ABSTRACTS OF PAPERS

Presented at Meetings of the American Phytopathological Society
ATTENUATION OF VIRULENCE OF COCHLIOLOBUS VICTORIAE AFTER INCUBATION ON SOILS OR LEACHED SAND. R. A. C. Akers, B. R. Filonow, and J. L. Lockwood, Department of Botany and Plant Pathology, Michigan State University, East Lansing, MI 48824.

Conidia of C. victoriae were aseptically incubated for 15-30 days on a leached sand apparatus, or for 15-60 days on 5 different soils. Virulence was assessed using susceptible, 31- and 48-day-old seedlings on glass slides inoculated with 10 to 100 treated or untreated conidia/roll. Conidia incubated on leached sand or on soils were generally less virulent than untreated conidia. For example, mean root lengths of seedlings inoculated with 100 conidia were 3.1 cm with untreated conidia and 4.8 cm with conidia leached for 15 days; root lengths of seedlings inoculated with conidia after 15 days incubation on soils were 4.1 to 5.0 cm. The reduced virulence was associated with decreased viability, decreased ability to germinate without exogenous nutrients, and retarded rates of conidial germination and hyphal growth on PDA. These results suggest that reduced virulence may be associated with depletion of endogenous nutrients.

IMPROVED TECHNIQUE FOR SCREENING BARLEY LINES AGAINST COCHLIOLOBUS SATIVI AND PSEUDPHALERA TERES. Dennis Berglund and V.D. Pederson, Dept. of Plant Pathology, N. Dak. State Univ., Fargo, ND 58105

Barley seeds were placed embryo end down and 1.5 cm apart along the edge of moistened seed germination paper (Anchor Paper Co., St. Paul, MN). The paper was folded over the seed and rolled together with a waxed paper backing, which was placed in a rubber band. The rolls were placed upright in 2 cm deep water in plastic trays at 20°C for seed germination. Seedlings in the 2-leaf stage were dip inoculated in a controllable suspension and incubated 15-24 hr in a moist chamber. After 6-7 days the seedlings were evaluated for disease reaction. Optimum incubation time and temperature were 15-24 hr and 20°C. Standardized inoculum from 10-day-old disease control seedlings consistently reproduces lesion ratings.

INTERACTION OF PREPLANT-INCORPORATED HERBICIDES WITH RHIZOCTONIA SEEDLING DISEASE OF SOYBEAN. J. E. Bowman, J. B. Sinclair, and L. M. Nax (USDA-SEA), Departments of Plant Pathology and Agronomy, University of Illinois, 1102 South Goodwin, Urbana, IL 61801.

Nine herbicides in combination with soil inoculated with R. solani (0.2 g/g sterilized field soil), were studied on Williams soybean in the greenhouse. Seedlings were harvested at 18 da. after planting. Inoculated pots treated with trifluralin had increases (P≤0.05) in emergence at 12 da. In number of plants with expanded uninfoliate leaves at 18 da., and in dry weight of soybean plant parts compared to inoculated, nontreated pots. Inoculated pots with chlorbenzen had a decrease (P≤0.01) in emergence at 12 da. Non inoculated pots treated with bifenox, alachlor, metolachlor, metribuzin, or trifluralin had decreases (P≤0.05) in root and total seedling dry weights compared to noninoculated, nonherbicide-treated controls. Four of the latter herbicide treatments (alachlor excepted) and chlorbenzen were associated with decreases (P≤0.05) in dry weights of above-ground plant parts.

