CHEMICAL AND BIOLOGICAL ALTERNATIVES FOR MANAGEMENT OF PLANT-PARASITIC NEMATODES IN CHILEAN VINEYARDS, INCLUDING RHIZOBACTERIA ISOLATED FROM PRODUCTIVE PLANTATIONS [ALTERNATIVAS QUÍMICAS Y BIOLÓGICAS PARA EL MANEJO DE NEMÁTODOS FITOPARÁSITOS EN PLANTACIONES CHILENAS DE VID, INCLUYENDO RHIZOBACTERIAS AISLADAS DE PLANTACIONES PRODUCTIVAS]. **E. Aballay. Departamento de Sanidad Vegetal, Universidad de Chile, P.O. Box 1004, Santiago, Chile. eaballay@uchile.cl.** The incidence of plant-parasitic nematodes in vineyards is very high, with several genera associated with root systems including rootstocks, in all varieties. Most control programs are based on chemical nematicides, organophosphates and carbamates but the introduction of some *Paecylomices lilacinus* strains has promoted the search and evaluation of other alternatives to the use of chemicals. This information is particularly valuable for those trying to develop commercial products based on native microorganisms. The results obtained with this fungus have been erratic. Some of the new developing alternatives are based in the isolation of rizobacterias from grape root systems grown in soils with low presence of parasitic nematodes along the productive area. Many of these bacterial strains have been evaluated in vitro and with potted plants, assessing their impact on the parasitism and damages caused by *Xiphinema index* and *Meloidogyne ethiopica*, the most important nematodes associated with the crop. The results obtained after several studies conducted over three years show that some of these strains are able to protect the growth of new roots, resulting in lower numbers of damaged roots and better growth.

GOING BEYOND GALL INDEX IN STUDYING AND REPORTING RESISTANCE TO ROOT-KNOT NEMATODES [lLENDO MÁS LEJOS DEL INDICE DE AGALLAMIENTO EN ESTUDIOS Y REPORTES DE RESISTENCIA AL NEMATODO AGALLADOR DE RAÍCES]. **S. O. Afolami, J. J. Atungwu, S. B. Orisajo and S. Odeyemi. Department of Crop pRotection University of Agriculture PMB 2240, Abeokuta, Nigeria. steveafolami@yahoo.com.** This work reviewed the standardized method used by the Co-operators of the International *Meloidogyne* Project in the seventies and eighties and offers a modification that divides a resistance study into two phases within one experiment. To achieve this, the replication initially is double the required number for one experiment; but a minimum of six. The first phase terminates at about sixty days after inoculation, using randomly selected half of the replicates in each treatment (minimum of three replicates) to know the gall index (GI), reproduction factor (R) and effect of the nematodes on plant growth. The other replicates are nurtured to harvest stage to provide yield data for statistical analysis. The level of plant resistance is determined using GI as measure of plant reaction to the nematode, R as measure of host suitability and yield as measure of plant damage, instead of GI that was previously used. The method considers damage from a utility point since most growers are more concerned with yield than number of galls that may have developed in the roots as a result of nematode infection. The quantitative scheme for assignment of resistance designations to plants is modified to include yield. Data from studies on rice, cowpea and soybean are presented to demonstrate the efficacy of the suggested modification.

CULTURAL MANAGEMENT OF SUGAR CANE FOR THE CONTROL OF *PRATYLENCHUS ZEAE* [MANEJO CULTURAL DE CAÑA DE AZÚCAR PARA EL CONTROL DE *PRATYLENCHUS ZEAE*]. **G. C. S. Alves, J. M. Santos, P. L. M. Soares, R. Ferreira. Júnior; F. G. Jesus; M. R. Rocha. 2009. Laboratório de Nematologia, Escola de Agronomia, Universidade Federal de Goiás, 74001-970, Goiânia, GO, Brazil, Laboratório de Nematologia, Faculdade de Agronomia e Veterinária de Jaboticabal, 14884-900 Jaboticabal, SP, Brazil. gleinacosta@yahoo.com.br.** Sugar cane has a great economic importance for Brazil and its productivity has suffered because of plant-parasitic nematodes attack. The aim of this study was to evaluate in the field, the influence of a synthetic nematicide and a bacterial isolate, applied to sugar cane line and between sugar cane lines on population of *Pratylenchus zeae*. The trial was installed in area of sugar cane variety SP87-365, in Itápolis, São Paulo state. The trial de-

sign was randomized blocks with six treatments and four replications. Each plot was five rows by 10 meters in length, are considered the three central lines as useful area. The treatments were: 1. Control in the row; 2. Control in between lines; 3. Aldicarb 150 g on line; 4. Aldicarb 150 g between rows; 5. Bacterial isolate FCAV 9 + organic mineral fertilizer in the row; and 6. Bacterial isolate FCAV 9 + organic mineral fertilizer in rows. All treatments were applied manually at planting. The evaluations consisted of samples of soil and roots, collected monthly until 210 days after planting, extraction and counting of nematodes. At 270 days, the last sampling took place and biometric analysis of height and number of tillers was done. The population of *P. zeae* was significantly reduced only by planting in rows. The use of isolated bacterial FCAV 9 + organic mineral fertilizer in the between rows resulted in an increase in the number of tillers.

POTENTIAL *IN VITRO* RHIZOBACTERIA FOR THE CONTROL OF KEY NEMATODE, FOR SUGAR CANE [POTENCIAL DE RHIZOBACTERIA *IN VITRO* PARA EL CONTROL DE NEMÁTODOS CLAVE EN LA CAÑA DE AZÚCAR]**. G. C. S. Alves, J. M. Santos, P. L. M. Soares, R. Ferreira. Júnior; F. G. Jesus; M. R. ALMEIDA, E. J. Rocha. 2009. Laboratório de Nematologia, Escola de Agronomia, Universidade Federal de Goiás, 74001-970, Goiânia, GO, Brazil; Laboratório de Nematologia, Faculdade de Agronomia e Veterinária de Jaboticabal, 14884-900 Jaboticabal, SP, Brazil. gleinacosta@yahoo.com.br.** The nematodes *Meloidogyne incognita, M. javanica* and *Pratylenchus zeae* are considered key nematodes for the sugar cane crop in Brazil. Among management practices for decreasing nematode infestation, biological control is an important alternative for the major crops. The objective was to evaluate the *in vitro* action of 21 isolates of rhizobacteria on hatching and motility of second stage juveniles (J2) of *M. incognita, M. javanica* and on the motility of *Pratylenchus brachyurus.* Two trials were conducted and arranged in a randomized design. The first trial had 11 treatments (rhizobateria + control) and four replications. The isolates were prepared for an absorbance of 0.2%, and ratings were up to 9 days. The second trial had 12 treatments (rhizobateria + control) and four replications. The isolates were prepared for an absorbance of 0.7%, and ratings were up to the 6th day. The bacterial isolates FCAV 6, FCAV 8 and FCAV 10 showed ovicidal action for *M. javanica.* Isolates FCAV 5, FCAV 7 and *Bacillus amyloliquefaciens* controlled 100% of *P.zeae.* These results confirm the potential of rhizobacteria for nematode control.

PROSPECCIÓN DE NEMATODOS ENTOMOPATÓGENOS DEL GÉNERO *STEINERNEMA* Y *HETERORHABDITIS* PARA EL CONTROL DE *TECIA SOLANIVORA*, POLILLA DE LA PAPA EN ECUADOR [PROSPECTION OF ENTOMOPATHOGENIC NEMATODES THE *STEINERNEMA* AND *HETERORHABDITIS* GENUS FOR THE CONTROL OF *TECIA SOLANIVORA,* IN POTATO IN ECUADOR]**. E. E. Argotti1, P. Hernández, J. Alcazar[2], P. Gallegos[3]. [1]Carrera de Ciencias Agropecuarias sto. Domingo, Escuela Politécnica del Ejército, Sangolquí, Ecuador. aeduardoargotti27@gmail.com, [2]Centro Internacional de la papa (CIP-Perú), Lima, Perú. j.alcazar@cgiar.org, [3]Departamento de Protección Vegetal, estación experimental santa catalina, INIAP, ecuador gallegos@fpapa.org.ec.** Muestras de suelo de los sistemas de producción papa-pasto, papa-otro cultivo, almacenamiento, vegetación natural y frutales de las provincias de Carchi, Cotopaxi, Chimborazo y Tungurahua, fueron evaluadas para establecer la presencia de nematodos entomopatógenos del género *Steinernema* y *Heterorhabditis*, utilizando como insecto cebo larvas de *Galleria mellonella.* De las 357 muestras evaluadas, 28 (7,8%) aislamientos fueron positivas para NEPs. La virulencia de los aislamientos se evaluó mediante re-infecciones a larvas de *G. mellonella* con 100 infectivos juveniles (IJs); por la sintomatología mostrada, 15 pertenecen al género *Steinernema* y 13 a *Heterorhabditis.* Los aislamientos que mostraron mortalidades superiores al 90% fueron evaluados sobre larvas del cuarto instar de *Tecia solanivora*, utilizando el método "One on One" (*Steinernema*) y "Five on One" (*Heterorhabditis*). "Five on One" mostró el 54,8% en relación a One on One con el 19,1%. Los aislamientos H01T y CC01 que presentaron mayor virulencia fueron evaluados a concentraciones de 0, 1, 2, 4, 8 y 16 IJs sobre larvas de *T. solanivora.* Los resultados obtenidos fueron sometidos a análisis Probit, en la que se determinó una dosis letal media (DL_{50}) de 2,4 y 1,8 IJs/larva, respectivamente. El potencial de reproducción de una larva de

T. solanivora de 45 y 53 mg inoculados con 20 IJs de H01T y CC01 producen 57667 y 53200 IJs/larva, respectivamente. La mayor producción de IJs de CC01 y H01T se presentó a los 4,3 y 7 días después del inicio de la emergencia con 28200 y 30800 IJs/larva. El desplazamiento de los IJs de CC01 y H01T en sustrato suelo y arena al 10 y 11% de humedad relativa fueron más eficientes a 5 cm de profundidad. El promedio de inoculación óptimo para la infección de *T. solanivora* con CC01 y H01T es de 22,33 ± 0,65 y 24,80 ± 0,63 IJs/larva. Rangos de humedad superiores al 15% en sustrato arena y 5 cm de profundidad fueron los más óptimos para H01T y CC01. Los aislamientos CC01 y H01T mostraron ser altamente patogénicos para otras plagas como *Symmestrichema tangolias* y *Premnotrypes vorax* con mortalidades superiores al 67 y 85% y 41 y 39%, respectivamente a la misma dosis letal media (DL_{50}) utilizada para *T. solanivora*.

EFFECT OF VINASSE ON *MELOIDOGYNE* SPP. AND *PRATYLENCHUS ZEAE* IN COSTAL TABLE CULTIVATED WITH SUGARCANE [EFECTOS DE LA VINAZA SOBRE *MELOIDOGYNE* SPP. Y *PRATYLENCHUS ZEAE* EN LA FAJA COSTERA CULTIVADA CON CAÑA DE AZÚCAR]**. L. B. Caixeta, E. M. R. Pedrosa, N. M. R. Barbosa and L. M. P. Guimarães. 2010. Universidade Federal Rural de Pernambuco, Departamento de Fitopatologia, Rua Dom Manoel de Medeiros, s/n, Dois Irmãos-CEP: 52171-900-Recife/PE. larissabcaixeta@gmail.com.** The root-knot nematode *Meloidogyne* spp. and the lesion nematode *Pratylenchus zeae* are the main plant parasitic nematodes in costal tables of Northeastern Brazil inducing high losses on sugarcane fields. Results of research in these areas have indicated that the addition of vinasse on soil can improve sugarcane development and induce suppressive effect on plant parasitic nematodes. The objective of the present study was to evaluate shifts on *Meloidogyne* spp. and *P. zeae* populations from 30 days before to 30 and 60 days after vinasse application on soil cultivated with sugarcane. In each period, 49 samples were collected 25-cm depth at each 10m in a regular grid inside a 60x60-m square. There was decrease in *Meloidogyne* spp. and *P. zeae* populations 30 days after vinasse application. However, there was an increase in both nematode populations 90 days after the residue application. Considering that the suppressive effect of vinasse is dependent on the residue rate in soil, the low rate of vinasse in soil 90 days after the residue application may explain the fast increase in nematode population density.

DIVERSITY OF *MELOIDOGYNE INCOGNITA* AS INFERED BY MORPHOLOGICAL, CYTOLOGICAL AND MOLECULAR APPROACHES [DIVERSIDAD DE *MELOIDOGYNE INCOGNITA* CON BASE EN CARACTERÍSTICAS MORFOLÓGICAS, CITOLÓGICO Y MOLECULARES]**. R. M. D. G. Carneiro, M. F. A. dos Santos, M. R. A. Almeida, A C. M. M.Gomes, F. C. Mota, M. D. G. Carneiro, P. Castagnone Sereno and M. S. Tigano. EMBRAPA-Recursos Genéticos e Biotecnologia, C.P. 02372, 70849-970 Brasília, DF, Brazil and INRA-UMR1301, UNSA, CNRS-UMR6243, Interactions Biotiques et Santé Végétale, 400 route des Chappes, BP167, 06903 Sophia Antipolis, France. recar@cenargen.embrapa.br.** Twelve *Meloidogyne incognita* isolates representing one cytological type (3n = 40-46) and four host races and three enzymatic phenotypes (esterase and malate desydrogenase: I1N1, I2N1 and S2N1) were studied. Considering morphometrical and morphological features, it was possible to conclude that the three enzymatic phenotype characterized *M. incognita* exhibiting some variability on male anterior regions. Other isolates from two closely related species, *M. hispanica* (H3N1, 2n = 32-36) and two isolates of an atypical *Meloidogyne* sp. (S2N3, 3n = 40-44) were included in this study. Morphologically, the S2N3 isolates differ from *M. incognita* and *M. hispanica* by the feature of female stylet. All isolates were tested with three species-specific molecular markers, i.e., SCARs, developed for *M. incognita*. The primers pairs B06F/R, incK14F/R and incK14F/R amplified three species-specific fragments of 1,200 bp, 399 bp and 955 bp, respectively, that were observed for the 12 isolates of *M. incognita* and not for those belonging to either *M. hispanica* or *Meloidogyne* sp. The overall genetic variability of the *Meloidogyne* spp. isolates used in this study was evaluated using the RAPD and ISSR markers. Phylogenetic analyses of the resulting matrices using UPGMA, Maximum Parsimony and Bayesian inference produced trees with the same general topology with respect to relationships among species. Two strongly supported monophyletic clades were observed: clade I, consisting of *M.*

hispanica isolates and the atypical isolates S2N3 and clade II clustering together all *M. incognita* isolates (I1N1, I2N1 and S2N1). No strict correlation could be detected between either the isoenzymatic phenotype or the race of the isolates and the tree topology. The results of this study suggested that the two isolates S2N3 belong to an unidentified species closely related to *M. hispanica.*

HOST STATUS OF LETTUCE AND CHICORY TO *MELOIDOGYNE ENTEROLOBII* [HOSPEDABILIDADE DA ALFCE E CHICÓRIA A *MELOIDOGYNE ENTEROLOBII*]**. M. D. G. Carneiro[1], J. Avarelo[2], R. M. D. G. Carneiro[1]. [1]Embrapa–Recursos Genéticos e Biotecnología, C.P. 02372, 70849-970, Brasília, DF, Brazil, [2]Centro Nacional de Sanidad Agropecuária, San José de las Lajas, Apartado 10, La Habana, Cuba. marinadechechi@gmail.com.** Two cultivars of *Lactuca sativa* ('Elisa' and 'Cinderela') and one of *Cichorium endivia* ('Biondina') were assessed for host status to *M. enterolobii (*senior synonym of *M. mayaguensis).* Six plants of each cultivar and tomato 'Santa Clara' (control for inoculum viability) were planted in individual pots and maintained under greenhouse conditions. Each plant was inoculated with 5,000 eggs and two months later they were evaluated. The results indicate that the three cultivars are good hosts (gall and egg masses indices >2) for *M. enterolobii.* They had reproduction factor (RF) >1.0. The RFs were: lettuce 'Elisa', 3.18, lettuce 'Cinderela', 2.72 and chicory 'Biondina': 34.33.

REACTION OF 'CONILON' COFFEE TO DIFFERENT POPULATIONS OF *MELOIDOGYNE* SPP. [REACCIÓN DEL CAFÉ 'CONILON' A DIFERENTES POBLAÇIONES DE *MELOIDOGYNE* SPP]**. R. M. D. G. Carneiro, S. B. Costa, F. R. de Sousa, D. F. dos Santos, M. R. A. Almeida, M. F. A. dos Santos, K. M. S de Siquiera, Myrian S. Tigano and A. F. A. da Fonseca. Embrapa Recursos Genéticos e Biotecnologia, C. P. 02372, 70849-970 Brasília, DF, Brazil. Embrapa Café/Incaper. C. P. 40315, 70770901, Brasília, DF, Brazil. recar@cenargen.embrapa.br.** The root–knot nematode, *Meloidogyne,* causes great economic impact on the production of coffee in Brazil. In the states of Paraná, São Paulo, Minas Gerais and Rio de Janeiro, *Meloidogyne exigua*, *M. paranaensis*, *M. incognita* cause the greatest yield losses and are the limiting factor for coffee cultivation in certain areas in Brazil. The most recommended methods of control for these pathogens are resistant varieties, crop rotation or organic matter applications. The objective of this study was to evaluate the resistance of *Coffea canephora* clones group "Conilon Vitória - Incaper 8142 and the clone 14 (drought tolerant) and 22 (not drought tolerant) to different populations of *Meloidogyne* spp. (*M. paranaensis*, *M. incognita* races 1 and 3 and avirulent and virulent populations of *M. exigua*) from different regions of coffee production in Brazil. The cultivar Catuaí Vermelho (IAC 81) was used as control. The plants were inoculated with 5,000 eggs/plant. The evaluation was done 8 months after inoculation, and the number of galls, egg masses and the reproduction factor (RF) were evaluated. The criteria used to evaluate resistance were RF <1.0 and susceptibility, RF ≥ 1.0. The results indicated for *M. paranaensis* that clonal varieties 2V, 3V, 6V, 7 V, 13 V and clone 14 were highly resistant. For *M incognita* race 3 (Londrina), only the cultivar clone 14 was considered highly resistant. Concerning *M. incognita* race 1 (Avilândia), seven varieties were highly resistant (2V, 3V, 6V, 8V, 13V and clone 14). For avirulent *M. exigua*, several clones were highly resistant, with the exception of clones 10V and 13 V, although RF presented low resistance when compared with control. For the virulent *M. exigua*, some of the clones were resistant (1V, 2V, 4V, 5V, 7 V, 9V, 11v, 12V and clone 14) and six clones were susceptible (3V, 6V, 8V, 10V, 13V and 22). It was concluded that there are sources of genetic resistance in the varieties of group Conilon to *M. paranaensis, M. exigua* and one population of *M. incognita.* The clone 14 was resistant to all species and populations of *Meloidogyne* from coffee evaluated in this study.

INCIDENCIA DE *AMPHIDOMERMIS* SP. (NEMATODA, MERMITHIDAE) PARASITOIDE DE *HYPSIPYLLA GRANDELLA* ZÉLLER (LEPIDOPTERA, PYRALIDAE) EN LA LOCALIDAD DE YUTO PROV. DE JUJUY—ARGENTINA [INCIDENCE OF *AMPHIDOMERMIS* SP. (NEMATODA, MERMITHIDAE) PARASITE OF *HYPSIPYLLA GRANDELLA* ZÉLLER (LEPIDOPTERA, PYRALIDAE) IN THE LOCALITY OF YUTO PROV. DE JUJUY-ARGENTINA]**. C. B. Carrizo, S. N. Tapia, S.**

N. Ochoa, D. Ortiz. Laboratorio de Zoología Agrícola y Forestal. Estación Experimental de Cultivos Tropicales-Yuto INTA Ruta Nacional N° 34 Km. 1286 El Bananal-Yuto. Jujuy-Argentina. cbcarrizo@correo.inta.gov.ar. En la región subtropical del NOA en Jujuy en la localidad de Yuto se detectó la presencia de *Amphidomermis* Filipjev 1934, género de mermitido parasitoide de *Hypsipyla grandella* Zéller (Lepidotera, Pyralidae) plaga forestal severa que ataca a los brotes de *Cedrela* sp. Rompiendo la dominancia apical provocando rebrotes laterales por repetidos ataques del insecto, dando como resultado numerosas ramificaciones que disminuyen el valor de la madera. El Objetivo del presente trabajo fue determinar la incidencia de *Amphidomermis* sp. Sobre larvas de *Hypsipylla grandella* durante el año 2009. Se realizaron 21 muestreos, donde se tomaron muestras de suelo y brotes atacados por larvas de *H. grandella* con una frecuencia quincenal, las larvas fueron colectadas directamente de los brotes terminales de los árboles que presentaban el daño identificado por secreciones gomosas y excremento del insecto, de las que se obtuvieron larvas postparasitas de *Amphidomermis* sp. Recién emergidas y los adultos del nemátodo se obtuvieron de muestras de suelo tomadas al azar con pala a una profundidad de 10cm cercanas al tronco de los árboles. Los resultados mostraron que la incidencia de *Amphidomermis sp.* Parasitando larvas de *H.grandella* fue mayor durante los meses de enero a marzo, mostrando un incremento de un 30% a un 50% respectivamente con una temperatura media mensual de 25°C y precipitaciones que incrementan de 146 mm a 153 mm; en noviembre 45% de incidencia y diciembre un 69%, meses donde las temperaturas y las precipitaciones son más elevadas (28°C a 36°C), en suelo se encontraron hembras de *Amphidomermis* sp. durante los meses invernales donde los ataques de *H. grandella* disminuyen.

NEMATODOS FITÓFAGOS ASOCIADOS AL CULTIVO DE CAÑA DE AZÚCAR EN LAS PROVINCIAS DE JUJUY Y SALTA [PHYTOPHAGOUS NEMATODES ASSOCIATED WITH SUGARCANE CULTIVATED IN THE PROVINCE OF JUJUY AND SALTA]. **C. Carrizo, S. Tapia1 y S. Ochoa Estación. Experimental de Cultivos Tropicales Yuto INTA. Ruta Nacional N° 34. CP: 4518. El Bananal, Yuto. Argentina. cbcarrizo@correo.inta.gov.ar.** Dada la importancia económica del cultivo de la caña de azúcar para la región NOA, en este trabajo se planteó: conocer la riqueza y abundancia de los géneros de nemátodos fitófagos presentes en suelos de este cultivo en localidades de las provincias de Salta y Jujuy, Argentina. Se evaluaron muestras de suelo tomadas en cultivos de Libertador General San Martin, Jujuy y de cañaverales de San Ramón de la Nueva Orán, Salta. Los análisis nematológicos se realizaron mediante el método de flotación-centrifugación, en el Laboratorio de Zoología Agrícola y Forestal de la EECT Yuto-INTA. Para Libertador General San Martín se obtuvo una riqueza de 8 géneros: la abundancia relativa de *Rotylenchus* sp. se presentó con el valor más alto para la zona 37,9%, *Hemicycliophora* sp. con un 24,2%, *Pratylenchus* sp. 17,5%, *Helicotylenchus* sp. 13,5% y *Meloidogyne* sp., *Trichodorus* sp., representantes de la Familia Criconematidae y *Xiphinema* sp. con menos del 4%. De las muestras de Oran se obtuvo una riqueza de 9 géneros: la abundancia relativa de *Helicotylenchus* sp. presentó un valor de 37,6%, representantes de la Familia Criconematidae con un 14%, *Pratylenchus* sp. 13,1%, *Hoplolaimus* sp. 12,8%, *Tylenchorhynchus* sp. 11% y *Hemicycliophora* sp., *Meloidogyne* sp., *Xiphinema* sp. y *Rotylenchus* sp. con menos del 3,3%.

DECLINE OF PESTICIDE USE IN MARTINIQUE: TOWARDS ZERO PESTICIDE IN INTENSIVE BANANA CROPPING SYSTEMS [DISMINUCIÓN DEL USO DE NEMATICIDA EN MARTINICA: HACIA CERO PESTICIDAS EN SISTEMAS INTENSIVOS DE CULTIVO DE BANANO]. **C. Chabrier and P. Quénéhervé. Laboratoire de Nématologie Tropicale, PRAM CIRAD-IRD, BP 214, 97232 Le Lamentin, Martinique, FWI. chabrier@cirad.fr.** In Martinique (French West Indies), bananas and sugarcane are the main cultivated crops. Until the middle of the 90's, the traditional cropping systems were based on the systematic use of pesticides to control diseases and pests of banana. To evaluate the use of pesticides in banana cultivation, exhaustive surveys have been realized with distributors of pesticides, growers and official custom services. These surveys were repeated annually from 1996 to 2009. In 1996, 56% of the pesticides used on banana fields belonged to the nematicide category which primarily targeted nematodes, especially the burrowing nematode *Radopholus similis*, but also the black weevil *Cos-*

mopolites sordidus. During that period (1996-2009), the use of nematicides and insecticides has declined sharply from 84.4 to 6.6 tons of active ingredients in Martinique. However, as the surface of banana fields also diminished from 8,600 to 5,900 ha, the relative consumption per ha regressed from 9.82 to 1.12 kg/ha/year. This dramatic regression is mainly the result of i) the development of new cultural systems based on the sanitation of fields by fallows or crop rotations combined with the use of nematode-free vitro-plants and ii) completed by the generalization of pheromone mass-trapping against the black weevil *C. sordidus*. This effort towards a zero pesticide in banana cropping systems should i) ensure both consumers and producers of the quality of banana production in the French Caribbean and ii) demonstrate the feasibility of such pest management to other banana producers.

