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Indian J. Nematol. **24** (1) : 1-6 (1994)

VARIATION IN DAMAGE-YIELD RELATIONS ARISING OUT OF *GLOBODERA* SPECIES INFESTATION ON POTATO*

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Abstract : The demage-yield relations caused by varying P is of two separate *Globodera* species were studied using a susceptible and a resistant potato cultivars. The comparison was on the proportionate yield-basis at two locations under the Southern hills conditions of India.

The study indicated that the external symptoms of damage to plants and the influence of density-dependent factors were evident only in susceptible clone. *G. pallida* damaged potato more than *G. rostochiensis*. The host resistance proportionately reduced the nematode damage and using a damage model it was explained. The tolerance values of the two nematode species were found to change according to host sensitivity and location. *G. pallida* had low values of tolerance while *G. rostochiensis* had higher values of tolerance.

Key words : *Globodera pallida, G. rostochiensis,* potato, yield.

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Indian J. Nematol. **24** (1) : 7-15 (1994)

DEVELOPMENTAL BIOLOGY OF A PREDATORY SOIL NEMATODE, *MYLONCHULUS MINOR*

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Abstract : *Mylonchulus minor* reproduced parthenogenetically with no males in the population. The eggs laid were ovoid, smooth-shelled and always in single-celled condition. The two blastomeres formed after first cleavage divided simultaneously and gave rise to four-celled condition. The embryo moved for the first time during "tadpole" stage. Hatching occurred as a result of rupture of the shell which became thin and flexible due to the pressure exerted by the juvenile. The gonad developed from two small genital primordia placed obliquely, on each side of intestine, in the first stage juvenile. The germinal nuclei of primordium remained undivided until third moult after which their number increased. The juvenile stages could be diferentiated more precisely on the basis of primordial development as other morphometric and allometric ratios showed high degree of overlap subsequent to second stage.

Key words : Embryonic, post-embryonic development, nematode, *Mylonchulus minor*.

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Indian J. Nematol. **24** (1) : 16-25 (1994)

NEMATODES, SOIL MICROORGANISMS IN RELATION TO PHYTOPHTHORA WILT DISEASE IN BETELVINE

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Abstract : Wilt disease of betelvine (*Phytophthora capsici*) is of great economic importance in Guntur district of Andhra Pradesh, as it causes 100 per cent wilting of plants in 2-3 months in diseased gardens. Soil samples collected at 9 days interval from apparently healthy as well as wilt diseased gardens were used for estimation of plant parasitic, saprozoic nematodes and also for total fungi, bacteria and actinomycetes population, in order to find out any relationship with the wilt disease incidence. The results revealed that as the soil microflora (total fungi, total bacteria and total actinomycetes) increased, the per cent change in wilt disease incidence also increased. The population of root-knot nematode *Meloidogyne incognita* were positively correlated with per cent change in wilt disease incidence in diseased garden. The saprozoic nematode, *Tylenchus* spp. was negatively correlated with per cent chage in wilt disease incidence in healthy garden.

Key words : Betelvine wilt disease, *Phytophthora capsici*, Plant parasitic nematodes, total fungi, total bacteria, total actinomycetes, relationship to wilt disease.

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Indian J. Nematol. **24** (1) : 26-30 (1994)

EFFECT OF SEED DRESSING ALONE AND IN COMBINATION WITH FOLIAR SPRAYING OF NEMATICIDE FOR THE CONTROL OF ROOT KNOT NEMATODE, *MELOIDOGYNE INCOGNITA* ON GREEN GRAM

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Abstract : A green house experiment was conducted during Kharif, 1991 at Department of Nematology, Assam Agricultural University, Jorhat, Assam to evaluate a management schedule of root-knot nematode, *Meloidogyne incongita* on green gram with seed dressing alone and in combination with foliar spraying with nematicides. Seed dressing with carbosulfan 25 STD @ 3 per cent (w/w) followed by either single or double spray with carbosulfan 25 EC or triazophos 40 EC @ 0.1 per cent were found to be most effective management schedule in reducing the infestation of root-knot nematode in terms of reducing the number of galls (61.23 - 63.59 per cent), egg masses (71.89 - 75.11 per cent) and final nematode population (63.43 - 67.10 per cent) and increased the plant growth characters and number of pods per plant (128.00 - 156.00 per cent) in comparison to untreated control.

