

ABSTRACTS OF PAPERS

**Presented at Meetings of the
American Phytopathological Society**

SOUTHERN DIVISION

Annual Meeting

February 7-10, 1982

ABSTRACTS

A CLOSTERO-LIKE VIRUS OF *NANDINA DOMESTICA* 'NANA-PURPUREA'.
Ahmed, N. A., S. R. Christie, and F. W. Zettler. Plant Pathology
Department, University of Florida, Gainesville 32611.

Nandina leaf extracts stained in 2% phosphate-buffered phosphotungstate (pH 7.2) revealed flexuous-rod particles; 68% of 114 were 725-795 nm long (mode 760 nm). Sectioned phloem cells stained in azure A revealed viral inclusions distinct from those of nandina mosaic (*Acta Horticulturae* 110:71-77, 1980). Tissues stained in calomine orange and Luxol brilliant green revealed no cytoplasmic inclusions indicative of potyviruses. The virus was graft, but not manually, transmitted to nandina seedlings and induced intermittently expressed foliar mosaic and distortion symptoms. Infected plants also showed stem-pitting symptoms, but were not stunted. These data and virus particle ultrastructure suggest that the nandina virus is a subgroup II closterovirus (Lister & Bar-Joseph. 1981. *Handbook of Plant Virus Infections*, p. 810). Serum specific electron microscopy of grids precoated with protein A and apple stem grooving antiserum showed a strong homologous reaction, but no reaction with the nandina virus.

HYPERSENSITIVE-LIKE REACTION IN TOBACCO SUSPENSION CELL CULTURES TO *PSEUDOMONAS PISI*. M. M. Atkinson and J. S. Huang, Department of Plant Pathology, North Carolina State University, Raleigh, NC 27650.

Tobacco suspension cell cultures underwent a hypersensitive-like reaction (HLR) when inoculated with *Pseudomonas pisi*, a pathogen incompatible with tobacco. UV killed *P. pisi* cells or cells of the compatible pathogen *P. solanacearum* K60 did not induce HLR. The reaction was characterized by a loss of electrolytes from tobacco tissue, tissue browning and increased respiration. Each of the above parameters was monitored over a 9h period after inoculation of tobacco cultures with 3×10^7 *P. pisi* cells/ml. Tobacco tissues exhibited reduced H^+ , Na^+ , Ca^{++} and Mg^{++} effluxes and K^+ uptake during the first 5h of HLR. Increased Na^+ , Ca^{++} , Mg^{++} and K^+ effluxes were observed within 9h. The differential effect on ion fluxes in the early stages of HLR suggests a primary effect on active transport systems which may be followed by general membrane disruption.

DETECTION OF CITRUS EXOCORTIS VIROID FROM CITRUS BY POLYACRYLAMIDE GEL ELECTROPHORESIS. Nadeer Baksh, R. F. Lee, and S. M. Garnsey, University of Florida, IFAS, AREC, Lake Alfred, FL 33850 and US Hort. Res. Lab., AR, SEA, USDA, Orlando, FL 32803.

Citrus exocortis viroid (CEV) was consistently detected in 20 g citron (*Citrus medica*) roots 2 weeks after inoculation and in 20 g citron leaves 3 weeks after inoculation with buds from field-grown, CEV-infected sweet orange and grapefruit trees. A polyacrylamide gel electrophoresis (PAGE) procedure for isolation of double-stranded RNA from virus-infected plant and fungal tissues (*Phytopathology* 69:854-858) was modified to detect CEV from citron. CEV-infected citron tissue was homogenized in 9 volumes of extraction buffer containing 0.28% bentonite. The viroid was partially purified by cellulose chromatography using 20% ethanol, concentrated by ethanol precipitation, separated by PAGE and detected by staining in ethidium bromide and viewing under UV light. The viroid was located on the gel by infectivity on citron, *Cynura aurantiaca* and tomato. The procedure worked with 3 severe and 7 mild CEV isolates which took 2-4 months by the traditional citron index to confirm CEV infection.

A POTATO TUBER ROT IN TEXAS. L. W. Barnes and R. A. Taber. Texas Agricultural Extension Service and Texas Agricultural

Experiment Station, Texas A&M University, College Station, Texas 77843.

Texas high plains potato growers have reported serious incidences of tuber rot in furrow-irrigated potatoes. Obvious foliar symptoms were not reported during the growing season but a firm tuber rot appeared either as tubers matured or following vine kill. Internal tissue of cut tubers was initially salmon-pink in color followed by a gradual blackening after several hours of exposure to the air. Two species of *Phytophthora* were isolated from diseased tubers. One has tentatively been identified as *P. nicotiana* var. *parasitica*. The second isolate has morphological characteristics which are different, but positive identification has not been made. Confirmation of both species is pending oospore induction. Koch's Postulates confirms that both isolates are capable of inducing tuber rot, and it is suggested that they may form a complex with greater disease potential.

SURVIVAL OF RHIZOCTONIA SOLANI ANASTOMOSIS GROUPS 1, 2, 3, and 4 IN DOTHAN LOAMY SAND. D. K. Bell and D. R. Sumner, Plant Pathology Department, Coastal Plain Station, Tifton, GA 31793.

Pots of heat treated soil were infested separately with *Rhizoctonia solani*: 4, 11, 2 and 15 isolates of AG 1 to 4 respectively, in Dec. 1980. Pots were buried to 5 cm of the rim, watered, and left fallow. Soil was sampled 3 times, ending in Sept. 1981. Populations were determined by plating soil on tannic acid-benomyl agar, then snapbean and corn were planted in all pots. Root and hypocotyl disease severity (RHDS) (1-5 scale) was determined after 2 wk. Temperature in the upper 10.2 cm of soil ranged from -4 to 40 C and 74 cm of rain fell on the pots. Populations averaged 3, 16, 0 and 13 propagules/100 g of soil for AG 1 to 4 respectively, after 283 days. One, 4, 0 and 8 isolates of AG 1 to 4 were recovered from soil. The RHDS for AG 1 to 4 averaged 2.3, 2.5, 1.2 and 2.4 on bean and 1.0, 1.7, 1.0 and 1.1 on corn. One AG 1 isolate was recovered from bean, 0 from corn; 4 AG 2 from bean, 5 from corn; 0 AG 3 from bean and corn; and 5 AG 4 from bean, 0 from corn.

BIOLOGICAL FACTORS RELATED TO COWPEA STUNT DISEASE DEVELOPMENT. C. P. Benner and C. W. Kuhn, Department of Plant Pathology, University of Georgia, Athens, GA 30602.

Certain factors associated with cowpea stunt disease, caused by a mixed infection of cucumber mosaic virus (CMV) and black-eye cowpea mosaic virus (BICMV), were studied in two cowpea cultivars: one showed synergism with necrosis (SN) and the other synergism with no necrosis (S). At 21 to 30 C the concentration of both viruses was greater in doubly infected plants than in singly infected ones, peroxidase activity was increased synergistically in the SN cultivar but not the S cultivar, and polyphenol oxidase activity and profiles of CMV RNAs were similar in both single and mixed infections. When temperatures of 33 to 35 C prevented both S and SN, CMV concentration was increased in doubly infected plants, but BICMV concentration and peroxidase activity were similar in single and mixed infections. We suggest the cowpea stunt synergism is caused by some event in the BICMV replication cycle.

DECLINE OF SPINY GREEK AND BLUE RUG JUNIPER CAUSED BY *PRATYLENCHUS VULNUS*. D. M. Benson and K. R. Barker. Dept. of Plant Pathology, North Carolina State University, Raleigh 27650.

Damage to *Juniperus excelsa stricta* 'Spiny Greek' juniper and *J. horizontalis* 'Blue rug' juniper by *Pratylenchus vulnus* was studied over 29 mo. in microplots. Containerized, 3-yr-old

plants were transplanted to fumigated microplots infested with 2160 nema/500 cm³ soil in May, 1979. Differences in growth were found 13 and 16 months after transplanting for Spiny Greek and Blue rug juniper, respectively. At 29 mo. after transplanting nematode-infected plants were 2-fold smaller than control plants. Xylem-water potential (Ψ) measured with a pressure bomb in Sept., 1981 was 2 bars greater for Spiny Greek plants infected with *P. vulnus* than control plants but similar for Blue rug plants. After 2 wk of drought, Ψ was 2 to 4-bars higher for nematode-infected plants of both species. Nematode density of *P. vulnus* was cyclic with changes in season each yr. Reproduction rates were 0.93 after 12 mo. but dropped to 0.57 after 29 mo. as root systems were damaged.

MAIZE DWARF MOSAIC VIRUS TRANSMISSION EFFICIENCY OF THE GREEN-BUG, *SCHIZAPHIS GRAMINUM* (RONDANI), BIOTYPE E. P.H. Berger and R.W. Toler, Department of Plant Sciences, Texas A&M University, College Station, Texas 77841.

The maize dwarf mosaic virus (MDMV) transmission efficiency of the greenbug, *Schizaphis graminum* (Rondani), biotype E, was compared to biotype C transmission efficiency. After either alatae or apterous aphids were allowed ten minutes acquisition access to MDMV-A infected sudangrass, late instar insects were assayed for inoculativity. A 1980 Texas isolate of biotype E was less efficient, transmitting MDMV at 10.25% and 11.09% for alatae and apterae, respectively. A 1980 Minnesota isolate of biotype C transmitted MDMV at 9.01% and 14.56% efficiency for alatae and apterae, respectively, while a 1978 Minnesota isolate of biotype C transmitted MDMV at 20.54% and 20.06% for alatae and apterae, respectively.

