

ABSTRACTS OF PAPERS

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ABSTRACTS

CONTROL QUIMICO DE PHYTOPHTHORA INFESTANS MONT. DE BARY EN PAPA. Octavio I. Aráuz, Facultad de Agronomía, Universidad de Panamá.

En pruebas realizadas en Cerro Punta, Provincia de Chiriquí, se evaluó en control de *Phytophthora infestans* con aspersiones semanales de Daconil (2.0 Kg/Ha), Difolatan + Dithane (1.0 + 1.0 Kg/Ha), Cruzate (1.0 Kg/Ha), Ridomil (1.0 Kg/Ha) y Dithane (2.0 Kg/Ha) en parcelas de 3X4 m. La semilla de la variedad Alpha fue sembrada en cinco surcos a 0.80 y 0.50 m, obteniéndose 50 plantas/parcela. Los mejores tratamientos al 1% de diferencia significativa fueron Daconil y Difolatan + Dithane con rendimientos de 37,384 Kg/Ha y 27,326 Kg/Ha, respectivamente. Las mediciones más bajas del nivel de daño foliar a la 10 semanas de la siembra fué en el tratamiento con Daconil.-

TOBACCO BREEDING LINES WITH MULTIPLE DISEASE RESISTANCE. Asdrúbal Arcia, Instituto de Agronomía, Facultad de Agronomía, Universidad Central de Venezuela. Maracay. Aragua. VENEZUELA.

Several lines of burley tobacco (*Nicotiana tabacum* L.), resistant to *Fusarium* wilt (*F. oxysporum* f.sp. *nicotianae*), Root-knot nematodes (*M. incognita*) and tobacco mosaic virus (TMV) have been developed at the Universidad Central de Venezuela, (UCV), as part of a tobacco breeding program. Field trials, using F₁₀ generation lines, indicate that UCV L2, L3 and L6, among others, are highly resistant to these diseases show good agronomic characteristics; yield and chemical analyses are similar to the susceptible commercial controls.

CONTROL BIOLÓGICO DEL NEMATODO MELOIDOGYNE INCOGNITA CON EL HONGO PAECILOMYCES LILACINUS. E. Candanedo, J. Lara, P. Jata y F. - González. Instituto de Investigación Agropecuaria de Panamá. Apdo 6-4391, Estafeta 1 Dorado. Panamá, 6 Panamá.

Se estudio el efecto de *Paecilomyces lilacinus* en la reproducción de *Meloidogyne incognita* y en los rendimientos de la variedad 1-12 de tomate industrial. El tratamiento con *P. lilacinus* se comparó con un tratamiento nemático (Furadan 2.5 kg m.i.a./ha) y un testigo no tratado con el fin de medir las tasas de reproducción del parásito y los rendimientos en cada caso. Los resultados mostraron que no hubo diferencias significativas en el rendimiento. Sin embargo, hubo una tendencia de mayor rendimiento en las parcelas tratadas con el hongo. Hubo diferencias significativas en agallamiento radicular entre los tratamientos, siendo éste significativamente menor en las parcelas tratadas con el hongo. En otro experimento de campo similar, hubo diferencia de rendimiento significativas entre tratamientos. El rendimiento de las parcelas tratadas con *P. lilacinus* fue estadísticamente superior al del testigo y no mostró diferencias con respecto al tratamiento nemático.-

CAMPOTOMERIS LEAF SPOT OF LEUCAENA LEUCOCEPHALA IN HONDURAS. K. T. Cason and R. T. Hanlin; Peace Corps, La Paz, Honduras and Dept. of Plant Pathology, Univ. of Georgia, Athens, GA 30602.

A leaf spot of *Leucaena leucocephala* caused by *Campotomeris leucaenae* (Stev. & Dalbey) Syd. resulted in severe defoliation of 4 accessions of the forage legume in 6 of 7 plantations in the Comayagua Valley, Honduras. The accessions Salvador K-72, Salvador K-8, Guatemala and Cunningham did not differ significantly in susceptibility. Symptoms began on lower leaves as brown necrotic lesions on the upper surface and black pustule-like reproductive structures on the lower surface. Two weeks after initial symptoms appeared, infection spread to 100 % of the leaves, leaflets began to turn yellow and abscise. Significant defoliation occurred within a month. Incidence and severity of the disease may be seasonal as no disease occurred during the dry months of March-June. This is the first report of *Campotomeris* leaf spot in Honduras. The disease may affect future use of *L. leucocephala* which is a promising source of fuelwood and ruminant forage for the tropics.