RELATIONSHIPS BETWEEN NEMATODES AND CROPPING SYSTEMS: CASE STUDY WITH *RADOPHOLUS SIMILIS* AND BANANA [RELACIÓN ENTRE NEMATODOS Y SISTEMAS DE CULTIVO: ESTUDIO DE CASO CON *RADOPHOLUS SIMILIS* Y BANANO]**. C. Chabrier and P. Quénéhervé. Laboratoire de Nématologie Tropicale, PRAM CIRAD-IRD, BP 214, 97232 Le Lamentin, Martinique, FWI. chabrier@cirad.fr.** Although the burrowing nematode *Radopholus similis* may be host of more than 250 plant species, it is generally considered as a major pest only on very few crops. In some regions, it is even considered as a parasite specific of banana or citrus. Studies on its biological characteristics show some particularities in contrast with other related species that may compete with *R. similis*. Its sexual dimorphism is especially marked. Males' digestive system is not functional. Its normal reproduction mode is sexual with separate parents, but in the absence of mating, females can develop to syngonic hermaphrodites and fecundate themselves. This species exhibits poor survivorship capacities, especially juveniles and females while males can live longer. *R. similis* seems to escape by dispersion in water, especially by water leached in soil. Its geographic dissemination is mainly performed through planting materials. These ecological features led *R. similis* to be very well adapted to cultural systems where banana plants are propagated and multiplied using suckers or bullheads comprising large populations of *R. similis*. The consequences on the modification of cultural systems on the evolution of nematofauna and on nematode management are discussed.

COMPORTMENT OF SUGARCANE GENOTYPES RB CULTIVATED IN PET BOTTLES IN RELATION TO *MELOIDOGYNE INCOGNITA* PARASITISM [COMPORTAMIENTO DEL GENOTIPO RB DE CAÑA DE AZÚCAR CULTIVADO EN BIBERON DE ANIMAL EN RELACIÓN AL PARASITISMO DE *MELOIDOGYNE INCOGNITA*]**. A. Chaves, D. E. Simões Neto, E. M. R. Pedrosa, L. M. P. Guimarães, S. R. V. L. Maranhão, M. K. R. dos Santos, W. D. L. Rodrigues and E. J. Silva. 2010. RIDESA, Universidade Federal Rural de Pernambuco, Estação Experimental de Cana-de-açúcar do Carpina, Rua Ângela Cristina C. P. de Luna, S/N, Bairro Novo, Carpina, PE - CEP: 55.810-000, Brazil. achavesfiuza@yahoo.com.br.** The search for alternatives to support research that is economical and environmental friendly is relevant in the sugarcane screening program. Every year new RB genotypes from the Sugarcane Genetic Program (RIDESA/UFRPE) are evaluated for nematode resistance. This study presents the response of nine sugarcane genotypes RB to *Meloidogyne incognita* parasitism. Sugarcane stalks were cultivated under greenhouse conditions and after two months seedlings were transplanted into *pet* bottles, inoculated with 5.000 eggs per plant and transplanted into an experimental field in a completely randomized design with five replications. Results pointed out high nematode reproduction of all genotypes in this new system. All genotypes were susceptible with high reproductive factors 40 days after inoculation.

CORRELACIÓN DE LAS CARACTERÍSITCAS FÍSICO-QUÍMICAS DEL SUELO CON RAÍCES Y NEMATODOS EN BANANO (*MUSA* AAA) [SOIL PHYSICAL–CHEMICAL CHARACTERISTICS CORRELATION WITH ROOTS AND NEMATODE POPULATION DENSITIES]**. C. Chávez[1], F. Solórzano[1], M. Araya[2]. [1]Laboratorio de Nematología Nemalab, S. A. casilla 0701044, Machala, El Oro, Ecuador, cesar.chavez@lapavic.com.ec, [2]CORBANA, maaraya@corbana.co.cr**. El estudio se realizó considerando muestras pareadas de 5 ha en una plantación comercial del Ecuador. El objetivo fue co-

rrelacionar las características físico-químicas del suelo con el peso de raíces y su número de nematodos en banano. En 120 unidades de producción se tomaron las muestras de raíces y suelo. Se hizo análisis físico y químico del suelo y sus valores se correlacionaron con peso de raíz total, funcional y número de nemátodos presentes en las raíces de banano. De las variables de suelo estudiadas, 4 se asociaron con peso de raíz total, 9 con raíz funcional, 5 con número de *Radopholus similis*, 6 con *Helicotylenchus* spp., 4 con *Pratylenchus* spp. y 9 con nematodos totales. De las características físicas (contenidos de arena, limo y arcilla) estudiadas, un 50% correlacionó con peso de raíces o con número de nematodos, mientras en las características químicas, solamente se encontró correlación en 15% de las relaciones estudiadas. A pesar de la significancia estadística, el valor de correlación fue bajo o muy bajo, siendo el máximo de r = 0,53; P < 0,0001 para el contenido de arena y número de nematodos totales.

RELACIÓN DEL NÚMERO DE NEMATODOS Y PESO DE RAÍCES CON LAS VARIABLES DE PRODUCCIÓN EN BANANO (*MUSA* AAA) [RELATIONSHIPS OF NEMATODE POPULATION DENSITIES AND ROOT WEIGHT WITH BANANA VARIABLE PRODUCTION]**. C. Chávez[1], F. Solórzano[1], M. Araya[2]. [1]Laboratorio de análisis agrícola (Nemalab, S.A.) casilla 0701044, Machala, El Oro, Ecuador. cesar.chavez@lapavic.com.ec. Agrícolas Lapavic, casilla 0701044, Machala, El Oro, Ecuador agrisolba@lapavic.com.ec, [2]CORBANA, maaraya@corbana.co.cr.** En campo se estudió la correlación entre peso de raíces y número de nemátodos de hijos de sucesión con sus variables de producción o de la planta madre. En dos experimentos, uno considerando plantas individuales y el otro grupos de 5 plantas, 110 hijos de sucesión de 1,5-1,75 m de altura de plantas recién florecidas fueron muestreados para estimar el contenido de raíces y número de nemátodos. Estos fueron recolectados en una criba de 0,025 mm y expresados por 100 g de raíces. A la cosecha de las plantas madre del primer experimento y de los hijos de sucesión muestreados en el segundo experimento, se les registró el peso del racimo, número de manos y la calibración del fruto. En el primer experimento, con excepción del agrupamiento de plantas por número de *R. similis,* el peso de raíz funcional siempre correlacionó (r > 0,94; P < 0,0068) con el peso de raíz total. *R. similis* correlacionó (r > 0,84; *P* < 0,0217) con nematodos totales. Cuando las plantas fueron agrupas por peso de raíz total, *R. similis* (r = 0,86; P = 0,0287) y nematodos totales (r = 0.89; P = 0,0156) correlacionaron con el número de manos por racimo. Al agrupar los hijos por el número de *R. similis*, se encontró que conforme aumentó el número de nematodos se redujo el peso de raíz funcional (r = -0,96; P = 0,0080) y total (r = -0,98; P = 0,0028). En el experimento 2, cuando se trabajó con grupos de plantas desde el campo, el peso de raíz funcional correlacionó con el peso total de raíces (r = 0,73; P < 0,0001) y *R. similis* con el total de nemátodos. Ninguna variable de raíces o nematodos correlacionó con producción.

BIOCONTROL POTENTIAL OF *HIRSUTELLA RHOSSILIENSIS* AND *H. MINNESOTENSIS* AGAINST CYST AND ROOT-KNOT NEMATODES [POTENCIAL DEL BIOCONTROL DE *HIRSUTELLA RHOSSILIENSIS*Y *H. MINNESOTENSIS* SOBRE NEMATODOS DEL QUISTE Y AGALLADOR DE RAÍCES]**. S. Y. Chen[1,*], X. Z. Liu[1,2], S. F. Liu[1], S. Mennan[3,4], H. Melakeberhan[4]. [1]University of Minnesota, Southern Research and Outreach Center, 35838 120th Street, Waseca, MN 56093, USA, [2]Key Laboratory of Systematic Mycology & Lichenology, Institute of Microbiology, Chinese Academy of Sciences, Beijing 100101, China, [3]Ondokuz Mayis University, Samsun 55139, Turkey, [4]Department of Horticulture, 256 Giltner Hall, Michigan State University, East Lansing, MI 48824, USA. [*]chenx099@umn.edu.** *Hirsutella rhossiliensis* and *Hirsutella minnesotensis* are spore-producing hyphomycetes that parasitize vermiform nematodes. Although the fungi can parasitize a wide range of nematodes, they were detected only on one or few species of nematodes in a particular field, indicating that they have certain degree of specificity in parasitism. The fungi were frequently encountered on the second-stage juveniles of cyst and root-knot nematodes. In some fields they parasitized a high percentage of cyst nematodes, and may be partially responsible for suppression of nematode population densities. Biocontrol effectiveness of the fungi against cyst and root-knot nematodes has been evaluated in a number of studies in laboratories, greenhouses, and fields. Variation exists between the two

species and among isolates. Highly effective control of the soybean cyst nematode, *Heterodera glycines*, and northern root-knot nematode, *Meloidogyne hapla* has been obtained in the greenhouse studies. Field experiments showed that both fungi reduced *H. glycines* population density and increased soybean yield sometimes, but not always. Soil texture, pH, organic matter may affect the fungal parasitism of nematodes and biocontrol effectiveness. The fungi have potential as biocontrol agents against the cyst and root-knot nematodes.

LA BIOFUMIGACIÓN UNA ALTERNATIVA MUY EFICIENTE EN EL CONTROL DEL NEMATODO AGALLADOR *MELOIDOGYNE* SPP. EN HORTALIZAS PRODUCIDAS EN CASA SOMBRAS [BIOFUMIGATION A VERY EFFICIENT ALTERNATIVE FOR THE CONTROL OF ROOT KNOT NEMATODE *MELOIDOGYNE* SPP. IN VEGETABLES PRODUCED IN HOUSE SHADOWS]. **Cid del Prado V. I. Lucero Pallares M. A., I. Pérez Rodríguez y J. Hernández Alfonsina. Colegio de Postgraduados. icid@colpos.mx.** En la última década, ha venido creciendo la producción de hortalizas bajo condiciones de sombra, esto ha traído como consecuencia que ciertas especies de patógenos se incrementen año con año, como es el caso de Culiacán, Sinaloa México, con el nematodo agallador *Meloidogyne* spp. La biofumigación que consistió en incorporar al suelo 80 ton./ha de sorgo y 40 ton./ha de gallinaza, mezclar perfectamente e incorporando esta mezcla hasta a 30 cm de profundidad, dar un riego a capacidad de campo y cubriendo finalmente la 1,5 ha del área experimental, con plástico negro, dejando la degradación de la materia orgánica por la intensa actividad microbiana, durante cuatro semanas, posterior ha este tiempo se retiro el plástico y se dejo airear por tres semanas, con la finalidad de dejar escapar los residuo de gases que se producen. Se sembró el jitomate tipo bola y se comparó con la aplicación de telone 1 lt /ha; la incorporación solamente de sorgo y la biofumigación. Del índice de agallamiento que se tenía al principio que era de 10, después de 240 días se tiene un índice de agallamiento de 6-7 en sorgo, un 9 a10, con telone y de cero (0) con la biofumigación. Los resultados nos indica que lo mas recomendable para el agricultor es utilizar el sobrante de materia orgánica vegetal tenga y la materia orgánica animal que tenga y aplique la biofumigación como una alternativa muy efectiva en el manejo de poblaciones de nematodos y otros agentes fitopatológicos del suelo; se obtuvo un 20% mas de producción, con respecto al testigo absoluto, además no se presento agallamiento alguno, contra un nivel de 8 en el testigo absoluto.

SOIL INHABITING NEMATODES OF THE GENERA TRISCHISTOMA, TRIPYLINA AND TRIPYLA FROM MEXICO AND THE USA [NEMATODOS DE LOS GÉNEROS TRISCHISTOMA, TRIPYLINA Y TRIPYLA HABITANDO SUELO DE MÉXICO Y ESTADOS UNIDOS]. **I. Cid del Prado Vera[1], H. Ferris[2] and A. Steven Nadler[2]. [1]Colegio de Posgraduado, México. [2]N U.C. Davis, USA. icid@colpos.mx.** Five species of the family Tripylidae were collected; four from the biosphere reserve at San Fernando, Los Tuxtlas, Veracruz, México: *Trischistoma veracruzensis* sp. n. has a slender body, females are longer than males, 1.2 vs 1.0 mm, the absence of cervical setae, conspicuous oval-shaped sperm and wide post-uterine sac, which is 33-196 (89.6 ± 24.8) µm long, abundant males without pre-cloacal papillae and producing oval sperm. *Tripyla tropica* sp. has conspicuous striation along the body, characterized by a stomatal chamber, a posteriorly-hooked dorsal tooth with subventral teeth posterior to it, the absence of sclerotised structures in the vulva and heavily muscular vagina, a one pair of vulva glands present and males without ventromedian papillae, curved spicules and straight gubernaculum. And two species from soil in the Napa Valley, California, USA: *Tripyla alaecaudata* sp. n. is differentiated from all other species of the genus by the lateral alae in the female, juvenile and male tails and a pair of papillae in the tail region. *Tripyla napaensis* sp. n. has a symmetrical unstriated head and males with 14 ventromedian papillae along the body, by a tiny subventral denticles anterior to the wedge-shaped dorsal tooth, vulva with slightly protruding lips and tail in both sexes tapering in anterior region and becoming barrowly cylindricalin posterior third ending in a long spinneret and one from the University of California, Davis, Student Farm: *Tripylina arenicola* has an asymmetric head and one small cervical seta, the subventral teeth are posterior to the dorsal tooth and there is a small ventromedian cervical setae close to the anterior end. In all cases, the habitats are moist soils from either natural seepage (Napa), irrigation (Davis) or rainfall (México).

GENOMIC RESPONSE OF RHABDITIDAE TO THEIR BACTERIAL PREY [REPUESTA GENÓMICA DE LOS RHABDITIDAE A SUS PRESAS BACTERIANAS]**. B. J. Darby and M. A. Herman. Ecological Genomics Institute, Kansas State University, Division of Biology, Manhattan, KS, 66506, U.S.A. bdarby@ksu.edu.** Since bacterial communities in the soil are more complex than can be reproduced in the lab, a genomic approach is beneficial for understanding the ecologically relevant relationships between nematodes and the bacteria they consume as prey. In essence, genomic tools allow us to 'ask the nematodes' how they perceive different bacteria and what cellular functions are utilized when exposed to certain bacterial types so that we can extrapolate modeled conditions in the lab to specific soil environments in the field. Although bacteria are a dietary necessity, there is increasing evidence that some bacteria can be pathogenic and should be viewed as potentially adverse components of a nematode's biotic environment. For example, exposing the nematode *Caenorhbaditis elegans* to human pathogens of clinical interest identified several main signaling pathways that regulate defense-related genes, including the insulin-like DAF-2/DAF-16, P38 Map-Kinase PMK-1, Toll-like TOL-1, and TGF-β DBL-1 pathways. We have developed a candidate gene list based on 204 *C. elegans* genes that were differentially expressed when exposed to several soil bacteria. Many of these genes were classified as defense or metabolism related based on gene ontology (GO) terms and are being tested functionally with RNAi knockdown and with knockout mutants. We have recently sequenced partial transcriptomes of four representative Rhabditidae nematodes from a native tallgrass prairie which we use to measure gene expression profiles on different bacteria. This genomic information will help us to answer how rhabditid nematodes deal with the bacterial communities that inhabit enriched soil conditions.

INTEGRATIVE TAXONOMY OF THE FAMILY TRICHODORIDAE USING COMPARATIVE MORPHOLOGY AND DNA SEQUENCE ANALYSIS. A CASE STUDY BASED ON THE TRICHODORID FAUNA FROM THE IBERIAN PENINSULA, AN APPARENT CENTRE OF SPECIATION [TAXONOMÍA INTEGRATIVA DE LA FAMILIA TRICHODORIDAE UTILIZANDO MORFOLOGÍA COMPARATIVA Y ANÁLISIS DE SECUENCIA DE ADN. UN CASO DE ESTUDIO BASADO EN LA FAUNA DE TRICHODORIDE DE LA PENÍNSULA IBÉRICA, UN APARENTE CENTRO DE EVALUACIÓN DE LAS ESPECIES]**. W. Decraemer, P. Castillo, J. E. Palomares-Rius, B.B. Landa, C. Cantalapiedra, I. Duarte, T. Almeida and N. Vovlas Royal Belgian Institute of Natural Sciences, Vautierstraat 29, B-1000 Brussels, Belgium, Institute of Sustainable Agriculture, CSIC, 14080 Córdoba, Spain, Escola Superior Agrária de Coimbra, 3040-316 Coimbra, Portugal, Universidade do Minho, 4710-057 Braga, Portugal, Laboratoria di Nematologia Agraria del Consiglio Nazionale delle Ricerche, Bari, Italy. Wilfrida.Decraemer@UGent.be.** Surveys for Trichodoridae were carried out in cultivated and natural environments in Southern Spain and compared with the trichodorid fauna from Portugal. In total six known species belonging to three genera (*Nanidorus minor, Paratrichodorus hispanus, P. allius* and *Trichodorus giennensis, T. lusitanicus, T. primitivus*) were found next to three new species of *Trichodorus* and four new species of *Paratrichodorus*. A comparative morphological study was carried out including the trichodorid species from Portugal and *T. variabilis* from Greece together with molecular analyses based on nuclear ribosomal RNA genes (D2-D3 expansion segments of 28S and partial 18S gene). Characteristic for the Iberian Peninsula is the high number of morphologically closely resembling *Trichodorus* species characterized in males by slightly ventrally curved spicules with a mid-blade constriction bearing bristles and in females by relatively large vaginal sclerotized pieces quadrangular to triangular in shape. In *Paratrichodorus*, spicules are less specific except for the presence of three out of four species possessing spicules with irregular outline of the calomus region. Comparative morphology and molecular analyses provide support for the Iberian Peninsula as an apparent centre of speciation.

EFICACIA DE NEMATICIDAS DE NATURALEZA BIOLÓGICA, QUÍMICA Y BOTÁNICA EN EL CONTROL DE *MELOIDOGYNE INCOGNITA* EN ROSAS CULTIVADAS EN INVERNADERO EN ECUADOR [EFFICACY OF BIOLOGICAL, CHEMICAL AND BOTANICAL NEMATICIDES IN THE

CONTROL OF *MELOIDOGYNE INCOGNITA* IN ROSES UNDER GREENHOUSE CONDITIONS IN ECUADOR]. **M. Delgado[1] y J. Revelo[2]. [1]Estudiante de Ing. Agropecuaria y [2]Docente, Universidad Técnica del Norte, Apdo. Ibarra, Ecuador.** *Meloidogyne incognita* se encuentra en la mayoría de las zonas productoras de rosas de Ecuador. Afectando la calidad de la flor y el rendimiento en 70%. En el manejo integrado de este nematodo el uso de patrones resistentes y la aplicación de nematicidas de naturaleza biológica y botánica, son el requisito principal para su control. Con este fin, en el 2008 se evaluaron 6 productos de origen biológico: Micosplag (0,005 g/l) (*M. anisoplae, P. lilacinus, B. bassiana*), Biostat (0,025 g/l) (*P. lilacinus*), Bionema 700 (0,02 cc/l) + Bionema 150 (0,004 g/l) (*P. lilacinus, Pseudomonas* sp.), Nematér (0,028 g/l) (*Mycrothecium verrucaria*), Biorgán (0,11 cc/l) (*B. subtilis, T. harzianum*) + Green Fish (0,05 cc/l) y Bioway (1757,81g/m^2) (*B. penetrans, B.subtilis, B.cereus*); 2 de origen botánico Neem-X (0,144 cc/l) (Azadirachtina + 23 limonoides) y Melaza (28 cc/l) (carbohidratos); 1 producto químico, Rugby (15g/m^2) (cadusafos) y un Testigo (sin aplicación) en un DCA con 4 repeticiones, en invernadero. La unidad experimental fue de 25,2 m^2 (33,6 m x 0,75 m) con 392 plantas de rosas variedad Roses Spray injertada en patrón Manetti. La parcela neta se consideró a 126 plantas centrales con un área de 8,11 m^2. Micosplag, Bionema, Nemater y Biorgán se aplicaron por 7 ocasiones a intervalos de 8, 15 y cada 30 días. Biostat, 3 aplicaciones a los 8, 60 y 120 días. Melaza, 7 aplicaciones a los 8 y cada 30 días. Neem-X, 2 aplicaciones a los 8 y 90 días. Estos productos se aplicaron en drench. Bioway, 2 aplicaciones a los 8 y 90 días y Rugby 1 aplicación a los 8 días, los dos por incorporación al suelo. Se consideraron las variables: incremento de la población de J2 y huevos en el suelo, J2 en el sistema radical, la eficiencia de los tratamientos, el rendimiento y el análisis económico. Rugby, Neem-X y Biostat presentaron mayor eficiencia de control de J2 en el suelo (92,88, 83,35 y 79,62%) que Bionema, Biorgán, Micosplag, Nemater, melaza, Bioway y el Testigo (75,59, 67,31, 50,93, 27,17, 18,79, 0,34 y 0,00%). En el sistema radical Neem-X y Rugby presentaron mayor eficiencia de control de huevos y J2 con 75,67 y 70,46% de eficiencia. En la variable rendimiento no se detectaron diferencias estadísticas a pesar que la población de J2 en el testigo fue de 664 a 2850 J2/ 100 g de suelo, mostrando que el patrón Manetti es de alta tolerancia, comportamiento corroborado por el análisis económico que mostró al testigo como el tratamiento más rentable.

AGROECOLOGICAL BASIS FOR THE USE OF SOIL BIODESINFECTION AS A NON CHEMICAL ALTERNATIVE [BASES AGROECOLÓGICAS PARA EL USO DE BIODESINFECCIÓN DE SUELO COMO UNA ALTERNATIVA NO QUÍMICA]. **M.A. Díez-Rojo[1], J. A. López-Pérez[1], J. M. Torres-Nieto[2], I. Castro Lizazo[3], S. C. Arcos[4], A. Lacasa[5], L. Díaz Viruliche[3], A. Bello[6]. [1]Centro Agrario de Marchamalo (JCCM), Cno San Martín s/n, 19180 Marchamalo, Guadalajara, Castilla-La Mancha, [2]SAT Costa de Níjar, Ctra. a Campohermoso, Km. 9, San Isidro, 04100 Almería, [3]Universidad Agraria de La Habana "Fructuoso Rodríguez Pérez", San José de Las Lajas, Cuba, [4]Museo Nacional de Ciencias Naturales (CSIC), C/José Gutiérrez Abascal, 2.28006 Madrid, [5]Dpto Protección de Cultivos y Biotecnología, Estación Sericícola, IMIDA, C/ Mayor s/n, 301550 La Alberca, Murcia, [6]Centro de Ciencias Medioambientales (CSIC). Serrano 115 dpdo, 28006 Madrid.** A major concern in the management of agricultural systems is to find alternatives with reduced impacts on the environment and human health. In the case of soil fumigants, the search for alternatives focuses on the use of organic and agricultural by-products which during decomposition in soil liberate gases and other substances producing biocides or biostatics that may regulate populations of parasitic organisms or pathogens, establishing the concept of soil biodesinfection that should complement the management of biological (functional biodiversity) and environmental diversity with agroecological basis. Soil nematodes are chosen as a model for the development of soil biodesinfection since this group not only includes phytoparasitic but also saprophytic nematodes which are of interest in the decomposition of organic matter, as well as dorylaimids and predators which act as biomarkers. The biodesinfectantes which are solid products such as manures and crop residues such as vinasses derived from the alcohol industry, alpechines from the olive industry and slurry from livestock systems. The work has focused on endoparasitic nematodes of the genus *Meloidogyne*, establishing their biogeographical structure, races and biotypes, as a basis for management protocols, determining their effect on saprophytes, preda-

tors and soil bio-indicators, complimented by the management of *Xiphinema index*, an ectoparasitic nematode vector of the GFLV virus in grapevines. The effects of biodesinfection on soil fertility and crop production are also taken into account. In general, the effect is biostatic, therefore the gases must be retained in the soil for several days, exerting a selective action in relation to soil organisms increaseing the number of saprophytes. The main limiting factor is the cost of transporting the biodesinfectants, therefore the use of local resources is important.

