

RESUMENES DEL PRIMER CONGRESO INTERNACIONAL DE NEMATOLOGIA TROPICOS, LA REUNION XIX DE LA SOCIEDAD BRASILENA DE NEMATOLOGOS Y LA REUNION XXVII DE LA ORGANIZACION DE NEMATOLOGOS DE LOS TROPICOS AMERICANOS.

RESUMOS DO CONGRESSO INTERNACIONAL DE NEMATOLOGIA TROPICAL, XIX CONGRESSO DA SOCIEDADE BRASILEIRA DE NEMATOLOGIA E XXVII CONGRESSO DA ORGANIZAÇÃO DOS NEMATOLOGISTAS DA AMÉRICA TROPICAL.

ABSTRACTS OF THE FIRST INTERNATIONAL CONGRESS OF TROPICAL NEMATOLOGY, AND XIX MEETING OF THE BRAZILIAN SOCIETY OF NEMATOLOGY AND XXVII MEETING OF THE ORGANIZATION OF NEMATOLOGISTS OF TROPICAL AMERICA.

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CONTROL DE NEMATODOS FITOPARASITOS ASOCIADOS AL CULTIVO DE LA FRUTILLA MEDIANTE SOLARIZACION EN LA ZONA CENTRAL DE CHILE [CONTROL OF PLANT PARASITIC NEMATODES ASSOCIATED WITH STRAWBERRY CROPS WITH SOLARIZATION IN THE CENTRAL ZONE OF CHILE]. E. Aballay,* A. Jardel** & J. Montealegre,** **Financiado por P. FONDECYT 1940255-94* y Facultad de Ciencias Agrarias y Forestales, Universidad de Chile, Casilla 1004 Santiago, Chile.**** — En enero de 1995 se inició un ensayo en un terreno destinado al cultivo de frutillas, el cual presentaba una alta población de nematodos fitoparásitos, especialmente del género *Pratylenchus*, además de problemas fungoso en el mismo cultivo. El ensayo tuvo una duración de 40 días, durante los cuales se registró la temperatura a 10, 20 y 30 cm de profundidad. Al término del período se midió el efecto de la solarización sobre la población de nematodos en comparación con CH3Br y un testigo a las mismas profundidades. Se determinó que bajo las condiciones del ensayo el efecto de la solarización no fue consistente, en tanto que el bromuro de metilo fue efectivo hasta los 20 cm.

THE EFFECT OF SELECTED CROPS ON THE POPULATION DYNAMICS OF *MELOIDOGYNE CHITWOODI* AND *PRATYLENCHUS NEGLECTUS* [EFECTO DE CULTIVOS SELECTOS SOBRE LA DINAMICA POBLACIONAL DE *MELOIDOGYNE CHITWOODI* Y *PRATYLENCHUS NEGLECTUS*]. S. L. Al-Rehiyani, S. Hafez & M. Thornton, **University of Idaho, Parma R&E Center, 29603 U of I Lane, Parma ID 83660, U.S.A.** — The host suitability of radish (*Raphanus sativus*), buckwheat (*Fagopyrum esculentum*), sudangrass (*Sorghum vulgare*), horsebean (*Canavalia ensiformis*), velvetbean (*Mucuna deerlingiana*), castor bean (*Ricinus communis*), sesame (*Sesamum indicum*), rapeseed (*Brassica napus*) and mustard (*Sinapis alba*) cultivars to *Meloidogyne chitwoodi* (Mc) race 2 and *Pratylenchus neglectus* (Pn) was evaluated in greenhouse and bucket microplots. Host status was assessed based on the reproductive factor (Rf) obtained by dividing the final soil and root populations of nematodes by the initial population added to the pots or buckets ($Rf = Pf/Pi$). Barley (*Hordeum vulgare*) and tomato (*Lycopersicon esculentum*) were included as hosts susceptible to Mc and corn (*Zea mays*) as a host susceptible to Pn. Mc successfully reproduced on barley and tomato in greenhouse pots and the bucket microplots ($Rf = 1$). Pn reproduced well on all crops tested except buckwheat (cv. Tardo) and beans, which were poor hosts. All buckwheat cultivars were non-hosts ($Rf = 0.1$) to Mc in greenhouse pots, but the Prego cultivar was a poor host in bucket microplots. Horsebean, velvetbean, castor bean and sesame were non-hosts to Mc. Sudangrass cultivars were poor or non-hosts of Mc while they were poor to suitable hosts to Pn. Radish cultivars were non-hosts to Mc in the microplots, but cultivar Adagio PHP-SA90 was a poor host in greenhouse pots. Rapeseed was a poor host to Mc in pots and buckets while it was a good host to Pn. Since Mc population densities following radish, buckwheat, velvetbean, horsebean, castor bean and sesame are lower than population densities following other crops tested, they may have potential as rotation crops in potato production systems for nematode management.

SOYBEAN CYST NEMATODE (*HETERODERA GLYCINES* Ichinohe) IN BRAZIL [NEMATODO QUISTE DE LA SOYA (*HETERODERA GLYCINES* Ichinohe) EN BRASIL]. **Paulino José Melo Andrade, EMBRAPA-CPAO, Cx. P. 661, 79804-970 Dourados, MS, Brazil.** — The soybean cyst nematode (SCN) was found in Brazil for the first time during the 1991-92 growing season and is already infesting more than 1 million ha. Field observations indicate that wind is an efficient way of disseminating this nematode inside a given region. In a beef cattle region of Mato Grosso do Sul State, the nematode was found at the rate of 5 cysts per 100 cm³ of soil in a first year soybean field. In this region, most of the soybean fields are disked several times during the fallow period (May to September), and wind storms are common from July. Although heavy losses are caused by SCN, actions of government at all levels are not very strong. Research on SCN has been directed mainly toward plant breeding to obtain resistant cultivars, with almost exclusive field testing of the putative resistant lines. Some studies are now under way dealing with biological control, host range, crop rotation, and nematode biology.

EFFICACY OF IZASOFOS APPLIED IN-FURROW TO REDUCE ROOT DAMAGE CAUSED BY *MELOIDOGYNE JAVANICA* IN TOMATOES [EFICACIA DEL IZASOFOS APLICADO AL SURCO PARA REDUCIR EL DAÑO DE RAICES POR *MELOIDOGYNE JAVANICA* EN TOMATE]. **G. L. Asmus,* R. M. F. Asmus** & M. C. F. Gonçalves,** EMBRAPA-CPAO, Cx. P. 661, 79804-970 Dourados, MS, Brazil* and VISÃO PESQUISA, Rua Balbina de Matos n° 1690, 79820-090 Dourados, MS, Brazil.**** — Izasofos 500 CS (MIRAL) was sprayed in furrows 1.0 m wide at 1 500, 2 000, 2 500, and 3 000 g a.i./ha, 6 days before transplanting tomato cv. Santa Clara. Soil was naturally infested with *Meloidogyne javanica* and inoculated with 500 eggs and juveniles per plant. Each treatment was replicated 5 times in a randomized complete block design. The plots were 5.0 m long and 2 rows wide, each containing 20 tomato plants. Five plants were collected from each plot at 30, 61 and 95 days after transplanting (DAT), and gall index ratings were made. All rates of izasofos were equally efficient in reducing root damage caused by *M. javanica* up to 30 DAT. When the dose of izasofos was 2 000 g a.i./ha or higher, a residual effect was observed until the last sampling date (95 DAT).

INCIDENCE OF NEMATODES ON VEGETABLE AND FRUIT CROPS AND PRELIMINARY ASSESSEMENT OF YIELD LOSS DUE TO *MELOIDOGYNE* SPECIES IN UGANDA [INCIDENCIA DE NEMATODOS EN CULTIVOS HORTICOLAS Y FRUTICOLAS: EVALUACION PRELIMINAR DE PERDIDAS POR ESPECIE DE *MELOIDOGYNE* EN UGANDA]. **N. D. Bafokuzara, Kawanda Agricultural Research Institute, P.O. Box 7065, Kampala, Uganda.** — An extensive survey of horticultural fields was conducted in 9 districts, representing the major production centres in Uganda, to identify and assess the importance of nematodes in production of fruits and vegetables. *Meloidogyne* spp., *Helicotylenchus* spp., *Scutellonema* spp. and *Rotylenchulus* spp. were the most commonly recovered phytoparasitic nematodes. Also common were *Pratylenchus* spp., *Hemicycliophora* spp., *Quinisulcius capitatus* and *Macropostonia* spp. The first 4 nematodes named above were present in virtually all districts. Based on incidence data, distribution, population density and associated damage on affected crops, *Meloidogyne* spp. were considered the most important parasites of the crops studied. *Meloidogyne* spp., *Pratylenchus* spp., *Helicotylenchus* spp. and *Xiphinema* spp. were more numerous in sandy soil of the Tororo District. Also, the intensively cultivated valleys of hilly Kabale and lowlands of Mbale and Tororo had the highest numbers of parasitic nematode genera. The nematode problems of crops were aggravated by farmer's lack of technical knowledge and advice. The nematode pathogens are damaging substantial interests of the farming public and need urgent attention. Management practices and recommendations for future research are discussed.

USE OF BIOLOGICAL DATA IN PLANT PARASITIC NEMATODE SYSTEMATICS: THE "SCUTELLONEMA BRADYS GROUP" [EL USO DE LA INFORMACION BIOLOGICA EN LA SISTEMATICA DE NEMATODOS FITOPARASITOS:GRUPO *SCUTELLONEMA BRADYS*]. **P. Baujard, Muséum National d' Histoire Naturelle, Laboratoire de Biologie Parasitaire, Prostistologie, Helminthologie. 61 rue Buffon 75005, Paris, France.** — Morphometrical data have been and are

those mainly used for systematics and identification of plant parasitic nematodes. However, little attention has been paid to the intraspecific variability of these characteristics. Biological data have been used only when taxonomic problems could not be otherwise solved, e.g. for some heteroderids. The study of relationships between three species of the genus *Scutellonema* originating from West Africa demonstrated a need to refer to biological data such as the effect of biotic and abiotic factors of the environment on the multiplication rate of the nematode. Determination of such biological characteristics constitutes a preliminary step to breeding and molecular studies.

EFFECT OF ABAMECTIN AS A TREATMENT OF GARLIC SEED CLOVES INFECTED BY *DITYLENCHUS DIPSACI* [EFECTO DE LA ABAMECTIN SOBRE LOS DIENTES DE AJO INFECTADOS POR *DITYLENCHUS DIPSACI*]. **W. F. Becker, EPAGRI/Est. Exp. de Caçador, Cx. P. 591, 89500-000 Caçador, SC, Brazil.** — Garlic seed cloves from the cv. Quitria, naturally infected by *Ditylenchus dipsaci*, were planted in nematode-free soil after immersion for 4 hrs in a solution of abamectin 1.8% at concentrations of 100, 200 and 400 ml/hl. A treatment of nematode-free garlic seed cloves and infected ones served as controls. The experimental design was completely randomized with 5 replicates in microplots of 1 m diam. Thirty days after emergence there was no difference in plant stand. At 139 days, the dosages of 200 and 400 ml/hl and the nematode-free control did not differ but were all proving themselves superior to the infected control. The smallest dosage did not differ from the infected control. The dosage of 400 ml/hl provided the highest production of bulbs but not significantly higher than the healthy control. At the 400 ml/hl dosage, a higher proportion of non-infected bulbs (93%) was obtained and the lowest density of nematodes found in the bulbs. The lowest dosages of abamectin did not differ significantly from the infected control in production, health and density of nematodes in the bulb.

GENETIC VARIABILITY OF PERUVIAN AND BRITISH POTATO CYST NEMATODE POPULATIONS [VARIABILIDAD GENETICA DE POBLACIONES PERUANAS Y BRITANICAS DE NEMATODOS QUISTE DE LA PAPA]. **I. Bendezu,* M. Canto-Saenz,* K. Evans** & P. Halford,** Universidad Nacional Agraria, La Molina, P.O. Box 456, Lima, Peru* and IACR, Rothamsted, Harpenden, Herts, AL5 2JQ, U.K.**** — Genomic DNA was extracted from cysts of 10 populations of *Globodera pallida* (5 British and 5 Peruvian) to search for inter-population genetic polymorphisms which might be related to virulence. Using two random primers, DNA fragments were amplified by PCR. A number of differences between populations from different countries and between populations of the same country were found, and these will be assessed for their potential as markers for virulence. There is 60% similarity between the British and Peruvian populations examined, with greater genetic variability in the latter.

REAÇÃO DE DEZ LINHAGENS DE ACEROLA (*MALPIGHIA GLABRA*) EM RELAÇÃO A *MELOIDOGYNE INCOGNITA* [REACTION OF TEN LINES OF *MALPIGHIA GLABRA* TO *MELOIDOGYNE INCOGNITA*]. **J. U. T. Brandão Filho & M. Demeis, Professor & Acadêmico do curso de Agronomia, e Univ. Estadual de Maringá, 87020-900 Maringá, PR, Brazil.** — Existem alguns relatos de que culturas de acerola foram severamente parasitadas por *Meloidogyne* spp., o que poderia estar causando perdas significativas na produção e redução da longevidade da cultura. Com o objetivo de avaliar as dimensões dessas perdas foi instalado um experimento, a nível de campo, usando *M. incognita* raça 2 e dez linhagens de acerola obtidas por seleção massal. Mudas das plantas produzidas a partir de sementes foram transplantadas para sacos plásticos contendo solo desinfestado e inoculados com 10 elevado a 3 unidades infectivas do nematóide (ovos + larvas), em condições de casa-de-vegetação. Após 20 e 30 dias, as mudas foram transferidas para condições de ambiente natural e transplantadas para o campo, respectivamente. Passados 30 dias no campo, fez-se a primeira avaliação, medindo o diâmetro das plantas próximo ao solo e a altura. Os resultados preliminares do desenvolvimento das plantas tem mostrado redução significativa com relação as plantas inoculadas.

EFEITO ANTAGÔNICO DE ALGUMAS ESPÉCIES DE PLANTAS A *HELICOTYLENCHUS MULTICINCTUS* [ANTAGONISTIC EFFECT OF SOME PLANTS TO *HELICOTYLENCHUS MULTICINCTUS*]. J. M. M. Bringel & G. S. Silva, UEMA/EMAPA, Cx. P. 176, 65001-970 São Luís, MA, Brasil. — O efeito antagônico de *Crotalaria spectabilis*, *C. juncea*, mucuna preta, mucuna branca, arroz 'Palha Murcha', milho 'Centramex', caupi 'CNC 0434' e bananeira 'Nanicão' a *Helicotylenchus multicinctus* foi avaliado em condições de telado. As plantas foram inoculadas com 485 nematóides e deixadas vegetar por 90 dias. A avaliação foi feita com base na contagem do número de nematóides em 10g de raízes e 100 ml de solo. Todas as plantas diferiram estatisticamente da testemunha, bananeira 'Nanicão' destacando-se *C. spectabilis*, *C. juncea* e arroz 'Palha Murcha' como as mais promissoras para serem usadas em programas de rotação de cultura, durante a reforma de bananais.

DETECTION OF *HETERODERA GLYCINES* ON SOYBEAN IN RIO GRANDE DO SUL STATE, BRAZIL [DETECCION DE *HETERODERA GLYCINES* EN SOYA DE EL ESTADO DE RIO GRANDE DEL SUL, BRASIL]. R. M. D. Carneiro & M. R. A. Almeida, EMBRAPA/CPACT, Cx. P. 403, 96001-970 Pelotas, RS, Brazil. — The soybean cyst nematode (*Heterodera glycines*) was detected and identified on soybean (*Glycine max* (L.) Merr.) in a plantation in Rio Grande do Sul State, Brazil. The infested site was located near the municipality of Cruzeiro do Sul. The average number of cysts extracted was 82/500 cm³ of soil. This nematode was probably introduced by infested seed from Mato Grosso do Sul State, Chapadão do Sul or by a harvesting machine brought from the same region. A survey should be made to study the distribution of *H. glycines* in Rio Grande do Sul State.

A NEW SPECIES OF *MELOIDOGYNE* (NEMATODA:MELOIDOGYNIDAE) PARASITIZING COFFEE PLANTS IN BRAZIL [UNA NUEVA ESPECIE DE *MELOIDOGYNE* (NEMATODA:MELOIDOGYNIDAE) PARASITA DEL CAFE EN BRASIL]. R. M. D. G. Carneiro,* R. R. G. Carneiro,** I. M. O. Abrantes,*** P. Castagone-Sereno,**** & M. R. A. Almeida,* EMBRAPA/CPACT, Cx. P. 403, 96001-970 Pelotas, RS, Brazil,* IAPAR, Cx. P. 1331, 86001-900 Londrina, PR, Brazil,** Universidade de Coimbra, Depto. de Zoologia, 3049 Coimbra, Portugal*** and INRA-Lab. Biol. Inv. B.P., Anúbes, France,**** — A root-knot nematode parasitizing coffee in Paraná State, Brazil, is described and illustrated from specimens reared on tomato roots. The perineal patterns show considerable variation and have similarities to that of *M. incognita*. The female stylet, 16.1 µm long, has a cylindrical cone slightly curved dorsally with knobs transversely elongate. The male has a high, rectangular, smooth head region, not set off from the body contour. The labial disc is continuous with medial lips. The head region is subdivided by an incomplete annulation. The stylet, 24.7 µm long, has rounded knobs usually to transversely elongate knobs; the shaft is cylindrical. Mean body length of second-stage juveniles is 457.9 µm. The head region is usually marked by incomplete annulation. The stylet, 13.5 µm long, has rounded knobs. The tail, 49.0 µm long, is narrow and conical, tapering to a finely rounded tip. Tobacco, watermelon and tomato are good hosts; cotton, pepper and peanut are not hosts. This *Meloidogyne* sp. reproduces by mitotic parthenogenesis and has a somatic chromosome number: 3n = 50-56. One esterase band was similar to the fast band found in *M. konaensis* and is unique among *Meloidogyne* species from coffee.

