ABSTRACTS OF PAPERS

Presented at Meetings of the American Phytopathological Society
SOUTHERN DIVISION

Annual Meeting
February 3-6, 1985

ABSTRACTS

NITIULIUS AS POSSIBLE VECTORS OF CERATOCYSTIS FAGACEARUM IN TEXAS. D. N. Appel, K. Andersen, C. F. Duns, Department of Plant Pathology and Microbiology, Texas A&M University, College Station, TX 77843, and F. Lewis, USDA Forest Service, Hardwood Insect and Disease Research Laboratory, Stoneville, MS 38870.

Free-flying sap beetles (Coleoptera: Nitidulidae) were collected at three oak wilt centers in central Texas. The centers were located at Burnett, Austin, and Kerrville, TX. Beetles were trapped on a weekly basis from March (Burnett) to April (Austin and Kerrville) and extending through September, 1984. They were then assayed for contamination with Ceratocystis fagacearum. Population peaks of nitidulids at Burnett, TX, were observed from mid-March to early May. Nitidulids then expressed at lower levels through the summer months. Similar trends were found at the other two sites. Fungal mats, the only known inoculum source, reached maximum development at Burnett on diseased Spanish oaks in March. Of 853 beetles assayed, 17 were contaminated with C. fagacearum.

TEXAS GULF COAST RICE SHEATH BLIGHT SURVEY. S. B. Belmar, R. K. Jones, and J. F. Stewart, Texas A&M Univ., Department of Plant Pathology and Microbiology, College Station, TX 77843.

Rice sheath blight, caused by Rhizoctonia solani (Ag-J), is an important disease in Texas. A survey of Texas rice fields was completed in 1984. Sclerotia samples were collected from 600-m plots in 1983. Sclerotia were collected from plots in 1984. Recovery of sclerotia from artificially infested leaves was greater than 90%. The highest mean population for any field was 11.8. Recovery of sclerota from artificially infested leaves was greater than 90%. The highest mean population for any field was 11.8. Recovery of sclerota from artificially infested leaves was greater than 90%. The highest mean population for any field was 11.8. Recovery of sclerota from artificially infested leaves was greater than 90%. The highest mean population for any field was 11.8. Recovery of sclerota from artificially infested leaves was greater than 90%. The highest mean population for any field was 11.8. Recovery of sclerota from artificially infested leaves was greater than 90%. The highest mean population for any field was 11.8. Recovery of sclerota from artificially infested leaves was greater than 90%. The highest mean population for any field was 11.8. Recovery of sclerota from artificially infested leaves was greater than 90%. The highest mean population for any field was 11.8. Recovery of sclerota from artificially infested leaves was greater than 90%. The highest mean population for any field was 11.8. Recovery of sclerota from artificially infested leaves was greater than 90%. The highest mean population for any field was 11.8. Recovery of sclerota from artificially infested leaves was greater than 90%. The highest mean population for any field was 11.8. Recovery of sclerota from artificially infested leaves was greater than 90%. The highest mean population for any field was 11.8. Recovery of sclerota from artificially infested leaves was greater than 90%. The highest mean population for any field was 11.8. Recovery of sclerota from artificially infesti\n
PEPPER VIRUSES IN NORTHEAST GEORGIA. G. P. Bemis, C. W. Kuhn, J. W. Demski, and J. B. Dobson, Dept. of Plant Pathology, Univ. of Georgia, Athens 30602 and Georgia Mountain Station, Blairsville, GA 30512.

Virus diseases are a major constraint to pepper production in northeast Georgia. Disease incidence was near 100% in both 1983 and 1984. Virus identification was determined by collecting leaf samples from nine fields and conducting serological (enzyme-linked immunosorbent assays and immunodiffusion) and infectivity tests. Tobacco mosaic virus (TMV) was the predominant virus in each field (over 95% of the plants). Cucumber mosaic virus was detected in eight fields, three of which had 20-50% infection. Potato virus Y occurred in 8 of 914 samples. All samples were negative for pepper mottle, tobacco mosaic, and tomato mosaic viruses. TMV was isolated from perennial Solanum and Physalis species near pepper fields which may be a primary source of inoculum. Field resistance to TMV was found in a few pepper lines. Neither oil spray nor fertilization strategies altered disease incidence or severity.


In 1983, 49 cultivars were evaluated at Baton Rouge, Louisiana for resistance to stem canker. Ratings were 0 to 9 with 0 indicating no symptoms and 9 indicating all plants in a plot were dead. In 1984, 69 cultivars were rated at Baton Rouge and Crowley, Louisiana using the same scale as 1983. Cultivars were evaluated in five maturity groups: V, VI, VII and VIII. Cultivars were rated as most resistant for both years were Yield II, Kees, Ticks, E, 177, 173, 174, and 175 (in maturity groups V, VI, VII and VIII, respectively). Those rated most susceptible were Yield II, Kees, Ticks, E, 177, 173, 174, and 175 (in maturity groups V, VI, VII and VIII). High stem canker ratings were usually correlated with low yields.

VIRUS-LIGHT INTERACTIONS IN COPPER CHLOROTIC MOTTLE VIRUS INFECTED SOYBEAN LINES. M. Bilaiosorada, and C. W. Kuhn, Dept. of Plant Pathology, Univ. of Georgia, Athens, GA 30602.

Virus-host interactions in soybeans infected with copper chlorotic mottle virus were classified into six categories based on virus accumulation and symptomatology. Lines which react with local chlorosis and systemic mosaic were defined into three categories: susceptible, moderately resistant, and resistant. They differed in levels of virus accumulation in inoculated and un inoculated leaves, symptom severity, and length of symptom incubation period. Lines which reacted with local necrotic lesions were defined into two resistant categories, based on the lesion size: moreover, small quantities of virus were detected in un inoculated symptomless leaves. The sixth category was comprised of lines which reacted locally with both chlorosis and necrosis. Symptoms on un inoculated leaves of lines in this category were variable, ranging from mild to severe mosaic and with local necrosis and were not related to virus accumulation.

TRANSMISSION, DETECTION, AND OCCURRENCE OF TOBACCO RINGSPOOT VIRUS IN JAPANESE HOLLY. J. H. Blake and J. M. McGurk, Dept. of Plant Pathology, Univ. of Arkansas, Fayetteville, 72701.

Transmission of tobacco ringspot virus (TRSV) to Ilex crenata 'Compacta' and I. crenata 'Convexa' by Xiphinema americanum and mechanical inoculations was attempted. Some control plants of 'Convexa' were infected, but 'Compacta' controls remained uninfected. Both mechanical and mechanical transmission of TRSV to 'Compacta' occurred. Detection of infected plants by ELISA and mechanical inoculation bioassay were compared. Chi-square tests indicated a higher percentage of detection of TRSV-infected Japanese holly plants by ELISA than by bioassay. Symptoms attributable to TRSV were not observed in infected plants in this greenhouse study. In a survey of landscape plants, 7 of 8 sites contained TRSV-infected Japanese holly plants as determined by ELISA. Some infected plants were unthrift, but it is unknown if the virus was involved. Viruliferous X. americanum were recovered from 3 of 8 landscape locations. TRSV was detected in Japanese holly plants from 5 of 10 garden centers surveyed.

GRENHOUSE INFECTION OF XANTHIIUM STRIATUM AND HELIANTHUS ANNUS WITH Puccinia camalilula, A POTENTIAL BIOCONTROL FOR YELLOW NUTSEED. H. B. Callaway, S. C. Phatak, Department of Horticulture, and H. B. Wells, USDA, ARS, University of Georgia Coastal Plain Experiment Station, Tifton, GA 31793.