GRAIN SORGHUM ROOT-KNOT AND RENIFORM NEMATODE HOST REACTIONS. W. Birchfield, and Louis Anzalone, Jr., USDA, SEA and Dept. of Plant Path. & Crop Physiol., La. State Univ. Agric. Expt. Sta., Baton Rouge, LA 70803

Grain sorghum, *Sorghum vulgare* var. *Drummondii* acreage is increasing in rotation with soybeans, cotton and corn in the southeastern and gulf states of the USA. It is grown in areas where root-knot and reniform nematodes are often a problem. Sorghum varieties Funk G421, Funk G499, Funk G516, Funk G522A, Funk G522BR, Funk G550, Funk G611, Funk G623, and DeKalb 55 were greenhouse tested for root-knot and reniform host reactions. All varieties tested were highly susceptible to root-knot nematode, *Meloidogyne incognita* *Wartellei*. Numerous galls and egg masses occurred on the roots 49 days after exposure to 2nd stage larvae. Root galls were small on distorted, reddish discolored roots. All varieties were highly resistant or immune to reniform nematode, *Rotylenchulus reniformis*. Few females and egg masses on the roots were observed. These varieties may be potential host reservoirs for *M. incognita* *Wartellei*, but could be used to reduce reniform nematode for subsequent crops.

THE INFLUENCE OF GROWTH REGULATORS ON JUGLONE LEVELS IN PECAN. A. Borazjani, C. H. Graves, Jr., and P. A. Hedin, Department of Plant Path. and Weed Sci., Miss. State Univ., and Boll Weevil Research Laboratory, USDA-ARS, Miss. State, MS 39762.

Juglone (5-hydroxy, 1,4-naphthoquinone) is interpreted as one factor for disease resistance in pecan (*Carya illinoensis*). Four growth regulators, 3-indoleacetic acid (IAA), gibberellic acid (GA₃), p-coumaric acid, and 1,1-dimethyl piperidinium chloride (mepiquat chloride), were compared with untreated checks for effects on the production and/or accumulation of juglone in mature trees. Single applications were made at 100ppm in late April, using 1-tree plots, 3 replications, cv. van Deman. Juglone was monitored at 3-wk intervals through 21 wks. Leaf juglone in IAA and mepiquat chloride treated trees was significantly increased at 3 wks; at 9 wks, juglone decreased in all. Juglone in nuts was higher at 12 wks following IAA and mepiquat chloride application, and at 15 wks after p-coumaric acid application. Increases in leaf weight occurred following mepiquat chloride, and in number of leaflets/leaf following GA₃ and IAA. A decrease in terminal growth was noted for all treatments except GA₃.

THE EFFECTS OF METALAXYL ON GROWTH AND MYCORRHIZAL INCIDENCE OF FRASER FIR. R. I. Bruck, C. M. Kenerley, and L. F. Grand. Department of Plant Pathology, North Carolina State University, Raleigh, NC 27650.

Plots were established in spring 1980 to determine the effects of metalaxyl (Subdue[®] 2E) on growth and mycorrhizal incidence of Fraser fir. Non-mycorrhizal 1/0 seedlings were transplanted into plots in natural fir stands and fir nurseries. Half of each plot was treated in spring and fall 1980 and spring 1981 with Subdue [2E 1.1 kg/ha (a.i.)]. Seedlings were removed from each plot on 8 occasions during the following 18 mos. Seedling root and shoot dry weights from metalaxyl treated plots were significantly greater (P=0.01) compared to untreated controls during all sampling periods except for the final fall 1981 sample. Mycorrhizal incidence was greater and onset earlier in metalaxyl treated trees compared to controls with the exception of the final fall 1981 sample. Seedlings from plots that previously were 75-100% mycorrhizal decreased in incidence to <25%, suggesting that these nonmycorrhizal roots may be more susceptible to soil borne pathogens.

HORSE PURSLANE, *TRIANTHEMA PORTULACASTRUM*, AS A HOST OF *MACROPHOMINA PHASEOLINA*. B. D. Bruton, USDA, ARS, SR, OTA, P. O. Box 267, Weslaco, Texas 78596.

Horse purslane (*Trianthema portulacastrum*) is a common weed in vegetables grown in the Rio Grande Valley of Texas. During the 1980-81 seasons, numerous isolations were made from roots of horse purslane and other weeds growing in cantaloup (*Cucumis melo*) plots. *Macrophomina phaseolina* was frequently isolated from roots of apparently healthy horse purslane plants. Microscopic examination of roots revealed the presence of sclerotia embedded in lateral roots. Pathogenicity studies confirmed that *M. phaseolina* is capable of colonizing horse purslane by the presence of sclerotia in the roots. Although there appears to be little or no detrimental effect on horse purslane, it can serve as a host to increase the sclerotial population in fields. Considerable losses occur in cantaloup every year from vine decline and postharvest decay caused by *M. phaseolina*. This is the first known record of horse purslane as a host of *M. phaseolina*.

MYROTHECIUM RORIDUM, A POTENTIALLY DEVASTATING PATHOGEN OF MUSKMELONS IN SOUTH TEXAS. B. D. Bruton, USDA, ARS, SR, OTA, P. O. Box 267, Weslaco, Texas 78596.

Myrothecium roridum most often occurs on the fruit of muskmelons in south Texas. The disease on the fruit is characterized by shallow to deep sunken lesions, 2-50 mm in diameter, covered with a greenish-black mass of sporodochia. Fruit losses of 30% in the field and further losses as a post-harvest decay occur. Disease incidence on other plant parts is erratic and depends on frequent rainfall and high temperatures. Lesions on stems and petioles become elongated, necrotic and sunken. The crown area is often girdled killing the plant. Lesions on the leaves are round to irregular, 2-15 mm in diameter, with tan centers and brown margins and often having the appearance of concentric rings. These lesions may often be mistaken for *Alternaria* leaf-blight. Abundant greenish sporodochia may be arranged in concentric rings on both surfaces of the leaf. The central necrotic tissue often breaks away resulting in shot-holes. *M. roridum* also causes a seedling disease and root rot.

BLIGHT-LIKE SYMPTOMS INDUCED IN CITRUS ON ROUGH LEMON ROOT-STOCK WITH AMMONIUM SOURCES. Harry C. Burnett, FDACS, Division of Plant Industry, 3027 Lake Alfred Road, Winter Haven, FL 33880, S. Nemes, USDA-SEA/AR, 2120 Camden Road, Orlando, FL 32803, M. Patterson, The Coca-Cola Company, Foods Division, Forest City, FL 32751.

Soil around rough lemon-rooted grove trees and rough lemon budded with sweet orange scions in a greenhouse was drenched with solutions of ammonia hydroxide, urea and ammonium nitrate. Grove trees treated with NH₄OH developed wilt symptoms similar to those on blight trees. Vessel plugging increased significantly in these trees compared to controls treated with water. Treated trees exhibited a significant decrease in water uptake but no increase in zinc content of new wood compared to controls. Wilt, vessel plugging and *Fusarium solani* infection were induced in NH₄OH treated greenhouse plants; plugging was greater in stems containing the fungus. Similar wilt occurred on plants treated with urea and NH₄NO₃. Ammonia toxicity to roots predisposes them to *F. solani* infection and provides the fungus with a source of N needed for phytotoxin production.

FUNGI ASSOCIATED WITH TAP ROOTS OF LADINO CLOVER IN NORTH CAROLINA. C. L. Campbell, Department of Plant Pathology, North Carolina State University, Raleigh NC 27650.

Ladino clover (*Trifolium repens* 'Tillman') was seeded in rows (30.5 cm spacing) into tall fescue (*Festuca arundinacea* 'KY 31') sod in 9/79. From 10/79 to 6/81, two samples (30.5 cm of row, 20-25 cm deep) were taken monthly and washed, surface disinfested clover tap roots (1-2 cm sections) were placed on 2% water agar. Fungi growing from root tissue were placed on potato dextrose agar. Fungi of 18 genera were identified. Most isolated genera colonized root tissue by 1/80. Spectrum of isolated genera varied little over time but proportion of isolates per sample varied for some genera. Potential clover root pathogens were isolated in each season. Mean percent of total isolates, range and seasonal variation for 3 clover pathogens were: *Fusarium oxysporum*-50.9% (29.4-85.1%), nearly constant in all seasons; *Rhizoctonia solani* and *R. solani*-like fungi-7.2% (0.0-16.0%) least frequent in winter; *Codinaea fertilis*-5.6% (0.0-20.4%), least frequent in summer.

CHARACTERIZATION OF PEPPER STRAIN, RACE 1 OF *XANTHOMONAS CAMPESTRIS* PV. *VESICATORIA*. A. A. Cook and Y. G. Guevara, Department of Plant Pathology, University of Florida, Gainesville, FL 32611

Resistance to pathotype 1 of the pepper strain of *Xanthomonas campestris* pv. *vesicatoria* has been found in *Capsicum chacoense*. Injection inoculation with 10^8 bacterial cells/ml followed by incubation at 30 C caused visible collapse of inoculated leaf tissues within 24 hr. Concentration of bacteria in inoculated (hypersensitive) leaf tissue is drastically reduced during the first 24 hr. incubation and the number of bacteria/mm² leaf tissue remains low thereafter. Race 1, pepper strain, differs from race 2, pepper strain, in appearance of hypersensitive symptoms induced, pattern of bacterial multiplication *in vivo*, and electrolyte loss from inoculated leaf tissues. It does, however, resemble the activity of the tomato strain of this bacterium. Hypersensitive resistance from *C. chacoense* was inherited as a single, dominant character in progenies of *C. chacoense* X *C. annuum*.