REATIONS OF HELIANTHUS TO SEEDLING BLIGHT CAUSED BY ALTERNARIA HELIANTHII. M. L. Carson, Plant Science Department, South Dakota State University, Brookings, SD 57007

A total of 153 entries of Helianthus germplasm, including hybrids and inbred lines, and open-pollinated varieties of H. annuus, several wild species and interspecific hybrids were evaluated in the greenhouse or resistance to seedling blight caused by Alternaria helianthii. Infection points appeared as water-soaked spots which became necrotic within 24 hours after inoculation, often killing seedlings. Although some differences among genotypes in disease reaction were evident, no entry exhibited a high level of resistance to the disease. Mycelial extracts (buffered and non-buffered) of A. helianthii caused a rapid collapse and necrosis of tissue when injected sub-epidermally into primary leaves of H. annuus (hybrid 984) seedlings while no such reaction was observed using culture filtrates.

A NEW CERECOSPORA SP. ON LEUONURUS SIBIRICUS. R. F. Cerkauskas, O. D. Dhingra and J. B. Sinclair, Dept. of Plant Pathology, Univ. of Illinois, 1102 South Goodwin, Urbana, IL 61801; and University Federal de Viçosa, Viçosa, Brazil 36.570.

Cercospora sp. was isolated from Leuonurus sibiricus, a common weed in soybean fields in Minas Gerais, Brazil. Circular stem lesions, 1-2 mm in diameter, had white centers and purple margins. Enlarged lesions up to 4-5 cm had concentric rings and abundant sporulation in the white centers. Stromata formed on stems, were multicellular, dark brown to black, 2.5-6.5 mm x 3(5). Fascicles were dense with more than 10 conidio phores; conidio phores multiglomerulate, tan-brown, unseptate, unbranched mostly 10-15 x 5.3-7.5 x 3.5-5.3(6.5) mm. Fascicles were dense with more than 10 conidio phores; conidio phores multiglomerulate, tan-brown, unseptate, unbranched mostly 10-15 x 5.3-7.5 x 3.5-7.5 mm. Fascicles were dense with more than 10 conidio phores; conidio phores multiglomerulate, tan-brown, unseptate, unbranched mostly 10-15 x 5.3-7.5 x 3.5-7.5 mm. Fascicles were dense with more than 10 conidio phores; conidio phores multiglomerulate, tan-brown, unseptate, unbranched mostly 10-15 x 5.3-7.5 x 3.5-7.5 mm. Fascicles were dense with more than 10 conidio phores; conidio phores multiglomerulate, tan-brown, unseptate, unbranched mostly 10-15 x 5.3-7.5 x 3.5-7.5 mm. Fascicles were dense with more than 10 conidio phores; conidio phores multiglomerulate, tan-brown, unseptate, unbranched mostly 10-15 x 5.3-7.5 x 3.5-7.5 mm. Fascicles were dense with more than 10 conidio phores; conidio phores multiglomerulate, tan-brown, unseptate, unbranched mostly 10-15 x 5.3-7.5 x 3.5-7.5 mm.

LIGHT AND TRANSMISSION ELECTRON MICROSCOPIC STUDY OF BROWN SPOT OF SOYBEAN. Edward A. H., Dept. of Biological Sciences, Western Illinois University, Macomb, Illinois 61455.

Pyridinolines of Pectoria phyceanes germinate on soybean leaves by producing thin germ tubes (0.7 mm dia.). Entry into the leaf is through lower stomata and takes up to 72 hrs. In the upper hyphae the larger hyphae (1.8 um dia.) grow slowly for the next several days. By day 5 host cells, especially palisade and upper epidermis, begin to collapse and become necrotic even though hyphae are mainly in the upper mesophyll. Early breakdown of the tonoplast and rapid cell organelle disintegration initiate the necrosis. Collapsed cells are brown in the light microscope and are uniformly electron dense with starch granules much in evidence in the transmission electron microscope. Maximum necrosis is reached by day 14 resulting in the angular, macroscopic brown spot. In the next few days necrotic, unwaved leaf tissues rapidly senesce accompanied by cell organelle disruption but without cell collapse. This tissue becomes extensively invaded by the fungus. Pyridinolines are formed during the 3rd week.