VIRUSES DETECTED IN THE POTATO GERMPLASM COLLECTION AT TORALAPA, BOLIVIA. R.G. Christie, F.W. Zettler, and T. Monasterios. Departments of Agronomy and Plant Pathology, University of Florida, Gainesville, FL 32611.

Samples representing 36 accessions of the potato (*Solanum* spp.) germplasm collection maintained by the Bolivian Institute of Agricultural Technology at Toralapa, Cochabamba, were assayed for virus in 1978 by: 1) immunodiffusion tests using potato X (PVX) and potato Y (PVY) virus antisera, 2) light and electron microscopic examination of tissues for virus-induced inclusions, and 3) electron microscopy of negatively stained leaf extracts for rod-shaped virus particles. Virus was detected in 72% of the accessions: 42% were infected with PVX, 28% with PVY, and 33% with a potyvirus that induced cylindrical inclusions distinct from those induced by either PVY or potato virus A (PVA). Whereas PVY and PVA inclusions are of the "subgroup IV" type (J.R. Edwardson & R.G. Christie. 1983. *Phytopathology* 73:290-293), the other virus induced "subgroup II" inclusions. Extracts of 6 samples in which only subgroup II inclusions were found did not react with PVY antisera.

DETECTION OF GEMINIVIRUSES BY LIGHT MICROSCOPY. R.G. Christie and J. Bird. Department of Agronomy, University of Florida, Gainesville, FL 32611 and Department of Plant Protection, University of Puerto Rico, Rio Piedras 00927.

Tissues of *Phaseolus lathyroides*, *Sida carpinifolia*, *Euphorbia prunifolia*, and *Rhynchosia minima* infected with bean golden mosaic, malveaceous chlorosis, euphorbia mosaic, and rhynchosia mosaic viruses, respectively, were cleared in 2-methoxyethanol, stained with Azure A (R.G. Christie & J.R. Edwardson. 1977. *Univ. Florida Monograph* 9), and examined for virus-induced inclusions. For all viruses, large blue-violet nuclear inclusions were readily detected in phloem cells of juvenile expanding leaves prior to and during early stages of symptom development. In mature fully expanded tissues with conspicuous mosaic symptoms, however, inclusions were sparse, smaller in size, and erratically distributed. In thin sections, inclusions were found to consist of masses of virus particles as described by Kim et al. (1978. *Virology* 89:22-33). The intracellular and tissue location of geminivirus inclusions should be useful in their detection and characterization.

PRE-STORAGE AND PRE-PLANT FUNGICIDAL TREATMENT ON EMERGENCE OF YAM SEED-PIECES, C.W.J.M. De Kok, J.S. Mignucci and R. Torres López, Dept. of Crop Protection, Agric. Expt. Sta., RUM, Mayaguez, P.R. 00708.

Habanero (*D. rotundata*) and Florido (*D. alata*) yam tubers were stored under four different storage structures. Tubers were treated by: i) a prestorage bath in thiabendazole fungicide solution, ii) a preplant bath in the same, iii) a combination of i) and ii), or iv) leaving them without any fungicide. During 2 months of storage, tubers were periodically monitored for weight loss, decay, and tuber microflora. Tuber-pieces (115 g each) were planted after storage to determine emergence and field performance. Treatment of yam tubers with thiabendazole either before planting alone or combined with prestorage treatment resulted in the earliest and most complete emergence of yam seed-pieces. Benefits from fungicide treatments were greater for Habanero than for Florido this year. Habanero yams showed greater natural storage deterioration than that of Florido.

RESPONSE OF BANANA FRUIT WEIGHT TO AERIAL APPLICATIONS OF CHLOROTHALONIL IN WATER. J. J. DeValdenebro and M. D. Grove, SDS Biotech Corporation, 8075 N. W. 53rd. St., Miami, Florida 33166.

