SUGARCANE SMUT IN FLORIDA. S. A. Alferi, Jr., C. P. Seymour, and J. W. Miller. Florida Department of Agriculture and Consumer Services, Division of Plant Industry, P. O. Box 1269, Gainesville, FL 32602.

Sugarcane smut, caused by Uvularia scitaminea, is one of the most serious diseases of sugarcane, Saccharum officinarum, in all cane-growing areas of the world, with losses ranging from negligible to total loss. Known since 1877 from South Africa, the disease appeared for the first time in the continental United States on June 28, 1978, 4.5 miles (7 km) southeast of Gilchrist in the major cane-producing area of Florida. The disease, concentrated in a 7 x 8-mile area, is characterized by a black, pencil-like, whip-like appendage at the apex of the stalk, stumps with spirally (grassy) shoots, multiple disturbed buds, and Lalas (pale-green, spirally adventitious roots). Susceptible varieties constitute 32 percent of the planted crop in Florida. The isolates were tested for virulence on greenhouse-grown, yellow, and bolliboy pine seedlings. Fourteen of the isolates came from pitch cankers on southern pine species, 2 from bolliboy shoots damaged by tip moth, 2 from midge lesions on needles, and 4 from sporodochia on slash pine, each from seed orchard site-plantation soil, and 1 from a dead woody plant. The isolates from dead woody plant and planting soil were avirulent on both pine species. The mean percent shoot mortality of the 11 virulent isolates was 36% on bolliboy, and 90% on Virginia pine. The range on bolliboy was 13-75% and on Virginia pine 40-100%. The coefficient of variation on bolliboy pine was 52%, and on Virginia pine 16%. Virulence of the cultures was not strongly associated with the source of isolates. This confirms previous observations that Virginia pine is more susceptible to pitch canker than bolliboy pine.

VARIATION IN VIRULENCE OF DIVERSE SOURCES OF FUSARIUM MONILIIFORME VAR. SUBGLOTTINAS ON VIRGINIA AND BOLLBOY PINE. Jane Davison-Broadbent and L. D. Dwinell. USDA For. Serv., For. Sci. Lab., Carlton St., Athens, GA 30602

Twenty-five isolates of Fusarium moniliforme var. subgloatinas were tested for virulence on greenhouse-grown, yellow, and bolliboy pine seedlings. Fourteen of the isolates came from pitch cankers on southern pine species, 2 from bolliboy shoots damaged by tip moth, 2 from midge lesions on needles, and 4 from sporodochia on slash pine, each from seed orchard site-plantation soil, and 1 from a dead woody plant. The isolates from dead woody plant and planting soil were avirulent on both pine species. The mean percent shoot mortality of the 11 virulent isolates was 36% on bolliboy, and 90% on Virginia pine. The range on bolliboy was 13-75% and on Virginia pine 40-100%. The coefficient of variation on bolliboy pine was 52%, and on Virginia pine 16%. Virulence of the cultures was not strongly associated with the source of isolates. This confirms previous observations that Virginia pine is more susceptible to pitch canker than bolliboy pine.


Phytophthora heveae was isolated from dieback tissue on a hybrid rhododendron growing in a western North Carolina nursery. Axillary buds on terminal shoots of hybrids, 'Catalina' and 'Brimas' and 'Rosewood Elegans' were removed and a 3-mm agar disk containing P. heveae was placed on the wound. Shoots were enclosed in plastic bags for 30 hr. Wound-inoculated shoots developed a brown discoloration that progressed into buds, petioles, and leaves. Rate of spread in stems of current growth was about 13 mm/day, but spread was slower in older stems. Mature leaves infected through macerated leaf sheath when touched. Shoot infection did not occur through intact axillary buds. In a second test, wounded plants with expanding shoots and/or expanding axillary buds on mature stems were inoculated by spraying with a zoospore suspension to run-off. Plants were misted intermittently (4 sec/min) for 2.5 days. Infection occurred on expanding stems, leaves, and buds but not on mature tissue. Oospores were observed in infected leaf tissue.

ENVIRONMENTAL FACTORS AFFECTING GERMINATION, INFECTION, AND DEVELOPMENT OF ANTHRACNOSE ON WINGED WATERPIMROSE UNDER CONTROLLED ENVIRONMENTS. J. M. Brunley and D. O. TeBeest. Department of Plant Pathology, University of Arkansas, Fayetteville, AR 72701.

Colletotrichum gloeosporioides f. sp. jassicus causes anthracnose of winged waterplantain. Planted inoculated with spore concentrations of 1, 2, and 4 x 10^6 spores/ml had 97, 96, and 95% leaf area bleached, respectively, 120 hr after inoculation. Disease developed more rapidly on plants held in dew chambers (100% RH) for 25-35 days than on plants held at 20 or 24 C for the same period. Percentage leaf infection was equal if dew periods were 28 hr or greater regardless of temperature (20-32 C). By 120 hr leaf infection exceeded 90% on plants inoculated at 24, 26, or 32 C in controlled growth chambers but was 13% on plants at 20 C. No disease developed on plants inoculated at 16 C. When day/night incubation temperatures alternated (32/24 C), disease severity was less than that at 28/28 or 28/20 C. Spore germination on the leaf surface was significantly affected by dew time and temperature.


