

A better understanding of *Botrytis cinerea* strains from apple could be useful for their identification and control. Forty isolates were selected from approximately 200 collected in BC apple orchards. The 40 isolates were evaluated for pathogenicity by inoculating apples of six different cultivars. Fungicide resistance of the isolates was determined by growing on Potato Dextrose agar amended with benomyl or cyprodinil. Isolates were tested for vegetative compatibility by challenging one with another on PDA agar and determining if a barrage formed. Results of the pathogenicity and fungicide resistance tests indicated that the isolates varied widely in both pathogenicity and resistance. Some of the isolates were compatible to one another and several compatibility groups were identified. The groups appeared to correspond to different geographical areas. Studies have been initiated to determine if vegetative compatibility groups can be identified by unique DNA sequences.

Seed decay in soil associated with green manure amendments. N. SHORT (1), K. Sivasithamparam (1), R. Gallagher (1), B. Degens (2), and N. Galwey (1). (1) Faculty of Agriculture, University of Western Australia, Australia 6907; (2) Waters and Rivers Commission, Western Australia 6004. Phytopathology 91:S82. Publication no. P-2001-0594-AMA.

The addition of green manure significantly increases both the organic matter and microbial activity in the sandy agricultural soils of Western Australia. Increases in soil microbial activity may lead to an increase in the extent of seed invasion by microorganisms. Degradation by soil microbes has been found to cause seed mortality in some plants. This study aimed to determine if changes to the biotic and abiotic soil environment that accompany incorporation of green manures would increase seed decay. The addition of green manures consisting of ground lupin, oat or mustard plants increased soil microbial activity. Lettuce, cress and lupin seeds buried in amended soils were rated for survival or decay. The viability of the seeds with time was related to changes in biotic (soil microbial activity) and abiotic (soil nutrient content) factors following green manure amendment.

The effects of temperature and pH on the growth of Asian pear pathogen, *Erwinia pyrifoliae*. R. Shrestha, J. H. Hur, and C. K. LIM. Division of Biological Environment, College of Agriculture and Life Sciences, Kangwon National University, Chunchon, 200-701, Republic of Korea. Phytopathology 91:S82. Publication no. P-2001-0595-AMA.

Erwinia pyrifoliae, which causes necrotic symptoms in branches of Asian pear tree, was first reported from Chunchon, South Korea in 1999. Chunchon has its unique climate, severe cold in the winter upto -20°C and over 38°C in the summer. The effects of temperature and pH on the growth of *E. pyrifoliae* are reported here for the first time. Growth rates were measured *in vitro* by an automated turbidimetric system Bioscreen, at 3°C intervals over the range of $12 - 39^{\circ}\text{C}$. The maximum (36°C) and optimum temperatures (27°C) were estimated with a doubling time of 2.69 hours and 1.53 hours respectively. Similarly, growth at different pH over the range of 2.0-9.0 with intervals of 0.5 units was observed in Mannitol Glutamic Yeast (MGY) broth medium. Maximum growth was measured at pH 7.0-7.5. No significant differences in the growth of *E. pyrifoliae* were observed in maximum and optimum temperatures, and acidic condition when compared with those of *E. amylovora*, the fire blight pathogen. Instead, *E. pyrifoliae* showed higher growth rate at low temperature and slightly alkali condition in comparison to *E. amylovora*.

Comparison of fungicide spray programs for control of scab on peaches. E. J. SIKORA (1), J. A. Pitts (2), R. Boozer (3), and E. M. Bauske (4). (1) Dept. of Ent. & Plant Path., Auburn Univ., AL; (2) Chilton Area Hort. Sta., Clanton, AL; (3) Dept. of Hort., Auburn Univ., AL; (4) AWIS Weather Services, Auburn, AL. Phytopathology 91:S82. Publication no. P-2001-0596-AMA.

Alabama peach producers often use sulfur instead of captan in their cover sprays to control scab *Cladosporium carpophilum*. Though captan is more effective in controlling this disease, sulfur is favored due to its low cost. Our two year study was designed to compare sulfur and captan for their effectiveness in controlling scab and to determine which product is more economical. Seven treatments were replicated four times in a RCB. Treatments included an unsprayed control and six fungicide programs that differed in cover spray and preharvest fungicide treatments. Each program included two applications of Bravo 720 at shuck split and petal fall, seven cover sprays of Captan 50WP 5 lb/A or Sulfur 80% 9 lb/A at 10-14 d-intervals, one application of Captan, Rovral or Orbit 7-days preharvest, and one application of Orbit 1-day preharvest. Incidence and severity of scab were rated at harvest on 40 fruit/plot. Captan programs usually had significantly more marketable fruit than sulfur programs.

Use of mutualistic fungal endophytes for biological enhancement of the culture derived planting material for the control of fungal wilt and parasitic nematodes on banana. R. A. SIKORA. Inst. fuer Pflanzenkrankheiten, Univ. Bonn, Nussallee 9, 53115 Bonn, Germany. Phytopathology 91:S82. Publication no. P-2001-0597-AMA.