REAÇÃO DE CULTURAS UTILIZADAS EM ROTAÇÃO E SUCESSÃO A SOJA AO NEMATÓIDE *HETERODERA GLYCINES* [RESPONSE OF CROPS USED IN ROTATIONS FOR SOYBEAN TO *HETERODERA GLYCINES*]. A. Carnielli, EMBRAPA-CPAO, Cx. P. 661, 79804-970 Dourados, MS, Brasil. — Objetivou-se com esta avaliação, conhecer a reação de hospedabilidade de algumas culturas utilizadas em rotação e sucessão à soja, ao nematóide de cisto *Heterodera glycines*. Em uma área natural e uniformemente infestada pelo parasito, em Chapadão do Sul, MS, 29 espécies vegetais foram semeadas em covas com dez repetições. Após 50 dias foi verificada a presença ou não de fêmeas do nematóide no sistema radicular das plantas. Nesta primeira etapa, ao nível de campo e com avaliação visual, concluiu-se serem hospedeiros do nematóide, além da própria soja, a ervilha, a ervilhaca peluda, o feijão comum e o feijão-de-fava. As demais culturas serão reavaliadas em condições controladas. Dentre as

espécies invasoras que ocorreram na área, observou-se que a *Commelina bengalensis* (trapoeiraba) é uma espécie hospedeira do nematóide de cisto da soja.

REAÇÃO DE CULTIVARES DE SOJA AO NEMATÓIDE *MELOIDOGYNE JAVANICA* [REACTION OF CULTIVARS OF SOYBEAN TO *MELOIDOGYNE JAVANICA*]. A. Carnielli & L. A. Almeida, EMBRAPA-CPAO, Cx. P. 661, 79804-970 Dourados, MS, & EMBRAPA-CNPSo, Cx. P. 1061, 86001-970 Londrina, PR, Brasil. — Duzentas e trinta e quatro cultivares de soja recomendadas para cultivo no Brasil, e/ou de interesse aos programas brasileiros de melhoramento genético da cultura, foram avaliadas quanto à reação ao nematóide formador de galhas *Meloidogyne javanica*. A avaliação foi realizada em uma área com alta infestação natural e uniforme do nematóide, no município de Jaraguari, MS, com delineamento em blocos casualizados em dez repetições. As parcelas constituíram-se de covas, com espaçamento de 1.00 × 1.00 m, com doze sementes cada. Aos 80 dias da emergência das plântulas, todas as parcelas foram arrancadas, e procedidas avaliações visuais do sistema radicular das plantas, visando principalmente identificar aquelas com ausência de galhas. De todas as cultivares, apenas vinte, possivelmente, poderão ser utilizadas em programas de melhoramento, visando a obtenção de genótipos resistentes ao nematóide: BR-6 (Nova Bragg), Braxton, Cajeme, Cordell, D 69-442, EMBRAPA 31, EMBRAPA 32 (Itaqui), EMGOPA 301, EMGOPA 307 (Caiapó), Flórida, Forrest, Hampton-206-A, Hartwig, Kirby, MSBR- I 9 (Pequi), OCEPAR 14, Peking, PI 227687, Pickett-71 e USP 3. Todas as demais apresentaram volumes de galhas que as identificam como suscetíveis ao nematóide.

FLUCTUACIONES POBLACIONALES DE *MELOIDOGYNE* SPP. EN EL CULTIVO DEL GUAYABO (*PSIDIUM GUAJAVA* L.) EN EL ESTADO ZULIA, VENEZUELA [FLUCTUATIONS IN POPULATION DYNAMICS OF *MELOIDOGYNE* SPP. ON GUAVA (*PSIDIUM GUAJAVA* L.) IN THE STATE OF ZULIA, VENEZUELA]. Ana M. Casassa, J. Matheus & R. Crozzoli, Instituto de Investigaciones Agronómicas, Facultad de Agronomía, Universidad del Zulia, Apartado 15205, Centro Frutícola del Zulia-Corpozulia y Facultad de Agronomía, Universidad Central de Venezuela, Maracaibo, Edo Zulia, Venezuela. — Un estudio de la dinámica de población de *Meloidogyne* spp. llevó a cabo durante un año en una plantación de guayabo (*Psidium guajava* L.) en el Municipio Mara del Estado Zulia, Venezuela. Las máximas poblaciones de *Meloidogyne* spp. se cuantificaron en el mes de Enero, alcanzando valores de 110 nematodos por cm³ de suelo y 1.171 huevos mas juveniles del segundo estado (J2) por gramo de raíces. Al realizar los análisis estadísticos no se detectó relación entre las condiciones climáticas de la zona y la dinámica poblacional del nematodo, sin embargo se observó que durante el mes de Octubre, donde se registró una mayor precipitación, las poblaciones del nematodo en el suelo disminuyeron drásticamente.

***MELOIDOGYNE* ON VEGETABLE CROPS IN BRAZIL [*MELOIDOGYNE* EN CULTIVOS HORTICOLAS DE BRASIL].** J. M. Charchar, EMBRAPA/CNPH-Nematology Research, 70000-000 Brasília, DF, Brazil. — Plant-parasitic nematode surveys on lettuce, potato, sweet-potato, carrot Peruvian, carrot, pepper, eggplant, okra, and tomato indicated that species of the genus *Meloidogyne* are the most important causes of quantitative and qualitative losses to vegetable crops in Brazil. The species of *Meloidogyne* more common in vegetable crops are *M. incognita* race 1 and *M. javanica*, found in frequencies of 48 and 37% of the samples, respectively. In potato fields, the most common species is *M. incognita* races 1, 2, 3 and 4, found in frequencies of 22, 11, 7, and 7%, respectively. Species found less frequently in vegetable crops in Brazil are *M. arenaria* (7%), *M. hapla* (4%) and *M. petuni* n.sp. (4%). Based on the high diversity of the *Meloidogyne* species infecting several crops, some research programs (mainly crop rotation and screening for resistance) were developed to control these nematodes on vegetable crops in Brazil.

STUDIES ON THE SUBFAMILY HEMICYCLIOPHINAE (NEMATODA: CRICONEMATOIDEA): PART 1 [ESTUDIOS SOBRE LA SUBFAMILIA HEMICYCLIOPHINAE (NEMATODA: CRICONEMATOIDEA): PARTE 1]. E. Costa-Manso, EMBRAPA/CENARGEN, Cx. P. 2373, 70849-970 Brasília,

Brazil. — Twelve species of *Hemicyclophora* and one of *Caloosi* were identified. In samples from Brazil, *H. belemnisi*, *H. diolaensis*, *H. loofi*, *H. poranga*, *H. typica* and *C. luci* were found. *H. thienemanni* apud Rashid *et al.* 1986 is renamed to *H. typica* and a population from Santa Catarina, Brazil is identified as a possible new species. The species, *H. andrassyi*, is described from Martinique and *H. typica* from Madagascar. The observation of specimens of *H. aquatica*, *H. californica* and *H. charlestoni* permitted an diagnosis emended.

IDENTIFICACION E IMPORTANCIA DE ESPECIES OBSERVADAS DEL GENERO MELOIDOGYNE EN CULTIVOS DE INVERNADEROS DEL NOROESTE ARGENTINO [THE IMPORTANCE AND IDENTIFICATION OF *MELOIDOGYNE* SPP. ON GREENHOUSE CROPS IN ARGENTINA'S NORTHWEST REGION]. M. A. Costilla & N. B. Coronel, Estación Experimental Agroindustrial Obispo Colombres, Casilla de Correo No° 9. Las Talitas, Tucumán, Argentina. — En los últimos tres años se realizó la identificación de las especies de *Meloidogyne* encontradas en cultivos bajo cubierta plástica. La más importante es *M. incognita* detectada en cultivos de melón, pepino, algunas variedades de tomate, arveja y berenjena. *M. javanica* se presentó en melón solamente y en forma aislada. También se observaron ejemplares de *M. lordelloi* en híbridos de tomate, en la localidad de Los Bulacio, Tucumán, siendo esta la primera información para Argentina.

NEMATODES FITOPARASITOS ASOCIADOS AL CULTIVO DE SOYA EN EL NOROESTE ARGENTINO [PLANT-PARASITIC NEMATODES ASSOCIATED WITH SOYBEAN IN ARGENTINA'S NORTHWEST REGION]. M. A. Costilla, Estación Experimental Agro-Industrial Obispo Colombres, Casilla de Correo No° 9, 4.101 Las Talitas, Tucumán, Argentina. — Durante las campañas agrícolas 1993/94/95, se realizó un relevamiento de suelo y raíces de distintas zonas y variedades de soya en la región del Noroeste Argentino. Las muestras de raíces se procesaron por el método de licuado-centrifugado y las de suelo, por flotación-centrifugado. Fueron observados con mayor frecuencia en raíces nematodos endoparásitos migratorios como: *Pratylenchus zeae*, *P. brachyurus* y *P. pratensis*. Las especies *Meloidogyne incognita* y *M. javanica* también se presentaron en menor proporción, produciendo daños significativos en casos puntuales. Entre las especies ectoparásitas figuran *Belonolaimus longicaudatus*, *Xiphinema americanum*, *Tylenchorhynchus annulatus* y *Macropostonia xenoplax*. Otros géneros encontrados fueron *Helicotylenchus*, *Rotylenchus*, *Scutellonema*, *Heterodera* y *Tylenchus*.

IDENTIFICATION AND CHARACTERISATION OF CYST NEMATODE SECRETIONS USING MONOCLONAL ANTIBODIES [IDENTIFICACION Y CARACTERIZACION DE SECRECIONES DE NEMATODOS QUISTE MEDIANTE ANTICUERPOS MONOCLONALES]. R. Curtis & J. T. Jones, Department of Entomology and Nematology, IACR - Rothamsted, Harpenden, Herts, AL5 2JQ, U.K., and SCRI and Scottish Crop Research Institute, Invergowrie, Dundee, DD2 5DA, Scotland, U.K. — To study the secretion of cyst nematode juveniles and their role in host-parasite relationships at a molecular level, monoclonal antibodies (MAbs) were raised to *Heterodera avenae* second-stage juveniles (J2). The fusion was screened by immunofluorescence by cryostat sections of *H. avenae* J2 and several MAbs which specifically recognize structures within the gland cells were identified. Here, we report preliminary results on the characterization of MAb recognizing structure within the dorsal oesophageal gland. The antibody recognizes a glycoprotein, since it binds to the lectin Con-A, with a molecular weight of approximately 29KD and a pI point of 7.5. The glycoprotein can also be identified in secretions produced by J2.

COMPARISON AMONG CAMEROON GRASS (*PENNISETUM PURPUREUM*) AND OTHER ANTAGONISTIC PLANTS IN THE CONTROL OF *MELOIDOGYNE JAVANICA* [COMPARACION ENTRE EL PASTO CAMERUNES *PENNISETUM PURPUREUM* Y OTRAS PLANTAS ANTAGONISTAS EN EL CONTROL DE *MELOIDOGYNE JAVANICA*]. C. N. D'Angieri Filho & S. Ferraz, Merck S. A., Fazenda Chapada, Cx. P. 46, 65950-000 Barra do Corda, MA, and Departamento de Fitopatologia/

UFV, 36571-000 Viçosa, MG, Brazil. — *Tagetes patula*, *Crotalaria paulina*, *Mucuna atterima* and *Pennisetum purpureum* were compared under greenhouse conditions for their efficiency to control *Meloidogyne javanica*. Tomato was used as the control. Plants were grown for 90 days in pots infested with 5 000 eggs each of the nematode. After 90 days, the aerial parts were removed, roots were mixed with the soil, and tomato seedlings were planted into each pot. By comparing root galling 30 days later, it was observed that *P. purpureum*, *T. patula* and *C. paulina* were equally effective in controlling *M. javanica*. *M. atterima* did not show good control.

THE POTENTIAL OF CAMEROON GRASS (*PENNISETUM PURPUREUM*) TO CONTROL *MELOIDOGYNE JAVANICA* [POTENCIAL DEL PASTO CAMERUNES (*PENNISETUM PURPUREUM*) PARA EL CONTROL DE *MELOIDOGYNE JAVANICA*]. C. N. D'Angieri Filho & S. Ferraz, Merck S. A., Fazenda Chapada, Cx. P. 46, 65950-000 Barra do Corda, MA, and Departamento de Fitopatologia/UFV, 36571-000 Viçosa, MG, Brazil — Well known as a very good forage crop, cameroon grass (*Pennisetum purpureum*) also was shown to be a good crop to control *Meloidogyne javanica* in a rotation scheme. Under greenhouse conditions, cameroon grass and tomato plants (control) were cultivated for 90, 120 and 150 days in pots infested with 5 000 eggs of *M. javanica*. Tomato seedlings were transplanted subsequently into the pots and 30 days later the roots were examined for galling. No galls were found on the tomato roots following cameroon grass.

HOST SUITABILITY OF SOME WEED SPECIES TO THE SOYBEAN CYST NEMATODE [ALGUNAS ESPECIES DE MALEZAS HOSPEDANTES DEL NEMATODO ENQUISTADO DE LA SOYA]. W. P. Dias,* S. Ferraz,* A. A. Silva,** R. D. Lima* & L. A. C. Valle,* Depto. de Fitopatologia,* and Depto. de Fitotecnia,** Universidade Federal de Viçosa, 36571-000 Viçosa, MG, Brazil. — The weeds, *Portulaca oleracea*, *Galinsoga ciliata*, *Cenchrus echinatus*, *Pennisetum setosum*, *Eleusine indica*, *Setaria geniculata*, *Amaranthus deflexus*, *Hyptis suaveolens*, *Ipomoea purpurea*, *Desmodium tortuosum*, *Eclipta alba*, *Cassia* sp., *Nicandra physalodes*, *Ageratum conyzoides*, *Bidens pilosa*, *Sonchus oleraceus* and *Plantago tomentosa* were evaluated in relation to host suitability to *Heterodera glycines* race 3 under greenhouse conditions. Soybean cv. FT-Cristalina was used as a control. Each plant was inoculated with 2 000 eggs, and nematode numbers evaluated at 30 and 40 days. No females were found on the roots of any plant. The controls showed 123 and 286 females/root system in the first and second evaluations, respectively. Roots of *D. tortuosum*, *Cassia* sp. and *A. conyzoides*, stained with fucsin showed only a few juveniles inside.

ANALISIS COMPARATIVO DE CARACTERES MORFOLOGICOS Y MORFOMETRICOS EN SEIS POBLACIONES DE *PRATYLENCHUS VULNUS* (NEMATA:TYLENCHIDA) [COMPARATIVE STUDY OF MORPHOLOGICAL AND MORPHOMETRIC CHARACTERISTICS IN SIX POPULATIONS OF *PRATYLENCHUS VULNUS* (NEMATA:TYLENCHIDA)]. M. E. Doucet,* J. Pinochet** & J. A. Di Rienzo,* Escuela para Graduados y Unidad de Procesamiento Electronico de Datos, Facultad de Ciencias Agropecuarias, Universidad Nacional de Cordoba CC 509, 5000 Cordoba, Argentina* y Departamento de Patologia Vegetal, Institut de Ricerca i Tecnologia Agroalimentaries, Cabrils-Barcelona, Espana.** — Se efectuó un análisis de los caracteres morfológicos y morfométricos de hembras y machos de seis poblaciones de *P. vulnus* provenientes de Europa y América. No se observaron diferencias de importancia en relación a los caracteres anatómico-morfológicos. Se detectaron diferencias significativas entre las poblaciones para la mayoría de los caracteres morfométricos. Se corrobora la idea de la existencia de patotipos.

ASOCIACION ENTRE *GAMOGAETA SPEICATA* Y EL NEMATODO *NOTHANGUINA* SP. OBSERVACIONES PRELIMINARES [ASSOCIATION BETWEEN *GAMOGAETA SPEICATA* AND THE NEMATODE *NOTHANGUINA* SP.: PRELIMINARY OBSERVATIONS]. M. E. Doucet,* E. L. Ponce de León** & R. Dehley*** Escuela para Graduados, Fac. de Ciencias Agropecuarias, Universidad Nacional de Cordoba, CC 509, 5000 Cordoba,* Cátedra de Morfologia Vegetal, Univ. Nacional de Rio

Cuarto, y Cátedra de Fitopatología,** Univ. Nacional del Sur., Argentina.** — Sobre las caras adaxial y abaxial de hojas de *G. spicata* (Compositae) provenientes de Bahía Blanca, Buenos Aires, Argentina, se observaron protuberancias semiesféricas. En su interior se detectaron gran cantidad de huevos, larvas y adultos de nematodos del género *Nothanguina*. Estos, se alojan en el interior de una cavidad rodeada de células parenquimáticas modificadas. El hecho de encontrar todos los representantes del ciclo de vida del nematodo en el interior de las protuberancias, hace suponer que *G. spicata* representa un huésped adecuado.