Puccinia camalilula has shown promise as a biological control

* = Presentation of Soybean Stem Canker Symposium
* = Student Paper Competition

496 PHYTOPATHOLOGY
of yellow nutsedge. Xanthium spp. and Helianthus annuus have been reported as alternate hosts for F. bulbosum, but a persistent search in recent years failed to indicate occurrence of the disease on these genera in the Tifton area. Therefore, to determine if local ecotypes or varieties of these plants were susceptible, X. strumarium and H. annuus were grown and inoculated with P. bulbosum var. virginiensis obtained from two collections of N. helianthi ssp. lanceolata from Fayetteville, AR. T. tenuis from one local source and from Arkansas resulted in infection and development of both pythium and Fusarium. X. bulbosum and H. annuus were inoculated with S. helianthi var. ssp. lanceolata from three local collections and one collection from Fayetteville, AR. T. tenuis from one local source and from Arkansas resulted in infection and development of both pythium and Fusarium. X. strumarium and H. annuus were grown. This demonstrates that factors other than lack of susceptibility are responsible for the absence of the disease occurring on the alternate host at Tifton, GA.

**DEPARTMENT OF PLASTIC CYTOLYSIS IN SIMULATED ACID RAIN SOLUTIONS.**

Acidity level in ambient rainfall may influence specific components of disease development. During spore germination, factors pathways may be exposed directly to acidic, ambient rain. To elucidate possible effects of acid rain on spore germination, cultured spores of L. bracinsiana (L), and sporangia of P. infestans (Pi) were placed in simulated acid rain solutions at pH 2.8, 3.0, 3.2, 3.4, 4.2, and 5.6. Percent germination and number of germ tubes/spore decreased significantly with increasing acidity for all isolates of Lb after incubation at 20 C for 4 hr. Direct and indirect germination for two isolates of Pi decreased with increasing acidity after 24 hr incubation at 28 or 30 C, respectively. The relationships between model acid rain and spore germination for Lb and Pi and solution pH exhibited quadratic responses.


Avirulent, Rhizoctonia-like bisnucleated fungi (BN) were grown on sterilized oat kernels for 10 da and mixed with soil at the rate of 3 g of kernels per kg of steamed soil. This mixture was placed in flats (35 x 25 x 7 cm) and seeded with dry beans (cv. Topcrop) spaced 2.5 cm apart. oat kernels (7.3 g) of a virulent isolate of Rhizoctonia solani (RS) was placed in a 2 cm-wide hole made in the soil in the middle of each flat. After 2 wk, two of the BN isolates gave 31 and 63% control of root rot (RS-inoculated control showed 77% disease). The two BN isolates were later incorporated in the furrow (45 g inoculated oat kernels/m of row) with bean seed planted in a RS-naturally infected field. Twenty-five and 52% of the bean plants were significantly protected from root rot (untreated control showed 81% disease).

**PURIFICATION AND PARTIAL CHARACTERIZATION OF NUCLEAR INCLUSIONS INDUCED BY A PEA MOSAIC ISOLATE OF BEAN YELLOW MOSAIC VIRUS.**

Nuclear inclusions induced by a pea mosaic isolate (PV-2) of bean yellow mosaic virus (Schroeder and Provvidenti. 1966. Plant Dis. Respr. 50:387-390) were purified from infected pea tissue. The inclusions were isolated and purified from the nuclei revealed and further purified by sodium dodecyl sulfate (SDS) polyacrylamide gel electrophoresis. The inclusion contains equimolar amounts of protein subunits with molecular weights of 49k and 94k, respectively. In addition, minor 98k protein was consistently associated with the inclusion. Nuclear inclusions isolated from 50k and 94k protein subunits were produced. The results of reciprocal SDS-Immunodiffusion tests showed that both protein subunits are unique to each other and are also from cytoplasmic cylindrical inclusion and capsid proteins induced by PV-2. Immunofluorescence tests showed that antisera to 49k and 94k proteins both reacted with PV-2 induced nuclear inclusions in vitro.

**EFFECTS OF PLANT GROWTH REGULATORS ON PYRIVINKLE INFLICTED WITH ASTER YELLOW MOSAICA-LIKE ORGANISM.**
C. J. Chang and R. C. Donaldson. Department of Plant Pathology, University of Georgia, Georgia Station, Experiment, GA 30212.

Pyrivinkle plants infected with the aster yellow mosamplaca-like organism (AYMLO) were obtained by graft transmission. After transmission, plants were kept two weeks in a cool room and sprayed with gibberellic acid (GA), indole-3-acetic acid (1A1), or kinetin at 200, 300, and 1000 ppm, respectively, on a weekly or biweekly basis for 6 to 8 weeks. Internodes were randomly selected from the middle of the three growth regulators on the plants. Internodes were elongated two to four times their original length with GA, whereas kinetin and 1A1 showed slight or no effect. AYMLO-infected plants sprayed with kinetin retained their seed production capability. None of the other symptoms of AYMLO infection, e.g. phylloidy and yellowing was affected by the growth regulators. It is evident that only GA but kinetin also influences symptom development by MLO infection.

**NAVING GLORES AS PERENNIAL RESERVORIES OF SWEET POTATO FERNIORY.**

Six morning glory species were monitored each month from 1981-1983 to determine the growth habit and incidence of sweet potato feathery mottle virus (SPFMV) infection. Ipomoea tricolor (L.) was regrown perennially, Ipomoea purpurea (L.) Wolfskehl, and Ipomoea hederacea (L.) H. Christ, were annual. Ipomoea sylvestris (L.) H. Christ, was also annual, and Perennial growth of IT and appearance of seedlings of IT; IH, and IV were first observed each year before sweet potato seed emergence. SPFMV was first observed in perennial IT in 1981, and IT 1-2 wk following resumption of growth, whereas in IT, IH, and IV seedlings, symptoms were first observed 6-8 wk later. The presence of PMV was confirmed by sero logical specific electron microscopy. Since IT in Louisiana is abundant, widely distributed, grown throughout the sweet potato growing season, and a perennial host of PMV, it may be a potentially important source of inoculum for infection of sweet potato by PMV.

**DIFFERENTIAL SUSCEPTIBILITY OF FIELD GROWN ROSES TO BLOSSOM BLIGHT CAUSED BY ALTERNARIA ALTERNATA.**
P. F. Colbaugh, P. L. Phelps and C. N. Taplin, Texas Agricultural Experiment Station, Texas A&M Univ. Research & Extension Center, Dallas, TX 75252.

Blossom blighting caused by Alternaria alternata is common on field-grown roses during the summer months in Texas. Laboratory observations of blighted rose blossoms indicated numerous fungal conidial infections were required for flower blighting activity. Symptoms of flower blighting are most common following periods of rain; however, some rose varieties are damaged severely by periodic high humidity. Field observations were made during June through August 1981 and 1983 to assess susceptibility of popular varieties of hybrid tea, floribunda and grandiflora roses to Alternaria blossom blight. Of 133 varieties observed in the field, only two were considered susceptible, while 22 showed only trace levels or no disease symptoms. Flower color was correlated with varietal resistance to blossom blighting activity. Rose varieties with yellow and red flower colors were more resistant to the disease than others observed.

**SCLEROTIUM ROLFSSII, A PROBLEM WITH APPLE NURSERY STOCK IN OKLAHOMA.**
Kennum E. Consay and Stephen T. Tomassing. Dept. of Plant Pathology, Oklahoma State University, Stillwater, OK 74078.

