

Propagation Materials Available

Anyone interested in commercial propagation of this selection may send written requests for materials to: Dr. Dale E. Herman, Department of Horticulture and Forestry, North Dakota State University, Fargo, ND 58105. Dormant, bare root liners will be available for shipment between March 10 and May 10, 1984. Hardwood cuttings can also be supplied. Potted liners will be supplied in June and July 1984 if prior arrangements are made for pickup. Softwood cuttings can be supplied during June.

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BOOKS

How to Grow Tree Seedlings in Containers in Greenhouses, by Richard W. Tinus and Stephen E. McDonald.

USDA Forest Service General Technical Report RM-60. Rocky Mountain Forest and Range Experiment Station, Forest Service, U.S. Department of Agriculture, Fort Collins, CO 80526. 256 pp.

JOHN H. ALEXANDER III

An appropriate subtitle for this book might be "The Mass Production of Seedlings for Forestry." Not a book for the home gardener, it is a manual for the professional nurseryman or prospective nurseryman.

Intending to give as much information as possible, a system of "Confidence Levels" is used to indicate assurance in some of the research. "Level A: thought to be complete and accurate. Level B: believed to be valid, but is subject to further testing. Level C: based on observation . . . offered in the view that some knowledge is better than none."

The authors begin with the question, "should you grow your own trees?" and go on to discuss the alternatives, carefully guiding the reader through the steps necessary to determine the most appropriate size and location for a container nursery.

The first 33 pages give advice for determining size and site. A market evaluation is

encouraged, and production costs are discussed, as are the availability and cost of fuels, water, and labor. Regarding the latter, the authors note that "... one laborer for each 120,000 trees and at least one technical supervisor for each 3,000,000 trees may be used as a rule of thumb."

The next three chapters describe the physical plant, including topics such as greenhouse heating, cooling, and humidity controls. These are followed by chapters on containers and media, temperature and humidity, and lighting. It is the combination of temperature control and lighting that affords the great advantage of greenhouse growing over the more traditional outdoor-production methods. Lighting systems for photosynthesis and for the prevention of dormancy are described. Three standard methods of preventing dormancy are discussed. "Photoperiod can be extended by continuous lighting 4 to 8 hours after sunset or before sunrise. Night break lighting employs 2- to 5-hour interruptions during the dark period. Cyclic lighting is brief interruptions of light repeated every 5 to 30 minutes throughout the dark period. This may require lighting only 2% to 10% of the time." Responses vary with species and within the species when growing genotypes from climatically different areas.

The longest chapter, "Mineral Nutrition and pH Control," provides suggestions for monitoring and controlling the pH and the salt concentration in the growing medium. The authors provide a table of published works on the nutrition of forest trees, which lists research on over 40 species. They also list publications that contain color photographs of known nutrient deficiencies for 19 species. Much emphasis is given here to the preparation and modification of nutrient so-

lutions to maintain optimum growing conditions continuously.

A chapter is devoted to formulating a growing schedule, and detailed growing schedules for 14 species are provided in an appendix.

When container-growing methods are employed for large quantities of seedlings, seeds are sown in the same container that the finished seedling will occupy. In forestry practices, that seedling tree is then planted in its permanent site outdoors. Since germination is seldom 100 percent, the nurseryman must determine how many seeds to sow in the space where he wants only one finished plant. Costs of thinning and of transplanting must be weighed; thinning is always less expensive, but the cost and availability of seed must be considered. This decision should be based on a predetermined germination percentage and the probability of germination in a proportion of the container cells. Probability tables are provided in the appendix.

Record-keeping and the efficiency gained through analysis are stressed throughout. Sample forms for maintaining records are included.

Some of the technological hardware discussed here is no longer available, having been superseded by new products and techniques.

In general, the information is well documented, readable, and frequently cross-referenced. Numerous charts, line drawings, and 45 black-and-white photographs amply illustrate it. An extensive bibliography is provided also. Although this book is primarily concerned with the growing of species important to forestry, it has much information that will be helpful to any production-oriented nurseryman.