INTERACTION BETWEEN ECHINOCEROSA TINCTURIUM ET. & EV. AND AN UNKNOWN BASIDIOMYCETE FROM SUPPRESSED ARBUTUS GRANDIS (BEGOLO.)

LINDL., Wallace K. Kelin and Paul E. Abo, Forest Products Lab, Madison, WI 53705, and Pacific Northwest Forest & Range Experiment Station, Corvallis, OR 97331.

The basidiocystec (UB) most often isolated from suppressed grand fir on the Malheur National Forest, Ore., has not been identified. Its role in decay of grand fir is thought to be that of a secondary invader following decay caused by E. tincturiun (ET), which causes most decay in mature grand fir, were equally obscure. Subsequent soil-block decay tests, conducted for 10 months at 23°C—the optimum temperature for growth of UB and ET—showed very little culture—resulted in average growth losses in fir heartwood of 20.02% for ET and 1.42% for UB. Inoculation of ET-infected blocks with UB slightly lessened the decay capability of ET. However, when UB was first inoculated into blocks, followed by ET, no decay occurred even if the UB-infected blocks were first sterilized. Apparently, UB imparted a substance into the blocks which prevented later development of ET. Hence, prior infection of grand fir by UB may provide some protection against decay by ET.
EFFECTS OF POWDERY MILDEW ON GRAIN YIELDS OF WINTER WHEAT
Jerry D. Franklin and Erwin Williams, Jr., Department of Plant Pathology, Oklahoma State University, Stillwater OK 74078.

Effects of powdery mildew, caused by Erysiphe graminis f. sp. tritici, on winter wheat (cultivar TAM 8-101) yielded were studied using a randomized block design with split plot arrangement of spray treatments. Gradations in powdery mildew severities were attained by spray intervals of 10, 20, and 30 days with mitracon (250 ml/ha of a 5.6 ml/1 solution for each application). Each main plot represented a spray interval treatment and consisted of two 1.5 x 6.15 m subplots; sprayed and unsprayed. Yield determinations were made by harvesting 2.4 m of the two center rows of each of the two locations established in an area with a history of mildew problems. Yields were determined on a 0-9 scale (0 = none; 9 = totally diseased) peaked at 5.5 at anthesis at location one compared to 5.0 at boot stage for location two. Overall grain yields irrespective of spray interval were increased by 13.5% (significant F = 0.05) at location one and by 85% (NS) at location two. This work indicated that E. graminis can be a serious pathogen for wheat in the central plains.

EFFECT OF HEAT STRESS ON ELECTROLYTE LEAKAGE FROM CORN LEAVES WHICH VARY IN SUSCEPTIBILITY TO NORTHERN CORN LEAF BLIGHT
M. O. Garreway* and W. E. Findley, Department of Plant Pathology, Ohio State University, Columbus, OH 43210 and Ohio Agric. Res. Dev. Ctr., and USDA, SEA, AR, Department of Agronomy, Ohio Agr. Res. Dev. Ctr., Wooster, OH 44691.

Un inoculated detached leaves from four corn inbreds (V64AN, Oh 07, Oh 509, and Oh 51A) which vary in susceptibility to NCLB were immersed in distilled water then subjected to heat stress alternating 12 hr cycles of 50 C in the light and 30 C in the dark. Electrolyte leakage (EL) as mg molar/mg dry wt. was measured every hr. The EL was recorded for 120 hr. The EL rate was moderate during the first 72 hr, but increased significantly thereafter. It was greatest for the susceptible inbred V64AN, less for the less susceptible inbreds Oh 07 and Oh 509, and least for the least susceptible inbred Oh 51A. The presence of the H4 gene caused a further decrease in the EL rate. Thus EL from corn leaves under heat stress may aid in screening for resistance to NCLB.

