

## Coastal Douglas-fir breeding; BC's oldest program

Forest genetics research in BC started in about 1956 under the leadership of Dr. Alan Orr-Ewing, a scientist with the Research Branch of the BC Forest Service. Working at the Cowichan Lake Research Station on southern Vancouver Island, Dr. Orr-Ewing began his studies with coastal Douglas-fir. His early work focused on attempts to create hybrid vigour by cross-breeding trees from very different parts of the species range. He also began experiments with inbreeding. Although this early work was not continued in the long-term breeding strategy, Dr. Orr-Ewing demonstrated the benefits of selecting trees based on stem and branch form and on growth rate. This led to plus tree selections in natural stands by forest companies and the BC Forest Service and ultimately to a cooperative province-wide approach to tree improvement and forest genetics. Over 50 years later this cooperative approach continues to thrive as the Forest Genetics Council of BC.

For many years, Douglas-fir was the principle commercial species on the west coast of North America. Tree breeding programs were also started in the United States, leading to cooperative work with the BC program and substantial research collaboration. There was also interest from several European countries and New Zealand, and a rich period of investigation and exchange of material and knowledge ensued. Through the 1960's, substantial work was undertaken by cooperators to find and propagate the straightest and fastest-growing trees for breeding and seed production.

In the early 1970's, a new breeding approach started under the leadership of Chris Heaman. Working with Bob Hattie, many controlled crosses were undertaken and field trial establishment began on a large scale, with about 100 sites planted over a period of 10 years. This work set a solid basis for the selection of parent trees and for seed orchard development by forest companies and the BC Forest Service. The work also led to today's recurrent breeding and selection program that produces selected parent trees for seed production in orchards. Genetic realized-gain trials and other research have also established protocols for quantifying stand-yield gains from the use of orchard seed.

Beginning in the 1990's, Jack Woods led the development of a second-generation breeding strategy that took the best performing parent trees from all progeny trials and brought them together in a mating and testing strategy that would lead to further selections for orchards and a third round of breeding. Orchard production increased and newer orchards began to incorporate 2nd generation selections. This work was taken over by Dr. Michael Stoehr who, working with Keith Bird, advanced progeny testing, selections and breeding to a third generation. Today, orchards are beginning to incorporate high-gain third-generation selected trees and virtually all of the seed used for reforestation comes from advanced-generation seed orchards.

**Photos – Top:** Dr. Alan Orr-Ewing: The founder of forest genetics and tree improvement programs in British Columbia. (FLNRO archives) **Middle:** A fast growing tree in a coastal Douglas-fir progeny test. (J. Woods). **Bottom:** Controlled mating underway at the Cowichan Lake Research Station. (J. Woods)

**Author:** Jack Woods. This article originally appeared in the FGC Annual Report 2011/12.

