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EFFECTS OF COMBINATIONS OF HOST GENETIC VARIABILITY, NEMATICIDES, RAINFALL AND SPECIES INTERACTIONS ON NEMATODE COMMUNITY ASSOCIATED WITH LIMA BEANS

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Abstract : Post-plant treatments with carbofuran and aldicarb at 2.5 kg a.i./ha significantly increased seed yields of lima bean cv. Davis White, but miral and oxamyl treatments were not significantly different from control. Nematicidal efficacy on concomitant populations of *Helicotylenchus microcephalus*, *Meloidogyne javanica* and *Pratylenchus sefaensis*, likewise species interactions and response to rainfall, differed on cv. Taiwan Acc. 1066 to cv. Davis White, respectively susceptible and resistant to *M. javanica*. Miral and aldicarb were in order most effective in the control of *H. microcephalus* and *M. javanica* on either cultivars. Against *P. sefaensis*, miral and oxamyl gave the best control on Taiwan Acc. 1066 and Davis White, respectively. A cultivar resistance varied with species within a field nematode community, though resistant to two contemporary species, it positively reacted to another. Miral and aldicarb caused alterations in species interactions of *H. microcephalus*, *M. javanica* and *P. sefaensis*, but carbofuran was passive. *H. microcephalus* was more influenced by rainfall than *M. javanica* on *P. sefaensis*. Treatment with nematicides increased/decreased nematode response to rainfall depending upon either nematicide or cultivar used. Nematode community structure was imbalanced in relation to interactions of the cultivar genetic variability, nematicide selectivity, competing species and rainfall to the advantage/disadvantage of a nematode species in a given field situation. This is believed to be the first report of *H. microcephalus* on lima beans.

Key words : *Helicotylenchus microcephalus*, *Meloidogyne javanica*, *Pratylenchus sefaensis*, Lima bean Cultivars, Taiwan and Davis white, rainfall, nematicides, interactom.

**SECTONEMA ANISONCHUM SP. N., S. MUCRODENS SP. N. AND S. TRUXUM
SP. N. (NEMATODA : DORYLAIMIDA) FROM COLOMBIAN RAIN FOREST**

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Sectonema anisonchum n. sp., *S. mucrodens* n. sp., and *S. truxum* n. sp. from a Colombian rain forest near Araracuara, are described. *S. anisonchum* (♀ L=3.98-4.2 mm; ♂=4-5 mm; V=54-58; spicules=84-96 µm) comes close to *S. basilgoodeyi* but differs from it in having a more tapering tail and an odontostyle having the dorsal arm about 1½ times as long as the ventral arm. *S. mucrodens* (♀ L=3.15-3.24 mm; V=52-53.5) is recognized by its continuous lip region and odontostyle having a solid deltoid mucronate tip and its posterior third being parallel-sided. *S. truxum* n. sp. is similar to *S. mucrodens* but has a differently shaped odontostyle and tail. *S. macbethi* Heyns, 1965 was also found near Araracuara, Colombia.

Key words : *Sectonema anisonchum* sp. n., *S. mucrodens* sp. n., *S. truxum* sp. n.

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DESCRIPTION OF TWO NEW AND A KNOWN SPECIES OF THE GENUS
TYLENCHUS (NEMATODA : TYLENCHINAE) FROM INDIA

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Abstract : Two new species of *Tylenchus* are described from India. *T. rohtangus* sp. n. is characterized in having longer body, equatorial medium oesophageal bulb, simple tubular rectum and pointed tail terminus. *T. hayati* sp. n. is distinguished in having anteriorly located vulva, differently shaped head. *T. arcuatus* Siddiqi, 1963 from Simla is also described hereunder.

Key words : *Tylenchus rohtangus* sp. n., *T. hayati* sp. n.

RELATIONSHIP BETWEEN INITIAL INOCULUM LEVELS OF *HETERODERA AVENAE* AND PENETRATION OF JUVENILES IN THE ROOTS OF SUSCEPTIBLE AND RESISTANT BARLEY CULTIVARS

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Abstract : The influence of cultivars and different inoculum levels on penetration by larvae and their development has been investigated. A marked difference was recorded in the penetration percentage of larvae between susceptible and resistant cultivars at the first two inoculum levels (100 and 1000). However, at the higher inoculum level (10,000) there did not seem to be any difference in the reaction of both the susceptible as well as the resistant cultivars.

Key words : *Heterodera avenae*, penetration of larvae, resistant and susceptible barley cultivar.