Southern blight of apple stock, caused by Sclerotium rolfsii, has been a problem in nurseries near Tahlequah, OK since 1973. The disease affects apple trees up to 3 yr of age. Although no fungicide was labeled for use on apple graft wood at the time of this study, use of imazalil (Systane 50, 8.5 kg a.i./ha) was reported to control petalochlorotobenzene (PCB) at planting (Terrarco 10 G, 8.5 kg a.i./ha). During 1981 one nursery lost 10% of grafted apple stock planted in one 1.2 ha field at planting. The nursery was estimated at 10,000 trees. In 1982 there was a 50% loss of Floribunda flowering crabapple (on common apple rootstock) planted in the same field and a 5-10% loss of Jonathan apple in adjoining fields. Total loss at the nursery was 21,000 grafted seedlings. An artificially-infested field plot was established at Stillwater, OK. to evaluate chemical and biological controls. Over a 2-year period, Trichoderma harzianum was as, or more effective than PCB applied either at planting or at midseason.

**ANTAGONISTIC EFFECTS OF TRICHODERMA HARZIANUM ON MACROPHOMA PHASEOLINA.**
P. J. Shinn, W. C. S. Gifford, Y. L. B. Riley, and Eume E. Eyo. Box 1525, South Carolina State College, Orangeburg, South Carolina 29117

Charcoal rot of soybeans (Glycine max), caused by Macrophoma phaseolina, reduces yield of infected plants. We evaluated the mycoparasitic properties of Trichoderma harzianum on M. phaseolina by growing T. harzianum on a wheat-bran medium (200 g bran, 200 g wheat, 200 g water, 5 g conidia/g) and M. phaseolina in an aqueous suspension (650,000 sclerotia/ml) to seed of Coker 237 soybean at planting. The seed were either treated with Captan {cis-[(trichloromethyl)-thio]atricyclic]carboxylic acid (Captan) at 36,000 ppm and were not treated. Addition of the antagonist in combination with the pathogen suppressed the pathogen more in plants grown from treated than from untreated seeds. Plants grown from M. phaseolina-inoculated seed that were treated with fumigicides or left untreated were shorter than plants from seed receiving both fungi or T. harzianum alone. Plants from seeds receiving M. phaseolina alone or T. harzianum alone had lower dry wt. than controls regardless of fumicide treatment.
A COMPARISON OF INCUBATION METHODS FOR EVALUATING STRAWBERRY PLANTS FOR RESISTANCE TO PHYTOTRICHIA FRAGARIE. S. W. George and R. D. Milholland, Department of Plant Pathology, North Carolina State University, Raleigh 27695-7616.

Roots of the susceptible cv. Tennessee Beauty were inoculated with Races A-2 and A-6 of P. fragariae by Immersion in a 1% solution of the茵suspension. Mycelium was planted in growth chambers and by spraying the roots with a suspension of 3 motile and 4 nonmotile zoospores (3x10^6 spores/ml). After incubation in the light at 14 C for 2 wk, five root segments (15 mm long) were removed from each plant and examined for zoospores. The average number of zoospores produced per root segment for treatments 1-4 were 0.3, 48, 1.4 and 34, respectively. Zoospores were produced in 80% of the root segments inoculated with nonmotile zoospores but in only 64% of those inoculated with the mycelial slurry. It was concluded that spraying strawberry roots with a suspension of nonmotile zoospores is an effective method for inoculating with P. fragariae. This technique also makes it possible to more precisely quantify levels of inoculum.

EFFECT OF INTERMITTENT WET PERIODS, EXTENDED WET PERIODS, AND DELAYED WET PERIODS ON INFECTION OF PECAN BY CLADOSPORIUM CARYGENUM. T. A. Guttway, USDA/ARS, Southeastern Fruit and Tree Nut Research Laboratory, P. O. Box 87, Byron, GA 31008.

The effect of intermittent wet periods (IWP), extended wet periods (EWP), and delayed wet periods (DWP) on infection of seedling pecan foliage by Cladosporium caryigenum was studied under controlled environmental conditions in growth chambers. Initial leaf wetness periods (ILWP) of 2 hr followed by a 12-hr dry period tended to decrease infection whereas ILWP's of 0 or more did not decrease infection when compared with a 48-hr ILWP. Plants inoculated with C. caryigenum followed by a 12-hr dry period. Spore survival and viability decreased only slightly over a 14-day period as determined by incidence of infection corresponding to DWP's from 2 to 335 hr. EWP's of 0 to 240 hr demonstrated a gradual increase in incidence of infection.


Thrips-borne tomato spotted wilt virus (TSWV) is a serious problem of solanaceous crops in Louisiana. Aluminum-painted plastic film mulches and black plastic film mulch were compared with no mulch for their effect on TSWV infection in repelling thrips and reducing TSWV-infection in tomato and bell peppers. Thrips were trapped on yellow sticky boards placed 12" above the row surfaces. The seasonal average number of thrips trapped per day in tomato and pepper fields in Pointe Coupee parish was reduced 66% by aluminum mulch and 14% by black mulch when compared with non-mulched plots. At the end of the season, there were 82 fewer TSWV-infected plants on aluminum mulch than none mulched and 15 fewer on black mulch than none mulched. These results show that both black and aluminum-surfaced film mulches can effectively repel thrips and reduce the incidence of TSWV in tomato and pepper crops; the black mulch is more effective than a black-surfaced mulch.

SURVEY OF RICE DISEASES IN LOUISIANA. B. K. Groth and C. A. Bollier, Rice Research Station, P.O. Box 14299, Crowley, LA 70752-1429 and La. Ext. Service, Knapp Hall, Louisiana State University, Baton Rouge, LA 70803.

A disease survey was conducted in Louisiana rice-growing parishes in 1984. Random samples were inspected in commercial rice fields and disease severities (0-9 scale) or frequencies were recorded. The most common diseases were water molds (Pythium sp. and Alternaria sp.), sheath blight (Bremia taptopa), brown spot (E. oryzae), late blight (E. oryzae), narrow brown spot (C. oryzae), stem rot (Sclerotium oryzae), and kernel spotting (various fungi).

Water molds were very severe in the spring on water-seeded rice, appearing in 19 and 92% of the 0.09F field areas examined in the north and southern parishes, respectively. Sheath blight was the most severe disease (average 2.0) with some fields severely affected (5-6.5). Disease pressure was two to three times greater in the southwest than in the north-east rice-growing region.


Ripe rot of peppers has been observed throughout the major growing regions of Louisiana. Both falcate and cylindrical spores of Colletotrichum spp. are commonly associated with the diseased pods. The falcate spore form has been identified as C. capsici, but the identity of the cylindrical spores isolated remains in doubt and may represent more than one species. To date, only C. capsici has been isolated from seed. Pepper plantings were made consisting of (1) clean seed in a clean field, (2) infected soil in a clean field, and (3) clean seed in an infected field. C. capsici lesions developed on all plants in all treatments. The clean seed in a clean field suggested that infected seed and crop debris may serve as sources of inoculum. Plants in all plantings had pods infected with cylindrical spored forms, suggesting that sources other than pepper may serve as reservoirs for these forms.

IDENTIFICATION OF DIAPORTHE AND PHOMOPSIS ISOLATES FROM SOYBEANS. R. V. Thomas and M. A. James, Center for Plant Pathology, Georgia Experiment Station, Experiment, GA 30292.

Diaporthe and Phomopsis isolates from soybean can be placed into four recognizable groups based on symptomatology and cultural characteristics. Two groups, D. phaseolorum var. sojae (Lehm) Wollm. and P. sp. sensu Knez et al. are involved in the pathogenesis of the disease. The other two groups, D. phaseolorum var. castelli or Thow & Conn, and an unidentified Diaporthe sp., both cause diseases which have been called "stem canker." Observations of symptoms on field-grown plants indicate that lesions on southern cultivars are larger and more unilaterial than has been observed for the disease on northern cultures. These observations correlate with differences in cultural characteristics, such as growth rate and colony color, that are characteristic of the two groups. It is suggested that the disease in the South be referred to as "Southern Stem Canker" and isolates of the pathogen as "southern isolates of Diaporthe phaseolorum causing stem canker."


