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RAPD analysis distinguishes four races of root-knot nematode, *Meloidogyne incognita*

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ABSTRACT : Eight populations of *Meloidogyne incognita*, from different locations, were collected and categorized into four different races on the basis of International host differentials. Total genomic DNA was isolated from the juveniles of the four races. By applying a set of 34,10-mer primers, RAPD-PCR analysis was performed on total genomic DNA to access the extent of genetic variation and establish the genetic relationships among the races. Based on RAPD profiling, the four races of *M. incognita* could be distinguished from each other. Cluster analysis, using UPGMA, demonstrated that race-1 was considerably different from other races and race-2 was closer to race-3 than to race-4. However, more extensive analysis including large number of populations representing different races may prove to be useful for identifying race specific diagnostic markers.

Key Words: *Meloidogyne incognita*, Races, RAPD, Cluster analysis, DNA.

Evaluation of chemicals as bare root-dip against rice root nematode, *Hirschmanniella oryzae*

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ABSTRACT : A field experiment was conducted in a naturally infested field with rice root nematode, *Hirschmanniella oryzae* using different chemicals as bare root-dip for 6 hrs. Altogether five chemicals viz., carbosulfan 25EC, triazophos 40EC, quinalphos 25EC, dimethoate 30EC and phosphamidon 36WSC with 0.2 and 0.3 per cent concentration each effective in reducing the nematode population as well as increasing plant growth and yield. Carbosulfan 25EC@ 0.3 percent was the best treatment followed by phosphamidon at the same rate where 35.1 and 34.7 q/ha grain yield as well as 48.7, 46.2 and 40.8, 40.00 per cent reduction in final soil and root population of rice root nematode were respectively recorded over untreated control.

Key words: Bare root dip, rice root nematode, *Hirschmanniella oryzae*, nematicides.

Pathogenicity and varietal reaction of blackgram against *Meloidogyne incognita* and *Fusarium oxysporum*

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ABSTRACT: Significant growth reduction of blackgram cv. T-9 was recorded at an initial inoculum level of 1000 J₂ of *Meloidogyne incognita* per kg soil which was the damaging threshold level. The rate of nematode reproduction was maximum at the lowest inoculum density and vice versa. Similarly, the damaging threshold level of *Fusarium oxysporum* was recorded at the initial inoculum level of 4 g mycelial mat/kg soil. Out of 62 germplasms/cultivars of blackgram, screened against mixed inoculation of *M. incognita* and *F. oxysporum*, none was recorded resistant. Four varieties viz., DPU-88-2, WBU-104, DPU-88-5 and NDU-88-9 exhibited moderate resistance.

Key words: *Meloidogyne incognita*, *Fusarium oxysporum*, Blackgram, pathogenicity, Resistance.

Nutritional status and biochemical alterations in cowpea roots infected by reniform nematode, *Rotylenchulus reniformis*

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ABSTRACT: The nutritional status and biochemical changes in cowpea cv. Pusa Komal inoculated with reniform nematode, *Rotyleuchulus reniformis* were investigated. Among various amino acids detected, ten were common in both healthy and infected plants; and four: L-glutamine, L- serine, L- proline and L- phenylalanine were present only in infestd cowpea. The results indicated elevated levels of various amino acids and amides in diseased tissues than in the healthy ones, except L-methionine. An increased percentage of total sugar, crude protein, nitrogen, potassium, calcium and magnesium content was observed in inoculated samples. The contents of chlorophyll-a, chlorophyll-b, total chlorophyll, phosphorus, sulphur and micro-nutrients viz. Cu, Zn, Mn, Fe, B and Mo were lower in diseased samples in comparison to healthy counterparts.

Key words: *Rotylenchulus reniformis*, cowpea, biochemical changes, nutrients.

Estimation of avoidable yield losses in maize (*Zea mays* L.) varieties due to stunt nematode infection in field*

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ABSTRACT: *Tylenchorhynchus vulgaris* is a serious pest of maize (*Zea mays* L.) in Gujrat. Application of Carbofuran @ 2 kg/ha significantly increased plant height, fresh shoot and root weights, Quantum root index, cob length, 1,000 grain weight, grain strover and straw yields in the tested cultivars, Farm Sameri (FS) and Gujarat Maize 1 (GMI). In both FS and GMI, carbofuran treatments significantly increased grain yield and 1,000 grain weight over control. Moisture %, ash%, fat, starch, protein, tryptophan and lysine were not much influenced by carbofuran treatment.