MORPHOLOGY AND MORPHOMETRICS OF *PRATYLENCHUS*
BRACHYURUS AND *P. ZEA* IV. VARIATION IN LARVAL STAGES AND
SINGLE FEMALE PROGENIES

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Abstract : The morphometrics of larval stages and the effect of age were evaluated on *Pratylenchus brachyurus* and *P. zae*. There was no dimensional overlap and an increase of temperature from 25°C to 30°C did not significantly change the morphometrics of larval stages and eggs. *P. zae* from the same inoculum source and host varied widely in size and old females were much larger with distinctly longer stylet than younger ones.

Key words : *Pratylenchus brachyurus*, *P. zae*, morphology, morphometrics from single female progenies.

***EVAGINORHABDITIS AGARICUS* GEN. N., SP. N. (RHABDITIDA :
RHABDITINAE) FROM MUSHROOM COMPOST, PUNJAB, INDIA**

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Abstract : *Evaginothabditis agaricus*, the type genus and a new species are described and illustrated. It is characterized in having a canal-like structure running along the entire body, four smooth lips, a simple V-shaped stoma, a cardia and a very prominent vulval swelling comprising of two different evaginations, a club-like vaginal and a collar-like, cuticular in origin.

Key words : *Evaginothabditis agaricus*, gen. n, sp., Mushroom compost

EFFECT OF FUNGAL FILTRATES OF *ASPERGILLUS NIGER* AND
RHIZOCTONIA SOLANI ON PENETRATION AND DEVELOPMENT OF
ROOT-KNOT NEMATODES AND THE PLANT GROWTH OF TOMATO VAR.
MARGLOBE

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Abstract : Root dip treatment with culture filtrates of *Aspergillus niger* and *Rhizoctonia solani* moderately improved plant growth, reduced larval penetration, suppressed nematode reproduction and gall formation on tomato roots. Culture filtrate of *A. niger* was distinctly more effective than *R. solani*. This may be attributed to the differences in number and nature of metabolites produced by the different fungi. Root dip treatment of tomato seedlings with *A. niger* filtrate for 30 minutes reduced the final larval population in soil to $1/2$ of the initial population. This explains the toxic effect of the fungal metabolite.

Key words : *Aspergillus niger*, *Rhizoctonia solani*, Root knot nematode, filtrate

RELATIONSHIP OF INITIAL POPULATIONS OF *HETERODERA ZEA* WITH PLANT GROWTH OF MAIZE AND NEMATODE REPRODUCTION¹

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Abstract : Pathogenicity tests with *Heterodera zea* on two cultivars of maize, namely, composite Shakti and hybrid Histarch, revealed that an initial inoculum of 100 larvae and above per kg of soil for Pusa (Bihar) population and 1000 larvae for Udaipur population significantly reduced various plant growth characters in comparison to uninoculated check plants. These inoculum levels are being considered as the minimum damaging threshold. The host infestation and nematode multiplication were density dependent with maximum cyst production and nematode reproduction occurring at 1000 inoculum level.

Key words : *Heterodera zea*, pathogenicity, damaging threshold, *Zea mays*.

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THREE NEW SPECIES OF HOPLOLAIMINAE (HOPLOLAIMIDAE :
NEMATODA) WITH NEW REPORT OF *SCUTELLONEMA UNUM* SHER, 1963
FROM TUNISIA

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Descriptions of three new species, one belonging to genus *Hoplolaimus* Daday, 1905 and other two to *Basirolaimus* Shamsi, 1979, are given. The authors also take the opportunity to include the record of *Scutellonema unum* Sher, 1963, apparently a new report from Tunisia.

Key words : *Hoplolaimus*, *Basirolaimus*, *Scutellonema*

ESTIMATION OF LOSS IN MUSHROOM YIELD DUE TO MYCELIOPHAGUS
NEMATODE, *APHELENCHOIDES SACCHARI*

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Abstract : Three experiments with different methods of nematode inocula, applied at spawning and casing time, were conducted for evaluation of yield losses in sporophores of *Agaricus bisporus* due to *Aphelenchoides sacchari*. The nematode caused 50-100% yield losses. The trends in mushroom yields in nematode infested and uninfested compost are discussed.

