

CURRENT FOREST TREE IMPROVEMENT RESEARCH IN THE CENTRAL STATES

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When I attended the first Lake States Forest Genetics Conference 2 years ago, I could not help noting the enthusiasm and earnestness of the participators in getting a sound tree improvement program under way. Today I see this same enthusiasm and earnestness, and from reports I have read I know that considerable progress has been made during this brief period.

Foresters in the Central States are interested in the work you are doing and plan to do in the Lake States in the field of forest genetics. It may surprise some of you to know that in 1954, typical of recent years, more than 45,000 acres were planted to trees in the Central States. The bulk of this planting is pine, and a good percentage of it includes pine species native to the Lake States. Faced with this demand for coniferous planting stock in a region where few of these species occur naturally, we must depend on cooperators in states to the south, east, and north of the region for seed.

Natural hardwood stands are the dominant forest cover in the region, however, and many hardwoods are planted each year. Our forest tree improvement research program, then, must include studies in the improvement of existing natural stands as well as the selection of high-quality trees--conifers and hardwoods--for reforestation projects.

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Before describing the current tree improvement projects, I should briefly list some of the completed studies which have been helpful in the current program. While at the Purdue University Agricultural Experiment Station, Wright made some rather comprehensive studies of racial variation in white ash and black walnut. At the same institution, Wean and Guard have contributed much to our knowledge of the seeding habits of yellow-poplar, and Carpenter obtained much better germination and development of seedlings by cross-pollination of this species than that obtained by natural, or wind pollination. Working with the Tennessee Valley Authority, Chase reported better nuts and wood from the Thomas black walnut than from native walnut trees. He also reported partial success in rooting black locust cuttings. Henry Hopp, of the Soil Conservation Service, reported definite growth-form variations of black locust. There have no doubt been other studies in the past which I have unintentionally overlooked.

In connection with work on the Dutch elm disease and phloemecrosis, the Agricultural Research Service is making a thorough search for resistant strains and species of this genus. One variety, the Buisman elm, appears very promising.

The Ohio Agricultural Experiment Station has an important program under way in forest genetics. Although initially restricted to sugar maple, work with other important trees, such as oaks and pines, is contemplated. The sugar maple study, undertaken by Kriebel, consists of two parts--one concerned with increasing the yield of syrup, the other concerned with wood quality and growth rate. To date, the study of geographic variations in sugar maple is the most significant aspect of the project; some 40 seed sources have been sampled, and observations of both physiological and morphological differences are being made. A detailed report of the responses of seedlings and small saplings will be prepared in the near future.

During the past 10 years the Central States Forest Experiment Station has begun a number of provenance studies and has collaborated with other agencies in field tests of various hybrids. A large number of species are included in these experiments.

JACK PINE

In the spring of 1954 2-0 jack pine seedlings from 17 different sources in the Lake States were planted in a number of locations in Indiana. Seed for this study was obtained largely from the Lake States Forest Experiment Station from some of the sources used by that Station for similar studies. With cooperation from the Indiana Department of Conservation and Purdue University Agricultural Experiment Station, the stock was produced at a state nursery and planted on old fields and strip-mined lands in the northern and western part of the state.

SHORTLEAF PINE

Two separate experiments, testing various geographic sources of shortleaf pine, have been established. One of these, which included stock from seed of pine from widely scattered locations, was established on old-field sites in southern Illinois in 1949; the other, using seed from seven different sources, was planted in the Missouri Ozarks and was established in cooperation with the Southern Forest Experiment Station in 1953.

LOBLOLLY PINE

Two separate loblolly pine source-of-seed experiments, one in 1949 and the other in 1950, have also been established in southern Illinois. The 1949 tests are independent studies and include stock from seed of seven sources. The 1950 tests, made in cooperation with the Tennessee Valley Authority, include stock from seed of different sources. Taken together, the results of these tests will serve as good checks on the reliability of tests for geographic sources. We have already noted differences in resistance to frost among several sources.

WHITE PINE

At the suggestion of the Southeastern Forest Experiment Station, a rather comprehensive white pine source-of-seed study is being planned. The Lake States and Northeastern Stations, as well as the Ontario Department of Lands and Forests in Canada, will also participate in the experiment. Working plans are in preparation, and we are now making the seed collections.

PINE HYBRIDS

Since 1949 a number of pine hybrids developed at the Institute of Forest Genetics, Placerville, California, have been field tested in southern Illinois. These include crosses and back-crosses of pitch and loblolly, and shortleaf and loblolly pines, planted on old fields in southern Illinois. To date none of the hybrids has been superior to interplanted shortleaf or loblolly pine in either survival or growth.

EASTERN REDCEDAR

An eastern redcedar source-of-seed experiment was also established in southern Illinois in 1951. Eight different sources of seed are being tested. Two of the four blocks planted have already been partially destroyed by fire. Survivals on the unburned blocks have ranged from 14 to 97 percent, and the average heights for the third year in the field range from 1.5 to 2.4 feet.

BLACK LOCUST

For this species we are concerned mainly in a selection that is resistant to the locust borer. Some of the early selections planted in the thirties have developed into good stands; so few of these have been found, however, that they furnish leads only for further testing. Two of the well-known locations of existing selection plantings are at Zanesville, Ohio, and Beltsville, Maryland. Six new selections are being propagated at our Columbus laboratory; the latter were obtained from Dr. W. W. Steiner of the Soil Conservation Service, Beltsville. His strain No. HC-4138 is smooth-barked and grows rapidly; it is expected to suffer less from borer attack than other strains, as the borers prefer to lay their eggs in deep bark crevices.

CHESTNUT

During 1952 and 1953, in cooperation with the Agricultural Research Service, we out-planted a number of blight-resistant strains of Chinese chestnut in Missouri and Illinois. Growth and survival in both locations have been fair, but existing natural vegetation is so luxuriant that frequent release cuttings will be necessary to maintain good development of the chestnut trees.

POPLAR HYBRIDS

In cooperation with the Northeastern Forest Experiment Station, we are continuing to study the use of hybrid poplars in the reclamation of strip-mined land. In 1951, 50 clones were planted on two different sites in eastern Ohio. Results have not been conclusive to date because the response of each clone has varied considerably among replicates.

Recently two clones of a natural hybrid of white poplar and bigtooth aspen have been found in Iowa. Both are fast growing, and one has wood of an attractive, wavy figure. The classification and nomenclature of these clones is now in the process of publication. Both can be reproduced easily by vegetative propagation. Cuttings of each, along with others from the University of Wisconsin and the Province of Ontario, are being field planted to compare growth and wood quality.

WHITE OAK

Epicormic branching of white oak is a problem that must be considered in stand improvement work. Current silvicultural experiments are designed to determine the effects of thinning, pruning, growth rates, stand density, and crown classes on the extent of epicormic branching. In addition to these studies, we are planning to begin experiments to study the role of heredity on the character and extent of epicormic branching.

YELLOW-POPLAR

In 1952 we began a study of yellow-poplar seed sources. Seeds were collected from 13 locations well distributed throughout the range of the species. The first field plots were established in the spring of 1954 in Ohio, Indiana, and Illinois. In addition to the usual stand-source experiments, we are testing the progenies of individual seed trees within each stand, and are attempting to find seedling characters of genetic significance. In the same experiment separate studies are being made to test effects of nursery practices on seedling quality, and to determine the effects of three different seed years on seed and seedling quality.