EFFECTS OF SOME HERBICIDES ON *RHIZOCTONIA SOLANI* AND *TRICHODERMA HARZIANUM*. Tom C. Creswell and E.A. Curl, Dept. of Botany, Plant Pathology and Microbiology, Auburn University, AL 36849.

Rhizoctonia solani and *Trichoderma harzianum* were grown separately in flasks containing Czapek-Dox broth amended with prometryn, cyanazine or norflurazon at concentrations of 0.5 and 20 ug/ml a.i. Oven-dry weights of mycelial mats and pH of the culture medium, determined at 5, 7, 9 and 11 days, indicated that growth of *R. solani* was not significantly affected by any of the herbicides. Growth of *T. harzianum* was increased significantly at the higher rate of norflurazon at days 5, 7 and 11. Colonization by *R. solani* of cotton petiole segments, which had been dried, treated and buried in soil, was increased by all three herbicides at 5 ug/ml and by cyanazine at 20 ug/ml and was decreased by norflurazon and prometryn at 20 ug/ml. In standard tests on herbicide-amended Czapek-Dox agar, the herbicides had little effect on antibiosis of *R. solani* by *Trichoderma*; however, the hyperparasitic action of *Trichoderma* was reduced in the presence of prometryn and norflurazon.

CONTROL OF PHYTOPHTHORA PARASITICA VAR NICOTIANAE IN TOBACCO WITH METALAXYL AND PHOSETHYL AL. A. S. Csinos, Coastal Plain Experiment Station, Tifton, Georgia 31793.

Metalaxyl and phosethyl Al were evaluated for control of tobacco black shank in an area heavily infested with *Phytophthora parasitica* var *nicotianae*. Metalaxyl at 1.12 or 0.56 kg ai/ha preplant incorporated plus 0.56 kg ai/ha layby controlled black shank as well as 2.24 kg ai/ha preplant incorporated (> 60% control). In other tests, metalaxyl at 2.24 kg ai/ha controlled disease more than 85%. Eight foliar applications of phosethyl Al at 1.12 and 2.24 kg ai/ha controlled disease 24 and 45%, respectively. In similar tests under lower infestations, phosethyl Al controlled black shank up to 60%. Both fungicides increased yields over the control. *In vitro* 1 mg/l of metalaxyl in V-8 agar completely inhibited pathogen growth, but phosethyl Al did not inhibit growth at 100 mg/l. Phosethyl Al, although inferior in control of disease at rates used, demonstrated capabilities of controlling black shank far superior to what may be expected from *in vitro* growth inhibition studies.

ACTIVITIES OF COLLEMBOLAN INSECTS IN RELATION TO THE SURVIVAL POTENTIAL OF CHLAMYDOSPORES OF *FUSARIUM OXYSPORUM* f. sp. *VASINFECTUM*. E. A. Curl, Department of Botany, Plant Pathology, and Microbiology, Auburn University, AL 36849.

It has been suggested that collembolan insects in the rhizosphere of cotton seedlings may transport pathogenic fungal propagules to infection sites on roots. Results of laboratory experiments showed that Collembola species *Proisotoma minuta* and *Onychiurus encarpatus* were readily attracted to non-germinated spores of *Fusarium oxysporum* f. sp. *vasinfectum* on the surface of water agar. The spore population within a 12-mm diameter area was reduced from 175 to 51 by approx. 100 insects in less than 3 hr, and germination of the remaining spores was reduced by 50%. Many of the consumed spores reappeared with walls intact in fecal pellets deposited on the agar. These did not germinate *in situ* nor when transferred to a nutrient medium. Transport of *Fusarium* spores on the bristled bodies of Collembola has been demonstrated; however, these data would indicate it is unlikely that transport by ingestion and redeposition could contribute significantly to the inoculum potential.

FACTORS INFLUENCING ELISA DETECTION OF SWEET POTATO FEATHERY MOTTLE VIRUS IN SWEET POTATO. P. R. Esbenshade and J. W. Moyer, Plant Pathology Department, North Carolina State University, Raleigh, NC 27650.

An indexing system for sweet potato feathery mottle virus (FMV) in sweet potato (*Ipomoea batatas* (L.) Lam.) was developed based on the enzyme-linked immunosorbent assay. The addition of 0.05M sodium diethyldithiocarbamate to the virus buffer, and 0.2% ovalbumin to the coating buffer rinse reduced non-specific reactions. There was no significant difference in ability to detect virus between homologous and heterologous combinations of two FMV strains and their antisera. A highly significant difference ($P < 0.01$) in levels of detectable virus existed between leaf positions sampled from the same shoot. Leaves at the base of the shoot were the most consistent source of detectable virus. Virus was most reliably detected in FMV-infected shoots 5 to 8 wk after emergence. Infected plants (i.e. a root and all shoots produced by that root) could be reliably detected by sampling two shoots per plant, using a composite sample of three leaves from each shoot.

EFFECTS OF INOCULUM DENSITY ON BACTERIAL WILT OF POTATO. R. D. Gitaitis, C. A. Jaworski, and S. C. Phatak, Coastal Plain Experiment Station, P. O. Box 748, Tifton, Georgia 31793.

Resistant (Ontario) and susceptible (Pungo) potato cultivars were used to study the effects of inoculum density on the development of bacterial wilt. Resistance in Ontario was displayed in the greenhouse only when dilute suspensions (10^3 cfu/ml) of *Pseudomonas solanacearum* were used as inocula. In the field, stem inoculations were made with four concentrations of bacteria (10^2 - 10^8 cfu/ml). Ontario displayed higher levels of resistance than Pungo at all bacterial concentrations. Amount of wilt in either cultivar increased in direct proportion to inoculum density to 10^6 cfu/ml but increasing inoculum concentration above that did not result in increased disease. Yield and tuber quality in Ontario were negatively correlated with increasing bacterial concentrations. No significant differences in yield or tuber quality occurred among different inoculum densities for the Pungo cultivar. Tuber yield and quality of inoculated Pungo plants were less than Ontario exposed to the highest inoculum level.

CHITINOLYTIC ACTIVITY OF FUNGI ISOLATED FROM CYSTS AND EGGS OF HETERODERA GLYCINES. G. Godoy, G. Morgan-Jones, and R. Rodriguez-Kabana, Department of Botany, Plant Pathology and Microbiology, Auburn University, Auburn, AL 36849.

Chitinolytic activity (CA) of 10 fungal species isolated from cysts and eggs of *Heterodera glycines* was studied using an agar medium with 0.2% chitin. The fungi were: *Neocosmospora vasinfecta*, *Codinaeae heteroderae*, *Stagonospora* sp., *Thielavia terricola*, *Exophiala jeanselmei*, *Gliocladium roseum*, *Verticillium leptobactrum*, *Chaetomium globosum*, *Phoma multirostrata*, and *P. microstroma*. Plates with medium were inoculated and incubated at 29C for 5 days. CA was evidenced as a clearing zone around the periphery or inside the developing colonies of some fungi 72 hr after inoculation. *C. heteroderae* and *V. leptobactrum* colonies showed peripheral clearing and *T. terricola*, *C. globosum*, *G. roseum*, and *Stagonospora* sp. showed clearing within their colonies; the remaining species did not show clearing. When the fungal were

tested for pathogenicity against eggs of *Meloidogyne arenaria*, 7 of the species parasitized the eggs but only *V. leptobactrum* and *P. multirostrata* infected more than 80% of the eggs on the surface of the agar.

SPORE DISCHARGE STUDIES OF THE PECAN SCAB FUNGUS CLADOSPORIUM CARYIGENUM. T.R. Gottwald, USDA-ARS, P.O. Box 87, Byron, Ga. 31008-0087

Conidia discharge of *Cladosporium caryigenum* from diseased leaf and nut shuck tissue of pecan, *Carya illinoensis*, was studied under controlled conditions of relative humidity (RH), temperature, vegetative wetness (VW) and infrared radiation (IR). Decreasing RH from near saturation to 40% produced only minimal spore release while decreasing RH to below 40% stimulated considerable discharge which could be enhanced with specimen exposure to IR of intensities >40 microeinsteins $M^{-2} Sec^{-1}$. Sustained periods of $<40\%$ RH were also conducive to spore release and could be enhanced by IR. However, spore release was less during decreasing RH changes than sustained periods. Spore release was stimulated by IR exposure periods of as little as 1 min and RH changes of as short as 2 min duration. Spore release was only recorded during periods of decreasing VW or when VW was maintained below 15%. Vibrations stimulated spore release at low RH however vibrational effects were less intense than those reported for other hyphomycetes.

POTATO TUBER ROTS INDUCED BY DIFFERENT SPECIES OF PHYTOPHTHORA. M. P. Grisham and R. A. Taber. Dept. of Plant Sciences, Texas A&M University, College Station, TX 77843.

Tuber rot symptoms caused by two isolates of *Phytophthora* (21001 and 21002) from potato in Texas were compared with symptoms caused by confirmed isolates of *P. nicotiana* var. *parasitica* (PNP), *P. erythroseptica* (PE), and *P. cryptogeta* (PC). Inoculum was placed in 8 mm dia wells cut in tubers of cultivars Norgold Russett (NR) and Red LaSota (RSL). All isolates darkened the skin around the eyes of RSL. The only external symptom on NR was killing of the buds by all isolates. PNP and 21001 caused internal tissues of tubers to gradually turn salmon-pink with exposure to air, reaching a maximum color intensity after 6 hr. PE, PC, and 21002 caused similar changes in tissue appearance; however, the discoloration was more diffuse and not as bright after the same time periods. Internal symptoms were more distinct in NR than RSL. Similarities in symptoms support the tentative identification of 21001 as *P. nicotiana* var. *parasitica*. 21002 differs from 21001 in morphology and symptoms. Identification is pending oospore induction.