Banana fruit stems sprayed with chlorothalonil fungicide

(BRAVO, DACONIL 2787) in water for the control of yellow Sigatoka leaf spot (*Mycosphaerella musicola*) averaged 3.28 kg. heavier than stems from plants sprayed with mancozeb in oil/water emulsion. The additional weight was due primarily to greater length of the individual banana fingers. Disease control in both treatments was excellent during the entire experimental period. Therefore, the extra production witnessed in the plots treated with chlorothalonil was considered due to either removal of oil from the spray mixture or to fruit growth stimulation caused by the presence of chlorothalonil.

RESUMEN DE LAS INVESTIGACIONES SOBRE LA MAZORCA NEGRA Y EL MAL DE MACHETE DEL CACAO EN TURRIALBA, COSTA RICA. G.A. Enríquez, CATIE, Turrialba, Costa Rica.

La Mazorca negra (*Phytophthora palmivora*) es a nivel mundial la enfermedad que más daño causa, el Mal de Machete (*Ceratocystis fimbriata*) es la enfermedad que más desastres económicos ha causado entre los agricultores, individualmente. El combate por medios químicos ha sido muy costoso e imposible, para estas dos enfermedades respectivamente. Se comprobaron y desarrollaron metodologías para detectar resistencia, se descubrieron cultivares promisorios, se probó la resistencia en la descendencia de los híbridos y se estudiaron sus características hereditarias. Los híbridos heredan las resistencias en forma poligénica. Para Mazorca negra, los cultivares 'Pound-7' y 'SCA-6' presentan alto valor reproductivo y 'UF-613', buena habilidad combinatoria específica. Se encontraron tres formas de resistencia: inhibición a la germinación muerte del micelio nuevo, muerte de células formando "puntos acuosos" retardando el ataque ('SCA-6'), e hipersensibilidad ('Pound-7'). Para Mal de Machete, los cultivares 'IMC-67' y 'SPA 9' tienen genes dominantes para resistencia.

CLADOSPORIELLA CERCOSPORICOLA DEIGHTON, HIPERPARASITO DEL AGENTE CAUSAL DE LA MANCHA DE LA HOJA DE LA CAÑA DE AZUCAR, CERCOSPORIDIUM KOEPKEI ESQUIVEL EN PANAMA. - E.A. Esquivel R., P.O. Box. 1043, David, Chiriquí. Rep. de PANAMA.

Se describe al hongo imperfecto *Cladosporiella cercosporicola* Deighton, encontrado como hiperparasito del hongo causante de la mancha amarilla de la hoja de la caña de azúcar, *Cercosporidium koepkei* Esquivel. Se dan detalles morfológicos del hongo y se establece su posible implicación en la epidemiología de la enfermedad. Se presentan figuras con detalles microscópicos de los conidios del hiperparasito.

PLEOSPORA SOLANI SP. NOV. TELEOMORFOSIS DE ALTERNARIA SOLANI (ELL. & MART.) JONES & GROUT. - E.A. Esquivel R. P.O. Box 1043. David. Chiriquí. Rep. de PANAMA. --

Se reporta una especie de *Pleospora* causando manchas blanco-grisáceas en hojas de Pimentón (*Capsicum annum* L.) Los estudios morfológicos y patogénicos de este ascomiceto demuestran que se trata del estado perfecto de *Alternaria solani*, causante de manchas foliares en solanáceas. Esta nueva especie se reporta como *Pleospora solani* Esquivel, y se da su descripción completa en latín y español según las normas seguidas para estos casos. El trabajo se acompaña de 7 figuras de síntomas y detalles morfológicos microscópicos de peritecias, ascos y ascosporos.

ALGUNAS NUEVAS ENFERMEDADES DEL FRIJOL, (PHASEOLUS VULGARIS L.) EN LA REPUBLICA DE PANAMA. E.A. Esquivel y C. Williams. P.O. Box. 1043. David, Chiriquí, Panamá.

Se reportan nueve nuevas enfermedades del frijol, *Phaseolus vulgaris* L. en Panamá. Algunas de ellas comunes en esta planta en otros países cercanos como el "Tallo hueco" por *Fusarium solani* f. sp. *phaseoli* Burk. y la "Pudrición gris" causada por *Macrophomina phaseolina* (Tassi.) Goid. Pero otras como el tizón foliar por *Choanephora* sp. y la mancha foliar concéntrica por *Corynespora cassicola* (Berk. & Curt.) Wei. no son comunes en la literatura fitopatológica americana. Se describen los patógenos y se presentan figuras de síntomas y detalles microscópicos de los hongos mencionados.