Key words: Carbofuran, maize, *Zea mays*, yield loss, stunt nematode, *Tylenchorhynchus vulgaris*.

Seed coating of chickpea with neem based pesticidal formulations for the management of *Meloidogyne incognita*

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ABSTRACT: Seed treatment of chickpea with neem seed kernel, neem seed coat, ahook, neemark and nimbecidine at 4 dosages were effective in reducing penetration of second-stage juveniles of *Meloidogyne incognita* and nematode multiplication. In general, neem seed kernel, neem seed coat and ahook were more effective than neemark and nimbecidine. Ahook @ 20% w/w showed maximum efficacy in reducing penetration, while neem seed kernel was the most effective in respect of increasing plant growth and reducing nematode infestation.

Key words : Ahook, chickpea, neem seed kernel, neemark, nimbecidine, seed treatment, *Meloidogyne incognita*.

Studies on stress induced proteins and enzyme activity of *Anguina tritici* under anhydrobiotic condition

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ABSTRACT: Exploration of anhydrobiosis associated proteins from anhydrobiotic ear-cockle nematode, *Anguina tritici* revealed that desiccated second stage juvenile (J₂) were having more number of low molecular proteins than that of the fresh J₂ and adult nematodes. The polypeptides with molecular weight of 18,42, 47, 51, 57, 59 and 105K were judged to be the stage-specific proteins, which were found to be lacking either in fresh J₂s or in adult nematodes. The higher molecular protein 105K, was considered to function as reservoir for the amino acid pool. The metabolic activity in desiccated and nematode anhydrobiote was reduced considerably as evident on the basis of lower titre of key enzyme Malate dehydrogenase of TCA cycle. Comparative studies on Non-specific esterase showed increased activity of enzyme in the fresh J₂ compared to desiccated J₂ and adult nematodes.

Key words : *Anguina tritici*, protein, anhydrobiosis, Malate dehydrogenase, Lactate dehydrogenase, Esterase.

Influence of *Meloidogyne incognita* on the fungal and bacterial wilt complex of banana

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ABSTRACT: Banana plants inoculated with *Meloidogyne incognita* and *Fusarium oxysporum* f. sp. *ubense* or *M. incognita* and *Pseudomonas solanacearum* or *M. incognita* alongwith both fungus and bacterium recorded significant increase in banana wilt. Presence of nematode population 10 days prior to fungus/or and bacterium accelerated the wilt disease development to the maximum. Likewise, the adverse effects were noticed in relation to the nematode population when the fungus/bacterium was present prior to nematode followed by simultaneous inoculations. Presence of all the three pathogens together had more deleterious effects on banana plants than when one or two pathogens were inoculated, indicating a positive interaction between all the three pathogens.

Key words: *Meloidogyne incognita*, *Fusarium oxysporum* f. sp. *ubense*; *Pseudomonas solanacearum*, banana, wilt complex.

Effect of phosphatic fertilizers on the interaction of *Glomus mosseae* and *Meloidogyne incognita* on blackgram (*Vigna mungo*)*

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ABSTRACT: A pot culture experiment was conducted to study the effect of different phosphatic fertilizers viz., superphosphate, dicalcium phosphate and rock phosphate on the interaction of vesicular - arbuscular mycorrhiza (*Glomus mosseae*) and root-knot nematode (*Meloidogyne incognita*) on blackgram. The plants treated with phosphatic fertilizers showed significant growth parameters which were on par with those treated with mycorrhiza. Application of phosphatic fertilizers, combined with mycorrhiza, resulted in lesser growth when compared to individual inoculation. The combination of super phosphate, VAM and the nematode recorded higher plant growth, minimum nematode population, higher VAM spore population, colonization and plant phosphorus content than the other two phosphatic forms.

Key words : Phosphatic fertilizers, *Glomus mosseae*, *Meloidogyne incognita*, interaction, *Vigna mungo*.