Stenophactum secundatum (Walt.) Kuntze accessions and cultivars were evaluated for resistance to chinch bugs, PMV-SAD, and combined resistance to both. Under laboratory conditions, mortality of adult chinch bugs after 4 days feeding ranged from 8.3% on Florida Common to 61.7% on Floratam. Chinch bug population means over a five month period for the two cultivars in the field ranged from 12.9 to 0.3 adults/aq ft respectively. Maximum insect population counts were 97 on Florida Common and 2 on Floratam. Disease reaction of the material following two air-infections with PMV-SAD ranged from 1 (no symptom development) to 3.8 (severe motting). Ten of the 17 accessions and Floratam failed to develop symptoms. FA-18, FA-217, and FA-236 were symptomless carriers of PMV-SAD as demonstrated by bio-assay on German Strain-R melito. Florida accessions.
on each plate and incubated in a continuously lighted (500 lux) incubator at 27°C for five days. Tomato seeds plated on agar amended with mycelium of P. myriotylum germinated and grew slowly compared with non-amended controls and agar amended with non-toxic mycelium from other fungi. In severe cases root rots developed, turning the seedling into a mass of mycelium. This indicates that non-viable mycelium of P. myriotylum contains a toxin which is heat stable and has the capacity to cause stunting, browning and death of germinating tomato seed similar to that caused by the living fungus.

SUPPRESSION OF RHIZOCTONIA SOLANI AND DAMPING-OFF IN COTTON BY MYCOPHAGOUS INSECTS OF THE ORDER COLEMBOLA. E. A. Curl, Dept. of Botany and Microbiology, Auburn University, Auburn, AL 36830.

Mycoophagous Colembola, Proisotoma minuta and Oonychus encapatus, are predominant in the rhizosphere of cotton seedling in Alabama. Their feeding preference for Rhizoctonia solani is the presence of Trichoderma harzianum and species of Aspergillus was demonstrated in laboratory tests. In growth tubes with either sterilized or nonsterilized sandy loam, the Colembola destructively altered the inoculum density of R. solani and reduced disease severity in cotton seedlings. Results of repeated greenhouse experiments in nonsterilized field soil showed that the insects can act suppressively upon R. solani in the presence of other organic food sources. Populations of 1000 and 2000 Colembola/kg soil added to soil with pathogen-chopped oats (20 mg/kg) resulted in increased seedling emergence, decreased disease severity, and increased plant growth.


The internal microflora of soybean seed grown in 1975 was determined after harvest. Seed from a test of 37 foliar fungicide treatments at Stoneville were sterilized or inoculated with microorganisms that were generally less than 1%. At Milford and Hollybush, Texas, and Stoneville, however, disease and cultivars. Three harvests were made for each cultivar at 15-day intervals. Diaporthe phaseolina occurred in 7% to 88% of the seed and was present in seed from all treatments. The level of D. phaseolina was apparently related to the high incidence of stem and pod blight in the test plots at Mississippi State. Alternaria spp., Colletotrichum spp., Fusarium spp., Penicillium spp., and unidentified fungi and bacteria were isolated from less than 1% to 18% of the seed of some treatments. Field exposure due to harvest date appear to affect the microflora more than the fungicide treatments.


The methods of Hussey and Barker (Plant Dis. Rept. 57: 1025-1028) and Byrd et al. (J. Nematol. 4: 226-269) were adapted for extraction of reniform nematodes. Eggs were extracted from root of sweet potato 'hatched more rapidly in vitro than eggs of Meloidogyne incognita extracted similarly. Extraction for 4 min with 0.53M NaOCl did not significantly reduce the hatching compared to a 2 min. extraction but resulted in increased numbers of eggs extracted for both nematode species. Extraction of reniform eggs from sweet potato cultivars each inoculated with 300, 1500, and 3000 eggs per 10-cm pot yielded 2665, 5080, and 11047 for Centennial; 1578, 5330, and 5675 for Jasper; and 1507, 2201, and 1969 for Goldrush, respectively. Egg production of E. reniformis in the greenhouse was almost as great on Bonny Best tomato, Centennial sweet potato, and Black Beauty eggplant. August field populations from 9 sweet potato cultivars averaged 528 eggs and 2711 larvae per 500 cm².

DAMPING-OFF SYMPTOMS PRODUCED BY NON-VIABLE MYCELION OF PYTHIUM MIRIOTYUM ON GERMINATING TOMATO SEED. A.S. Cisnovs, Plant Pathology Department, University of Georgia, Coastal Plain Experiment Station, Tifton, GA 31794.

Pythium myriotylum and other fungi were cultured on liquid medium, frozen, and lyophilized. Mycelium was added to water agar at the rate of 250 mg/l, blended, pH adjusted to 4.5, autoclaved, poured in Petri plates (9 cm) and allowed to gel. Five surface sterilized 'chuyo 11' tomato seeds were placed on each plate and incubated in a continuously lighted (500 lux) incubator at 27°C for five days. Tomato seeds plated on agar amended with mycelium of P. myriotylum germinated and grew slowly compared with non-amended controls and agar amended with non-toxic mycelium from other fungi. In severe cases root rots developed, turning the seedling into a mass of mycelium. This indicates that non-viable mycelium of P. myriotylum contains a toxin which is heat stable and has the capacity to cause stunting, browning and death of germinating tomato seed similar to that caused by the living fungus.

INFLUENCES OF MELOIDOGYNE RAPLA AND MACROPOSTHONIA ORNATA ON THE EFFECTIVENESS OF MICROSCOROTIAL INOCULA OF CYLINDROCLADUM CYLINDROCLADUM AND P. MYRIOGOTYUM ON TOMATO. M. Diomande and M. E. Beute, Department of Plant Pathology, North Carolina State University, Raleigh, N. C. 27650.

Influences of Meloidogyne hapla and Macroposthonia ornata on the capacity of Cylindrocladium cylindrocladum to cause black rot (CBR) on peanut were investigated in greenhouse factorial experiments. Two peanut cultivars (CBR-resistant 'NC 3033' and CBR-susceptible 'Florigiant') were used. Four inoculum densities of C. cylindrocladum microsclerotia (0, 0.5, 5, and 50 mg/ml of soil for NC 3033 or 0, 0.025, 0.25, and 2.5 mg/ml of soil for Florigiant) and three inoculum densities of M. hapla eggs or M. ornata larvae and adult mixtures (0, 1,000, and 10,000/15-cm clay pot) were tested. CBR severity increased in the presence of 1,000 and 10,000 M. hapla eggs on both NC 3033 and Florigiant. M. ornata eggs were found to increase disease at 10,000 nematodes/15-cm pot with 0.25 and 2.5 mg/ml of Florigiant but failed to affect the disease syndrome on NC 3033 at all density combinations tested.


