Research Programs with Species Other Than Yellow-Poplar, Sweetgum, Cottonwoods, and Oaks

KEITH W. DORMAN [1/]

Several years ago the Committee on Southern Forest Tree Improvement directed a Subcommittee to prepare a survey of forest genetics research similar to those made in the Lake States and the Western states and Canada. The survey material finally has been pulled together and I hope will be published this year. Studies in forest genetics, forest tree improvement, and studies in closely related fields are included.

At this time it is my job to summarize briefly for you the work underway with hardwoods that was not covered in the papers on breeding oaks, poplar, sweetgum, and yellow-poplar.

I will not attempt to describe techniques used or give the amount of project work completed, but will give the agency, the tree species, and the subjects being investigated. Further information can be obtained from the survey report or from agencies concerned.

1. Auburn University, Department of Forestry. Hardwoods in general. Evaluation of promising exotics or replacements for currently grown species and establishment of exotics as a source of breeding material.
2. Clemson University, Department of Forestry. Ash species (Fraxinus spp.) and black tupelo (Nyssa sylvatica). Use of X-ray to correlate seed embryo conditions with viability.
3. Continental Can Company. American sycamore (Platanus occidentalis) and white ash (Fraxinus americana). Comparison of wood properties where age,site, and spacing are uniform; relationship between wood properties of certain sample trees and their ramet and their open-pollinated progenies; and relationship between wood properties, bole, and crown characteristics and pulp and paper properties.
4. Florida Forest Service. Various tropical forest species. Adaptation tests of species that will grow and produce forest products in south Florida.
5. Florida Forests Foundation. Several species of eucalyptus plus silk oak (Grevilla robusta). Adaptability of promising species to representative southwest Florida land types; relationship between applications of ground rock phosphate and species adaptability patterns; comparisons of various species and the importance of seed source; and, in eucalyptus, performance of progenies of Florida-selected plus trees; performance of Florida plus-tree progenies compared with Australian seed sources and the maternal parent; and comparison of several Australian seed sources.
6. Louisiana State University, School of Forestry and Wildlife Management. American sycamore (Platanus americana). Natural variation in botanical features and certain wood characteristics; relationship of such variation to existence of geographic races, clines, or to environmental influences.
7. North Carolina State University at Raleigh, School of Forestry. Hardwoods in general. Statistical methods applicable to quantitative genetics and to progeny testing of forest trees; inheritance patterns, variance components, and best breeding procedures; and, variation and inheritance of physiological and closely related traits. Water tupelo (Nyssa aquatica) and swamp tupelo (Nyssa sylvatica var. biflora). Variation within tree, among trees, and among stands in wood quality factors; isolation of wood quality factors important in final products; and inheritance patterns of wood quality factors. American sycamore (Platanus occidentalis) and white ash (Fraxinus americana). Development of vegetative propagation methods.
8. Tennessee Valley Authority, Division of Forestry Development. Chestnut (Castanea dentata), black walnut (Juglans nigra), black cherry (Prunus serotina), red maple (Acer rubrum), and birch (Betula verrucosa). Selection and development of trees of most rapid growth, highest quality, and greatest economic usefulness for growing in the Tennessee Valley. Development of vegetative and other methods of propagating and producing select plant material of hardwood tree species. Sugar maple (Acer saccharum). Determination of the geographic limits within which seed should be collected for production of forest planting stock Used within the Tennessee Valley.
9. United States Forest Service, Southeastern Forest Experiment Station, Asheville, N.C. Black cherry (Prunus serotina). Inheritance of stem form, particularly crook and sweep.

1/ U.S.D.A., Forest Service, Southeastern Forest Experiment Station

10. Southeastern Forest Experiment Station, Athens, Georgia. Hardwoods in general. Location, description, and cataloging of individual hardwood trees that exhibit characteristics useful in genetics and tree improvement programs. American sycamore (Platanus occidentalis). Variation in seedling size and optimum size or grade for use in underplanting.
11. Southeastern Forest Experiment Station, Charleston, South Carolina. Water tupelo (Nyssa aquatica) and swamp tupelo (Nyssa sylvatica var. biflora). Effects of saturated and flooded soil conditions on growth, anatomy, and morphology of seedlings from two locations, each in three ecotypes. For water tupelo: red river, black river, and nonalluvial swamp. For swamp tupelo: pond, black river, and nonalluvial swamp.
12. Southern Forest Experiment Station, Gulfport, Mississippi. Hardwoods in general. Application of theories of quantitative genetics to the special problems of breeding forest trees; relation of the concepts of character development and correlations to economically oriented selection and to the genetic variability structure of natural stands of forest trees; analysis, on the basis of present theories, of proposed methods for producing genetically improved seed.
13. Southern Forest Experiment Station, Harrison, Arkansas. Chinese chestnut (Castanea mollissima). Determination of blight resistance, survival, growth and adaptability to two of the better hardwood sites in the Arkansas Ozarks.
14. Southern Forest Experiment Station, Marianna, Florida. Hardwoods in general. Exploratory planting trials of available species, races, or hybrids.
15. University of Georgia, Department of Botany. Hardwoods in general. Growing of callus cultures of male gametophyte tissues in vitro; initiation of bud and root formation on such tissues to obtain haploid plants; and doubling the chromosome number in vitro in an attempt to produce a homozygous diploid; i. e., a true breeding strain which would have much utility in practical as well as basic utilization.
16. University of Tennessee, Department of Forestry. Chestnut (Castanea dentata). Development of trees with resistance to blight by selective breeding and irradiation of nuts. Chinese chestnut (Castanea mollissima) and black walnut (Juglans nigra) Testing of improved nut trees for their adaptability to Tennessee conditions.
17. University of Virginia. Chestnut (Castanea dentata). Testing of trees grown from irradiated seed for resistance to chestnut blight.

This completes the summary of work that was reported. If there is other information that should be included in our survey of genetics and tree improvement research, I will be very glad to have it.