BENIOWSKIA BLIGHT OF SETARIA IN GEORGIA. R. T. Hanlin and E. A. Brown., Depts. of Plant Pathology and Extension Plant Pathology, University of Georgia, Athens, GA. 30602.

A disease of knotroot bristlegrass (*S. geniculata*) growing on a farm in north central Georgia was brought to our attention by a farmer concerned about possible toxicity in his pasture grasses. The pathogen was identified as *Beniowskia sphaeroidea*, a hyphomycete that forms white sporodochia on the leaves of the host. The sporodochia are circular to irregular in outline, up to 1.5mm in diam., and are attached to the host by a bundle of parallel hyphae. Except for the sporodochia the mycelium is completely internal. Numerous globose, hyaline conidia are borne on denticles directly on the sporodochial hyphae. This is the first report of this fungus from Georgia. It has been reported only occasionally on grasses in the tropics.

FURTHER STUDIES OF THE APHID TRANSMISSIBILITY OF ARAUJIA MOSAIC VIRUS. D. S. Heron, R. Charudattan, and F. M. Hofmeister. Plant Pathology Department, University of Florida, Gainesville, FL 32611

The potyvirus Araujia mosaic virus (AjMV) is transmissible both mechanically and by aphids to some members of the Asclepiadaceae (Phytopathology 70: 909-913, 1980). In our aphid transmission study, none of 26 species representing 17 plant families other than the Asclepiadaceae exhibited symptoms following aphid-inoculation of AjMV, nor was AjMV detectable in these species when manual back-inoculations were made from them to healthy *Morrenia odorata* or *Araujia sericofera* (Asclepiadaceae) indicator plants. The virus was efficiently transmitted in a stylet-borne manner by the aphids *Myzus persicae* or *Aphis nerii*

from AjMV-infected *M. odorata* or *A. sericofera* to healthy seedlings of *M. odorata*; *A. sericofera* seedlings were inoculated using *M. persicae*. The results provide further evidence that AjMV has a very restricted host range, and may be a suitable biocontrol agent for *M. odorata*, a troublesome weed in Florida citrus groves.

A COMPARATIVE ANALYSIS OF THE VIRUS-SPECIFIC PROTEINS OF TWO BEAN YELLOW MOSAIC VIRUS ISOLATES AND A CLOVER YELLOW VEIN VIRUS ISOLATE. E. Hiebert, J. Nagel, and F. W. Zettler, Plant Pathology Department, University of Florida, Gainesville, FL 32611

Bean yellow mosaic virus isolates from gladiolus (BYMV-G) and red clover (BYMV 204-1) and a clover yellow vein virus isolate from white clover (CYVV-P) were compared by serological tests and product analyses after the in vitro translation of the respective isolated RNAs. Immunodiffusion tests using antisera to BYMV-G, BYMV 204-1, and CYVV-P indicated that the 2 BYMV isolates were closely related to each other but were distantly related to CYVV-P. In vitro translation studies using the rabbit reticulocyte lysate system revealed that at least three of the six distinct translation products of CYVV-P were different in estimated MW from those of the BYMV isolates. The proposed gene map for the BYMV isolates is: 5' end - 84-85,000 (84-85K) MW protein - 51K protein - 44-45K protein - 69K cylindrical inclusion protein - 56K protein - 34K capsid protein - 3' end. The proposed gene map for CYVV-P is: 5' end - 82K protein - 49K protein - 44K protein - 69K cylindrical inclusion protein - 59K protein - 37K capsid protein - 3' end.

NATURE OF RESISTANCE IN COWPEAS TO SOUTHERN BEAN MOSAIC VIRUS. H. A. Hobbs and C. W. Kuhn, Department of Plant Pathology, University of Georgia, Athens, GA 30602.

After preliminary screening of cowpea lines, 12 were selected to study the nature of resistance to southern bean mosaic virus (SBMV). Virus accumulation in inoculated primary leaves varied from less than 1 to more than 1,000 $\mu\text{g/g}$ of leaf tissue, but the quantity was distinct for each line. Although symptoms did not occur on five lines, virus replicated and moved into non-inoculated tissue in all 12. Necrotic local lesions developed on two lines, one of which produced 50-100 times as much virus as the other and it also developed systemic necrosis. Plant growth at 3 and 6 weeks after inoculation was generally correlated with virus concentration. One line, however, had over 1,000 $\mu\text{g/g}$ of tissue and no significant reduction in early plant growth. In susceptible lines more virus was produced in plants incubated at 27 C than at 33 C but an opposite effect was found in one resistant line. A new strain of SBMV developed when resistant plants were maintained at 21 and 24 C.

FRUIT ROTTING CAPABILITY OF THE DAYLILY LEAF-STREAK FUNGUS, COLLECEPHALUS HEMEROCALLI. G. E. Holcomb. Department of Plant Pathology & Crop Physiology, Louisiana State University Agricultural Experiment Station, Baton Rouge, LA 70803.

The genus *Collecephalus* was erected by Spencer in 1972 to accommodate the fungus that causes leaf spots and streaks of daylily (*Hemerocallis* spp.). The fungus is primarily a wound-pathogen that induces limited necrosis at inoculation or infection sites. Leaf yellowing associated with infection frequently extends well beyond infection sites. Macerative activity at daylily wound-inoculation sites suggested a more generalized rotting capability for *Collecephalus*. Artificial inoculations of common fruits showed that *C. hemerocalli* produces a firm rot of lime, lemon, sweet orange, Satsuma orange, kumquat, grape, avocado, Japanese persimmon, peach and apple. The fungus was also pathogenic on rainlily (*Zephranthes* sp.), cotton bolls, false garlic (*Nothoscordum inodorum*) and cactus (*Hylocereus* sp.).

SWARMING DISEASE IN APHELENCHUS AVENAE. J. P. Hollis, Dept. Plant Path. & Crop Physiol., La. State Univ. Agric. Expt. Sta. Baton Rouge, LA 70803 and I.K.A. Ibrahim, Dept. Plant Path. Alexandria Univ., Alexandria, EGYPT.

Soybean roots of mature plants (Davis var.) heavily galled by *Meloidogyne incognita* Kofoid and White and containing a layer of rhizospheric soil on their surfaces were incubated with excess moisture in plastic bags for 2 weeks at 90° day and 70° night F. temperatures. Nematode extractions from root surfaces and soil thereon yielded large mixed populations of

nematodes, including Aphelenchus avenae Bastian 1865. Large globose swarms (5-7 thousand specimens) of A. avenae in all stages were selected and purified by transfer to clean water in Syracuse water glasses and maintained for 60 days. This is the first report of swarming (now known as swarming disease) in a nematode easily cultured in vitro since discovery of the phenomenon 23 years ago - Nature (Lond.) 182: 956-957 (1958). A. avenae swarms are particularly useful in disease mortality studies.

FUNGI ASSOCIATED WITH POD AND PEG ROT OF PEANUT (ARACHIS HYPOGAEA L.) IN SOUTH CAROLINA. M. W. Hotchkiss and L. W. Baxter, Jr., Department of Plant Pathology and Physiology, Clemson University, Clemson, SC 29631.

Isolation frequency of fungi from peanut pods and pegs in South Carolina was examined and certain isolates were tested for pathogenicity. Selected fungicides were tested for inhibitory properties and control of the disease. Fusarium, Penicillium, Calonectria (Cylindrocladium) crotalariae, Trichoderma, Neocosmospora vasinfecta, Rhizopus, and Aspergillus were isolated more frequently than Sclerotium rolfsii and Rhizoctonia solani. Pods were inoculated in the greenhouse by pouring spore/hyphal suspensions into slits made in unsterilized or sterilized soil close to undisturbed young pods. R. solani, C. crotalariae, N. vasinfecta, and Fusarium sp. were recovered from inoculated pods but always at a low frequency. C. crotalariae caused more rotted pods and was reisolated more often than other fungi. Pods inoculated with S. rolfsii showed typical symptoms of infection but S. rolfsii was not recovered from the pods. Certain fungicides were inhibitory in vitro, but tests for disease control were inconclusive.

IN-FURROW BENOMYL TREATMENT REDUCES INCIDENCE OF PEANUT BLACKHULL DISEASE IN NEW MEXICO, 1971 TO 1981. David C. H. Hsi, New Mexico State University, Middle Rio Grande Experiment Station, Los Lunas, NM 87031

Trichodactylis basicola Ferr. caused blackhull of Valencia peanut plants (defined as more than 25% of the shell area discolored) in New Mexico since 1963. In chemical screening tests, benomyl was consistently effective in inhibiting the growth and development of T. basicola. Field experiments using long replicated four-row plots were conducted in heavily infested areas since 1971. The soil was treated with benomyl at varying rates applied in-furrow as a spray at planting time. One to ten locations were used yearly during the decade. The incidence of blackhull was significantly reduced, from 26-79% untreated to 10-33% by treatment with benomyl at dosages 1.7 kg a.i./ha or higher. A 24-C label was finally granted in 1981 after lengthy review for in-furrow soil application of benomyl at 3 lbs. Benlate per acre or 1.7 kg a.i./ha on commercially grown peanuts for blackhull control in New Mexico.

ON THE STATUS OF STATISTICS IN PHYTOPATHOLOGY. Steven B. Johnson and R. D. Berger, Plant Pathology Dept., University of Florida, Gainesville, FL 32611.