Field tests conducted in 1977 and 1978 indicate that plant resistance and the nematocide ethoprop are effective in
The fungus Nabil A. Baras and Joseph Kuc, Department of Plant Pathology, University of Kentucky, Lexington, Ky. 40506.

Potato lectin lyzes zoospores of races 0, 1, 4, 1, 4, and 1234, of Phytophthora infestans. A solution of lectin (25 mg/g protein) caused 80-100% lysis of zoospores in one hr. Solutions of potato lectin, phenol oxidase, chitinase, chitobiose, and cellulase had no effect on potato lectin.

In a field study, application of phenylmercuric acetate (PMA) to the corn plant whole plants protected plants from infection by Phytophthora alborescens. The effect of PMA on the number of spores in the phyllosphere was studied further by inducing a bacterial suspension of either 10^7 cells/ml or 10^8 cells/ml in the whole of corn seedlings. Leaf tissues from inoculated areas were sampled and prepared for scanning electron microscopy. Small numbers of bacteria were observed in stomata and sub-stomatal chambers only in those samples exposed to 10^8 cells/ml. Infection also occurred when stomatal opening was inhibited with acetic acid. Ingestion, therefore, does not require that stomata be fully opened.

The pathogenicity of Poria latemarginata on six southern hardwoods was studied in a lath house. The fungus was isolated from diseased roots of peach (Prunus persica Redglobe) at the Mississippi Delta Branch Experiment Station. The hardwood species used were cottonwood (Populus deltoides), green ash (Fraxinus pennsylvanica), silver maple (Acer saccharinum), bigtooth aspen (Populus grandidentata), sycamore (Platanus occidentalis) and sweetgum (Liquidambar styraciflua). Prunus persica was also inoculated. Seventy percent mortality was observed in peach.

Inoculations of cottonwood and yellow-poplar and 35% mortality in cherrybark oak (4%) occurred only in the root dip treatment. No mortality occurred in sweetgum or green ash.

Inhibitory effects of ribulose 1,5-bisphosphate carboxylase by victorion and recovery of victorion after binding to fraction 1 protein, Martha C. Hawes, and S. J. Sheen, Department of Plant Pathology, University of Kentucky, Lexington, Kentucky 40506.

Partially purified victorion caused up to 60% inhibition of ribulose 1,5-bisphosphate (RuBP) carboxylase activity of Fraction 1 (F-1) protein of tobacco. The same toxin concentration inhibited RuBP carboxylase by 90% in wheat seedlings. Carboxylase activity was inhibited by culture filtrates of pathogenic strain of the fungus or by inactive victorion.

Vitamin-treated F-1 protein was subjected to gel chromatography. Carboxylase activity of protein so treated remained inhibited, suggesting that victorion is bound to F-1 protein. Bound victorion was dissociated from the protein by treatment with 2N NaCl and was found to be toxic to susceptible oats. These results suggest that inhibition of RuBP carboxylase may provide a means for bioassay of victorion, and the binding of victorion to F-1 protein may allow separation of victorion from other fungal metabolites.
The ecology of Penicillium species on barley grain. Robert Hill, Plant Pathology Dept., Coastal Plain Experiment Station, Tifton, GA 31794; John Lacey, Plant Pathology Dept., Rothamsted Experimental Station, Harpenden Herts., ALS 2Q, England.

Inflorescences of barley (Hordeum vulgare) are colonized by bacteria, yeasts and filamentous fungi. Fungi characteristic of stored grain, including many Penicillium species, can be isolated from them. No sharp distinction exists between 'field fungi' and 'storage fungi'. Molding in storage is largely governed by grain water activity (a_w), temperature and aeration. Between 0.65a_w and 0.87a_w the Penicillium glaucus group predominates. Penicillium verrucosum var. cyclopium is often dominant in grain with more than 0.87a_w when heating does not occur. Above 0.9a_w, spontaneous heating, initiated by growth of species like P. verrucosum var. cyclopium, P. funiculosum, P. variabile and P. janthinellum, usually occurs followed by thermotolerant fungi including P. capsulatum and P. piceum. Restricting oxygen reduces microbial activity and P. roquefortii and yeasts may become abundant.


Dorylaimus spp. feed on the roots of higher plants (G. Thor and Helen Heath Awanger, A Monograph of the Nematode Genera Dorylaimus Dujardin, Aporcelaimus n. g. Dorylaimoides, N. g. and Pungentus n. g., Martinus Nijhoff, The Hague, 1957). These authors reported from examination of intestinal contents of 5 Dorylaimus spp. that all had been filled with material from the higher plants, indicating that these are their preferred source of food. During the same year, the broad microbial host range of Dorylaimus eternitbergensis de Man 1885 was revealed in laboratory studies (Phytopath. 47: 448-473, 1957). Hosts included blue-green and green algae, protozoan cysts, fungus spores and hyphae, and saprozoic nematodes. The data suggest dorylaimids can act as agents for the transfer of protoplastic constituents, involving the alteration and transfer of chromosomal and plasmid-linked life support systems between microorganisms and higher plants.

Seasonal concentrations of bacterial plasms severely infected with the Pierce's disease bacterium. D. L. Hopkins, University of Florida, Agricultural Research Center, Leesburg, FL 32748.

