIOUS METABOLITES AS  
INFLUENCED BY ROOT-KNOT NEMATODE IN *ABELMOSCHUS  
ESCULENTUS***

WIDHI SHARMA AND P.C. TRIVEDI

Department of Botany, University of Rajasthan, Jaipur - 302 004. Rajasthan.

**Abstract :** Biochemical alterations brought about in *Abelmoschus esculentus* as a result of root-knot infection was estimated in roots uprooted after 30, 60 and 90 days of *Meloidogyne incognita* inoculation. Quantitative analysis for different metabolites in both highly susceptible (Pusa Sawani) and less susceptible (Punjab-7) cultivars showed reducing sugars, proteins, total free amino acids, proline, phenols, ascorbic acid, enzymes, nitrogen and sodium excepting total sugars, non reducing sugars, phosphorus, and potassium to be increasing in diseased roots of both the okra cultivars over their healthy counter parts.

**Key words :** Biochemical, *Meloidogyne incognita*, *Abelmoschus esculentus*, susceptible, metabolites.

**FIVE NEW SPECIES UNDER SUB-FAMILY LONGIDORINAE (NEMATODA)  
ASSOCIATED WITH FRUIT CROPS FROM NORTH AND  
NORTH-EASTERN INDIA, WITH COMMENTS ON  
THE GENUS *NEOLONGIDORUS* KHAN, 1986**

M. SINGH AND E. KHAN

Division of Nematology, Indian Agricultural Research Institute, New Delhi - 110 0012

**Abstract :** Taxonomic studies on soil and plant parasitic nematodes around the rhizosphere of fruit crops from north and north-eastern states of India yielded five new species of genera under sub-family Longidorinae viz., *Longidorus concavus*, *L. socialis*, *L. conicephalatus*; *Longidoroides lobus* and *Neolongidorus doonensis* are diagnosed and discussed. *L. concavus* sp.n. is characterized by having moderate body size, narrow elevated, rounded lip region, small asymmetrical amphid; equally developed female gonads with long ovaries; convex conoid rounded tail with two pairs of caudal pores. *L. socialis* sp.n. is distinctive by having strongly ventral arcuate body with continuous conoid truncate head; pouch like elongate amphid tail three anal body width long with four pairs of caudal pores. *L. conicephalatus* sp.n. in characterized by having ventrally curved body; asymmetrical bilobed amphid with slit-like aperture, tail convex conoid with subacute rounded terminus. *Longidoroides lobus* sp.n. is distinctive by having continuous conoid-rounded head; symmetrically bilobed amphidial pouch with slit-like aperture, presence of dorsal and ventral body pores, Hypodermal glands well developed and dorsally convex, almost hemispherical tail. *Neolongidorus doonensis* sp.n. is characterized by having conoid-rounded head, asymmetrical bilobed amphidia' pouch with slit-rounded head, more posteriorly located spear guiding ring; tail short with thick cuticle. The synonymy of the genus *Neolongidorus* Khan, 1986 with *Longidorus* by Jianhua Xu & D.J. Hooper, 1990 is not accepted.

**Key words :** *Longidorus cocavus*, *L. socialis*, *L. conicephalatus*, *Longidoroides lobus*, *Neolongidorus doonensis*

## POTENTIAL OF TWO NEMATOPHAGOUS MITES IN SUPPRESSING ROOT-KNOT NEMATODE, *MELOIDOGYNE JAVANICA* ON OKRA

KUM KUM WALIA AND SUDHA MATHUR\*

Department of Nematology, CCS Harayana Agricultural University, Hisar - 125 004

**Abstract :** In pot experiments, the nematophagous mites, *Tyrophagus putrescentiae* and *Hypoaspis calcuttaensis* (@ 5, 10 and 15 mites per kg soil) reduced the root galling by *Meloidogyne javanica* (@ 1000 juveniles per kg soil) on okra. The final soil population of nematode was also reduced significantly. However, *T. putrescentiae* failed to multiply in pot soil but managed to survive only. On the other hand, *H. calcuttaensis* multiplied very well -from an initial level of 15 mites per kg soil, its number increased to 115 by the end of the experiment (45 days).

**Key words :** Biological control, predation, root-knot nematode, okra

## **PHYSIOLOGICAL CHANGES WITH REFERENCE TO BIVALENT CATIONS AND OTHER MINERALS ON SUSCEPTIBLE AND RESISTANT CULTIVARS OF TOMATO DUE TO *MELOIDOGYNE INCOGNITA* INFECTION**

J. ARTHUR JACOB\*, M.M. HAQUE AND D.R. DASGUPTA

Division of Nematology, Indian Agricultural Research Institute, N. Delhi - 110012.