CHEMICAL CONTROL OF SCLEROTINIA STALK ROT OF SUNFLOWER

Hybrid 894 sunflower seed was pelleted at 2000 and 4000 ppm a.i. with Bemate, Butran, Meritet, Orthocide, Ronilim, Roval, and Topasam-T and planted in a field with a previous history of severe Sclerotinia stalk rot. Nine weeks after planting, only Meritet at the higher rate inhibited stalk rot. This control did not persist for the remainder of the growing season, but did during the test. The result significant until the autumn. The seven fungicides plus Terraloc were tested as soil-applied, pre-plant, incorporated treatments, at rates of 3 and 20 kg a.i. per hectare. Only Ronilim at the higher rate exhibited significant disease control, and none of the treatments resulted in significant yield increases over that of control plots. Control of Sclerotinia stalk rot of sunflower with seed or soil-applied fungicides does not look promising at present.

EFFECTS OF FUNGICIDES ON REDUCING LEAF SPOT AND MELTING-OUT ON KENTUCKY BLUEGRASS, M. E. Hirzel, Dept. of Plant Pathology, University of Illinois, Urbana, IL 61801.

Epidemic development of leaf spot and melting-out caused by Dreschlera porae was studied with respect to fungicide treatment. Two methods for estimating disease severity were used: a qualitative estimate for the crown rot phase and a quantitative moisture of lesion number in a 5 cm area. The 19 fungicide treatments fell into three groups based on apparent infection rate (c): for group 1 the control, r = 0.160; group II, r = 0.072; and group III, r = 0.042. The quantitative method of measuring disease severity is not only more accurate for calculating r but also is a better indicator of fungicide application would be most effective. This is because inoculation period, based on leaf development, more closely coincides with the infection period of the pathogen than does the incubation period based on crown rot development.

EFFECT OF AGAR MEDIA AND TEMPERATURES ON GROWTH AND SPORULATION OF BOTRYODIPLODA HYPODERMAEA. J. H. Krupinsky, USDA-SEA-AR. Northern Great Plains Research Station, P.O. Box 459, Mandan, ND 58554.

Culture growth and pycnidiospor production of three isolates of Botryodiplodia hypothemaea were determined in fifteen different culture media at different temperatures. Fungal growth and spore production were greatest on potato dextrose agar-Dico (PDA-D) or potato dextrose agar-"home made" (PDA-P) followed by yeast malt extract agar (YMA) and malt extract agar (MEA) with the lowest on MEA. Cultures were best at 25±1°C for PDA-D and PDA-P, while 21±1°C was the optimum temperature for Y-MA and YMA. Thus, fungal response to temperature differences was not the same on all media and the temperature X medium interaction was significant. Sterile wheat kernels added to the surface of these media produced additional growth and pycnidiospor production and provided a convenient inoculum for inoculations.

HELMINTHOSPORIUM LEAF SPOT RESISTANCE IN AGROCYRON
INTERMEDIUM. J. M. Krupinsky and J. D. Berdahl, USDA-SEA-AR. Northern Great Plains Research Center, P.O. Box 459, Mandan, ND 58554.

Through four glasshouse inoculations with Helminthosporium sativum, 8,792 individual plants were progressively reduced to 29 resistant and eight susceptible genotypes. Inoculum, a composite of isolates from A. intermedium, was sprayed on the plants which were then maintained in a misted fog atmosphere for 48 hours. A total plant selection in the first two inoculations resulted in a higher percentage of resistant plants compared with an selected check population. Clonal replication improved the reliability of disease scores relative to scores on single plants. Although the genotype X inoculation interaction was significant, the difference between the most resistant and susceptible genotypes was maintained in the third and fourth inoculation of clonally replicated genotypes.

TRANSMISSION OF MAIZE WHITE LINE MOSAIC VIRUS. Raymond Louie, D. T. Gordon, and P. E. Lipp, USDA-SEA-AR and The Ohio Agricultural Research and Development Center, Wooster, OH 44691.

