Illinois Division of Forestry and Tree Improvement

by
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When I started with the Illinois Division of Forestry in 1940, the Division had four foresters and two nurserymen who were not foresters. At the present time, we have 19 foresters and three nurserymen who are all foresters. Most of the foresters are engaged in farm woodland management and other phases of forestry in Illinois.

In 1941 our two Illinois nurseries distributed 10.5 million seedlings. In 1966 we distributed about 7 million plants. The emphasis has shifted from black locust for erosion control to pines, to Christmas trees, to shrubs and trees for wildlife habitat, and recently to hardwoods. There is a good deal of interest in planting black walnut at present. We are collecting 2100 bushels of nuts this fall for direct seeding and seedling production. Eastern white and Scotch pines are in the greatest demand due to their value for Christmas trees.

We are producing more than 30 species and varieties of trees and shrubs in our nurseries. The variety of species being grown makes it more difficult to concentrate on any single species. We need more information on many of them as to seed source in relation to Illinois climate, site, and market factors. Seed procurement is sometimes a major problem.

All of our production is from seed. This is the most economical method. Low production cost is considered essential in the production of forest nursery stock. In procuring seed, we are concerned with the following points:

1. Availability
2. Quality
3. Suitability
4. Superiority

It is often expedient to consider these points in the order listed. It is recognized that they should be considered in reverse order.

Our excellent refrigerated seed storage enables us to insure the availability of many varieties. Some seeds have been in storage for 20 years.

Our purchase specifications and collection practices insure a degree of quality. In purchasing seed which is not available locally, we specify quality and origin. We have been able to control quality by paying on the basis of germination percent as determined by an independent seed test.

Suitability depends on requirements for our area and this must take into account geographic origin of the seed. We have some ideas as to what is suitable but more information is needed. We specify certain sources without real assurance that the seed is from the specified source or that the specified source is best in some cases.

Superiority can be taken to mean proven higher genetic quality. This should be qualified to mean proven higher genetic quality in the area where the trees are to be grown. We have very little information of this kind with regard to Illinois.

The following is a brief outline of our seed collection program over the last 27 years by 10-year intervals.

1940—Seed of native species was collected from the most available local source. Black locust seed was from Idaho. Several thousand pounds were available from CCC collections in Idaho during the 1930's. Seed of northern pine species came from the northern Lake States. Southern pine seed came from available sources.

1950—Seed sources were the same as in 1940, with the exception that southern pine seed was coming from the northern part of the range in Maryland, Tennessee, Missouri, Arkansas, and Oklahoma. The Austrian hill strain of Scotch pine was being grown.

1960—Seed sources were the same as in 1950 except we were using Nauvoo black locust seed obtained from a good stand along the Mississippi River and purchased black locust seed from Italy. White pine was being grown from North Carolina seed for planting in southern Illinois. Scotch pine of Spanish and French origin was being used because of the better winter color for Christmas trees.

1966—Seed sources are about the same as in 1960. Walnut seed is being brought in from most of Illinois and part of Indiana to meet the increased demand for seedlings.

SOURCES OF SEED

We realize that some geographic origins such as white pine and cottonwood from southern parts of their ranges may grow faster than northern sources and that red and white pine seed from the southern part of the Lake States may be better for Illinois than seed from the northern part of the Lake States. Seed from the edge of a tree's range is more difficult to obtain. Provenance tests are generally lacking except for Dr. Jokela's plantings of eastern cottonwood, white pine, and Scotch pine. The Carbondale station is working with black walnut.

We regard southern Illinois seed sources for such species as yellow-poplar, sweetgum, and baldcypress to be best for Illinois and are able to get our own seed. We would like to get yellow-poplar seed from a northern source for possible use in northern Illinois.

Silver maple has a strong tendency to develop multiple stems. I established a planting in the late 1940's for seed production. There are very few single-stemmed trees but these are being released.

We are thinning 25 to 30-year-old planted stands of various species of pine on state lands for seed production. I have planted seed production areas with several of the better strains of Scotch pine.

I have established a clonal orchard of Nauvoo black locust with root cuttings. Incidentally, this Nauvoo source consistently produces about 2 percent albino seedlings. This Nauvoo source is a good phenotype but progeny data are not available as yet.

Professor Polk suggested that I describe some experiences, good or bad, relating to tree improvement. During World War II, shortleaf and loblolly pines were planted in central Illinois. These plantings suffered severe winter injury, although the seed was probably from a northern source. Some hardy individuals may be found. A loblolly pine planting of about IA acre planted at the Mason Nursery about 1938 failed except for three trees which are now large, open grown, orchard-type specimens. Perhaps they are unusually hardy.

We grew the Austrian hill strain of Scotch pine because of its relatively good form and fast growth but lost a good deal of Christmas tree seedling business because of the yellow autumn color of this strain. We are now using the best available strains of Spanish and French Scotch pine. We have been unable to obtain certified seed from known stands of superior quality in Europe.

Cottonwood cuttings from a wide range of Mississippi Valley sources were used to establish a cutting orchard and for observation. There was almost no demand or interest in cuttings from this planting. This may have been due to insufficient publicity. After 3 years, the coppice clumps became so large that it was considered advisable to pull them out.

Dr. Minckler conducted an eastern red cedar seed source study in southern Illinois. A central Tennessee source, among others, showed early promise. The planting was destroyed by fire after about 7 years. Seedlings from Tennessee and seven or more other widely separated sources have been grown at the Mason Nursery for several years. This is being done partly because seed from the various sources happens to be available. There seems to be little interest in red cedar. Unfortunately, most of this seed is from commercial sources. These and similar trials have given us some experience in growing and maintaining the identity of small lots of the same species in the nursery.

What can we do for tree improvement as a state forestry organization at present? The following would seem to be logical procedures:

1. Develop seed production areas by selective thinning of outstanding young planted stands
2. Plant public land for seed production
3. Look for promising parent trees
4. Be more selective in seed collection
5. Try to get seedlings from selected sources planted where they will have the greatest value
6. Continue to assist other agencies in tree improvement work

In the future we should try to obtain suitable land and plant materials for the production of improved seed. Emphasis should be placed on site factors and proximity of management.

The State Division of Forestry does not have a research program but it may wish to provide facilities and personnel for applied research as more material becomes available. State nurseries will no doubt be called upon to produce improved trees as improved seeds and trees become available.

We must recognize that much tree improvement work outside the Central States will not produce material suitable for the Central States and that we need to develop and promote our own program. Extensive testing will be needed to evaluate various selections. Records of the identity and performance of the various selections will be of vital importance.