CICLO DE HETERORHABDITIS BACTERIOPHORA Y CARACTERIZACION DE HERMAFRODITAS DE SEGUNDA Y TERCERA GENERACION [LIFE CYCLE OF *HETERORHABDITIS BACTERIOPHORA* AND THE CHARACTERIZATION OF SECOND AND THIRD HERMAPHRODITIC GENERATIONS]. **M. M. A. Doucet, M. A. de Bertolotti & S. R. Cagnolo, Centro de Zoología Aplicada, F.C.E.F. y N. - UNC - C.C. 122, 5000 Córdoba, Argentina.** — El ciclo de *Heterorhabditis bacteriophora* *in vivo* es heterogámico con una primera generación hermafrodita (H) una segunda anfimítica (A) y otras según la calidad y cantidad de alimento. Autotoquia sería el mecanismo de reproducción seleccionado por los parásitos para colonizar rápidamente un recurso; luego se reproducirían por anfimixis. Larvas de *Galleria mellonella* (.20-25 g) se parasitaron (máximo 10 infectantes por insecto) con *H. bacteriophora* (aislado OLI) y disecaron diariamente. Se sucedieron tres generaciones: una primera H, una segunda H+A y una tercera H. Por primera vez se describen las últimas Hs.; se diferencian por la longitud y forma de la cola y la de la vulva y difieren de la primera generación en todos los caracteres morfométricos. La hipótesis referida a los mecanismos de reproducción en función del recurso debe ser evaluada.

DIVERSITY OF MERMITHIDS IN CORDOBA, ARGENTINA [LA DIVERSIDAD DE MERMETIDOS EN CORDOBA, ARGENTINA]. **M. M. A. de Doucet & S. R. Cagnolo, Centro de Zoología Aplicada, F.C.E.F. y N. - UNC - C.C. 122, 5000 Córdoba, Argentina.** — Because of the importance of understanding biodiversity and the search for biological agents for the control of insect pests, a survey of entomoparasitic nematodes of the Mermithidae family was conducted in Córdoba. The purpose of this research is selection of species that better adapt to biocontrol programs. The analysis of the aquatic environment showed the existence of the genera: *Gastromermis*, *Isomermis*, *Mesomermis*, *Strelkovimermis*, *Hydromermis*, *Pseudomermis*, *Limnomermis* and *Divisispiculimermis*. In the terrestrial environment were found: *Agamermis* and *Mermis*. The Córdoba mermithids are a group widely represented, mainly in aquatic environments. The genera mentioned are cited for the first time in Córdoba, except *Gastromermis* and *Divisispiculimermis*. In all cases, the known ranges of distribution are widened.

NEW RECORDS OF ENTOMOGENOUS NEMATODES (STEINERNEMATIDAE: HETERORHABDITIDAE) IN CORDOBA, ARGENTINA [NUEVOS HALLAZGOS DE NEMATODOS ENTOMOGENOS (STEINERNEMATIDAE; HETERORHABDITIDAE) EN CORDOBA, ARGENTINA]. **M. M. A. de Doucet & M. A. Bertolotti, Centro de Zoología Aplicada, F.C.E.F. y N. - UNC - C.C. 122, 5000 Córdoba, Argentina.** — Entomogenous nematodes (Steinernematidae and Heterorhabditidae) are insect biological control agents. Isolates from Córdoba showed that certain ones are particularly aggressive. At present, the research is aimed at detecting new populations and evaluating their aggressiveness. Samplings (n = 151) were made in diverse environments during 1993 and 1994. A rapid technique for detecting entomogenous nematodes was used. Populations belonging to *Steinernema rara*, *S. ritteri*, *S. carpocapsae*, *S. glaseri* and *Heterorhabditis bacteriophora* were found. The records widen the known distribution of entomogenous nematodes in Córdoba. The great diversity of this group in Córdoba is made evident.

TECNICA PARA DETECCION DE NEMATODOS ENTOMOFAGOS: EVALUACION Y EFICIENCIA [A TECHNIQUE FOR DETECTION OF ENTOMOGENOUS NEMATODES: EVALUATION AND EFFICACY]. **M. M. A. de Doucet, M. A. Bertolotti & A. L. Giayetto, Centro de Zoología Aplicada, F.C.E.F. y N. - UNC - C.C. 122, 5000 Córdoba, Argentina.** — La técnica rápida (TR) para detección

de nematodos permite procesar numerosas muestras de suelo en espacio y tiempo reducidos. A fin de conocer su eficiencia, se colocaron concentraciones definidas de larvas (L) de *Heterorhabditis bacteriophora* sobre papeles de filtro (PF) y suelo, este se procesó según TR. El huésped auxiliar fue *Galleria mellonella*. La concentración fue de 10 L por cada 100 g de suelo y 5 L de huésped. El número de parásitos se cuantificó, por disección manual (DM) y por digestión enzimática (DE); a los cinco días de la puesta en contacto nematodo insecto. Para cada variable se consideraron 10 unidades experimentales. Se recuperó según los casos: TR+DM = 11%; TR+DE = 17% y PF+DM = 13%. Los resultados no presentan diferencias significativas ($P3/4.01$) tanto para la detección como recuperación. Se confirma la eficiencia de esta técnica y sus límites quedan demostrados.

PROVING AN IMMUNOASSAY FOR WORK WITH POTATO CYST NEMATODES [PRUEBA DE INMUNOENSAYE PARA TRABAJAR CON EL NEMATODO QUISTE DE LA PAPA]. J. Dunn, R. Curtis, M. Russell & K. Evans, Entomology and Nematology Department, IACR - Rothamsted, Harpenden Herts, AL5 2JQ, U.K. — Careful screening of monoclonal antibodies (MAbs) has identified two which differentially recognize the two species of potato cyst nematodes (PCN), *Globodera rostochiensis* and *G. pallida*. If used in a routine advisory assay, it is important that the MAbs permit quantification of each species in the presence of the other. It is also important that the MAbs recognize only live eggs to provide for a good estimate of the amount of host invasion that will occur if a crop is planted. Results will be presented to demonstrate successful quantification of mixed species of PCN populations and to show that as populations age, or are killed by agents such as chemicals, heat or parasitic fungi, they lose antigenicity.

BANANA NEMATODES IN BRAZIL WITH EMPHASIS ON THE DAMAGE CAUSED BY *RADOPHOLUS SIMILIS* [NEMATODOS ASOCIADOS A EL BANANO EN BRASIL CON ENFASIS SOBRE EL DAÑO OCASIONADO POR *RADOPHOLUS SIMILIS*]. L. C. C. B. Ferraz, Departamento de Zoologia, ESALQ/ Universidade de São Paulo, Cx. P. 9, 13418-900 Piracicaba, SP, Brazil — In Brazil, major nematode problems in banana closely resemble those of other important producing countries or regions. *Radopholus similis* is the most relevant species although *Helicotylenchus multicinctus*, *Pratylenchus coffeae*, *Rotylenchulus reniformis*, and *Meloidogyne* spp. occur frequently as associated species and may demand special attention under some circumstances. Due to commercialization of infected rhizomes, the distribution of *R. similis* is almost ubiquitous, with population levels reaching 20 000 specimens/100 g roots or higher. Clean new areas should be planted only with immune plantlets obtained by *in vitro* propagation of vegetal fragments containing meristematic tissue or with slightly infected material adequately peeled and treated with hot water or nematicides.

DAMAGE CAUSED BY *PRATYLENCHUS BRACHYURUS* TO THREE SOYBEAN CULTIVARS [DAÑO CAUSADO POR *PRATYLENCHUS BRACHYURUS* A TRES CULTIVARES DE SOYA]. L.C.C.B. Ferraz, Departamento de Zoologia, ESALQ/Universidade de São Paulo, Cx. P. 9, 13418-900 Piracicaba, SP, Brazil. — The pathogenicity of *Pratylenchus brachyurus* to 3 soybean cultivars (Andrews, Invicta, and Ocepar-14) was evaluated under greenhouse conditions, with the temperature ranging from 16 to 32°C. Four different nematode inoculation levels were used (noninoculated check, 200, 1 000 and 5 000 specimens/plant/pot) with 6 replications each. The plants were grown for 70 days in 1 000 cm³-pots filled with a sterilized mixture of soil and cattle manure (2:1). Damage evaluation was based on fresh root (FRW) and top dry (TDW) weight. Reproduction factor values were also determined. Growth reduction was observed for all the cultivars, especially at the 1 000 and 5 000 levels. Compared to noninoculated plants, the highest inoculation level caused decreases in the FRW and TDW mean values which ranged from 14-42% and 14-33%, respectively. The nematode reproductive rate was inversely correlated with the inoculum level.

TISSUE CULTURE FOR NEMATODE ERADICATION FROM BLACK PEPPER [CULTIVO DE TEJIDOS PARA ERRADICAR NEMATODOS DE PIMIENTA NEGRA]. E. S. Figueira Filho, A. L. Bárbara & R. C. V. Tenente, EMBRAPA/CENARGEN. Cx. P. 2372, 70849-970 Brasília, DF, Brazil. — Black pepper germplasm (*Pepper wichmanii*) infected by *Ditylenchus* sp. was maintained in a quarantine greenhouse in CENARGEN/EMBRAPA. During plant development, apical shoots were collected, surface sterilized (20 min in 70% ethanol plus 1% sodium hypochlorite) and rinsed repeatedly with distilled water. Meristems were excised from these shoots and cultured *in vitro*. Cultures were transferred weekly to reduce high levels of endogenous phenols. A certain level of endogenous bacteria also was present in the cultures. With further organogenesis, plantlets were transferred monthly until they produced 4 shoots per explant. These plants eventually grew successfully and free of plant-parasitic nematodes.

BIOASSAY FOR DETERMINING THE DENSITY OF ENDOSPORES OF PASTEURIA PENETRANS IN FIELD SOIL [BIOENSAYO PARA DETERMINAR LA DENSIDAD DE ENDOESPORAS DE PASTEURIA PENETRANS EN CAMPOS AGRICOLAS]. L. G. Freitas,* D. J. Mitchell* & D. W. Dickson,** Department of Plant Pathology, University of Florida, Gainesville, FL. 32611, U.S.A.,* and Department of Entomology and Nematology, University of Florida, Gainesville, FL. 32611, U.S.A.** — *Pasteuria penetrans* is an obligate parasite of nematodes. Since no culture medium has been developed for *in vitro* cultivation of *P. penetrans*, it is not possible to quantify the bacterial density in soil by serial dilution. Soil from a field suppressive to the nematode host, *Meloidogyne arenaria* race 1, was allowed to dry to kill the nematodes and then separated into 2 subsamples. One subsample was placed into Petri dishes and kept for 3 days at room temperature. The second subsample was autoclaved to kill nematodes and *P. penetrans* endospores and distributed in Petri dishes. A suspension of *P. penetrans* at 10^3 , 10^4 , 10^5 or 10^6 endospores/g of soil was added to the autoclaved soil, and was allowed to dry for 3 days. Juveniles of race 1 of *M. arenaria* were spread on the surface of the soil of both subsamples, and the dishes were incubated for 3 days. The nematodes were extracted to determine the number of endospores attached per juvenile in each treatment. The endospore density in the field was determined by comparison with soil in which known concentrations of the bacterium were added.

EFFECTIVENESS OF DIFFERENT ISOLATES OF PAECILOMYCES LILACINUS AND AN ISOLATE OF CYLINDROCARPON DESTRUCTANS ON THE CONTROL OF MELOIDOGYNE JAVANICA [EFECTIVIDAD EN DIFERENTES AISLAMIENOS DE PAECILOMYCES LILACINUS Y UN AISLAMIENTO DE CYLINDROCARPON DESTRUCTANS EN EL CONTROL DE MELOIDOGYNE JAVANICA]. L. G. Freitas,* S. Ferraz,** & J. J. Muchovej,*** Department of Plant Pathology, University of Florida, Gainesville, FL. 32611, U.S.A.,* Departamento de Fitopatologia, Universidade Federal de Viçosa, 36571-000 Viçosa, MG, Brazil,** and Ornamental Horticulture, Florida A & M University, Tallahassee, FL. 32307, U.S.A.*** — Nineteen isolates of *Paecilomyces lilacinus* from 4 countries and 9 regions of Brazil and 1 isolate of *Cylindrocarpon destructans* were evaluated *in vitro* for parasitism of eggs of *Meloidogyne javanica*. The isolates varied in their ability to colonize eggs. In greenhouse studies with tomato plants, isolates of *P. lilacinus* and *C. destructans* reduced the number of galls of *M. javanica*, but differed in effectiveness. The isolates of *P. lilacinus* from France and Italy were the most effective in both *in vitro* and greenhouse experiments.

RECEPTIVITY OF THREE FORMULATIONS OF PAECILOMYCES LILACINUS ON COLONIZATION OF EIGHT SOILS [RECEPTIVIDAD DE TRES FORMULACIONES DE PAECILOMYCES LILACINUS EN LA COLONIZACION DE OCHO SUELOS]. C. B. Gomes & R. M. D. G. Carneiro, EMBRAPA/CPACT, Cx. P. 403, 96001-970 Pelotas, RS, Brazil. — The receptivity of different soils, sterilized or not, to the colonization of the nematophagous fungus, *Paecilomyces lilacinus*, was evaluated under laboratory conditions. The fungus was inoculated into soil with three formulations: alginate pellets, sterile rice grains or conidia suspension in water. All soils allowed fungus colonization and sur-

vival during 5 months of the test. The pelleted formulation was the most stable in the soil. The conidia suspension maintained higher levels than the fungus grown on rice in the nonsterilized soils. The introduction of rice grains was unfavorable to development of the fungus and sterilization of the soils improved their receptivity. Apparently, soil texture and chemical composition did not influence development of the fungus in the soil. The competition of *P. lilacinus* and other soil fungi was evaluated. Studies *in vitro* showed *P. lilacinus* was poorly competitive, but it behaved as an excellent saprophite in the different soil types.

THE EFFECT OF OIL RADISH AND WHITE MUSTARD TRAP CROPS ON SUGARBEET CYST NEMATODE POPULATIONS IN SOIL AND SUBSEQUENT SUGARBEET CROP YIELD [EFECTO DE LOS CULTIVOS DE RABANO Y *SINAPIS ALBA* EN LAS POBLACIONES DEL NEMATODO QUISTE DE LA REMOLACHA Y LA PRODUCCION]. S. L. Hafez, K. Hara & R. Portenier, University of Idaho, Parma R&E Center, 29603 U of I Lane, Parma, ID 83660, U.S.A. — Four varieties of oil radish, *Raphanus sativus* var. *oleifera* (Adagio, Pegletta, Ultimo, Remonta), and 3 varieties of white mustard, *Sinapis alba* (Metex, Maxi, Martigena) were planted following wheat in a sugarbeet cyst nematode infested field in the fall of 1993 in Parma, Idaho. Each variety was replicated 4 times in a randomized complete block design, and a fallow treatment was included as a control for comparison. All varieties were mechanically chopped and incorporated 3 months after planting. Soil samples before planting in the fall and in the following spring were collected for nematode assay. All varieties reduced the total number of eggs and juveniles significantly. Oil radish (var. Adagio) caused the highest percent reduction in comparison to fallow (51%). White mustard (var. Martigena) caused the lowest percent reduction (21%). The following spring, sugarbeet (var. HM-WS-90) was planted following the oil radish and mustard varieties. Sugarbeet yield increased significantly following Adagio, Ultimo Maxi and Metex in comparison with the fallow treatment.

THE POTENTIAL OF ENDOPHYTIC MICROORGANISMS FOR CONTROL OF *MELOIDOGYNE INCOGNITA* [POTENCIAL DE MICROORGANISMOS ENDOFITICOS PARA EL CONTROL DE *MELOIDOGYNE INCOGNITA*]. J. Hallmann,* R. Rodríguez-Kábana,* J. Kloepper* & R. A. Sikora,** Department of Plant Pathology, Auburn University, AL 36849-5409, U.S.A.,* and Institut für Pflanzenkrankheiten Nußallee 9, 53116 Bonn, Germany.** — The effect of fungal and bacterial root endophytes on *Meloidogyne incognita* infestation was investigated. Endophytic fungi from surface-disinfested tomato plants were grown on wheat grain and applied as a ground powder 1 cm below tomato seed. For bacterial application, cucumber seeds were coated with bacteria, originally isolated from surface-disinfested maize and cucumber plants. Three weeks after fungal application or 2 weeks after bacterial application 1 000 second-stage juveniles were inoculated per plant. Nematode control was determined 7 weeks after planting by measuring plant growth and number of galls and egg masses. Seven out of 72 endophytic bacterial strains and 8 out of 39 endophytic fungal strains significantly reduced infestation up to 50% compared to nontreated plants. Intense colonization of the host tissue by fungal endophytes was observed and correlated with decreasing numbers of penetrated juveniles and reduced juvenile development. The results demonstrate that indigenous endophytic microorganisms are potential antagonists to *M. incognita*.