SUBSTRATE MODULATION AND GROUP EFFECTS IN THE RESPONSES OF ENTOMOPATHOGENIC NEMATODES TO NEMATOPHAGOUS FUNGI [MODULACIÓN EN SUBTRATOS Y EFECTOS EN GRUPO DE LA RESPUESTA DE NEMATODOS ENTOMOPATOGÉNICOS A HONGOS NEMATÓFAGOS]. **F. E. El-Borai[1,2], R. Campos-Herrera[1], R. J. Stuart[1] and L. W. Duncan[1]. [1] Entomology and Nematology Department, University of Florida, IFAS, Citrus Research and Education Center, 700 Experiment Station Road, Lake Alfred, FL 33850-2299, U.S.A,[2] Plant Protection Department, Faculty of Agriculture, Zagazig University, Zagazig, Egypt. Fahiem@ufl.edu.** Laboratory experiments were conducted to assess the attraction or repellency of five species of entomopathogenic nematodes (EPNs; *Steinernema diaprepesi*, *S.* sp. *glaseri*–group, *S. riobrave*, *Heterorhabditis zealandica* and *H. indica*) to three species of nematophagous fungi (NF; the trapping fungus *Arthrobotrys gephyropaga*, and the endoparasites *Myzocytium* sp. and *Catenaria* sp.). We hypothesized that EPN responses to NF allelochemicals might play a role in the relative susceptibility of EPN to NF. Experiments compared EPN response to "activated" NF (i.e., induced to form traps or sporangia by previous interactions with EPN) versus controls of non-activated NF or heat-killed EPN, and were conducted on water agar in Petri dishes (dia = 9 cm) and in horizontal sand columns (8 cm L × 2.7 cm dia). On agar, all EPN species were attracted to all activated NF species except for *S. riobrave*, which was neutral. In sand, all EPN species were repelled by activated *Arthrobotrys* but attracted to activated *Myzocytium* and *Catenaria*, except *H. indica* (neutral to *Myzocytium*) and *S.* sp. (neutral to *Catenaria*). These results indicate potential complexity (i.e., mixed responses, group movement or aggregation) and species specificity in the responses of EPN to NF, demonstrate that results on agar can differ markedly from those in sand, and underline the potential importance of utilizing natural substrates to assess the role of allelochemicals in soil food webs. We detected no association between EPN behavioral responses and relative susceptibility to NF except that *H. indica* exhibited low susceptibility and a neutral response to *Myzocytium* in sand whereas the remaining EPN were highly susceptible and attracted.

EL INISAV, 30 AÑOS SIRVIENDO AL AGRICULTOR. APORTE AL CONOCIMIENTO SOBRE LOS NEMATODOS Y SU MANEJO [THE INISAV, 30 YEARS SERVING THE FARMER. CONTRIBUTION TO THE NEMATODES KNOWLOGE AND THEIR MANAGEMENT]. **E. Fernández[1], H. Gandarilla[2], J. M. Draguiche[3], E. Jiménez[4]. [1]Instituto Investigaciones de Sanidad Vegetal. Calle 110 #514, Miramar, Habana, Cuba, [2]Laboratorio Central de Cuarentena Vegetal, Centro Nacional Sanidad Vegetal, Habana, Cuba, [3]Laboratorio Provincial Sanidad Vegetal, Villa Clara, Cuba, Laboratorio Provincial Sanidad Vegetal, Ciego de Ávila, Cuba. efernandez@inisav.cu.** El Instituto de Investigaciones de Sanidad Vegetal (INISAV) fue creado en 1977 como soporte científico metodológico del Sistema Estatal de Sanidad Vegetal. Junto al Laboratorio Central de Cuarentena Vegetal (LCCV) y los Laboratorios Provinciales enfrentan los problemas causados por las plagas agrícolas en Cuba. Desde sus inicios el INISAV ha liderado investigaciones, desarrollado variadas formas de capacitación e innovación, brindado servicios a los productores y generado tecnologías, que se han implementado tanto nacional como internacionalmente. Cuenta con grupos científicos en todas especialidades de la Sanidad Vegetal. En este sentido el INISAV de conjunto con el LCCV, han liderado al grupo de nematólogos del sistema estatal para acometer los trabajos propios de la especialidad, manteniendo una estrecha vinculación con otras instituciones cubanas. De forma concatenada se han establecido y perfeccionado metodologías de trabajo con nematodos nativos y cuarentenarios. Se han identificado los principales problemas nematológicos en arroz, banano, cafeto, frutales, hortalizas, malanga, ornamentales, papa, plantas medicinales y tabaco. Igualmente se han estudiado, validado e implementado

alternativas de manejo disponibles para el agricultor, para atenuar los daños de las principales especies asociadas. Entre ellas el uso de preparaciones de suelo adecuadas, sistemas de rotación de cultivos, empleo de biofumigación y solarización, inclusión de variedades resistentes, perfeccionamiento de técnicas de preparación de los semilleros de cultivos susceptibles, desarrollo y aplicación de antagonistas como cepas de *Trichoderma harzianum* y *T. virides*, identificación y localización de *Pasteuria penetrans* entre otras. Los principales cultivos susceptibles a nematodos tienen implementados sistemas flexibles de manejo de nematodos.

ASSESSMENT OF ROOT-KNOT NEMATODES ASSOCIATED WITH *IMPATIENS MULTICOLOR* IN THE DEPARTMENT MANUEL BELGRANO, PROVINCE OF JUJUY, ARGENTINA [EVALUACIÓN DE NEMATODOS NODULADORES DE RAÍCES ASOCIADOS CON ***IMPATIENS MULTICOLOR*** **EN EL DEPARTAMENTO MANUEL BELGRADO, PROVINCIA DE JUJUY, ARGENTINA]. C. Gallardo and S. Muruaga De L'Argentier. Cátedras de Zoología Agrícola and Cátedra de Zoología General, Facultad de Ciencias Agrarias, Universidad Nacional de Jujuy, Alberdi 47, San Salvador de Jujuy. zoolgral@fca.unju.edu.ar.** Ornamental plant species have great economical value to national trade, as well as for small regional economics of several Argentina provinces where this crop is grown. Eggs masses were individually separated from *Impatiens multicolor* plants severely damaged by *Meloidogyne* spp. In order to increase that material, each eggs mass was inocculated on susceptible tomato (*Lycopersicon esculentum*, Mill) cv. "Tropic". After 60 days, a source of inoculum that was pure populations of *Meloidogyne* spp. was obtained. Specific assessment of *Meloidogyne* spp. was done by observing perineal patterns of adult females, complemented with the test of differential hosts. This study confirmed using differential hosts and perineal patterns, that these populations correspond to *Meloidogyne arenaria* and *M. incognita*.

HETERODERA FICI **KIRJANOVA Y *EKTAPHELENCHOIDES* BAUJARD: PRIMERAS DETECCIONES EN CUBA A TRAVÉS DEL SISTEMA DE Gandarilla VIGILANCIA FITOSANITARIA** [*HETERODERA FICI* KIRJANOVA AND *EKTAPHELENCHOIDES* BAUJARD: FIRS DETECTION IN CUBA THROUH THE PHYTOSANITARY SURVEILLANCE SYSTEM]**: H. Gandarilla-Basterrechea, S. Valdés-Ramírez, Emilio Fernández Gonzálvez, A. Navarro Lantes, M. Almarales-Antúnez, A. Rojas. Laboratorio Central de Cuarentena Vegetal. Centro Nacional de Sanidad Vegetal, Ayuntamiento #231, Plaza, La Habana, Instituto Investigaciones de Sanidad Vegetal. Calle 110 #514, Playa, Habana, Laboratorio Provincial de Sanidad Vegetal Cienfuegos, Laboratorio Provincial de Sanidad Vegetal Camaguey. nematologia@sanidadvegetal.cu**. El Sistema de Vigilancia Fitosanitaria de la República de Cuba cuenta con un Programa de Defensa para la detección de fitonematodos cuarentenarios y peligrosos, que abarca la realización de diferentes encuestas nacionales en cultivos de importancia económica. Mediante los análisis de suelo en plantaciones de cafeto en zonas montañosas de la provincia de Cienfuegos se identificó la presencia del nemátodo formador de quistes *Heterodera fici* Kirjanova en Jagüey (*Ficus* sp.) árbol utilizado para sombra en los cafetales. La ejecución de la encuesta de fitonematodos en *Pinus* spp. permitió la detección de *Ektanphelenchoides* Baujard en troncos de pino procedentes de bosques de la provincia de Camaguey. No se apreciaron daños en sus hospederos provocados por estas nuevas especies para la fauna cubana, que constituyen un indicador de la biodiversidad en dichos ecosistemas y de la efectividad del Sistema de Vigilancia Fitosanitaria del país.

CAPSIDIOL ACCUMULATION IN CHILLI CM-334 INFECTED BY *NACOBBUS ABERRANS* [ACUMULACIÓN DE CAPSIDIOL EN CHILE CM-334 INFECTADO POR *NACOBBUS ABERRANS*]**. D. Godinez-Vidal[1], M. Soto-Hernández[1], M. Rocha Sosa[2], E. Lozoya-Gloria[3], R. I. Rojas-Martínez[1] and E. Zavaleta-Mejía[1]. [1]Colegio de Postgraduados, Montecillo, Estado de Mexico, [2]Instituto de Biotecnología-UNAM, Cuernavaca, Morelos, Mexico, [3]Centro de Investigación y Estudios Avanzados-IPN, Irapuato, Gto. zavaleta@colpos.mx.** Accumulation of capsidiol phytoalexin in roots of *Capsicum annuum* CM-334 infected and non-infected with *Nacobbus aberrans* was compared and the effect of capsidiol on nematode second stage juveniles (J_2) was tested *in vitro*. Capsidiol content in roots of plants

inoculated with the nematode was significantly lower as compared to the non-inoculated ones. The exposure of *N. aberrans* juveniles to capsidiol caused significant nematode immobilization, which increased as the concentration (from 0.01 to 1.50 µg of capsidiol/ml) and the exposure time to the phytoalexin augmented. However, the J_2 recovered their mobility when capsidiol was replaced by water, which suggests that the effect of the phytoalexin was nematostatic only. Since the capsidiol was toxic to *N. aberrans*, the reduction of phytoalexin accumulation in nematode infected roots indicates that the plant defense mechanisms of Chilli CM-334 may be arrested by the nematode to favor its establishment and development.

***MELOIDOGYNE ETHIOPICA* COMO INDICADOR DE LA ACCIÓN DE SOILBUILDER SOBRE LA POROSIDAD DEL SUELO, EN *VITIS VINIFERA* (LINN., 1753) CV. CHARDONNAY, CASABLANCA, CHILE** [*MELOIDOGYNE ETHIOPICA* AS INDICATOR SOILBUILDER ACTION ON THE POROSITY OF THE SOIL, IN *VITIS VINIFERA* (LINN, 1753) CV. CHARDONNAY, CASABLANCA, CHILE]. **V. González, T. Ahumada, R. Mancilla y J. C. Magunacelaya. Universidad Católica Valparaíso. jmagunac@ucv.cl.** El incremento de la porosidad del suelo favorece el crecimiento de raíces, mejora la producción de las plantas, y al crecer las raíces aumentan las poblaciones de nemátodos fitoparásitos. *Meloidogyne ethiopica* fue un bioindicador del sistema radical para evaluar Soilbuilder®, producto microbiológico que propone mejorar la aireación, porosidad y estructura del suelo. El ensayo se realizó en *Vitis vinifera* cv Chardonnay del valle de Casablancam, Chile. Se evaluó porosidad del suelo, con fotografías estandarizadas, calificando la calidad y cantidad de raíces, y a través de la densidad aparente (método de parafina) y densidad real (método del picnómetro). Se evaluó la respuesta de la planta mediante el rendimiento y crecimiento vegetativo. Se utilizó la población *in situ* de *M. ethiopica*. La calidad y cantidad de raíces mejoró significativamente a concentraciones entre 600 y 1000 ppm. Las evaluaciones visuales revelaron aumento de porosidad a concentraciones entre 600 y 1000 ppm. La porosidad evaluada a través de la densidad aparente y densidad real no marcaron diferencia. El rendimiento mejoró, sin diferencia estadística con los testigos, mientras el crecimiento vegetativo no respondió a los tratamientos. Las poblaciones de *M. ethiopica* aumentaron considerablemente concordando con lo observado en las raíces, sobre las que se nutren y desarrollan. Los resultados de este estudio permiten concluir que el producto Soilbuilder® aumentó la porosidad del suelo.

DETECTION OF INTRASPECIFIC AND INTRA POPULATION GENETIC VARIABILITIES BETWEEN NEMATODE *M. INCOGNITA* AND *M. JAVANICA* POPULATIONS USING RANDOM AMPLIFIED POLYMORPHIC DNA [DETECCIÓN DE LA VARIABILIDAD GENÉTICA INTRAESPECIFICA E INTRAPOBLACIÓN DE LOS NEMATODOS *M. INCOGNITA* Y *M. JAVANICA* USANDO LA TÉCNICA MOLECULAR RAPD]. **S. Haroon, E. Osman and R. Yousef. Nematology and Biotechnology Lab, Agriculture College, Fayoum University, Egypt. sanaaharoon@hotmail.com.** Root knot nematode *Meloidogyne* spp. are important pests all over the world. In Egypt two species *M. incognita* and *M. javanica* both infest crops, vegetables and fruits. Detection of genetic variability that exists among geographic populations is important for understanding nematode evolution and control management. Amplification of mitochondrial DNA was used to distinguish between different genera and species. Single egg masses were increased under tissue culture conditions and, a single juvenile was used in a PCR reaction. Primer annealing sites were located in the 3' portion of the mitochondrial gene coding for cytochrome oxidase subunit II and the 16S rRNA gene. Fragment of size 1700 bp specific for genus *Meloidogyne* digestion of the amplified product with *hind f* produces 700 bp fragment with two banded pattern in *M. javanica* 700 and 1000 bp, versus a three banded pattern in *M. incognita* 1000, 400, 300 bp. RAPD method was used to investigate the genetic diversity for both nematodes. Populations of both nematodes were examined with eight primers. With primer OPK-1, major bands of approximately 300, 350, 600 and 900 bp were common for all populations of the two nematode species. Intraspecifc variation occurred and were detected with major bands 500 bp specific for *M. incognita* and 1300pb for *M. javanica* populations. With primer OPK-2, a DNA fragment at 400 bp was intraspecific for *M. javanica* populations and 500 bp was intraspecific for *M. incognita* populations.

***MELOIDOGYNE INCOGNITA*, FACTOR LIMITANTE EN LA PRODUCCIÓN SOSTENIDA DE UVA DE MESA EN PERÚ** [*MELOIDOGYNE INCOGNITA*, LIMITATING FACTOR IN THE SUSTAINABLE PRODUCTION OF GRAPES IN PERÚ]. **E. Herrera. Nematólogo Consultor, Lima, Perú. eherreraalva@ hotmail.com.** Perú cuenta con el 80% de los climas existentes en el mundo, lo que permite excelentes condiciones para la producción sostenida de uva en sus diferentes variedades. La producción está ubicada en la Costa del Perú favorecida por climas aptos para el cultivo de uva de mesa de distintas variedades, estimándose un área aproximada de 7000 hectáreas, con un crecimiento sostenido anual de 20% que incluyen las variedades Red Globe, Flame seedless, Thompson seedless, Crimson seedless, correspondiendo la mayor área de exportación a la variedad Red Globe estimada en un 70%, cuya producción va desde el mes de Octubre hasta Marzo. El empleo comercial de portainjertos tanto americanos como europeos, con característica de resistencia y/o tolerancia a nemátodos en especial a *Meloidogyne* y *Xiphinema*, se justifica plenamente, en razón que hay una infestación creciente de nemátodos parásitos en casi todos los suelos donde se cultiva vid, siendo los principales géneros de nemátodos *Meloidogyne, Xiphinema, Pratylenchus* y *Rotylenchulus*. Sin embargo y pese a ello la sostenibilidad de esta característica de resistencia y/o tolerancia, se ve afectada principalmente por *Meloidogyne incognita* desde el segundo año de establecimiento del patrón por pérdidas en vigor y calidad en la producción con calidad. Se estima el siguiente orden creciente de resistencia en los materiales Paulesen, Mgt 101-14, Dodgridge, Harmony y Freedom. Se ha llegado a establecer sostenidos programas integrales de control a base de inductores de resistencia genética, nematicidas químicos selectivos y otros preferentemente de naturaleza biológica u orgánica para las etapas fenológicas más importantes del cultivo.

PRODUCTION OF HEALTHY PLANTS FOR PLANTING—A BASIS FOR SUSTAINABLE CONTROL OF PLANT-PARASITIC NEMATODES [PRODUCCIÓN DE PLANTAS SANAS PARA TRASPLANTE-UNA BASE PARA EL CONTROL SOSTENIBLE DE NEMATODOS FITOPARÁSITOS]. **S. Hockland and P. Reed. Plant Pest and Disease Programme, The Food and Environment Research Agency, Sand Hutton, York YO41 1LZ England, UK. sue.hockland@fera.gsi.gov.uk.** International trade in plants and planting material can pose a threat to food security by providing a pathway for the transport of pests and diseases around the world. The International Plant Protection Convention is an international treaty on plant health that aims to prevent this spread and promote appropriate measures for their control. This has been done by setting International Standards for Phytosanitary Measures (ISPMs), sharing information and technical assistance. The European and Mediterranean Plant Protection Organization is one of ten Regional Plant Protection Organizations that helps to implement Standards by the development of certification schemes to produce planting material that is of a known health standard for pests and diseases. Regulatory measures such as EU Council Directives stipulate requirements for the marketing of such material. Examples of the consequences of such international and regional policies on the regulation of the trade in flowering plants and potatoes will be described with particular reference to plant-parasitic nematodes.

NEMATODE PARASITES OF BROMELIADS AND THEIR REGULATORY IMPACT ON THE FLORIDA ORNAMENTAL INDUSTRY [NEMATODOS PARÁSITOS DE BROMELIAS Y SU IMPACTO REGULATORIO PARA LA INDUSTRIA ORNAMENTAL DE FLORIDA]. **R. N. Inserra, J. D. Stanley, F. De Luca, A. Troccoli, L. W. Duncan, S. A. Subbotin and R. T. McMillan, Jr. Florida Department of Agriculture and Consumer Services, DPI, Nematology Section, Gainesville, FL 32614-7100, U.S.A., Istituto per la Protezione delle Piante, 70126 Bari, Italy, University of Florida, CREC, Lake Alfred, FL 33850-2299, U.S.A., Plant Pest Diagnostic Center, Sacramento, CA 95832, U.S.A., University of Florida, TREC, Homestead, FL 33031-3314. inserrr@doacs.state.fl.us.** Bromeliads are epiphytes that are traded for their attractive foliage and flowers. These ornamentals produce roots that anchor the plant to tree branches or soil but also take up nutrients, which are not essential for plant growth. In Florida, bromeliad roots of the genera *Guzmania, Neoregelia* and *Vriesea* are parasitized by plant-parasitic nematodes. Surveys conducted in 2007-2009 showed that *Helicotylenchus dihystera, Meloidogyne arenaria, Pratylenchus brachyurus* and *P. hippeastri* (<10 specimens/g fresh roots) were the most com-

mon species. The identification of *P. hippeastri* and *H. dihystera* was verified by conducting sequence and phylogenetic analyses of the D2-D3 expansion segment of 28S rDNA and the ITS region. The presence of these nematodes in bromeliad operations may cause production of bromeliads that fail to meet the quality and nematode certification standards required by national and international trade agreements. The implementation of strict sanitation practices is the most effective method for the production of bromeliads free from regulated nematode pests.

POTENTIAL WEED HOSTS OF ROOT KNOT NEMATODES FROM FIJI WITH NEW HOST RECORDS [POTENCIALES MALEZAS HOSPEDERAS DE NEMATODOS AGALLADORES DE FIJI CON NUEVOS REGISTRO DE HOSPEDEROS]**. U. R. Khurm and S. K. Singh. School of Biological and Chemical Sciences, Faculty of Science, Technology and Environment, The University of the South Pacific, Suva, Fiji. khurma_u@usp.ac.fj.** Weeds were examined for root knot nematodes in agricultural areas of Fiji and farm soil maintained in bioassay pots. The farms were sampled from 10 localities on the main island, Viti Levu and the presence of root knot nematodes was found in 277 of the sampled farms. Most of the *Meloidogyne* populations were placed into the three commonly occurring species: *M. incognita*, *M. javanica*, and *M. arenaria*. Based on direct examination of weeds sampled from farms and those growing in bioassay pots, a total of 45 weed species were recorded as potential weed hosts of root-knot nematodes. The weed hosts allowed reproduction of root-knot nematodes. The number of root galls and egg masses varied on different weed hosts indicating that some weeds may act as better hosts of root-knot nematodes than the others. More importantly some weeds were able to survive heavy infection of root-knot nematodes while the tomato host died in the pot assay. Using the weed and tomato bioassay method, 11 weed species were recorded as non hosts with a gall index of 0, relative to infected tomato growing in pot soil samples. Some of the common weed hosts include slender amaranth, balsamapple, tropic ageratum, ivy gourd, sicklepod, little ironweed, and cutleaf groundcherry. Some 30 weeds are being reported as new host records. Over 300 weeds are listed as authenticated weed records in Fiji, many of which may host root knot and other nematodes. It is very important to study the host status of weeds to important nematodes because weed hosts acting as reservoir hosts can substantially reduce the effectiveness of nematode management methods.

NOTES ON THE TAXONOMY OF THE GENERA *DISCOLAIMIUM* THORNE, 1939 AND *DISCOLAIMOIDES* HEYNS, 1963 (DORYLAIMIDA, QUDSIANEMATIDAE) [NOTAS SOBRE LA TAXONOMÍA DEL GÉNERO *DISCOLAIMIUM* THORNE, 1939 Y *DISCOLAIMOIDES* HEYNS, 1963 (DORYLAIMIDA, QUDSIANEMATIDAE)]**. Y. Kolombia, J. Abolafia, S. Álvarez-Ortega, G. Liébanas and R. Peña-Santiago. 2010. Departamento de Biología Animal, Biología Vegetal y Ecología, Universidad de Jaén, Campus 'Las Lagunillas' s/n, Edificio B3, 23071- Jaén, Spain. rpena@ujaen.es.** The identity of the genera *Discolaimium* and *Discolaimoides* has been and is a matter of controversy. Traditionally, they have been separated on the basis of a few characters of questionable taxonomic value: the morphology of lip region (expanded *vs* not expanded), the nature of anterior region of pharynx (muscular *vs* weakly or non-muscular), presence/absence of a pre-rectal blind sac, and tail length. New evidences derived from studying many Iberian populations of these two genera, including the first observations under SEM, revealed that it is not possible to find and define solid morphological patterns to characterize both genera, and, consequently, to support a separate status for them. In any case, further studies should be undertaken, including molecular analyses, to clarify the true nature of the evolutionary relationships of these two taxa.

ANÁLISIS DE LAS RELACIONES FILOGENÉTICAS ENTRE ESPECIES DE LA FAMILIA THELASTOMATIDAE [ANALYSIS OF THE PHYLOGENETIC POSTER RELATIONSHIPS AMONG SPECIES OF THE FAMILY THELASTOMATIDAE]**. P. Lax[1], J. C. Rondan Dueñas[2], C. N. Gardenal[3] and M. E. Doucet[1]. [1]Centro de Zoología Aplicada, C.C. 122, 5000 Córdoba, Argentina, [2]CEPROCOR, Córdoba, Argentina, [3]Genética de Poblaciones y Evolución, F. C. E. F. y N., Córdoba, Argentina.** La escasa información acerca de las relaciones filogenéticas entre especies de la familia Thelastomatidae lle-

vó al desarrollo del presente trabajo. Se amplificó y secuenció el segmento de expansión D2-D3 (LSU rDNA) en especímenes de *Hammerschmidtiella diesingi*, *Thelastoma* sp. (ambas extraídas del intestino posterior de *Periplaneta americana*) y *Leidynema appendiculata* (proveniente de *Blaptica* sp.) de Argentina. Las secuencias se compararon con información publicada en Genbank referida a los géneros citados (igualmente extraídos del intestino de cucarachas) y que constituyen la única información disponible en esa base de datos. Se realizó un análisis de Neighbor joining (1000 repeticiones), utilizando como extragrupo una secuencia de *Ascaris lumbricoides*. Los resultados mostraron que *L. appendiculata* de Argentina se relacionó con la única secuencia conocida para ese mismo nematodo extraído de *P. americana*; a la vez, esta especie se asoció con *L. portentosae* (obtenida de *Gromphadorhina portentosae*). Una situación equivalente se observó con *H. diesingi* (proveniente de *P. americana* y *Blatta orientalis*) y la especie *H. cristata* (*G. portentosae*). *Thelastoma* sp. mostró una relación muy estrecha con otra secuencia conocida del mismo género extraída igualmente de *P. americana* en Rusia. Si bien aún existen pocos estudios moleculares acerca de las diferentes especies de los tres géneros considerados, los resultados obtenidos muestran que el segmento D2-D3 es un buen marcador para estudios taxonómicos de nematodos de esta familia.

ECOLOGICAL INDICES OF *CEPHALOBIUM* SP. (CEPHALOBIIDAE) INFECTION IN *GRYLLUS ARGENTINUS* (GRYLLIDAE) [ÍNDICES ECOLÓGICOS DE *CEPHALOBIUM* SP. (CEPHALOBIDAE) EN *GRYLLUS ARGENTINUS* (GRYLLIDAE)]**. P. Lax. and M. E. Doucet. Centro de Zoología Aplicada, Universidad Nacional de Córdoba, C.C. 122, 5000 Córdoba, Argentina. plax@com.uncor.edu.** In Argentina, about 15 new nematode species inhabiting the gut of several cricket species have been described since the 1990s. Fifty adult specimens of *G. argentinus* (19 females and 31 males) were collected from the city of Córdoba (Province of Córdoba, Argentina). The insects were dissected, the hindgut was excised and the nematodes present were removed. Nematodes were identified based on the analysis of morphological characters. Juveniles and adults of *Cephalobium* sp. were detected, with a Prevalence (P) of 28%. Comparing insect sex, P values were 12% and 16% for cricket males and females, respectively. The parasitized crickets had between 1-100 nematodes in the hindgut, with a Mean Intensity of 19.6 and an Abundance of 5.5. The genus *Cephalobium* is cited in *G. argentinus* in Argentina for the first time.