A virus-like mosaic was observed on centipedegrass (Tenuuros orbiculata) and the weed grass crowfootgrass (Narcissus flexuosa). The symptoms on both centipedegrass and crownfootgrass were caused by a similar type of mosaic of the leaves. Centipedegrass with mosaic symptoms was widely distributed throughout the affected lawn. This disease was found during a routine survey for St. Augustine decline disease. This disease was characterized by plants with agar diffusion serology indicated that both centipedegrass and crownfootgrass were infected with a Panicum mosaic/ St. Augustine decline group virus.

WATER STRESS IN GRAPEVINES WITH PIERCE'S DISEASE. D. L. Hopkins, Agricultural Research and Education Center, IFAS, University of Florida, Leesburg, FL 32749-0388.

The visible symptoms of Pierce's disease (PD) suggest a dysfunction of the water conducting system; therefore, water relations in grapevine with PD was investigated. Leaf water potential was correlated with leaf marginal necrosis (MN) symptoms in both Carignane bunch grape and Carlos muscadine grape. For example, the average water potential of leaves from healthy Carignane was -3.6 bars and that of leaves with MN was -19.2 bars. In Carignane a strong influence of cool planting leaves first and developed in an acropetal direction. The leaves immediately adjacent to leaves with MN had xylem water potentials that were nearly as negative as those from leaves with MN symptoms. In Carlos, relief water content of leaf tissue as well as percentage of blocked xylem vessels in the petiole also was correlated with leaf MN symptoms. These studies indicate that water stress is a cause of the leaf MN symptoms of PD.

SPATIAL DYNAMICS OF PHYMATOCRIOCHROM R. ROOH TOT IN COTTON. J. J. Jarrell, C. M. Kourier, Texas A&M University, College Station, TX 77843, and J. M. Crider, Blackland Research Center, Temple, TX 76503.

Epidemics of Phymatocrichrom root rot in cotton were monitored on a commercial farm in the Blacklands area of central Texas during the summer of 1984. All plants in a plot area of 32 rows spaced 10.9 ft apart were destructively sampled for incidence of root rot at 7-day intervals from 12 June to 17 August. The number and length of runs (sequence of diseased plants), and the number of plants/run were recorded. In late June there were 1 run with 176 runs with 1 plant/run and in late August the equivalent values were 767 runs and 13 plants/run; frequency distributions were highly skewed, however, with a maximum recorded value of 280 plants/run. Spatial distributions of root rot in cotton are influenced by plant-to-plant spread of the pathogen.
A BACTERIAL LEAF SPOT OF Hibiscus rosa-sinensis INITIATED BY A NEW PATHOGEN OF PSEUDOMONAS SYRINGAE. J. J. Jones, IPAS, Univ. of Fla., Gulf Coast Res. & Ed. Center, Bradenton, FL 34203, A. R. Chase, B. C. Raju, and J. W. Miller.

A leaf disease of Hibiscus rosa-sinensis was characterized by angular dark-brown to black lesions that were surrounded by chlorotic halos. A bacteria was consistently isolated. It produced a fluororescent, yellow-green pigment that is characteristic of certain pseudomonads and is negative for oxidative reduction and arginine dihydrolase. The bacteria utilized mannitol, sorbitol, erythritol, L(+)-tartrate, and sucrose but not B-saline, D(-)-tartrate, DL-lactate, or trehalose. Although the bacteria was biochemically related to P. syringae pv. lachrymans and P. syringae pv. tabaci, inoculation of the hibiscus strains onto cucumber and tobacco produced no pathogenic reaction. The hibiscus strains were virulent on M. rosa-sinensis. One P. syringae pv. lachrymans strain produced a weak reaction on H. rosa-sinensis. Based on these results, the hibiscus strains should be placed in a new pathovar of P. syringae.

OBSERVATIONS ON PATHOTYPES OF DIAPORTHE PHASEOLIUM VAR. CAULIVORA. B. L. Keeling, USDA-ARS, Stoneville, MS 38776.*

The pathogenicity of Diaporthe phaseoli var. caulivora isolates recovered from soybean plants symptomatic of stem canker disease was determined using six differentially reacting host cultivars (Kinca, Tracy-M., Arskov, Centennial, S-100, and J77-339). The pathogen exhibited a consistent and susceptible reaction of seedling plants inoculated by the toothpick technique. Differential cultivars susceptible to the pathotypes varied in pathotypes 1 (Centennial), 2 (Arskov), 3 (S-100, J77-339), 4 (all except Kinca), 5 (all except Kinca and Arskov), 6 (all except S-100), 7 (Centennial and J77-339), 8 (Centennial and S-100), 9 (S-100 and J77-339), and 10 (Arskov).


Blast (Pyricularia oryzae Cav.) development on the rice cultivars Brazos and M-201 was evaluated under water management systems simulating upland and flooded field conditions. Point sources of inoculum were introduced into each plot. Disease progress was monitored at 3-4 day intervals. Significant differences in disease development were observed between upland and flooded plots. Disease in upland plots progressed rapidly during the growing season. Disease progress was greatly retarded in flooded plots. Final disease severity in upland and flooded plots averaged 38% and 12%, respectively. When upland plots were subsequently flooded after an epidemic was initiated, disease was great of blast was increased. No increase in disease was observed in previously flooded plots that were drained. These results demonstrate that flooding is a highly effective way of controlling rice blast disease.

MORPHOLOGICAL CHARACTERISTICS OF SYNCYTIA IN DIFFERENT COMPATIBLE HOSTS INFECTED BY SOYBEAN CYST ENDOPHYTAE. Y. K. Kim, K. S. Kim, and R. D. Riggs. Dept. of Plant Pathology, Univ. of Arkansas, Fayetteville, AR 72701.

Symycina induced in different compatible hosts (cleome, Kohe lespedeza, and Lee soybean), infected by Heteroderas glycines (Race 3) were examined to compare their morphological characteristics. The synycina formed in cleome were confined to the inside of the stoma, which was occupied by lespedeza tissue. In soybean, however, the synycina were formed in both the stoma and cortex. The major characteristics of synycina, such as the cell wall perforations and hypertrophy of synycina components, were the same in the different hosts. However, cell wall ingrowths, another characteristic feature of synycina, were more prominent in soybean than in lespedeza and were not observed in cleome. Synycina component cells of cleome and lespedeza were degenerated whereas those of soybean showed no signs of degeneration at 20 days after inoculation.


Conidia of Cristalibera moricola were applied at the rate of 54ml to leaves of potted Splitty pecan trees. Trees were incubated in dew chambers at 21 C and 100 RH for 48 hr then transferred to greenhouse for 48 hr. Propacinole at 700 ppm benzyl or potassium propionate at 599 ml ai/l were sprayed to runoff on the leaves. Alternate leaves that were covered with plastic bags when the fungicide were applied served as controls. After four days incubation, fungus lesions ranged from 30 mm in diameter, avg. 5.7 mm. At 11 days after inoculation, no sporulation by C. moricola was evident on leaves treated with propionate; conidiation occurred on benzyl-treated leaves, but with a different morphology than that of the control. The benzyl-treated leaves that were plated onto Caspar's plus yeas extract agar did not yield cultures of C. moricola whereas typical cultures developed from benzyl-treated leaves.

EVALUATION OF COPPER FUNGICIDES USED ALONE AND IN VARIOUS SCHEDULES WITH BRAVO ON PEANUT POD YIELDS. Robert H. Littrell, F. F. Pathology, Dept., Univ. of Ga., Coastal Plain Station, Tifton, GA 31793.

