

Combating Viral, Bacterial, and Fungal Diseases of Ornamental Plants

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Thermotherapy of virus-diseased deciduous fruit trees and ornamental planting stock is done routinely on a large scale at the IR-2 facility near Prosser, WA. According to P. R. Fridlund, over 800 cultivars and clones have been treated successfully in inexpensive homemade cabinets of plastic and wood (see illustration). Research from this station along with that from other scientists

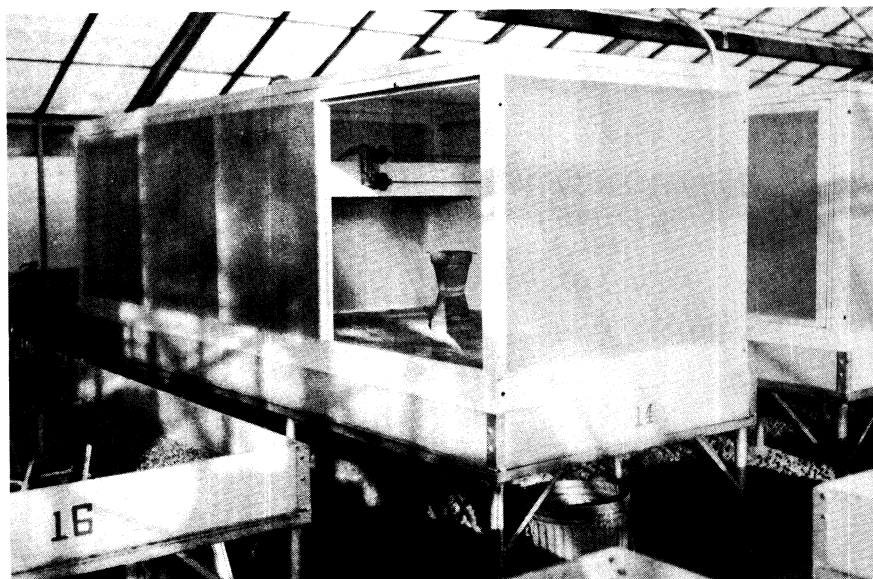
determine if frost damage induced by the bacterium is correlated with disease severity. I would welcome hearing from other scientists and growers who are observing this disease, especially if the incidence is increasing.

An approach to **biological control of Verticillium wilt using genetic engineering** methods is being pursued by C. I. Kado at the University of California, Davis. The topic is of interest to nurserymen because some species of shade trees and landscape plants are afflicted by the disease. The

California, Davis. E. D. Standish, J. D. MacDonald, and W. A. Humphrey inoculated eight juniper cultivars with a pathogenic isolate of *P. cinnamomi*, then compared them for disease development 8 months later. *Juniperus sabina* 'Tamariscifolia' and *J. chinensis* 'Gold Coast' were the most severely affected by root rot, and *J. conferta* 'Blue Pacific' had moderate symptoms. *J. chinensis* 'Plumosa' and 'Prostrata,' *J. horizontalis* 'Bar Harbor' and 'Prince of Wales,' and *J. virginiana* 'Prostrata' appeared relatively free from root rot symptoms. When these same cultivars were inoculated with a pathogenic isolate of *P. cryptogea*, only *J. conferta* 'Blue Pacific' had severe symptoms; when the plants were subjected to periodic soil flooding, however, root rot was severe on all cultivars except *J. chinensis* 'Prostrata' and *J. virginiana* 'Prostrata,' which showed only moderate symptoms. The workers conclude that, with proper irrigation management, some cultivars of juniper may be fairly tolerant or resistant to Phytophthora root and crown rot and should be considered for planting in areas where the disease is a potential problem.

The Bureau of Oceans and International Environmental and Scientific Affairs of the Department of State joined with the Department of Agriculture, the Agency for International Development (AID), and six other federal agencies in sponsoring a **Strategy Conference on Biological Diversity** last November in Washington, DC. The principal objectives were to raise awareness of genetic resource issues, to define U.S. interests associated with the continuing worldwide loss of plants and animals and associated natural habitat, and to recommend an appropriate federal policy and program response at both domestic and international levels.

Under Secretary James L. Buckley and AID's Assistant Administrator for Science and Technology, Nyle C. Brady, welcomed 300 prominent scientists, resource managers, businessmen, conservationists, and congressional aides to the first session. Throughout the conference, Administration officials and private sector representatives emphasized the enormous dependence U.S. agriculture and other commercial interests have on the sustained integrity and diversity of the world's biological resource base. Specific recommendations for action by U.S. public and private sector institutions were developed on issues pertaining to terrestrial plants and animals, aquatic species, microbial resources, and ecosystem management.



Cabinets for thermotherapy of virus-diseased plants.

involved in the IR-2 project has achieved worldwide attention. As a consequence, the XII International Symposium on Fruit Tree Virus Diseases in June included a visit to the Prosser Station plots and facilities. This is the first time the symposium has been held outside Europe.

Nurserymen in the Pacific Northwest are reporting increasing numbers of ornamental plants, such as red maple, Japanese pear, and Bradford pear, showing symptoms attributed to **infection by *Pseudomonas syringae***. My work at Oregon State University includes isolating and collecting *P. syringae* strains to determine the pathogen's geographic distribution and the number of plant species infected. Because some *P. syringae* strains are ice-nucleation active, each newly isolated strain is being screened for ice nucleation activity to

work is being developed in two directions and is progressing fairly well. Kado writes: "First, we have isolated over 60 different bacterial antagonists against *Verticillium dahliae* (cotton and potato strains) and are examining those that release polypeptide mycotoxic compounds. We are currently screening those containing plasmids and anticipate isolating the genes coding the mycotoxins. These genes will be ligated and inserted into *Agrobacterium radiobacter* by means of our mini-Ti vir⁻ plasmid (patent pending). So far, the data look promising. The second long-term approach currently under way is to genetically modify crops for resistance to *Verticillium*. The techniques we are using are those developed in our laboratory on the uptake of plasmid DNA molecules by protoplasts that will be screened, cloned for phenotypic expression of inserted genes, and regenerated into plants."

Greenhouse experiments with **junipers infected by *Phytophthora* root and crown rot** are under way at the University of