REPRODUCTION OF *NACOBBUS ABERRANS* ON PEPPER CULTIVARS [REPRODUCCIÓN DE *NACOBBUS ABERRANS* EN CULTIVARES DE PIMIENTO]**. P. Lax[1], D. Ramos[2] and M. E. Doucet[1]. [1]Centro de Zoología Aplicada, C.C. 122, 5000 Córdoba, Argentina, [2]Facultad de Agronomía y Veterinaria, Universidad Nacional de Río Cuarto, Río Cuarto, Córdoba, Argentina. plax@com.uncor.edu.** In Argentina, *Nacobbus aberrans* causes severe damage to pepper production, mainly to greenhouse cultivated crops. In the present work, two *N. aberrans* populations of known aggressiveness to pepper were considered. They were from the localities of Río Cuarto (RC) and Lisandro Olmos (LO), province of Córdoba and Buenos Aires, respectively. Their reproductive capacity was evaluated on three pepper cultivars: two commonly used in the production area of Córdoba (Fyuco INTA and Yatasto) and one cultivar recently introduced into the market (Hybrid 36 615). California Wonder, a cultivar susceptible to the parasite, was used as control. The experiment was conducted under greenhouse conditions, at a mean temperature of 23°C, with six replications per cultivar. Each four-leaf seedling was inoculated with 100 second-stage juveniles at transplanting. At 80 days, Reproduction Factor was estimated (RF = final density/initial density). All the cultivars showed high susceptibility to both populations; range of RF values was 20.5-38 (LO) and 30.5-49.3 (RC). No significant differences were observed between populations for a single cultivar or between cultivars for a single population (including the control). Further studies are needed to find resistant cultivars as an alternative to manage this important pest.

THE GENUS *ORIVERUTUS* SIDDIQI, 1971 (DORYLAIMIDA, NORDIIDAE) IN COSTA RICA [EL GÉNERO *ORIVERUTUS* SIDDIQI, 1971 (DORYLAIMIDA, NORDIIDAE) EN COSTA RICA]**. G. Liébanas[1], A. Esquivel[2], P. Guerrero[1], J. Abolafia[1], S. Álvarez-Ortega[1] and R. Peña-Santiago[1]. 2010.**

[1]Departamento de Biología Animal, Biología Vegetal y Ecología, Universidad de Jaén, Campus 'Las Lagunillas' s/n, Edificio B3, 23071- Jaén, Spain, [2] Laboratorio de Nematologia, Escuela de Ciencias Agrarias, Universidad Nacional Ap 86-3000, Heredia, Costa Rica. gtorres@ujaen.es. The genus *Oriverutus* is an interesting dorylaimid taxon, distributed in tropical areas worldwide, but very rare in temperate regions. Seven species, namely *O. ecae, O. maturitatis, O. masculus, O. microdorus, O. parahastus, O. sturhani* and *O. tropicus*, are known to occur in Central and South America (Bolivia, Colombia, Costa Rica, Ecuador, Nicaragua and Peru). The study of the material deposited in InBio nematode collection revealed that *Oriverutus* is highly diversified in neotropical areas, since six species inhabit Costa Rican soils: *O. asaccatus, O. ecae, O. tropicus* and three other undescribed. These species have been characterized in detail, including descriptions, measurements, LM pictures, etc. Special mention deserves the first observations made under SEM. They allowed the accurate description of lip region: six conspicuous, separate and comparatively high, lobe-like lips; labial and cephalic papillae appearing especially developed, distinctly protruding, more seta-like than papilla-like; and perioral area consisting of a thick, elevated, ring-like structure surrounding oral opening which is a dorso-ventral slit.

RESPUESTA VARIETAL DE CULTIVARES DE PAPA AL NEMATODO DEL NUDO DE LA RAÍZ *MELOIDOGYNE JAVANICA* [RESPONSE OF POTATO CULTIVARS TO ROOT KNOT NEMATODE *MELOIDOGYNE JAVANICA*]**.** **I. Lima-Medina[1], C. B. Gomes[2]. 2010. [1]Universidade Federal de Pelotas/PPGF /FAEM, 96010-900, Pelotas-RS, Brazil. islimes@hotmail.com, [2]Embrapa Clima Temperado/Pelotas-RS, Brazil.** Los nematodos del género *Meloidogyne* ocasionan grandes pérdidas en diferentes cultivos de importancia económica. En el cultivo de papa *Meloidogyne javanica* es considerado la especie más fitopatogénica en la mayoría de variedades cultivadas en el mundo, presentando síntomas como la reducción de la planta, amarillamiento, e inviabilizando la calidad del tubérculo (protuberancia, reducción de tamaño y formación de nódulos). El objetivo del presente estudio fue de evaluar la resistencia de seis cultivares y tres clones de papa a *M. javanica*. Plantas individuales de papa mantenidas en macetas de 4 kg con suelo autoclavado, fueron inoculadas con 5 000 huevos + J2 de *M. javanica*, en casa de vegetación. Después de 55 días a la inoculación, se evaluó el número de nódulos y huevos en las raíces de cada planta, verificándose el factor de reproducción (FR = pob, final/pob. Inicial) y el grado de resistencia, en contraste con el testigo (tomate 'Santa Cruz'). De los diferentes genotipos estudiados (Cristina, PCDAG 03-11, Clon 12-2, Cota, Asterix, Ágata, Catucha y Eliza) todos fueron susceptibles a *M. javanica*.

RESPUESTA DE VARIEDADES Y CLONES DE PAPA A LOS NEMATODOS DEL NUDO DE LA RAIZ *MELOIDOGYNE MAYAGUENSIS* Y *M. ETHIOPICA* [RESPONSE OF POTATO VARIETIES AND CLONES TO ROOT KNOT NEMATODES *MELOIDOGYNE MAYAGUENSIS* AND *M. ETHIOPICA*]**.** **I. Lima-Medina[1] and C. B. Gomes[2]. 2010. [1]Universidade Federal de Pelotas/PPGF/ FAEM, 96010-900, Pelotas-RS, Brazil. islimes@hotmail.com, [2]Embrapa Clima Temperado/Pelotas-RS, Brazil.** El nematodo del nódulo de la raíz és considerado uno de los principales problemas fitosanitarios del cultivo de la papa, causando formación de nódulos, reducción del tamaño de la planta y perjudicando en la calidad del tubérculo, lo que posteriormente inviabiliza su comercialización. El objetivo del presente trabajo fue evaluar la respuesta de seis variedades y tres clones de papa al dos especies de *Meloidogyne*. Plantas individuales de papa mantenidas en macetas fueron inoculados con 5.000 huevos y J2 de *Meloidogyne mayaguensis* y *M. ethiopica* en invernadero por un período de 55 dias. Para análisis de los resultados fueron contados el número de gallas y huevos presentes en las raíces para verificar el grado de resistencia y factor de reproducción (FR) en relación al testigo (tomate susceptible). De los genotipos evaluados, dos presentaron resistentes (Cristina y PCDAG 03-11), y siete fueron susceptibles (Ana, Clon 12-2, Cota, Asterix, Ágata, Catucha y Eliza) a *M. mayaguensis*. Para el caso de *M. ethiopica*, todas las variedades y clones de papa se mostraron susceptibles a este nematodo.

BIODESINFECTION OF SOILS AND THE EFFECTS ON CROPS DIVERSITY IN CUBA. [BIODESINFECCIÓN DE SUELOS Y SU EFECTO SOBRE LA DIVERSIDAD DE CULTIVOS EN CUBA]**.** **I. Castro Lizazo[1], A. López-Pérez[2], A. Villalón Hoffman[3], MA. Díez-Rojo[2], MR. González-López[4], C. Martínez[4], I. Urra Sayas[1], I. Hernández Escobar[1], MG. Rodríguez Hernández[5], L. Robinson[6], L. Díaz**

Viruliche[1], A. Bello[4], R. Rodríguez Kábana[7]. [1]Univ. Agraria de La Habana, Cuba. ivanc@isch.edu.cu, irelio@isch.edu.cu, [2]Centro Agrario de Marchamalo, JCCM, Guadalajara, España. jalopezp@jccm.es, madiez@jccm.es, [3]Inst. Investigaciones del Tabaco, San Antonio de Los Baños, Cuba. ailyn@iitabaco.co.cu, [4]Centro de Ciencias Medioambientales, CSIC, Madrid, España. antonio.bello@ccma.csic.es, [5]Centro de Sanidad Agropecuaria (CENSA), San José de Las Lajas, Cuba. mayra2531961@yahoo.es, [6]Museo Nacional de Ciencias Naturales (MNCN), Madrid, España. lee.r@mncn.csic.es, [7]Univ. Auburn, EEUU. rodrirr@auburn.edu. In today's society the protection of the environment is a high priority, in which the use of agrochemicals in agriculture contributes to alterations. Human beings from their beginnings as farmers noted that to grow and produce food, manure or crop waste should be incorporated to the soil to increase yields. Agro-industrial wastes are a serious worldwide problem due to their environmental impact. Only an agricultural model based on ecological criteria can provide added value for these products. Biodesinfection of soil is proposed as an alternative to the use of chemicals, evaluating different agricultural wastes, especially those generated in higher quantities in Cuba, such as sugar cane vinasse and liquid wastes from the dairy industry, under laboratory and field conditions to determine their effects, either alone or combined on plant parasitic nematodes and beneficial organisms, taking into account their action on plant growth, nutrition, galling index caused by nematodes of the genus *Meloidogyne* and soil chemical properties. The research is focused on vegetables and banana crops. Biodesinfection was effective in reducing nematodes of the genus *Meloidogyne* up to 98.9%, with a positive effect on soil fauna, observing an increase in the plant variables with a positive action on the fertility, physical, chemical and biological properties of the soil and a reduction in production costs and environmental impact. It should be remembered that the nature of the organic matter may be of different i.e. solid or liquid, in which during their decomposition produce gases which appear to have a nematostatic effect, increasing the saprophytic soil fauna and crop yield.

EFEITO DE ACIBENZOLAR-S-METIL SOBRE A POPULAÇÃO DE *PRATYLENCHUS BRACHYURUS* EM CANA-DE-AÇÚCAR [EFFECT OF ACIBENZOLAR-S-METHYL ON *PRATYLENCHUS BRACHYURUS* POPULATION IN SUGARCANE]**. L. M. Lobo, L. C. Santos, M. R. da Rocha, R. A. Teixeira, K. A. G. Barbosa, 2010. Universidade Federal de Goiás, Escola de Agronomia e Eng. de Alimentos, Laboratório de Nematologia, 74001-970, Goiânia, GO, Brazil. mrocha@agro.ufg.br.** O uso de indutores de resistência é uma ferramenta relativamente nova e ainda pouco utilizada na agricultura. O objetivo deste estudo foi avaliar o efeito do indutor de resistência acibenzolar-S-methil (ASM) no manejo de *Pratylenchus brachyurus* em cana-de-açúcar, variedade SP80-1816, em condições de casa-de-vegetação, realizando-se inoculação artificial das plantas. Os tratamentos foram compostos pela combinação entre quatro doses de ASM (0, 5, 10 e 20 g i.a/100L) e duas formas de aplicação do produto (pulverização na parte aérea e no solo). As pulverizações foram feitas aos 7, 15, 21 e 28 dias após a inoculação de *P. brachyurus*. A avaliação foi feita aos 70 dias após inoculação fazendo-se a extração e contagem dos nematóides nas raízes. Com a aplicação do ASM em pulverização na parte aérea observou-se um efeito quadrático com menores densidades populacionais do nematóide nas doses de 5 e 10 g/100L. Apesar de a população voltar a aumentar na dose de 20 g i.a./100L, ainda assim a população ficou bem abaixo daquela observada na testemunha. Quando a aplicação do produto foi feita via pulverização no solo observou-se que a população de *P. brachyurus* diminuiu à medida que as doses de ASM foram aumentadas.

ANÁLISIS HISTOPATOLÓGICO DE RAÍCES DE TABACO (*NICOTIANA TABACUM* L) ATACADAS POR N*ACOBBUS ABERRANS* [HISTOPATHOLOGICAL ANALYSIS OF TOBACCO ROOTS ATTACKED BY N*ACOBBUS ABERRANS*]**. J. Macagno[1], M. Tordable[1], P. Lax[2], R. Santo[3] and M. E. Doucet[2]. [1]Morfología vegetal, Universidad Nacional de Río Cuarto, 5800 Río Cuarto. Córdoba, Argentina, [2]Centro de Zoología Aplicada, Universidad Nacional de Córdoba. Casilla de Correo 122, 5000 Córdoba, Argentina, [3]Dirección Provincial de Desarrollo Agrícola y Forestal, Jujuy, Argentina. mdoucet@efn.uncor.edu.** Se evaluó la reacción de raíces de tabaco cultivar K394 tipo Virginia (loca-

lidad Alto la Torre, Provincia de Jujuy, Argentina), naturalmente infectadas por *N. aberrans*. Raíces (con y sin agallas) fueron fijadas en FAA, procesadas y analizadas mediante procedimientos convencionales para microscopía óptica. Las agallas no superaron los 2.5 mm de diámetro. En cortes transversales y longitudinales se observó un importante incremento del volumen del cilindro central debido a la presencia de tejido hiperplásico e hipertrófico. En esta zona, el nematodo indujo además la formación de sincitios constituidos por numerosas células, de tamaños variables, con citoplasma denso y vacuolizado. Los sitios de alimentación estaban inmersos en el xilema secundario e incorporaban en su formación células de ese tejido provocando su reducción e interrupción; algo equivalente fue observado en el cambium vascular. Estrechamente relacionados con los sincitios se encontraron hembras del nematodo que, por el aumento del volumen de su cuerpo, producían considerables alteraciones en los tejidos vasculares (xilema y floema) y en el parénquima cortical (con extensas zonas de células aplastadas y/o rotas). Los resultados muestran que el hospedador estudiado es susceptible a la población de *N. aberrans* considerada. Por primera vez se describe esta asociación nematodo-parásito en el país.

EFECTO NEMATICIDA DE CADUSAFOS APLICADO EN RIEGO POR GOTEO E INYECCIÓN CON CINCEL, MANEJO DE SUELO, RIEGO Y BENEFICIOS PARA LA PLANTA, EN *VITIS VINIFERA* CV. FLAME SEEDLESS, COPIAPÓ, CHILE [NEMATICIDAL EFFECT OF CADUSAFOS APPLIED IN DRIP IRRIGATION AND CHISEL INJECTION, LAND MANAGEMENT, IRRIGATION, AND BENEFITS FOR THE PLANT, IN *VITIS VINIFERA* CV. FLAME SEEDLESS, COPIAPÓ, CHILE]**. J. C. Magunacelaya, J. Lundstedt, R. Mancilla y T. Ahumada. Universidad Católica Valparaíso. jmagunac@ucv.cl.** En la temporada 2009-2010 se aplicó cadusafos, 15, 30 y 45 l/ha en flor y cuaja, por riego por goteo; 30 L/ha en cuaja y 45 L/ha en flor, a través de inyección con cinceles al suelo en vid cv. Flame seedless. Durante las dos últimas temporadas no hubo producción debido a la mala calidad de las plantas. Cadusafos se aplicó a 400 ppm i.a. Furadan y QLAgri 35 fueron testigos químicos y dos testigos sin aplicación. Se subsoló y cambió los riegos históricos cortos y frecuentes, por riegos largos y distanciados. Se evaluaron los nemátodos, calidad radical, producción y crecimiento vegetativo. Las aplicaciones por inyección y goteo tuvieron similar control sobre *Meloidogyne* spp. y *Mesocriconema xenoplax*, pero la aplicación por goteo fue más uniforme y penetrante en el suelo que la inyección. Cadusafos 15, 30 y 45 L/ha tuvieron un control nematicida similar pero al aumentar la dosis aumentó el volumen de suelo protegido colonizado por raíces sanas observado en calicatas. Todas las plantas tuvieron mayor producción comercial que la temporada anterior. Los tratamientos químicos tienden a mayor producción que los testigos y mejor calidad de raíces. Este ensayo demuestra la eficacia de un apropiado manejo de suelo y una eficaz aplicación de cadusafos para recuperar un parrón en decaimiento.

***POCHONIA CHLAMYDOSPORIA*: SOME BIOLOGICAL AND PHYSIOLOGICAL ASPECTS IN THE HOST-PARASITE RELATIONSHIP** [*POCHONIA CHLAMYDOSPORIA*: ALGUNOS ASPECTOS BIOLÓGICOS Y FISIOLÓGICOS EN LA RELACIÓN HUÉSPED-PARÁSITO]**. R. H. Manzanilla-López, B. R. Kerry[1], I. Esteves[2], E. Ward[1] and P. R. Hirsch[1]. [1]Plant Pathology and Microbiology Division, Rothamsted Research. Harpenden, Herts. AL5 2JQ, UK, [2]IMAR-CMA Universidade de Coimbra, 3004-517 Portugal. rosa.manzanilla-lopez@bbsrc.ac.uk.** The nematophagous fungus *Pochonia chlamydosporia* (Clavicipitaceae) can parasitize eggs of cyst (*Globodera* spp., *Heterodera* spp.), root-knot (*Meloidogyne* spp.) and false-root knot (*Nacobbus* spp.) nematodes. Its potential as a biological control agent has been the subject of numerous studies to understand the micro-ecological conditions, including the tri-trophic (e.g. plant, fungus, nematode) and host-parasite relationships, which allow the fungus to thrive in the soil and rhizosphere environment. In order to exploit the fungus effectively in regulating plant endoparasitic nematodes, a careful selection of fungal isolates (biotypes) appropriate for both host plant and nematode is essential. *Pochonia* survives in soil in the absence of a nematode host and, although it behaves as a saprophyte, research evidence points to a physiological 'switch' from saprophytic to parasite stages which is triggered by nutrition, e.g. availability of C and N sources, and the activation of enzymes,

such as VCP1, involved in nematode egg shell degradation and subsequent colonization of the eggs by the fungus. Fungal chlamydospore-based products for application to soil as an inoculum have been shown to be viable commercial products. However, ongoing research related to the basic biology of the fungus can provide new insights into commercial production methodology.

EFFECT OF PRECIPITATION AND SOIL ATTRIBUTES ON *MELOIDOGYNE* SPP. AND *PRATYLENCHUS ZEAE* DENSITY IN SUGARCANE GROWING AREAS [EFECTO DE LA PRECIPITACIÓN Y ATRIBUTOS DEL SUELO SOBRE LA DENSIDAD DE *MELOIDOGYNE* SPP. Y *PRATYLENCHUS ZEAE* EN AREAS DEL CULTIVO DE CAÑA DE AZÚCAR]**. S. R. V. L. Maranhão, L. M. P. Guimarães, A. Chaves, E. M. R. Pedrosa and D. E. Simões Neto. 2010. Universidade Federal Rural de Pernambuco, Brasil. Rua Dom Manoel de Medeiros, S/N, Dois Irmãos, Recife, PE - CEP 52.171-900, RIDESA, Universidade Federal Rural de Pernambuco, Estação Experimental de Cana-de-açúcar do Carpina, Rua Ângela Cristina C. P. de Luna, S/N, Bairro Novo, Carpina, PE - CEP 55.810-000. srmaranhao@hotmail.com.** Considering plant disease epidemiology models applicability and the different conditions of sugarcane (*Saccharum* sp.) growing areas in Northeastern Brazil, the present study had the objective of comparing variations on population density of *Meloidogyne* spp. and *Pratylenchus zeae* in areas with different edaphic attributes, from crop field renovation to harvest, using regression models and the area under population density curve (AUPDC) of the nematode to analyze the variations. Evaluations were carried out in South Coast of Pernambuco, Brazil, in two areas characterized in lean and sheet lands, in four collection periods. Progress curve of both *P. zeae* and *Meloidogyne* spp. described quadrate functions, in lean and sheet lands. The lowest ($P \leq 0.05$) values of AUPDC for *Meloidogyne* spp., in soil or root, occurred in sheet lands. To *P. zeae*, lean and sheet lands did not show statistical difference ($P \leq 0.05$) for AUPDC in soil and root. In soil, the highest ($P \leq 0.05$) AUPDC occurred in sheet and lean land, but in root in non irrigated lean lands. In lean and sheet lands, the accumulated precipitation negatively affected both parasite population density especially *P. zeae*, in root and soil.

SOIL NEMATODE COMMUNITY IN LEAN AND SHEET AREAS UNDER SUGARCANE CROPPING IN NORTHEASTERN BRAZIL [COMUNIDAD DE NEMÁTODOS EN SUELO BAJO LAS HOJAS DE LA CAÑA DE AZÙCAR] **S. R. V. L. Maranhão, L. M. P. Guimarães, A. Chaves, E. M. R. Pedrosa and D. E. Simões Neto. 2010. Universidade Federal Rural de Pernambuco, Brasil. Rua Dom Manoel de Medeiros, S/N, Dois Irmãos, Recife, PE-CEP 52.171-900, RIDESA, Universidade Federal Rural de Pernambuco, Estação Experimental de Cana-de-açúcar do Carpina, Rua Ângela Cristina C. P. de Luna, S/N, Bairro Novo, Carpina, PE - CEP 55.810-000. srmaranhao@hotmail.com.** Nematodes community trophic structure, in particular *Meloidogyne* spp. and *Pratylenchus zeae*, in soil at field renovation and harvest of sugarcane (*Saccharum* spp.) are fundamentals for understanding shifts in population dynamic and consequent effects on crop production. The objective of the present study was to characterize plant parasitic nematode community, correlate trophic groups, and asses the influence of crop field renovation and harvest period on nematode community under different edaphic and climatic conditions at Northeastern Brazil. Evaluations were carried out in North and South Mata of Pernambuco, Brazil, in lean and sheet lands. The results pointed out that plant parasitic nematode population dynamics is dependent on physic-chemical soil characteristics and possible sugarcane variety. In lean and sheet lands from South of Pernambuco, the dominance of plant parasitic nematodes tended to increase along with crop development, although decreases in *taxa* abundance were registred. Contrary situations occurred in no irrigated costal table (North Mata of Pernambuco and South Coast of Paraíba) and lean land of North Mata of Pernambuco. In swamp lands, abundance and dominance of plant parasitic nematodes and the other *taxa* seem to be lowly affected during crop season. Among the plant parasitic nematodes *Meloidogyne* spp. and *P. zeae* were the dominant *taxa* in all areas and periods evaluated, except in lean lands from South Mata at harvest in which the dominant *taxa* were *Helicotylenchus* sp. and *Xiphinema* sp. The low *taxa* richness of nematofauna reflects the low balance of the communities, characteristic of intensive crop management.

COMBATE DE NEMATODOS ASOCIADOS A HORTALIZAS EN MÉXICO: DOS DECADAS DE LUCHA [CONTROL OF NEMATODES ASSOCIATES TO VEGETABLES CROPS IN MEXICO: TWO CONTROL DECADES]**. N. Marbán-Mendoza[1] y A. J. Cabrera-Hidalgo[2]. [1]Universidad Autónoma Chapingo, Depto. Parasitología Agrícola, Chapingo, Estado de México, México, [2]Colegio de Postgraduados, Instituto de Fitosanidad, Montecillo 56230, Edo. De México, México.** Consideramos que en los últimos 20 años el combate de nematodos deletéreos para los cultivos de tomate (*Solanum lycopersicum*), Chile (*Capsicum annuum*) y cucurbitáceas, han sido inducidas por la necesidad de reemplazar el uso del bromuro de metilo (BM), política gubernamental inducida por el Protocolo de Montreal. En nuestra plática discutiremos los cambios de una agricultura a cielo abierto, sin uso de acolchados, sus consecuencias (buenas y malas), hasta el boom de la agricultura protegida, sus bondades y limitaciones. Para el caso de la agricultura a cielo abierto, los nemátodos *Meloidogyne* spp y *Nacobbus aberrans* han sido los más combatidos con alternativas químicas de transición (formulaciones de BM y I, dicloropropeno, Vapam, etc., combinados con cloropicrina), así también, como la aplicación de nematicidas no fumigantes y biológicos. Los sistemas de producción bajo cubierta son a la fecha un gran éxito en organizaciones altamente tecnificadas, pero no así en los menos o poco tecnificados. Trataremos de explicar la situación actual en nuestra realidad socioeconómica.