NEMATOCIDE USAGE AT WORTHY PARK SUGAR ESTATE, JAMAICA. Trevor Falloon, Sugar Industry Research Institute, Kendal Road, Mandeville Jamaica.

A complex of soil organisms including nematodes, arthropods, and fungi result in low plant cane yields on the illudis gravelly clay loam soil type at Worthy Park Estate in Jamaica. Experiments beginning in the 1950's and continuing into the 1980's, show best yield response, of up to 42.7 tons cane per hectare (TC/HA) (17 tons cane per acre (TC/A), to nematocides. Guided by those results, Worthy Park began commercial treatment of fields in 1976 with liquid fumigants, D-D and Telone II, and later with Furadan granules. The result has been an overall 27 pct increase in TC/HA, with D-D giving 29.6 pct increase, Telone II 21.3 pct and Furadan 28.5 pct, which is equivalent to an average increase of some 22.6 TC/HA (9 TC/A). Together with Worthy Park's traditional good juice quality this translates to more than 2.5 tons sugar/ha (TS/HA) (1 Ton sugar/acre). Severe drought, as occurred in 1976, can however, result in economic loss.

NATURALEZA DE LA RESISTENCIA EN TOMATE TOLERANTE A PSEUDOMONAS SOLANACEARUM SMITH. Alejandro Ferrer Z., Instituto de Investigación Agropecuaria de Panamá (IDIAP), Aptdo. 6-4391, Estafeta El Dorado, Panamá 6, Panamá.

La Línea P.I. 126408, mostró un alto nivel de resistencia a *Pseudomonas solanacearum* en inoculaciones realizadas en invernadero. Cruces con Bonny Best, indican que la resistencia es de naturaleza poligénica. Esta misma relación, se observó en progenies de cruces recíprocos. No se observó aumento de la población bacteriana, debido a exudados provenientes de plantas resistentes o susceptibles. El tamaño de las colonias en un medio de agar agua no aumentó debido a exudados de raíces de tomate, pero sí en áreas influenciadas por hongos contaminantes. El patógeno penetra raíces sin heridas artificiales y según observaciones hechas, la bacteria se multiplicó en las puntas de las raíces. Plantas susceptibles y resistentes inoculadas artificialmente pudieron ser diferenciadas a 30 y 32°C, pero no hubo mucha diferencia a 25 y 28°C.

PUNTA SECA EN CEBOLLA ASOCIADA AL HONGO COLLETOTRICHUM sp. Alejandro Ferrer Z., O. Fernández, C. Miranda, E. de León, Instituto de Investigación Agropecuaria de Panamá (IDIAP), Apartado 6-4391, Panamá 6, Panamá.

Daños severos en cultivos de cebolla se encontraron asociados a una especie no identificada de *Colletotrichum*. Los síntomas inicialmente se limitan a una necrosis de las puntas de las hojas y bajo condiciones favorables de humedad, estas lesiones progresan hasta cubrir toda la hoja. Plantas afectadas algunas veces crecen retorcidas y mueren prematuramente. Raramente las lesiones se inician en el cuello o sección intermedia de las hojas mostrando numerosos acérvulos en el centro. Pérdidas de más de 50% se observó en algunos campos afectados por esta enfermedad.

ESTUDIO PRELIMINAR DE LOS VIRUS DEL PIMENTON Y EL AJI (CAPSICUM spp.) EN PANAMA. O. Fernández G., Instituto de Investigación Agropecuaria de Panamá (IDIAP), Apartado 6-4391, Panamá 6, Panamá.

