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Role of Manures and Fertilizers in the Management of the Root Nematode (*Hirschmanniella oryzae*) in Rice (*Oryza sativa* L.)

J.S. PRASAD, R. MAHENDER KUMAR AND L.V. SUBBA RAO

Directorate of Rice Research, Rajendranagar, Hyderabad-500 030
E-mail: jsprasad24@yahoo.com

ABSTRACT : Influence of some of the commonly used organic and inorganic sources of manures and fertilizers on rice root nematode, *Hirschmanniella oryzae* was studied under field conditions. Application of fresh leaves of *Azadirachta indica*, *Sesbania aculeata*, water hyacinth or water hyacinth compost at the rate of 60 kg N/ha were found useful for managing this nematode and increasing grain yields. However, the leaves of *A. indica* or *S. aculeata* when applied to the soil at the rate of 10 kg N/ha in combination with inorganic fertilizers had no effect on the nematode population.

Key words: *Hirschmanniella oryzae*, rice, fertilizers, organic and inorganic manures.

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Screening of Banana Hybrids (4X) against *Pratylenchus coffeae* under Field Conditions

V. KRISHNAMOORTHY AND N. KUMAR

*Department of Fruit Crops, Horticultural College and Research Institute, Tamil Nadu Agricultural University,
Coimbatore - 641 003, Tamil Nadu*

ABSTRACT : Eighteen new synthetic tetraploid banana hybrids and five parental banana clones were screened against the lesion nematode, *Pratylenchus coffeae* under field conditions, during 2000-2002. Sixteen hybrids were found to have less root and corm lesion index than the susceptible clones Redbanana and Robusta. The lowest nematode population and multiplication rate was recorded in H-02-29 followed by H-02-26, H-02-34 and Pisang Lilin among the parents. H-02-18 (25.80 µg/g) H-02-17 (24.41 µg/g) and H-02-25 (24.00 µg/g) recorded higher content of chlorogenic acid, H-02-30 (641.23 µg/g) and H-02-18 (976 units/min/g fresh weight) recorded higher content of bound phenol and phenylalanine ammonia lyase activity respectively.

Key words: Lesion index, biochemical, enzyme, *Pratylenchus coffeae*, banana

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Control of Root-lesion Nematode, *Pratylenchus coffeae* in certain Cultivars of Banana using different Chemicals

P. SUNDARARAJU

Crop Protection Laboratory, National Research Centre for Banana (ICAR), Tiruchirapalli - 620 102, Tamil Nadu

ABSTRACT : An experiment was conducted in the field heavily infested with root-lesion nematode on three commercial cultivars of banana viz., Karpuravalli (ABB), Monthan (ABB) and Nendran (AAB) by using two nematicides viz., Monocrotophos and Carbofuran in different doses at different period of application along with the recommended practice of paring and pralinage of the suckers. Both the chemicals were found to be effective in reducing the nematode population and subsequently increase the plant growth and yield when compared to untreated control. The treatment combination of sucker dip with mud slurry and sprinkle with carbofuran @ 50 g/sucker followed by two applications after planting at 3 monthly intervals was found to be very effective in reducing the nematode population and significantly increased the yield.

Key words: Banana, root-lesion nematode, *Pratylenchus coffeae*, carbofuran, monocrotophos.

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Role of Reniform Nematode, *Rotylenchulus reniformis* in the Incidence of Root Rot, *Rhizoctonia bataticola* on Cotton*

R.R. PATEL, B.A. PATEL AND N.A. THAKAR

Department of Nematology, Gujarat Agricultural University, Anand Campus, Anand - 388 110

ABSTRACT: Interaction study between the *Rotylenchulus reniformis* and *Rhizoctonia bataticola* (virulent and avirulent strains) revealed that avirulent strain of *R. bataticola* and the virulent one were equally effective in causing seedling root-rot of cotton in presence of *R. reniformis*. In virulent strain of fungus *R. bataticola*, the disease set one week earlier in different combinations of nematode and the fungus than fungus alone. Among the different combinations, nematode inoculated 15 days prior to fungus inoculation (N-F) proved highly detrimental, causing cent per cent root rot with both the strains of fungus followed by simultaneous (FN) and fungus inoculated 15 days prior to nematode (F-N).

