

Western larch: a tree improvement success story

The western larch tree breeding and seed orchard program in southeastern BC is one of the most successful in the world. Although western larch is a relatively minor reforestation species in BC, accounting for about 6 million of 250 million trees planted annually, it is highly productive and locally important to the economy and environment of southeastern BC.

Started in 1987, the western larch program benefitted from the experience and knowledge gained from programs already underway in BC. FLNRO scientist, Barry Jaquish, implemented a simple but effective strategy of selection and progeny testing that capitalized on the silvics of the species. Starting with open-pollinated seed collected from over 600 parent trees selected in naturally-occurring forests in the East and West Kootenay areas, over 100,000 seedlings were established in field-based progeny trials throughout the region. Western larch, an early-seral species, grew quickly in these tests and exhibited large levels of genetic variation in growth rate and wood quality. These trials provided the data needed to select parent trees with characteristics desirable for reforestation and timber production.

Concurrent with the selection of parent trees in natural stands, grafts were made for seed orchard development in 1990 at the FLNRO Kalamalka Forestry Centre near Vernon. Western larch at this site proved to be a prolific cone and seed producer, and within just over a decade most of the western larch seed used in reforestation was derived from orchard seed.

As progeny tests matured, they provided high quality data on the performance of offspring from the selected parents. This allowed estimates of parental breeding values and provided the opportunity to remove orchard trees with less desirable breeding values, boosting the average breeding value for growth traits of the remaining trees to over 25%.

Subsequent research in realized-gain trials has verified the gains expected from progeny test selections. Matings are now underway among the better parent trees to develop a second-generation population for field-testing and the subsequent selection of parent trees with higher levels of gain. In seed orchards, the replacement of inferior trees with higher-breeding-value trees continues. The success of this program is attributed to a fortunate combination of species biology and silvics, good seed production in the north Okanagan, high levels of genetic diversity, and an effective and well-implemented strategy by FLNRO staff.



Photos

Left - Western larch stand in the Kettle Valley area (*J. Woods*);

Top right - Harvesting cones in a western larch orchard (*C. Walsh*);

Bottom right - Barry Jaquish in a young western larch realized gain trial near Burton – elite on right, wild stand control on left (*V. Ashley*).



As the BC climate warms, the natural range of western larch is expected to expand northward. Field trials, established over 30 years ago in areas that are climatically similar but not in the natural range of the species, have been very successful. These trials, combined with results from western larch bioclimatic modeling, led to a recent change to the provincial Chief Forester's Standards for Seed Use that allows the limited use of western larch for reforestation in specific areas outside the species' natural range. There is every expectation that western larch will continue to become a larger and more important component of the provincial timber supply, with the associated jobs and economic activity. These opportunities are only now possible because of the vision, skill, and effort of Barry Jaquish and others from FLNRO, industry, and the research community.

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