Key words : Root-knot nematode, *Meloidogyne incognita*, kharif, biotic, root nodule, bacteria

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Indian J. Nematol. **24** (1) : 31-37 (1994)

PATHOGENICITY OF *MELOIDOGYNE INCOGNITA* ON SMALL CARDAMOM, *ELETTARIA CARDAMOMUM* MATON

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Abstract : The relationships between a logarithmic series of five initial densities (Pi) of *Meloidogyne incognita* (0 to 400 nematodes/100 cm^3 soil) and growth as well as yield of a susceptible accession of small cardamom (*Elettaria cardamomum*) were investigated through a long term study. Maximum growth suppression and yield loss (46.1%) were noticed at Pi=4 nematodes/100 cm^3 soil followed by Pi=0.4/100 cm^3 soil. The earliest visible damage due to nematode infestation was noticed as reduction in number of tillers, observed six months after inoculation. However, stunting and narrowing of leaves were also observed at the fag end of the trial. No significant difference was observed in the final nematode densities in roots of cardamom plants of different Pi s. The nematode population stabilised after the initial temporal changes as a result of the self-regulatory, density dependent processes with time. Damage caused at the early part of the growth phase of cardamom plants was critical to the final yield and crop stand.

Key words : Root-knot nematode, *Elettaria cardamomum* pathogenicity, yield loss

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Indian J. Nematol. **24** (1) : 38-44 (1994)

INCIDENCE AND INTENSITY OF ROOT-KNOT AND IDENTITY OF SPECIES/RACES ASSOCIATED WITH VEGETABLE CROPS IN SOME DISTRICTS OF UTTAR PRADESH, INDIA.

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Abstract : A survey was conducted in 9 districts of Agra and Bareilly divisions of Uttar Pradesh to determine incidence and intensity of root-knot disease and indentity of species and races of root-knot nematodes associated with vegetable crops. About 50% of the vegetable fields examined were found to be infested with root-knot nematodes. Incidence of the disease in the root samples was also about 50%. Eggplant and cucumber were most affected crops followed by tomato, pepper and okra. Root gall index/egg mass index ranged from 2-5/1-5. *Meloidogyne incognita, M. javanica and M. arenaria* were the species present in the area. *M. javanica* was most frequent followed by *M. incognita* and *M. arenaria*. The species were encountered both in single or mixed populations. Of the 4 races of *M. incognita* detected in *M. incognita* populations of the area, race 2 was most frequent followed by race 1, race 4 and race 3. Race 2 alone comprised the *M. arenaria* populations of the area.

Key words : Vegetables, root-knot nematodes, incidence, intensity, identity, species, races.

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Indian J. Nematol. **24** (1) : 45-49 (1994)

CROP-INDUCED BIO-ECOLOGICAL VARIATIONS IN *ROTYLENCHULUS RENIFORMIS*

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Abstract : The effect of nine different crops (okra var. Pusa Sawani, bottle gourd var. Pusa Summer Prolific Long, chilli var. Pusa Jwala, cotton var. H-777, cowpea var. Pusa Komal, maize var. Ganga-5, soybean var. Pusa-24 and castor) on the various bio-ecological features of single egg-mass progeny of *Rotylenchulus reniformis* was studied. Population development, sex-ratio and fecundity of this nematode varied greatly from crop to crop. The maximum increase in population was recorded on bottle-gourd (12.6 times) followed by castor and okra while the decline in population was observed on chilli, cotton and maize. Most of the good host crops shifted the initial male-female ratio of 1:2 towards the higher number of females ie. 1:5.1 to 1:6.9, whereas the reverse trend was observed on poor host crops. Fecundity was maximum (112 eggs/egg-mass) on bottle gourd and minimum on cotton (19 eggs/egg-mass). The studies indicated large crop-induced intra-specific bio-ecological variability in *R. reniformis*.