Key words: Reniform nematode, *Rotylenchulus reniformis*, *Rhizoctonia bataticola*, cotton

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Evaluation of VAM for Management of Root-Knot Nematode in Brinjal

ASHA JOHN AND HEBSY BAI

Department of Entomology, College of Agriculture, Vellayani, Thiruvananthapuram - 695 522

ABSTRACT : Different isolates of VAM fungi like *Glomus fasciculatum*, *G. etunicatum*, *G. mosseae*, *G. constrictum*, *G. monosporum* and *A. morrowae* were evaluated for their efficacy in controlling root-knot nematode infestation in brinjal. These cultures did not show any significant difference in growth parameters (height and number of leaves) at transplanting and one month after transplanting. Later, (45 and 60 days after transplanting) significant increase in height and number of leaves were observed in plants raised in soil inoculated with *G. etunicatum* and *G. fasciculatum*. Higher percentage of VA mycorrhizal colonisation was observed in plants artificially inoculated with VAM. Plants raised in *G. etunicatum*, *G. fasciculatum* and *G. monosporum* recorded significantly lower root-knot indices. The fecundity of the nematode was also significantly reduced in mycorrhizae treated plants. *G. fasciculatum* registered the lowest population per gram root while *G. fasciculatum* and *G. constrictum* significantly lowered the nematode population in the soil.

Key words: Vesicular Arbuscular Mycorrhizae, root-knot nematode, brinjal.

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Race Specific Biochemical Responses in Differential Hosts against the Root-Knot Nematode, *Meloidogyne incognita*

S.C. SWAIN, A.K. GANGULY AND UMARAO

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

ABSTRACT : Investigations on sequential development of phenylalanine ammonia lyase (PAL), polyphenol oxidase (PPO), phenol and lignin-like polymers, were undertaken in differential host plants (cotton cv. Deltapine-16 and tobacco cv. NC-95) along with susceptible hosts (cotton cv. H-777 and tobacco cv. FCV-Special) after inoculation with different host races of *Meloidogyne incognita*. All the races induced a faster and early accumulation of these defense parameters upon inoculation to host differentials than their healthy controls, whereas race-inoculated susceptible tobacco cv. FCV Special and cotton cv. H-777 showed a gradual and delayed accumulation in their defense reactions, but the per cent increase over their uninoculated controls, was of less magnitude than that observed in host differentials at different time intervals. Further, gel electrophoretic study showed *de novo* appearance of isozyme only in race-inoculated host differentials. It was evident that virulent and avirulent races were able to induce defense mechanisms with different speed in host differentials. On the basis of interactions observed between races and host differentials at 7 DAI, a biochemical model has been hypothesized for differentiating the four races of *M. incognita* with respect to phenylalanine ammonia lyase activity.

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Key words: Phenol, phenylalanine ammonia lyase, lignin, polyphenol oxidase, *Meloidogyne incognita*, races, biochemical model

Isozyme Patterns of *Heterodera avenae* and *H. filipjevi* Populations of India

S.P. BISHNOI¹, SHASHI SINGH, SATISH MEHTA AND HARISH K. BAJAJ

Department of Nematology, CCS HAU, Hisar - 125 004

¹Agricultural Research Station, Durgapura, Jaipur- 302020

ABSTRACT : Isozyme patterns of catalase (CAT), b-esterase (EST) and malate dehydrogenase (MDH) of white females of three populations of *Heterodera filipjevi* (pathotype Hf 31 and Hf 41) and five populations of *H. avenae* (pathotype ha 21) were studied using polyacrylamide gel electrophoresis. The two species could easily be differentiated on the basis of single band position of malate dehydrogenase that was at Rf 0.34 for *H. filipjevi* as compared to Rf 0.40 for *H. avenae*. Isozyme profiles of catalase and esterase, however, were not found useful for the separation of two species. A single band of catalase with Rf value of 0.26 was present in all the tested populations. Number of b-esterase bands were either three or two in these populations of cereal cyst nematode.

Key words: Isozyme patterns, enzymes, *Heterodera avenae*, *Heterodera filipjevi*.

