ON THE TESTING OF SOME CONIFER SPECIES AND TYPES IN NEW YORK STATE

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Although New York State has never had a forest genetics project as such, we have been testing coniferous species and their various geographic races since about 1928. It was in that year that we set out experimental planta -tions of Scotch pine from seed which had been furnished to the Department by Henry I. Baldwin, who had made arrangements for obtaining seed from a number of known sources in Sweden during his sojourn there as a Scandinavian-American Fellow. This might be called our first milestone, and I might add that Dr. Baldwin has been associated at one time or another, with these investigations ever since.

Our main line of investigations was developed around the expanded refor-estation program of the 1930's. During that period the Department embarked upon a large-scale undertaking of acquiring submarginal agricultural lands which were planted and gradually organized into State Forest units, of rich there are now some 350, aggregating more than half a million acres distributed throughout the entire State outside the Adirondack and Catskill parks.

As a result of funds which were made available from the reforestation ap-propriations and because of the active interest in reforestation, the Depart. ment had a going research organization (the Bureau of Forest Investigations) under the senior writer's direction, with a seed laboratory, experimental nur-sery and specially-assigned field testing areas on the State Forests. Eliason with one or two assistants, handled the nursery and seed testing end of the project. The planting operations were headed up at Albany with several tech-nicians assigned to the Bureau for supervising the field plantings, in addi-tion to duties in connection with growth studies and other investigations. It was thus possible to maintain a rigid control of these tests all the way from the seed to the established plantations. I may say that without such adminis-trative control and very close coordination between nursery and field opera-tions, there is little use in anyone starting such investigations.

As regards the over-all Department policy, an attempt to obtain seed of known origin, particularly in the case of Scotch pine, was begun in the middle 1920's. Previous to that, seed had been purchased from the lowest bidder in accordance with the State finance regulations, but by 1920, the unfortunate results of planting this sort of Scotch pine had already become evident, and it was decided to give the technical forestry staff more to say about seed procurement. In 1935 a system of seed lot numbers was given to every sowing in the nursery and carried all the way through the shipping and planting records, so that from then on, it was possible to trace with reasonable accuracy, the origin of any of our plantations, wherever located. Credit for instituting this system should be given to C. Edward Behre, then Director of the Northeastern Forest Experiment Station at New Haven, who really talked us into this without much initial enthusiasm on our part! After the Bureau of Forest Investigations became organized, a large number of species not previously used here in reforestation, as well as special seed stocks of regular species, were introduced. As a result of this rather complex administrative situation, our tests of species and races fall into 5 categories.

1. Those which terminated at the nursery owing to lack of hardiness or failure from some other cause;
2. "Tailor-made" field plots usually of an acre or less, sometimes divided into plots or replications containing as small a number as a dozen trees on specially assigned areas;
3. Stock set out in lots of 1,000-10,000 trees on State Forest areas where a technician from B.F.I. would select the planting area, make the lay-out in advance, and if possible, supervise the planting job;
4. Surplus stock from experimental nursery beds which was "'farmed out" tc the District Foresters with instructions to keep them segregated;
5. Special stocks put into production and given general distribution. There might be anywhere from 10,000-100,000 or more of such trees planted on a number of State Forest areas or even distributed to private owners.

It will be obvious that the records and observations on these different classes of experimental plantings varied in intensiveness with character of the project. Those over which B.F.I. had complete control, whether on areas specially assigned to the Bureau or other State Forest areas where we selected the site, had complete data recorded on forms prepared for this purpose, together with detailed maps of the lay-out. On stock which was "farmed out" we had fairly detailed information furnished by the District Foresters as to location and planting data, and usually had someone go around to check up on them within a year or two after establishment. Where stock was sent out through the regular distribution channels, we had only such records as are maintained by the State Forest organization, but these are sufficiently detailed to permit finding the plantations without difficulty, and give basic data such as date of planting, site and spacing.