Taxonomic studies on Criconematoidea (Nematoda : Tylenchida) associated with fruit crops from north and north-eastern regions of India-II. Description of five new species*

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ABSTRACT : Three new species of *Lobocriconema* and two new species of *Hemicycliophora* found around the rhizosphere of fruit crops from North and North-Eastern regions of India are described and illustrated. *Lobocriconema rishikensis* n.sp. has 39-45 body annules; head with two annules and distinct fold in lateral area with distinct breaking of annules having frilled wavy margins, last two body annules with 2-3 spines. *L. bhowaliensis* n.sp. has 36-42 body annules; head with single anteriorly directed annule; body cuticle with trough shaped structures bearing serrations arranged in 10 longitudinal rows. *L. sherpai* n.sp. has 35-40 body annules, single anteriorly directed, saucered head annule with serrated margins forming protuberances in last 13 annules; vulva located at 2-3 body annules from tail terminus. *Hemicycliophora planiannulatum* n.sp. is characterized by having small body with adpressed sheath, two head annules and vulva modified into lip-like structure comprising 1-2 annules only. *H. bilineatus* n.sp. is distinctive in having a moderate body size and high number of annules (350-400), two distinct lines in the lateral field forming a single row of block; vulva opening outside cuticularized tube comprising of modified 10-12 annules.

Key words : Nematoda, Criconematoidea, Taxonomy, *Lobocriconema*; *Hemicycliophora*; new species.

Comparative efficacy of organic amendments and a nematicide on population dynamics of *Tylenchorhynchus brevilineatus*, microbial activity, groundnut pod disease and yield

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ABSTRACT: The efficacy of different organic amendments on the population dynamics of plant parasitic nematodes including *Tylenchorhynchus brevilineatus*, microbial population (total fungi, bacteria, actinomycetes) and the pod disease severity of groundnut was compared with carbofuran. The maximum reduction in *T. brevilineatus* was recorded in sawdust (25 q/ha) supplemented with nitrogen (30 kg/ha), phosphorus (40 kg/ha) and potassium (50 kg/ha), followed by neem cake (10 q/ha), poultry manure (50 q/ha), farm yard manure (100 q/ha), sugar factory pressmud (25 q/ha), groundnut cake (10 q/ha), and castor cake (10 q/ha). *T. brevilineatus* population was correlated positively with the pod disease index. The maximum increase in saprozoic nematode population was recorded with sugar factory pressmud. The total soil microflora was negatively but non-significantly correlated with the per cent disease index. The maximum increase in the fungal and bacterial population was recorded in farm yard manure treatment and the highest in actinomycetes population in sugar factory pressmud.

Key words : Groundnut, Kalahasti malady, management, organic amendments, soil microflora, *Tylenchorhynchus brevilineatus*.

Seasonal fluctuations of a commonly occurring predatory mononch, *Mylonchulus minor* (Nematoda : Mononchida)

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ABSTRACT: Seasonal fluctuations of a predatory nematode *Mylonchulus minor* alongwith prey nematodes were studied at different depths in a vetiver field. Maximum population density of the predator was found at 10-15 cm and minimum at 0-5 cm depth of soil; its population attained annual peak during November-January. More or less same pattern of fluctuations was observed for the prey nematodes. Temperature had a negative effect on the population of *M. minor* at 0-10 cm depth. High populations of the predator were found when mean atmospheric temperature ranged between 22.4-24.3°C. Rainfall did not have any significant effect on fluctuations of *M. minor* population at any depth.

Key words : *Mylonchulus minor*, *Helicotylenchus dihystrera*, *Rotylenchulus reniformis*, temperature, rainfall, population density.

Proteins and enzyme activity of *Meloidogyne incognita* under moisture stress condition

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ABSTRACT: The moisture stressed second stage juvenile (J₂) within brown egg-masses of *Meloidogyne incognita* had six polypeptides with molecular weights of 36, 48, 55, 62, 63 and 67K while in the case of adult and fresh J₂ there were only three and two polypeptides with molecular weights of 36, 55 and 94K and 67K, respectively. The relative concentration were also higher in case of moisture stress J₂ than the fresh J₂ and adult nematodes. The polypeptides with molecular weight of 48, 62 and 63 K recorded from moisture stress J₂ apparently disappeared in fresh J₂ and adult nematodes and were judged to be the moisture stress induced polypeptides. A slow moving new polypeptide with molecular weight of 94K recorded in fresh J₂ as apparently lacking in other two stages. The metabolic activity in moisture stress nematodes was reduced considerably as evident on the basis of lower titre of key enzyme of TCA cycle. Comparative studies on non-specific esterase showed increased activity of enzyme in fresh J₂ as compared to desiccated J₂.

Key words : *Meloidogyne incognita*, Anhydrobiosis, Polypeptides, Enzymes, Electrophoresis.