Cuprohydroxide (Kocide 606, Super Coe), trispiric copper sulphate (Phelps Dodge), and copper ammonium carbonate (Ag Research) were evaluated at 2 of formulated products per ha and Bravo 500 at 2.5 1 per ha on Flounner peanut. Treatment was initiated on September 5 with Bravo fungicide and every 2 wks until two weeks of harvest. Spray regimes used were: (1) copper first spray and Bravo last 4 sprays; (2) Bravo first 4 sprays and copper last 4 sprays; (3) alternating Bravo and copper sprays throughout the season; (4) Bravo only; and (5) Bravo full season. Lowest yields were with full season use of copper fungicide (4,658 kg/ha) and highest with Bravo full season (5,937 kg/ha). Yields increased significantly when each change in schedules from (2), (1), and (3); I was better than 2 because late leaf spot developed rapidly in late season.


Dipodopsis gosyssina was recovered 1-2 cm above and 2-4 cm below the point of wound inoculation of sweet potato vines after 55 days in the greenhouse. After 40 days, the proximal ends of storage roots harvested from field plots in which the vines were artificially inoculated or the soil artificially infested. After 4 mo storage, the roots from the inoculated vines were all greater than from the control vines. From the infected soil showed more disease. Freshly-harvested roots inoculated by placing artificially infected soil on cut proximal ends developed higher disease severity after 4 mo storage than uncut roots and roots inoculated with spore suspensions, mycelial plugs, or infected sweet potato tissue on cut ends. D. gosyssina spores survived in field soil over winter and for at least 240 days. Thus, the pathogen may survive in soil and infect roots through wounds at harvest.

GROWTH OF THE TALL FESCUE ENDOPHYTE INTO SEEDLEGS AS RELATED TO TEMPERATURE AND SHEATH DIFFERENTIATION. P. C. Lyons and C. W. Bacon, Department of Plant Pathology, University of Georgia, Athens 30602 and USDA, ARS, Athens, GA 30013.

Growth of the fungal endophyte (Speluloria viridis) in tall fescue seedlings from infected need aged 6 mo and older was studied at 15, 22, and 30 C. All temperatures percent infection increased in seedling populations during a 2- to 3-wk period beginning within 2 wk of planting. Maximum infection and infection rate depended on seedlot, but within seedlots were always lower at 30 C than 15 or 22 C. The fungus did not grow into the coleoptile or leaf blade, and infection of the seedling did not occur until the sheath of the first leaf was approximated. The endophyte was infrequently observed below 0.1 mm long. Establishment of infection in seedling populations occurred with the period of early development of the first leaf sheaths. Infection decreases at 30 C were not reduced to sheath differntiation but later differentiation was similar at 22 and 30 C. Infection of subsequent leaves also coincided with sheath differentiation.

INFECTIVITY OF PHYTOPHTHORA INFESTANS IN SIMULATED ACID RAIN SOLUTIONS. S. B. Martin, Jr., C. Lee Campbell, and R. L. Pruck. Dept. of Plant Pathology, North Carolina State University, Raleigh, 27695.

Acidity of rainfall may influence the infection process which lead to the establishment of plant disease. In order to examine these potential effects, culturally produced sporangia of Phytophthora sojae infection drop (I) were suspended in simulated rain solutions at pH 3.4, 3.0, 3.6, 4.2, and 5.6. Sporangial suspensions (5 X 10^6/ml) were placed as hanging drops (25 ul) on the abaxial surfaces of leaflets of Kennebec potato plants at 21 C. Inoculated leaves were incubated for periods of 0, 4, 8, or 16 hr of ambient light (60-70% RH) and then

* = Presentation of Soybean Stem Canker Symposium

= Student Paper Competition

Vol. 75, No. 4, 1985

501
maintained at 100% RH by using humidifiers containing deionized water. In tests with 8 and 4 hr before misting, pH did not affect infection efficiency; after 8 to 16 hr, infection was not established at pH 2.4 or 3.0 and infection was reduced at higher pH values compared to pH 4.0. Infection efficiency in this system may be conditioned by acidity of rain and duration of exposure to an acidic level.

SOLARIZATION FOR THE CONTROL OF FUSARIUM WILT OF WATERMELON, R. B. Martyn and T. Hartz. Department of Plant Pathology, College Station 77843, and Texas Agricultural Extension Service, Weslaco 78596, Texas A&M University System. Microplot trials were initiated to determine the effectiveness of using solarization for the control of Fusarium wilt of watermelon (Fusarium oxysporum f. sp. niveum). A sand/cornmeal inoculum mix was incorporated into methyl bromide treated soil in 84 cm (10) concrete microplots. Infested wilted stems were covered with 1.5-m thick plastic and removed plots were either 30 or 60 days later. Temperature maxima in non-solarized plots were 59°C, 50°C, 42°C, and 37°C, at 2, 10, 20, and 30 cm, respectively. Soil samples were assayed for FON at depths of 5-10, 15-20 and 30-35 cm. Plots solarized for 30 days showed a dramatic decline of FON throughout the soil profile compared to nonsolarized plots. Further decline in FON was achieved in the top 10 cm after 60 day treatment; however, FON increased in deeper strata. Solarization was effective in delaying the onset of wilt in "Sugarbaby" watermelon as well as reducing disease incidence, although total control was not achieved.

REACTION OF NINE JERUSALEM ARTICHOKE GENOTYPES TO SELECTED PATHOGENS. S. M. McCarter and S. J. Kay. Departments of Plant Pathology & Horticulture, University of Georgia, Athens 30602. Jerusalem artichoke (Helianthus tuberosus) has received increased attention in recent years as a potential crop for fructose and fuel alcohol production. Rust (Puccinia helianthi), powdery mildew (Erysiphe aliicola), and brown spot (Sclerotinia rolfsii) have reduced tuber yields in Georgia. Nine genotypes of H. tuberosus were compared for disease susceptibility and yield in field plots near Athens, GA in 1983-84. Controls included one of its progeny had high Puccinia rust resistance. However, these selections were highly susceptible to Coeopsorium helianthi, whereas the others were not. The nine selections varied in susceptibility to powdery mildew. Cultivars with pigmented tubers were less susceptible to the tuber rot complex than those with white tubers. No differences in susceptibility to S. rolfsii were noted. These results suggest the possibility of using breeding to improve disease resistance in H. tuberosus.

INHIBITION OF SOLEROTINIA MINOR BY PENCILLIUM CITRINUM. N. A. Melouk, P. A. Chanchikia and R. E. Conway. USDA-ARS, Stillwater, OK, Dept. of Crop Science, Univ. of Zimbabwe, and Plant Pathology Dept., Okla. State Univ., Stillwater, OK 74078. Penicillium citrinum Thom was isolated from soil of Solerottinia minor collected from field soil planted to peanuts. P. citrinum inhibited the growth of S. minor grown on PDA, Czapek-Dox broth, and Czapek-Box agar (CDA). Growth of S. minor was significantly inhibited on CDA amended with 10% (v/v) filtrate from 2- to 3-wk-old cultures of P. citrinum grown on Czapek-Box broth. Inhibition of S. minor was 100% with 5% C. citrinum filtrate when autoincubated for 20 min at 121°C and 1.06 kg/cm². Dialysis and ultrafiltration of culture filtrate indicated that the molecular weight of the active component(s) is < 1000. Also, culture filtrate of P. citrinum incorporated in CDA at 10% (v/v) significantly inhibited growth of S. major and Solerotinia rolfsii. Citrinin, a biocide, was tentatively identified in the filtrate of P. citrinum as an active component against S. minor.