PARCELAS DEMOSTRATIVAS DE LIMON PARA MUESTREAR EL EFECTO SOBRE EL CONTROL DEL NEMATODO DE LOS CITRICOS *TYLENCHULUS SEMIPENETRANS* EN PERU [DEMONSTRATION OF CITRUS NEMATODE (*TYLENCHULUS SEMIPENETRANS*) CONTROL IN PERU]. E. Herrera,* L. Castillo* & M. Mundo-Ocampo,** Convenio ADEX AID/MSP, *Av. Camino Real, San Isidro, Lima, Peru y Depto. de Nematología de la Universidad de California, Riverside, CA, 92521, U.S.A. — Con la finalidad de mostrar dos métodos efectivos de control de *T. semipenetrans*, se desarrollaron cuatro parcelas demostrativas de limón sítel en los Deptos. de Lambayeque y Piura de la Costa Norte de Perú, donde existen, alrededor de 13 000 hectáreas en producción. El área demos-

trativa fue de una hectárea donde se aplicaron nematicidas y enmiendas orgánicas. Los nematicidas fueron Nematicur 10G ó fenamiphos 330 g/planta, el producto nematicida biológico Hunter 1.5 L/Ha y la enmienda orgánica: Humus de lombriz, empleándose 50 kg/planta de Humus. Se efectuaron dos aplicaciones por campaña/año. Estos tratamientos estuvieron reforzados por los fungicidas Ridomyl y/o Aliette para control de "Gomosis". Los mejores tratamientos tanto para el control de poblaciones de *T. semipenetrans* como para incrementar la producción y la calidad se obtuvieron con el nematicida Nematicur y la combinación de Nematicur más Humus.

OCCURRENCE OF *XIPHIDORUS MINOR* AND *PARATRICHODORUS ANTHURII* IN THE STATE OF SAO PAULO, BRAZIL [PRESENCIA DE *XIPHIDORUS MINOR* Y *PARATRICHODORUS ANTHURII* EN EL ESTADO DE SAO PAULO, BRASIL]. **M. M. Inomoto & A. R. Monteiro, USP/ESALQ/Departamento de Zoologia, Cx. P. 9, 13418-900 Piracicaba, SP, Brazil.** — *Xiphidorus minor* and *Paratrichodorus anthurii* were recorded for the first time in the State of São Paulo, Brazil, from forest remnants in Piracicaba. This population of *X. minor* had a shorter body, odontostyle, and stylet, as well as lower values of a, b, and c, than the type material. Triangular sclerotizations of the vulva, the principal diagnostic character of *P. anthurii*, were quite difficult to observe. However, other characters could be used for recognition of *P. anthurii*: a) neither the esophagus overlaps the intestine nor vice-versa; b) vulva with short transversal slit shape; c) spermatheca rounded or oval and full of sperm; d) caudal pores absent; and e) tail hemispherical.

PATHOGENICITY OF *RADOPHOLUS SIMILIS* TO *ANNONA SQUAMOSA* [PATOGENICIDAD DE *RADOPHOLUS SIMILIS* TO *ANNONA SQUAMOSA*]. **M. M. Inomoto, A. R. Monteiro & L. C. C. B. Ferraz, USP/ESALQ/Departamento de Zoologia, Cx. P. 9, 13418-900 Piracicaba, SP, Brazil.** — Two-week-old seedlings of *Annona squamosa* were transplanted from 250 ml plastic pots to 8 L black plastic bags. After 1 week, *Radopholus similis* was inoculated at doses of 0, 1 650, 4 950, 14 850, or 44 550 nematodes per bag, each treatment with 5 replications. The two highest levels of inoculum suppressed growth of *A. squamosa* 26.7% and 40.0% after 29 days, and 21.5% and 44.6% 61 days after inoculation. However, after 104 days, the affected plants did not show great differences in growth when compared with the noninoculated ones. This was probably due to the elimination of the nematodes by high temperatures in the greenhouse. This did not happen to additional plants that had been transplanted into clay pots, inoculated, and kept outside the greenhouse. The nematode was still present in the necrotic roots of these stunted plants.

A NEW *TROPHURUS* (NEMATA:BELONOLAIMIDAE) FROM FOREST REMNANTS IN PIRACICABA, STATE OF SAO PAULO, BRAZIL [UN NUEVO *TROPHURUS* (NEMATA:BELONOLAIMIDAE) DE REMANENTES FORESTALES EN PIRACICABA, SAO PAULO, BRASIL]. **M. M. Inomoto & A. R. Monteiro, USP/ESALQ/Departamento de Zoologia, Cx. P. 9, 13418-900 Piracicaba, SP, Brazil.** — *Trophurus* n. sp. collected from forest remnants in Piracicaba, São Paulo State, Brazil, is characterized by: a) middle band of lateral field wider than outer ones; b) cephalic framework weakly sclerotized; c) conus of stylet shorter than shaft (M=33.3 - 41.9); d) dorsal gland opening very close to stylet (DGO=0.9 - 1.9 µm); e) ovary outstretched and spermatheca rectangular with rounded corner; f) female tail cylindrical, with hemispherical and clavate terminus; g) cuticle of female tail terminus smooth and 4.5-7.5 µm thick; h) male bursa smooth, except anterior part, and not forming lobe. *Trophurus* n. sp. comes close to *T. sculptus*, but differs by the characters a, d, and h described above.

ERRADICAÇÃO DE *DITYLENCHUS DIPSACI*, NO ALHO ATRAVÉS DE TERMOTERAPIA [ERRADICATION OF *DITYLENCHUS DIPSACI* ON GARLIC BY HEAT]. **A. Jaehn, F.C.A./UNESP, Cx. P. 237, 18603-970 Botucatu, SP, Brasil.** — Um lote de bulbilhos de alho 'Roxo Pérola de Caçador', com um IVD entre 30 e 40% descascados e portadores do nematóide *D. dipsaci*, foi dividido em dois blocos com 8 tratamentos e 8 repetições cada. Somente o primeiro bloco, foi submetido a um preaquecimen-

to em água pura, na temperatura de 30°C durante 60 minutos. No trabalho de erradicação propriamente dito, todos os tratamentos, com ou sem preaquecimento foram imersos em banho-maria com temperatura constante e com agitação contínua do meio. A cada 30' um tratamento do bloco foi retirado de forma programada. Assim, o último, ocorreu a 210'. A temperatura de cada bloco variou entre 43°C e 50°C. Após a retirada de cada tratamento, os bulbilhos foram lavados resfriados até à temperatura ambiente e colocados em geladeira a 9°C durante 72 horas. O material foi então, macerado em liquificador durante 20 segundos e passado em peneiras "Granutest" números 60 e 400. O conteúdo retido na peneira 400, após a lavagem, foi recolhido em Becker de 50 ml. Retiraram-se então alíquotas de um ml, que transferidos para placas de Petri foram avaliados em lupa estereomicroscópica para averiguar a presença de nematóides vivos no tratamento. A linha térmica letal apareceu entre 47°C e 48°C. As temperaturas de 49°C e 50°C durante 60', independentemente dos tratamentos, com ou sem pré-aquecimento, erradicaram o *D. dipsaci* dos bulbilhos.

MICROBIAL AGENTS FOR THE BIOLOGICAL CONTROL OF PLANT-PARASITIC NEMATODES [AGENTES MICROBIANOS PARA EL CONTROL BIOLOGICO DE NEMATODOS FITOPARASITOS]. **Brian Kerry, Department of Entomology & Nematology, IACR-Rothamsted, Harpenden, Herts AL5 2JQ, U.K.** — Bacteria and fungi which may reduce the invasion of roots by nematodes and their development within roots have been isolated from soil. These natural regulators of nematode populations may be true parasites or antagonists which produce nematotoxins or may possibly induce resistance in roots to nematode attack. Progress in the development of biological control agents for nematode pests will be reviewed with special reference to control of root knot nematodes (*Meloidogyne* spp.), and the role of the host plant in the interactions between these nematodes and their natural enemies.

IN VITRO EFFICAY OF ARTHROBOTRYS SPP. AS BIOLOGICAL CONTROL AGENTS FOR PLANT-PARASITIC NEMATODES [EFECTIVIDAD IN VITRO DE ARTHROBOTRYS SPP. COMO CONTROL BIOLOGICO DE NEMATODOS FITOPARASITOS]. **R. D. Lima, S. Ferraz & W. P. Dias, UFV/DFP, 36571-000 Viçosa, MG, Brazil.** — In the last 10 years, the nematology laboratory in the Federal University of Viçosa, Brazil has been screening soil samples from all over the country for nematophagous fungi. Many *Arthrobotrys* species were isolated using the soil sprinkling technique and *Pan-agrellus* sp. as bait. From this collection, 157 isolates were evaluated against *Meloidogyne incognita* race 3, *M. javanica* and *Heterodera glycines*. PDA disks containing the fungal colonies were placed in the center of 1.5% water-agar in petri dishes and 500 second-stage juveniles were distributed around the colony. After 10-12 days a low level of predation, from zero to 10%, was shown by isolates: 126 for *M. javanica* and 114 for *M. incognita*. Only 14 isolates, in relation to *M. javanica* and 15 to *M. incognita*, showed predatory capacity higher than 50%. The juveniles of *H. glycines* were not attacked by any fungal isolates. Predation was always higher than 90% on free-living nematodes used as controls, indicating there was no loss of virulence.

LETTUCE RESISTANCE TO MELOIDOGYNE INCOGNITA AND M. ARENARIA [RESISTENCIA DE LA LECHUGA A MELOIDOGYNE INCOGNITA Y M. ARENARIA]. **A. I. L. Lordello, R. R. A. Lordello & R. S. Lisboa, EMBRAPA/IAC, Seção de Nematologia & Seção de Hortaliças, 13020-902 Campinas, SP, Brazil.** — Resistance to *Meloidogyne incognita* race 2 and *M. arenaria* race 2 in 12 lettuce (*Lactuca sativa* L.) cultivars was evaluated in 2 experiments under greenhouse conditions. After transplanting, each plant received 10 000 eggs per pot containing 1 400 cm³ of fine sand. Each treatment had 6 replications for each nematode, arranged in a completely randomized design. After 45 days, the following parameters were evaluated: gall and egg mass index, egg number per plant and per g of root, and reproduction factor (Rf). The lettuce cultivars: Brisa, Grand Rapids, Brasil 304, Verônica and Brasil 303, in decreasing order, were considered poor hosts for *M. incognita* race 2, with Rf <1. Thus, these cultivars would constitute good alternatives for planting in fields infested with this species. The cultivars, Brasil 202, Brasil 221, Regina 440, Great Lakes, Glória, Romana Baloon and Regina 71 were sus-

ceptible. All cultivars were highly susceptible to *M. arenaria* race 2, with Rf varying from 4.2 for cv. Grand Rapids to 14.1 for cv. Regina 71.

SOYBEAN CYST NEMATODE SURVEY IN BRAZIL: II [PROSPECCION II DEL NEMATODO DE LA SOYA EN BRASIL]. R. R. A. Lordello,* A. I. L. Lordello,** R. S. Berton* & F. L. Haas,*** IAC/Seção de Nematologia, Cx. P. 28, 13020-902 Campinas-SP, Brazil,* EMBRAPA/IAC, Campinas-SP, Brazil** and LAGRO, Campinas-SP, Brazil.*** — Soil samples collected in soybean fields and sent for chemical analysis at the laboratories of Instituto Agrônômico and LAGRO at Campinas, São Paulo State, were surveyed for *Heterodera glycines*. The 695 samples covered 90 counties and 13 States of Brazil (Bahia, Goiás, Maranhão, Mato Grosso, Mato Grosso do Sul, Minas Gerais, Paraná, Pernambuco, Rio Grande do Norte, Rio Grande do Sul, Rondonia, São Paulo and Tocantins), and the Federal District. The samples were processed with sieves (24 and 60-mesh), and the residues examined on discs of white filter paper. Six samples possessed *H. glycines*, 4 from Iraí de Minas (MG), one from Nova Ponte (MG), and one from Assis (SP), where 18, 9 and 4 samples were examined, respectively. The results reinforce the indication that this species is a recent introduction in Brazil due to large numbers of fields low or no infestation. Additionally, it was not detected until 1993-94, even in regions of high occurrence.

INFESTAÇÃO DE MELOIDOGYNE EM VIVEIROS DE PRODUÇÃO DE MUDAS DE CAFEEIRO NO ESTADO DO PARANÁ, PERÍODO 1984-1994 [COFFEE PLANT INFESTATION BY MELOIDOGYNE IN NURSERIES OF PARANÁ STATE, BRAZIL 1984-1994]. L. A. L. Lozano,* B. B. Santos** & R. C. Zonta Carvalho,* SEAB/CDME, Cx. P. 646, 80040-340 Curitiba, PR,* e Departamento de Biologia Geral/UFG, Cx. P. 131, 74001-970 Goiânia, GO, Brasil.** — Com base na Portaria nº 006 de 12/01/81 do Ministério da Agricultura, que credenciou a SEAB/PR como entidade certificadora e fiscalizadora de sementes e mudas, implantou-se o trabalho de diagnóstico no Centro de Diagnóstico "Marcos Enrietti". Um percentual de 0.5% das mudas de caféiro produzidas no Estado do Paraná foram coletadas, com idade de 3 a 4 pares de folhas e enviadas para análise, feita através de métodos normalmente utilizados na nematologia. Neste período de 10 anos o laboratório oficial do estado analisou 248.099 mudas sendo observada em 8.885 a presença de nematóides *Meloidogyne incognita*, *Meloidogyne exigua* e *Meloidogyne* spp. correspondendo a uma contaminação de 3.58%. Cerca de 30 variedades foram analisadas, destas 'Mundo Novo' e 'Catuaí Vermelho' corresponderam, respectivamente, a 54.84% e 24.38% das mudas coletadas e 1.64% e 0.82% das infestadas. Estima-se que cerca de 1 800 000 mudas foram destruídas neste período evitando-se assim a disseminação destes nematóides para novas áreas de plantio.

CULTIVATION OF ANTAGONISTIC FUNGI IN LOW COST SUBSTRATES AND PATHOGENICITY TEST FOR THE CONTROL OF MELOIDOGYNE JAVANICA [CULTIVO DE HONGOS ANTAGONISTAS EN SUBSTRATOS DE BAJO COSTO Y PRUEBAS DE PATOGENICIDAD PARA EL CONTROL DE MELOIDOGYNE JAVANICA]. V. de O. F. Machado & V. P. Campos, DCR EMBRAPA/CNPAF, Cx. P. 179, 74001-970 Goiânia, GO, Brazil and UFLA/Depto. Fitossanidade, Cx. P. 37, 37200-000 Lavras, MG, Brazil. — The mycelial growth and pathogenicity of *Paecilomyces lilacinus*, *Arthrobotrys conoides* and *Verticillium chlamydosporium* cultivated on rice bran, rice hulls, coffee hulls, cow manure, sugarcane bagasse and corn cobs were evaluated against *M. javanica* *in vivo* and *in vitro*. Distilled water was added to the substrates to the point of saturation, autoclaved, inoculated with fungi and incubated at 28°C for 4 days. The best mycelial growth of the fungi was obtained with rice bran. The pathogenicity of *A. conoides* grown on rice bran and *P. lilacinus* grown on corn cobs was better than with other substrates. In greenhouse studies with tomato plants, significant reduction of second-stage juveniles, eggs per g of root and total population of *M. javanica* was obtained with fungi cultivated on rice bran as compared to the control.

EFFICIENCY OF ANTAGONISTIC FUNGI CULTIVATED IN LOW COST SUBSTRATES ON THE CONTROL OF *MELOIDOGYNE JAVANICA* IN THE GREENHOUSE [EFICACIA ANTAGONISTA DE HONGOS CULTIVADOS EN SUBSTRATOS DE BAJO COSTO PARA EL CONTROL DE *MELOIDOGYNE JAVANICA* EN INVERNADERO]. V. de O. F. Machado & V. P. Campos, DCR EMBRAPA/CNPAF, Cx. P. 179, 74001-970 Goiânia, GO, Brazil, and UFLA/Depto. Fitossanidade, Cx.P. 37, 37200-000 Lavras, MG, Brazil. — The efficiency of the fungi, *Paecilomyces lilacinus*, *Arthrobotrys conoides* and *Verticillium chlamydosporium*, cultivated on rice bran, rice hulls, coffee hulls, corn cobs, sugarcane bagasse and cow manure for the control of *Meloidogyne javanica* was evaluated in the greenhouse. Ten g of infested substrate per L of potted soil was used. The fungi demonstrated good efficiency in the reduction of second-stage juveniles, eggs per g of root and total population regardless of substrates used. However, some parameters were not statistically significant. The fungi grown in cow manure significantly reduced the number of eggs, galls and eggs masses per g of root and total population of *M. javanica* as compared to others substrates.