A large number of non-pathogenic fungi were isolated from healthy rhizomes and root tissue of different cultivars of banana growing in plantations in Africa and Central America. The isolates were screened for their ability to control Panama-wilt, *Fusarium oxysporum* f. sp. *cubense*; the burrowing nematode, *Radopholus similis*; and banana weevil borer, *Cosmopolites sordidus* in the green house on tissue culture propagated plantlets. Reduction in wilt was only observed at low preplant pathogen density in the soil. VCG testing with known tester strains of pathogenic forms of *F. oxysporum* affecting plantlets inter-cropped with banana were conducted to verify non-pathogenic nature of the endophytes and proved negative. Significant reductions in nematode infection were obtained with select isolates following pre-treatment of plantlets with spores of the endophytes. A number of isolates also were shown to parasitize weevil eggs and reduce larval feeding in the rhizome. Mechanisms of action and IPM strategies will be discussed.

Disease resistance through biotechnology: Assessing benefits to U.S. growers. C. S. SILVERS and L. P. Gianessi. National Center for Food and Agricultural Policy. Phytopathology 91:S82. Publication no. P-2001-0598-AMA.

The National Center for Food and Agricultural Policy completed a survey of thirty crops in the U.S. for which genetically engineered cultivars have been or are being developed for improved pest management. These include crops that have been engineered for resistance to viral, fungal and bacterial pathogens. Crops that have been engineered for disease resistance will be reviewed, including the diseases targeted and the proposed mechanisms of resistance. For each crop reviewed, estimates of potential, and in some cases already realized, benefits of disease resistance through biotechnology will also be presented. Impacts discussed will include improved production, decreased costs of production, and reductions in pesticide use.

Incidence of the fungus *Phytophthora* associated with *Diaprepes abbreviatus* and other root weevil species in Texas citrus. M. SKARIA (1) and I. Victor French (1). Texas A&M University-Kingsville Citrus Center. Phytopathology 91:S82. Publication no. P-2001-0599-AMA.

The presence of the sugarcane root stalk borer weevil, *Diaprepes abbreviatus*, was confirmed (October, 2000) in an orange orchard near McAllen, Texas. This was a result of several months of investigations to identify the cause(s) of rapid decline and death of orange trees in several citrus orchards in the Texas Lower Rio Grande Valley (LRGV). Affected trees first showed severe leaf wilt, yellowing and defoliation, followed by tree death in 4-5 weeks. Trees at several locations were pushed out and the roots were washed with a handgun sprayer. The roots showed extensive insect feeding injury (channeling), together with severe *Phytophthora* root rot. Most recently, grapefruit trees have also been found with similar decline symptoms. A survey of grapefruit, orange, and lemon trees in the LRGV citrus orchards is currently underway to identify the incidence, severity, and distribution of *Phytophthora parasitica* and/or other species associated with the weevil complex.

Sonata, a novel biofungicide for rust control in peppermint. W. R. SLA-BAUGH (1), J. Calkin (2), and J. Cacka (3). (1) AgraQuest, Inc., Parma, IL 83660; (2) AgSolutions, Inc., Corvallis, OR 97330; (3) Western Farm Service, Rickreall, OR 97371. Phytopathology 91:S82. Publication no. P-2001-0600-AMA.

Rust, caused by *Puccinia menthae*, can be a serious disease on peppermint (*Mentha piperita*) grown in the Pacific Northwest. Severe defoliation may result in reduced yields. During the 2000 growing season, Serenade WP (*Bacillus subtilis*, strain QST 713) and Sonata WP (a new biofungicide candidate) were compared with propiconazole for efficacy to control rust on the cultivar Refined Murray in the Willamette Valley. Disease pressure was high in the trial with an average disease severity of 50 percent on untreated foliage. Serenade and Sonata were as effective or more effective than propiconazole. Serenade at 8.9 kg/ha, Sonata at 8.9 kg/ha and propiconazole at 0.17 kg ai/ha when applied weekly provided 36, 72 and 37 percent control, respectively, based on the area under the disease progress curve. A second trial on the cultivar Black Mitcham provided similar results. In summary, Serenade and Sonata appear to be as effective as conventional fungicides. Serenade and Sonata also offer additional benefits as resistance management tools with low environmental impact and short preharvest intervals.

Combinations of different fungicides for control of storage rot in potato. G. Kleinkopf (2). (1) University of Idaho Kimberly. Phytopathology 91:

Storage potato losses reach \$100-\$500 per acre. Fungicide registered over 80% of *G. p.* rot antagonistic biofungicides, based on individual strains, consistency include of strains with T. vidualy, in com. cumstances (diff. Strain combinati. tency than indivi. not significantly.

RAPD characterisation of *D. muscivora* morphs. D. R. Wisconsin, MA. 2001-0602-AMA.

RAPD marker analysis of *D. muscivora* morphs. These morph *D. muscivora* (anam. 21-24 x 12-14) those of *B. r.* reduced 86 frag. ated. UPGM among isolates (Israel, Mor. Zealand) and Europe) and Published 1. Whether th. other speci.

Evaluation of *Phytophthora* spp. in New York State. Plant Path. 91:S83.

This research is a spatial damage assessment putting gen. and num. 120 estab. genera. samples. mella sp. spatial d. ports the. the north.

Identification of *Ustilago* spp. in *Ustilago* and *S. Athens*. 0604-A.

The co. only t. genicid. identi. filam. muta. syste. tify. ment. com. use. the.