Key words : Bio-ecological variations, *Rotylenchulus reniformis*, crop-induced

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Indian J. Nematol. **24** (1) : 50-53 (1994)

EFFECT OF THE FUNGUS, *PAECILOMYCES LILACINUS* ON THE BURROWING NEMATODE, *RADOPHOLUS SIMILIS* INFESTING BETEL VINE

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Abstract : The effect of the fungus, *Paecilomyces lilacinus* on multiplication of the burrowing nematode, *Radopholus similis* infesting betel vine was studied. *R. similis* alone (100/plant) caused maximum damage to plant growth and recorded maximum multiplication of nematodes. *P. lilacinus* reduced the damaging effect of *R. similis* on inoculation. Simultaneous inoculation of both the organisms or inoculation of the fungus 25 days after nematode inoculation were not effective in reducing the damage.

Key words: ***Radopholus similis, Paecilomyces lilacinus, betel vine, damage***

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Indian J. Nematol. **24** (1) : 54-61 (1994)

EFFECT OF FENVALERATE, TRIAZOPHOS AND FMC 54800 ON PENETRATION AND REPRODUCTION OF *MELOIDOGYNE INCOGNITA*

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Abstract : Three chemicals Triazophos, Fenvalerate and FMC 54800 were evaluated for their effect on the penetration and reproduction of 2nd stage juveniles (J2) of *Meloidogyne incognita* on cowpea (*Vigna unguiculata*). The chemicals adversely affected the penetration of J2 into the roots of cowpea seedlings when either the larvae or egg masses were chemically treated. Triazophos showed least penetration followed by FMC 54800 and Fenvalerate. Apart from reduced penetration further development of host galls and egg masses was also considerably less in the Triazophos treated J2 as compared to the check and the other chemicals tested.

Key words: Triazophos, Fenvalerate, FMC 54800, penetration, reproduction, *Meloidogyne incognita*.

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Indian J. Nematol. **24** (1) : 62-68 (1994)

ONE NEW AND TWO KNOWN SPECIES OF THE FAMILY TYLENCHIDAE

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Abstract : *Psilenchus curcumerus* n.sp. is described and illustrated. It is characterized by a smooth lip region, dorsal oesophageal gland orifice near spear base, four inscisures, presence of post-rectal sac and intestine with fasciculi like structures. *Filenchus sandneri* and *Malenchus undulatus* are being reported for the first time from India.

Key words : Taxonomy, *Psilenchus curcumerus* n. sp., *Filenchus sandneri* and *Malenchus undulatus*.

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Indian J. Nematol. **24** (1) : 69-79 (1994)

ACARINE FAUNA OF ARABLE SOILS AND THEIR SCREENING FOR NEMATOPHAGY

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Abstract : A qualitative and quantitative survey of CCS Haryana Agriculutral University farm for soil acarine and nematode fauna associated with different crops revealed that overall, cryptostigmatid mites were the most frequent and abundant, followed by mesostigmatids, prostigmatids and astigmatids. The relative densities of cryptostigmatids and mesostigmatids were almost similar with annual and perennial crops. Soil mites occurred more frequently in the upper soil layer (0 -5 cm) as compared to the deeper layer (15 - 30 cm), however, in terms of abundance, Prostigmata was more in upper layer and Mesostigmata in deeper layer, while Crytostigmata and Astigmata were equally abundant in the two soil layers. No qualitative correlation between soil acarines and coinhabiting plant parasitic nematodes was evident.

Out of the total 37 acarine genera screened for nematophagy *in vitro,* most of the mesostigmatids (12 out of 14 genera) were observed to feed and survive on nematodes. Only four species viz., *Hypoaspis calcuttaensis, Lasioseius* sp. (Mesostigmata), *Tyrophagus putrescentiae and Caloglyphus* sp. (Astigmata) multiplied on nematodes. None of the 13 genera of cryptostigmatid and 8 of prostigmatid mites was found feeding or reproducing on nematodes. Uropodids (Mesostigmata) neither survived nor reproduced on nematodes.