EFFECT OF BEETLE BIOCIDE ON TRANSMISSION OF PLANT VIRUSES USING THE GREEN WOUNDING TECHNIQUE. Judit Molin, H. A. Scott, and C. Gergich, University of Arkansas, Fayetteville, AR 72701. Repugnant from Mexican bean beetles and bean leaf beetles prevented the transmission of non-beetle-transmissible zucchini yellow mosaic (ZYM) and tobacco mosaic (TM) viruses but had little effect on beetle-transmissible cowpea severe mosaic viruses, when mixed with purified virus and inoculated to systemic tissues by the green wounding technique. Two members of the bromovirus group, both of which are transmitted only by beetles, behaved very differently: prorococcus mosaic virus was not inhibited by repugnant, whereas cowpea chlorotic mottle virus (CCMV) acted like a non-beetle-transmissible virus. Infectivity of CCMV, TMV, and TMW was regained when the viruses were re-isolated by insect-transmission methods, demonstrating that non-beetle-transmissible viruses and the inefficiently-transmitted CCMV are not inactivated by repugnant components.

EVALUATION OF ARTHROBOTrys AMEROSPORA AS A BIOCONTROL AGENT FOR HETERODERA GLYCINES ON SOYBEAN. T. L. Niblack, R. S. Russey, Department of Plant Pathology, University of Georgia, Athens, 30602. A nematode-trapping fungus, Arthrobotrys amerospora (AA), in commercial preparations of Trichoderma harzianum, was evaluated for control of Heterodera glycines (HG) on soybean ('Glyclay nc cv 'Bragg') in the field and greenhouse. In four successive greenhouse studies, soybeans were inoculated at planting with 10,000, 50,000, 100,000, and 200,000 per 1-cm disk pots) and treated with one of the AA preparations or 70% TCS at recommended rates, or were left untreated. Two field studies of the same nematode-control treatments were conducted in plots infested in soil naturally infested with H. glycines in a greenhouse. In the greenhouse, only TCS significantly reduced nematode populations compared with the untreated controls, whereas in the field, none of the treatments provided significant nematode control or a yield increase.

USE OF A LOW-COST, MULTISPECTRAL RADIOMET To ESTIMATE YIELD LOSS IN PEANUTS CAUSED BY LATE LEAF SPOT (Cercosporidium personatum). F. W. Hutter, Jr., R. R. Littrell, and V. D. Pederson, Departments of Plant Pathology, Univ. of Georgia, Athens 30602; Univ. of Georgia, Coastal Plain Station, Tifton 31932; and North Dakota State Univ., Fargo 58105. Peanut leafspot epidemics of different intensities were generated in peanut (Arachis hypogaea 'Florunner') field plots by using fungicides that differed in control efficacy and by altering Bicide schedules. Disease severity was measured 15 days after planting by visual assessment (using standard area diagrams) and by recording the quality of sunlight reflected from peanut canopies in the 350- to 800-nm wavelength range using a handheld, multi-channel radiometer. Reflectance values in the 800-nm range explained 85% of the total variation in visual disease severity and 74% of the total variation in yield compared with the visual method, which explained 65% of the total variation in yield. Yield loss estimates derived from reflectance measurements could be generated in 4 hr, whereas the visual method required a minimum of 80 hr.

ISOLATION AND CHARACTERIZATION OF ICE NUCLEATION-ACTIVE BACTERIA OCCURRING ON APPLES AND PEACH TREES IN GEORGIA. J. W. Olive and S. M. McCarter, Department of Plant Pathology, University of Georgia, Athens 30602. Buds or blossoms collected from two apple and two peach orchards in Georgia from December, 1984 through April, 1985 were assayed for ice nucleation-active (INA) bacteria. INA bacteria were present in all orchards although populations varied among orchards and sampling dates. Of the 40 INA strains selected and characterized, 88% were fluorescent, oxidase and arginine dihydrolase negative, and produced a hypersensitive reaction on tobacco, suggesting that they were pathogenic strains. Pseudomonas syringae was the predominant INA bacterium on both apple and peach, however, 34% were positive at ~5°C or higher. INA strains of Erwinia herbicola occurred infrequently and were usually INA only lower than ~5°C. All INA strains from three of the four orchards were susceptible to smoking but only 50% of the strains from an apple orchard where streptomycin had been used routinely for fire blight control were resistant.

EFFECT OF NEMATICIDES AND HERBICIDES ALONE AND IN COMBINATION ON HATCHING, PENETRATION, DEVELOPMENT, AND REPRODUCTION OF MELODIOGYNE INCONGRIB. L. A. Payan, A. W. Johnson, and R. H. Littrell, Department of Plant Pathology, University of Georgia and USDA, ARS, Coastal Plain Experiment Station, Tifton, GA 31937. The influence of phenoxypes (6 ppm), carbofuran (6 ppm), trifluralin (T, 0.5 ppm), metribuzin (M, 0.5 ppm), P-T, P-M, C-T, and C-M on hatching, penetration, development, and reproduction of Meloidogyne incognita (race 3) was studied under laboratory conditions. Larvae were exposed to fresh solutions of pesticides for 16 days and second-stage juveniles (J2) were collected every 48 hr. The J2's collected from 6-8 days were used as inoculum in a series of tests to study penetration, development, and reproduction. Results indicated that P, T, P-M injective (P=0.05) hatching, penetration, development of females, and numbers of eggs produced, but C-T and C-M were ineffective. This method can be used to study other nematicide-pesticide combinations.

SEASONAL SUSCEPTIBILITY AND INFECTION COURTS OF TEXAS LIVESTOCK ORCHARDS WITH CERATOCYSTIS Fimbriata. R. N. Peters and D. A. Appel, Department of Plant Pathology and Microbiology, Texas A&M University, College Station, TX 77863. One hundred and twenty mature, native live oaks were selected for growth.
inoculation with a Texas isolate of Ceratocystis fagacearum to study seasonal susceptibility and infection courts. These were made at four times of the year in 1963 and 1964 via roots, trunks, and lower branches. The success of root inoculations was 100%, 90%, 16%, and 17% in September, January, and March, respectively. Trunk inoculations were successful at the rates of 100%, 16%, 16%, and 83% in the same four months. Only one branch inoculation, performed in May 1963, produced oak wilt symptoms. Spread along the fungal food chain from inoculated trunk inoculations performed in May 1963. In one case, a single branch inoculation resulted in infection of 23 trees within six months. Seasonal susceptibility and infection courts have proven to be important factors in the successful colonization of Texas live oaks by C. fagacearum.

CURRENT STATUS OF SOYBEAN STEM CANKER IN THE SOUTHEASTERN UNITED STATES. D. A. Roberts, Department of Plant Pathology, University of Florida, Gainesville, Florida 32611.

Soybean stem canker was first identified in Mississippi in 1974 and is now found throughout soybean growing areas in Alabama and Mississippi, and to a lesser extent in Florida, Georgia, Louisiana, South Carolina, and Tennessee. The disease has been found only twice in Arkansas and has not been reported in North Carolina, although the disease is probably present. Susceptible cultivars still are grown throughout the region, but where great losses have occurred, a high proportion of resistant cultivars now are used; in these areas, a reduction in the importance of the disease is anticipated. Because resistant cultivars are commonly infected, selection pressure for increased virulence should be low. Therefore, it is probable that new biotypes will not develop in response to the adoption of resistant cultivars.

CHARCOAL ROOT AND CROWN ROT OF ALFALFA IN NORTHERN FLORIDA. D. A. Roberts, Department of Plant Pathology, University of Florida, Gainesville, Florida 32611.