In the experimental work, emphasis has been placed on three species or species-groups, Scotch pine, larch and Douglas fir. These are of course, the ones which exhibit the most clear-cut differences in geographic races from different provenances, and in addition, are species which were of particular ecological or economic significance in our reforestation program. A number of other species or groups have been tested, including the five-needled pines and Pinus ponderosa. A detailed tabulation of the different stocks which we have

tested over the years, accompanies this paper. I may say in general, that we have plantings of Scotch pine from just about every significant locality in northern Europe as far east as the Ural Mountains. With larch, the main nursery production has been concentrated on stocks from Scotland and the Sudeten Mountains, although we have one lot from the Italian Dolomites which has confirmed the low opinion always held of this type. Japanese larch, which we have planted since 1926 and which has comprised most of our production since World War II,, appears to be a rather homogeneous species and no attempt has been made to differentiate racial types. During the latter 30's, we went in quite strongly for the so-called Dunkeld hybrid larch, starting with a planting of F1 stock in the fall of 1932 and continuing with more extensive plantings from 1.935 to 1940. Douglas fir tests have included both Rocky Mountain and interior British Columbia sources.

I should make mention at this point of our participation in the exper iments initiated by the International Union of Forest Research Organizations which Dr. Baldwin has described in its broader phases. Through his efforts we received a considerable number of seed stocks of Scotch pine and Norway spruce in 1938, and particularly in the case of Scotch pine we have what I consider to be some excellent field lay-outs. In 1946, we received larch seed from the same source.

Brief mention should also be made of the tests we have made of native species, particularly red pine. So far the only lot which has showed any marked individuality is one from the Province of Ontario and observations are being made on this wherever it has been planted.

The weakness of our project here in New York., and one which it probably shares with a great deal of experimental work, is our inability to follow up the field plots in adequate fashion. Since the war years particularly, the investigative organization has been broken up and the writers have been assigned to responsibilities connected with forest management and nursery administration, respectively, so that except for sporadic observations, the plantations have been pretty much left to themselves. There is a wealth of material here with all the facts of origin and establishment systematically recorded, waiting for the occasion when someone will have the time or interest to look them up.

PROVENANCE OF CONIFER SPECIES PLANTED IN NEW YORK STATE SINCE 1928

Pinus sylvestris (Scotch pine). "Riga"; East Prussia; Silesia; Wurttemberg*; "Danish"; Bavaria; "Polish"; Austria White Russia*; Jutland, Denmark; Scotland*; Regensburg, Bavarian State Forest*; Scandinavia (six provenances); Czechoslovakia (?); Belgium; Finland; Ural Mts.; Grant-On-Spey (Ontario flan tation)* Nebraska N. I. State Forests; Boonville N. Y.; Baker Essex Co. N. Y.; Parishville, N. Y.; South Colton, St. Lawrence Co., N. Y.; Luther, Saratoga Co., N. Y.; Cazenovia, Madison Co., N. Y.

Larix decidua (European larch). Predominantly Scotland and Sudeten Mtns. Also from the Dolomite Mtns., Italy; Switzerland*; Stephenstown, N. Y.

L. leptolepis (Japanese larch). Central Hondo, Japan.

*Exact geographic origin is known.

L. eurolepis (L. decidua x L. leptolepis; Dunkeld larch). Fl seed from the original parents at Athol, Scotland . F. Meinicke)*; seed from an F1 planting on the Athol Estate* Commercial seed.

Pseudotsuga taxifolia (Douglas fir). Rocky Mountain forms-Pike National Forest*;White River National Forest*; Cornell campus; commercial seed. Interior British Columbia forms--interior British Columbia.

Pinus strobes (eastern white pine). Adirondack Mountains; New England; Canada; New York.

P. resinosa (red pine). Adirondacks; Massey,Ontario* (outstanding); Lake States; Canada; N. Y. State Forests.

P. ponderosa (ponderosa pine). Rocky Mountains; Black Hills.
monticola, F. flexilis, P. ayacahuite*. Western United States.

Ficea abies (Norway spruce). Finland*; Switzerland*; Bavaria; Black For est, Germany; northern Europe (very slow); Adirondack plantations.