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Effect of Aqueous Leaf Extracts of Botanicals on Egg Hatching and Larval Penetration of *Meloidogyne incognita* in Banana*

A.D.PATEL,D.J.PATEL AND N.B.PATEL

Department of Nematology, B.A. College of Agriculture, Gujarat Agricultural University, Anand Campus, Anand-388 110

ABSTRACT : A Study on effect of various aqueous leaf extracts on egg hatching and subsequent larval penetration of *Meloidogyne incognita* in banana cv. Basrai roots, indicated that aqueous leaf extracts of argemone (*Argemone maxicana*, L.) and lantana (*Lantana camera*, L.) and neem seed kernel suspension NSKS (*Azadirachta indica* Juss.) proved to be the most effective in almost complete inhibition of nematode egg hatching at 48, 96 and 144 hrs, indicating ovicidal effect. Ipomea (*Ipomoea fistulosa*) and castor (*Ricinus communis*) leaf extracts were the least effective. There was no larval penetration from egg masses previously treated with argemone and lantana leaf extracts and NSKS treatment. Significantly more nematode larval penetration was recorded from egg masses treated with castor and Ipomea leaf extracts, indicating their ovistatic effect.

Key words: Botanicals, leaf extracts, egg hatching, larval penetration, *Meloidogyne incognita*, banana

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Effect of Different Plant Products on the Hatching of *Meloidogyne incognita* Eggs

B. SARAVANAPRIYA, M. SIVAKUMAR, G. RAJENDRAN AND S. KUTTALAM

Department of Nematology, Tamil Nadu Agricultural University, Coimbatore -3, Tamil Nadu.

ABSTRACT : The nematicidal properties of fifteen plant products viz., leaves of *Albizzia amara*, *Aristolochia bractiata*, *Tagetes erecta*, *T. patula*, *Origanum majorana*, *Azadirachta indica*, *Butea monosperma* and *Calotropis gigantea*, roots of *Acorus calamus*, bulbs of *Allium sativum*, seeds of *Citrullus lanatus*, *Areca catechu* and *Anona reticulata*, latex of *C. gigantea* and *Carica papaya* were screened against root-knot nematode, *Meloidogyne incognita* for egg hatch. The seed extract of *Areca catechu* recorded the highest inhibition rate at 0.1% concentration. Latex of *Carica papaya* caused 98.22 and cent per cent inhibition of hatching at 1.0 and 10.0% concentrations respectively. Latex of *C. gigantea* also caused cent per cent inhibition at 10.0% concentration.

Key words: *Meloidogyne incognita*, egg hatching, plant products.

Biological Control of Plant Parasitic Nematodes associated with Chickpea using Oil Cakes and *Paecilomyces lilacinus*

SARTAJA. TIYAGI AND SHAMIM AJAZ

Section of Plant Pathology and Nematology, Department of Botany, Aligarh Muslim University, Aligarh-202 002, India

ABSTRACT : The addition of organic matter to soil has been explored as an alternative means of nematode control. Oil-seed cakes of neem (*Azadirachta indica*), castor (*Ricinus communis*), groundnut (*Arachis hypogaea*), linseed (*Linum usitatissimum*), sunflower (*Helianthus annuus*) and soybean (*Glycine max*) were found to be highly effective in reducing the multiplication of soil nematodes and subsequently plant growth increased significantly. The multiplication rate of nematodes was less in the presence of *Paecilomyces lilacinus* as compared to the absence of *P. lilacinus*. Damage caused by the nematodes was further reduced when *P. lilacinus* was added along with oil-seed cakes. Most effective combination of *P. lilacinus* was with neem cake, under field conditions.

Key words: Oil-seed cakes, chickpea, nematode management, biological control, *Paecilomyces lilacinus*, nematode population, plant growth.

Biocontrol Agents for the Management of Disease Complex involving Root-Knot Nematode, *Meloidogyne incognita* and *Fusarium moniliforme* on Grapevine (*Vitis vinifera*)

T.SENTHILKUMAR AND G. RAJENDRAN

Department of Nematology, Tamil Nadu Agricultural University, Coimbatore-3, Tamil Nadu, India

ABSTRACT : Field trials were conducted for the management of disease complex involving *Meloidogyne incognita* and *Fusarium moniliforme*, on grapevine cv. Muscat Hamburg. The vines were treated with commercial formulations of biocontrol agents viz., *Pseudomonas fluorescens* (100 g/vine) and *Trichoderma viride* (100 g/vine) alone and in combination at half dosage, along with farmyard manure (20 kg/vine) and carbofuran 3G (60 g/vine). All the treatments significantly reduced the final soil nematode population and wilt disease incidence. The highest reduction in final soil nematode population (56.9%), least root gall index (1.8) and least wilt disease incidence (24.8%) were observed in FYM (20 kg) + *P. fluorescens* (100 g/vine) treated vines. The bunch weight of grapevine increased by 155.4% in FYM (20 kg) + *P. fluorescens* (100 g/vine) treated vines compared to untreated control.

