News About Nursery Production of Ornamental and Landscape Plants

LARRY W. MOORE
USDA Cooperative State Research Service, Washington, DC

Excluding plant pests of foreign origin has long been used to protect our domestic plants from imported pathogens. Now, according to J. W. Miller of the Florida Department of Agriculture, **containerized shipping** of large amounts of plant materials is posing a new threat. The containers are not opened and inspected at ports of entry but are shipped directly to their destinations, then opened. This procedure can place imported pests closer to potential host plants and out of sight of trained inspectors.

Miller also reports that a privately operated **virus indexing system** detects cymbidium mosaic and odontoglossum ringspot viruses in cultivated orchids. Three commercial orchid nurseries routinely use the system, which is the modified agar-gel immunodiffusion technique developed at Florida State University. Conscientious indexing is expected to significantly reduce the incidence of the two viruses in orchid collections, eventually eliminating the diseases and improving the quality of the plants.

Swiss needle disease of Douglas-fir Christmas trees in the Pacific Northwest can be controlled, according to Gary Chastagner of the Western Washington Research and Extension Center, Puyallup, WA. The disease, caused by *Phaeocryptopus gäumanni* and producing premature needle loss and unsightly trees at harvest, has become a major problem. Workers in Oregon and Washington showed that a single application of chlorothalonil, benomyl, and/or mancozeb, using conventional backpack sprayers, controlled the disease during 1980.

Biological control of crown gall on *Euonymus* spp. by *Agrobacterium radiobacter* K84 has been highly successful at Forrest Keeling Nursery, Elsberry, MO, according to Wayne Lovelace, general manager. Crown gall had virtually forced the nursery to eliminate all *Euonymus* spp. except *E. alatus* var. *compacta* from its production list. Up to and including the 1979–1980 harvest, the nursery was destroying about 40% of its production. Applications thereafter of K84 reduced the incidence of diseased plants to 3% for the first two crops. The third, and current, crop has been inspected twice by state nursery inspectors, who could not find one infected plant in a block of some 25,000 finished plants. The increase in sales of *Euonymus* plants reflects the economic impact of the control measure: from 4,200 for the 1979–1980 season to 10,862 for the 1980–1981 season, with approximately 25,000 finished plants ready for the 1981–1982 season. Lovelace worked closely with Dan Millikan, plant pathologist at the University of Missouri, to ensure proper implementation of the biological control technique.

Clonal accessions at the **Northwest Plant Germplasm Repository** near Corvallis, OR, dedicated April 15, 1981, will include some woody plants used as ornamentals. The clonal stock will be collected, evaluated, and maintained for distribution to scientists for plant breeding and other research, according to Otto Jahn (USDA/ARS), curator, and Melvin Westwood, horticulturist.

The problems inherent in **maintaining virus-free planting stock** and the importance of good diagnostic tools in the hands of qualified cooperating scientists are illustrated by the recent recovery of tomato ringspot virus (TmRSV) from a newly patented (Michigan State University) and introduced apple rootstock called "Mark." The Mark material had been heat-treated and indexed at the IR-2 Repository in Prosser, WA, then returned to Michigan State University, where it was budded onto seedlings. The next year, Mark tops on seedling roots were shipped to the Oregon Rootstock Nursery as source material to be increased rapidly in their new tissue culture facility. By the time the Oregon Department of Agriculture indexed the source trees from Michigan State University, 10,000 small Mark trees had been produced through micropropagation methods. To everyone's concern, some of the source trees tested positive for TmRSV by the ELISA technique. All of a second shipment of source trees from Michigan State University indexed positive at Oregon State University; indicator hosts of cucumber and *Chenopodium quinoa* and the ELISA technique were used. Subsequent indexing at Oregon State University and Washington State University showed that the Mark budwood initially released from the IR-2 Repository did not contain TmRSV. Further investigation disclosed that the seedlings budded with the virus-free budwood from Prosser must have acquired the virus when they were inadvertently planted in a Michigan field infested with *Xiphinema americanum*, a nematode vector of TmRSV. All the 10,000 Mark trees increased at the Oregon Rootstock Nursery were subsequently destroyed, even though no TmRSV was detected in any of the trees assayed for the virus. Increase of Mark rootstock by microculture at this nursery is now done from material shipped directly from the IR-2 Repository. As Ronald Cameron of Oregon State University points out, these events show how rapidly virus-diseased trees could be multiplied by the new methods of plant propagation and dispersed throughout the nation.

How much loss occurs in the nursery from plant disease? Most people agree that better estimates of loss are needed and that estimates are often biased or incomplete. At North Carolina State University, Raleigh, D. M. Benson, R. K. Jones, and K. R. Barker initiated a pilot program to evaluate techniques, strategies, difficulties, and benefits of unbiased crop loss assessments for nursery-produced woody ornamentals. They chose container-grown evergreen azaleas and hybrid rhododendrons and field-grown Japanese hollies infected by *Phytophthora* spp. or parasitic nematodes for the study. The tremendous variations in disease incidence found among nurseries greatly restricted the confidence that could be placed in the estimates (standard error was 80% of the estimates). Because no two nursery operations were the same, such variabilities were expected. The differences in management contrast sharply with how agronomic crops are grown, ie, under more uniform practices in a given geographic area. Benson and co-workers conclude that a much higher level of precision is needed to survey container production of woody ornamentals among nurseries and that the greater amounts of time and money required for such a survey may be prohibitive.

0191-2917/82/05043901/$03.00/0