Maize white line mosaic virus (MWMV) was serially transferred in the greenhouse by planting Soneca Chief sweet corn (Zea mays L.) in field soil previously containing diseased plants (eight transfers), in sterile soil to which diseased roots were added (three transfers), and by immersing 2 to 4-day-old corn seedlings in a water suspension of MWMV infected sweet corn (one transfer). MWMV transmission was confirmed by enzyme-linked immunoabsorbent assay in leaves and roots of symptomless and MWMV-symptom corn plants previously exposed to root inocula or a water suspension of diseased roots. It was also detected in a water suspension that passed through a 0.2 then a 0.12 μm polycarbonate membrane, the supernatant and pellet fraction of the filtrate centrifuged at 19,000 rpm for 10 min, and in the fraction of the pellet obtained with a 0.45 μm millipore filter. Several kinds of microorganisms were associated with MWMV in the centrifuged pellet and filtered fractions, but zoospores of an Ophidium-like fungus was considered the most likely vector.
PATTERN RECOGNITION ANALYSIS OF SPATIAL AND TEMPORAL DISEASE SPREAD. David S. Marshall and Gregory Shaner, Department of Botany and Plant Pathology, Purdue University, West Lafayette, IN 47907.

Pattern recognition analysis utilizing two measures of similarity was developed to study wheat leaf rust development. Prototype classes of temporal disease progress patterns were determined for five distances from a point source in plots of the susceptible winter wheat cultivar Monon. Temporal disease progress patterns in different Monon clones were compared to the prototypes. The distance from the point source in the different plots was determined with an accuracy of 86 and 82 percent for Buclidean and Mahalanobis distances, respectively. The results of this study indicate that distance from a point source can be determined by monitoring temporal disease progress. Disease progress data, for each of the four compass directions, were averaged over the four compass directions. Consequently, wind direction was not a factor.

REUSE OF MDW-A COATED ENZYME-LINKED IMMUNOSORBENT ASSAY PLATES. M. A. Mikel, Cleora J. D'Arcy, and R. E. Ford. Department of Plant Pathology, University of Illinois, Urbana, 61801.

The technique developed by Bar-Joseph et al. (Phytopathology 69: 424-426) was modified for reuse of male dwarf mosaic virus strain A (MDW-A) specific, 3-globulin on polystyrene microtiter plates. Treatments were 0.1% glycine-CHI at pH 2.1, 2.5, or 2.8, each for 2, 30, or 60 min. Control wells were uncoated. The treatments were applied to plates that had been previously blocked either by addition of 3 M NaOH, or by transferring individual well contents into NaOH. For NaOH-blocked plates, the dissociation efficiency (DE) was 51 to 79% for glycine-CHI, 24 to 70% for glycine-CHI and 3 M NaOH. DE was 91 to 96% for glycine-CHI, and it was 98% for NaOH. In a second experiment, 5-12 month old NaOH-blocked M-A and soybean mosaic virus plates were recoted for MDW-A. Plates were washed and rinsed prior to recocating. Recocated wells were specific for M-A, whereas wells not recoted were at background levels.

Effect of cropping history, cultivar and sampling date upon recovery of fungi from soybean roots. J. O. Murphy, R. J. Shortt, and J. B. Sinclair. Department of Plant Pathology, University of Illinois, Urbana, 61801.

The effects of cropping history, cultivar and sampling date upon recovery of fungi from surface disinfested tap roots 20, 40, 54, 68, 82, 96, and 110 days after planting (May 30, 1980) was determined using triplicate multiple regression. Tap root pieces (1 cm) were washed in 0.2% from 2-7 cm below the soil line, dried in 95% ethanol and surface disinfested in 10% Clorox. The most frequently recovered fungi were Fusarium spp., Glomusmos sp., Phaseolin sp., Phomopsis sp. and Trichoderma sp. At various dates recovery of M. phaseolina and Phomopsis sp. was greater from a field previously planted to soybeans than to corn, and greater for Trichoderma sp. from a field previously planted to corn than to soybeans. Recovery of M. phaseolina and Phomopsis sp. also were affected by cultivar. Recovery of M. phaseolina was greater from early maturing cultivars than late. Recovery of B. roseum was affected by sampling date and Fusarium spp. were unaffected by any factor.