Authors used multiple comparison procedures in nearly 300 tables and figures published in 12 recent issues of PHYTOPATHOLOGY. These statistical methods were inappropriately used in over 60% of the cases. Two common errors of multiple comparison procedures were application to (i) levels of quantitative factors like temperature or inoculum density, and (ii) treatments in factorial experiments where interactions are present. The proper techniques are to use regression analysis or a curve fitting procedure to compare quantitative levels and to analyze separately where interactions occur before making comparisons within main-effects or within sub-effects in factorial experiments. Improper use of statistics invariably leads the author to improper conclusions.

EVALUATION OF METHODS FOR SEPARATING PSEUDOMONAS SYRINGAE PV. TOMATO FROM P. SYRINGAE PV. SYRINGAE OCCURRING ON TOMATO TRANSPLANTS. J.B. Jones, Univ. of Florida, Bradenton 33508, R.D. Gitaitis, and S.M. McCarter, Univ. of Georgia, Tifton 31793 and Athens 30602, respectively.

When 134 leaf lesions from 13 transplant fields were triturated

in water and tested by indirect immunofluorescence (IIF) with antiserum prepared against P. syringae pv. tomato (PST) and for ice nucleation (IN), 77% and 41% were pos.(+) for the two tests, respectively. However, only 25% of 119 pure cultures from the lesions were PST whereas 69% were P. syringae pv. syringae (PSS). All PST isolates were IN neg.(-), and came from lesions that were IN - and IIF +. Although only 65% of PSS isolates originated from lesions that were IN +, 95% were IN + in pure culture. These results suggest that neither IIF nor IN alone differentiates PST from PSS in tissue but when used together provide for rapid and highly accurate identification of pure cultures. Erythritol (PSS +) and DL-lactate (PSS +) use, degradation of pH 5.0 pectate medium (PST +), and syringomycin production (PSS +) are reliable confirmatory tests.

EVALUATION OF 25 COMMERCIAL SOURCES OF CARRIZO CITRANGE ON RADOPHOLUS SIMILIS REPRODUCTION. D. T. Kaplan and J. H. O'Bannon, USDA, ARS, Horticultural Research Laboratory, 2120 Camden Road, Orlando, FL 32803

Carrizo citrange (Citrus sinensis X Poncirus trifoliata) is generally considered tolerant of the burrowing nematode (Radopholus similis). However, isolated burrowing nematode problems on this rootstock have been reported. Greenhouse evaluations were made using 10 plants each of 25 commercial sources of Carrizo citrange 6 mo after inoculation with an identified citrus population of R. similis. Significant nematode populations occurred in roots of most test plants in 9 sources; in 1-4 test plants of 14 sources; whereas nematodes were not detected in 2 sources. Nematodes did not affect root or top growth under greenhouse conditions. These findings do not eliminate the possibility of race involvement, but emphasize the importance of host source because variability exists in the germplasm between and within rootstock sources.

EFFECT OF FLOODING ON PHYTOPHTHORA ROOT ROT OF FRASER FIR. C.M. Kenerley, K. Papke, L. F. Grand, and R. I. Bruck. Dept. of Plant Pathology, N. C. State University, Raleigh, NC 27650.

Effect of flooding on Phytophthora root rot of Fraser fir was assessed in soil naturally infested (NI) with Phytophthora cinnamomi without seedlings, and with 2-yr-old seedlings transplanted into NI or noninfested soil, each with continuously flooded soil for 0, 24 or 48 hrs. Propagule density was quantified at 2, 9, and 16 da and mortality at 27 da after flooding. At 9 and 16 days propagule density was greater (P=0.01) in treatments with seedlings present. Propagule density was greater (P=0.01) with flooding than without flooding within treatments of seedlings in NI soil. No differences in propagule density were found among water regimes without the host. Seedling mortality was higher (P=0.01) in infested than in non-infested soil. Flooding increased (P=0.01) seedling mortality compared to non-flooded treatments in NI soil. The increase in disease commonly observed in nursery beds after flooding may be the result of interactions between a physiologically stressed host and the rapid production of pathogen inoculum.

EFFECTS OF REPEATED EXPOSURES OF SO₂ AND NO₂ ON SOYBEANS. C.I. Klarer and R. A. Reinert, Department of Plant Pathology, North Carolina State University, Raleigh 27650

Greenhouse grown soybeans (Glycine max cv. Bragg) inoculated with Rhizobium japonicum were exposed to SO₂ (0.0, 0.2, or 0.3 ppm) and NO₂ (0.0, 0.1, or 0.2 ppm) singly and in combination. Three hour exposures were initiated when plants were 3 weeks old and continued every other day until plants were harvested after 5, 10, or 15 exposures. After 5 exposures, SO₂ and NO₂ interacted to reduce dry shoot weight. As number of exposures increased, NO₂ and SO₂ acted independently to reduce shoot weight. At the final harvest only SO₂ reduced shoot weight. SO₂ alone reduced the dry root weight² after 5 exposures. As the number of exposures increased the two gases interacted to reduce root weight. Pollutants interacted to reduce fresh nodule weight at all 3 harvests. Maximum weight reduction ranged from 17 to 38% depending on the variable measured. More studies are needed to understand the mode of action and physiological effects of SO₂ and NO₂ on soybean.

EFFECT OF NAPROPAMIDE ON GROWTH AND MORPHOLOGY OF RHIZOCTONIA SOLANI. Mark E. Kurtz, Delta Branch Experiment Station, Stoneville, MS 38776, A. Wayne Cole and William E. Batson, Jr.,

Plant Pathology and Weed Science Department, Mississippi State, MS 39762.

Growth and development of *Rhizoctonia solani* Kuhn in response to napropamide [2-(α -naphthoxy)-*N,N*-diethylpropionamide], and 2,4-dinitrophenol were studied. Napropamide at 2.2, 4.4, and 8.7×10^{-5} M concentrations inhibited growth 15, 60, and 78%, respectively by 96 hrs at 25 C, and 2,4-dinitrophenol, at 3, 6, and 12×10^{-5} M, inhibited growth 43, 51, and 72% by 72 hrs at 25 C. *R. solani* could not utilize napropamide as a sole carbon or nitrogen source. Napropamide did not alter pH of growth media in liquid culture and no degradation of napropamide by *R. solani* occurred over 20 days. Somatic hyphae of *R. solani* were examined microscopically for effects of napropamide on number of nuclei per cell. Napropamide at 4.4×10^{-5} M resulted in 7, 8, and 27% of the tip, mid, and y type cells, respectively, having more than eight nuclei/cell. No other treatment resulted in more than a one % increase.

SPLASH DISPERSAL AND CULTURAL CONTROL OF PHYTOPHTHORA PARASITICA CAUSING DIEBACK OF RHODODENDRON. C. R. Kuske and D. M. Benson, Department of Plant Pathology, North Carolina State University, Raleigh, NC 27650

Splash dispersal of *Phytophthora parasitica* propagules was studied on hybrid rhododendron cv. Purple Splendor grown under lath in containers on a naturally-infested pine bark base. Plants in all tests were irrigated (0.6 cm/day) by overhead sprinklers. Height of lesion occurrence was recorded on two height classes of plants from 8 June to 10 October, 1981. Splash dispersal was characterized by frequency distribution of lesion heights. Average height of lesion development (site) on plants averaging 33 and 64 cm tall was 26 and 49 cm, respectively. Cultural control was studied by placing 1-yr-old rhododendron cv. Nova Zembla in 3.8 liter pots under lath on either naturally-infested (NI) pine bark or NI pine bark covered with a 5 cm layer of gravel. Lesion incidence per plant for plants on bark and gravel averaged 2.8 and 0.3, respectively. Average mortality was 75 and 5%, respectively.

MELOIDOGYNE SPECIES IDENTIFICATION USING ISOELECTRIC FOCUSING. Edgar C. Lawson, III, and George E. Carter, Jr. Dept. of Plant Pathology and Physiology, Clemson University, Clemson, SC 29631.

Isoelectric focusing (IEF) is an electrophoretic separation technique which can be used to separate proteins from complex mixtures. The proteins form distinct bands at their isoelectric points in a pH gradient established in a polyacrylamide gel matrix. We applied this technique for the first time to the biochemical systematics of plant-parasitic nematodes. This technique detected twice as many protein bands in extracts of *Meloidogyne* species as did disc-gel electrophoresis. *M. hapla*, *M. javanica*, *M. incognita*, and *M. arenaria* were distinguished from each other by the protein profiles generated by the IEF of total soluble proteins extracted from eggs. *Hoplolaimus columbus* and *Heterodera glycines* also produced distinctive protein profiles. Extracts from eggs, larvae and egg-laying adults of *M. incognita* gave different protein profiles.

RESISTANCE TO COPPER IN *XANTHOMONAS CAMPESTRIA* PV. *VESICATORIA* G.M. Marco and R.E. Stall. Plant Pathology Dept., Univ. of Florida, Gainesville, Florida 32611.