Seasonal concentrations of the Pierce's disease (FD) bacterium in infected vines were studied. Stem, petiole, and leaf vein tissues were collected five times during the season. Transverse sections of the tissues were stained and examined by light microscopy for bacterial plasms. The highest concentration of the bacterial plasms occurred in all three tissues at the June 7 sampling date, with high concentrations also present in the July 28 sample. On June 7, leaf veins had 57% of the vascular bundles infected, petioles had 37%, and stems 21%. Between April 21 and June 7 there was a 10-fold, or greater, increase in the number of infected vessels per cross section in all three tissues. FD bacterial concentrations in leaf veins were highly correlated with leaf marginal necrosis.

Seasonal concentrations of FD bacterial plasms correlated very well with symptom development and with seasonal transmission data.

Detection of Maize dwarf mosaic virus using ELISA. A. D. Bueter & R.W. Toler, Texas A&M University, College Station, TX 77840.

Enzyme-linked immunosorbent assay (ELISA) was used to detect maize dwarf mosaic virus (MDMV) in infected corn and sorghum. The two enzyme systems were used: horse-radish peroxidase (HRP) in conjunction with the substrate 2,2'-azino-di-(3-ethyl-benzthiazoline-6-sulfonate) (ABTS), and alkaline phosphatase with the substrate p-nitrophenyl phosphate. The enzyme conjugates have been purified preparations and we detected virus concentrations as low as 10 and 50 µg/ml for the peroxidase and phosphatase systems, respectively. The sensitivity of these systems may be greater, since lower virus concentrations were not tested. From infected plants diluted 1:5000 gave positive results with the HRP conjugate. The alkaline phosphatase system gave positive results at a dilution of 1:2500. We accomplished the test routinely within 8 hr, however, slight but readable results can be obtained after 4 hr. The HRP system consistently gave a more visible reaction than the phosphatase system, but also showed some non-specific reactions.

The influence of fungicide and insecticide applications on persistence of ladino clover. J. R. James, L. T. Lucas, B. S. Chambless, and W. V. Campbell. Department of Plant Pathology, North Carolina State University, Raleigh 27650.

Applications of benomyl, carbofuran, and benomyl plus carbofuran to plots of Ladino clover (Trifolium repens) indicate that a pathological-entomological complex in a major factor involved with lack of persistence of Ladino clover. The area covered with Ladino clover in control, benomyl, carbofuran, and carbofuran plus benomyl treated plots after 3 1/2 years was 12, 24, 75 and 88%, respectively. In the third year, yields of clover in control, benomyl, carbofuran, and carbofuran plus benomyl treated plots were 27.9, 28.1, and 31.1 lbs., respectively. Less root injury from the clover root curculio (Sthena hispida) was observed in plots treated with carbofuran. Insect damage and rot of roots and stolons were highly correlated in plant samples collected throughout the experiment.

Aireborne populations of Aspergillus flavus in irrigated and non-irrigated field corn. Roger K. Jones and H. E. Duncan, Department of Plant Pathology, North Carolina State University, Raleigh 27650.

Aireborne spore samples were used to monitor aireborne spores of Aspergillus flavus link ex Fries in non-irrigated and irrigated corn plots. Spores were monitored for 166 days (May 13-October 27) during 1978. The sampling were adjusted to operate for 90 sec, each hour at a volume of 1 cubic foot/minute. On spores were placed in each plot at a height of 3 feet. Spores were trapped on Petri dishes of Czapek Dox agar (Difco) + 6% NaCl and plates were changed daily at 0800. Colonies of A. flavus were identified following incubation for 6 days at 25°C. Spore concentrations remained low during May and the second half of August. Thereafter, spore concentrations increased in both treatments but remained lower in the irrigated treatment. Late in the season spore counts rose sharply in both plots during and after harvests. Unidentified species of Cladosporium and Penicillium were the predominant fungi trapped during the growing season.

Control of fusarium root on lobolly pine seedlings with the fungicide, Bayleton. W. D. Kelley, Botany and Microbiology Dept., Auburn Univ. Agric. Exp. Sta., Auburn, Alabama 36830.

Efficacy of Bayleton [1-(4-chlorophenyl)-2,3-dimethyl-1-(1H, 2,4-triazol-1-yl)-2-butanoic] to control fusarium root on lobolly pine was examined in a greenhouse test. Treatments were 1) control; 2) Bayleton root soil treatments (2 and 5 kg a.i./ha, preplant incorporated [PPI]); 3) Bayleton foliar spray (FS)
INCUBATION TEMPERATURE AS A METHOD OF SELECTIVE ISOLATION OF ASPERGILLUS FLAVUS FROM SOIL AND ORGANIC SUBSTRATES. 

Gary King, Dept. of Plant Pathology and Physiology, Clemson University, Clemson, SC 29631.

Temperatures characteristics of A. flavus are of value in isolating it from mycorrhizally complex substrates. Approximately 235 propagules of A. flavus per g (pm) of corn-field soil were identified on dilution plates of malt-agar (M3A) incubated at 40 C. It was identified on 89% of corn roots from the field when plates were incubated at 40 C. Comparable figures were 0.9% and 33.5%, respectively, when plates were incubated at 25 C. A. flavus grew from 30% of corn roots on plates incubated at 25 C, compared to 68% when incubated at 40 C. Incubation temperature did not affect the differences in the mg of A. flavus recovered from corn grain. The dilution plates, however, were counted after a shorter incubation period with fewer sampling fungi when incubated at 40 C, than at 25 C.

A LEAF SPOT DISEASE OF WHEAT CAUSED BY HELMINTHOSPORIUM SOROKINIANUM IN SOUTH CAROLINA. 

Gary King, Dept. of Plant Pathology and Physiology, Clemson University, Clemson, SC 29631.