REACTION OF SOME MEDICINAL PLANTS TO *MELOIDOGYNE INCOGNITA* RACE 2, *MELOIDOGYNE JAVANICA*, AND *PRATYLENCHUS BRACHYURUS* [REACCION DE ALGUNAS PLANTAS MEDICINALES A *MELOIDOGYNE INCOGNITA* RAZA 2, *MELOIDOGYNE JAVANICA*, Y *PRATYLENCHUS BRACHYURUS*]. S. L. Maciel & L. C. B. Ferraz, Departamento de Agronomia, UEM, Av. Colombo, 5790, 87020-900 Maringá, PR, and Departamento de Zoologia, ESALQ/Universidade de São Paulo, Cx. P. 9, 13418-900 Piracicaba, SP, Brazil. — Host suitability of 8 medicinal plant species commonly cultivated in Brazil (*Achillea millefolium*, *Achyrocline satureioides*, *Arctium lappa*, *Briophyllum calycinum*, *Coleus barbatus*, *Crassula portulaca*, *Polygonum hidropiperoides*, and *Tropaeolum majus*) in relation to *Meloidogyne incognita* race 2, *M. javanica*, and *Pratylenchus brachyurus* was evaluated under greenhouse conditions, with the temperature ranging from 17-31°C. Each plant was inoculated with approximately 5 000 eggs of both *Meloidogyne* spp. or 600 specimens of *P. brachyurus* and grown for 60 days in 600 ml polyethylene pots filled with 500 ml of a sterilized mixture of soil and cattle manure. Based on egg-mass index and reproduction factor data, *A. millefolium*, *A. lappa*, and *B. calycinum* were rated highly resistant to the 3 nematode species. *C. portulaca* was highly resistant to *M. incognita* race 2 but moderately susceptible to *M. javanica*. *P. brachyurus* reproduction was very poor in all plants, except *T. majus*, which was rated as moderate.

CONTROL DE NEMATODOS FITOPARASITOS EN VIDES EN LA 2ª ZONA CENTRAL DE CHILE [CONTROL OF PLANT PARASITIC NEMATODES ON GRAPES IN THE SECOND CENTRAL ZONE OF CHILE]. J. C. Magunacelaya, Lab. Nematología Agraria, Universidad de Chile, Casilla 1004, Santiago, Chile. — Estudios sobre las poblaciones de Nematodos fitoparásitos, presentes en suelos de viñedos var. Chardonnay de tres años en la zona de Casablanca, Quinta región de Chile, muestran la presencia de *Helicotylenchus* sp., *Paratylenchus* sp., *Tylenchorhynchus* sp., *Xiphinema americanum*, *Pratylenchus* sp. y *Meloidogyne* spp., destacándose los niveles poblacionales altos de los nemátodos del género *Meloidogyne*. Se realiza un ensayo que compara los tratamientos de 1) Carbofurano en dosis comercial de 8 lt/ha, 2) Carbofurano en dosis de 6 lt/ha, 3) Carbofurano en dosis de 2 lt/ha 3) Phenamiphos en dosis de 12 lt/ha, 5) Adición de materia orgánica y 6) Testigo sin tratamiento. Se trabajó con tres repeticiones por tratamiento. Los niveles poblacionales de *Meloidogyne* spp. en el suelo no arrojaron diferencias estadísticamente significativas entre los tratamientos.

EVEITOS DE EXSUDATOS RADICULARES DECOMPOSTOS NA ECLOSÃO DE LARVAS DE *MELOIDOGYNE INCOGNITA* RAÇA 3 [EFFECT OF COMPOSITAE ROOT EXUDATES ON THE ECLOSION OF *MELOIDOGYNE INCOGNITA* RACE 3]. N. Mauch & S. Ferraz, UFPEL-FAEM, Depto. Fitossanidade, Cx.P. 3154, 96001-970 PELOTAS, RS e UFV, Depto. De Fitopatologia, 36570-000 VIÇOSA, MG, Brasil. — Avaliou-se a influência de exsudatos radiculares de cravo-da-índia, picão-preto, zínia, tomateiro e solo sem planta, na eclosão de larvas de *Meloidogyne incognita* Raça 3, aos 5, 10,

15 e 20 dias após a retirada das plantas. Não existiu diferença significativa entre a testemunha 2 (solo sem planta) e os demais tratamentos, exceto cravo-da-índia, que apresentou maior eclosão nos períodos de cinco e dez dias. Aos quinze dias, verificaram-se, também, diferenças entre os tratamentos picão-preto, zínia e testemunha 1 (tomateiro), quando comparados com o solo sem planta. Já, aos 20 dias, verificou-se a maior taxa de eclosão, com diferença significativa, porém, somente entre o tomateiro e zínia, onde ocorreram o maior (64.3) e o menor (58.0) percentual de eclosão de larvas, respectivamente. As larvas, em sua maioria, eclodiram até o 10º dia.

SUSCETIBILIDADE DE ESPÉCIES DO GÊNERO *OCIMUM* AO NEMATÓIDE *MELOIDOGYNE JAVANICA* [SUSCEPTIBILITY OF SPECIES FROM *OCIMUM* TO *MELOIDOGYNE JAVANICA*]. E. R. Mesquita, J. K. A. Mattos & R. M. Souza, EAG & Dep. de Fitopatologia, Univ. de Brasília, 70910-970 Brasília, DF, Brasil. — O gênero *Ocimum* compreende importantes espécies de valor medicinal, popularmente conhecidas como “manjeriões” e “alfavacas”, as quais apresentam grande importância para a indústria de óleos essenciais e para a medicina popular. Algumas das mais importantes espécies do gênero são altamente suscetíveis ao nematóide das galhas *Meloidogyne javanica*, o que tem comprometido seu cultivo. Com o objetivo de revelar fontes de resistência ao nematóide, foram inoculados em vaso doze acessos do gênero *Ocimum*. A inoculação das raízes foi feita com 5 000 ovos do nematóide por planta, em delineamento inteiramente casualizado com quatro repetições. A testemunha foi o tomate *Lycopersicon esculentum* cv. Kada. Após sete semanas da inoculação foi feita a avaliação do número de galhas, massas de ovos e ovos por massa nas raízes previamente coradas com Floxina-B 0.2 g/L em água, mediante a escala de Taylor e Sasser (1975). Os resultados apresentam como resistente apenas o *O. gratissimum*, como altamente suscetível o *O. basilicum*, ficando os dez acessos restantes apenas como suscetíveis.

MORPHOLOGICAL COMPARISONS OF *GLOBODERA TABACUM VIRGINIAE* AND *G. TOBACUM SOLANACEARUM* ON TWO HOSTS [COMPARACIONES MORFOLOGICAS DE *GLOBODERA TABACUM VIRGINIAE* Y *G. TOBACUM SOLANACEARUM* EN DOS HOSPEDANTES]. L. I. Miller, Department of Plant Pathology, Physiology and Weed Sci., Virginia Tech, Blacksburg, VA 24061, U.S.A. — Comparisons were made of 125 specimens of second-stage juveniles (J2), males, females and cysts of *G. tobacco virginiae* (N₁) cv. and *G. tabacum solanacearum* (N₂) cultured on *Solanum carolinense* (P₁) and *G. tabacum solanacearum* (N₂) cultured on *Solanum carolinense* (P₁) and *Nicotiana tabacum* ‘VA 312’ tobacco (P₂). Hosts P₁ and P₂ significantly influenced dimensions of N₁ and N₂ for Hesling’s ratio, length, (with or without neck), width and fenestral length for cysts; and for length and width of eggs with J2 and length of unsegmented eggs. These measurements negate meaningful comparisons of N₁ and N₂ for those characters unless both nematode subspecies were compared on the same host. Dimensions of the following characters were not influenced by host but comparisons between N₁ and N₂ were not significantly different: stylet length, tail length, shape and size of stylet knobs, Miller’s θ d of J2 and distance between anus to fenestra of cysts. P₁ or P₂ did not influence dimensions of either N₁ or N₂ and were useful hosts to compare the following characters that differentiate the two subspecies: perineal pattern, Granek’s ratio, color, shape, and length/width ratio of cysts; DGO, length, and tail length of males; width of unsegmented eggs; stylet length, stylet knob width, stylet cone length and θ d value of dorsal stylet knob of females.

MORPHOLOGICAL IDENTIFICATION OF *MELOIDOGYNE* POPULATIONS FROM COFFEE PLANTATIONS IN SAO PAULO STATE, BRAZIL [IDENTIFICACION Y MORFOLOGICA DE POBLACIONES DE *MELOIDOGYNE* DE PLANTACIONES DE CAFE DE SAO PAULO, BRASIL]. A. R. Monteiro,* C. M. G. Oliveira,* L. C. C. B. Ferraz* & W. Gonçalves,** USP/ESALQ/Departamento de Zoologia, Cx. P. 9, 13418-900 Piracicaba, SP,* and Instituto Agrônomico de Campinas/Seção de Genética. Cx. P. 28. 13001-970 Campinas, SP, Brazil.** — The optical microscope morphological study of females and second-stage juveniles of *Meloidogyne* populations, taken from 30 farms in the

State of São Paulo, revealed that there are, besides *M. exigua*, *M. incognita*, and *M. javanica*, at least 2 undescribed species. One population is similar to *M. incognita* but differs in having the perineal pattern usually more dorso-ventrally stretched, and a wider anal opening. In addition, its second-stage juvenile has a longer hyaline tail zone. The other population could be mistaken for *M. arenaria*, but the rounded perineal pattern has a less wide anal opening, and its second-stage juvenile has a hyaline tail zone similar to that of the first population, but with a more finely rounded tail tip.

EFFECTO ANTAGONICO DE DIFERENTES ESPECIES VEGETALES SOBRE LAS POBLACIONES DE MELOIDOGYNE SPP. EN EL CULTIVO DEL GUAYABO (*PSIDIUM GUAJAVA* L.) EN VENEZUELA [ANTAGONISTIC EFFECT OF DIFFERENT PLANT SPECIES AGAINST MELOIDOGYNE POPULATIONS ON GUAVA (*PSIDIUM GUAJAVA* L.) IN VENEZUELA]. **A. Montiel, D. Romero, F. Valbuena & C. Castro, Facultad de Agronomía, Universidad del Zulia, Partado 15205, Venezuela.** — Para evaluar la capacidad antagónica de diferentes especies vegetales sobre las poblaciones de nemátodos del género *Meloidogyne*, al desarrollarse junto a plantas de guayabo (*Psidium guajava* L.), se estableció un ensayo experimental en umbráculo en el Centro de Frutícola, Edo. Zulia, Venezuela. Se incluyeron los tratamientos testigo sin inóculo, testigo con inóculo, *Cajanus cajan*, *Canavalia ensiformis* y *Tagetes* sp. Fueron evaluadas las variables indirectas altura de plantas (ALP), peso seco (PES), peso fresco (PEF), peso de raíz (PER), número de hojas (NUH) y las directas número de agallas (NUA), población de nemátodos en las raíces (POR) y población de nemátodos en el suelo (POS). El diseño experimental fué un completamente aleatorizado, *Canavalia ensiformis* y *Tagetes* sp. redujeron en forma altamente significativa la POR (58,71% y 85,66% respectivamente) así como el grado de agallamiento en las raíces (65,56% y 91,91% respectivamente), no hubo diferencias significativas entre *Cajanus cajan* y testigo con inóculo. En las especies vegetales estudiadas las diferencias altamente significativas observadas sobre las variables ALP, PEF y NUH, fueron debidas a un efecto de competencia o alelopatía de las especies vegetales sobre el guayabo y no a un efecto sobre el desarrollo de los nemátodos. Las variables PES, PER y POS no fueron afectadas.

REAÇÃO DE GENÓTIPOS DE SOJA AO NEMATÓIDE DE CISTO (*HETERODERA GLYCINES*), RAÇA 14, EM GOIÁS, BRASIL [GENOTYPE REACTION IN SOYBEAN TO CYST NEMATODE (*HETERODERA GLYCINES*) RACE 14 IN GOIAS STATE, BRAZIL]. **W. A. Moreira,* M. S. Assunção** & F. S. A. Matos,** EMBRAPA/CPATSA, Cx.P. 23, 56300-300 PETROLINA, PE* & EMBRAPA/EMGOPA, Cx.P. 49, 74001-970 GOIÂNIA, GO, Brasil.**** — Foram avaliados 144 genótipos de ciclo precoce, médio e tardio, incluindo cultivares comerciais e linhagens do programa de melhoramento para o cerrado, frente a uma população nativa de nematóide de cisto na Fazenda Mida, Município de Chapadão do Céu, determinada como pertencente à raça 14, com base no número de fêmeas encontrado nas cultivares diferenciais (Pickett 71, Pelsing, PI 88788, PI 90763 em comparação com a Lee). A cv. Cristalina foi incluída no ensaio para comparação. O experimento foi instalado em 08/11/94 e aos 33-35 dias do plantio foi efetuada contagem do número de fêmeas no sistema radicular das plantas. A reação dos genótipos foi caracterizada com base na tabela proposta por Schmitt & Shamon (1992), considerando-se o percentual de reprodução comparativamente ao hospedeiro suscetível que nesse caso foi a cv. Cristalina. Com base nesse critério, nenhum dos genótipos testados foi considerado resistente, apenas 13 linhagens e 01 cultivar foram consideradas moderadamente resistentes ou seja: ciclo precoce (BR 91-10556, BR 92-15266, BR 92-15454, BR 90-4722, GOBR 91-13367, BR 92-15463, BR 90-4630, BR 90-4617 e Hartwig, incluída como testemunha); ciclo médio (GO 90-112016, BR 91-10569 e BR 92-15440); ciclo longo (GOBR 91-17408); ciclo não definido (BR 92-15458).

BRAZILIAN NEMATOLOGY: HISTORY AND PERSPECTIVE [HISTORIA DE LA NEMATOLOGIA EN BRASIL Y PERSPECTIVAS]. **A.R. Monteiro, USP/ESALQ/Departamento de Zoologia, Cx. P. 9, 13418-900 Piracicaba, SP, Brazil.** — The history of Brazilian nematology started with the note of Jobert (1878) and the classical paper of Goeldi (1887/1892) concerning the coffee tree nematosis in

Brazil. However, it was the First Brazilian Plant Nematology Course, taught by Dr. Gotthold Steiner in 1951 at the Instituto Agrônomo de Campinas by solicitation of Dr. Olavo José Boock, that gave the fundamental base for the development of the discipline in this country. The work conducted by Steiner's disciples was essential for this purpose. The efforts of the great pioneer, Dr. Luiz Gonzaga E. Lordello ("Father of Brazilian Nematology"), and other Brazilian and foreign nematologists resulted in the recognition of the importance of plant-parasitic nematodes in Brazil. In this way, plant nematology teaching, research, and extension were started and improved all around the country. Today, agronomists and farmers want to know more about plant-parasitic nematodes and their control in Brazil. Much has been done but much more must be done. The future is promising.

EFFECTIVIDAD DE DOS BIOESTIMULANTES DE SUELO PARA MINIMIZAR EL EFECTO DE NEMATODOS FITOPARASITOS DE JITOMATE EN MORELOS, MEXICO [EFFICACY OF TWO SOIL BIOSTIMULANTS TO REDUCE TOMATO DAMAGE BY NEMATODES IN MORELOS, MEXICO].

M. Mundo-Ocampo,* J. Mundo O. & P. Conde A.,**** Departamento de Nematología, Universidad de California, Riverside, CA 92521* y Universidad Autónoma del Estado de Morelos, Av. Universidad 1001 Chamilpa, Morelos, México.** — La restricción del uso de pesticidas agrícolas es evidente en los países desarrollados; sin embargo, en países de Latinoamérica a menudo éstos se continúan utilizando sin las precauciones necesarias. En parte el problema radica en que el agricultor no tiene alternativas adecuadas y utiliza los pesticidas disponibles comercialmente. Es entonces prioritaria la búsqueda de productos que ofrezcan posibilidades viables al agricultor y que al mismo tiempo minimizen el problema de la contaminación ambiental. Se estudió el efecto de dos bioestimulantes de suelo: Sincocin® y Agrispon® a una dosis de 1L por ha, para minimizar el efecto de nemátodos fitoparásitos en el cultivo de jitomate (*Lycopersicum esculentum*). Un campo infestado, principalmente con *Rotylenchulus reniformis*, *Meloidogyne* spp., *Hoplolaimus* sp. y *Tylenchorhynchus* sp. fue tratado con los dos productos mencionados en combinación con tres niveles de nitrógeno (25%, 50% y 100% de la dosis comercial) y comparadas contra Carbofuran. Aunque no se observó una reducción significativa de las poblaciones de nemátodos, el mejor rendimiento se obtuvo con la combinación de ambos productos y la dosis completa de nitrógeno.

TRATAMIENTO DE LA SEMILLA DE AJO CON TERMOTERAPIA PARA ELIMINAR DITYLENCHUS DIPSACI EN EL VALLE DE TAMBO, PERU [SEED TREATMENTS OF GARLIC BY THERMOTHERAPY TO ELIMINATE DITYLENCHUS DIPSACI IN THE TAMBO VALLEY, PERU].

M. Mundo-Ocampo,* E. Herrera & L. Castillo R.,**** Departamento de Nematología de la Universidad de California, Riverside, CA 92521 U.S.A.* y Convenio ADEX-USAID-MSP Lima, Perú.** — Durante los últimos cinco años, principalmente en la campina de Arequipa y en el Valle de Tambo, la producción de ajo ha sido reducida considerablemente por el daño que el nemátodo de los bulbos y los tallos *Ditylenchus dipsaci* ocasiona al cultivo. El tratamiento de la semilla con termoterapia ha sido utilizado como una de las medidas más efectiva para eliminar al nemátodo del material vegetativo que es utilizado en la propagación del cultivo. Aunque en la región se han hecho intentos para adoptar el uso de esta práctica, no se han obtenido los resultados esperados debido a que el equipo utilizado no tiene las características adecuadas para garantizar la efectividad del tratamiento. Por lo que se ha diseñado un sistema semicomercial, portátil, con una fuente de calor a base de gas butano que puede tratar hasta 500 kg de semilla. Se presentan los detalles de la construcción del equipo y se discute el procedimiento utilizado para la desinfestación del material de siembra.