Resistance to copper was detected in 12 of 18 cultures of *Xanthomonas campestris* pv. *vesicatoria* isolated during the past 15 years from pepper in Florida. Resistant isolates were not killed during 24-hr exposure to deionized water extracts from 3 or 6 g/l of $\text{Cu}(\text{OH})_2$ or tribasic copper sulphate. Sensitive isolates were killed within 3 hr. The amount of soluble copper in water extracts was determined to be between 1 and 2 ppm. Sensitive isolates were killed by 1 ppm of Cu as $\text{Cu}(\text{SO}_4)$ during 3-hr exposure, but 8-16 ppm were required to kill the resistant isolates. Both copper resistant and sensitive isolates were sensitive to deionized water extracts of the combination of $\text{Cu}(\text{OH})_2$ and mancozeb suspended at 3.0 and 1.5 g/l respectively. Extracts of mancozeb (1.5 g/l) were not toxic to the bacteria. In field tests with pepper plants inoculated with copper resistant and sensitive isolates and sprayed with $\text{Cu}(\text{OH})_2$, resistant isolates were not controlled, but sensitive isolates were controlled. The combination of $\text{Cu}(\text{OH})_2$ and mancozeb controlled both types of isolates.

EFFICACY OF SELECTED FUNGICIDES ON RHIZOCTONIA BLIGHTS OF TALL FESCUE IN THE GREENHOUSE. S. B. Martin, C. L. Campbell, and

L. T. Lucas, Department of Plant Pathology, North Carolina State University, Raleigh, NC 27650.

Benomyl, carboxin, PCNB, triadimefon, iprodione, and chlorothalonil at 0, 100, and 1000 mg a.i./l were applied to tall fescue foliage in incomplete factorial combinations in repeated experiments. Four-week-old plants were inoculated with isolates of *Rhizoctonia solani*, binucleate *Rhizoctonia*-like fungi (RLF), and multinucleate *Rhizoctonia zeae*-like fungi (RZF) and rated after 10 days. All main effects and interactions were significant ($P=0.1$) for benomyl, carboxin, and PCNB, however disease control was similar for triadimefon, iprodione, and chlorothalonil. Benomyl did not control foliar blight induced by RLF and RZF. RZF-induced disease was not controlled with PCNB, and benomyl enhanced disease caused by RZF isolates. PCNB was not as effective as the other fungicides tested for control of *R. solani*. Results indicated that specific identification of the pathogens is necessary for the proper selection of a fungicide for the effective control of some brown patch diseases.

RESISTANCE AND SUSCEPTIBILITY OF *CUCURBITA* SPP. TO *FUSARIUM OXYSPORUM* F. SP. *NIVEUM*. R.D. Martyn and R. McLaughlin. Dept. of Plant Sciences, Texas A&M University, College Station, 77843.

Formae speciales of *F. oxysporum* are noted for their host specificity. Specificity of f. sp. *niveum*, causal agent of watermelon wilt, is well documented on hosts outside the Cucurbitaceae but not so within the family, especially the genus *Cucurbita*. Thirty-four cultivars encompassing 6 species of *Cucurbita* were tested for resistance or susceptibility to *F. oxysporum* f. sp. *niveum*. All *Cucurbita* spp. tested were resistant except some cultivars of *C. pepo* var. *meloepo*, which include the zucchini and yellow summer squashes. Ten of the 29 cultivars or accessions of var. *meloepo* displayed significantly more wilt than comparable plants in uninfested soil. Percent wilt in the susceptible cultivars ranged from 37-100%. 'Golden Eagle', 'Hyrific', 'Straightneck', and 'Early Prolific Straightneck' were the most susceptible. 'Yellow Crookneck' was resistant to f. sp. *niveum* as were bush scallop, cushaw and pumpkin. This confirms earlier reports that the winter squashes are resistant to f. sp. *niveum* and extends the host range to include some of the summer squashes.

THE IR-4 PROGRAM IN THE SOUTHERN REGION
Charles W. Meister, Pesticide Research Lab., IFAS,
University of Florida.

Farmers, growers, nurserymen and others using fungicides can utilize the IR-4 program to expand pesticide labels for minor uses. A pesticide clearance request is sent from the IR-4 State Liaison Representative to National Headquarters, Rutgers University, where experimental protocols are prepared based on information derived from consultations with EPA and the manufacturer. The IR-4 Regional Leader Laboratory at the University of Florida financially supports field studies and residue analyses required for the collection of efficacy, phytotoxicity and pesticide residue data. Data and information from required areas are assembled by IR-4 and submitted to EPA for expanded registration. Since 1977 IR-4 data was used to substantially expand the ornamental labels for eight fungicide formulations. Currently there are fungicide projects underway on 20 food commodities and 84 ornamental species and work is expected to expand by 25% in 1982.

EFFECTS OF FUNGICIDE TREATMENTS ON THE RATE OF INCREASE OF ONION FOLIAGE DAMAGE CAUSED BY *ALTERNARIA PORRI*. Marvin E. Miller, Texas Agricultural Experiment Station, Weslaco, Texas 78596.

Bravo 500 (tetrachloroisophthalonitrile) and Manzate 200 (zinc-manganese salt of ethylenebis(dithiocarbamate) delayed an increase of foliage damage caused by *Alternaria porri* (E11.) Cif. by 7-10 days and 3-5 days, respectively, on Texas Grano 502 and New Mexico Yellow Grano onions over untreated controls when the leaf damage level was 10-20%. However, above 20% damage, the rate of increase of damaged leaf tissue was approximately the same for all treatments on both varieties. At foliage damage levels below 20%, fungicide treatments apparently reduce the rate of new infection site establishment. However, once established, the lesions girdle the leaf causing death of tissue distal to the lesion and in advance of fungal growth. As a result, effects of fungicide treatments are masked and increases of damaged tissue are similar for fungicide treatments and untreated controls.

EFFECT OF INOCULUM DENSITY, SAPROPHYTIC FUNGI AND CITRUS SPECIES ON WILT SEVERITY AND SOIL POPULATIONS OF FUSARIUM OXYSPORUM F. SP. CITRI. K.T. Morgan and L.W. Timmer, Dept. Plant Path., Univ. Florida, Gainesville, 32611 and Agri. Res. and Educ. Center, Lake Alfred, FL 33850.

A wilt and dieback of greenhouse-grown Mexican lime seedlings caused by Fusarium oxysporum f. sp. citri has been described in Florida (Phytopathology 69:730). Mexican lime seedlings were inoculated with 0, 1000, 4000 and 8000 microconidia per gram of soil, symptom severity increased with increasing inoculum density. In experiments where potting mix was infested with Aspergillus ochraceus, Penicillium restrictum and Trichoderma harzianum at 5000 conidia per gram of soil 2 wk prior to inoculation with F. oxysporum f. sp. citri, A. ochraceus reduced, P. restrictum increased and T. harzianum had no effect on disease severity. Prior inoculation with A. ochraceus also reduced populations of the pathogen. In naturally and artificially infested potting mix, populations of the pathogen were generally higher where highly susceptible Mexican limes had grown than where resistant species were.

HOMOGENEITY OF BEAN YELLOW MOSAIC VIRUS ISOLATES FROM GLADIOLUS (GLADIOLUS X HORTULANUS). J. Nagel, F. W. Zettler, University of Florida, Gainesville, FL 32611 and S. W. Scott, Clemson University, Clemson, SC 29631.

Twenty-seven gladiolus isolates of bean yellow mosaic virus from the United States (FL, CA, CO, MI, MN, NJ), Holland and Egypt were compared with single isolates from Trifolium pratense (204-1), T. repens (CYVV-P), Pisum sativum (58-1027), Alpinia sp. (Al) and Freesia sp. (Fr); these were originally collected in KY, Canada, NY, FL, and Holland, respectively. The gladiolus isolates were indistinguishable from each other but differed from the others. Whereas the 204-1, CYVV-P, Al, and Fr isolates readily infected Phaseolus vulgaris 'Bountiful' systemically, the gladiolus isolates did not. Only CYVV-P induced systemic necrosis in P. sativum 'Alaska', and only CYVV-P and 58-1027 induced intranuclear inclusions visible by light microscopy. Gladioli were susceptible to 204-1, CYVV-P, and several gladiolus isolates by manual inoculation. In immunodiffusion tests with antisera to 204-1, CYVV-P, and a gladiolus isolate, all the gladiolus isolates reacted identically but could be distinguished by spur formation from the others. Similar results of gladiolus isolate homogeneity were obtained in ELISA tests with 204-1 and CYVV-P antiserum.

EFFECTS OF FUNGICIDES AND NEMATICIDES ON CITRUS BLIGHT IN FLORIDA. S. Nemeec, USDA, ARS, Orlando, FL 32803; B. Bustillo, Mobay Chemical Corp., Lutz, FL 33549; J. H. O'Bannon, USDA, ARS, Prosser, WA 99350; and M. Patterson, Coca Cola Co., Forest City, FL 32751

Control of citrus blight was attempted in 4 field tests with fungicides and nematicides in the last 6 years. Chloroneb, chlorothalonil, sodium azide, thiophanate-methyl + ethazol, thiabendazole, cycloheximide, and benomyl applied as soil drenches 4 times in 1 year did not halt disease 21 mo after the first treatment in 1 test. In another test, 3 soil applications of 3 rates of granular NaN₃ did not improve tree health after 2 years. Symptoms were not reduced by foliar sprays of oxamyl, soil drenches of benomyl or a combination of both, nor by phenamiphos and aldicarb granules applied to soil in a grove with high populations of Tylenchulus semipenetrans. Nematode populations in soil and roots were not appreciably changed by nematicides. Of the fungicides used, only benomyl reduced Fusarium levels in soil up to about 50% of the control.

FIELD EVALUATIONS OF SYSTEMIC RESISTANCE TO BLUE MOLD IN TOBACCO INDUCED BY INOCULATIONS WITH THE BLUE MOLD PATHOGEN. W. C. Nesmith, Yigal Cohen, Joseph Kuć and Harvey Spurr, Univ. of Kentucky, Lexington, Ky and USDA-ARS, Oxford, N. C.