Se exponen los resultados de los primeros trabajos de virología en *Capsicum* spp. en Panamá. Para ello se utilizó la prueba de doble difusión en agar con SDS para identificar los siguientes virus: Virus del grabado del Tabaco (TEV), Virus Y de la papa (PVY) y virus del moteado del pimentón (PeMV) con antisueros de Florida. Para detectar el virus del Mosaico del Tabaco (TMV) se utilizó agar sin SDS y antisuero de la cepa común del TMV. Paralelamente se realizaron ensayos de transmisión mecánica con plantas indicadoras. En la región de Azuero se encontró solamente TEV, en el Valle de Antón se encontró TMV y TEV y en zonas próximas a la ciudad de Panamá se encontró PVY y TEV. En ningún caso se encontró el PeMV. Además en zonas próximas a la ciudad de Panamá se encontró un virus no identificado asociado a moscas blancas cuyos síntomas iniciales son aclaramiento de las nervaduras, luego achaparramiento y deformación de hojas y frutos. Estos síntomas desaparecen a temperaturas menores de 30°C.

INVESTIGACIONES REALIZADAS SOBRE LA MONILIASIS DEL CACAO EN CENTRO Y SUR AMERICA. J.J. Galindo y G.A. Enríquez, CATIE, Turrialba, Costa Rica.

La Moniliasis del cacao (*Theobroma cacao* L.) causada por el hongo *Monilia rozeri* Cif. y Par. fue encontrada en Centroamérica en 1978. Las pérdidas económicas ocasionadas por la enfermedad llegan a 60% de la producción nacional en Costa Rica y 25-30% en Colombia y Ecuador. El combate por medio de fungicidas es muy costoso debido al número de aplicaciones necesarias para lograr reducción de la incidencia. La poda sanitaria y las prácticas culturales para disminuir la alta humedad dentro de la plantación han probado ser

efectivos medios de combate. El uso de variedades resistentes al patógeno parece ser la base de un sistema económico de combate, que puede ser complementado con los componentes sanitarios, cultural y químico. En pruebas de inoculación (10^5 conidios/ml) de los clones de la colección del CATIE, se encontró que hay una diferencia significativa en los grados de susceptibilidad hallándose algunos que podrían considerarse resistentes, tales como: CC-210, 266; EET-48, 59, 94, 95; RB-41 y UF-296.

INTEGRATED CONTROL OF WEB-BLIGHT DISEASES OF BEANS (*Phaseolus vulgaris*). G.E. Gálvez, B. Mora and R. Alfaro. Centro Internacional de Agricultura Tropical, CIAT, Cali, Colombia and Ministry of Agriculture, San José, Costa Rica.

Spread of *Thanatephorus cucumeris* (*Rhizoctonia solani*) occurs mainly by soil splashing. Therefore, mulching avoids very effectively dissemination of the disease in the tropics where frequent heavy rains occur. Rice husk works efficiently, but an easy and cheap formed mulch is difficult for beans, either grown in small or medium or large size farms. Some varieties are more tolerant to the pathogen such as Porrillo 70, S-630-B, Turrialba 1. It is known that Benomyl at 500 gr/ha in 3-4 applications controls the disease fairly good. However, none of these treatments by itself can economic and efficiently control web-blight. The use of the tolerant Porrillo 70, mulch formed by burning weeds Glyphosate or Paraquat, and three applications of Benomyl controlled the disease as shown by an average yield perplot of 350 grs., whereas just Porrillo 70 plus mulch yielded 240 gr, Porrillo 70 plus benomyl 120 gr, and Porrillo 70 alone 70 gr. The same treatments with the susceptible ICA-Pijao yielded 110 gr, 58 gr, 30 gr, and 0 gr., respectively.

POTENCIAL AND PROSPECTS OF BIOLOGICAL CONTROL OF NEMATODES. Párviz Jatala, International Potato Center, Apdo. 5969, Lima, Peru.

After several successful laboratory and greenhouse studies, experiments were carried out in several *M. incognita* infested fields of the Cañete Valley, coastal Peruvian desert, to compare the effect of several nematocides and *P. lilacinus* in controlling the nematodes. Results indicate that *P. lilacinus* effectively controlled *M. incognita* in all field trials and its effect surpassed those of nematocides. Similar results were obtained in field trials conducted in the USA, Philippines, Panama, Malasia, and Puerto Rico. The use of this organism for controlling various plant parasitic nematodes was investigated and encouraging results were obtained from the experiments conducted in Peru for controlling *Tylenchulus semipenetrans* on oranges. *P. lilacinus* reduced *T. semipenetrans* populations to levels lower than three commonly used nematocides. Root, fruit diameter, and plant growth in the fungus treated trees was significantly higher than those of nematocide treated plants. Potential and prospects of such an effective biological control agent has given the field of nematode control a new dimension which needs to be exploited.