ANALYSIS OF ESTERASE ALLOZYMES FROM CHINESE, JAPANESE, AND U.S.A. POPULATIONS OF HETERODERA GLYCINES [ANALISIS DE ALOENZIMAS ESTERASICAS DE POBLACIONES DE HETERODERA GLYCINES DE CHINA, JAPON Y E.U.A.]. G. R. Noel & Z. L. Liu, USDA-ARS and Department of Food Science, University of Illinois, Urbana, IL 61801, U.S.A. — Individual females from 20 populations of *Heterodera glycines* from China, Japan, and the United States were analyzed for esterase polymorphism. Eight esterase phenotypes were resolved. Three loci, est-1,

est-2 and est-3, were identified, having two, three and one allele, respectively. The 3 loci expressed 6 genotypes in the 5 Chinese populations. Loci est-2 and est-3 were identified in 6 Japanese populations and expressed 4 genotypes, whereas only est-2 and 3 genotypes were identified in populations from the U.S.A. Genetic composition at each locus was defined as a character for data analysis. Relationships among populations were consistent using phylogenetic (phylogenetic analysis using parsimony [PAUP]) and phenetic (unweighted pair-group method with arithmetic mean [UPGMA]) analysis. Larger numbers of loci and alleles in Chinese populations and similarities among Japanese and U.S.A. populations are consistent with the hypothesis that the ancestral *Heterodera glycines* originated in China and that Japanese and U.S.A. populations are result of recent migration.

ROTATION OF SOYBEAN RESISTANCE GENES REDUCES *HETERODERA GLYCINES* POPULATION BELOW DETECTION LEVEL [ROTACION DE SOYA RESISTENTES PARA REDUCIR LOS NIVELES POBLACIONALES DE *HETERODERA GLYCINES* POR DEBAJO DEL NIVEL DE DETECCION]. G. R. Noel & D. I. Edwards, USDA-ARS and Department of Plant Pathology, University of Illinois, Urbana, IL 61801, U.S.A. — A 10-yr field study was initiated to follow population development of *Heterodera glycines* after introduction of 50 cysts/plot into a field with no history of soybean production. Soybean cultivars either susceptible or resistant to *H. glycines* were grown either in monoculture or rotated with maize in a 2-yr rotation. During the first 5 yrs, resistant cultivars with the Peking source of resistance were planted. Monoculture of Peking resistance resulted in 18 cysts/250 cm³ of soil, while populations in the continuous cropping of susceptible soybean increased to 45/250 cm³. During years 6-10, resistant cultivars having the PI 88.788 source of resistance were planted. In year 6, numbers of cysts declined to 1/250 cm³ and by year 10, no cysts were found in any plots. Numbers of cysts in plots planted to continuous susceptible soybean remained nearly constant during years 6-10.

NEMATOLOGICAL SURVEY IN CITRUS ORCHARDS FROM SAO PAULO STATE, BRAZIL [PROSPECCION NEMATOLOGICA EN HUERTOS DE CITRICOS EN SÃO PAULO, BRASIL]. W. R. T. Novaretti,* M. Okamura,** S. Zambon** & Z. Correia,** A.N.N.A./Laboratório de Nematologia, Rua Francisco P. Maia, 100, Piracicaba, SP,* and Rhodia/Agro Ltda., Av. Maria Coelho Aguiar, 215, São Paulo, SP, Brazil.** — During a nematological survey in citrus orchards from São Paulo State, Brazil, approximately 190 samples were collected from 55 different locations. *Tylenchulus semi-penetrans* was the most frequently found species, occurring in 73.7% of the orchards. Population levels as high as 1 000 juveniles + young females per 5 g roots were detected in about 56% of these samples. *Pratylenchus coffeae* was found in 3 orchards, and its population ranged from 480 to 2 480 specimens per 5 g roots.

PATHOGENICITY AND CONTROL OF SUGARCANE NEMATODES IN BRAZIL [PATOGENICIDAD Y CONTROL DE NEMATODOS DE LA CAÑA EN BRASIL]. W.R.T. Novaretti, A.N.N.A./Laboratório de Nematologia, Rua Francisco P. Maia, 100 Piracicaba, SP, Brazil. — The major nematode problems in the most important sugarcane producing areas of São Paulo State, Brazil, are *Meloidogyne javanica*, *M. incognita*, *Pratylenchus zeae*, and *P. brachyurus*. Ectoparasitic forms such as *Helicotylenchus* and *Paratrichodorus* spp. only reach high populations and affect crop production under very favorable edaphic and climatic conditions. For years, the use of nematicides (systemic carbamates) proved to be a profitable control technique, allowing yield increases which ranged from 20 to 40 T/ha. More recently, integrated control programs including resistant/tolerant varieties, cultural practices (crop rotation, green manure), and application of nematicides have been evaluated with promising results.

INHIBICION DE LA EMERGENCIA DE J2 DE *MELOIDOGYNE INCOGNITA* POR MOLECULAS SOLUBLES DE *EUPHORBIA* SP. ELUIDAS EN GEL FILTRACION [HATCHING INHIBITION OF *MELOIDOGYNE INCOGNITA* J2 BY SOLUBLE MOLECULES OF *EUPHORBIA* SP. ELUDED BY GEL

FILTRATION]. **J. Olivera, A. Marcelo, E. Arbaiza & A. González**, Centro de Investigacion de Bioquímica y Nutricion, y UNMSM, Apartado 1546, Lima, Peru, y Centro Internacional de la Papa, Apartado 1558, Lima, Peru. — Con la fracción P1 de *Euphorbia* sp.; (extraída con sulfato de amonio, 0-30% p/v), realizamos una nueva separación en columna de Sephadex G-75, y 50 m M de fosfato, 107 m M de Na Cl, p H 7. Obtuvimos 58 tubos leídos a 215 nm. que fueron llevados a una absorvencia de 1.0 a 215 nm. En el bioensayo se expusieron 3 masas de huevos de *M. incognita* por cada tubo eluído durante 3 días. Después las eluciones fueron cambiados por agua destilada evaluándose la emergencia por 7 días. Los resultados nos sugieren inhibición de la emergencia de moléculas que corresponden a pesos moleculares de 70, 25, 18 y menores de 3 kilodaltons.

LOW TEMPERATURE SCANNING ELECTRON MICROSCOPE OBSERVATIONS ON MELOIDOGYNE INCOGNITA EMBRYO DEVELOPMENT [MICROSCOPIA DE BARRIDO A BAJA TEMPERATURA PARA OBSERVAR EL DESARROLLO DEL EMBRION DE MELOIDOGYNE INCOGNITA]. **D. Orion**, Department of Nematology, Agricultural Research Organization, The Volcani Center, Bet-Dagan, Israel. — Egg masses of the root-knot nematode, *Meloidogyne incognita*, obtained from monoxenic cultures were fractured and observed in a low temperature scanning electron microscope. The egg-shell surface and the stages of the nematode embryo development from one cell through cleavages, blastula, gastrula, differentiation, morphogenesis, elongation and molt of J1 juvenile within the egg shell are presented in a series of SEM-graphs.

THE INFLUENCE OF PLANT-PARASITIC NEMATODES ON COTTON PRODUCTION IN LOUISIANA, U.S.A. [LA INFLUENCIA DE NEMATODOS FITOPARASITOS EN LA PRODUCCION DE ALGODON EN LOUISIANA, E.U.A.]. **C. Overstreet & E. C. McGawley**, Louisiana Cooperative Extension Service and Department of Plant Pathology and Crop Physiology, LSU Agricultural Center, Baton Rouge, LA 70803, U.S.A. — Cotton is severely injured in Louisiana by both the root-knot nematode (*Meloidogyne incognita*) and the reniform nematode (*Rotylenchulus reniformis*). A survey was conducted during 1994 in 100 cotton fields from the major production areas, primarily in the northeast region of the state. Reniform nematode was found in 59% of the fields while root-knot was present in 15% of the fields surveyed. Nematicides are currently recommended as a management practice and approximately 60-70% of the cotton acreage is treated with aldicarb. A number of cultivar trials have been conducted in reniform infested fields. Currently, no cultivar has any known level of resistance and none have been consistent top producers in a number of different locations.

AValiação fitopatológica de linhagens, híbridos F₁ e cultivares de pimentão (*Capsicum annuum*), a resistência a *Meloidogyne incognita* (raças 1, 2, 3 e 4) e a *M. javanica* [PHYTOPATOLOGICAL EVALUATION OF LINES, F₁ HYBRIDS AND CULTIVARS OF CHILI (*CAPSICUM ANNUUM*) TO *MELOIDOGYNE INCOGNITA* (RACES 1, 2, 3 AND 4) AND *M. JAVANICA*]. **J. R. Peixoto,* W. R. Maluf** & V. P. Campos,**** Trabalho executado com apoio da Pioneer Sementes Ltda., Universidade Federal de Uberlândia, Cx. P. 593, 38400-902 Uberlândia, MG,* e Universidade Federal de Lavras, Cx. P. 37, 37200-000 Lavras, MG, Brasil.** — Com o objetivo de avaliar a resistência de 47 genótipos de pimentão aos nematóides do gênero *Meloidogyne* spp., foi conduzido um experimento numa das estufas da Pioneer Sementes Ltda; utilizando-se o delineamento blocos casualizados em esquema de parcela subdividida, com 5 repetições e 8 plantas em cada subparcela. Todas as cultivares e linhagens-padrão (Linha 004 e 006) foram susceptíveis às raças 1, 2, 3 e 4 de *M. incognita* com exceção da cultivar Agrônômico 8, a qual foi moderadamente resistente às raças 3 e 4, e das cultivares Nacional AG-506 e Ikeda, as quais foram moderadamente resistentes à raça 4. Todas as linhagens experimentais foram resistentes às 4 raças de *M. incognita*, o mesmo ocorrendo com os híbridos F₁, apesar de o grau de resistência dos híbridos, em geral, ter sido inferior ao das linhagens. Todos os genótipos foram resistentes a *M. javanica*.

AVALIAÇÃO GENÉTICA DE LINHAGENS, HÍBRIDOS F₁ E CULTIVARES DE PIMENTÃO (*CAP-SICUM ANNUUM*), QUANTO A RESISTÊNCIA A *MELOIDOGYNE INCOGNITA* (RAÇAS 1, 2, 3 E 4) E A *M. JAVANICA* [GENETIC EVALUATION OF LINES, F₁ HYBRIDS AND CULTIVARS OF CHILI (*CAP-SICUM ANNUUM*) FOR RESISTANCE TO *MELOIDOGYNE INCOGNITA* (RACES 1,2,3,4) AND *M. JAVANICA*]. J. R. Peixoto,* W. R. Maluf & V. P. Campos,** Trabalho executado com apoio da Pioneer Sementes Ltda., Universidade Federal de Uberlândia, Cx. P. 593, 38400-902 Uberlândia, MG* e Universidade Federal de Lavras, Cx. P. 37, 37200-000 Lavras, MG, Brasil.** — Com o objetivo de avaliar a resistência de 47 genótipos de pimentão aos nematóides do gênero *Meloidogyne* spp., foi conduzido um experimento numa das estufas da Pioneer Sementes Ltda, utilizando-se o delineamento blocos casualizados em esquema de parcela subdividida, com 5 repetições e 8 plantas em cada sub-parcela. De forma geral, as cultivares e linhagens-padrão foram susceptíveis a *M. incognita* e todas as linhagens experimentais foram resistentes às 4 raças de *M. incognita*, o mesmo ocorrendo com os híbridos F₁ apesar de o grau de resistência dos híbridos, em geral, ter sido inferior ao das linhagens, sendo viável a utilização dos mesmos. Todos os genótipos foram resistentes a *M. javanica*. O alelo Me1 (oriundo de PM 217) e o alelo Me3 (oriundo de PM 687), presentes nas linhagens, são efetivos para controlar a resistência e possuem efeito de dominância incompleta.**

SELEÇÃO DE LINHAGENS DE PIMENTÃO (*CAP-SICUM ANNUUM*) RESISTENTES A *MELOIDOGYNE INCOGNITA* (RAÇA 2) [SELECTION OF RESISTANT LINES OF CHILI (*CAP-SICUM ANNUUM*) TO *MELOIDOGYNE INCOGNITA* (RACE 2)]. J. R. Peixoto,* W. R. Maluf, V. P. Campos** & J. M. dos Santos,** Universidade Federal de Uberlândia, Cx. P. 593, 38400-901 Uberlândia, MG* e Universidade Federal de Lavras, Cx. P. 37, 37200-000 Lavras, MG, Brasil.** — Com o objetivo de selecionar linhagens de pimentão resistentes à raça 2 de *M. incognita*, foram avaliadas 81 linhagens experimentais numa das estufas da Universidade Federal de Lavras, utilizando-se o delineamento blocos casualizados, com 84 tratamentos (81 linhagens e 3 cultivares - Nacional AG-506, Ikeda e Agrônomo 8). As cultivares foram susceptíveis a *M. incognita*. Foram selecionadas as linhagens com 75% ou mais de plantas sem galhas, de modo a maximizar a probabilidade de se escolherem linhagens homozigóticas para os alelos de resistência em questão (Me1 e Me3). A herdabilidade estimada no sentido amplo e o ganho com a seleção foram altos, indicando que a maior parte da variação é devida a causas genéticas, sendo pequeno o efeito ambiental. As linhagens podem ser usadas como cultivares “per se” ou como linhagens parentais em híbridos F₁ resistentes.**

TREATMENT OF RICE SEED INFESTED WITH *DITYLENCHUS* SP. AND *APHELENCHOIDES* SP. [TRATAMIENTO DE SEMILLAS DE ARROZ INFECTADAS CON *DITYLENCHUS* SP. Y *APHELENCHOIDES* SP.]. F. P. Pinheiro, A. L. Bárbara & R. C. V. Tenente, EMBRAPA/CENARGEN, Cx.P. 2372, 70849-970 Brasília, DF, Brazil. — The efficacy of several physical and chemical methods to eradicate *Ditylenchus* sp. and *Aphelenchoides* sp. in rice seed was evaluated. Eight replicates of 50 seed each were treated as follows: 1) moist heat of 40°C for 15, 30 or 60 minutes, followed by moist heat of 60°C for 5, 8 or 10 minutes, respectively; 2) dry heat of 60°C for 6 hours followed by dry heat of 90°C for 4, 6, 8 or 12 hours; 3) sodium hypochlorite (1% or 2%) plus 0.5% formol for 15 or 30 minutes; and 4) carbofuran 350 SX at 1x and 2x recommended dosage for 30 minutes. Four replicates of each treatment were used to evaluate efficacy by Baermann funnel extraction. The other 4 replicates were used to evaluate percent germination, vigor, and root size. All treatments eradicated both nematode species. Untreated controls exhibited an average of 97% germination, 96% vigor and 6.45 cm root length. Sodium hypochlorite-formol treatments reduced root growth compared to controls. Moist heat of 40°C for 30 minutes, followed by moist heat of 60°C for 8 minutes resulted in the best seed performance (96% germination, 94.5% vigor and 7.42 cm root length).

THE POTENTIAL FOR RESISTANCE TO CYST NEMATODE IN TRANSGENIC PLANTS WHICH EXPRESS ANTIBODIES [POTENCIAL DE RESISTENCIA PARA NEMATODO DE QUISTE EN PLANTAS TRANSGENICAS QUE PRESENTAN ANTICUERPOS]. B. Ramos,* R. Curtis,**

K. Evans, P. Burrows** & P. Haydock,** Crop and Environment Research Centre, Harper Adams University Sector College, Newport, Shropshire, TF10 8NB, U.K.,* and Entomology and Nematology Department, IACR - Rothamsted, Harpenden Herts, AL5 2JQ, U.K.**** — Each year, potato cyst nematode (PCN) causes great damage to potato crops worldwide. Monoclonal antibodies (MAbs) are invaluable tools for identification of nematode antigens, and they may also be used in a novel control measure. Specific antibodies have been expressed in plants (plantibodies) that bind to plant viruses and provide some protection against viral attack. A bank of MAbs to PCN has been produced at Rothamsted and is currently being screened by indirect immunofluorescence. The proteins recognized by the selected MAbs will be characterized. MAbs with potential to interfere in nematode development will be cloned as short-chain antibody fragments for expression in plants. Protocols will be devised to analyze the efficacy of these MAbs in reducing infection and development. Preliminary results on the identification and characterization of nematode antigens recognized by MAbs with the potential to be used as “plantibodies” will be presented.

BIOLOGIA DE MELOIDOGYNE INCOGNITA RAÇA 2 (TYLENCHIDA-MELOIDOGYNIDAE) EM FEIJOEIRO (*PHASEOLUS VULGARIS* L.) [BIOLOGY OF *MELOIDOGYNE INCOGNITA* RACE 2 ON BEANS (*PHASEOLUS VULGARIS* L.)]. **N. M. S. Risso & A. Jaehn, FFALM/BR 369, km 54, 86360-000 Bandeirantes, PR* e UNESP/SFCA, Cx. P. 237, 18603-970 Botucatu, SP, Brasil.** — Estudou-se a biologia de *Meloidogyne incognita* Raça 2 em feijoeiros (*Phaseolus vulgaris*), nas linhagens IAPAR MD-806 (IAPAR 57) e IAPAR MD-808, e na cultivar IAPAR 14, usada como padrão de susceptibilidade. O ensaio foi desenvolvido em vasos com uma planta cada, em casa-de-vegetação, sob temperatura média de 24.8°C. Os feijoeiros foram inoculados com 5 000 ovos e eventuais larvas. Os dados foram coletados de quatro em quatro dias à partir do 16º da inoculação, avaliando-se o número de nematóides presentes em todo o sistema radicular, bem como a fase do ciclo biológico em que se encontravam, até o aparecimento das primeiras fêmeas com ovos. No feijoeiro IAPAR MD-806 o ciclo se completou em 36 dias, no IAPAR MD-808 em 28 dias e no IAPAR 14 em 24 dias, o que permitiu projetar os números de: 2.3; 3.0 e 3.5 gerações respectivamente, nos feijoeiros estudados.