Key words : *Aphelenchoides sacchari*, *Agaricus bisporus*

EFFECT OF FOLIAR APPLICATION OF SYSTEMIC PESTICIDES ON THE DEVELOPMENT OF *MELOIDOGYNE GRAMINICOLA* IN RICE

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Abstract : The growth and development of *Meloidogyne graminicola* in rice roots was studied following foliar sprays of oxamyl, carbofuran, phorate and chlorpyrifos at 125, 250, 500 and 1000 ppm, 10 days after larval inoculations to rice cultivar "IR-8". Oxamyl was superior in reducing the number of endoparasites followed by phorate. In treated plants there was delayed development of the nematode. Males increased in higher doses of oxamyl and carbofuran. The studies indicate that oxamyl, phorate or carbofuran can be effectively used as foliar sprays at 500 to 1000 ppm in the therapy of rice root-knot nematode.

Key words : Foliar application Systemic pesticides, *Meloidogyne graminicola*, rice

DEVELOPMENT OF *HETERODERA AVENAE* IN SUSCEPTIBLE AND
RESISTANT BARLEY CULTIVARS IN RELATION TO LARVAL
INOCULUM AND PENETRATION

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Abstract : Inoculum level influenced the rate of development, both in resistant and susceptible cultivars. More larvae penetrated and developed at higher level compared to lower one but when per cent development was taken, reverse was found to be true. The sex ratio changed from 2.9 : 1.0 (female : male) at 100 level to 1.9 : 1.8 at 10,000. There was a trend towards maleness at higher inoculum levels.

Key words : *Heterodera avenae*, development in susceptible and resistant barley cultivars

INFLUENCE OF ROOT-KNOT NEMATODE, *MELOIDOGYNE JAVANICA* ON PRE-AND POST-EMERGENCE DAMPING-OFF OF TOMATO

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Abstract : Root-knot nematode increased the extent of damage by pre-and post-emergence phases of damping-off caused initially by any of the three test fungi. Association of *Fusarium*+*Rhizoctonia* with or without nematode produced low percentage and long duration of damping-off, low root-knot index and low recovery of nematode population. Nematode+*Rhizoctonia*, in addition to causing high percentage of damping-off and root-knot index, also affected maximum reduction in shoot length and high nematode count of the soil. Mechanical wounding of roots, devoid of nematode, in the presence of any of the damping-off fungi exhibited low percentage of damping-off, minimum reduction in plant height and their fresh weight in comparison to the treatments where nematode replaced mechanical wounding.

Key words : *Meloidogyne javanica*, *Fusarium*, *Rhizoctonia*, damping-off, tomato

NEW DESCRIPTIONS OF THE GENUS *ROTYLENCHUS* FILIPJEV, 1936
(TYLENCHIDA : HOPLOLAIMIDAE)

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Abstract : Three new species of *Rotylenchus* Filipjev, 1936 from high altitudes of India are described and illustrated. *R. satsilanicus* n.sp. is characterized by body 25-27 μm long, orifice of dorsal oesophageal gland at 1/3 of spear length, phasmids at pre-anal level and tail equal to one anal-body diameter with 7-12 annules. *R. jagatpurensis* n.sp. is characterized by body 0.62-0.84 mm long, 3-4 lip annules which is truncate, spear 24-28 μm long, orifice of dorsal oesophageal gland at 1/3 of spear length, phasmids at post-anal level and tail more than one anal-body diameter long, marked with 13-18 annules. *R. lobatus* n.sp. is characterized by body 0.55-0.62 mm long, 5-6 lip annules, spear 25-29 μm long, orifice of dorsal oesophageal gland at more than 1/3 of spear length, phasmids at pre-anal level and tail equal to one anal-body diameter, marked with 7-9 annules.

Key words : *Rotylenchus satsilanicus* sp.n. *R. jagatpurensis*, sp.n., *R. lobatus* sp.n.

RELATIONSHIP BETWEEN INITIAL DENSITIES OF *ROTYLENCHULUS*
RENIFORMIS AND DAMAGE TO COTTON WITH A FIT TO
SEINHORST'S CURVES

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Abstract : Inoculation of logarithmic series of *Rotylenchulus reniformis* to cotton, under green house conditions, revealed significant growth reduction beyond 100 young females per 1000 cc of soil, 30 days after inoculation. After 60 days, growth reduction was significant even at 10 young females per 1000 cc of soil. The threshold level for damage was 1000 young females per 1000 cc of soil. A computer programme based on algorithm given by Ferris *et al.* (1981) has been developed for fitting Seinhorst curves. The tolerance levels for shoot weight, root weight and leaf area were respectively 16.2 and 18 nematodes per 200 cc of soil at 60 days.