SISTEMAS DE FINCA Y PERDIDAS POS-COSECHA, ENTRE LOS COMPONENTES DE FINCAS PEQUEÑAS CON EL SISTEMA MAÍZ/FRIJOL EN RELEVO EN EL SALVADOR: UN ESTUDIO DINAMICO DE CASO. L.R. Peña y J.F. Larios CATIE, APTDO. PI. (01) 78, San Salvador, El Salvador, C. A.

Mediante 5 estudios dinámicos de casos de fincas de pequeños productores (1.3-2.5 Ha), del sistema maíz/frijol en el Oeste de El Salvador, se determinaron mensualmente durante el año agrícola, los flujos de maíz entre los componentes de fincas típicas; las pérdidas de peso, así como sus causas, tanto en las plantas de maíz doblado que permanecen secándose en el campo de Agosto a Noviembre, como en los graneros (diciembre a Julio). Entre el 24 y el 51% de la producción de maíz se mantiene almacenada en los graneros durante un período de 7 meses; previo a lo que al momento de la madurez fisiológica (agosto), la planta de maíz es doblada para evitar el exceso de humedad y acelerar el secamiento. En este período (Agosto- Noviembre) las pérdidas suben a 8-9% de peso. En los graneros las pérdidas oscilan alrededor del 3% (Diciembre-Julio). Las causas de las pérdidas fueron debidas a insectos (40%) hongos (29%) y recalamiento y daños físicos (31%) en promedio. Durante la época lluviosa, los daños por hongos tendieron a aumentar ligeramente.

CHARACTERIZATION OF NUCLEOPROTEIN ASSOCIATED WITH MAIZE STRIPE DISEASE IN VENEZUELA. R. Lastra & O. Carballo, Laboratorio de Virus de Plantas, I.V.I.C., Apdo. 1827, Caracas 1010 A, Venezuela.

Maize Stripe (Hoja Blanca del Maíz) is the most important viral disease of maize in Venezuela. A nucleoprotein was consistently isolated from infected maize and not from healthy plants. After purification of the nucleoprotein a single band was usually found in CsCl isopycnic centrifugation with a density of 1.29 g/ml. The absorption spectrum of the band was characteristic of a nucleoprotein with a maximum between 261-262 and a minimum at 239-242 and a 260-280 ratio of 1.39. A single stranded ribbon-

cleic acid was isolated from the band and the protein component migrated as a single component with a M.W. of 33,500 daltons in PAGE. A non-capsid protein induced by the virus is present in large amount in the infected plants. After purification and electrophoresis the non-capsid protein migrated as a main band of 19,000 daltons M.W. This protein is strongly immunogenic, therefore antiserum could be useful for diagnostic purpose.

IDENTIFICATION OF THE MAJOR CONSTITUENT OF AMORPHOUS INCLUSIONS AS ANOTHER NONSTRUCTURAL PROTEIN OF THE POTYVIRAL GENOME. María V. G. de Mejía, E. Hiebert, and D.E. Purcifull, Plant Pathology Department, University of Florida, Gainesville, FL. 32611.

A procedure was developed for isolation of the cytoplasmic, amorphous inclusions (AI) induced by pepper mottle virus (PeMV) and watermelon virus-1 (WMV-1). SDS-PAGE purified AI proteins (m.w. 51k) were immunogenic and serologically distinct from host proteins. Major *in vitro* translated products of PeMV (m.w. 78k) and WMV-1 (m.w. 110k) RNA's immunoprecipitated by antisera to AI proteins were not immunoprecipitated by antisera to cylindrical inclusion proteins, to viral coat proteins or either 49k or 54k tobacco etch virus (TEV) nuclear inclusion proteins. However, tobacco vein mottling virus (TMVM) helper component (HC) antiserum was able to immunoprecipitate the same 110k WMV-1 RNA translation product that was immunoprecipitated by WMV-1 AI protein antiserum. The PeMV and WMV-1 AI proteins represent another nonstructural protein coded by the potyviral genome.