Charcoal root and crown rot, caused by Macrophomina phaseolina (Tash.) Goell., occurred in 1963 and 1964 at Gainesville, Florida, in experimental plots of alfalfa (Medicago sativa L. 'Florida 77'). Leaves on dwarfed shoots became light green or yellow and wilted before their death and turned brown. A fungus caused a dry, brown rot and shredding of stelar tissues of diseased tap roots and crowns; decayed cortical tissues were black. Numerous black pycnidia, approximately 200 μm in diameter, contained hyaline, one-celled conidia (approximately 12 X 24 μm). A few black scerotia were observed. M. phaseolina, a known pathogen of alfalfa, is already widespread in the state as a pathogen of such crop plants as corn, soybean, cowpea, and pine. It should be an important stand-depleting agent in alfalfa, which has been recently recommended for commercial production in Florida.

EFFECTS OF TILLAGE AND CROPPING ON SOUTHERN STEM CANKER OF SOYBEANS. C. L. Enstrom, T. W. Nobbs, and D. V. Phillips, Dept. of Plant Pathology, Georgia Experiment Station, Experiment, GA 31807.

During the 1983 and 1984 seasons, bottom soybeans were assessed for southern stem canker in an experiment designed to test the effects of conventional vs. no tillage and monocropping vs. double cropping of wheat and soybeans. Percentage of diseased plants (dead + cankered) was determined each year. In 1983, disease incidence was low (less than 2% overall) but was significantly higher in no tillage plots. In 1984, total disease incidence was greater than that present in no tillage plots than in conventional tillage plots (8.6% and 6.2%, respectively). A similar pattern was found for pathogen isolation in 1984. Double cropped plots had significantly more dead plants both years. That alone suggests that increased disease incidence and that stem canker results from a barely detectable amount to an epiphytic level in one year.


Twenty-two rice lines with mean disease ratings of 2 to 4 on a 0 to 9 scale, were evaluated for their apparent infection rates and disease sensitivity values during 1983. Terminal severity values ranged from 0.8 to 25.5% and infection rates from 0.05 to 0.20 in resistant and susceptible varieties, respectively. Five lines that were susceptible and killed, apparent infection rates in 1983, as well as one line with moderate infection and one susceptible check variety, were evaluated in the field in 1984 using isolates of Cercospora oryzae Miyake from Texas, Arkansas, and Louisiana. Four of the five rice lines showed a rate reducing (horizontal) resistance to narrow brown leaf spot. These data constitute the first report of a possible source of horizontal resistance to this pathogen.


Selected commercial fields of yellow summer squash (Cucurbita pepo 'Dixie hybrid') in Greenville Co. were monitored for watermelon mosaic virus-1, watermelon mosaic mosaic virus-2 (WMV-2), cucurbit leaf spot virus (CuLSV), cucurbit mosaic virus, and squash mosaic virus. Viruses were identified by ELISA and ultra-diffusion serology. WMV-2 and TRSV were the only viruses detected. WMV-2 incidence increased to a maximum of 72% in one field whereas TRSV infection was less than 2% in another field. The pattern of spread of plants infected with WMV-2 was random whereas TRSV spread in a plant-to-plant fashion. The predominant aphid species, as determined by yellow pan traps, in the WMV-2 field were Macrosiphum euphorbiae, Myzus persicae, Macrosiphum ambrosiae. Aphids of the Aphis and A. cornifoliae, in descending order of frequency. Xiphinema americanum was present in the TRSV field, and bait plants in field soil were infected. TRSV in smooth pigweed (Amaranthus hybridus) was seed transmitted.

COMPARISON OF AN ENZYME-LINKED IMMUNOSORBENT ASSAY (ELISA) AND A FILTER PAPER DOT-IMMUNOBINDING ASSAY FOR DETECTION OF WHEAT STEM RAGS MOSAIC VIRUS. J. S. Sanford and A. H. Schonbeck, Department of Plant Pathology, University of Nebraska, Lincoln, NE 68588.

A direct sandwich ELISA and a filter paper dot-immunobinding assay were compared for detection of wheat stem streak mosaic virus (WSSMV) in purified and crude sap preparations from wheat. The filter paper dot-immunobinding assay, originally developed for detection of seed inoculum (J. S. Sanford and D. E. Koplen, 1983, Ann. Phytopath. Soc. Am. 49:121), has been adapted for detection of plant viruses (Raber, S. C., Agriculture Canada, Winnipeg, Manitoba). With purified preparations, 2 ng/ml of WSSMV were detected by ELISA, and the degree of response was linear for 4 to 290 ng/ml. With dot-immunobinding, 64 ng/ml of WSSMV were detected, and the degree of response appeared similarly linear. In crude sap, ELISA was more reliable in discerning differences in virus concentrations at different days of incubation in the dot-immunobinding assay. The dot-immunobinding assay could readily differentiate virus-infected and uninfected plants and can be completed in less than 2 hr.

RESPONSE OF LEAFSPOT-RESISTANT PEANUT GENOTYPES TO THREE LEVELS OF DISEASE MANAGEMENT. F. M. Shokes and D. W. Gorbet, North Florida Research and Education Center, Rt. 3, Box 638, Quincy, FL 32351.

Five peanut (Arachis hypogaea L.) genotypes were evaluated under three management programs from 1979-83. Three resistant breeding lines (72x5-9-7-1-8 and 72x5-10-2-1-8, 72x830-7-2-1B), a plant introduction (PI 261993), and a susceptible cultivar (Florunner) were used. Control programs were no fungicide, fungicide (chlorothalonil) applied a 2-day interval (minim management), or fungicide applied a 10-day (1979-80) or 14-day interval (1981-83). Mean yield loss for 5 yr due to disease ranged from 12.5% for B31 to 51% for Florunner when no fungicide was applied. The genotypes sustained losses of 2.1% and 6.8% respectively, under the minimal program. Examination of disease progression data indicated that the PI had the highest level of resistance of the genotypes tested. Best separation of the genotypes according to resistance was obtained using the areas under the disease progress curves.


Colletotrichum fragariae may infect any of the above ground parts of the strawberry plant. The conidal spray inoculation method currently used identifies plants with resistance to petiole infection of anthracnose; however, crown rot is the most destructive phase of this disease in the southeastern U. S. Variations in infection methods have been used for their potential as an anthracnose resistance screening program. A "crown spray plus petiole" inoculation method with a conidial suspension consistently gave higher disease severity ratings than other inoculation methods. Tests were done on 100 of the selections derived from crosses between some resistant strawberry lines surviving following inoculation by this method. These results suggest that some strawberry plants have resistance to the crown rot phase of anthracnose and that they can be identified by a crown injection inoculation.

* = Presentation of Soybean Stem Canker Symposium
INTERACTIONS BETWEEN MELOIDOGYNE INCOLUMA, FUSARUM DISSEXSOPHORUM F. SP. VASINACTINUM AND THE ENDOCYNNICAL FUNGUS, GLOMUS
INTRARADICIS ON COTTON. G. S. Smith, R. W. Roncadori, and R. S. Hussey, Department of Plant Pathology, University of Georgia, Athens, GA 30602.

- Root-knot susceptible cotton (Stoneville 213) was grown in infested soil inoculated with four inoculums densities of Fusarium oxysporum f. sp. vasinfectum race 1 (FOV), four inoculum densities of Meloidogyne incognita (MI) eggs, and with or without the endocynical fungus, Glomus intraradices (GI), in a greenhouse factorial experiment. GI X FOV interactions were highly significant for both weights and GI root colonization. Boll weights were reduced but not until initial FOV soil infestation levels were 50 cfu/g soil and MI inoculum levels were 375 eggs/g soil. All two-factor treatment combinations had highly significant effects on MI reproduction (eggs/g root). Nematode reproduction was stimulated by increasing inoculum levels of MI and FOV, whereas GI reduced nematode reproduction by 42% to 96%. Nematode incidence was not affected by GI.