Commercially produced, Nicotiana tabacum L. 'Burley' transplants were inoculated in the field with Peronospora tabacina, the causal agent of blue mold, to study induced resistance. Inducing inoculations involved pouring one ml of a 5×10^3 conidia suspension on the stem-root-interface at transplanting or two weeks earlier in the greenhouse. Uninoculated plants served as controls. Protective fungicides were applied twice weekly for three weeks to reduce natural infections. Necrosis of the cambium and phloem developed at the inoculation zone in 18, 86 and 0% of the transplant inoculated, greenhouse inoculated and controls, respectively. Extreme stunting was associated with all plants having necrosis, but these plants were highly resistant to further P. tabacina infections. Inoculated plants that did not develop systemic necrosis were not protected against blue mold.

THE ASSESSMENT OF PEANUT LEAF SPOT (CERCOSPORIDIUM PERSONATUM) IN FIELD EXPERIMENTS. D. J. Nevill and R. H. Littrell, Post Doctoral Associate and Department Head, Plant Pathology Department, Coastal Plain Station, Tifton, GA 31793.

Field tests of fungicides, dosages and spraying schedules were used to compare methods of peanut leaf spot assessment. Immediately before harvest, numbers of infected leaves and numbers of lesions were recorded for 3 main stems per plot. Starting 100 days from planting, percentage necrosis on the fourth, sixth and eighth leaves below the growing point of the main stem and percentage defoliation were estimated every 10 days. Observations of necrotic area gave a fast means of severity estimation that was closely associated with results of the techniques involving lesion counts. Multiple regression analysis indicated that 96% of the variation in yield loss could be explained by estimates of percentage necrosis and defoliation.

PROPAGULE EFFICIENCY IN THE RHIZOSPHERE. K. M. Reynolds, D. M. Benson, and R. I. Bruck, Department of Plant Pathology, North Carolina State University, Raleigh, N. C. 27650.

We propose an expansion of Gilligan's root-infection model (Phytopathology 69:782-784) to include propagule distance from the root surface and environmental effects since inoculum efficiency of root pathogens (infection probability) is dependent upon these factors. The model is:

$I = \pi L.M.D. [c r_0^2 + \sum_{i=1}^n (r_i^2 - r_{i-1}^2) f(r_i)]$ where: I = total expected infections; L = average susceptible root length per root (cm); M = number of susceptible roots; D = inoculum density (propagules/cm³); c = constant; r₀ = root radius; r_i = radial distance (cm) from center of root axis to an outer annulus i; f(r_i) = probability of infection for a single propagule in annulus i. Our model provides for variable inoculum efficiency as an explicit function of radial distance from the root surface [i.e. -f(r_i)]. Also, "c" and the shape and scale parameters of f(r_i) can be made functions of environmental parameters which exert both direct and indirect effects of the propagule.

STEM CANKER OF SOYBEAN INCITED BY ISOLATES OF DIAPORTHE AND PHOMOPSIS FROM COTTON. Kenneth W. Roy and William A. Miller, Department of Plant Pathology and Weed Science, Mississippi State, MS 39762.

Fungal cultures producing the Diaporthe stage, Phomopsis stage, or both, were isolated from fully-developed cotton leaves and hypocotyls. All isolates were pathogenic when inoculated into stems of flowering soybean plants in the field. Stem canker size, which varied with isolate tested, ranged from 0.9 cm - 12.6 cm in length. Interveneal leaf necrosis and killing of plants were associated with infection by 37% and 34% of the isolates tested, respectively. Symptoms induced in soybean by cotton isolates were comparable to those induced by isolates of Diaporthe phaseolorum from soybean.

EFFECT OF AERIAL AND SOIL TEMPERATURE ON DISEASE SEVERITY IN TOBACCO INOCULATED WITH POTATO VIRUS Y AND MELOIDOGYNE INCOGNITA. R. C. Ruffy, N. T. Powell, and G. V. Gooding, Jr., Dept. of Plant Pathology, N. C. State University, Raleigh 27650.

Strain M^SR of Potato Virus Y causes necrosis on Nicotiana tabacum cultivars resistant to the root-knot nematode (Meloidogyne incognita) but not on root-knot susceptible cultivars. Effects of soil and aerial temperature on reactions to root-knot and PVY strain M^SR were studied since root-knot resistance becomes ineffective at high temperatures. At 28C soil temperature, NC95 (root-knot resistant) plants inoculated with PVY and root-knot nematodes developed severe necrosis in response to the virus and no galls were detected. At 32C, viral necrosis was mild and 10% of the root system showed galling. No virus necrosis occurred at 35C and galls were formed on 15% of the root system. Results were similar in aerial temperature experiments. The same temperatures which break root-knot resistance also inhibit the necrotic reaction to M^SR strain of PVY. Therefore, it is possible for these two reactions to be due to pleiotropic effects of a single gene.

A VIRUS OF TRIFOLIUM AMBIGUUM BIEB. Simon W. Scott and O. W. Barnett, Jr., Department of Plant Pathology and Physiology, Clemson University, Clemson, SC 29631.

An isometric virus was isolated from *T. ambiguum*; a species considered resistant to clover viruses commonly occurring in the U.S. Incorporation of this resistance into *T. repens* L. offers a solution to the virus problems encountered with the growth of white clover, but susceptibility of *T. ambiguum* to this new virus may limit the usefulness of this source of resistance. Virus particles are 25 nm in diameter and sediment as three bands in rate-zonal centrifugation in 10-40% sucrose gradients. The physical properties of the virus are: longevity in vitro 2-5 days, thermal inactivation point 50-60° C and dilution end point 10⁻²-10⁻³. The virus has a host range similar in many respects to that of broad bean wilt virus (BBWV) but does not appear to be related serologically to any of the BBWV strains. In the latter stages of purification, the virus tends to aggregate irreversibly.

ALTERATION IN CYTOKININ LEVELS IN SOUTHERN PINES INOCULATED WITH THE FUSIFORM RUST FUNGUS. Dallas Seifers and V. D. Ammon, Department of Plant Pathology and Weed Science, Mississippi State University, Mississippi State, MS 39762.

Pine tissue susceptible, tolerant, and resistant to fusiform rust was sampled to determine changes in cytokinin levels following infection. Cytokinin-like activity (CLA) in tissue extracts from 3-mo-old healthy and inoculated pine trees was negligible. At 6-mo, CLA had increased in extracts from both healthy and inoculated trees and, with the exception of resistant shortleaf pine, CLA was higher in tissue extracts from healthy than from inoculated pine seedlings. Qualitative differences were observed among the three groups and between uninoculated and inoculated trees.

SURVIVAL OF *PHYTOPHTHORA CINNAMOMI* IN SOIL COLUMNS EXPOSED TO SIMULATED ACID RAIN. S. R. Shafer, R. I. Bruck and A. S. Heagle, Dept. Plant Pathology, N.C. State Univ., Raleigh 27650.

Polyvinyl chloride tubes (5.6 cm diam) supported in Büchner funnels were filled to depths of 1, 2, 4, or 8 cm with soil naturally infested with *Phytophthora cinnamomi* (Pc). Three soil columns of each depth were exposed on 5 consecutive days to simulated rainfall (\bar{X} =2.3 cm per exposure, 2 hr 17 min average exposure duration) adjusted to pH 5.6, 4.0, 3.2, or 2.4. Effluent pH from each column was measured after each exposure. In soil cores exposed to pH 3.2 and 2.4 "rains," effluent pH measurements at the end of the fifth exposure and Pc populations (average ppg for whole columns) varied directly with soil depth (all $P < 0.05$). Soil depth had no significant effect on either effluent pH or Pc populations of columns exposed to 4.0 and 5.6 treatments. Results indicate that this soil buffers rainfall acidity within the top 4 cm and that Pc populations in this layer are decreased by rain of pH < 4.0.

EFFECTS OF PLANT STRESS ON INCIDENCE OF SOUTHERN STEM ROT OF PEANUT. B. B. Shew and M. K. Beute. Department of Plant Pathology, North Carolina State University, Raleigh 27650.

The effects of moisture level, foliar mite and insect infestation, and leafspots on incidence of Southern stem rot of peanut were examined in field microplots (1 m-diam) during summer 1980 and 1981. Peanut plants cv. Florigiant were grown with adequate moisture (moist), or rainfall and irrigation were withheld (dry). Plots were not sprayed, or sprayed with an acaricide [dicofol(1980) or propargite(1981)], insecticide (carbaryl), or fungicide(chlorothalonil). Treatments were applied in all combinations at low (10 sclerotia of *Sclerotium rolfsii*/plot) and high (100 sclerotia) inoculum levels. In both years, disease incidence was lowest in dry+low inoculum plots, highest in moist+high inoculum plots, and intermediate in dry+high inoculum and moist+low inoculum plots. Within the moist+high inoculum plots, treatments with dicofol(1980) and chlorothalonil(1981) increased disease ($P=0.01$). Highest disease incidence in both years occurred with treatments promoting development or maintenance of foliar canopy.

A Comparison of Three Sampling Techniques for Determining the Incidence of *Cercospora* and *Cercosporidium* Leafspots in Peanuts. F. M. Shokes, R. K. Sprenkel, and J. E. Arnold. Univ. of Florida, Agric. Res. and Educ. Ctr., Quincy, FL 32351.