A. sorokinianum was the only pathogen isolated from lesions of a leaf spot disease of Holley wheat collected during a small grains disease survey. Numbered larger numbers of lesions developed on Bluebird and Coker 615 wheat than on Arthur or Holley wheat or on barley or rye when infected with sorokinianum from a pure culture of H. sorokinianum originally isolated from the wheat. Disease was also observed on controls. H. sorokinianum was recovered from all leaf lesions of rye and Holley wheat examined after incubation in moist chambers. Seventy percent of the lesions revealed the presence of the pathogen. The wheat and rye leaf lesions were rated between 4 and 5 for sporulation on a scale of 0 to 5 scale (0 = no sporulation; 5 = prolific sporulation on all of the lesions observed). Only lesions were rated 2. This isolate of H. sorokinianum appears to be even more virulent on wheat and rye than on barley.

ACEROONIDELLA AND EPIPOLEUM LEAF MOLDS OF BERGMUGASS. 


Two superficial fungi produce conspicuous growths on living leaves of Cynosum dactylon in Georgia. Aceroonidella erysiphoides (Dimericaceae) forms crusts of small, brown mycelia on green and discolored tissues of mature leaves. On V. aureus leaf agarascuse cultures develop colonies of spores, brown mycelium and sclerotia in 4 wk. Aceroonidella chloridii (Hyphomycetes) covers young green tissue with a white mycelium supporting a tuft of conidiophores and conidia. Black, disk-shaped sclerotia develop on exposed surfaces and below leaf sheaths. Germination of sclerotia is by germination of conidiophores through the rind. Cultures from conidia and sclerotia produce conidia abundantly on several media. Inoculations on grasses other than Bermudagrass, including Chloris spp., failed.

COMPARISON OF TWO FORMULATIONS OF TRIPHENYL HYDROXIDE FOR CONTROL OF CERECOURS AND CERCOSPORIUM ON PEANUTS. 

R. H. Littrell, July E. Lindsey, University of Georgia, Coastal Plain Station, Tifton, Georgia 31794.

Du-tar 47.5% WP and an experimental flowable formulation (FF) of triphenyl hydroxide were compared on Flourrunner peanunt (Arachis hypogaea) for control of Cercospora arachidicola and Cercosporidium persumdom. An average of 0.000 0.013 cm of C. arachidicola was observed on FF and Du-tar respectively. A. hypogaea had 71% and 83% 0.046 and 0.046 of Du-tar and FF 0.040 and 0.040 respectively. Percent infection in the field was determined just prior to harvest. C. arachidicola conspiracy was significantly different at the 0.01 level of probability. Sporulation of C. arachidicola was observed on 13% and 73% of lesions treated with FF and Du-tar respectively.

CONTROL OF BELONOLAIMUS LONGICAUDATUS ON BERGRASS. 

R. T. Lucas, Department of Plant Pathology, N.C. State University, Raleigh, N.C. 27607.

Poor growth of Tifton 328' Bermudagrass (Cynosum dactylon) on soil which contains 20% sand soil along the coast of North Carolina was suppressed by Belonolaimus longicaudatus. An average of 0.000 0.013 cm of B. longicaudatus was found in soil samples from areas before treatment with nematocides. Phenamphos, fenoxathiin and 1, 2-dichloro-3, 4-dichlorophenoxyacetic acid (2,4-D) were applied as granules at 0.2, 0.2 and 6.0 kg (a.i.)/ha respectively, on August 5, 1967. Nematocides 1-5, 0.046 and 0.046 weeks after treatment and all treatments respectively. Densities of B. longicaudatus were assessed at 1, 2, and 3 weeks after treatment with nematocides, fenoxathiin and 2,4-D, respectively. Densities of B. longicaudatus were reduced in 2,4-D treated plots only.
Cercospora kikuchii (Matsumoto & Tomoyasu) Chupp was grown on ten media at temperatures ranging from 5 to 40°C. Maximum growth on solid media occurred at 28°C on malt extract agar (MEA) and potato dextrose agar (PDA) with the least growth on water agar (WA). In liquid media, growth was observed in V-8 juice broth and the fungus sporulated in C/S agar (5.7 x 10⁴ conidia/ml) and carrot-leaf decoction agar (3.6 x 10⁴ C/S). No sporulation occurred on corn meal agar (CMA), MEA, or PDA. Cultures were maintained at 20 and 25°C. There was no significant difference in sporulation between CL and C/S media (6.9 and 6.4 x 10⁴ C/S).

POTENTIAL IMPACT OF SHEATH BLIGHT ON YIELD AND MILLING OF SHORT-STATUTED RICE LINES

M. A. Marchetti, USDA-SEA/AR-4R, Rt. 9, Box 909, Beaumont, TX 77706.

Clemson for completion of tests. From June-Sept 1978 we indexed 1000 samples from cooperators in AL, KY, LA, MD, MS, NC, and VA and noted no adverse effects due to mowing.

AN ULTRASTRUCTURAL COMPARISON OF CORNELLIA COMARDAE IN FIRE BRANCH AND COMARDA UMBRELLA.

Margaret A. Mead and P. E. Tainter, Dept. of Plant Pathology, University of Arkansas, Fayetteville, AR 72701.

The ultrastructure of corn dwarf blight, Cornarilla comaradae, was compared in a primary host, Pinus echinata, and in an alternate host, Comarada umbrella. A matrix similar to the host cell wall entirely surrounded the intercellular hyphae in pine. In corn, the homogenous matrix was heterogeneous and was restricted to areas between the host cell wall and the wall of the intercellular hyphae. In pine, intercellular hyphae often deeply penetrated the host cell walls. These hyphae resembled haustoria in transverse section although they lacked a haustorial matrix and were surrounded by a layer of host cell wall material. A comparable phenomenon was not apparent in corns. Unusual structures containing tubular material were seen in the cytoplasm of all collections of infected and control corns.

