# 14th Southern Forest Tree Improvement Conference



The motif shown on the cover of these Proceedings is a product of the artistic skill of Mr. Edward Merkel of the Southeastern Forest Experiment Station at Olustee, Florida. This design was selected from among 19 designs offered by participants in response to a competition arranged at the 13th Conference in Raleigh, North Carolina.

The Southern Forest Tree Improvement Committee is grateful to Mr. Merkel for contributing this motif symbolizing the purposes and aspirations of the Committee and its members.

# PROCEEDINGS OF THE

FOURTEENTH SOUTHERN FOREST TREE IMPROVEMENT CONFERENCE

Gainesville, Florida June 14-16, 1977

Distributed by;

Eastern Tree Seed Laboratory Post Office Box 819 Macon, Georgia 31202 USA

Sponsored Publication No. 36 of the Southern Forest Tree Improvement Committee

Copies of this publication can be obtained by writing to the: Eastern Tree Seed Laboratory United States Forest Service Post Office Box 819 Macon, Georgia 31202 USA A charge of \$3.50 per copy will be made to cover the costs of printing and postage. Checks should be made payable to the: SOUTHERN FOREST TREE IMPROVEMENT COMMITTEE

### FORWORD

The Fourteenth Southern Forest Tree Improvement Conference was held in J. Wayne Reitz Union on the campus of the University of Florida in cooperation with:

> The School of Forest Resources and Conservation University of Florida

> > and

The Southeastern Forest Experiment Station USDA Forest Service

#### Conference Cochairmen

R. E. Goddard, ProfessorA. E. SquillaceSchool of Forest Resources and ConservationChief Plant GeneticistUniversity of FloridaSoutheastern Forest Expt. Sta.Gainesville, Florida 32611Olustee, Florida 32072

## Local Arrangements Chairman

Anthony S. Jensen, Associate Professor School of Forest Resources and Conservation University of Florida Gainesville, Florida 32611

# TABLE OF CONTENTS

SESSION I: TREE BREEDING	1
Breeding better urban treesproblems, practices and potential. Frank S. Santamour	2
Rooted cuttings in production forests. William J. Libby	13
Extraction and storage of loblolly pine (Pinus taeda pollen). Jerry R. Spragus and Vernon W. Johnson	20
Pollen quantity affects cone and seed yields in controlled slash pine pollinations. David L. Bramlett	28
Early testing of loblolly pine. Ernest M. Long, J. P. vanBuijtenen and M. Wendel	35
Patterns of fusiform rust increase and their implications for selection and breeding. M. M. Griggs and R. J. Dinus	43
Wide crosses in the southern pines. Mike Williford, Ray Brown and Bruce J. Zobel	53
Third-year results of a shortleaf x loblolly pine hybrid progeny test in Georgia. Timothy LaFarge	63
Removal of competition bias from forest genetics experiments. D. T. Cooper and Robert B. Ferguson	70
Development and potential of a longleaf pine seedling seed orchard. D. L. Rockwood and H. R. Kok	78
SESSION II: SEED ORCHARD TECHNOLOGY	87
Seed orchard pest management strategies. Harry O. Yates III	88
<i>Dioryctrua</i> damage in slash pine seed orchards. Suzanne E. Goldman	100
A new cone midge, <i>Cecidomyia</i> spp. (Diptera: Cecidomyiidae) affecting slash pine cones. Isodore L. Williams and Carl W. Fatzinger	104

Effect of an insecticide spray program on slash pine seed orchard efficiency. John F. Godbee, Jr., Terry S. Price, and D. L. Bramlett	108
Evaluation of carbofuran for the control of thrips, coneworms, and seedbugs in a slash pine seed orchard. Edward P. Merkel, Carl W. Fatzinger, and Lee Draper, Jr.	116
Seed orchard seed evaluation testing (SOSET) and cone analysis service (CAS) at the Eastern Tree Seed Lab. Robert P. Karrfalt	
Pitch canker of loblolly pine in seed orchards. L. D. Dwinell, P. L. Ryan, and E. G. Kuhlman	130
Movement of shortleaf pine seed orchards south may greatly increase flowering. R. C. Schmidtling	138
Crown shaping in a slash pine seed orchard. Charles R. Gansel	144
Effects of fertilization on seed orchards. Jack T. May	152
Seed orchard fertilization: optimizing time and rate of ammonium nitrate application for grafted lobiolly pine (Pinus Invida L.), Michael S. Greenwood	164
SESSION III: HARDWOODS	170
Opportunities and limitations in hardwood tree improvement research and development. Eyvind Thor	171
Rooting response of mature American sycamore cuttings. G. Sam Foster and Eyvind Thor	180
Vegetative propagation of American sycamore. Samuel B. Land, Jr	186
Sweetgum variation changes with time. Robert B. Ferguson and D. T. Cooper	194
Black cherry seed source study in northern Alabamaten year results. Paul E. Barnett	201

Characterization of a complex pecan-water hickory population in northern Louisiana.	
Bart A. Thielges, Randall J. Rousseau, and John R. Toliver	206
Tolerance of cottonwood to damage by cottonwood	91.9
leaf beetle. F. L. Oliveria and D. T. Cooper	213
SESSION IV: POPULATION GENETICS	218
Use of isoenzyme techniques in forest genetics research. M. Thompson Conkle and W. T. Adams	219
Use of monoterpene composition in forest genetics research with slash pine. A. E. Squillace	227
Use of mutants in forest genetics research.	
Use of mutants in forest genetics research. E. C. Franklin	239
Analysis of population structure from allozyme frequencies. R. P. Guries and F. T. Ledig	246
SESSION V: MISCELLANEOUS	254
GOT macrogametophyte isoenzymes of Virginia pine. Peter P. Feret and Martha S. Witter	255
A 16-year provenance test of loblolly pine in	
southern Arkansas. Hoy C. Grigsby	261
Genotype x mineral nutrient interactions with fusiform rust resistance in slash pine. C. A. Hollis, J. E.	269
Smith, and R. A. Schmidt	209
How much genetic variance will be reduced through clonal selection. Fan H. Kung	275
Black walnut pollen storage and germination.	
Walter F. Bieneke, Charles J. Masters, and Stephen G. Pennington	282
Quality hardwood seedlings require early mycorrhizal	
development in nursery beds. Paul P. Kormanik, W. Craig Bryan, and Richard C. Shultz	289
Evaluation of clone-nitrogen interactions in Populus deltoides. W. K. Randall and B. G. Blackmon	294