INTRODUCTION TO NEMATODES: A NEW MULTIMEDIA PRESENTATION [INTRODUCCIÓN A LOS NEMÁTODOS: UNA NUEVA PRESENTACIÓN MULTIMEDIA]**. E. C. McGawley[1], M. J. Pontif[2] and C. Overstreet[3]. [1, 3]LSU AgCenter, Dept. of Plant Pathology and Crop Physiology, 302 Life Sciences Bldg., Baton Rouge, LA 70803, [2]LSU AgCenter, Sugarcane Research Station, St. Gabriel, LA 70776. emcgawley@agctr.lsu.edu.** Introduction to Nematodes is a multimedia presentation that contains 99 multi-layered slides. The presentation contains 481 photographs, 155 illustrations, 17 tables and 14 videos. The presentation is formatted as a Quicktime movie and therefore will play on either a Macintosh or a PC computer. The presentation is accompanied by a 13 page syllabus with notes and credits for each slide, an index of the 18 sections (General, History, Morphology, Body Systems, Symptoms, Loss Estimates, Movement & Dissemination, Sampling, Extraction, Population Dynamics, Thresholds, Management, Taxonomy, Parasitism, Key for Identification, Highlighted Genera, Disease Complexes and Entomogenous Nematodes), a "read me" file which contains instructions for obtaining and using the Quicktime player and a set of "thumbnail views" of each slide. This presentation can be obtained as a FREE download courtesy of the websites of ONTA and the Society of Nematologists.

VARIATION IN REPRODUCTION AND PATHOGENICYTY OF GEOGRAPHIC ISOLATES OF *ROTYLENCHULUS RENIFORMIS* ON COTTON. [VARIACIÓN EN LA REPRODUCCIÓN Y PATOGENICIDAD DE AISLAMIENTOS GEOGRÁFICOS DE *ROTYLENCHULUS RENIFORMIS* EN ALGODÓN]**. E. C. McGawley, M. J. Pontif and C. Overstreet. 2010. LSU AgCenter. Baton Rouge, LA 70803, USA. emcgawley@agctr.lsu.edu.** The comparative reproduction and pathogenicity of isolates of *Rotylenchulus reniformis* from Alabama, Arkansas, Hawaii, Louisiana, Mississippi and Texas on cotton was evaluated in microplot trials. Prior to initiation of microplot trials, ten clonal populations of each geographic isolate were derived from single egg masses. Reproduction of the clonal populations of each geographic isolate were evaluated in greenhouse studies with Stoneville LA887 cotton by assessing the numbers of vermiform stages in soil and eggs per gram of root tissue 60 days after inoculation. On the basis of these trials, each repeated once, one clonal population of each of the six isolates was selected for use in microplot trials. Averaged over the two trials, clonal population designations selected for use in microplot trials and their respective reproduction values (R, where R = Pf/Pi) and numbers of eggs per gram of root were: AL-8 (R = 14.9, eggs = 202); AR-3 (R = 30.4, eggs = 525); HI-9 (R = 20.2, eggs = 183); LA-3 (R = 18.2, eggs = 517.); MS-7 (R = 25.7, eggs = 602) and TX-l0 (R = 42.8, eggs = 938). Data from full-season (147 days) microplot trials, averaged over 2 years, showed significant differences (Tukey's HSD test ($P \leq 0.05\%$)) among isolates of reniforrn nematode in both reproduction and pathogenicity. Dry plant weight at harvest averaged 370.6 g for the non-in-

oculated control. All isolates except the one from HI produced root weights at harvest that were reduced significantly below that of the control. Harvest weights for plants inoculated with LA-3 and MS-7 were significantly lower than those from the other four geographic regions.

SUITABILITY OF SOME ANNUAL CROPS TO THREE SPECIES OF ROOT-KNOT NEMATODES [SUSCEPTIBILIDAD DE ALGUNOS CULTIVOS ANUALES A TRES ESPECIES DE NEMÁTODOS AGALLADORES DE RAÍCES]**. M. L. Mendes and D. W. Dickson. 2010. University of Florida, P.O. Box 110620, Gainesville, FL 32611 USA. mlmendes@ufl.edu.** Twenty annual crops were evaluated to determine the reproductive potential on them of *Meloidogyne mayaguensis* (Mm), *M. floridensis* (Mf), and *M. javanica* race 3 (Mj3). 'Rutgers' tomato was included as a standard susceptible host. Plants were inoculated with 5,000 eggs and juveniles of each species. Sixty five days after inoculation the plants were uprooted; the number of galls, egg masses, final population density and the reproductive factor (Rf = Pf/Pi) was determined. Aster 'Purple Burst', cosmos, sorghum and zinnia 'Zowie Yellow Flame' were nonhosts to all three species. Sun hemp supported only a very low level of infection by Mm (0.03), and was a nonhost to Mf and Mj3, whereas oat was a nonhost to Mm and Mf but susceptible to Mj3 (1.48). Gourd was a nonhost to Mm (0.79) and Mj3 (0.35), but susceptible to Mf (8.37). Pepper 'Big Dad' and 'Hot Lemon' were nonhost to Mf and Mj3, but susceptible to Mm (1.59 and 2.07, respectively) Impatien 'Macarena' was a nonhost to Mf, but susceptible to Mm (2.21) and Mj3 (2.07). Basil 'Summerlong' was a nonhost to Mf (0.71), however served as a host for Mm (4.37) and Mj3 (1.82). Corn Yellow Dent and Silver Queen were nonhosts for Mm, although susceptible to Mf (3.97 and 12.47, respectively) and Mj3 (14.82 and 16.90, respectively). Vetch, green bean 'Fortex' and 'Heavyweight II', lima bean 'Big Mama', mustard 'Florida broadleaf', morning glory 'Candy Pink', calendula 'Oktoberfest', and tomato were susceptible to all three species.

MOLECULAR AND MORPHOLOGICAL CHARACTERISATION OF SPECIES WITHIN THE *XIPHINEMA AMERICANUM*–GROUP (DORYLAIMIDA: LONGIDORIDAE) FROM THE CENTRAL VALLEY OF CHILE [CARACTERIZACIÓN MOLECULAR Y MORFOLÓGICA DE ESPECIES DEL GRUPO *XIPHINEMA AMERICANUM* (DORYLAIMIDA: LONGIDORIDAE) PROVENIENTES DEL VALLE CENTRAL DE CHILE]**. P. Meza[1,2], Erwin. Aballay and P. Hinrichsen[2]. [1]Facultad of Agronomy, Universidad de Chile, Avenida Santa Rosa 11315, Santiago, Chile, [2]Biotechnology Laboratory, INIAP La Platina, Avenida Santa Rosa 11610, Santiago, Chile.** Species of the *Xiphinema americanum*-group are among the most damaging nematodes for a diverse range of crops. This group includes 51 nominal species throughout the world. They are very difficult to identify by traditional taxonomic methods. Despite its importance in agriculture, the species composition of this group in many countries, including Chile, remains unknown. In order to identify the species in the central valley of Chile, we studied the morphological, morphometric and molecular diversity of 13 populations. Through classical taxonomic methods two species, *X. inaequale* and *X. peruvianum*, were identified with clear differences in the shape of the lip region. The DNA sequences of the ITS of ribosomal genes revealed divergence in the nucleotide sequences of the two species from 7.3% in ITS1 to 14.7% in ITS2. These results confirmed the presence of two distinct species, namely *X. peruvianum* and *X. inaequale*, in the northern and southern parts of the central valley of Chile, respectively. PCR-RFLP was developed for rapid species identification of these two species.

MORPHOLOGICAL AND MOLECULAR CHARACTERISATION OF *MELOIDOGYNE* POPULATIONS ASSOCIATED WITH ANDEAN FRUITS AND *MUSA* PLANTS IN COLOMBIA. [CARACTERIZACIÓN MORFOLÓGICA Y MOLECULAR DE POBLACIONES DE *MELOIDOGYNE* ASOCIADAS CON FRUTALES ANDINOS Y PLANTAS MUSA EN COLOMBIA]**. G. E. Múnera[1], W. Bert[2], G. Karssen[3], M. Couvreur[2], L. Waeyenberge[4], A. Vierstraete[2] and W. Decraemer[2,5]. 2010**. **[1]Corporación Colombiana de Investigación Agropecuaria, CORPOICA, A.A. 100 Rionegro, Antioquia, Colombia, [2]Ghent University, Department of Biology, Ledeganckstraat 35, 9000 Ghent, Belgium, [3]Plant Protection Service, Nematology Section, P.O. Box 9102, 6700 HC, Wageningen, The Netherlands, [4]Institute**

for Agricultural and Fisheries Research, Burg. Van Gansberghelaan 96, 9820 Merelbeke, Belgium, [5]Royal Belgian Institute of Natural Sciences, Vautierstraat 29, 1000 Brussels, Belgium. gladismunera@yahoo.com. Twenty-four *Meloidogyne* populations from Andean fruits (*Cyphomandra betacea, Solanum quitoense, Passiflora ligularis*) and *Musa* plants occurring in Colombia were identified using different approaches: morphological and morphometrical analyses by light (LM) and scanning electron microscopy (SEM), species-specific primers, protein analyses, molecular analyses of sequences and phylogenetic analyses. Morphometric and/or morphological features allowed separation of populations into species groups as a first step towards identification. Although purification of populations is recommended as a second step in identification, only three species could be successfully purified. However, to overcome the mixed species problem for all other species, *Meloidogyne* identification was based on a single young egg-laying female (protein analysis) and DNA (for species-specific PCR and sequence analyses) was always extracted from a single juvenile. Six known species were identified: *M. incognita, M. javanica, M. arenaria, M. hapla, M. konaensis* and *M. paranaensis*. The last two species had never been recorded previously in Colombia but since they show morphological features similar to *M. incognita* and *M. arenaria* they were probably misidentified in the past. Isozyme analysis also recovered two phenotypes that could not be related to known *Meloidogyne* species. The first phenotype represents a new species that is currently under investigations by researchers from Holland and Brazil and, additional specimens of the second phenotype are needed for accurate morphological and morphometrical studies.

NEMATODES ASSOCIATED WITH SOIL AND ROOTS OF *CHRYSANTHEMUM* SPP. IN LOCALITIES OF QUEBRADA (DRY VALLEY) OF HUMAHUACA, JUJUY PROVINCE, ARGENTINA [NEMATODOS ASOCIADOS CON SUELO Y RAÍCES DE *CHRYSANTHEMUM* SPP. EN LOCALIDADES DE QUEBRADA DE HUMAHUACA, JUJUY (VALLE SECO), PROVINCIA DE JUJUY, ARGENTINA]**.** **S. Muruaga de L'Argentier, C. Gallardo, S. Quintana de Quinteros, H. Vilte y R. Bautista. Cátedras de Zoología General y Zoología Agrícola. Alberdi 47. San Salvador de Jujuy. (4600). Argentina. zoolgral@fca.unju.edu.ar.** *Chrysanthemum* spp. have a great economical importance in the province of Jujuy. Studies on nematodes are available for other flower producing areas; but such information is not available for Jujuy. Research was aimed at identifying the nematofauna associated with this host in the "Quebrada" (dry valley) of Humahuaca, Jujuy province. With this purpose, during 2008 many soil samples and *Chrysanthemum* plant roots have been taken in the main flower producing localities of this area: Huacalera, El Perchel and Uquía. Samples were processed using the flotation-centrifugal method. Preparations from the resulting material were examined microscopically, with 1000x. With the aid of morphometrical keys, eight genera were identified: in Huacalera, *Criconemoides* sp. in soil and *Pratylenchus* sp. in roots; in El Perchel, *Helicotylenchus* sp. in soil, *Pratylenchus* sp. and *Tylenchorhynchus* sp. in roots; in Uquía, *Hemicycliophora* sp. and *Pratylenchus* sp. in soil, *Aphelenchus* sp., *Aphelenchoides* sp., *Trichodorus* sp. and *Tylenchorhynchus* sp. in roots. This is the first report of *Criconemoides, Hemicycliophora*; *Trichodorus* and *Tylenchorynchus* in *Chrysanthemum* for Jujuy as well as for Argentina. It should be established whether the soil nematodes have a parasitic relation with these plants.

ANTAGONISTIC EFFECT OF THE FUNGUS *FUSARIUM OXYSPORUM* (ASCOMYCOTA: PYRENOMYCETES) ON THE ENTOMOPATHOGENIC NEMATODE *HETERORHABDITIS* SONORENSIS (NEMATODA: HETERORHABDITIDAE) [EFECTO ANTAGONISTA DEL HONGO *FUSARIUM OXYSPORUM* (ASCOMYCOTA: PYRENOMYCETES) SOBRE EL NEMATODO ENTOMOPATOGENO, *HETERORHABDITIS* SONORENSIS (NEMATODA: HETERORHABDITIDAE]**.** **P. D. Navarro and S. P. Stock. Department of Entomology, University of Arizona, Tucson AZ, USA.** It is known that persistence of entomopathogenic nematode (EPN) populations in agro-ecosystems is influenced by rates of progeny production and the virulence of their progeny. Rates of EPN progeny production can be influenced by interactions with other organisms of the same and/or different trophic guilds. In this study we investigated interactions between a soil-borne plant pathogenic fun-

gus, *Fusarium oxysporum,* and a Sonoran-native EPN, *Heterorhabditis sonorensis*. Both organisms coexist in asparagus fields in the state of Caborca Mexico. Therefore, a series of experiments were carried out to assess the interactions between *H. sonorensis* and *F. oxysporum*. Preliminary results suggest the plant-pathogenic fungus interferes with the infection and development of the EPN in the insect host. Insect host mortality, EPN establishment in the insect cadaver and progeny production were assessed. Mortality data was corrected using Abbott's formula and analyzed using logistic regression. EPN penetration efficiency and progeny production were analyzed using ANOVA. Means were compared using Tukey's test.

IMPORTANCIA DEL MONITOREO NEMATOLÓGICO EN LA PRODUCCIÓN AGRICOLA COLOMBIANA [NEMATOLOGYCAL SURVEY IMPORTANCE IN THE COLOMBIAN AGRICULTURAL PRODUCTION]**. R. Navarro A, B. Gaviria G. Universidad Católica de Oriente (UCO) Rionegro, Antioquia. Colombia. sanidadveg.inv1@uco.edu.co, sanidadveg.inv2@uco.edu.co.** Colombia con su variedad de pisos térmicos, disponibilidad hídrica, salidas al mercado internacional, identifican a la producción agrícola como un renglón de alto potencial exportador, con una demanda creciente por el cambio en hábitos de consumo y a la necesidad de productos sanos e inocuos. Cultivos de importancia económica como Banano, Café, frutales, plantas aromáticas, ornamentales, entre otros, pueden ser afectados por diferentes plagas, enfermedades y disturbios abióticos, entre éstos, los nematodos fitoparásitos tienen gran importancia porque son parásitos obligados en una amplia variedad de plantas causando daños severos en raíces y follajes impidiendo el desarrollo normal de las plantas, convirtiéndose en una limitante para su producción, inclusive al interactuar con otros como hongos, bacterias, virus, insectos; problemas fitosanitarios que inciden negativamente sobre los indicadores de calidad de los productos, trayendo esto como consecuencias, pérdidas económicas. Por ello, la implementación de programas para la producción sostenible de cultivos se perfila como una clara necesidad del sector agrícola frente a las nuevas tendencias de la agricultura mundial, de ahí que se plantea que en la agricultura moderna y para integrar conceptos de manejo de población de patógenos, el muestreo resulta ser el primer paso decisivo, algunos investigadores señalan dentro de los objetivos comerciales de un muestreo de nematodos el diagnóstico y monitoreo general, el conocimiento detallado de fincas o lotes, la determinación de umbrales económicos, el pronóstico de pérdidas y la toma de decisiones para el manejo. Por eso es importante conocer con certeza géneros como *Meloidogyne*, *Pratylenchus, Paratylenchus, Helicotylenchus, Aphelenchoides, Trichodorus, Macroposthonia, Xyphinema, Radopholus, Rotylenchulus, Tylenchorhynchus, Hoplolaimus*, *Globodera*, entre otros, la nematofauna y organismos benéficos, lo que les posibilitaría un manejo sostenible de los cultivos evitando pérdidas económicas.

NEMATODOS FITOPARÁSITOS ASOCIADOS A CULTIVOS DE IMPORTANCIA ECONÓMICA EN EL VALLE DE SAN NICOLÁS, ANTIOQUIA, COLOMBIA [PLANT PARASITIC NEMATODES ASSOCIATED WITH ECONOMICAL IMPORTANT CROPS IN THE VALLEY OF SAN NICOLAS, ANTIOQUIA, COLOMBIA]**. R. Navarro A y B. M. Gaviria G. Universidad Católica de Oriente (UCO) Rionegro, Antioquia. Colombia. sanidadveg.inv1@uco.edu.co y sanidadveg.inv2@uco.edu.co.** La zona tropical Colombiana del Valle de San Nicolás, Antioquia, presenta condiciones favorables para producir cultivos de importancia económica de aromáticas, plantas medicinales, frutales, hortalizas, y ornamentales, sin embargo, se han visto afectados por problemas fitosanitarios caracterizados por deformaciones, necrosis en hojas y raíces, amarillamientos, nudosidades en raíces y retraso en crecimiento, causando pérdidas en la producción entre 10 y 35%. Con el objeto de generar conocimiento de los nematodos presentes, el Laboratorio de Sanidad Vegetal UCO, mediante análisis en plantas de producción y por métodos de extracción tradicional Baermann, ha identificado nematodos fitoparásitos como *Aphelenchoides ritzemabosi* que afectan follaje en Crisantemo, Alstroemeria, Albahaca y Lirios; los síntomas producidos por estos microorganismos desorientan a los agricultores, quienes lo confunden y atribuyen el daño al ocasionado por hongos o bacterias. Otro género importante es *Meloidogyne*, asociado a cultivos de Tomate, Tomate de Árbol, Crisantemos y Tomillo, mostrando como síntoma

principal diversos tipos de nudosidades; a partir del patrón perineal de la hembra se identificaron las especies *M. incognita, M. javanica, M. hapla, M. arenaria* y otras aun sin definir. Además se han caracterizado géneros fitoparásitos importantes como *Pratylenchus, Helicotylenchus, Trichodorus, Macroposthonia* y también géneros de dudoso parasitismo y de vida libre, entre ellos, *Tylenchus, Dorylaimus, Plectus* y *Rhabditis*. New researches which consist on i) using natural and introduced biodiversity and ii) selecting new tolerant varieties may complete this evolution toward "zero pesticide". Thereby, cover crops and sigatoka resistant varieties may decrease also the needs for herbicides and fungicides.

CAUSES OF INCONSISTENCY AND NEEDS FOR INTEGRATED APPROACHES TO THE MANAGEMENT OF PLANT PARASITIC NEMATODES [CAUSAS DE INCONSISTENCIA Y NECESIDADES DE PROPUESTAS INTEGRADAS PARA EL MANEJO INTEGRADO DE NEMÁTODOS FITOPARÁSITOS]**. J. W. Noling. University of Florida, IFAS, Citrus Research & Education Center, 700 Experiment Station Rd., Lake Alfred, FL 33850. jnoling@ufl.edu.** Florida field research has repeatedly demonstrated that pest control efficacy of soil applied fumigant nematicides is generally more highly dependent upon application uniformity and various physical, chemical, cultural, biological, and environmental factors. For example, spatial analysis of patterns of field distribution of root-knot nematode repeatedly indicates a nonrandom, aggregated pattern in most fields surveyed. Areas of survivorship often appear to be the crowned areas of the field which are thought to be the hottest and driest areas of field at the time of soil fumigation, and the more rapid escape of the fumigant may afford nematodes greater survival. Spatial and temporal aspects of ground water hydrology and subsurface topography of spodic horizons is also thought to play a significant role upon nematode survival to soil fumigant treatment. In other studies, soil profile differences in physical characteristic, soil texture and penetration resistances all have been demonstrated to impact patterns of nematode field distribution, plant damage, and soil fumigation efficacy. The presence of subsurface traffic pans (a dense, highly compacted soil layer), unavoidably cause changes in hydraulic conductivity, permeability to fumigant gases, and root penetration into soil. Hyperspectral reflectance and other plant, field, and aerial imaging technologies are being used to characterize geospatial differences in nematode induced crop stresses and needs for new, integrated nematode management tactics. The presentation will illustrate how success and consistency of an integrated nematode management tactic may only occur if specific conditions are met, and that favorable conditions may not persist or occur only intermittently.

CULTURAL MANAGEMENT OF SUGAR CANE FOR THE CONTROL OF *PRATYLENCHUS ZEAE* [MANEJO CULTURAL DE CAÑA DE AZÚCAR PARA EL CONTROL DE *PRATYLENCHUS ZEAE*]**. G. C. S. Alves, J. M. Santos, P. L. M. Soares, R. Ferreira. Júnior; F. G. Jesus; M. R. Rocha. 2009. Laboratório de Nematología, Escuela de Agronomía, Universidad Federal de Goiás, 74001-970, Goiânia, GO, Brazil, Laboratório de Nematologia, Faculdad de Agronomía y Veterinária de Jaboticabal, 14884-900 Jaboticabal, SP, Brazil. gleinacosta@yahoo.com.br.** Sugar cane has a great economic importance for Brazil and its productivity has suffered because of plant-parasitic nematodes attack. The aim of this study was to evaluate in the field, the influence of a synthetic nematicide and a bacterial isolate, applied to sugar cane line and between sugar cane lines on population of *Pratylenchus zeae*. The trial was installed in area of sugar cane variety SP87-365, in Itápolis, São Paulo state. The trial design was randomized blocks with six treatments and four replications. Each plot was five rows by 10 meters in length, are considered the three central lines as useful area. The treatments were: 1. Control in the row; 2. Control in between lines; 3. Aldicarb 150 g on line; 4. Aldicarb 150 g between rows; 5. Bacterial isolate FCAV 9 + organic mineral fertilizer in the row; and 6. Bacterial isolate FCAV 9 + organic mineral fertilizer in rows. All treatments were applied manually at planting. The evaluations consisted of samples of soil and roots, collected monthly until 210 days after planting, extraction and counting of nematodes. At 270 days, the last sampling took place and biometric analysis of height and

number of tillers was done. The population of *P. zeae* was significantly reduced only by planting in rows. The use of isolated bacterial FCAV 9 + organic mineral fertilizer in the between rows resulted in an increase in the number of tillers.

NEMATODE DISTRIBUTION IN SWAMP LANDS AND COSTAL TABLES CULTIVATED WITH SUGARCANE UNDER IRRIGATED AND NON IRRIGATED SYSTEMS [DISTRIBUCIÓN DE NEMATODOS EN TIERRA PANTANOSA Y SABANA COSTANERA CULTIVADAS CON CAÑA DE AZÚCAR BAJO SISTEMAS IRRIGADO Y NO IRRIGADO]**. E. M. R. Pedrosa, S. R. V. L. Maranhão, L. M. P. Guimarães, A. Chaves and D. E. Simões Neto. 2010. Universidade Federal Rural de Pernambuco, Rua Dom Manoel de Medeiros, S/N, Dois Irmãos, Recife, Pernambuco, Brasil.- CEP 52.171-900, RIDESA, Universidade Federal Rural de Pernambuco, Estação Experimental de Cana-de-açúcar do Carpina, Rua Ângela Cristina C. P. de Luna, S/N, Bairro Novo, Carpina, Pernambuco, Brasil.-CEP 55.810-000. elvira.pedrosa@dtr.ufrpe.br.** Understanding shifts on nematode population density at harvest and renovation of sugarcane (*Saccharum* spp.) are fundamental for efficient crop management and high profits. The objective of the present study was to characterize plant parasitic nematode communities and assess the influence of crop field renovation and harvest period on nematode community under different edaphic conditions at Northeastern Brazil. Evaluations were carried out in swamp lands and both irrigated and non irrigated costal tables of Pernambuco and Paraíba in Brazil. Among the plant parasitic nematodes, *Meloidogyne* sp. and *P. zeae* were the dominant *taxa* in all areas and periods evaluated. In the irrigated costal table from North of Pernambuco, the dominance of plant parasitic nematodes tended to increase highly along with crop development, although decrease in *taxa* abundance was registered. Contrary situations occurred in non irrigated costal tables (North of Pernambuco and South of Paraíba). In addition, in the irrigated table the distribution of *P. zeae* was more uniform in contrast to non irrigated areas. Non irrigated tables presented weak spatial dependence degree for all periods of samples, whereas in irrigated area the dependence degree ranged from weak to moderate. In swamp lands, abundance and dominance of free-living and plant parasitic nematodes seem to be lowly affected during crop season.