Both the matrix and tubules of these globules stained black in Gomori indicating an unstained lipid composition.

EFFECTS OF ARTIFICIAL DRYING AND CONTROLLED ATMOSPHERE STORING ON CONTROL OF BLACK MOLD (ASPERGILLUS NIGER) OF ONIONS.

Marvin E. Miller and R. C. Dillon, Jr., Texas Agricultural Experiment Station, Weslaco, Texas 78596.

Aspergillus niger, black mold, was the major cause of bulb losses of yellow onion varieties "Texas Grano 602", "Yellow Granex", "New Mexico Yellow Grano" and "Ben Shamen" during a 1977 survey. Bacterial soft rot and Fusarium basal rot were of minor importance, while Botrytis neck rot was not evident. Control of black mold was attempted by drying onions for 8-31 hrs. with dehumidified-heated air and by storing in controlled atmosphere holding chambers. Although differences in the moisture treatments and storage methods were not significant, dried onions stored with air at or below 36% relative humidity (RH) at 37.8°C usually had less black mold than untreated controls. In storage tests following drying treatments, RH and air temperature in the holding chambers significantly affected black mold losses after 1-2 weeks independently of drying effects.

RESPONSE OF SELECTED PEANUT CULTIVARS TO CYLINDROCLADUUM BLACK ROT IN SOUTH CAROLINA.

C. S. Morton and L. W. Baxter, Jr., Department of Plant Pathology and Physiology, Clemson University, Clemson, SC 29631.

Selected peanut cultivars were evaluated for 3 years on land infested with Cylindrocladum corallariae to determine yield response. Two peanut cultivars, G-3 and Tifton, yielded higher than Flurroner and Florigrap (the two common peanut cultivars grown in SC) in 2 of 3 and 1 year respectively. NC-6 and Early Bunch were found to yield as well as Flurroner and Florigrap. Micropet evaluations of field tolerance to root necrosis were made using the previously mentioned cultivars and NC-3033, a C3R-resistant breeding line. Soil was infested with 25% sclerotia of C. corallariae/g of soil at a depth of 7.2 cm. Peanuts were in four replicates, harvested, and evaluated for root necrosis. NC-3033 had less root necrosis than any other peanut cultivar. G-3 and Tifton had less root necrosis than Flurroner, Florigrap or NC-6. Early Bunch had the most root necrosis. All cultivars increased microsclerotial levels with the exception of NC-3033 which essentially maintained them.

MAILING ELISA PLATES EXTENDS VIRUS INDEXING POTENTIAL.

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An ELISA procedure was used in regional project 3-127, Forage legume viruses, indexing forage legumes for alfalfa mosaic, bean yellow mosaic, clover yellow mosaic, clover yellow vein, peanut stunt, red clover vein mottle, white clover vein mottle, and white clover vein mottle with antibodies to these viruses, rinsed but not dried, covered with spent plates as lids, sealed inside ziplock plastic bags containing wet paper towels, boxed with healthy and virus-infected plant tissue for controls and buffer concentrate for sample preparation and mailed to 3-127 cooperators. Cooperators prepared samples by grinding leaf tissue to obtain 0.2 ml sap for each virus test. Plates containing samples were covered and sealed in plastic bags as before and held overnight at 4°C. Samples were rinsed from plates with cold tap water. Plates were placed as before and mailed to

CONTACT MICROCOLONIES IN CHINESE CHESTNUT AT HARVEST AND DURING STORAGE.

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EFFECTS OF FIVE FUNGICIDES ON ENDOMYCNORRHIZAL DEVELOPMENT IN SUGAR ORANGE. S. Nemec, USDA, SEA, Orlando, FL 32803.

Copper (Cu) up to 224 kg/ha, CA 48988 [N-(2,6 dimethylphenyl)-2-mercaptoacetyl] alanine methyl ester up to 9 kg/ha, thiamazole (TBZ) up to 18 kg/ha, were tested against Glomus mosseae (G). Chlorothalonil up to 22.4 kg/ha, and sodium azide (NaN3) up to 31.4 kg/ha were tested against G. mosseae (M). Soil seedlings were placed in 15 cm pots containing low-phosphorus soil mixed with these fungicides and chlamydoma.

LIPID ANALYSIS OF GLOMUS MOSSEAE-INFECTED AND NONINFECTED CITRUS ROOTS. S. Nemec, USDA, SEA, Orlando, FL 32803; S. Nagy and R. Nordby, USDA, SEA, Winter Haven, FL 33880.

Six citrus rootstock cultivars were inoculated with Glomus mosseae in a low-phosphorus sand in the greenhouse and fertilized monthly with a liquid 12-0-0. Noninoculated cultivars served as controls. After 160 days, roots were washed, weighed, and extracted in chloroform/methanol. 20 L lipids were purified by Sephadex G-25 and separated by silica gel chromatography. Neutral lipids (NL) and coconuts comprised about 75%, glycolipids (GL) about 22%, and phospholipids (PL). 2-75% of the fatal soluble extracts. In general, GL were higher in controls; PL were higher in all inoculated cultivars.

COMPARATIVE APHID TRANSMISSION PROPERTIES OF ISOLATES OF TOBACCO ETCH VIRUS. T. P. Pirone, Department of Plant Pathology, University of Kentucky, Lexington, KY 40546.

The aphid transmissibility of an isolate of tobacco etch virus (TEV) maintained for several years by mechanical transfer (TEV-M) was compared with that of a recent field isolate maintained by aphid transfer (TEV-A). The frequency of transmission of TEV-A was 10X that of TEV-M when aphids acquired virus from infected plants. Transmission from plants doubly infected with either isolate and an isolate of potato virus Y (PVY) which is readily aphid-transmissible did not change the transmission frequency of the isolate. When purified, neither TEV isolate could be transmitted unless helper component from PVY-infected plants, was added to the virus preparations. Purified TEV-A was then transmitted with at least twice the frequency (up to 10 times the frequency, in some experiments) at which TEV-M was transmitted. The results suggest that the aphid transmissibility of potyviruses may not be solely dependent upon the ability of poorly transmitted isolates to induce the production of helper component.