**Abstract :** The plant samples (shoot and root) of tomato resistant (Mangla) and susceptible (Pusa ruby) were processed after inoculations with *Meloidogyne incognita* and the concentrations of bivalent cations and other minerals were estimated. The percentage increase in the concentrations of calcium and magnesium, sodium, manganese and iron over check in the roots of susceptible and resistant plant was found to be 11.76 and 17.24, 8.51 and 33.33, 25.0 and 27.77, 6.14 and 9.15, 20.0 and 1.5 respectively. In shoots of resistant cultivar, the concentration of calcium increased slightly (3%) where as 13.76% decrease was recorded in susceptible cultivar after the inoculation of *M. incognita*. It was also found that copper, zinc, manganese and phosphorus were more in the roots of resistant cultivar but in shoot copper was high.

**Key words :** *Meloidogyne incognita*. Physiological changes, Bivalent cations, minerals, susceptible and resistant cultivars, Tomato.

## **SUSCEPTIBILITY OF THE COCKROACH *PERIPLANETA AMERICANA* TO *STEINERNEMA CARPOCAPSAE*: HISTOPATHOLOGICAL CHANGES IN THE COCKROACH MIDGUT**

NOOPUR MATHUR, S. KHERA, SANTOSH GANDHI AND RENU GUPTA

Department of Zoology, Panjab University, Chandigarh - 160 014

**Abstract :** Laboratory assessment of the virulence of *Steinernema carpocapsae* to cockroach, *Periplaneta americana*, using filter paper exposure method at 25°C, revealed that at dosage levels of 5000 infective juveniles per insect caused 70 and 50 percent mortality in males and females respectively. LD 50 values were 3467.78 and 4986.05 for male and female cockroaches respectively. Histopathological changes due to movement and penetration of nematode larvae in host midgut showed increase vacuolization and disintegration of columnar cells. Destruction of cytoplasm followed by degeneration of nuclei was also noticed.

**Key words :** midgut, *Periplaneta americana*, *Steinernema carpocapsae*, Histopathological changes.

## PARASITISM OF *HETERODERA CAJANI* BY *FUSARIUM SOLANI* AND OTHER SOIL FUNGI

MOHINDER SINGH, SHASHI B. SHARMA AND RENU SHARMA<sup>1</sup>

International Crops Research Institute for the Semi-Arid Tropics (ICRISAT),  
Patancheru, Andhra Pradesh 502 324.

**Abstract :** *Heterodera cajani* is an important nematode pest of pigeonpea (*Cajanus cajan* (L.) Millsp.) in India. Forty-one *H. cajani* infested pigeonpea fields and *H. cajani* cultures maintained on pigeonpea at the ICRISAT Asia Center, Andhra Pradesh, were examined for presence of natural parasites of the nematode. The fungi *Cephalosporium* spp., *Fusarium solani*, *Fusarium* spp., *Glomus* spp., and gram positive bacterium, *Pasteuria penetrans* were found in cysts. *Fusarium solani* was the most commonly occurring fungus in eggs of *H. cajani*. On water agar, *F. solani* infected 70% of eggs in egg sacs. The numbers of eggs were reduced by 45-60% in presence of the fungus in greenhouse tests. Growth of pigeonpea cultivar ICPL 87 in *H. cajani* infested soil was improved by the presence of *F. solani*. The nematode reproduced in greater numbers in infested soil treated with 0.2% benomyl than in soil naturally infested with the nematode and the fungus but not treated with benomyl. The *F. solani* isolates recovered from *H. cajani* did not infect pigeonpea plants and were effective in suppressing *H. cajani* under natural conditions.

**Key words :** Biological control, cyst nematode, egg parasite, pigeonpea, soil fungi.

## **NEMATODES OF FRUIT PLANTS IN MANIPUR – FIVE NEW SPECIES OF TYLENCHIDS (NEMATODA: TYLENCHIDA)**

R.K. GAMBHIR AND CH. DHANACHAND

Department of Life Sciences, Manipur University, Canchipur- 795 003 Imphal, Manipur

**Abstract :** A survey of plant parasitic nematodes associated with common fruit plants in Manipur from 1984-89, yielded a large number of species of Tylenchids. Among them five are new species and named as *Boleodorus (Neobasiria) punici n.sp.*, *Neopsilenchus prasadi n.sp.*, *Discocriconemella cephalobus n.sp.*, *Caloosia shorai n.sp.* and *Hemicaloosia psidii n.sp.* collected from around roots of Pomegranate, Nectarine, *Rhus semialata*, Gooseberry and Guava respectively.