Key words : Nematophagous mites, predation, biocontrol agents

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PEROXIDASE (E.C.1.11. 1.7) ACTIVITY IN RESISTANT AND SUSCEPTIBLE BARLEY CULTIVARS INFECTED WITH CEREAL CYST NEMATODE, *HETERODERA AVENAE*

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Abstract : The changes in peroxidase activity in the shoots and roots of three barley cultivars, DL 482 (susceptible), RD 2052 and C 164 (resistant) were determined after 30 days of inoculation with *Heterodera avenae*. Irrespective of the type of cultivars, peroxidase activity in both shoots and roots increased with *H. avenae* infection compared to respective checks. Further, out of the two resistant cultivars, the peroxidase activity was found to be greater in RD. 2052 with *H. avenae* infection.

Key words : Barley, *Heterodera avenae*, resistance, peroxidases.

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Indian J. Nematol. **24** (1) : 83-87 (1994)

DESCRIPTIONS OF *ISCHIODORYLAIMUS PARAUGANDANUS* SP. N. AND *TYLENCHOLAIMUS ASYMMETRICHUS* SP. N. (NEMATODA: DORYLAIMIDA) FROM INDIA

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Abstract: Two new species of dorylaim nematodes, one each belonging to the superfamilies Dorylaimoidea and Tylencholaimoidea are described and illustrated. *Ischiodorylaimus paraugandanus* sp. n. has 4.91 mm long body; a=37; b=5.0; c=15; V=41; odontostyle = 54μm; odontophore = 60μm; and is closely related to *I. ugandanus* Andrassy & Banage in Andrassy, 1969. *Tylencholaimus asymmetricus* sp. n. has 0.56-0.66 mm long body; a=25-27; b=3.4-4.0; c=38-39; V=69-72; odontostyle= 6-6.8μm; odontophore = 6-7μm and is closely related to *T. nanus* Thorne, 1939 and *T. chathami* Yeates, 1979.

Key words: *Ischiodorylaimus paraugandanus* sp. n.; *Tylencholaimus asymmetricus* sp. n.; Dorylaimida, soil nematode, description.

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Indian J. Nematol. **24** (1) : 88-92 (1994)

VARIATION IN PATHOGENICITY OF *MELOIDOGYNE INCOGNITA* ON CHICKPEA AT DIFFERENT INOCULUM DENSITIES*

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Abstract: Survey conducted in different chickpea growing areas of Karnataka indicated the occurrence of root-knot nematode with a variation in population levels among the districts, with a mean inoculum level of 0.12 larvae per g soil under field conditions. An inoculum level of 2 larvae per g soil was found as optimum damaging threshold level on cultivar Annegiri-1 under green house conditions. Increase in the level of larval inoculum resulted in proportional decrease in plant growth and an increase on root-knot disease on chickpea.

Key words: Pathogenicity, *Meloidogyne incognita*, chickpea

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Indian J. Nematol. **24** (1) : 93-99 (1994)

DYNAMICS OF CONCOMITANT POPULATIONS OF *TYLENCHORHYNCHUS MASHHOODI* AND *HOPLOLAIMUS INDICUS* IN SUGARCANE FIELDS UNDER CROP SEQUENCES AND PESTICIDE APPLICATION

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Abstract: Population dynamics of *Tylenchorhynchus mashhoodi* and *Hoplolaimus indicus* from six fields having sugarcane in rotation and monoculture was studied. *T. mashhoodi* was the dominant species in all the fields except two, one containing jute and the other sugarcane in rotation where *H. indicus* was numerically dominant. In general, monoculture supported more numbers than rotations. All the crops under study promoted nematode multiplication except seasame and garlic which depressed it. Two peaks of both the species were observed, one during May and the other in October under sugarcane. Nematode population fluctuations were influenced by crop growth, rainfall and temperature. Under the remaining crops, population showed only one peak which synchronized with the late growth stage of the host. Correlation coefficient calculated between nematode numbers and yield of sugarcane revealed a significant negative relationship. Corm powder of wild arum (*Typhonium trilobatum*) exerted its nematicidal effect in bringing down population significantly.

Key words: Population dynamics, plant product, nematode control, population density and crop yield.

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