ANÁLISIS DE SUELOS Y TUBÉRCULOS DE PAPA, PARA RATIFICAR LA CONDICIÓN DE ÁREA LIBRE DE NEMATODOS CUARENTENARIOS EN LAS REGIONES DE LOS RÍOS Y DE LOS LAGOS, DEL SUR DE CHILE [ANALYSIS OF SOILS AND POTATO TUBERS TO RATIFY THE QUARANTINE NEMATODES FREE AREA CONDITION IN LOS LAGOS AND LOS RIOS REGIONS IN THE SOUTH OF CHILE]**. M.G Peña y C.A. Hernández. Servicio Agrícola y Ganadero. Laboratorio Regional SAG Osorno. Ruta a Puerto Octay U-55-V, calle de servicio, Osorno, Chile. gloria.pena@sag.gob.cl.** Chile posee una superficie cultivada de 53.689 ha de papa (INE,2007) de las cuales 32.587 se encuentran localizadas en la zona sur del país, en el área comprendida entre la provincia de Arauco, Región del Bío-Bío y la Región de Magallanes y Antártica Chilena, declaradas por el Servicio Agrícola y Ganadero (SAG) área libre de plagas cuarentenarias de la papa dentro de las cuales se encuentran *Globodera rostochiensis* y *Globodera pallida* (Resol. exenta N°2104 del 05 de Agosto de 2003). A fin de prevenir la diseminación de nematodos cuarentenarios y garantizar la buena condición sanitaria de estas regiones, el SAG ha implementado, desde el año 2007, el Programa Nacional de Sanidad de la Papa, el cual considera acciones de vigilancia, fiscalización de comercio y transporte, cuarentena vegetal, utilización de semilla y otras las que han permitido mantener la condición de Área Libre, posibilitando el abastecimiento de papa semilla y consumo para el resto del país y la exportación a otros países. En este trabajo se presentan los resultados de los análisis de laboratorio, de muestras de tubérculos y suelos de cultivos de papas captadas en actividades de vigilancia y fiscalización las temporadas 2008 y 2009 en la región de Los Ríos y de Los Lagos que en conjunto representan aproximadamente el 50% de la superficie cultivada en el área libre. El año 2008 se realizaron 789 análisis nematológicos de los cuales 435 correspondieron a muestras de suelo y 354 muestras de tubérculos con síntomas sospechosos de daños por nemátodos en tanto que el año 2009 se realizaron 1.103 análisis correspondiendo a 593 muestras de suelo y y 510 muestras de tubérculos con síntomas. Todos

los análisis de las muestras de suelo en ambas temporadas resultaron negativos a nematodos formadores de quistes (*Globodera pallida* y *Globodera rostochiensis*), mientras que la totalidad de muestras de tubérculos con síntomas de protuberancias resultaron negativas a las especies cuarentenarias *Meloidogyne chitwoodi* y *Pratylenchus scribneri* lo cual ratifica la condición de área libre y sugiere la mantención de las medidas y el programa adoptado por la autoridad fitosanitaria.

***PASTEURIA* SPP.: ENDOSPORE-FORMING BACTERIAL PARASITES OF NEMATODES AND CLADOCERANS AS NATURALLY OCCURRING AGENTS FOR BIOCONTROL** [*PASTEURIA* SPP.: BACTERIAS FORMADORAS DE ENDOSPORA PARÁSITAS DE NEMATODOS Y CLADÓCEROS EN LA NATURALEZA PARA EL BIOCONTROL]**.** **J. F. Preston[1], L. M. Schmidt[2], G. Nong[1], L. Mouton[3], J. A. Brito[4], D. W. Dickson[5], R. M. Giblin-Davis[6] and D. Ebert[7]. [1,5]Microbiology and Cell Science and Entomology and Nematology Department, University of Florida, Gainesville, FL 32611, [2]Pasteuria Bioscience, Suite 185, Alachua, FL 32615, [3]University de Lyon, F-69000, Lyon, France, [4]Division of Plant Industry, P.O. Box 147100, Gainesville, FL 32614, [6]Fort Lauderdale REC, Ft. Lauderdale, FL 33314, [7]Zoologisches Institut, Universitat Basel, CH-4051 Basel, Switzerland. jpreston@ufl.edu.** *Pasteuria penetrans* and other described species of *Pasteuria* are obligate endospore-forming parasites of several soilborne nematodes and have been shown to cause suppressiveness of some of the more important plant parasites. *Pasteuria ramosa*, which is an obligate parasite of water fleas (*Daphnia* spp.), also has been shown to modulate cladoceran populations in natural ecosystems. These related species and their biotypes have been compared with respect to multiple gene sequences, including those encoding 16S rRNA and others encoding proteins associated with growth and sporulation. The sequences of orthologous genes encoding proteins differ in species and strains to a greater extent than sequences of 16S rRNA genes, and have served as probes to differentiate species and biotypes with different host specificities. Single nucleotide variations have been observed in genes from different populations of *P. penetrans* P20 with a preference to *Meloidogyne arenaria* race 1, and in *P. ramosa* derived from different populations of *Daphnia* spp. While most of these are silent single nucleotide polymorphisms, some result in amino acid substitutions. Contributions these variations make to host preference and virulence requires further investigation. A monoclonal antibody directed against an adhesin epitope present on *P. penetrans* P20 endospores, previously determined to be specific for *Pasteuria* spp. associated with several phytopathogenic nematodes, also detects an epitope associated with *P. ramosa* endospores. The presence of a shared adhesin epitope among these species with such ecologically distant hosts, along with phylogenetic relationships of gene sequences, suggests ancient processes in these endospore-forming bacilli that contribute to virulence toward their respective hosts.

ADVANCES IN THE IDENTIFICATION OF *XIPHINEMA AMERICANUM* SENSU LATO. [AVANCES EN LA IDENTIFICACIÓN DE *XIPHINEMA AMERICANUM* SENSU LATO]**.** **T. Prior[1], S. Hockland[1] and W. Decraemer[2]. [1]Plant Pest and Disease Programme, The Food and Environment Research Agency, Sand Hutton, York YO41 1LZ England, UK, [2]Royal Belgian Institute of Natural Science, Rue Vautier 29, B-1000 Brussels, Belgium. sue.hockland@fera.gsi.gov.uk.** Presently four putative species belonging to the *X. americanum* group are known to transmit four American nepoviruses. Identification of species in this group is therefore of particular importance for phytosanitary purposes, but is problematic because of the similar morphology of the putative species. There is debate on the number of recognized species and the interpretation and relative significance of morphological features, but access to relevant taxonomic expertise and identification tools such as reference slide material is difficult. Literature searches and collection of type slide material and live populations in Europe were made. Image Analysis software was used with an interference phase microscope to catalogue features on type and other specimens. Improved definition of major characters was achieved. New distinguishing characters were discovered. A final selection of a definitive set of characters is being made for use in new identification keys which will facilitate the development of molecular tools. This work was jointly funded by the Plant Health Division, Defra and the Synthesys project BE-TAF

1769. Eight collaborative institutions contributed type and non-type material of *Xiphinema americanum sensu lato*; Fera (formerly CSL), UK; RBINS, Belgium; CABI, UK; R-Res, UK; BARI, Italy; KiS, Slovenia; Servicio Agrícola y Ganadero, Chile; USDA, N. America.

DETECTION AND DIAGNOSTIC OF FOLIAR AND BULBS NEMATODES OF QUARANTINE IMPORTANCE IN MEXICO [DETECCIÓN Y DIAGNÓSTICO DE NEMATODOS FOLIARES Y DE BULBOS DE IMPORTANCIA CUARENTENARIA EN MÉXICO]**. A. Ramírez-Suárez, Plant Pathology Department, Institute of Agriculture and Natural Resources, 411, Plant Science Hall, Lincoln, Nebraska, 68583, University of Nebraska-Lincoln, USA. angelrasu75@huskers.unl.edu.** Among the pathogens included in the Mexican phytosanitary regulation on plant products imported, foliar and bulb nematodes have the highest probability and risk of introduction into Mexican territory through nursery stock, cut flowers and fresh foliage. The timely detection and accurate diagnosis of quarantine nematodes on ornamental plants are key factors to prevent their introduction to officially recognized free zones. To achieve this, it is important to adopt protocols approved by regional plant protection organizations. In Mexico, nematode problems that have been frequently detected in ports, airports and borders are foliar and bulb nematodes of genus *Aphelenchoides* such as *A. fragariae*, *A. besseyi* and *A. ritzemabosi* mostly found in bulbs of *Lilium*, *Hyacinthus, Tulipa*, *Iris* and *Oxalis*, corms of *Liatris*, *Gladiolus, Chrysanthemum* and *Alstroemeria* cutting and fern seedlings of *Rumohra* and *Pteris* particularly in shipments coming from Europe. On the other hand, there is a low number of detections of bulb nematode *Ditylenchus destructor* on corms of *Liatris* and the root-knot nematode *Meloidogyne javanica* on corms of *Gladiolus* and tubers of *Zantedeschia*.

EPIDEMIOLOGÍA, IMPORTANCIA Y PERTINENCIA DE DESARROLLAR UN SISTEMA DE MANEJO INTEGRADO DE LOS NEMATODOS AGALLADORES *NACOBBUS* SP. Y *MELOIDOGYNE* SP. PARA OPTIMIZAR SU CONTROL EN TOMATE (*LYCOPERSICUM ESCULENTUM* MILL) EN EL VALLE DEL CHOTA, ECUADOR [EPIDEMIOLOGY, IMPORTANCE AND PERTINENCE TO DEVELOPMENT A CROP SYSTEM INTEGRATED MANAGEMENT FOR ROOT KNOT NEMATODES *NACOBBUS* SP. AND *MELOIDOGYNE* SP. TO OPTIMIZE THEIR CONTROL IN TOMATO IN CHOTA VALLEY, ECUADOR]**. J. Revelo[1], C. Cazco[2], N. Castillo[3], A. Sandoval[4], G. Sánchez[5], L. lomas[6], A. Corrales[7]. [1,3] Dpto. Protección Vegetal-INIAP, Casilla 17-01-340, Quito, Ecuador, [1,2]Docentes, [4, 5, 6, 7]Estudiantes graduados de Ing. Agropecuaria, Universidad Técnica del Norte, Ibarra, Ecuador.** En zonas tomateras del valle del Chota en Ecuador, de mayo 2006 a junio 2007, se realizaron estudios de la epidemiología de *Nacobbus* sp. y *Meloidogyne* sp. para determinar su importancia, problemática y pertinencia de desarrollar un sistema de manejo integrado. *Meloidogyne incognita* presentó mayor incidencia y distribución que *N. aberrans,* pero similar severidad (20 a 80 nemátodos/100 g de suelo), entre altitudes de 1620 a 2550 m y 1620 a 2400 m, respectivamente. El monocultivo en invernadero, la mala calidad sanitaria de las plántulas, el sistema de riego por inundación en campo y los cultivos de rotación reducen la población de *N. aberrans* pero incrementan la población de *M. incognita* e influyen en su diseminación. *N. aberrans* presentó un rango de hospederos amplio, pero bledo (*Amaranthus hybridos*), melloco (*Ollucus tuberosus*), cenizo (*Chenopodium paniculatum*), quínoa (*Chenopodium quinoa*), lechuga (*Lactuca sativa*), nabo chino (*Rapanus sativus*), pepinillo (*Cucumis sativus*), oca (*Oxalis tuberosa*), chamico (*Datura stramonium*) y frutilla (*Fragaria vesca*), hospederos deficientes, podrían funcionar como cultivos trampas. La variedad Titán presentó un nivel de tolerancia de 18 huevos y estados larvales J2/g de suelo (h y l/g s.) de *N. aberrans*, incremento (I) máximo de 46 veces a una población inicial de 1 h y l/g s. y nivel de equilibrio de 180 h y l/g s., que indica que esta variedad es tolerante. Diva, Fortaleza, Chibli, Victoria, Gina, Sahel, Thomas y Rocío, fueron resistentes tolerantes a *M. incognita* (I = 0,1 a 0,7, sin pérdida de rendimiento). Sahel, resistente no tolerante (I = 0,4, rendimiento 2,2 kg/planta sin nemátodos y 1,2 kg/planta con nematodos). Nemonetta, E2532067, Charleston, Suncret, Titán, FA1418, Sweet, Paronset, Don José, Ikram y Stacatto, susceptibles tolerantes (I = 1,1 a 4,4, sin pérdida de rendimiento) y Sheila, susceptible no tolerante. Todos las variedades más Pericle, Miroma, Platone, E2731642, Sheila y AG375, se comportaron como susceptibles tolerantes a

N. aberrans (I = 1,4 a 19,8 veces, sin pérdida de rendimiento). La remoción del suelo y la incorporación de gallinaza fresca al suelo, no disminuyeron la población de *N. aberrans* y *M. incognita*, pero la gallinaza propició una reproducción baja de los dos nematodos e influyó en la obtención de mejores rendimientos; los cultivos de cebolla, fréjol y maíz, fueron adecuados para reducir la población de *N. aberrans*, pero no para *M. incognita* lo que dificulta su utilización en lotes donde los dos nematodos estén presentes. El problema de estos nematodos es superado por la resistencia o tolerancia de las variedades cultivadas, la aplicación de materia orgánica (gallinaza) en campo e invernadero y por la rotación con cebolla, fríjol, vainita y maíz.

COMPORTAMIENTO DE PAPAS NATIVAS AL PARASITISMO DEL NEMATODO DEL QUISTE DE LA PAPA (*GLOBODERA PALLIDA*) EN ECUADOR [BEHAVIOUR OF NATIVE POTATO TO PARASITISM OF THE CYST NEMATODE *GLOBODERA PALLIDA* IN ECUADOR]**. Riera W.[1], Revelo J.[2], Rivadeneira J.[3]. [1]Estudiante graduado de Ing. Agropecuaria, [2]Docente, Universidad Técnica del Norte, Ibarra, Ecuador, [3]INIAP, Casilla 17-01-340, Quito, Ecuador.** En Ecuador, la papa es el cultivo más rentable de la Región Sierra. Zonas de minifundio de pequeños agricultores presentan infestaciones altas de este nematodo (>100 huevos y J2/gramo de suelo) por siembras continuas de papa y 30% de pérdidas de rendimiento. Para evitar las pérdidas, reducir y mantener la población del nematodo a niveles bajos, se estableció la necesidad de desarrollar variedades de papa resistentes para estas zonas. Con este propósito, en el 2008, en invernadero se evaluó el comportamiento de 20 materiales de papas nativas al parasitismo de G. *pallida,* patotipo P4A, para identificar fuentes de resistencia. De cada material se sembraron 10 tubérculos semilla de 40 g en macetas conteniendo 3,5 kg de suelo esterilizado; cinco macetas se inocularon con 20 huevos y J2/gramo de suelo y cinco no se inocularon. Como testigo referencial se utilizó la variedad INlAP-Gabriela (susceptible tolerante). El comportamiento de los materiales se califico relacionando las variables rendimiento (kg/planta) y el incremento de la población del nematodo (I = Pf/Pi), mediante los criterios de Cook (1974) y Canto-Sáenz (1985). Los materiales: Milagrosa, Coneja Negra, Poluya, Bolona, Chaucha Blanca, Unknow, Curipamba, Leona Blanca, Calvache, Norte Roja, INlAP-Gabriela (testigo), Carrizo Cotopaxi, Uvilla y Chaucha Colorada presentaron un comportamiento susceptible tolerante al incrementar la población del nematodo de 5 a 26 veces y no ser afectado su rendimiento ("t" 0,05). Chaucha Amarilla, Violeta, Coneja Blanca, Rosada, Osito, Macholulo, Yema de Huevo, Jubaleña, Puca Huayro y Leona Negra Norte, se comportaron como susceptibles no tolerantes por incrementar la población de 3 a 37 veces y por ser afectado su rendimiento ("t" 0,05). En el material evaluado no se encontraron materiales resistentes.

INVESTIGATING THE TROPHIC BEHAVIOR OF FUNGIVOROUS SOIL NEMATODES USING FLUORESCENT *IN SITU* HYBRIDIZATION [INVESTIGACIÓN DEL COMPORTAMIENTO ALIMENTARIO DE NEMATODOS FUNGÍVOROS USANDO HIBRIDACIÓN FLUORESCENTE *IN SITU*]**. M. E. Riley and A. M. Treonis. 2010. Department of Biology, University of Richmond, Richmond, VA 23173, U.S.A. megan.e.riley@richmond.edu.** Species of soil nematodes are known to feed on bacteria, fungi, plant roots, or other nematodes. Little is known, however, about their feeding preferences within these broad trophic groups. We are using a fluorescent *in situ* hybridization (FISH) technique with taxa-specific oligonucleotide probes to identify recent "meals" present within the nematode pharynx, prior to digestion. Our goal was to develop this procedure for use in quick assessment of the trophic behavior of uncultured nematodes extracted directly from soils. We successfully identified food sources within bacterial-feeding nematodes using FISH, and we are currently using the rRNA fungal probes FR1 and PF2 to investigate this technique in *Aphelenchus avenae* cultured on the fungus *Rhizoctonia solani*. Rather than ingest the entire cell like bacterial-feeders, stylet-bearing nematodes such as *A. avenae* use their stylets to pierce the fungal cell wall and pump out cytoplasm and organelles. Based on the small size and high density of ribosomes within fungal cells, we expected the nematode stylet to permit the passage of ribosomes that are then the target for our FISH probes. However, a lack of fluorescent signal in *A. avenae* labeled with fungal probes suggests that fungal rR-

NA is not present in the pharynx of *A. avenae*. It is possible that digestion of the fungal intracellular contents occurs very rapidly within the nematode. Our current work involves culturing *A. avenae* on GFP-labeled *Ustilago maydis* in order to further investigate the feeding behavior of these fungal-feeding nematodes.

GLYCERIN BASED COMPOSITIONS FOR CONTROL OF WEEDS, PLANT PATHOGENIC NEMATODES AND OTHER SOILBORNE PLANT PESTS [CONTROL DE MALEZAS, NEMATODOS FITOPATÓGENICOS Y OTRAS PLAGAS DE ORIGEN EDÁFICO CON PREPARACIONES BASADAS EN GLICERINA]**. R. Rodríguez-Kábana, L. J. Simmons and C. R. Taylor. 2010. Agroecology Program, Auburn University and the Alabama Agricultural Experiment Station, Pesticide Research Building, 411 Research Road, Auburn, Alabama, U.S.A. rodrirr@auburn.edu.** Biodiesel production results in accumulation of crude glycerin [CG], an alkaline water soluble liquid composed principally of glycerin and volatile compounds. CG applied directly to soil [>2-8 MT/ha] can suppress a variety of plant pathogenic nematodes [PPN], and other soilborne pests. Results from a 5-year study at Auburn University, indicate that CG can be used as inexpensive raw material to make glycerin-based compositions with naturally occurring pesticidal compounds. Some of these compositions have broad-spectrum activity against soil-borne pests and were researched as herbicides and for control of PPN and soilborne phytopathogenic fungi. Also, CG can be modified through inexpensive reactions with low molecular weight common organic acids and aldehydes, or can be halogenated to result in effective broad-spectrum materials for control of weeds and other soilborne plant pests. World-wide abundance of inexpensive CG indicates that new and environmentally sound and economical approaches to pest control can be developed on a global basis to replace petroleum based pesticides.

PROGRESS IN THE USE OF BIODIESEL FOR CONTROL OF WEEDS, PHYTOPATHOGENIC NEMATODES, AND OTHER SOILBORNE PLANT PESTS [AVANCES EN EL USO DE BIODIESEL PARA CONTROLAR MALEZAS, NEMATODOS FITOPATOGÉNICOS Y OTRAS PLAGAS DE ORIGEN EDÁFICO]**. R. Rodríguez-Kábana, L. J. Simmons, C. R. Taylor. 2010. Agroecology Program, Auburn University and the Alabama Agricultural Experiment Station, Pesticide Research Building, 411 Research Road, Auburn, Alabama, U.S.A. rodrirr@auburn.edu.** Biodiesel [BD], a mixture of methyl esters of fatty acids from vegetable or animal oils and fats, can be formulated for direct application to soil for controlling weeds, phytopathogenic nemaodes [PPN] and other soilborne plant pests [SBP]. BD is also an excellent solvent for a variety of naturally occurring phytochemicals. BD can be combined with acids formed in anaerobic bacterial fermentations [propionic, butyric], with common aldehydes [e.g. acrolein, benzaldehyde, salicylaldehyde], or with isothiocyanates and other allylochemicals. Results from a 4-year study with greenhouse and microplot experiments showed that these combinations are usually synergistic in activities against weeds, PPN and SBP when applied to soil using suitable formulations. Results also showed that BD can be formulated with standard registered pesticides [e.g. dazomet, various herbicides] to obtain inexpensive broadspectrum weed and pest control suitable for use in the production of horticultural crops.

THE WORLD'S FOOD AND BIOENERGY SYSTEM: AN OVERVIEW OF SUSTAINABILITY ISSUES WITH SPECIAL REFERENCE TO PHOSPHORUS AND PEST CONTROL [EL SISTEMA ALIMENTARIO Y BIOENERGÉTICO EN EL MUNDO: REVISIÓN DE TEMAS REFERENTES AL FÓSFORO Y CONTROL DE PLAGAS]**. R. Rodríguez-Kábana and C. Robert Taylor. 2010. Agroecology Program, Auburn University and the Alabama Agricultural Experiment Station, Pesticide Research Building, 411 Research Road, Auburn, Alabama, U.S.A. rodrirr@auburn.edu.** Modern agriculture is heavily dependent on fossil fuels for production of inputs, including pesticides and fertilizers. While N is fixed from air using natural gas, P and K are mined. Depletion of world P supplies could occur within 25 – 30 years or sooner with substantial increase use of plant material for biofuel production. Price and future availability of commercial fertilizer, particularly P, are of growing global concern. Peak P has been projected to occur with peak oil. Many ancient and traditional cropping systems are

sustainable and allow for nutrient stability and recycling, and development and maintenance of suppressiveness of soils against phytopathogenic nematodes and other pests. In contrast, most contemporary agricultural systems depend on constant inputs of: pesticides, P and other nutrient elements. This affords limited or no possibilities for nutrient recycling and results in degradation of beneficial microbial activities with consequent increase in problems caused by nematodes and other soilborne pests. This paper will focus on issues dealing with world food and bioenergy policy to encourage expanded research on technology for recycling nutrients with emphasis on P through systems that result in improved soil health.

MANEJO DE *MELOIDOGYNE INCOGNITA* EN NARANJILLA *(SOLANUM QUITOENSE)* Y TOMATE DE ÁRBOL (*SOLANUM BETACEUM*) CON EL USO DE PORTA INJERTOS RESISTENTES [MANAGEMENT OF *MELOIDOGYNE INCOGNITA* IN NARANJILLA *(SOLANUM QUITOENSE)* AND TOMATO TREE (*SOLANUM BETACEUM*) WITH THE USE OF RESISTANT ROOTSTOCKS]**. Ron L.[1] y Revelo J.[2]. [1]Estudiante graduado de Ing. Agrónomo, [2]Docente, Universidad Técnica del Norte, Ibarra, Ecuador**. La naranjilla y el tomate de árbol son dos frutales de importancia económica en Ecuador. El problema fitosanitario común es el nematodo *M. incognita* y el hongo *F. oxysporum.* Debido a la escasa variabilidad genética de estos frutales, el uso de patrones resistentes, se consideró como la mejor alternativa. El propósito de la presente investigación fue conocer el tipo de resistencia de los portainjertos *Solanum hispidum* y *Solanum arboreum* a *M. incognita* y a *F. oxysporum* y la afinidad de injertación con tomate de árbol y naranjilla. Tres ensayos fueron realizados en invernadero: 1) En cada portainjerto, se evaluaron 5 tratamientos: t0 = testigo sin inocular nemátodos, t1 = *M. incognita* población Valle Hermoso, t2 = *M. incognita* población Tumbaco, t3 = *M. incognita* población Río Negro, t4 = *M. incognita* población Nanegalito. A los 90 días de inocular 20 huevos y J2/g de suelo de cada población, se registraron las variables altura de la planta, peso fresco del follaje, peso seco del follaje e incremento del nematodo, las cuales fueron relacionadas mediante los criterios de Cook (1974) para conocer su comportamiento. 2) Para determinar la edad ideal del material para sincronizar su injertación, se establecieron semilleros con *S. hispidum*, *S. arboreum*, naranjilla y tomate de árbol. Se registró el tiempo que cada especie requirió para alcanzar 6 mm de diámetro, considerado ideal para la injertación. 3) Para determinar la posible interacción entre *M. incognita* y *F. oxysporu*m se evaluaron 8 tratamientos resultantes de la combinación de; a) injertos, *S. hispidum*-naranjilla y *S. arboreum*-naranjilla, b) inoculación de *M. incognita* y sin inoculación y c) inoculación de *F. oxysporum* y sin inoculación. Las variables analizadas fueron incidencia de *F. oxysporum* en el sistema vascular de los injertos, altura de planta, peso fresco y seco del follaje e incremento del nematodo. *S. hispidum* y *S. arboreum* presentaron un comportamiento susceptible-tolerante con incrementos de 23 a 35 y de 1 a 4 veces, respectivamente en las 4 poblaciones de *M. incognita.* Para desarrollar el injerto *S. arboreum*–naranjilla, se debe sembrar la naranjilla 21 días después de sembrar el patrón; para el injerto *S. arboreum*–tomate de árbol, sembrar el tomate de árbol 14 días después de sembrar el patrón a una temperatura promedio de 24 ºC y humedad relativa de 63%. No existió interacción entre *M. incognita* y *F. oxysporum* en los injertos *S. hispidum*-naranjilla y *S. arboreum*-naranjilla, al no registrar plantas con la enfermedad marchitez vascular, lo cual permite crear un aspecto de resistencia al ataque de este hongo. Se concluye que *S. arboreum* es el más adecuado para injertar tomate de árbol y naranjilla.