Key words: Grapevine, disease complex, *Meloidogyne incognita*, *Fusarium moniliforme*, biocontrol, *Pseudomonas fluorescens*, *Trichoderma viride*.

Evaluation of Diploid Banana Hybrids against Burrowing Nematode, *Radopholus Similis*

V. KRISHNAMOORTHY, N. KUMAR AND K. POORNIMA

*Department of Fruit Crops, Horticultural College and Research Institute, Tamil Nadu Agricultural University,
Coimbatore-641 003, Tamil Nadu, India*

ABSTRACT : A field study was conducted to know the reaction of fifteen new diploid banana hybrids against burrowing nematode, *Radopholus similis*. Three hybrids namely, H-02-08, H-02-09 and H-02-10 recorded the lowest root and corm lesion index followed by H-02-14 and H-02-15 and Pisang Lilin. The nematode population in the soil and root of these hybrids were minimum. H-02-10 among the hybrids and Pisang Lilin recorded higher amount of total phenol (711.38 and 1622.10 µg/g respectively) and ortho-dihydric phenol (34.10 and 133.60 µg/g respectively) and polyphenol oxidase activity (971.51 units/min/g fresh weight) in roots.

Key words: Diploid, hybrids, banana, burrowing nematode, *Radopholus similis*.

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Prevalence of Phytophagous Nematodes in Rhizosphere of Okra (*Abelmoschus esculentus* L. Moench) in Parbhani District, Maharashtra, India

B.B. BHOSLE, MUKESH SEHGAL¹, S.N. PURI² AND SUVASISH DAS³

Cotton Research Station, Degloor Road, Nanded-431604, Maharashtra

¹National Centre for Integrated Pest Management, New Delhi-110012; ²MPKV, Rahuri, Maharashtra;

³School of Environment Management, GGS Indraprastha University, Delhi

ABSTRACT : A survey was conducted in Parbhani district to know the prevalence of plant parasitic nematodes in okra field. Six phytophagous nematodes viz. *Meloidogyne incognita*, *Rotylenchulus reniformis*, *Helicotylenchus* sp., *Tylenchorhynchus* sp., *Hoplolaimus indicus* and *Aphelenchus avenae* were encountered in rhizosphere of okra on farmer's fields of Parbhani District. The *Meloidogyne incognita* was found to be the most predominant nematode species and which might be associated with stunted growth, yellowing of leaves and temporary wilting in okra.

Key words: *Meloidogyne incognita*, okra, phytophagous nematodes.

Effect of Urea Coated with Neem Formulations on Root-knot and Reniform Nematodes in Okra

V. MOJUMDER, PANKAJ, GAUTAM CHAWLA AND JAGWANT SINGH

Division of Nematology, Indian Agricultural Research Institute, New Delhi - 110 012
vmojumder@rediffmail.com

ABSTRACT : The investigations were carried out to know the effect of three commercially available neem-based formulations viz. Nimin[®], U-Coat[®] and Modified-neem-oil[®] as urea coatings (@ 500 g/50kg urea) on the root-knot (*Meloidogyne incognita*) and reniform (*Rotylenchulus reniformis*) nematodes in okra. Two glasshouse experiments and a field trial were conducted in three successive years. Application of recommended doses of urea coated with Nimin[®] and U-Coat[®] significantly reduced root-knot index as well as soil population of *M. incognita* and *R. reniformis* and increased plant growth parameters. In field trial, all the three treatments reduced the root-knot index (3.0-3.6 compared to 4.8 in check), soil populations of root-knot (17-23%) and reniform (14-25%) nematodes compared to the check, and increased the yield/plot. Nimin[®] and U-Coat[®] urea treatments were *at par* and effective while increase with Modified-neem-oil[®] was not significantly different from the check.

Key words: Nimin[®], U-coat[®], Modified-neem-oil[®], okra, *Meloidogyne incognita*, *Rotylenchulus reniformis*.