A survey of 12 North Florida peanut fields was made from August 19-21, 1981, using three sampling methods to assess leafspots caused by *Cercospora arachidicola* Hori (CA) and *Cercosporidium personatum* (Berk. & Curt.) Deighton (CP). In method 1 (extension scouting method) one leaf was randomly taken at mid-

canopy level from each of 50 sites within the field. Method 2 consisted of 5 leaves from mid-canopy at each of 40 sites along the four arms of an 8.5 ha W-shaped pattern. In method three 5 leaves from the top-third of the canopy were taken from the same sites as method two. A comparison of the scouting method (Method 1) to method 2 gave a high linear correlation coefficient for total lesions/leaflet of CA and CP ($r^2=0.98$) and for lesions/leaflet of CP alone ($r^2=0.97$). Method three detected fewer lesions/leaflet than the other methods and had a high r^2 only for lesions/leaflet of CA ($r^2=0.96$). Of the 48,417 leafspots counted 13.9% were CA and 86.1% were CP.

LEAF SPOT DISEASE OF CALATHEA AND MARANTA SPECIES INCITED BY *DRECHSLERA SETARIAE*. G. W. Simone, Plant Pathology Department, University of Florida, Gainesville, Florida 32611.

Samples of *Calathea roseo-picta* and *Maranta leuconeura* var. *Kerchoveana* were received at the Florida Plant Disease Clinic with unusual foliar disease symptoms. Leaf lesions on both plant species were round to slightly irregular, measuring 2-16 mm in diameter. Lesions were typically enclosed by a 1-3-mm-band of chlorosis. On *M. leuconeura* var. *Kerchoveana* lesions were narrowly zonate, golden tan with a white center. Lesions on *C. roseo-picta* were dark brown and typically lacked the zonation and white center. Isolations from diseased tissue resulted in the consistent recovery of *Drechslera setariae*. Isolates of *D. setariae* were grown on acidified potato-dextrose agar (pH = 4.5). Conidial suspensions of 6×10^3 spores/ml were used to inoculate plants of both species in the greenhouse. Typical leaf symptoms were apparent five days after inoculation. Isolates from *Maranta* and *Calathea* were pathogenic on both hosts. The causal fungus was readily reisolated from inoculated plants with symptoms.

TRANSLOCATION OF LABELED PHOTOSYNTHATE IN GRASSES INFECTED WITH *MYRIOGENOSPORA ATRAMENTOSA*. K.T. Smith, C.W. Bacon, and E.S. Luttrell. Dept. of Plant Pathology, University of Georgia, Athens, GA 30602.

The growth of *Myriogenospora atramentosa* is entirely superficial and on the expanded leaves is restricted to isolated stromata near the tips of the leaves. Stromatal bridges may be formed as successive opposing leaves are bound together at the tips of their adaxial surfaces by the fusion of stromata. The superficial nature of these stromatal bridges enables the dissection and fractionation of host and pathogen tissue. Supplying ¹⁴C₂ to illuminated infected bahiagrass plants demonstrated that labeled photosynthate was translocated into the stromata. Chromatographic identification of soluble labeled carbohydrate in both leaves and stromata was undertaken to determine the nutritional relationship of host and fungus.

MYCELIAL INTERACTION BETWEEN ISOLATES OF *MONILINIA FRUCTICOLA*. R. M. Sonoda, University of Florida, Agricultural Research Center, Fort Pierce, FL 33454 and J. M. Ogawa, Department of Plant Pathology, University of California, Davis, CA 95616.

Sixty seven monoascosporic isolates of *Monilinia fructicola* from seven ascocarps were plated 2.5 cm apart on oatmeal agar in all combinations. Light to dark, single or double, lines of interaction formed between mycelia of some isolates. The 67 isolates could be separated into 14 groups of non-interacting isolates. Each ascocarp contained members of two to seven groups. Different ascocarps contained members of the same group. The occurrence of mycelial interactions provide an additional marker for epidemiological studies of *M. fructicola*, the causal agent of brown rot of stone fruits.

CROP ROTATION AND YIELD LOSS IN CORN IN SOIL INFESTED WITH *RHIZOCTONIA SOLANI* AG-2 AND AG-4. Donald R. Sumner and D. K. Bell, Coastal Plain Station, Tifton, Georgia 31793.

Soil in 0.7 m² field microplots of Tifton loamy sand was fumigated with DD-MENCs in Feb. 1980 and separately infested with *Rhizoctonia solani* AG-2, AG-4, *Rhizoctonia*-like fungi (binucleate) (RBN), or noninfested. Corn or peanut, or double crops of cucumber-southern pea or turnip-soybean were planted in 1980. After harvest the soil was notill fallowed until the spring of 1981, and corn planted following the legumes. Populations of *R. solani* AG-2, AG-4 and RBN in soil following legumes averaged 5, 78, and 24 propagules/100g, respectively, in Feb. 1981. Only

R. solani AG-2 caused brace, crown, and lateral root diseases in corn. Treatments did not influence growth and yield of corn in 1980, but in 1981 root growth and height were less and yields were reduced 36% in soil infested with AG-2 compared with non-infested soil (9.0 vs 5.8 MT/ha). Corn grown in soil infested with AG-4 or RBN was not different from the control. None of the cropping systems studies influenced populations of AG-2 or growth and yield of corn.

EFFECT OF TEMPERATURE ON SPORE GERMINATION OF LEPTOSPHAERULINA BRIOSIANA. Wayne Thal and C. Lee Campbell, Department of Plant Pathology, N. C. State University, Raleigh 27650.

Determining temperature response of spore germination is an initial step in modeling the Leptosphaerulina briosiana-alfalfa system. Three pathogenic single-spore isolates were used to initiate colonies for spore production by blending a colony in 50 ml sterile distilled water and placing droplets on V8 juice agar medium. Cultures were grown under fluorescent light (12 hr light/dark) at room temperature. After 6-7 days, 6 cm cellophane squares were placed in lids for a 4 hr spore collection period. Cellophane squares (with spores) were put on temperature adjusted water agar, incubated at 8-36C for 0.5, 1.5, 3.0, 3.5, 6.0, and 30.0 hr, stained with safranin (0.1% in 95% EtOH) and refrigerated. Percent germinated spores for 250 spores per treatment was determined. Optimum germination occurred between 22 and 25C for all isolates at each time. After 30 hrs, germination was at or near 100% between 16-30C but was significantly less at 8 and 36 C.

THE POTENTIAL FOR CONTROLLING DOWNY MILDEW OF CANTALOUPE USING PLANT INTRODUCTION SOURCES OF RESISTANCE. Claude E. Thomas, USDA, ARS, SR, OTA, P. O. Box 267, Weslaco, Texas 78596.

Twenty-one Cucumis melo plant introductions (PI's) and 14 cantaloupe varieties were evaluated in replicated field plots for resistance to Pseudoperonospora cubensis in south Texas in 1978. Disease severity was monitored as percent leaf loss. Final percent leaf loss among PI's ranged from 13 to 97% and among varieties from 29 to 98%. The calculated percentage of disease control (PDC) indicated that the levels of resistance in 12 PI's were significantly higher than in the most susceptible variety. The most resistant PI, 180283, had a calculated PDC of 87% compared to the most susceptible variety, 'Perlita', and 55% compared to the most resistant variety, 'Smith's Perfect'. The comparative PDC between PI 124111 and its inbred derivative was 85%. This study indicates the potential for

improving the levels of resistance in the tested PI's and, thus, the level of downy mildew control in cantaloupe varieties that are developed utilizing these sources of resistance.

EFFECTS OF FUNGICIDES AND HARVEST TIMES ON SOYBEAN SEED QUALITY. J. T. Turner, Jr., Dept. of Plant Pathology, Univ. of Georgia, Georgia Experiment Station, Experiment, GA 30212.

Soybeans from seed lots with low germination test results (50-80%) were collected and cultured. The most frequently isolated fungi were Phomopsis spp., which were found in nearly 50% of the seeds of some lots. Other genera commonly found were Alternaria, Fusarium, Cercospora, Aspergillus, Penicillium, and Colletotrichum. A seed treatment mixture of thiram and captan increased germination by an average of 18% in a laboratory test, but increased field emergence by an average of only 6%. Foliar fungicides delayed invasion of pods by certain fungi, but at maturity the fungal populations were similar to those of controls. In all treatments and controls, seeds harvested from subplots at maturity had high germination rates. When harvest was delayed 2 and 4 weeks, germination rates were lower. Among the fungi isolated from the seeds, Phomopsis spp. showed a corresponding increase over time. Harvesting promptly at maturity was essential to high quality seed regardless of fungicide use.

DNA ISOLATED FROM A MYCOVIRUS OF THE AQUATIC FUNGUS, RHIZIDIOMYCES APOPHYSATUS ZOPF. V. H. Wojcik and C. W. Kuhn, Dept. of Plant Pathology, University of Georgia, Athens, GA 30602.

A pathogenic icosahedral mycovirus (60 nm) has been found in eight isolates of Rhizidiomyces. The virus infection reduced the mycoparasitic activity of the fungus on oogonia of plant pathogens. Virions concentrated by Amicon pressure filtration and purified by sucrose density gradient centrifugation had the same size and shape as those observed in infected whole fungal cells. The nucleic acid was extracted by pronase-hot phenol-SDS procedures. Diphenylamine and DAPI tests were positive for DNA. The perchloric acid hydrolysate contained thymine but not uracil. Nucleic acid properties such as DAPI fluorescence and agarose gel electrophoretic bands were lost after treatment with DNase I. The viral nucleic acid had an average melting point of 85.5 C indicating a G+C ratio of 41.8%. The A₂₆₀/A₂₈₀ ratio for whole particles suggests a nucleic acid content of @ 10% and an extinction coefficient of @ 3.5. We conclude that the mycovirus contains dsDNA. No previous report of DNA isolated from a mycovirus was found.