SOIL NEMATODE COMMUNITY STRUCTURE UNDER DIFFERENT SOIL MANAGEMENT REGIMES IN OLIVE TREE ORCHARDS [ESTRUCTURA DE LA COMUNIDAD DE NEMATODOS BAJO DIFERENTES REGIMENES DE MANEJO DE SUELO EN PLANTACIONES DE OLIVO]**. T. Salmerón, M. Talavera, E. Flor-Peregrín, M. Chirosa and J. Castro. IFAPA Camino de Purchil, Apdo. 2027, 18080 Granada, Spain. miguelf.talavera@juntadeandalucia.es.** Soil nematode biodiversity was estimated in five different olive orchards under different agronomic and soil management regimes (conventional *vs* organic management, soil tillage *vs* non tillage and use of cover crops plus herbicide *vs* cover crops and string trimmer removal). Total relative abundances of nematode orders in the olive orchards sampled were: Rhabditida 35,45%, Tylenchida 20,87%, Dorylaimida 20,33%, Aph-

elenchida 16,32% and Mononchida 3,15%. Most abundant phytoparasitic nematodes were those from the families Hoplolaimidae 26,91%, Telotylenchidae 14,28% and Pratylenchidae 9,23%. The rest of plant parasitic nematodes were included in the families Paratylenchidae 8,34%, Anguinidae 5,32%, Criconematidae 4,87%, Meloidogynidae 4,80%, Longidoridae 4,56% and Heteroderidae 2,53%. A list of the most abundant families and genera is provided. Organic management increased the relative abundance of bacterivore nematodes and reduced densities of omnivore nematodes. Species richness and relative abundance of predatory nematodes was greater in non tillage orchards and densities of phytoparasitic nematodes were increased in those treatments that maintained a cover crop on the soil. Biodiversity and Maturity indexes based on nematode fauna were calculated and their significance, related to agricultural practices, is discussed.

EFEITO DE DERIVADOS DE NIM E DA CASCA DE CAFÉ SOBRE A DENSIDADE POPULACIONAL DE *HETERODERA GLYCINES* [EFFECT OF NEEM DERIVATIVES AND COFFEE BEANS HUSK ON *HETERODERA GLYCINES* POPULATION DENSITY]**. L. C. Santos, M. R. Rocha, R. A. Teixeira, F. G. Araujo, K. A. G. Barbosa and F. S. O. Lima. 2009. Laboratório de Nematologia, Escola de Agronomia e Eng. de Alimentos, Universidade Federal de Goiás, 74001-970, Goiânia, GO, Brazil, Faculdade Católica do Tocantins, CCAA, 77061-002, Palmas, TO, Brazil. leogreko@hotmail.com.** A incorporação de matéria orgânica ao solo tem demonstrado potencial na redução populacional de fitonematóides devido à liberação de produtos tóxicos a estes patógenos. Alguns estudos destacam a ação nematicida de produtos derivados do nim indiano (*Azadirachta indica*) e resíduos orgânicos, como a casca de café. O objetivo deste estudo foi verificar os efeitos da torta e do óleo de nim e da casca de café sobre populações de *H. glycines* em plantas de soja cultivar BRSGO Luziânia, em condições de casa de vegetação. Utilizou-se delineamento inteiramente casualizado com seis tratamentos (1. torta de nim 10 g/vaso, 2. torta de nim 5 g/vaso, 3. óleo de nim 5%, 4. óleo de nim 8%, 5. casca de café 20% volume do vaso, 6. testemunha) e cinco repetições. Foi incorporado ao solo os tratamentos com torta de nim e casca de café ao solo e foi realizado o tratamento de radículas com o óleo de nim. Foram conduzidos ensaios nos anos de 2007 e 2008. Aos 30 dias após a inoculação avaliou-se o número de fêmeas de *H. glycines* e o número de ovos por fêmea. No ensaio realizado em 2008, a adição de torta de nim (10 g/vaso) e a imersão da radícula em óleo de nim (8%) foram os tratamentos mais eficientes na redução do número de fêmeas nas raízes, diferindo significativamente da testemunha. O número de ovos por fêmea não sofreu efeito dos tratamentos.

EFEITO DE DERIVADOS DE NIM E DA CASCA DE CAFÉ SOBRE *PRATYLENCHUS BRACHYURUS* NA CULTURA DA SOJA [EFFECT OF NEEM DERIVATIVES AND COFFEE BEANS HUSK ON *PRATYLENCHUS BRACHYURUS* IN SOYBEAN]**. L. C. Santos, L. B. Macedo, M. R. Rocha, R. A. Teixeira, F. G. Araujo, K. A. G. Barbosa, T. G. Alves, 2009. Universidade Federal de Goiás, Escola de Agronomia e Eng. de Alimentos, Laboratório de Nematologia, 74001-970, Goiânia, GO, Brazil. leobarros01@hotmail.com.** Nas últimas safras, o nematóide das lesões radiculares, *Pratylenchus brachyurus* tem se tornado problema para a cultura da soja nas áreas de Cerrado do Brasil Central levando os pesquisadores a buscar alternativas de controle. O presente estudo teve como objetivo avaliar os efeitos do uso de derivados de nim (óleo e torta) e da casca de café sobre populações de *P. brachyurus* em área naturalmente infestada, no município de Vicentinópolis, Goiás, Brasil. O delineamento experimental foi o de blocos casualizados com seis tratamentos (1. testemunha, 2. torta de nim 214 kg/ha, 3. torta de nim 429 kg/ha, 4. óleo de nim 286 mL/100 kg de sementes, 5. óleo de nim 457 mL/100kg de sementes, 6. Casca de café 1190 kg/ha. Os tratamentos com torta de nim e casca de café foram incorporados ao solo, no plantio. O tratamento com óleo de nim foi efetuado via tratamento das sementes. A densidade populacional de *P. brachyurus* nas raízes da soja foi avaliada aos 30 e 45 dias após o plantio (DAP). A população de *P. brachyurus* foi bem mais elevada aos 30 DAP e, nesta época, a torta de nim na dose de 429 kg/ha resultou em menor densidade populacional mas apenas diferindo dos tratamentos com óleo de nim. Aos 45 DAP não houve diferença entre os tratamentos. Também não houve efeito dos tratamentos sobre a produtividade.

NEMATODE FAUNA OF THE PARANÁ RIVER DELTA (ARGENTINA) AND ITS RELATIONSHIP WITH THE INVASIVE MUSSEL *LIMNOPERNA FORTUNEI* [NEMATOFAUNA DEL DELTA DEL PARANÁ (ARGENTINA) Y SU RELACIÓN CON EL MEJILLÓN INVASOR *LIMNOPERNA FORTUNEI*]**. Paula Sardiña[1] and Eliseo Chaves[2]. [1]Museo Argentino de Ciencias Naturales "Bernardino Rivadavia", 1405 Buenos Aires, Argentina, [2]INTA-EEA Balcarce, 7620 Balcarce, Argentina. psardina@macn.gov.ar.** We studied the nematode communities in two rivers (Luján and Canal del Este) of the Paraná River delta, and we analyzed its relationship with *Limnoperna fortunei*. Samples were obtained from the mussel beds themselves and from the soft sediment beneath them. The genera *Actinca, Aetholaimus, Anonchus, Aporcelaimellus, Aquatides, Labronemella, Mesodorylaimus, Xiphidorus, Monhystera, Aphanolaimus, Plectus, Panagrolaimus, Mononchus, Mylonchulus, Prismatolaimus, Tobrilus* and *Trypila* were found, and other undetermined Triplonchida, Mermithidae, Dorylaiminae, Prodorylaiminae and Qudsianematinae. Samples from the mussel colonies grouped together independently of the river, while soft sediment samples grouped by river (CLUSTER on presence-absence data). *Mylonchulus* and *Tobrilus* characterized mussel samples, *Anonchus* characterized Luján River, and Mermithidae and *Anonchus* were characteristics of Canal del Este River. The structure of the nematode communities can be mainly attributed to two factors: the presence of *L. fortunei*, and the site-specific environmental conditions of each river. Like other benthic fauna, some nematode species benefits from *L. fortunei* fouling on human introduced hard substrates in the Paraná River delta, where soft sediments naturally prevail.

IDENTIFICATION OF *Meloidogyne* SPECIES INFECTING TOMATO USING FAME ANALYSIS. [IDENTIFICACIÓN DE ESPECIES DE *MELOIDOGYNE* QUE INFECTAN AL TOMATE USANDO EL ANÁLISIS FAME]**. N. S. Sekora, M. L. Mendes, W. T. Crow. 2010. University of Florida Entomology and Nematology Department, P.O. Box 110620, Gainesville, FL 32611. nssekora@ufl.edu.** Fatty acid methyl ester (FAME) analysis has been used to identify several *Meloidogyne* species and races isolated from soil. Roots of *Lycopersicon esculentum* cv. 'Rutgers' infected with isolates of *M. arenaria* race 1, *M. arenaria* race 2, *M. hapla, M. incognita* race 2, and *M. javanica* race 1 were analyzed using this method to test its applicability as a practical diagnostic tool for infected plant tissue. Infected and uninfected root tissues were compared using the developed FAME method and analyzed with SAS. The FAME profile of uninfected root tissue was significantly different ($P < 0.0001$) from root tissue containing any of the five *Meloidogyne* isolates based primarily on the absence of the fatty acid 18:1 ω9t and higher proportion of 16:0 in healthy root tissue. Out of the ten total comparisons among *Meloidogyne* populations, 60% differed significantly ($P \leq 0.0228$). Even though tissue containing *M. incognita* race 2 was not statistically distinct from tissue containing *M. arenaria* race 1, *M. arenaria* race 2, or *M. hapla* and *M. arenaria* races were not readily distinguishable, observable differences in fatty acid expression were present. These results indicate that with some modification to the extraction method it may be possible to use FAME analysis as a diagnostic tool for tissue infected with *Meloidogyne* populations.

THE USE OF *IN VITRO* PRODUCED *PASTEURIA* SPP. FOR THE CONTROL OF *ROTYLENCHULUS RENIFORMIS* [EL USO DE *PASTEURIA* SPP. PRODUCIDA *IN VITRO* PARA EL CONTROL DE *ROTYLENCHULUS RENIFORMIS*]**. L. J. Simmons[1], T. Hewlett[2], K. Smith[2], M. C. Doroh [2] and A. K. Klapp[1]. 2010. [1]Auburn University, Pesticide Research Building, 411 Research Road, Auburn, AL 36849, U.S.A., [2]Pasteuria Bioscience, Inc. 12085 Research Drive, Suite 185, Alachua, FL 32615, U.S.A. simmole@auburn.edu.** Innovations within the last decade have allowed for practical and economical *in vitro* production of *Pasteuria* spp. spores for the biological control of plant parasitic nematodes. A product using *Pasteuria* spp. known to parasitize *Belonolaimus longicaudatus* has U.S. EPA registration and has been commercially available for use on turf in the U.S. since January of this year. Many new products are being developed using *Pasteuria* spp. specific to nematode pests of agronomic crops like *Rotylenchulus reniformis* in cotton. Granular, liquid and seed treatment products using *Rotylenchulus reniformis*-specific *Pasteuria* have been produced and have demonstrated significant pesticidal efficacy in greenhouse and field trials. U.S. EPA registration is underway and these products may become commercially available in the U.S. as soon as 2011.

PATHOGENICITY TEST AND MANAGEMENT OF ENDOPARASITIC NEMATODES OF FIELD CROPS [PRUEBAS DE PATOGENICIDAD Y MANEJO DE NEMATODOS ENDOPARÁSITOS EN CULTIVOS DE CAMPO]**. S. Simon. Department of Plant Protection, Sam Higginbottom Institute of Agriculture, Technology & Sciences, Allahabad 211007 (U.P.) India. sobitasimon@reddiffmail.com.** The plant parasitic nematodes, *Meloidogyne incognita, M. graminicola, Hirschmanniella mucronata, Heterodera cajani* and *Pratylenchus thornei,* are the major endoparasitic nematodes associated with vegetables crops, rice and pulses in the northern part of India. Pathogenicity study on *H. mucronata* on rice variety PD4 at milky stage caused significant reduction of fresh root weight, length of flag leaf, ear head length when inoculated with 50, 100 and 500 larvae/pot compared with control. The inoculum level caused significant reduction of 20.1%, 28.3%, 20.6% and 19.2% in fresh root weight, where as at 10 and 500 inoculum levels the length of flag leaf was reduced 19.6% and 45.5%. Pathogenicity of *P. thornei* on chickpea with an inoculum level of 100, 500, 1000 larvae/pot reduced shoot length at 30, 60 and 90 days after inoculation. Pathogenicity of *M. graminicola* on rice inoculated with 0, 1000, 2000 and 3000 larvae/pot at 90 days after inoculation showed a reduction in shoot length of 34.6, 46.1 and 55.8%, in shoot weight 41.4, 57.8 and 68.4%; root length 40.1, 55.6 and 64.1% and root weight 26.9, 38.4 and 53.8% compared to the control. The pathogenic nature of *H. cajani* in arhar, cowpea moong and urd were seen with the inoculum 0, 10, 100, 250, 500 cyst/plot. There was a linear relationship between, increase in initial inoculum level of the nematodes with a corresponding decrease in host growth at all stages of development in arhar, cowpea, moong amd urd. Different inoculum levels of root-knot nematodes such as 1000, 2000, 3000, 4000, 5000 larvae showed declined in the plant growth with higher population density and root decline. Okra seeds treated with the fungal antagonistic *Paecilomyces lilacinus* caused significant reduction of galling of *M. incognita* over control (63.44%), followed by *Trichoderma viride* (62.9), *Trichoderma harzianum* (57.3) and other fungi. Green manures of mung, cowpea, sunnem and dhaincha incorporated into heavily infested soil with *Heterodera* reduced cyst nematodes population. Mixed cropping treatments of rice + soybean intercropping were significantly effective in reducing the root-knot galls and larvae population of *M. graminicola* in soil as compared to rice + moong, rice + groundnut, rice + cowpea and rice alone. The maximum 72% reduction of *H. mucronata* population in conventional tillage was observed in November 2007, followed by 53.7%, 51.4% and 28.5% reduction in November 2009, January 2008 and July 2007 respectively.

PRODUCTION OF NEMATODE-FREE TROPICAL FOLIAGE AND FLOWER PLANTS FOR EXPORT [PRODUCCIÓN DE FLORES Y FOLLAJE DE PLANTAS TROPICALES LIBRES DE NEMATODOS PARA EXPORTACIÓN]**. Brent Sipes and Roxana Cabos. Department of Plant and Environmental Sciences, University of Hawaii. Honolulu, HI, 96822, U.S.A., USDA, Pacific Basin Agricultural Research Center, Hilo, HI 96720, U.S.A. sipes@hawaii.edu.** Many export markets impose quarantines against plant-parasitic nematodes in potted plants. Regulations and protocols designed to maintain nematode-free plants allow for the issuing of phytosanitary certificates and the export of potted plants. However, infestations still occur. Possible sources of nematodes include potting media, irrigation water, and propagative material. Soil-less potting mixes of peat moss, cinder, bark, or perlite are not sterile. Irrigation water from catchments, ditches, or municipal supplies may harbor nematodes and infect plants. Propagative material may not be free of nematodes and simply carry nematodes along as plants are planted into nematode-free media. To ensure nematode-free potting media, the media must be heat or chemically sterilized. Water needs to be clear of soil sediment. Propagative material can be tissue-cultured. Heat-treatment has been used to rid anthurium stems of burrowing nematodes. Worker education is equally important to ensure that protocols are followed and plants remain nematode-free. Therapeutic treatments to clean infected plants can be used. Dips and drenches of Avid or Pylon have worked well in controlling burrowing and foliar nematodes in anthurium and orchids. These therapeutic pesticide treatments however lead to challenges in detecting low nematode

populations. An integrated approach that limits sources of nematode introduction and has workers follow best practices should ensure the production of nematode-free plants suitable for export.

AGGRESSIVENESS OF TWO *MELOIDOGYNE ETHIOPICA* POPULATIONS ON DISTINCT GRAPEVINE ROOTSTOCKS AND CULTIVARS [AGRESIVIDAD DE DOS POBLACIONES DE *MELOIDOGYNE ETHIOPICA* BAJO PATRONES Y VARIEDADES DE VIÑA]**. L. Somavilla[1], C. Bauer Gomes[2] and R. L. Naves[3]. 2010. [1]PPGF/FAEM/Ufpel, P.O. Box 354, 96010-900, Pelotas-RS, Brazil, lsomavilla@hotmail.com, [2]Embrapa Clima Temperado, Pelotas-RS, Brazil, [3]Embrapa Uva e Vinho, Jales-SP, Brazil.** The aggressiveness of two *Meloidogyne ethiopica* populations was studied in grapevine rootstocks 'IAC313-Tropical', 'SO4' and '420A' and in 'Niágara Rosada' and 'Chardonnay' cultivars. Plantlets of the distinct genotypes were inoculated with 5.000 eggs + J2/plant with a pure *M. ethiopica* population from Kiwi (Brazil) or from grape (Chile). The experiment was conducted as a factorial 5 × 2 (cultivars and populations) experiment under a randomized design with six replicates per treatment. Six months after the inoculation, roots of each plant were evaluated for gall number and reproduction factor (RF) of the two nematode populations in the five genotypes. The rating was: RF=0 immune; RF < 1,00 resistant and RF > 1,00 susceptible. Subsequently, the values of gall number and RF were analyzed using ANOVA and the means were compared by the Duncan test at 5%. 'IAC 313-Tropical' and 'SO4' rootstocks behaved as resistant whereas 'Niágara Rosada' and 'Chardonnay' were susceptible to Brazilian and Chilean *M. ethiopica* populations; however, the resistance reaction of '420A' was dependent upon the nematode present. On the '420A' genotype, the kiwi nematode population was more aggressive than the grapevine population when compared to the other tested materials.

PATOGENICIDAD Y VIRULENCIA DE NEMATODOS ENTOMOPATÓGENOS (STEINERNEMATIDAE Y HETERORHABDITIDAE) SOBRE LARVAS DE *MUSCA DOMESTICA* LINNAEUS, 1758 (DIPTERA: MUSIDAE) [PATHOGENICITY AND VIRULENCE OF ENTOMOPATHOGENIC NEMATODES (STEINERNEMATIDAE Y HETERORHABDITIDAE) AGAINST LARVAE OF *MUSCA DOMESTICA* LINNAEUS, 1758 (DIPTERA: MUSIDAE)]**. F. J. Sotelo-Rivera[1], G. Peña-Chora[1], V. M. Hernández-Velázquez[2], A. G. Trejo-Loyo[1] and L. P. Lino-García[2]. [1]Laboratorio de Parasitología Vegetal Centro de Investigaciones Biológicas, [2]Lab. de Control Biológico Centro de Investigaciones en Biotecnología. Universidad Autónoma del Estado de Morelos. Av. Universidad No. 1001, Col. Chamilpa, Cuernavaca, Morelos, México. CP. 62209 Tel. 777 3297029. franciscoj@uaem.mx.** *Musca domestica* es un díptero capas de provocar más de cien enfermedades al hombre y a los animales domésticos y su control prácticamente se basa en la aplicación de productos químicos Sin embargo, este tipo de aplicación se ve frenada porque *M. domestica* es uno de los insectos con mayor habilidad para desarrollar resistencia a los plaguicidas por lo que se platea el uso de enemigos naturales como son los nemátodos entomopatógenos. Se evaluaron dos aislados de nemátodos entomopatógenos nativos de la entidad SRS-01 de *Steinernema* y SRH-06 de *Heterorhabditis* contra *M. domestica* en laboratorio y se pudo observar que los dos aislados son capases de buscar y causar mortalidad al estado larval de la mosca casera de mortalidad (SRS-01 65%) y (SRH-06 95%) así mismo se determino la concentración letal^{50} de 4600 nemátodos/larva para SRS-01 y de 8784 nemátodos/larva para SRH-06. Se encontró variabilidad de respuesta en la patógena de los dos aislados sobre larvas de *M. domestica.*

PHYTOSANITARY PROGRAMS IMPLEMENTED BY FLORIDA GROWERS TO MEET NATIONAL AND INTERNATIONAL NEMATODE CERTIFICATION REQUIREMENTS AND TO PREVENT THE INTRODUCTION OF DAMAGING EXOTIC NEMATODES SUCH AS POTATO CYST NEMATODES [PROGRAMAS FITOSANITARIOS IMPLEMENTADOS POR PRODUCTORES DE FLORIDA PARA REUNIR LOS REQUERIMIENTOS DE CERTIFICACIÓN NACIONAL E INTERNACIONAL DE NEMATODOS Y PREVENIR LA INTRODUCCIÓN DE NEMÁTODOS EXÓTICOS DAÑINOS TALES COMO LOS NEMÁTODOS DEL QUISTE DE LA PAPA]**. J. D. Stanley[1], R. N.**

Inserra[1], G. S. Hodges[1] and W. N. Dixon[1]. [1]Florida Department of Agriculture and Consumer Services, DPI, Nematology Section, Gainesville, FL 32614-7100, U.S.A. stanlej@doacs.state.fl.us. In Florida, regulatory nematology programs are implemented by the Florida Department of Agriculture and Consumer Services, /Division of Plant Industry. These programs allow growers to export plant products to national and international markets, protect the Florida citrus industry from nematode parasites of citrus, and prevent the introduction of exotic nematodes that would be detrimental to Florida agriculture. The programs include the Ornamental Certification Program and the Citrus Nursery Certification Program. Presently there are no safe nematicides available for ornamental and citrus nurserymen to use. Additionally, the restrictions imposed by states and countries against plant parasitic nematodes occurring in Florida have become more stringent. These factors have made phytosanitary pest exclusion programs the most effective strategy for Florida growers to produce nematode-free plants. The most effective approach for nematode management is pest exclusion. The success of these pest exclusion programs is based on the implementation of sound phytosanitary practices. These ecologically sound programs are both profitable and beneficial for Florida nurserymen and include various multi agency collaborative exotic nematode surveys. These surveys and the use of certified seed potatoes have kept the Florida potato industry free from potato cyst nematodes.

THE BACTERIAL RECEPTACLE IN *STEINERNEMA* NEMATODES (NEMATODA: STEINERNEMATIDAE). [EL RECEPTÁCULO BACTERIANO EN EL NEMÁTODO ENTOMOPATÓGENO STEINERNEMA (NEMATODA: STEINERNEMATIDAE)]**.** **S. P. Stock. Department of Entomology, University of Arizona. Tucson, AZ, USA.** Third-stage infective juveniles (IJ) of entomopathogenic nematodes *Steinernema* spp. are colonized by a monoculture of *Xenorhabdus* bacteria at a discrete structure located in the anterior portion of the intestine known as the 'bacterial receptacle' or 'intestinal receptacle'. The nature and structure of this receptacle is presently not well understood. Early transmission electron microscopy (TEM) studies on the vesicle suggested that this vesicle is a modification of the ventricular region of the intestine that lies immediately beneath the esophago-intestinal valve in the nematode IJ. We examined structural and ultrastructural features of the bacterial vesicle in a selection of *Steinernema* spp., which represent distinctive evolutionary clades in this nematode's molecular (multigene) phylogenetic framework. Differential interference contrast optics (DIC) microscopy was used to examine the shape of the vesicle and its esophageal-intestinal connections among different taxa. Additionally, transmission electron microscopy was also considered to assess ultrastructural variation in colonized and no-colonized receptacles. Vesicle lining (presence *vs.* absence of microvilli), cells and organelles were compared in each of the examined species.

INTERACTION BETWEEN THE SOYBEAN CYST NEMATODE AND MYCORRHIZAL FUNGI IN DIFFERENT pH SOILS [INTERACCIÓN ENTRE EL NEMATODO DEL QUISTE DE LA SOYA Y HONGOS MICORRIZADOS EN DIFERENTES pH DEL SUELO]**.** **M. Sun[1,2], J. Zhou[1], S. Chen[1,3*] and J. E. Kurle[1]. [1]Department of Plant Pathology, University of Minnesota, Saint Paul, MN 55108, [2]Institute of Plant Protection, Chinese Academy of Agricultural Science, Beijing, China, [3]University of Minnesota, Southern Research and Outreach Center, 35838 120th Street, Waseca, MN 56093. chenx099@umn.edu.** The soybean cyst nematode (SCN), *Heterodera glycines*, is the most important pathogen of soybean. Arbuscular mycorrhizal fungi (MF) are widely distributed in soils and form symbioses with more than 90% of plant species including soybean. In the symbioses, MF enhance plant uptake of minerals and increase plant tolerance to environmental stresses and pathogen attack. There are a number of reports showing that MF can suppress plant-parasitic nematodes. We studied the interaction between SCN population density and MF at different pH soils in two greenhouse pot experiments. Experiment 1 was a RCB design with three factors: 1) SCN population densities (0, 500, and 10000 eggs/100 cm^3 soil), 2) MF treatments (MF and non-MF), and 3) soil pH levels (pH 5.6, 6.9, and 8). The effect of mycorrhizal fungi and initial SCN population density (Pi) on SCN final population density (Pf) differed at different sampling times and at different pH levels. At 35 days after planting, the egg population density (Pf35) was largest in the pH 8 soil, intermediate in pH 6.9 soil, and

smallest in pH 5.6 soil. Pf35 increased with increasing Pi. MF generally increased Pf35 at all levels of Pi probably due to improved plant growth. At 65 days after planting, egg population densities (Pf65) decreased with increasing Pi except that in pH 6.9 and 8 soils without MF the Pf65 did not differ with different Pi levels. The lower Pf65 that occurred in the higher Pi was probably due to a reduced food source caused by SCN damage. The presence of MF reduced SCN egg population density at 65 days after planting, and the reduction of egg numbers was greatest in the pH 6.9 soil. Pf65 was highest in the pH 6.9 and intermediate in pH 8, and lowest in pH 5.6 soil. The greater Pf65 in pH 6.9 than pH 8.0 was probably due to a better plant growth in the pH 6.9 soil. The percentage of roots colonized by MF did not differ among the three soil pH levels. However, the high nematode population density suppressed colonization of soybean roots by MF. Experiment 2 was conducted in the pH 8 soil inoculated with eight SCN population densities (0, 500, 1000, 2000, 4000, 8000. 16000, and 32000 eggs/100 cm^3 soil), and two MF levels (MF and non-MF). In this experiment a quadratic relationship existed between Pi and Pf65. In addition Pf65 was smaller in MF-infested soil than non-infested soil at all Pi levels. This study demonstrated that the MF and SCN are antagonistic to each other, but their interaction depends on soil pH level and sampling time.