BIOLOGIA DE MELOIDOGYNE INCOGNITA RAÇA 3 (TYLENCHIDA-MELOIDOGYNIDAE) EM FEIJOEIRO (*PHASEOLUS VULGARIS* L.) [BIOLOGY OF *MELOIDOGYNE INCOGNITA* RACE 3 ON BEAN (*PHASEOLUS VULGARIS* L.)]. **N. M. S. Risso & A. Jaehn, FFALM/BR 369, km 54, 86360-000 Bandeirantes, PR e UNESP/FCA, Cx. P. 237, 18603-970 Botucatu, SP, Brasil.** — Estudou-se a biologia de *Meloidogyne incognita* Raça 3 em feijoeiros (*Phaseolus vulgaris* L.) nas linhagens IAPAR MD-806 e IAPAR MD-808, e na cultivar IAPAR 14, usada como padrão de susceptibilidade. O ensaio foi desenvolvido em vasos com uma planta cada, em casa-de-vegetação, sob temperatura média de 24.8°C. Os feijoeiros foram inoculados com 5 000 ovos e eventuais larvas. Os dados foram coletados de quatro em quatro dias à partir de 16º da inoculação, avaliando-se o número de nematóides presentes em todo o sistema radicular, bem como a fase em que se encontravam. Com o surgimento das primeiras fêmeas com ovos interromperam-se as avaliações. Em feijoeiro IAPAR MD-806 o ciclo foi de 32 dias, em IAPAR MD-808 de 28 dias e em IAPAR 14, 28 dias, o que permitiu projetar os números de: 2.6; 3.0 e 3.0 gerações respectivamente, nos feijoeiros estudados.

BIOLOGIA DE MELOIDOGYNE JAVANICA (TYLENCHIDA: MELOIDOGYNIDAE) EM FEIJOEIRO (*PHASEOLUS VULGARIS* L.) [BIOLOGY OF *MELOIDOGYNE JAVANICA* ON BEAN (*PHASEOLUS VULGARIS* L.)]. **N. M. S. Risso & A. Jaehn, FFALM/BR 369, km 54, 86360-000 Bandeirantes, PR, e UNESP/FCA, Cx. P. 237, 18603-970 Botucatu-SP, Brasil.** — Estudou-se a biologia de *Meloidogyne javanica* em feijoeiros (*Phaseolus vulgaris* L.), nas linhagens IAPAR MD-806 e IAPAR MD-808, e na cultivar IAPAR 14, usada como padrão de susceptibilidade. O ensaio foi desenvolvido em vasos com uma planta cada, em casa-de-vegetação, sob temperatura de 24.8°C. Os feijoeiros foram inoculados com 5 000 ovos e eventuais larvas. Os dados foram coletados de quatro em quatro dias à partir do 16º da inoculação, avaliando-se o número de nematóides presentes em todo o sistema radicular, bem como a fase

em que se encontravam. Com o surgimento das primeiras fêmeas com ovos foram interrompidas as avaliações. Em feijoeiro IAPAR MD-806 o ciclo foi de 36 dias, em IAPAR MD-808 de 28 dias e em IAPAR 14 também 28 dias, o que permitiu projetar os números de: 2.3; 3.0 e 3.0 gerações respectivamente, nos feijoeiros estudados.

EVALUATION OF ROOTSTOCK RESISTANCE OF CITRUS TREES TO *TYLENCHULUS SEMIPENETRANS* COBB [EVALUACION DE LA RESISTENCIA DE TRES PORTA INJERTOS DE CITRICOS AL NEMATODO *TYLENCHULUS SEMIPENETRANS* COBB]. **A. B. Salibe, A. Jaehn & W. Albino, FCA-UNESP, Cx. P. 237, 18603-970 Botucatu, SP, Brazil.** — The degree of resistance of various citrus rootstocks to the citrus nematode, *T. semipenetrans*, was investigated through the analysis of roots three experimental orchards. Two of them were randomized rootstock experiments, having as scion varieties Pera orange and Owari Satsuma mandarin. The other one was a plot of unbudded seedlings of the same rootstocks, 12 years old. Of the 8 rootstocks included in the experiments, none were found immune or totally resistant. Highest populations of the nematode occurred in trees budded on Rangpur lime (up to 6 000 nematodes per 20 g of rootlets), the most commonly used rootstock in Brazil. Lowest number of nematodes were found in rootlets of Carrizo citrange, Volkamer lemon and Cleopatra mandarin. Intermediate populations were found on Trifoliate orange, Rough lemon, Sweet orange and Sunki mandarin. High populations of nematodes, independent of the rootstock, were found in the trees with Pera orange scion and unbudded seedlings. Trees of Satsuma mandarin revealed a considerably smaller number of nematodes, indicating an evident effect of the scion variety on the total number of nematodes in the root system (40 to 480 individuals per 20 g of rootlets).

EFFECTIVENESS OF FIVE NEMATOPHAGOUS FUNGI ON THE CONTROL OF *MELOIDOGYNE* SPP. IN THREE SUCCESSIVE CROPS [EFECTIVIDAD DE CINCO HONGOS NEMATOFAGOS PARA EL CONTROL DE *MELOIDOGYNE* SPP. EN TRES CULTIVOS SUCESIVOS]. **M. A dos Santos & S. Ferraz, Departamento de Fitopatologia, Universidade Federal de Viçosa, 36571-000 Viçosa, MG, Brazil.** — Five nematophagous fungi were tested under greenhouse conditions to control *Meloidogyne arenaria*, *M. incognita* and *M. javanica* in snap bean, tomato and lettuce grown in this order. The fungi were: *Monacrosporium ellipsosporum*, *Arthrobotrys robusta* and 3 species belonging to the subdivision mastigomycotina, all isolated from Brazilian soils. Carbofuran was used as a control. *Monacrosporium ellipsosporum* was the most efficient fungus to reduce the populations of all 3 *Meloidogyne* species, mainly *M. arenaria* and *M. javanica*, as compared to the other fungi and the nematicide treatment. This fungus is now under evaluation in the field.

***MELOIDOGYNE EXIGUA* AND *LASIODIPLODIA THEOBROMAE*: THE MAIN BIOTIC COMPONENTS OF A DISEASE COMPLEX OF RUBBER TREES IN MATO GROSSO STATE, BRAZIL** [*MELOIDOGYNE EXIGUA* Y *LASIODIPLODIA THEOBROMAE*: PRINCIPALES COMPONENTES BIOTICOS DE UNA ENFERMEDAD COMPLEJA EN ARBOLES DE HULE EN GROSSO, BRASIL]. **J. M. dos Santos, UNESP/FCAV, Dept. Entomologia e Nematologia, Rod. Carlos Tonanni, Km 5, 14870-000 Jaboticabal, SP, Brazil.** — Evidence indicates that some branches in the upper part of shrubs and trees receive a more direct influence from some portions of the root system than from others. Consequently, the damage caused by root pathogens may lead to different degrees of stress among branches. *Meloidogyne exigua* causes severe galling of the root system of rubber trees in Mato Grosso. Galls measure 3 to 5 mm in diam and frequently carry several females partially inside the stele. As many as 12 individuals were observed in a single transversal section 15 mm thick. Giant cells were observed only inside the stele, resulting in severe distortion of the xylem and associated tissues. *Lasiodiplodia theobromae*, a known opportunistic pathogenic fungus causes dieback of rubber trees, mostly those with galled roots. The infection starts in a branch causing drying and goes down to the trunk, sometimes leading to the death of the tree.

MORPHOMETRIC AND BIOCHEMICAL DETAILS OF *MELOIDOGYNE* N. SP., A NEW ROOT-KNOT NEMATODE OF COFFEE IN BRAZIL [DETALLES MORFOMETRICOS Y BIOQUIMICOS DE *MELOIDOGYNE* N. SP., UNA NUEVA ESPECIE DE NEMATODO AGALLADOR EN CAFE, BRASIL]. J. M. dos Santos,* W. Gonçalves** & A. Jaehn,*** UNESP/FCAVJ/DEN Rod. Carlos Tonanni Km 5, 14870-000 Jaboticabal, SP,* IAC, Seção de Genética, Campinas, SP** and UNESP/FCA/DDF, Botucatu, SP, Brazil.*** — Perineal patterns of *Meloidogyne* n. sp. found in coffee (*Coffea arabica*) in São Paulo and Paraná States, characteristically show a high, squarish arch shaped by widely spaced, coarse striae intercalated with fine ones. Irregularly oriented short, coarse and broken striae are seen above the anus and around the tail area. Short, fine and diverging oriented striae are observed at the ends of the vulval slit. Female stylets measure about 17 µm, DGO 3 µm, and stylet knobs are about two times wider than high. The excretory pore opens about 31 µm from the end of the head. Males are about 1 730 µm long. Examination by SEM (face view) shows that the head cap is oval shaped. Labial disc and medial lips are fused. The robust stylet, about 24 µm long, has large and rounded knobs. The head region is usually smooth but may have 1 or 2 small incomplete annulations on the dorsal and/or ventral sides. Light microscopy shows (lateral view) that the head cap is slightly wider than the head region. Second-stage juveniles, about 430 µm long, have a smooth head region, a stylet about 11 µm long and a tail 50 µm long. *Meloidogyne* n. sp. has an esterase phenotype formed by 2 very close bands whose rate of migration is similar to that of higher mobility in the esterase phenotype of *M. javanica*.

SEM STUDY OF *HOPLOLAIMUS GALEATUS* FOUND IN JABOTICABAL, SP, BRAZIL AND ITS POTENTIAL AS A THREAT TO LOCAL AGROECOSYSTEMS [ESTUDIO EN MICROSCOPIA DE BARRIDO SOBRE *HOPLOLAIMUS GALEATUS* ENCONTRADO EN JABOTICABAL, SP, BRASIL Y SU POTENCIAL AMENAZADOR PARA AGROECOSISTEMAS LOCALES]. J. M. dos Santos & Arlete S. Maia, UNESP/FCAV, Depto. Entomologia e Nematologia, Rod. Carlos Tonanni, Km 5, 14870-000 Jaboticabal, SP, Brazil. — From a soil sample collected in a corn field at Jaboticabal, SP, 196 individuals of *Hoplolaimus galeatus*/100 cm³ of soil were recovered. The field showed patches with stunted and yellowed plants. SEM study of females and males was conducted to help identify the species and determine the variability of some morphological characters. The head of the male and female is set off from the body, usually with 4 to 6 annuli. The basal annule has 32 to 38 longitudinal striations. A SEM face view shows the head region divided into 6 sectors of approximately equal size. The labial disk is rounded and well-marked. The lateral field is areolated with 4 incisures. The tail is rounded with 9-12 annuli. The male is usually smaller and more slender than the female. The head region is higher and less conoid than in females. The gubernaculum has 2 lateral tiillae, and the broad bursa is striated, enveloping the tail. Since *H. galeatus* elsewhere is damaging to sugarcane, corn, cotton and soybean, some of the most important crops of the region, this nematode should be seen as a threat to our agroecosystems.

INTEGRATED MANAGEMENT OF ROOT-KNOT AND LESION NEMATODES UNDER SAVANNA CONDITIONS [MANEJO INTEGRADO DE NEMATODOS AGALLADORES Y LESIONADORES EN CONDICIONES DE SAVANA]. R. D. Sharma & A. C. Gomes, EMBRAPA/CPAC, Cx. P. 08223, 73301-970 Planaltina, DF, Brazil. — During the 1986 to 1989 cropping seasons, integrated management to control root-knot nematode, *Meloidogyne javanica*, and root lesion nematode, *Pratylenchus brachyurus*, in Oxisol (Dark Red Latossol) under savanna conditions was studied. Main plot treatments consisted of six different cropping sequences to study the effect of previous crops on nematode control. An initial crop of either soybean, beans, upland rice, peanut, corn and sanhemp as green manure was followed by a bean-corn-pea sequence, then the initial crops (soybean, beans, upland rice, peanut, corn, sanhemp as green manure) repeated followed by a resistant variety of wheat. Subplot treatments consisted of either no nematicide (check) or phenamiphos 10G at 4 kg a.i./ha applied to only the initial crops, peas, and wheat. Best control of nematodes and highest crop yields

were obtained in the following cropping sequences combined with nematicide: 1) sanhemp-beans-corn-peas-sanhemp-wheat; 2) peanut-beans-corn-peas-peanut-wheat; 3) corn-beans-corn-peas-corn-wheat.

FITONEMATÓIDES ASSOCIADOS A SOJA NO SUL DO MARANHÃO, BRASIL [PLANT PARASITIC NEMATODES ASSOCIATED WITH SOYBEAN IN MARANHÃO STATE, BRAZIL]. **G. S. Silva, EMAPA/UEMA, Cx. P. 176, 65001-970 São Luís, MA, Brasil.** — Exame de 116 amostras de raízes e solo da rizosfera de soja, coletadas em três municípios no Sul do Maranhão revelou a presença dos seguintes fitonematóides: *Criconemella* sp. (89.6%), *Helicotylenchus dihystra* (73.0%), *Peltamigratus* sp. (39.6%), *Meloidogyne* spp. (26.7%), *Xiphinema* spp. (19.8%), *Pratylenchus brachyurus* (10.3%) e *Hemicycliophora* sp. (5.2%). Das populações de *Meloidogyne*, 67.7% foram identificadas como *M. javanica* e 29.0% como *M. incognita* raças 1 e/ou 2.

PASTEURIA PENETRANS PARASITANDO FITONEMATÓIDES NO ESTADO DO MARANHÃO, BRASIL [PASTEURIA PENETRANS PARASITING PLANT PARASITIC NEMATODES IN MARANHÃO, BRAZIL]. **G. S. Silva & M. A. C. Rodrigues, UEMA/EMAPA, Cx. P. 176, 65001-970 São Luís, MA, Brasil.** — *Pasteuria penetrans* foi identificada parasitando fitonematóides extraídos de amostras de solo coletadas em diversos locais do Estado do Maranhão. Até o presente, *Meloidogyne incognita*, *M. javanica* e *Helicotylenchus* sp. foram os nematóides encontrados parasitados naturalmente. A patogenicidade dos isolados de *Pasteuria* obtidos, a vários fitonematóides de importância econômica está sendo avaliada.

EFFECT OF CROP ROTATIONS ON MELOIDOGYNE INCOGNITA BIOTYPE IAPAR [EFECTO DE ROTACIONES DE CULTIVOS EN EL BIOTIPO IAPAR DE MELOIDOGYNE INCOGNITA]. **J. F. V. Silva & R. G. Carneiro, EMBRAPA-CNPSo. P.O. Box 231, 86001-970 Londrina, PR, and IAPAR. P.O. Box 1331, 86001-970 Londrina, PR, Brazil.** — The effects of 16 crop rotations on populations of *M. incognita* biotype IAPAR were studied in a 2.5-year field experiment in Astorga-PR (89% sand, 2% silt, 9% clay, pH 4.7, 0.7% organic matter). The field had been in coffee for the preceeding 6 years. The experimental design was a randomized complete block with 5 replications. Each plot was 3-m-wide and 10-m-long. Soil samples for nematode analysis were collected from each plot (two composite samples/plot consisted each of 4 soil cores) which were collected from the root zone of the plants to a depth of 15 to 20 cm in April and October of 1992, and January, May and October of 1993 and 1994. For each composite sample, a 50 cm³ subsample was removed for nematode extraction using Baermann funnels, and 500 cm³ was used to estimate the population by gall index in tomato. The following crop rotation schedule can be used to reduce *M. incognita* biotype IAPAR population in infested fields:

oat (<i>A. sativa</i>)	- peanut	- <i>C. spectabilis</i>
oat (<i>A. sativa</i>)	- peanut	- velvet bean
oat (<i>A. strigosa</i>)	- peanut	- <i>C. spectabilis</i>
oat (<i>A. strigosa</i>)	- peanut	- velvet bean
oat (<i>A. sativa</i>)	- common bean	- corn/ <i>C. mucronata</i>
oat (<i>A. sativa</i>)	- common bean	- corn/ <i>C. spectabilis</i>
oat (<i>A. sativa</i>)	- peanut	- corn/ <i>C. mucronata</i>
oat (<i>A. sativa</i>)	- peanut	- corn/velvet bean

REACTION OF CULTIVARS AND LINES OF SOYBEAN TO HETERODERA GLYCINES ICHINOHE, RACE 3 [REACCIONES DE CULTIVARES Y LINEAS DE SOYA A HETERODERA GLYCINES ICHINOHE, RAZA 3]. **J. A. L. de Silva, T. Sedyama, W. P. Dias & S. Ferraz, UFV/DFP, 36571-000 Viçosa, MG, Brazil.** — The following soybean varieties and lines were evaluated: Bibosi-93, Bibosi-94,

L-082-91-A, L-2621, L-6092-91-A, L-6059-91-A and L-6001-91-A originated from Colombia and supplied by CIAT-ANAPO (Santa Cruz, Bolivia) UFV90-361861, UFV90-361796, UFV91-751-10, UFV89-2461226, UFV91-751-8, UFV91-61-15, UFV92-050492, UFV89-361826, FT-Estrela, FT-Cometa and Ipagro-21 from the germplasm bank of the Federal University of Viçosa, Brazil. For race identification purposes the differentials, Pickett, Peking, PI 88788 and PI 90763, were included. The variety FT-Cristalina was the standard of susceptibility. Each plant was inoculated with 2 000 eggs of *H. glycines*, and evaluation was performed 29 days later. The number of females in the root systems was determined, and the female index (FI) calculated. The absence of females on the differentials confirmed the inoculum as race 3. All genotypes were susceptible, except the variety Ipagro-21 (FI=3.3).