YIELD LOSSES DUE TO ANTHRACNOSE AND DIPLODIA STALK ROT OF CORN. T. A. Nort and D. G. White. Plant Pathology Department, University of Illinois, Urbana 61801.

Twenty-four corn hybrids were inoculated in the first elongated internode by injection of a spore suspension of Colletotrichum graminicola or Diplodia maydis to determine potential yield loss. Experiments were done for 3 years from 1978-80 with a second location and the D. maydis test added the last two years. Treatments were compared to a water control. Depending on year and location, losses due to C. graminicola ranged from 0-12.3% for all hybrids and from 0-53% for specific hybrids with 12/3 combinations having the highest losses. Inoculations with D. maydis did not significantly improve yields, but was added to the most important component of yield loss, but kernel weight reductions also occurred. Yield loss from natural infection of C. graminicola was 2.4% in 1978 as estimated by paired plant comparisons.

COMPONENTS OF RATE LIMITING RESISTANCE IN 6-ROW SPRING BARLEY TO NIT BLOTCH (PYRENOSORPHA TERES) USING A SEED GERMINATION PAPER TECHNIQUE. E. W. Hutter, Jr. and V. D. Federson. Department of Plant Pathology, North Dakota State University, Fargo, ND 58105.

Variatetal effects on disease efficiency (DE), latent period (LP) and sporulation (SP) are cumberomous parameters that because of extensive growth of the host space is often required to accommodate the need for defined environmental conditions and large sample sizes. The use of rolled seed germination papers reduces space constraints and labor costs. Paired comparisons were made between 'Glen' and 'Larker' (moderately resistant and susceptible respectively based on disease reaction). Sporulation was significantly higher on 'Larker' while DE was significantly higher on 'Glen'. 6-row barley transformed separately on either 'Glen' or 'Larker', DE remained higher on 'Glen', indicating that this attribute is not affected by maintenance on one variety. There were no significant differences for LP. The DE of 7 other 6-row barley varieties was also determined. These experiments suggest that DE as well as disease reaction should be considered as a means of evaluating rate limiting resistance in 6-row barley.


Necrotic spots on developing barley kernels were observed only rarely on spikes before 1977, but were common on sprinkler irrigated Klages barley in southern Idaho in 1977. Necrotic lesions on barley leaves and leaf sheaths were also observed in 1980. Affected kernels had tan to dark brown necrotic spots with distinct margins. Lesions varied in size, were 2 mm in diameter, and were predominantly the lamina. Usually, necrosis did not extend into the seed coat. On leaves, tan to dark brown lesions coalesced into elongated necrotic areas that slowly expanded laterally. A gram negative, oxidase negative, catalase positive, bacterium, identified as Pseudomonas syringae pv. syringae was the causal organism. Inoculation with an air brush was the most reliable of several methods tested for inducing kernel blight. Infection of barley lesions occurred most often in kernels inoculated before the lemma became attached to the seed.

A COMPARISON OF THE INFECTI ON OF HEALTHY AND MOSAIC (TMV) NICOTIANA SIVELSTYRSE BY NECROTIC STRAINS OF TMV. J. L. Sherwood and D. W. Fulton, Dept. of Plant Pathology, Univ. of Wisconsin-Madison, Madison, WI 53706.