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Role of Cuticular Surface Carbohydrates of J2 Larvae of *Anguina tritici* in Specific Recognition of the Host

PARVEEN AND S.P. AHUJA

Department of Biochemistry, Punjab Agricultural University, Ludhiana-141004

ABSTRACT: Different extracts of J2 larvae of *Anguina tritici* were analyzed to understand the mechanism of location and recognition of the host seedlings. Glycoproteins extracted by dimethylsulfoxide were maximally glycosylated and might represent the surface coat glycoproteins of second stage juvenile (J2) whereas those extracted by sodium dodecylsulfate and deoxycholate (DOC) might be deeply embedded in the cuticle. Surface carbohydrates of J2 with wheat germ agglutinin (WGA), concanavalin A (Con A) and antisera to blood group substances showed the presence of sialic acid, N-acetyl glucosamine. The SDS as well as DOC extractable cuticular proteins showed the absence of galactose and N-acetylgalactosamine. It is indicated that J2 of *A. tritici* lack the ability to glycosylate their proteins with galactose and N-acetyl galactosamine, but they utilize the cuticular sialic acid and N-acetylglucosamine for locating the host containing WGA.

Key Words: *Anguina tritici*, host recognition, lectins, carbohydrates, cuticle.

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Control of Citrus Nematode, *Tylenchulus semipenetrans* in Nagpur Mandarin Orchard

BANSA SINGH*

National Research Centre for Citrus, Amaravati Road, Nagpur-440010

E-mail: bs@iipr.up.nic.in

ABSTRACT: A field trial for the control of the citrus nematode, *Tylenchulus semipenetrans* in a ten year old Nagpur mandarin orchard on rough lemon rootstock showed that the application of carbofuran 3G and phorate 10G, each at 1, 3 and 5kg a.i/ha reduced the nematode (*Tylenchulus semipenetrans*) populations in soil and on roots significantly within one month of nematicide application. The repeated application of the nematicides after one year kept the nematode populations significantly lower as compared to non-repeated and check treatments. Increase in canopy volume was also significant in treatments where carbofuran and phorate were applied at 5kg a.i/ha during first year and in repeated treatments during second year. In second year, the fruit yield was increased by 32.4 and 29.7% over check in the repeated treatments where carbofuran and phorate were applied each at 5 kg a.i./ha.

Key Words: Citrus nematode, Control, *Citrus reticulata*, Nagpur mandarin, *Tylenchulus semipenetrans*

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Response of Chickpea Varieties/lines Against Reniform Nematode *Rotylenchulus reniformis*

MOHD. SHAIKHUL ASHRAF AND TABREIZ AHMAD KHAN

Section of Plant Pathology and Nematology, Department of Botany, Aligarh Muslim University, Aligarh – 202002

ABSTRACT: A pot experiment was conducted to evaluate fifty six chickpea (*Cicer arietinum*) varieties against their reaction to reniform nematode (*Rotylenchulus reniformis*). Out of fifty six varieties, only 3 varieties (BG- 1086, KPG-59 and Pusa-372) were found resistant and 4 varieties (BG-1072, BG-1108, ICC-88506 and Pusa-1003) as moderately resistant to *R. reniformis*. Six varieties viz. BG-276, BG-1100, BG10863, BGD-112, BGD-117 and CIYTSL-2 showed tolerant response to *R. reniformis*. Nineteen varieties (BG-376, BG-1032, BG-1087, BG-1095, BGD-72, BGD-98, BGD-1104, Biogreen, C-235, CSG-9505, EC-442507, GPF-2, ICC- 88503, ICCV-5, L-550, Pusa-212, RSG-143, RTY-411, and SAKI-9303) were found susceptible, while the remaining varieties showed highly susceptible reaction to *R. reniformis*.

Key words: Resistant, susceptible, tolerant, *Rotylenchulus reniformis*, chickpea.

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Life Cycle of *Meloidogyne graminicola* on Paddy and its Host Range Studies

K.R. DABUR, A.S. TAYA* AND HARISH K. BAJAJ

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

ABSTRACT: Screening of eight crops of Kharif season and three of Rabi season against a Haryana population of *Meloidogyne graminicola* revealed that rice, sorghum, pearl millet, wheat and oats, were good hosts of this nematode. Brinjal, tomato, okra, green gram and barley did not support the multiplication of this nematode. Few galls but with egg masses were formed on *Sesbania* and the use of this crop in the management of rice root-knot nematode management has been discussed. *Cyperus rotundus*, *C. iria*, *Dicanthium annulatum*, *Echinocloa colonum*, *E. crusgalli*, *Eclipta alba*, *Melilotus alba* and *Trigonella polycerate* were found to be very good hosts of this nematode. *M. graminicola* completed its life cycle in 24 days in the months of July-August.

Key Words: Rice root-nematode, rice, sorghum, Pearl millet, wheat, oats, weed, *Sesbania*, trap crop.

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