Singh, U. S., Nashaat, N. I., Doughty, K. J., Awasthi, R. P., Heran, A. and Kolte, S. J. 1997. Induction of local and systemic resistance to virulent isolates of Peronospora parasitica and Albugo candida in Brassica juncea cotyledons by an avirulent isolate of A. candida. American Phytopathological Society (APS). pp. S90

Relationships of in vitro pathogen inhibition to potato scab biocontrol by antagonistic *Streptomyces* spp. K. SHIMIZU (1), L. L. Kinkel (1), and J. L. Schottel (2). (1) Dept. Plant Pathology and (2) Dept. Biochemistry and Plant Molecular Genetics Institute, University of Minnesota, St. Paul, MN 55108. Phytopathology 87:S90. Publication no. P-1997-0639-AMA.

Spontaneous mutants of two disease suppressive *Streptomyces* strains were selected to investigate the relative importance of in vitro pathogen inhibition to the biological control of potato scab. Mutants were selected based upon their reduced ability, compared with the parental strains, to inhibit the growth of pathogenic *S. scabies* in vitro. Though no longer completely inhibitory towards any of the *S. scabies* isolates tested, all mutants retained resistance to in vitro inhibition by the parental strains. Mutants were closely related to the parental strains and to one another based upon analyses of cellular fatty acids and DNA fingerprints generated by PCR. To date, no reductions in the efficacy of biological control of potato scab by the mutants have been observed in the greenhouse test. These data suggest that in vitro pathogen inhibition assays may not be predictive of the potential of antagonists to inhibit potato scab development in soil.

Characterization of *Cyathus olla* isolates, a potential biological control agent. T. C. SHINNERS and J. P. Tewari. Dept. Agricultural, Food, and Nutritional Science, University of Alberta, Edmonton, Alberta, Canada T6G 2P5. Phytopathology 87:S90. Publication no. P-1997-0640-AMA.

Cyathus olla, a bird's nest fungus, is a potential microbial inoculant intended to accelerate canola residue decomposition and hence reduce incidence of stubble-borne diseases. Isolates collected from central and northern Alberta, Canada are being evaluated based on their stubble colonizing and decomposing capabilities. Taxonomically, these isolates are classifiable as *C. olla* and *C. olla* f. sp. *anglicus,* however, isolates have been collected that appear similar to *C. olla,* but vary in peridial morphology, fruiting requirements, and cultural characteristics Molecular characterization of *C. olla* isolates by PCR based RAPD analysis revealed distinct RAPD fragment patterns. These "fingerprints" differentiated *C. olla* from *C. olla* f. sp. *anglicus,* and produced a RAPD pattern with a fragment polymorphic to the latter, which corresponded to the variant isolates. These RAPD fragment patterns, in conjunction with morphology, fruiting, and cultural characteristics suggested that these isolates may be variants of *C. olla* that have not been taxonomically described to date.

Host range of the cucurbit powdery mildew. N. SHISHKOFF and M. T. McGrath. Cornell Univ., Long Island Hort. Res. Lab, Riverhead, NY 11901. Phytopathology 87:S90. Publication no. P-1997-0641-AMA.

Powdery mildew caused by *Sphaerotheca* is a serious disease of cucurbits but the life cycle of the pathogen is poorly understood, in part because of confusion concerning its identity. It is usually referred to as *S. fuliginea* (Schlecht.:Fr.) Poll., or *S. fusca* (Fr.) Blumer. An examination of herbarium specimens identified as *Sphaerotheca fuliginea* on various hosts showed that they consisted of at least three morphologically distinct taxa (differing in the diameter of the thin-walled ascus tip). One is probably *S. fuliginea* (and may include the powdery mildew from cucurbits), one is probably *S. fusca* and the third is an as yet unidentified *Sphaerotheca. Sphaerotheca* from cucurbits infected plants in the Astereaceae, Fabaceae, Malvaceae, Ranunculaceae and Scrophulariaceae, but such infections tended to be sparse and difficult to maintain. Cross-inoculation experiments with squash, *Matricaria, Bidens* and *Taraxacum* showed that mildews from each host could often weakly infect the others, but the cucurbit powdery mildew sporulated strongly only on cucurbits and *Matricaria.*

***Nicotiana glauca* as a model system for screening bacteria for biological control of *Agrobacterium vitis*.** P. L. SHOLBERG and K. C. Eastwell. Pacific Agri-food Research Centre, Agriculture and Agri-Food Canada, Summerland, B.C. V0H 1Z0. Phytopathology 87:S90. Publication no. P-1997-0642-AMA.