ESTIMATION OF LEAF SPOT SEVERITY ON ALFALFA USING SAMPLING WITHIN STEMS. W. H. Thal and C. Lee Campbell. Department of Plant Pathology, North Carolina State University, Raleigh, 27695.

- Pattern of leaf spot severity among leaves within alfalfa stems was investigated to determine appropriate sampling procedures for estimating disease severities. Two sampling techniques, the visual indexing technique and the percentage of infected leaves technique, were compared in estimating leaf spot severity. Stems were collected from 24 or 28 cvs. in experimental plots at 2 locations in NC during 1983. Relative position and a visual estimate of leaf spot area (%) were recorded for each leaf. Variability due to stems within a plot, upper vs. lower half of plant, nodes within a plant half and leaves within a node was estimated. Leaves within a node accounted for the greatest percentage of total variation, usually > 70%. Difference in severity between lower and upper plant half was another important source of variation. The results indicate that disease estimation should involve sampling of nodes from upper and lower strata within a stem and high rates of subsampling at selected samples.

- RESISTANT REACTION OF MUSKELON LINE MR-1 AGAINST DONNY MILDEW. Claude E. Thomas, USDA, ARS, U. S. Vegetable Laboratory, Charleston, SC 29407.

- Muskelon (Cucumis melo L.) line MR-1 is an inbred derived from F. P. 124111. It has a unique resistant reaction against donny mildew incited by Pseudomonas cubensis (Berk. & Curt.) Host. Lesions on leaves of MR-1 are small (1-2 mm), circular, chlorotic, and water-soaked, whereas lesions on leaves of susceptible cultivars are large (10-15 mm), irregular, and yellow. Previously, the recognition of donny mildew resistance in C. melo germplasm has been based on presence or absence of yellow lesions. Extremely limited sporulation is present on MR-1 only when environmental conditions are optimal. Sporulation per unit of leaf area on MR-1 is <1% of that on susceptible commercial cultivars. Lesions on MR-1 do not expand and result in leaf collapse as they do on susceptible cultivars. Research supported by BARD.

- REACTIONS OF SUDANGRASS ACCESIONS TO STRAIN B OF MAIZE DWARF MOSAIC VIRUS. Stephen R. Yann, Robert W. Toler, Dept. of Plant Pathology & Microbiology, and Frederick R. Miller, Dept. of Soil and Crop Sciences, Texas A&M University, College Station, TX 77843.

- Seventy-three foreign and domestic sudangrass (Sorghum sudanense Itch.) accessions were screened for resistance to maize dwarf mosaic virus - Strain B. During the winter of 1983, seedlings grown in plastic containers in the greenhouse were inoculated at the 3-5 leaf stage using a DeVilbiss paint spray gun at a pressure of 6.33 kg/cm². Disease symptom severity was rated after three weeks. Symptoms varied from mild to severe mosaic. Of the accessions tested, 50 were susceptible, 13 intermediate, and 10 resistant. Examples of resistant accessions included P-26, A-901, and 1418. Symptoms in susceptible accessions included DLS-11 and TE-1004; and susceptible candidates included GA 337 and Trudan 6. With the use of known antisera of strain B, double diffusion tests were conducted to confirm infection with the virus.

- POLLINATION, A MAJOR FACTOR CONTROLLING THE FLORAL INFECTING MUT, TOLYPOMERIS PNNICILLARIAE, OF PEARL MILLET. Homer D. Veille, Wayne Hanna and Glenn W. Burton, USDA,ARS, Coastal Plain Station, Tifton, GA 31793.

- Pearl millet cytoplasmic male sterile line 23 AE (S) and the isogenic restorer line 23 RE (F) were inoculated by spraying heads of the male-sterile line with the floral infecting mutant of Tolypomeris pennisilariae. Heads were inoculated at ca 4:00 p.m. and immediately covered with pre-wetted 65% x 25 cm plastic bags. After 16 h the plastic bags were removed and heads covered with glassine bags. After 22 h a portion of F were pollinated (FP) with the remainder depending on self pollination only. Heads were rated for smut development after 21 d. Heads were collected from 6 plants: 0, 4, 10, 10-30, 3 = 30-70%, 4 = 70-90% and 5 = 90% of florets showing smut. The average rating of S, F and FP were 3.0, 2.0 and 1.0, respectively. Percentage of heads with 30% or more of the florets showing smut for the S, F and FP were 66, 35, and 0%, respectively.

- VARIATION IN VIRULENCE EXPRESSED BY SINGLE BASIDIOPORE ISOLATES OF RHIZOCONIA ZEAE. A. S. Mindman and T. L. Lucas, Department of Plant Pathology, North Carolina State University, Raleigh 27695.

- Twenty single basidiospore isolates derived from each of three field isolates of Rhizoctonia zeae were inoculated on Kentucky 31 tall fescue to evaluate their pathogenicity. Isolates were grown in a saturated water agar inoculated with inoculated 4-week-old tall fescue. Tall fescue in 10.2-cm clay pots was inoculated with 0.5 g (fresh weight) of inoculum and incubated in a humidity chamber in the greenhouse for 7 days. Disease severity was assessed at 4 and 7 days using the Norsfall-Barrack scale. All 60 of the isolates were pathogenic on tall fescue. Disease severity reactions after 7 days for single basidiospore isolates of KE 215, KE 247, and KE 255 ranged from 2-75%, 0-67%, and 0-98%, respectively. Most of the isolates were less virulent than their respective parents.

- RESPONSE OF SOYBEANS TO HETERODERA GYLCENAE AND IRRIGATION. L. D. Young and W. G. Heathers, USDA-ARS, 605 Airways Blvd., Jackson, TN 38301 and P. O. Box 196, Stoneville, MS 38776, respectively.

- Essex soybeans were grown in 56-cm diameter microplots under a transparent shelter for 2 yr in a silt loam soil that was either infested with heterodera glycines (Hg) or noninfested (fumigated with methyl bromide). Movie (-0.1 to -0.3 bar) and dry (-0.5 to -0.8 bar) soil water potentials were maintained in the upper 35 cm of soil for each level of nematode infestation. Response of leaf area and shoot weight to treatments was wet-dry and noninfested-infested, with no significant (P<0.05) interaction. Significant leaf area and shoot weight response occurred for pod weight; response was wet-infested-dry-noninfested-wet-infested-dry-infested. In 1983 significant (P<0.01) interaction occurred for seed yield; response was wet-infested-dry-infested-dry-infested-dry-infested. Root weights in the 0-15 and 15-30-cm soil zones were equal for all treatments. Significantly more first-generation Hg cysts occurred in the wet-infested treatment.

- 1,3-DICHLOROPROPOFEN IN BROADCAST VERSUS STRIP TREATMENTS FOR CONTROL OF PEACH TREE SHORT LIFE. E. L. Zehr and J. K. Bild, Dept. of Plant Pathology and Physiology, Clemson University, Clemson, SC 29631.

- Broadcast and strip treatments of 1,3-dichloropropene (1,3-D) at 136 L/ha were compared for control of Circinella monospalt in orchards of short life peach trees in 12-tree plots replicated four times. The strip treatment, 2.4 m wide centered on the tree row, covered 50% of the plot surface area. The 1,3-D was applied ca. 25 cm deep by shanks 25 cm apart to two before the first leaf showed growth. Peach trees in low-voltage rootstock were planted to stigma 1,3-D treated controlled C. monospalt for ca. 2 yr after application. Short life occurred in the third year in the control and strip-treated plots, but did not appear until the fifth year in broadcast-treated plots. By the sixth year, 25-60% of trees in the broadcast, strip, and control treatments, respectively, had died. Broadcast preplant treatments of 1,3-D appear to be more effective than strip treatments for extending the usefulness of short life trees.