INTERACTION OF PRECIPITATION, TEMPERATURE, AND ANNUAL RADIAL GROWTH OF WHITE OAK IN DETRATED LENSES. P. W. Winter, Dept. of Plant Pathology, University of Arkansas, Fayetteville, AR 72701.

A decline of oak trees has occurred in northwest Arkansas during the past decade. To determine the effects of climate in initiating this decline, base-line climatic and growth data were analyzed. Ring-width indices were determined for the period 1900-1976. A below average radial growth was evident from 1963-1972. Correlation coefficients were calculated for April-May and July-August data. A significant correlation (negative) was found only between average temperature of July-September and ring-width indices of the subsequent year. High temperature due to low moisture during July-September, apparently caused cellular injury which resulted in depressed growth the following year.

INDUCED RESISTANCE TO TOBACCO MOSAIC VIRUS IN HYPERSENSITIVE PLANTS UNAFFECTED BY SYMPTOMATIC INFECTION BY POTATO VIRUS X. D. A. Roberts, University of Florida, Gainesville, FL 32611.
Cupric salts of straight chained C-1 to C-8 saturated monocarboxylic fatty acids were examined for activity against Sclerotium rolfsii (SR) and selectivity for Trichoderma spp. (T). When soil plates infested with SR received 20 kg/ha of the salts, growth, and production of sclerotia were reduced only in plates with formate, acetate, propionate, or butyrate. Growth of SR and T on plates with formate, acetate, propionate, or butyrate increased in a 4- to 9-fold increase in colonization of SR by T compared with plates that received the other salts. Changing the cation to Na+, Mg, Zn, or Fe, did not alter the selective properties of propionate for T or its fungitoxicity to SR. Application of Cu propionate (CuP) on soil plates at 200 kg/ha repressed the growth of SR but not maximal selectivity for T occurred between 15 and 20 kg/ha. Pentachloronitrobenzene or CuP applied at 25 kg/ha stopped growth of SR but only plates with CuP had T. In greenhouse tests with Florunner potatoes in soil with SR, application of CuP at 25 kg/ha reduced mortality to 95%.

The relationship of soil pH to nematode efficacy in soybeans. D. P. Schmitt, Department of Plant Pathology, North Carolina State University, Raleigh, NC 27650.

Each of four 9.2 X 19.5-m areas in a Lakehead sand infested with Belonolaimus longicaudatus was adjusted to pH 5.5 and 6.7 with sulfur and calcium hydroxide, respectively, or left untreated (ck) (pH 6.0). Each main plot was subdivided into 4 subplots, each with 5 rows and 1 m wide. Each subplot contained 10 kg (a.1)/ha of 1,2-dibromo-3-chloropropane (D), 4.5-kg (a.1) ha of ethoprop (E), sulfoxanof (F) and phenoxam (P). D was injected to a depth of 20 cm and banded. E, F, and P were applied in a 30 cm band and incorporated to a depth of 15 cm. All plots were planted to Glycine max cv. Osage. Soil samples were: pH 5.5—ck-1075, D-998, E-1718, F-6195, and P-2603; pH 6.0—ck-460, D-1827, E-1539, F-1839, and P-2086; and pH 6.7—ck-1381, D-1545, E-1945, F-2674, and P-2890. Soil pH affected nematode efficacy and the resulting nematode numbers at 35 and 74 days after planting which were negatively correlated (r=-0.938) with yield.


Leaf disks (0.9 mm diam) of 'Hershey Red' azalea (Rhododendron obtusifolium) and Rhododendron cultivar 'Glastonbury', 4 to 8-week-old seedlings of Fraser fir (Abies fraseri), 3-day-old radicles of blue lupsine (Lupinus angustifolius) and needles of cedrus deodara (CED) were recovered as P. cinnamomi from naturally infested soil from azalea and fir. Sample size varied between 5 and 150 g. Samples >50 g were washed through nested 125m and 38m sieves to reduce volume. Samples <50 g or 38m sieve residue were combined with 100 ml of distilled water and 1 drop of Tween 20 in a 150 ml beaker. Baits (3-5) were floated on the water surface for 1 or 2 days at 20 C, then removed and placed on a Phytophthora selective medium and incubated at 20 C for 48 hr. Leaf disks, fir seedlings, cedrus needlles, and lupine radicles yielded colonies of P. cinnamomi from 100 to 59%, and 16% of the baits, respectively. Leaf disks also yielded fewer contaminants than other baits. A known inoculum density of 10 p/kg of soil could be detected.

Influenza of Meloidogyne incognita and Verticillium dahliae on tomato at different inoculum densities. P. A. Shedd, and K. R. Barker, Dept. of Plant Pathology, W. W. State Univ., Raleigh, NC 27650, respectively.

The effects of Meloidogyne incognita and Verticillium dahliae on 'Warler' tomato were studied in 4x4 factorial experiments in outdoor 16x16 cm tile microplots. Initial densities for M. incognita were: 0, 0.32, 2.54 and 20.3 eggs per cm³ of soil in 1977 and 0, 0.1, 1.0 and 10.0 in 1978. Densities for V. dahliae in both years were 0, 0.1, 1.0 and 10.0 microsclerotia cm³ of soil. Analyses indicated that main effects for both nematode and fungus were significant, but interaction was not significant. For example, mean yields (1977) for inoculum densities of V. dahliae alone were: 0 mg (control) - 2.0 kg, 0.1 mg - 1.3 kg, 1.0 mg - 1.5 kg, and 10.0 mg - 1.2 kg. The V. dahliae was combined with the high nematode density (20.3 eggs cm³), yields were 0 - 1.3 kg, 0.1 mg - 1.4 kg, 1.0 mg - 1.5 kg, and 10 mg - 0.8 kg. Thus, results of experiments over 2 years showed that M. incognita had no synergistic effect on Verticillium wilt of tomato under these semi-controlled conditions.