COFFEE ANTHRACNOSE: CONTROL OF BERRY DISEASE WITH FUNGICIDES AND FERTILIZER APPLICATIONS. J.S. Mignucci and P.R. Hepperly Dept. of Crop Protection, Agric. Expt. Sta., College of Agric. Sci., RUM, Mayaguez, P.R. 00708.

Anthracoze was the principal disease of coffee in production fields in Puerto Rico. *Colletotrichum gloeosporioides* (*Glomerella cingulata*) is the most common fungus associated with diseased branches. Necrotic spots on coffee berries were associated with the coffee anthracnose fungus (*C. gloeosporioides*), the eye spot fungus (*Cercospora coffeicola*) and the scaly bark or collar rot fungus (*Fusarium stilboides*). Typical lesions were dark brown colored and slightly depressed and usually contained all three fungi. Fungicide sprays (Benomyl plus Captafol) and increased fertilization (454g/tree every 3 months) of coffee trees partially controlled berry spotting. High balanced fertility alone appeared to reduce the number of diseased berries by approximately 23% while fungicide sprays gave 57% control. Combining high rate of fertilization and fungicide applications resulted in a reduction of approximately 85% of diseased berries.

PARASITISM OF MELOIDOGYNE ARENARIA EGGS BY PAECILOMYCES LILACINUS AND VERTICILLIUM CHLAMYDOSPORIUM. G. Morgan-Jones, J. F. White and R. Rodriguez-Kabana, Dept. of Botany, Plant Pathology and Microbiology, Auburn University, Alabama 36849.

Isolates of *Paecilomyces lilacinus* and *Verticillium chlamydosporium*, from females of *Meloidogyne arenaria* were evaluated, *in vitro*, for their ability to parasitize eggs of the nematode. The fungi prevented hatching and were able to colonize the eggs by hyphal penetration. Both egg shell and larval cuticle were disrupted, and hyphae readily proliferated endogenously within eggs and larvae. Hyphae within eggs were able to re-emerge through the shell. Some ultrastructural disorganization of the chitin and lipid layers of the egg shell was evident. Invaded larvae soon became necrotic and disintegrated internally. Some difference could be discerned in the egg shell disorganization induced by the respective fungal species.

DIAGNOSTICO, DISTRIBUCION E INCIDENCIA DEL VIRUS DEL MOSAICO DEL "DASHEEN" EN COSTA RICA. P. Ramírez y R. Gómez, Universidad de Costa Rica. (CIBCM)

El virus del mosaico del "dasheen" (DMV) fue identificado en plantaciones comerciales de tiquisque (*Xanthosoma sp.*) y malanga (*Colocasia esculenta*) en diversas regiones de Costa Rica. Las plantas infectadas mostraban síntomas de la enfermedad y una notoria reducción en la producción. La incidencia observada oscilaba entre 80 y 100%. Las preparaciones de plantas infectadas reaccionaron positivamente con antiseros preparados contra la cepa de Florida del DMV, en pruebas de inmunodifusión en agar o in situ microscopía electrónica. El examen de las mismas preparaciones al microscopio electrónico mostró la presencia de partículas flexuosas alargadas de aprox. 760 nm de largo. En plantas indicadoras, de la especie *Philodendron selloum*, este virus indujo síntomas típicos del DMV. La cepa costarricense del DMV fue

purificada por métodos basados en extracción con solventes orgánicos, precipitación con polietileno glicol y centrifugación diferencial.

La "mancha mantecosa" del fruto del maracuyá *Passiflora edulis* var. *flavicarpa*: Etiología y medidas preliminares de control. R.D. Zárate-Reyes. Universidad Nal. de Colombia, Facultad de Ciencias Agropecuarias, Apartado Aéreo 237, Palmira, Colombia.

En la zona del valle del Cauca, se detectó la presencia de *Colletotrichum gloeosporioides* Penz, asociado a lesiones en el fruto de maracuyá. Alta humedad relativa, lluvias periódicas, temperatura promedio de 24°C y heridas en el fruto aumentan la incidencia y severidad de la enfermedad, cuyas pérdidas pueden llegar a más de 30%. Se describe la sintomatología observada y se sugieren medidas preliminares de control, utilizando fungicidas (Benomil, Captafol o Clorotalonil) y destruyendo frutos afectados.

