

United States  
Department of  
Agriculture

Forest Service  
Southern Region



# Southern Pine Nursery Handbook

## FOREWORD

Southern pine nursery managers have relied on Philip Wakeley's *Planting the Southern Pines* (Agriculture Monograph no. 18, 1954) as the "bible" for 30 years. It is still a warehouse of information and represents the single best reference on forest tree nursery management and planting in the South.

In the late 1970's Robert G. Hitt (then Staff Director, Forest Management, Southeastern Area, USDA Forest Service) suggested that a handbook for southern pine nursery managers would be a very useful publication. This was to be a practical, cookbook type of publication which could also serve as a reference to help bridge the information gap from 1954 to the present. The looseleaf format would enable readers to update their copies with revised information as it became available. This format also would encourage individuals to personalize their handbooks and make them truly operational manuals.

Shortly thereafter, Jack T. May, who had recently retired as Professor of Forestry, University of Georgia, was awarded a 2-year contract to write 14 of the 17 chapters of the handbook. The remaining three chapters

were written by Earl W. Belcher, Jr. (chapter 5, Seed Handling); Charles E. Cordell and T.H. Filer, Jr. (chapter 13, Integrated Nursery Pest Management); and David South (chapter 15, Weed Control).

I coordinated the writing and technical editing with a great deal of assistance from Dwight Brenneman, John Brissette, C.B. Davey, Carl Muller and Lynn Stump. Lynn Stump also provided invaluable assistance with graphics and layout and Barry Nehr assisted with art work. Many other individuals have offered helpful comments and suggestions.

All of us in the Forest Service are indebted to these people for their part in making this a comprehensive handbook.

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# **SOUTHERN PINE NURSERY HANDBOOK**

## **FOREWORD**

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# INTRODUCTION

## History of Reforestation in the South

The first forest nursery in the South was established in the 1820's when the Federal government established a nursery on Santa Rosa Island near Pensacola, Fla. The nursery was built to grow live oak seedlings needed for the production of ship timbers.

After the National Forests were transferred from the Department of the Interior to the Department of Agriculture in 1905, many nurseries were established by the Forest Service in the West. In the South, a small nursery was established in the early 1900's on the Biltmore Forest in North Carolina. The great Southern Lumber Company, Bogalusa, La., established the first industrial nursery in the South, in 1919.

Passage of the Clarke-McNary Law in 1924 provided for the cooperation of the Federal Government with States to produce and distribute forest tree nursery stock for planting idle or unproductive farmland. By the mid-1920's, several States and industries in the South had established nurseries. Among these were the Industrial Lumber Company, De Ridder, La.; the Texas Forest Service, at Kirbyville and Conroe; the Louisiana Forestry Commission, Woodworth; the Camp Jackson Nursery in South Carolina, the Louisiana State University Nursery, Baton Rouge, La., and the Oconee-Denmark nursery at the University of Georgia, Athens. Philip C. Wakeley of the USDA Forest Service, Southern Forest Experiment Station was assigned to a Forestation Project in 1924. This resulted in publication of USDA Technical Bulletin, *Artificial Reforestation in the Southern Pine Region*, in 1935.

The beginning of a new era in seedling production in the South began in 1933 with the establishment of the Civilian Conservation Corps, Soil Conservation Service (formerly Soil Erosion Service) and the Resettlement Administration. The Forest Service and the States increased seedling production by establishing new nurseries or expanding old ones. Research on seedling production was expanded by the Forest Service and some of the forestry schools.

World War II affected nursery operations in several ways. Many of the rural laborers living near nurseries moved to cities and industrial jobs—thus forcing more mechanization of nursery operations. The chemical industry developed a new field of organic and inorganic chemicals to control weeds, nematodes, fungi, insects and other pests. The effects of these pesticides on seedlings could range from beneficial to completely destructive.

New equipment, chemicals and procedures enabled scientists to make reliable analyses of nursery soils and plant components. The first complete soil and foliar analysis laboratory in the South designed for forest tree nurseries was established at Auburn University, in 1953-54.

Philip Wakeley completed USDA Monograph No. 18, *Planting the Southern Pines*, in 1954. This publication summarized the technical knowledge available at that time on nursery management, seedling handling, planting, plantation care, and seed handling. Most of the information was from studies conducted by the Southern Forest Experiment Station and from records of the Forest Service's Southern Region. Results of studies and observations from other sources were also evaluated and included in the Monograph.

The Soil Bank Act of 1956 provided for the expansion of State nurseries to meet the demand for seedlings to be planted under the Conservation Reserve Phase of Public Law 540, and also provided for the expansion of nursery research. Wood-using industries, especially the pulp and paper companies, established new nurseries or expanded existing nurseries as a result of their tree improvement programs and the conversion to short rotation, even-aged management. Under the Soil Bank Program, 1.9 million acres were planted in the South from 1956 to 1961.

The Forest Service continued its involvement in nursery research, but forestry schools, State forestry departments and industry assumed the lead in nursery research between 1950 and 1980. The most active agencies were Auburn University, Mississippi State University, North Carolina State University, University of Georgia, Virginia Division of Forestry and Weyerhaeuser Company.

This handbook summarizes the technical knowledge that has accumulated since the publication of Wakeley's Monograph No. 18 in 1954. The information in this new handbook has been drawn from many sources which include personal observations of nurseries during the past 25 years, research from Federal and State agencies, universities, private industry, and from many publications, especially *Tree Planters' Notes* and the proceedings of the Southern Forest Tree Nursery Conferences.

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## PESTICIDE PRECAUTIONARY STATEMENT

Pesticides used improperly can be injurious to man, animals, and plants. Follow the directions and heed all precautions on the labels.

Store pesticides in original containers under lock and key—out of the reach of children and animals—and away from food and feed.

Apply pesticides so that they do not endanger humans, livestock, crops, beneficial insects, fish, and wildlife. Do not apply pesticides when there is danger of drift, when honey bees or other pollinating insects are visiting plants, or in ways that may contaminate water or leave illegal residues.

Avoid prolonged inhalation of pesticide sprays or dusts; wear protective clothing and equipment if specified on the container.

If your hands become contaminated with a pesticide, do not eat or drink until you have washed. In case a pesticide is swallowed or gets in the eyes, follow the first aid treatment given on the label, and get prompt medical attention. If a pesticide is spilled on your skin or clothing, remove clothing immediately and wash skin thoroughly.

Do not clean spray equipment or dump excess spray material near ponds, streams, or wells. Because it is difficult to remove all traces of herbicides from equipment, do not use the same equipment for insecticides or fungicides that you use for herbicides.

Dispose of empty pesticide containers promptly. Have them buried at a sanitary land-fill dump, or crush and bury them in a level, isolated place.

**Note:** Some States have restrictions on the use of certain pesticides. Check your State and local regulations. Also, because registrations of pesticides are under constant review by the Federal Environmental Protection Agency, consult your county agricultural agent or State extension specialist to be sure the intended use is still registered.