STRATEGY FOR CONTROL OF *RADOPHOLUS SIMILIS* IN BANANA PLANTATIONS USING VITROPLANTS [ESTRATEGIA PARA CONTROLAR A *RADOPHOLUS SIMILIS* EN BANANO UTILIZANDO VITROPLANTAS]. S. P. Silva Neto, Departamento de Biotecnologia, CAMPO - Cia. de Promoção Agrícola, Cx. P. 139, 38600-000 Paracatu, MG, Brazil. — Two experiments were conducted in the field using clean and contaminated soil to test the efficiency of the conventional control methods of *R. similis* compared to alternative methods using vitroplants. In the first, clean soil was planted with vitroplants without any chemical treatment (carborfuran 5%) or with contaminated rhizomes. The vitroplants were Nanicão (*Musa* AAA), a Cavendish clone susceptible to *R. similis*. Sixteen months after planting, it was observed that the conventional chemical treatment and scalpel was not effective in cleaning contaminated planting material. Presence of nematodes was detected in 18% of families which came from rhizomes. A second experiment, tested the elimination of the old plantation, followed alternatively by (1) immediate replanting with vitroplants; (2) fallowing 6 months and replanting with vitroplants and (3) cultivation of *Tagetes* spp., incorporation after flowering and replanting with vitroplants. During the first 16 months, visual symptoms were not observed in the roots, or the shape and number of fruits in treatments (2) and (3). However, the number and size of fruits were inferior in treatment (1), suggesting that a fallow period of at least 6 months is necessary before replanting with vitroplants.

PLANT PARASITIC NEMATODES IN ECONOMIC CULTURES [NEMATODOS FITOPARASITOS EN CULTIVOS ECONOMICOS]. S. G. P. da Silveira & J. C. F. Coutinho, Laboratory of Nematology, Department of Agriculture Defense, CATI, P.O. Box 960, 13073-001 Campinas, SP, Brazil — During the period from January 1993 to February 1995, the Laboratory of Nematology processed 763 samples of plants. In 244 of these, the presence of plant parasitic nematodes were observed. These samples were processed from 76 counties of São Paulo State, 5 from Rio Grande do Sul State, 7 from Santa Catarina State in Brazil and 1 from Cordoba in Argentina. First records of presence in Brazil are reported: *Ditylenchus myceliophagus* in orchids destined for export and produced in Campinas county, SP, *Hemicycliophora* sp. in citrus nurseries of Ijuí and Pereci Novo, RS, and *Tylenchulus semipenetrans* in citrus nurseries of Laurentino and Rio do Oeste counties, SC.

PHYTOPARASITIC NEMATODES ASSOCIATED WITH FRUIT TREES IN RIO GRANDE DO SUL, BRAZIL [NEMATODOS FITOPARSITOS ASOCIADOS A CULTIVOS DE FRUTALES EN RIO GRANDE DO SUL, BRASIL]. C. A. Sperandio, P. Sedrez & L. F. Lopes, Fac. de Agronomia -FAEM/ UFPel, Cx. P. 354, 96001-730 Pelotas, RS, Brazil. — Fifty soil and root samples of 7 species of fruit trees from Rio Grande do Sul state were examined. The samples were collected in 9 localities within the state and the phytoparasitic nematodes and their percentage of occurrence were as follows: *Helicotylenchus* sp. (68), *Xiphinema* sp. (44), *Tylenchus* spp. (34), *Aphelenchus* sp. (32), *Helicotylenchus dihyss-tera* (32), *Criconemella* sp. (28), *Paratrichodorus minor* (28), *Pratylenchus* sp. (24), *Meloidogyne* spp. (16) *Criconemella xenoplax* (12), *Xiphinema californicum* (12), *Aphelenchus avenae* and *Hemicycliophora* sp. (10), *Pratylenchus zeae*, *Aphelenchoides* spp., *Hemicycliophora lutosa* and *Criconemella onensis* (6), *Hoplolaimus galeatus*, *Helicotylenchus crenacauda*, *Xiphinema krugi*, *Tylenchulus semipenetrans*, *Hemicycliophora poranga*

and *Rotylenchus caudaphasmidius* (4), *Coslenchus alacinatus*, *Meloidogyne javanica*, *Ogma civellae*, *Rotylenchus* sp. and *Tylenchorhynchus annulatus* (2).

EFFECT OF TEMPERATURE ON RESISTANCE IN GERmplasm OF *PHASEOLUS VULGARIS* AND THE DEVELOPMENT OF *MELOIDOGYNE* SPP. [EFECTO DE TEMPERATURA SOBRE LA RESISTENCIA EN GERMOPLASMA DE *PHASEOLUS VULGARIS* Y EN DESARROLLO DE *MELOIDOGYNE* SPP.]. G. M. Sydenham, R. McSorley & R. A. Dunn, Entomology and Nematology Department, University of Florida, Gainesville, FL 32611-0620, U.S.A. — Two experiments were conducted in growth chambers to determine the effects of temperature on the expression of resistance in *P. vulgaris* germplasm to *Meloidogyne* spp. Plants were maintained in growth pouches at pre/post inoculation temperatures of 24/24, 24/28, 28/24, or 28/28° C. In the experiment with resistant Nemasnap, which contains gene system 1, numbers of *M. incognita* race 2 were similar at all temperature regimes. In the second experiment, similar results were obtained with *M. arenaria* race 1 entering roots of resistant G1805, which contains gene system 2. Resistance in Nemasnap and G1805 was effective in suppressing numbers of nematodes within roots compared with numbers in susceptible Black Valentine roots in both experiments. However, advanced developmental stages were reached more rapidly at regimes with the higher post-inoculation temperature on the resistant germplasm in both experiments. The same trend also was observed on the susceptible Black Valentine control in both experiments. Therefore, increased temperature under these conditions affects rates of development of nematodes in resistant germplasm as well as in susceptible germplasm, rather than reducing resistance to the nematodes.

PENETRATION AND DEVELOPMENT OF *MELOIDOGYNE* SPP. IN ROOTS OF RESISTANT AND SUSCEPTIBLE GERmplasm OF *PHASEOLUS VULGARIS* [PENETRACION Y DESARROLLO DE *MELOIDOGYNE* SPP. EN RAICES DE GERMOPLASMA RESISTENTES Y SUSCEPTIBLES DE *PHASEOLUS VULGARIS*]. G. M. Sydenham, R. A. McSorley & R. A. Dunn, Entomology and Nematology Department, University of Florida, Gainesville, FL 32611-0620, U.S.A. — Effects of two genetic resistance systems in *P. vulgaris* germplasm on penetration and development of *Meloidogyne* spp. were studied under growth room conditions at 22-25°C. Up to 7 days after inoculation, there were no differences in numbers of *M. incognita* race 2 juveniles penetrating roots of susceptible Black Valentine and resistant Nemasnap, which contains gene system 1. After 7 days, more nematodes were present in roots of Black Valentine, and more nematodes reached advanced stages of development. Rate of development into mature females continued to be greater in Black Valentine roots than in Nemasnap roots. Differences in total numbers of *M. arenaria* race I in roots of susceptible Black Valentine and resistant G1805, which contains gene system 2, were significant 14 days after inoculation, and they continued to be higher in roots of Black Valentine plants after this time. Also in this gene system, advanced stages of development occurred earlier and in greater numbers in susceptible plants than in resistant plants. In these studies, resistance to *M. incognita* race 2 and *M. arenaria* race 1 in bean lines which contain gene system 1 and gene system 2, respectively, was expressed by delayed development rather than by differential penetration compared with susceptible plants.

NEMATODES ASSOCIATED WITH IMPORTED GERmplasm AND THEIR ERADICATION [NEMATODOS ASOCIADOS A GERMOPLASMA IMPORTADO Y SU ERRADICACION]. R. C. V. Tenente & E. Costa Manso, EMBRAPA/CENARGEN, Cx. P. 2372, 70849-970 Brasília, DF, Brazil. — The Nematology laboratory in the Exchange and Quarantine Section of CENARGEN/EMBRAPA inspected 4265 imported plant germplasm samples for contamination by plant parasitic nematodes in 1994. Methods used included Baermann funnels and trays, tissue maceration and cyst flotation. Plant parasitic nematodes were detected in 556 samples from various countries. *Ditylenchus* sp. was detected in black pepper and *D. dipsaci* in garlic. Rice was found to be infected by *Aphelenchoides* sp., *A. besseyi* and *Ditylenchus* sp.; *Aphelenchoides* sp. was also found in garlic. Juveniles in the order Dorylaimida were

found in *Bracharia*. Nematodes were eradicated from germplasm tissue using dry and moist heat treatments, depending on the plant. Black pepper tissues were disinfected using tissue culture. All germplasm sources were eventually certified free of nematodes and made available to plant breeders.

PRATYLENCHUS COFFEAEE TYLENCHULUS SEMIPENETRANS CAUSAM REDUÇÃO DE PRODUTIVIDADE DE CITRUS EM SÃO PAULO, BRASIL [PRATYLENCHUS COFFEAEE AND TYLENCHULUS SEMIPENETRANS CAUSAL AGENTS OF REDUCED CITRUS PRODUCTION IN SAO PAULO, BRAZIL]. F. Tersi, J. dos Santos & A. Maia, UNESP/FCAVJ, Depto. Entomologia e Nematologia, Rod. Carlos Tonanni Km 05, 14870-000 Jaboticabal, SP, Brasil. — No Serviço de Clínica Nematológica da UNESP/Faculdade de Ciências Agrárias e Veterinárias de Jaboticabal-SP, tem sido frequente a detecção de *Pratylenchus coffeae* em amostras coletadas na rizosfera de citrus em São Paulo. A presença do nematóide tem sido associada com redução de crescimento das plantas e outras desordens. Recentemente, numa amostra coletada em um pomar da variedade Valência com oito anos de idade, enxertada sobre limoeiro cravo, em um solo podzólico vermelho amarelo, textura média, no município de Itápolis, foram detectados 13 920 indivíduos de *Tylenchulus semipenetrans* e 8 880 indivíduos de *Pratylenchus coffeae* em 10 g de raízes. Muitas plantas exibiam redução de crescimento e produtividade, ramos mais finos, folhas menores e cloróticas, frutos menores, menor emissão de brotação nova e menor quantidade de radículas na projeção da copa, quando comparadas com plantas de um talhão adjacente, cuja população desses nematóides se encontrava em níveis muito mais baixos. O exame de machos e fêmeas da população de *Pratylenchus coffeae*, ao microscópio eletrônico de varredura, permitiu a confirmação da identidade da espécie, a observação e a documentação detalhada de caracteres morfológicos relevantes.

EFFECT OF GREEN MANURE SPECIES ON PAECILOMYCES LILACINUS [EFECTO DE COBERTURAS VIVAS EN PAECILOMYCES LILACINUS]. M. S. Tomizawa & J. F. V. Silva, University of Londrina, Agronomic Institute of Paraná Laboratory, Londrina, PR, and EMBRAPA-CNPSo. P.O. Box 231, 86001-970 Londrina, PR, Brazil. — The objective of this research was to evaluate the effects of *Mucuna deeringiana* and *Crotalaria spectabilis*, both with low C:N ratios, and CRPC *Avena strigosa*, with high C:N ratio, on the population of the nematode egg parasitic fungus, *Paecilomyces lilacinus*. The study was conducted under greenhouse conditions using 1 L capacity clay pots. The different green manure species were added to the soil in a proportion of 6 mT/ha dry matter. The fungus was formulated on coarsely ground rice and 2 g of this inoculum was added to each pot. A completely randomized experimental design, with 4 replications, was used for arranging pots on a greenhouse bench. Monthly evaluations were performed by successive soil dilutions and inoculation of *P. lilacinus* on selective medium. Results indicated no statistically significant differences between the different green manures on the population of the fungus in the soil. However, *M. deeringiana* promoted the highest increase of the fungal population in the soil.

EFFECT OF LEGUMES USED AS GREEN MANURE ON HETERODERA GLYCINES [EFECTO DE LEGUMINOSAS UTILIZADAS COMO COBERTURAS VIVAS SOBRE HETERODERA GLYCINES]. L. A. C. Valle, S. Ferraz & W. P. Dias, Departamento de Fitopatologia, Universidade Federal de Viçosa, 36571-000 Viçosa, MG, Brazil. — The potential of some legumes in reducing *H. glycines* population levels in soil was evaluated under greenhouse conditions. The following species were tested by planting in pots with naturally infested soil (1 plant per pot): pigeon pea (*Cajanus cajan* 'IAC-Fava Larga'), *Centrosema plumieri*, *C. pubescens*, *Crotalaria spectabilis*, *C. striata*, black velvetbean (*Mucuna atterima*), dwarf velvetbean (*M. deeringiana*) and soybean (*Glycine max* 'FT-Cristalina'). One treatment without plants (fallow) also was included. In the Cristalina soybean, number of cysts, eggs and J2/100 ml of soil were evaluated at 60 and 120 days after planting. At these times, a bioassay was conducted in which the number of females on roots of soybean 30 days after planting was determined.

In the first evaluation (60 days), the roots of the legumes species were examined for the presence of females of the nematode. In the bioassay at 120 days, the fresh top and root weights of the soybean plants also were obtained. Females of the nematode were found only in soybean and *Centrosema plumieri*. All the legumes reduced nematode population levels and increased the fresh weight of the soybean plants in bioassays compared to the check (soybean-soybean). *Mucuna* spp., pigeon pea and *C. striata* gave the best results and were selected for field tests.

HOST SUITABILITY OF SOME PLANT SPECIES TO THE SOYBEAN CYST NEMATODE, *HETERODERA GLYCINES* [RESPUESTA DE ALGUNAS ESPECIES DE PLANTAS HOSPEDANTES AL NEMATODO QUISTE *HETERODERA GLYCINES*]. L. A. C. Valle, W. P. Dias & S. Ferraz, Departamento de Fitopatologia, Universidade Federal de Viçosa, 36571-000 Viçosa, MG, Brazil. —The soybean cyst nematode (SCN) was introduced recently in Brazil, and there are only a few basic studies on *H. glycines* in this country. With the purpose of obtaining information on the host range of a race 3 SCN population from Nova Ponte - MG, the following plant species were tested: *Crotalaria juncea* 'IAC-1', *C. paulina*, *C. spectabilis*, *C. striata*, *Canavalia gladiata*, pigeon pea (*Cajanus cajan* 'IAC-Fava Larga'), lab lab (*Lab lab purpureus* 'IAC-697'), dwarf velvetbean (*Mucuna deeringiana*), black velvetbean (*Mucuna aterrima*), adzuki bean (*Vigna angularis* 'AL-9'), mung bean (*Vigna radiata* 'M-124') and soybean (*Glycine max* 'FT-Cristalina') (susceptible check) from Leguminosae (=Fabaceae), tomato (*Lycopersicon esculentum* 'Santa Cruz') from Solanaceae and *Chaenopodium ambrosioides* from Chenopodiaceae. The number of females per root system was determined in 4 plants from each treatment at 30 and 45 days after inoculation of 4 200 eggs and juveniles per plant. The root systems of 2 plants from each treatment were stained to observe the presence and development of the nematode. In both evaluations, females were found in soybean (34 and 84), adzuki bean (51 and 35), mung bean (19 and 4), *C. juncea* (5 and 8) and pigeon pea (1 and 1). Females were not found in the other species. Juveniles of the nematode were observed in almost all the species, except lab lab, tomato and *Chaenopodium ambrosioides*. In the roots of *Mucuna* spp. and *Crotalaria striata*, there were males and empty cuticles but no females.

DEVELOPMENT OF A NEW BIOLOGICAL NEMATOCIDAL COMPOSITION [DESARROLLO DE UNA NUEVA COMPOSICION DE BIONEMATOCIDA]. P. Warrior, L. Rehberger & P. Grau, Abbott Laboratories, 6131 RFD, Oakwood Road, Long Grove, Illinois 60047, U.S.A. —Target pest-directed screening efforts resulted in the discovery of a nematocidal composition designated ABG-9008 produced by an isolate of a soil fungus, originally isolated from nematode cadavers. Laboratory and greenhouse tests demonstrated significant levels of nematode control. Field studies on carrots, tomatoes, and cauliflower indicated that ABG-9008 provided commercially acceptable control of the root-knot nematode, *Meloidogyne incognita*, and cyst nematode, *Heterodera schachtii*, while enhancing crop yields. The toxicological profile of the final product is quite favorable. Current efforts are directed at field development of a commercial product.