A SURVEY OF BIOLOGICAL CONTROL ORGANISMS FOR *MELOIDOGYNE* SPP. IN SPANISH HORTICULTURAL CROPS [MUESTREO DE ORGANISMOS PARA EL CONTROL DE *MELOIDOGYNE* SPP EN CULTIVOS HORTÍCOLAS DE ESPAÑA]**. M. Talavera[1], E. Flor-Peregrín[1], S. Verdejo-Lucas[2], M. Blanco-Rubio[2], F. J. Sorribas[3], C. Ornat[3] and A. Stchiegel[4]. [1]IFAPA Camino de Purchil, Apdo. 2027, 18080 Granada, Spain, [2]IRTA Cabrils, Ctra. Cabrils s/n, 08348 Cabrils Barcelona, Spain, [3]DEAB-UPC, Esteve Terradas, 8, 08860 Castelldefels Barcelona, Spain, [4]Unitat de Microbiologia URV, 43201 Reus Tarragona, Spain. miguelf.talavera@juntadeandalucia.es.** A survey was carried out at the end of the growing season in two horticultural growing areas in Spain to detect and characterize biological control agents (BCOs) for *Meloidogyne* spp. Soil and root samples were collected in sixty fields and nematode population densities and percentage of parasitism of egg and juvenile were determined. The surveyed crops included tomato, eggplant, green pepper, cucumber, melon and watermelon. *Meloidogyne*, *Pratylenchus* and *Helicotylenchus* spp. were the most abundant plant-parasitic nematodes. Population densities of *Meloidogyne* at the end of the growing season were on average 1800 J2 per 250 cm^3 of soil and 30957 eggs per g of roots. The fungi associated with *Meloidogyne* eggs and juveniles included *Acremonium*, *Arthrobotrys*, *Dactylella*, *Fusarium*, *Pochonia*, and others. Percentage of egg parasitism ranged from 1 to 11% in Andalusia and from 3 to 95% in Catalonia. The bacterial hyperparasite *Pasteuria penetrans* was found in soil samples from Catalonia but not from Andalusia. Nematode and BCOs occurrence and their incidence are discussed according to agronomical features of the fields sampled.

CURRENT STATUS OF SOIL DESINFESTATION METHODS FOR CONTROL OF *MELOIDOGYNE* SPP. IN CARNATION AND STRAWBERRY CROPS IN SOUTHWESTERN SPAIN [ESTADO ACTUAL DE LOS MÉTODOS DE DESINFECCIÓN DE SUELOS PARA EL CONTROL DE *MELOIDOGYNE* SPP. EN LOS CULTIVOS DE CLAVEL Y FRESA EN EL SUROESTE DE ESPAÑA]**. M. Talavera[1], M. D. Vela-Delgado[2], M. J. Basallote-Ureba[3], L. Miranda[3], J. M. López-Aranda[4] and J. M. Melero-Vara[5]. [1]IFAPA Camino de Purchil, Apdo. 2027, 18080 Granada, Spain, [2]IFAPA Chipiona, Cno. Esparragosa s/n, 11550 Chipiona Cadiz, Spain, [2]IFAPA Las Torres-Tomejil, Ctra. Sevilla-Cazalla Km. 12, Alcala del rio 41200 Seville, Spain, [3]IFAPA Churriana, Cortijo de la cruz, 29140 Churriana Malaga, Spain, [4]IAS-CSIC, Apdo. 4084, 14080 Cordoba, Spain. miguelf.talavera@juntadeandalucia.es**. The Spanish Methyl Bromide Alternatives Project (INIA) has carried out microplot and field trials in various crops and with different chemical, physical and biological soil treatments for more than 10 years. In this work we summarize results obtained for root-knot nematode (*Meloidogyne* spp.) control in carnation and strawberry crops in Southern Spain. Treatments included untreated controls, biofumigation with poultry or brassica manure; solarization; 1,3 dichloropropen; chloropicrin; dazomet; dimethyl disulphide; furfural; metam sodium; methyl iodide and sodium azide in different dosages and

combinations and by different application methods. Agronomic traits such as plant survival, plant vigour, early and total yield were recorded periodically and nematode populations were estimated before and after treatment and at the end of the growing season. A comparison of efficacy in reducing nematode densities and increasing fruit or stem commercial yield is given for all treatments and both crops. Generally, treatments including 1-3 dichloropropen or soil solarization combined with biofumigation, reduced nematode densities and maintained the commercial production similar to that of fumigation with methyl bromide. This work reviewed the standardized method used by the Co-operators of the International *Meloidogyne* Project in the seventies and eighties and offers a modification that divides a resistance study into two phases within one experiment. To achieve this, the replication initially is double the required number for one experiment; but a minimum of six. The first phase terminates at about sixty days after inoculation, using randomly selected half of the replicates in each treatment (minimum of three replicates) to know the gall index (GI), reproduction factor (R) and effect of the nematodes on plant growth. The other replicates are nurtured to harvest stage to provide yield data for statistical analysis. The level of plant resistance is determined using GI as measure of plant reaction to the nematode, R as measure of host suitability and yield as measure of plant damage, instead of GI that was previously used. The method considers damage from a utility point since most growers are more concerned with yield than number of galls that may have developed in the roots as a result of nematode infection. The quantitative scheme for assignment of resistance designations to plants is modified to include yield. Data from studies on rice, cowpea and soybean are presented to demonstrate the efficacy of the suggested modification.

NEMATODOS FITÓFAGOS ASOCIADOS A ORÉGANO "CHILENO" EN UNA ZONA DE CULTIVO DE CÓRDOBA, ARGENTINA [PLANT PARASITC NEMATODES ASSOCIATED TO "CHILEAN" OREGANO IN CULTIVATION AREA OF CORDOVA, ARGENTINA]**. P. A. Tolocka[1,2], M. E. Doucet[1], P. Lax[1] and P. J. I. Bima[2]. [1]Laboratorio de Nematología, Centro de Zoología Aplicada, Universidad Nacional de Córdoba, C.C. 122, 5000 Córdoba, Argentina, [2]Laboratorio de Biotecnología Vegetal, Facultad de Ciencias Agropecuarias, Universidad Nacional de Córdoba, C.C. 509, 5000 Córdoba, Argentina. patricia_tolocka@yahoo.com.ar.** En plantaciones de orégano de la provincia de Córdoba, fueron identificados diferentes nematodos del suelo de hábitos fitófagos. Su densidad de población fue estimada en lotes de la localidad de San Pedro, provincia de Córdoba, en la que se cultiva la variedad "Chileno". La evaluación se realizó en la primavera de 2007 observándose los valores siguientes: *Helicotylenchus* y *Paratrichodorus* (3 individuos/100 gr de suelo), *Nothocriconema* (8 individuos/100 gr de suelo), *Meloidogyne* (18 individuos/100 gr de suelo), *Paratylenchus* (95 individuos/100 gr de suelo) y *Pratylenchus* (1 individuos/100 gr de suelo). Se desconoce en qué medida el conjunto de nematodos mencionados afectan al crecimiento y producción de esas plantas. Sin embargo, los valores correspondientes a *Meloidogyne* y a *Paratylenchus*, llevan a suponer que interfieren con el cultivo (especialmente en el caso del primer género, dado que se observaron en las raíces agallas y masas de huevos generadas por el nematodo). La cantidad de individuos correspondientes a los dos géneros anteriormente citados, permite inferir que la variedad mencionada representaría un buen hospedador para los parásitos.

HISTOPATOLOGÍA DE RAÍCES DE *TRICHOCEREUS TERSCHECKII* INFECTADAS POR *CACTODERA CACTI* EN LA PROVINCIA DE LA RIOJA, ARGENTINA [HISTOPATHOLOGY OF *TRICHOCEREUS TERSCHECKII* ROOTS INFECTED BY *CACTODERA CACTI* IN THE PROVINCE OF LA RIOJA, ARGENTINA]**. M. Tordable[1], S. Suárez[1], P. Lax[2] and M. E. Doucet[2]. [1]Morfología Vegetal, Universidad Nacional de Río Cuarto, (5800) Río Cuarto, Córdoba, Argentina, [2]Centro de Zoología Aplicada, Universidad Nacional de Córdoba, (5000) Córdoba, Argentina. mdoucet@efn.uncor.edu.** Se analizaron las alteraciones anatómicas e histológicas en raíces de cardón *T. terscheckii* (Familia Cactaceae) infectadas naturalmente por *C. cacti* en la localidad de Anillaco (La Rioja). Para evaluar el gra-

do de asociación hospedador-parásito se fijaron trozos de raíces (atacadas y sanas) y se procesaron siguiendo técnicas convencionales para microscopía óptica. En cortes longitudinales y transversales se observaron algunos juveniles del nematodo alojados en la corteza, muy próximos al cilindro vascular. Las hembras maduras tenían su cuerpo inmerso en el tejido cortical, en el que se observaron grandes espacios debido a la ruptura de células cercanas al nematodo. Además, en relación con la porción anterior del parásito se detectaron sitios de alimentación (sincitios) constituidos por pocas células (4 a 8), ligeramente hipertróficas, con ruptura parcial de sus paredes; el citoplasma era escaso y mostró una apariencia densa y granulosa. Los sincitios se desarrollaban en el cilindro central ocasionando la reducción y desplazamiento de los tejidos vasculares. En las raíces se observaron cortes transversales de quistes con huevos en su interior; la porción del quiste que quedaba inmersa dentro de los tejidos de la raíz estaba rodeada por células aplastadas y/o rotas que tenían paredes celulares engrosadas y lignificadas. Por primera vez se describe la asociación *C. cacti-T. terscheckii* en Argentina.

USING FLUORESCENT *IN SITU* HYBRIDIZATION TO VISUALLY IDENTIFY NEMATODE FEEDING CHOICES [USO DE HIBRIDACIÓN FLUORECENTE *IN SITU* PARA IDENTIFICAR VISUALMENTE LAS PREFERENCIAS ALIMENTICIAS DE LOS NEMATODOS]**. A. M. Treonis, E. H. Michelle, C. A. O'Leary, E. E. Austin and C. B. Marks. Department of Biology, University of Richmond, Richmond, VA 23173, U.S.A. atreonis@richmond.edu** Most nematode species are assigned easily to trophic categories based on morphology, association with disease, or information from cultures. There are taxa, however, that have ambiguous feeding behavior (e.g., Tylenchidae, omnivores). For other taxa, preferences with a trophic group are unknown (e.g., bacterial-feeders). We are using a fluorescent *in situ* hybridization technique to localize and identify consumed food within nematodes. Oligonucleotide probes that hybridize to specific rRNA sequences in target food sources are applied to nematodes immediately after extraction from soils. Presence of target sequence is indicated by a fluorescent signal within the nematode digestive system. To date, we have applied this technique to species of plant-parasitic, fungal-feeding, omnivorous, and bacterial-feeding nematodes. We have had little success with identifying the food sources of stylet-bearing nematodes using this technique, suggesting that the digestion process occurs very rapidly in these nematodes. In bacterial-feeders, we have identified bacterial and archaeal food sources within the nematode pharynx. Food sources were never detected in the nematode intestine, indicating that digestion of nucleic acids occurs before entry. Over the course of our studies, we have also observed bacterial pathogens and an ovarian symbiont in nematodes isolated from Mojave Desert soils. This technique shows great potential for understanding the interactions between nematodes and their microbial symbionts and food sources.

NEMATODOS FITOPARÁSITOS EN EL CULTIVO DE ROSAS Y OTRAS FLORES DE CORTE EN LAS PROVINCIA DE PICHINCHA E IMBABURA EN ECUADOR [PLANT PARASITIC NEMATODES OF IMPORTANCE IN ROSE PLANTATIONS AND OTHER CUT FLOWERS IN THE PROVINCES OF PICHINCHA AND IMABURA, ECUADOR]**. C. Triviño[1] y E. Espín[2]. [1]Instituto Nacional Autónomo de Investigaciones Agropecuarias (INIAP), Estación Experimental del Litoral Sur "Dr. Enrique Ampuero Pareja", Departamento Nacional de Protección Vegetal, P.O. Box 09 01 7069 Guayaquil, Ecuador. trivino.carmen@gmail.com, [2]Universidad Técnica de Babahoyo, Facultad de Ciencias Agropecuarias.** En la Sierra ecuatoriana se siembra la mayor cantidad de flores exportables superando en superficie la rosa (*Rosa* sp.) con 3500 Ha, hipérico (*Hypericum* spp.) con 500 Ha y en menor superficie la especie gipsófila (*Gypsophila* spp.) y otras flores de verano, las que son sembradas en invernadero y campo abierto. Según monitoreos efectuados en el presente año en las provincia de Pichincha (2820 m.s.n.m) e Imbabura (2214 m.s.n.m), se encontró que el 88 y 50% de las plantaciones de rosas están infestadas respectivamente con *Meloidogyne incognita* en densidades poblacionales que varían de 50 a >2000 J2 en 10 g de raíces y 50 >2500 en 100 cm^3 de suelo. Las plantaciones de *Hypericum* spp. están infestadas con *M. incognita* en 81% con densidades poblacionales de 200 a 50000 J2 en 10 g de raíces y 200 a 3000 J2 en 100 cm^3 de suelo. En plantaciones de *Gypsophila* la especie *Nacobbu*

aberrans es la más frecuente con índices de agallamiento que llegan a 8 en escala del 0 al 10 y densidades poblaciones >5000 *N. aberrans* en 10 g de raíces y 100 cm^3 de suelo. Otros nematodos fitoparásitos presentes en las tres especies de flores en menor incidencia son *Helicotylenchus*, *Hemicycliophora* y *Criconemoides*. El manejo más común de las poblaciones de nematodos en éstas tres especies de flores se efectúa con oxamil 24% L alternado con ethoprop 15% G y cadusafos 10% G.

NEMATODOS FITOPARÁSITOS EN PLANTACIONES DE PIÑA, MARACUYÁ Y TOMATE DE ÁRBOL EN ECUADOR [PLANT-PARASITIC NEMATODES IN PINEAPPLE, PASSION FRUIT AND TREE TOMATO IN ECUADOR]**. C. Triviño[1] y G. Moreta[2]. [1]Instituto Nacional Autónomo de Investigaciones Agropecuarias (INIAP), Estación Experimental del Litoral Sur "Dr. Enrique Ampuero Pareja", Departamento Nacional de Protección Vegetal, P.O. Box 09 01 7069, Guayaquil, Ecuador, trivino.carmen@gmail.com, [2]Universidad Técnica de Babahoyo, Facultad de Ciencias Agropecuarias.** Ecuador produce aproximadamente 4000 ha de piña (*Ananas sativus*), 22000 ha de maracuyá (*Passiflora edulis*) y 6000 ha de tomate de árbol (*Solanum betaceum*). Los nematodos están causando problemas de importancia económica en estos cultivos. Entre los años 2008-2010 se hicieron evaluaciones en plantaciones comerciales de los tres cultivos mencionados. En piña de un total de 720 muestras, el 78% correspondió a la variedad de exportación Md2 y el 22% a la variedad Criolla. En este cultivo el 61% de muestras estuvieron infestadas con *Pratylenchus* en densidades poblacionales medias de 3446 en 10 g raíces sobresaliendo la variedad Criolla con el 100% de plantaciones infestadas con la mayor frecuencia de poblaciones altas de *Pratylenchus*, que se atribuye a la siembra intercalada con maíz, excelente hospedero del nematodo. *Helicotylenchus dihystera* se determinó en el 66% de muestras con poblaciones media de 1171 en 10 g de raíces y 4171 en 100 cm^3 de suelo. En menor población estuvieron *Meloidogyne incognita*, *Criconemoides* y *Hemicycliophora*. Las plantaciones de maracuyá, presentan altas poblaciones de *Rotylenchulus reniformis*, su presencia en el suelo es común y abundante e inclusive en suelos aparentemente secos, además en algunos casos está asociado con *Fusarium*. En tomate de árbol el nematodo común e importante por altas densidades poblacionales es *Meloidogyne incognita*. En las provincias de Pichincha e Imbabura, de un total de 100 muestras colectadas en cada una, el 93 y 88% respectivamente estuvieron infestadas con el nemátodo agallador, aunque la mayor frecuencia de altas densidades poblacionales se encuentran en Imbabura.

EVALUACIÓN DEL PARASITISMO DE ALGUNAS ESPECIES DE *MELOIDOGYNE* Y PERDIDAS CAUSADAS EN TRES VARIEDADES COMERCIALES DE TABACO BURLEY Y NEGRO (*NICOTIANA TABACUM* L.) EN COLOMBIA [PARASITISM EVALUATION OF SOME *MELOIDOGYNE* SPECIES AND YIELD LOSSES CAUSED IN TREE COMMERCIAL VARIETY OF BURLEY AND BLACK TOBACCO (*NICOTIANA TABACUM* L.) IN COLOMBIA]**. D. M. Vanegas - Villa[1], R. Á. Navarro[2], L. A. Kafuri[3], B. M. Gaviria[2], S. Uribe S.[3]. [1]Coltabaco–PMI. diana.vanegas@pmintl.com, [2]Universidad Católica de Oriente. sanidadveg.inv1@uco.edu.co, sanidadveg.inv2@uco.edu.co, mailto, [3]Universidad Nacional de Colombia: lafanado@unal.edu.co, suribe@unal.edu.co.** El género *Meloidogyne* constituye uno de los principales problemas nematológicos en el cultivo de tabaco en Colombia, generando pérdidas considerables en su producción. Para determinar las especies de *Meloidogyne,* el parasitismo y las pérdidas que ocasionan en este cultivo, se tomaron muestras de 22 fincas de la región de Los Santos-Santander, obteniéndose 97 poblaciones puras de este género, que posteriormente se identificaron con el estudio del ADN genómico amplificado con PCR-RAPDs utilizando 40 cebadores aleatorios y correlacionándolos con el patrón perineal de la hembra, permitiendo identificar las especies, *M. incognita, M. javanica* y *M. arenaria*. El parasitismo y las pérdidas por las tres especies diferenciadas se evaluaron inoculando bajo condiciones de invernadero plántulas de tres variedades comerciales de tabaco, Negro var. C 23 RM, Burley var. TN 90 y Colt 35, observándose un bajo nivel de parasitismo en la variedad resistente Colt 35, y un alto nivel de parasitismo en variedades susceptibles como C 23 RM; además *M. javanica* ocasionó el mayor daño en las plántulas de tabaco después de 53 días de la inoculación y pérdidas en rendimiento del 100% en la variedad TN 90 y 85% en C 23 RM.

NUTRIENT REGULATION OF PARASITISM IN *POCHONIA CHLAMYDOSPORIA* [REGULACIÓN POR NUTRIENTES DEL PARASITISMO EN *POCHONIA CHLAMYDOSPORIA*]**.** **E. Ward[1], G. Mutua[2], R. H. Manzanilla-López[1], B. R. Kerry[1], J. Kimenju[2] and P. R. Hirsch[1]. [1]Plant Pathology and Microbiology Dept., Rothamsted Research, Harpenden AL5 2JQ, UK, [2]University of Nairobi, Kenya. Elaine.ward@bbsrc.ac.uk.** Effective establishment of microbes applied to soil often requires addition of an exogenous nutrient source to overcome competition from the resident microflora. However, readily-available nutrients may compromise the parasitic ability of microbial facultative parasites added as biological control agents. In particular, soil amendments used to improve organic matter levels in soil and increase nematode control may reduce the efficacy of rhizosphere antagonists as biological control agents. We are therefore investigating the role of nutrition in the switch from the saprotrophic to the parasitic phase of *Pochonia chlamydosporia*, a fungus used to control root-knot nematode pests. This research is important for optimising the exploitation of *P. chlamydosporia*. Molecular techniques were used to assess variation in *P. chlamydosporia* isolates, including analysis of the VCP1 gene, a proteinase involved in the initial stages of egg infection. The sequences of the upstream flanking regions of this gene were highly conserved and contained putative regulatory motifs. Expression of the VCP1 gene was investigated in media containing different nutrients. Improvements were made to a bioassay to assess the parasitism of *P. chlamydosporia* on eggs of *Meloidogyne javanica* and *Globodera pallida*. Using the assay, it was possible to detect variation in parasitic activity among isolates and demonstrate host preferences.

INVESTIGATING FORAGING STRATEGIES IN BACTERIVORUS NEMATODES [INVESTIGANDO LAS ESTRATEGIAS DE BÚSQUEDA DE ALIMENTOS POR NEMATODOS BACTERIÓFAGOS]**.** **T. R. Weicht, N. R. LeBlanc and D. A. Neher. Department of plant & Soil Science, University of Vermont, Burlington, VT 05405. dneher@uvm.edu.** Soil communities are often described as functionally redundant. Yet there are few studies that elucidate fine scale dynamics to explain soil community assemblages. The precision of a biological indicator depends on our understanding of community dynamics. For nematodes communities, trophic group ratios and maturity index values are often used as indicators of disturbance. However, with trophic groups and maturity values, nematodes taxa respond differently to disturbance. Part of this difference may be explained by differences in foraging behavior if differences can be demonstrated. Characterization of bacterivorous nematodes foraging was quantified based on two-dimensional movements on agar media. Classical ecological descriptors and autoregressive models were used to characterize nematode movement. Principal component analysis of these data showed that path shape and distance travelled accounted for the greatest loading. Differences in measured parameters, for bacterivorous nematodes families, *Cephalobidae* and *Rhabditidae*, suggest there are differences in foraging behavior within a trophic group. Further analysis shows that there is an effect of bacteria prey presence on foraging strategy, based on turn angle distributions. Calcutation of current labour inputs and possible future collaborations in accordance with these rudimentary results justify further investigation and characterization of nematodes foraging.

PREDATORY ABILITY OF *PLEUROTUS* SPP. MUSHROOMS ON *HETERORHABDITIS BACTERIOPHORA* [HABILIDAD PREDATORA DE LOS HONGOS *PLEUROTUS* SPP. SOBRE *HETERORHABDITIS BACTERIOPHORA*]**.** **C. N. Wille[1], C. Bauer Gomes[2], J. S. Nascimento[1], L. Somavilla[1], J. V. Casarin[1]. 2010. [1]PPGF/FAEM/Ufpel, P.O. Box 354, 96010-900, Pelotas-RS, Brazil. wille_carol@yahoo.com.br, [2]Embrapa Clima Temperado, Pelotas-RS, Brazil.** The mushrooms *Pleurotus citrinopileatus*, *P. ostreatus*, *P. ostreatoroseus*, *P. pulmonarius* and *P. sajor-caju* were evaluated to their ability to capture *Heterorhabditis bacteriophora* juveniles under laboratory conditions. The fungal mycelium previously grown in PDA medium was transferred to discs of agar-water on slide glasses maintained in Petri dishes using four replications. Subsequently, 30 nematode juveniles were added to each subculture and the Petri plates countaining the fungi and the nematodes were incubated at 25°C. For ten consecutive days, at 24-hour intervals, the captured and dead nematodes were evaluated under mi-

croscope. All *Pleurotus* species formed trapping structures (ring-shape) as well as producing secretions possibly associated with nematode mortality. These results show that even *Pleurotus* spp. affect the survival of *H. bacteriophora*. It also shows prospective use as a biological control of phytoparasitic nematodes.

ANTAGONISTIC PLANTS FOR NEMATODE MANAGEMENT [PLANTAS ANTAGONISTAS PARA EL MANEJO DE NEMATODOS]**. Emma Zavaleta-Mejía. Instituto de Fitopatología, Colegio de Postgraduados, Km 36.5 Carr., México-Texcoco, Montecillo, Edo. de Méx. CP 56230. México. zavaleta@colpos.mx.** All plants in nature synthesize a great variety of secondary metabolites with antimicrobial properties; however, some plant species stand out for the great amount of toxic metabolites that they accumulate in their tissues and/or exude through their surfaces. Therefore, these plants represent an ecological alternative with great potential for the management of plant parasitic nematodes. These antagonistic plants can be associated or rotated with the main crop and/or be incorporated in the soil. For example, with the association and/or rotation of marigold (*Tagetes erecta*) and (*Crotalaria longirostrata*) with tomato or chilli plants there were significant reductions in root-galling induced by *Nacobbus aberrans* and *Meloidogyne incognita,* respectively. The reduction of root galling on *C. longirostrata* was explained by the exudation of toxic metabolites and not by its effect as a trapp crop. The J2 of *M. incognita* were immobilized by its root exudates *in vitro* conditions. With the incorporation of plant residues or organic amendments into the soil, the incidence and severity of diseases induced by root pathogens are frequently reduced by the biofumigation effect. This process is expressed to the maximum when the incorporated residues come from plants with high contents of glucosinolates (as Brassicaceae species) from which at least 20 toxic volatile sulphured products can be liberated.