Twenty-one to 242 times more of a necrotic strain of TMV was required to produce an equal number of lesions on mosaic as on healthy N. sylvestris, but slopes of infectivity curves were similar. Resistance of mosaic plants to superinfection was not due to inhibition of necrosis; non-necrotic starch lesions did not occur, nor was there a decrease in thickness of external epidermal cell walls. No inhibitor of TMV multiplication in mosaic leaf tissue was detected. Growing mosaic or healthy plants at 32 C increased resistance to superinfection or infection, respectively. Catalase activity did not differ significantly in mosaic and healthy plants, but mosaic plants had higher peroxidase concentrations than healthy plants. When mosaic plants were superinfected, peroxidase activity did not significantly increase until after the onset of necrosis. Induction of b proteins could not be correlated with resistance to superinfection.

SOYBEAN SEED QUALITY LOSSES ASSOCIATED WITH BEAN LEAF BERTHLES AND ALTERNARIA TENUIS. R. J. Shortt, J. B. Sinclair, and M. Kogan, Depts. of Plant Pathology and Entomology, Univ. of Illinois, Urbana, IL 61801.

Abnormally high populations of the bean leaf beetle (Gectosoma triforcata) in 1980 caused extensive injury to soybean pods in some areas of Illinois. Pods and seeds of six soybean cultivars grown near Urbana were analyzed for fungal infection and loss of seed viability. Pod injury was most severe on late-maturing cultivars and least on Elf, a heavily pubescent cultivar. The incidence of seedborne Alternaria tenuis was correlated with pod injury (r=0.53) and loss of seed viability (r=0.55). After 5 serial transfers in the lab, infection and seed viability losses varied greatly among cultivars. Fungicide seed treatment increased the germination of seeds from damaged pods. In a greenhouse study A. tenuis consistently decayed seeds within artificially injured pods but did not infect seeds within uninjured pods. Nine species of fungi known to infect soybeans were isolated from adult beetles.

LOPHODERMUM NEEDLECAST ON PONDEROSA PINE IN NORTH DAKOTA. J. A. Willis and W. N. Stack, North Dakota State Univ. Fargo, ND 58105.

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An 8 ha plantation of mixed red and ponderosa pine in northeast North Dakota a needlecast disease was found defoliating the ponderosa pines. The red pines were not damaged. We first observed that this disease was present in the plantation at low levels in 1977. In 1980, most needles were dead on the lower 2 m of trees that averaged 6 m in height. The fungus was present on needles in the upper crown of several groups of dead trees. Many of the infected needles remained attached to branches after death. The associated fungus was found to be a Lophodermium species. Dr. J. Stailey, U.S. Forest Service, identified it as similar to an unnamed species commonly found on red pine in Minnesota. The red pines in this plantation were wild seedlings collected from Minnesota. It seems likely that the disease was introduced to this plantation on the red pine. The disease has since been found in a nearby ponderosa pine plantation. Characterization of the fungus is underway to confirm identification. Level of spore release is being monitored to find optimum time of fungicide application.

An isolation technique to quantify resistance in potato to species of Verticillium. F.J. Zambino and R.A. Anderson, Dept. of Plant Pathology, Univ. of Minnesota, St. Paul, MN 5510B.

The pathogenicity of isolates of Verticillium dahliae from diverse hosts was tested on potato, tomato, and eggplant. Plants were inoculated by clipping root tips and immersing roots in a suspension of 10⁶ conidia/ml. A diagnostic medium was prepared by adding 1 ml agit, 10 mg streptomycin sulfate and 5 mg penicillin G to a sterile solution of 1% agar with 0.5% KSCN at 50°C. This medium was poured over stem sections. All isolates were recovered from all inoculated hosts within 8 wk. In combinations of a susceptible host and a virulent isolate, colonies developed throughout the agar. Ten potato clones were inoculated with six isolates of Verticillium species pathogenic on potato. In this test the agar medium was poured over sap expressed from a 1 cm stem section. Colony numbers were correlated with disease resistance. From susceptible Kennebec plants inoculated with V. dahliae or V. albo-atrum, an average of 74.5 or 87.5 colonies per plate were recovered, respectively. From resistant plants of clone CF73531, 2.1 and 1.5 colonies per plate were noted.