Key word : *Rotylenchulus reniformis*, cotton, seinhorst curves

OBSERVATIONS ON THE MORPHOLOGY OF ADULTS AND JUVENILES OF
XIPHINEMA AMERICANUM COBB, 1913

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Abstract : Observations on the morphology of adults and juveniles of *Xiphinema americanum* are based on the study of a very large number of specimens collected from the campus of Aligarh Muslim University, Aligarh, during different periods of the year. Both sexes occur though males are extremely rare and their role in reproduction is doubtful. The four juvenile stages can easily be distinguished from each other as well as from the adults on the basis of their body length, size of functional and replacement odontostyle, size of genital primordia etc.

Key words : *Xiphinema americanum*, morphology

PERSISTENCE OF ALDICARB SULFONE RESIDUES IN COWPEA AND SOIL FOLLOWING FOLIAR APPLICATION AND ITS NEMATICIDAL ACTIVITY

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Abstract : Persistence and nematicidal activity of aldicarb sulfone 75 per cent W.P., applied as foliar spray on cowpea at the rate of 1.25 and 2.5 kg a.i./ha, were evaluated under field conditions. Aldicarb sulfone was found to be translocated basipetally from foliage to roots in enough quantities to provide some protection against the major root infesting nematodes viz, *Meloidogyne incognita*, *Rotylenchulus reniformis*, *Hoplolaimus indicus*, *Helicotylenchus delhiensis* and *Tylenchorhynchus vulgaris*. The residues persisted upto 60 days in shoot and 30 days in root. The residues were also translocated into the green pods and were detected in all the pickings upto 90 days of application. The residues in the pods varied between 0.016 and 0.035 ppm depending upon the time lapse and rate of application.

Key words : Aldicarb sulfone, persistence, nematicidal activity, *Vigna unguiculata*, *Meloidogyne incognita*, *Rotylenchulus reniformis*, *Hoplolaimus indicus*, *Helicotylenchus delhiensis*, *Tylenchorhynchus vulgaris*.

THE ROLE OF KINETIN ON THE BIOLOGY OF ROOT-KNOT NEMATODE, *MELOIDOGYNE INCOGNITA*

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Abstract : The influence of exogenous application of kinetin and diaminopurine on the penetration and subsequent development of the root-knot nematode, *Meloidogyne incognita* were studied in susceptible (Pusa Ruby) and resistant reacting (SL-120) cultivars of tomatoes. Alterations in the level of kinetin, through foliar application, induced susceptible reaction in resistant reacting variety, as judged on the basis of development of egg laying females, fecundity and number of root galls. Furthermore, exogenous application of kinetin resulted in the establishment of feeding sites required for the development of the females. Exogenous application of diaminopurine, known inhibitor of kinetin, led to the resistant responses to *M. incognita* in a susceptible tomato cultivar. Interference in the utilization of kinetin affected the development of the nematode. Apparently, kinetin had profound influence on the successful development of feeding sites required for the further development of infective larvae into gravid females. Bioassay studies for estimation of cytokinin indicate that the level of endogenous cytokinin is more in Pusa Ruby than SL-120 and resistant as well as susceptible varieties show higher level of cytokinin during post-infection period.

Key words : Kinetin, *Meloidogyne incognita*, biology, diaminopurine

THE RESPONSES OF *MONONCHUS AQUATICUS* TO CHEMICALS AND pH

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Abstract : Different concentrations of salts and furadan 3-G and pH gradients were used to determine their effects on the activity of the predatory nematode, *Mononchus aquaticus*. Except urea, the higher concentrations (0.06M) of all the other salts proved highly toxic and except for cupric sulfate and ammonia, the lower concentrations (0.001M) had stimulating effect. Furadan 3-G proved very toxic, even at low concentration, suppressing activity much below control. pH 5.8 proved optimal for nematode activity. The effectiveness of salts, with some exceptions, was directly proportional to their molecular weight.

Key words : *Mononchus aquaticus*, responses, effect of salt concentration.

HISTOLOGICAL ASPECTS OF *PSEUDOMONAS* AND ROOT-KNOT NEMATODE WILT COMPLEX IN BRINJAL*

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Abstract : Histological studies of brinjal roots inoculated with *Meloidogyne javanica*, two or three weeks before *Pseudomonas solanacearum* biotype-3 inoculation showed extensive cavities of broken cortical and endodermal cells. The nematode inoculated roots contained pronounced hyperplastic and hypertrophic regions characterised by 'giant cells' with dense cytoplasm and enlarged nuclei. The cellular changes (hypertrophy and hyperplasia) resulted in syncytial formation. Development in the nematode inoculated roots predisposed the bacterial invasion and colonization.

Key words : *Meloidogyne javanica*, *Pseudomonas solanacearum*, wilt complex, Brinjal,
Cellular changes