Biological control of grape crown gall has been hampered by lack of a system to rate potential biocontrol agents. *Nicotiana glauca* develops large galls when inoculated with *Agrobacterium vitis* and was used to screen 17 bacterial isolates. Initially, each isolate was screened on two plants in which five wounds were made along the plant stem. Each wound was inoculated with 25 microliters each of biocontrol agent and *A. vitis* grown for 24 hr at 30C in nutrient broth, washed and resuspended in saline and adjusted to OD620 = 2.4. *A. vitis* was either inoculated immediately after the biocontrol agent had been absorbed (time = 0) or after one week (time = 1wk). Crown gall was evaluated 6 weeks later by counting number of galls and measuring gall area. Five biocontrol agents reduced galls on *N. glauca* plants and were studied further using ten plants per treatment. Isolate 1100-6 significantly reduced the number of galls from 5.0 to 0.6 and from 1.7 to 0.4 when inoculated with *A. vitis* at time = 0 and 1wk respectively. The use of *N. glauca* has made it possible to identify at least one potential biocontrol agent.

Hyphal fusion across vegetative compatibility groups and formae speciales of *Fusarium oxysporum*. E. R. SIEGEL and R. W. Schneider. Dept. Plant Pathology & Crop Physiology, Louisiana State Univ. Agric. Center, Baton Rouge, LA 70803. Phytopathology 87:S90. Publication no. P-1997-0643-AMA.

Epifluorescence microscopy and differential staining were used to distinguish between different strains of *Fusarium oxysporum* in liquid cocultures. Germinated microconidia of strains to be paired were stained with DiIC(18) (red) or DiOC(18) (green) (Molecular Probes), then mixed in nitrogen-free medium for overnight incubation. Within *F. o. lycopersici,* hyphal fusions were observed between strains belonging to different vegetative compatibility groups (VCGs). Cellular degeneration was not seen in vegetatively incompatible cells joined by hyphal fusions. Prototrophic growth was microscopically evident in pairings between same-VCG nitrate nonutilizers after a one-day incubation in liquid medium containing nitrate. Hyphal fusions were observed between *F. o. lycopersici* and 10 of 11 other formae speciales but were rarely observed between *F. o. lycopersici* and other species. None of the pairings that yielded interforma hyphal fusions contained strains of the same VCG.

Electron microscopy of virus-infected *Ipomoea* spp. J. SIM, R. A. Valverde, and C. A. Clark. Dept. of Plant Pathology and Crop Physiology, Louisiana State University, Baton Rouge, LA 70803. Phytopathology 87:S90. Publication no. P-1997-0644-AMA.

Sweetpotato samples collected from the field were grafted to various *Ipomoea* spp. Two samples designated: Comeaux (in *I. setosa*) and W-285 (in *I. aquatica*) showing leaf distortion and foliar mottle symptoms, respectively, were selected for electron microscope studies. Tissues were fixed and thin sections examined. Filamentous particles in the phloem vessels and along the tonoplast of vacuoles of phloem parenchyma were observed in the Comeaux sample. Filamentous virus particles were observed in the cytoplasm and nucleus of phloem cells of the W-285 sample. The particle morphology and tissue localization, suggests that the W-285 sample may be infected with a closterovirus.

Induction of local and systemic resistance to virulent isolates of *Peronospora parasitica* and *Albugo candida* in *Brassica juncea* cotyledons by an avirulent isolate of *A. candida*. U. S. Singh, N. I. NASHAAT, K. J. Doughty, R. P. Awasthi, A. Heran and S. J. Kolte. IACR-Rothamsted, Harpenden, Herts, AL5 2JQ, England. Phytopathology 87:S90. Publication no. P-1997-0645-AMA.

Albugo candida (white rust) and *Peronospora parasitica* (downy mildew) often occur in association on *Brassica juncea.* Populations of *A. candida* and *P. parasitica* contain races that differ in their host-specificity. Virulent infection by *A. candida* is known to predispose the host to subsequent infection by *P. parasitica,* but in this study we investigated how an *A. candida* isolate (IA01A), avirulent on a *B. juncea* line (PPBJ1), affects that host's interactions with virulent isolates of both *P. parasitica* (IP04) and *A. candida* (IA02A). Inoculating one cotyledon with IA01A reduced the severity of symptoms locally if IP04 or IA02A were also inoculated onto that cotyledon, and also systemically, if they were inoculated onto the opposite cotyledon or subsequently-emerging true leaves. Longer intervals (up to 4 days) between IA01A and IP04 or IA02A inoculations, and high IA01A inoculum concentrations, gave greatest protection. There was little protection if the IP04 or IA02A inoculum was applied before that of IA01A.

RNA-mediated virus resistance in tobacco plants transformed with a modified coat protein of tomato mottle geminivirus? X. H. SINISTERRA (1), J. E. Polston (2), E. Hiebert (1), A. M. Abouzid (1). (1) University of Florida, Dept. of Plant Pathology, Gainesville, FL 32611; (2) University of Florida, GCREC, Bradenton, FL 34203. Phytopathology 87:S90. Publication no. P-1997-0646-AMA.

Tobacco plants (*Nicotiana tabacum* 'Xanthi') were transformed with a binary vector containing the coat protein gene of tomato mottle virus (ToMoV)