**Key words :** Taxonomy, Tylenchids, new species, *Boleodorus*, *Neopsilenchus*, *Discocriconemella*, *Caloosia*, *Hemicaloosia*, fruit plants.

## **GROWTH EFFICIENCY IN WHEAT AGAINST *HETERODERA AVENAE***

UMARAO AND GOPAL SWARUP

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

**Abstract :** *Heterodera avenae* affected both the trend of growth components and plant morphology of the wheat. A drastic reduction of dry weight of shoot and root was more prominent at anthesis compared to earlier stages but the reduction of leaf area and rate of leaf area expansion was more before anthesis. There was no effect on the plant morphology. A linear relationship was observed between the absorbed incident radiation and dry matter produced or growth efficiency at different nematode inoculum levels.

**Key words :** *Heterodera avenae*, wheat, growth parameters, growth efficiency.

## **SUPPRESSION OF *HETERODERA CAJANI* BY *PASTEURIA PENETRANS* DURING THREE SUCCESSIVE PLANTINGS OF COWPEA**

BANSA SINGH\* AND S.C. DHAWAN

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

**Abstract :** Studies were undertaken to ascertain the extent of suppression of *Heterodera cajani* by *Pasteuria penetrans* during three successive plantings of cowpea. Number of cysts and juveniles ( $J_2$ ) decreased significantly in treatments receiving combined inoculations of *H. cajani* and *P. penetrans* compared to the treatment receiving *H. cajani* alone at the harvest of each planting with maximum reduction being 60.5 and 87.2% in cyst and  $J_2$  populations respectively. Cyst infection increased from 6% at the harvest of first planting to 50% at the harvest of third planting. Average number of eggs per cyst also decreased significantly at the harvest of each planting in the presence of *P. penetrans* than without it. All the plant growth characters, except root length, increased significantly at the harvest of second planting in treatments receiving *H. cajani* and *P. penetrans* together than *H. cajani* alone. The damage caused by *H. cajani* was completely offset by *P. penetrans* at the harvest of third planting and the growth was at par with control (without *H. cajani* and *P. penetrans*)

**Key words :** *Heterodera cajani*, *Pasteuria penetrans*, cowpea, different plantings, nematode suppression, biological control.

**AN INTEGRATED APPROACH FOR MANAGEMENT OF RICE STEM  
NEMATODE, *DITYLENCHUS ANGUSTUS* IN DEEP  
WATER RICE IN ASSAM**

P. DAS

Regional Agricultural Research Station, Assam Agricultural University, North Lakhimpur- 787 001

**Abstract:** A field experiment was carried out during 1993 and 1994 at Regional Agricultural Research Station, North Lakhimpur, Assam in a plot ( 3 x 5m) where ufra disease was a problem. Altogether ten treatments combining both cultural and chemical methods of control were used. The results revealed that lowest infestation was observed in treatments with two spraying with carbosulfan 40EC @ 0.2 per cent (43.79%) followed by two spraying with triazophos 4OEC @ 0.2 per cent (56.73%) as compared to untreated control (80.77%). Significant increase in grain yield was also observed in these treatments.

**Key words:** rice stem nematode, *Ditylenchus angustus*, ufra, deep water rice, control.

**SEASONAL VARIATION IN THE HORIZONTAL SPATIAL PATTERN OF THE  
ROOT-KNOT NEMATODE, *MELOIDOGYNE INCOGNITA* AND APPLICATION  
OF THE NEGATIVE BINOMIAL AND TAYLOR'S POWER LAW MODELS IN  
DEVELOPING SAMPLING SCHEMES**

JAGWANT SINGH AND H.S. GAUR

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

**Abstract:** The horizontal spatial pattern of *Meloidogyne incognita* in an brinjal field was highly aggregated and could usually be described by the negative binomial distribution model. The spatial pattern was affected by the growth and cultural practices. It tended to become more random as the crop matured but reverted back to scattered patches following post-harvest ploughing in summer. The parameters of the negative binomial as well as of the Taylor's power law models were not solely species specific but also varied with the increase in sampled area and the season. The mean population density and the degree of aggregation determined the desired sampling intensity for precise estimates. The least number of cores was required about a fortnight before the final harvest. Sampling after dividing the field into a grid could give more precise estimates of the mean population density than the random sampling of the entire field.

**Key words:** *Meloidogyne incognita*, distribution, sampling, population dynamics, brinjal, seasonal variation.