Tabasco pepper plants rarely found to be infected with Cucumber Mosaic Virus (CMV), although CMV often occurs in other pepper cultivars. Tabasco seedlings used as indicator plants are known to be susceptible to CMV. The age of plants when mechanically inoculated was found to affect symptom expression. Plants less than 8 wk old exhibited shock symptoms including vein inflation, ring spots, necrotic stem streaks, and leaf blisters. Inoculated plants of Tabasco pepper usually develop a few necrotic ring spots but did not result in systemic symptoms. Thus, after late bacterial development CMV symptoms are restricted to inoculated branches rendering the Tabasco pepper effectively resistant to field infection by CMV.

Protease activity in red clover clones resistant and susceptible to bean yellow mosaic virus. L. R. Su, Pear Ueng and S. A. Sheehy, Department of Plant Pathology, University of Kentucky, Lexington, Kentucky 40506.

Proteases (papain, chymotrypsin and carboxypeptidase) were detected in leaf homogenates of red clover clones KYC13, KYC7-1 and KYC36 (representing hypersensitive, systemic necrosis and chlorosis genotypes, respectively) when infected with bean yellow mosaic virus. KYC13 had the highest activity of all proteases, whereas KYC36 had the lowest. Papain activity was proportional to bean yellow mosaic virus at 22°C, the systemic hosts had about two-thirds the papain activity of KYC13 48 hours after inoculation. When inoculated plants were kept at 32°C, the papain activity of KYC7-1 increased to a level comparable to that of KYC13. This coincided with the localization of bean yellow mosaic virus at 32°C. Partial purification of the papain from KYC36 and KYC7-1 markedly increased its activity. It is proposed that the regulation of protease activity by endogenous and exogenous factors may be involved in the virus localization.

Survival and inoculum potential of Rhizoctonia solani in a large sand soil. Donald R. Sumner, Coastal Plain Station, Tifton, GA 31794.

Pasturized soil was infected separately with 3 isolates of Rhizoctonia solani (AG 4) and soil dilutions were made to produce 0.0.1 to 3.2 propagules/g (PG) of soil. Cucumber, pole beans and cowpeas were planted in infested soils in a greenhouse. Populations were determined by placing soil on tannic acid-benzonil agar (TAB). Approximately 0.2 PG caused 50% damping-off in all crops. In March those soils and soils infested separately with 6 other isolates of R. solani were placed in clay pots and buried 5 cm below the rim in a field, where they remained fallow and exposed to weather for 25 wk.
THE EFFECTS OF FOUR VIRUSES ON BELL, JALAPEÑOS, CHILES AND OTHER PEPPER TYPES. Ben Villalon, Texas Agricultural Experiment Station, Weslaco, Texas 78596.

Viruses are the major disease factor in the decline of profitable pepper production in Texas. A virology-breeding program has yielded breeding lines resistant to tobacco etch, pepper mottle, potato y. and tobacco mosaic virus. Resistant lines include bell, jalapenos, chiles, pimientos, ancho, cherries, cayennnes, serranos, yellow pickling and pepperoncini. Tests indicated a significant difference in yields and overall performance between resistant and susceptible germplasm. Significantly higher yields were found between healthy and virus inoculated peppers. Six bell cultivars inoculated with 4 viruses ranked line 7506 the highest yielding followed by K.R.G. no. 3, Elray Bell, Lucky Green Giant, VR-2 and Pp. In noninoculated trials, there were no significant differences in 24 highest yielding bells, 10 of which were resistant, 6 chile lines yielded higher than 3 commercial varieties. The 10 highest yielding jalapenos were virus resistant lines.

MYCOFLORA AND MARKET QUALITY OF CHESTNUTS TREATED WITH HOT WATER FOR CONTROL OF THE CHESTNUT WEEVIL. John M. Wells and Jerry A. Payne. United States Dept. of Agriculture, Science & Education Administration, Agricultural Research, Southeastern Fruit and Tree Nut Laboratory, P. O. Box 87, Byron, GA 31008.

Post-harvest treatments of Chinese chestnuts in 52 C water for 5 or 15 minutes reduced the percentage of infection of weevil-damaged or discolored kernels and the number of fungal colonies isolated by about 50% compared to nontreated checks. Thirty minute treatments were significantly more effective but also resulted in a decrease of soluble sugars, thereby slightly affecting market quality. The addition of the fungicide 2,6-dichloro-4-nitroaniline (Botran) to the hot water reduced total number of colonies isolated compared to hot water alone but did not reduce percentage of kernels infected. Species of Alternaria, Penicillium, and Aspergillus were the major genera of fungi but commonly isolated from discolored or damaged chestnuts.


The nematode, Rotylenchulus reniformis Linford and Oliveira 1940, severely reduces tuber size and grade quality of sweet potatoes in Louisiana. Feeder roots of Centennial sweet potato had abundant females and egg-masses 3 wk after inoculation. The female nematodes were present in the root cortex. The juveniles penetrated intercellularly and fed in the single-layered endodermis. A single endodermal cell at the nematode head hypertrophied into a giant cell. The uniserate pericycle adjacent to the giant cell reacted to the infection and hypertrophied into a curved sheet of syncytia encompassing 7-10 cells on either side of the infection site. These infected pericycle cells stained darkly with methylene blue and showed dense cytoplasmic contents. Phloem cells at the infection point enlarged crushing the cambium layer and compressing the xylem vessels.

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