The "greasy spot" of the maracuyá *Passiflora edulis* var. *flavicarpa*: etiology and control. Rubén Darío Zárate Reyes, Universidad Nacional de Colombia Facultad de Ciencias Agropecuarias. Apartado Aéreo 237 Palmira- Valle- Colombia. - The incidence and severity are variable. The losses account for reached 30% in some areas. The disease affect all comercial varieties but strongly affect the yellow variety. A detailed description of morphologic and histologic symptoms is been done. The oil nature and the bright aspect of injury gave disease name. This can show up on any part of the fruits surface even the peduncule. A severe attack causes an early fruit fall and a lost of its quality. On nature letions can be observed the reproductive structures of the fungus. The disease causal agent is the fungus *Colletotrichum gloeosporioides* Penz. wich is disseminated by wind, rain and possibly by insects. The disease spread an settlement is favored by high humidity and un average temperatures of 22-24 °C. as well as an even rainfall regime. The acarus and fruit scraper insect damage seems to be a suitable way for the pathogen penetration. Some recommendations are given for controlling this disease.

Soybean *Glycine max* (L) Merrill purple decoloration *Cercospora kikuchii* (Matsumoto and Tomoyasu) Gardner control by mean of seed thermic treatment. Rubén Darío Zárate Reyes, A. Echeverry A. and M.R. Rojas, Universidad Nacional de Colombia. Facultad de Ciencias Agropecuarias Palmira, Apartado Aéreo 237, Palmira Valle- Colombia. - The patogen is localiced on the seed inners being difficult its

control. Thermotherapy (hot water) in combination with different temperatures and exposition periods were proved. Temperatures above 55°C affected the germination and emergency porcentajes as well as the Germination Velocity Index (G.V.I.). The optimum - tolerance region to treatments was among 49 and 50°C. and the exposure period 5-10 minutes. In vitro an in vivo the patogen was inactivated at 40°C for 5 minutes. The trials were carried out in a completely randomized blocks with factorial arrangement. The corresponding graphic and variance analysis were made.

FUNGI ASSOCIATED WITH SEVERAL DEVELOPMENTAL STAGES OF HETERODERA GLYCINES FROM AN ALABAMA SOYBEAN FIELD SOIL. R. Rodríguez-Kabana, G. Morgan-Jones and B. O. Gintis, Dept. Botany, Plant Pathology and Microbiology, Auburn University, Alabama 36849.

Young cream-colored cysts of *Heterodera glycines* were colonized by *Chaetomium cochliodes*, *Exophiala pisciphila*, *Fusarium oxysporum*, *F. solani*, *Phytophthora cinnamomi*, *Pythium* sp. and *Trichosporon beigelii*. Fifty percent of these were infected by fungi as compared to 20% of the younger white, lens-shaped females. Sausage-shaped females within roots and brown cysts from soil were invaded by fungi 2 and 70% respectively. Results indicated a progressive increase in fungal colonization with nematode development. Fungi occurring in significant numbers in older cysts were: *Cylindrocarpon tonkinense*, *Neocosmospora vasinfecta*, *Paecilomyces lilacinus*, *P. variotii*, *Phoma terrestris*, *Scytalidium fulvum* and *Verticillium chlamydosporium*.

EVALUATION OF FUNGICIDES FOR CONTROL OF TOMATO DISEASES. D. Sánchez and J. Samaniego. Fac. of Agronomy, University of Panama, Panama.

A field trial was established in Panama to compare three fungicides for control of tomato diseases. The experimental site was located within a tropical plain at an altitude of 5.20 meters above sea level. Fungicides evaluated were BRAVO 500 (1.5 kg a.i./ha) Vitigran Verde, (1.5 a.i./ha) Dithane M-45 (1.5 kg a.i./ha and a combination of Vitigran Verde plus Dithane M-45, (1.5 + 1.5 kg a.i./ha). Diseases encountered were early blight (*Alternaria solani*), target spot (*Corynespora cassiicola*), and gray leaf spot (*Stemphylium solani*), the latter pathogen causing the most damage. Best control was obtained with BRAVO 500 (21.4 tons/ha) followed by Dithane M-45 + Vitigran Verde (16.7 (tons/ha)), Dithane M-45 (14.8 tons/ha), Vitigran Verde (14.0 tons/ha) and non-treated check (10.0 tons/ha).