INCREASING FOREST PRODUCTIVITY IN THE LAKE STATES THROUGH GENETIC IMPROVEMENT

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ABSTRACT.—Genetic improvement is a direct and efficient method for increasing forest productivity. However, a challenge for forest genetics programs in the Lake States is addressing numerous commercially important species simultaneously. An added challenge is working across many relatively small ownerships with differing abilities to fund work. The Minnesota Tree Improvement Cooperative addresses those opportunities and challenges by bringing together the strengths, interests, and resources of many organizations to work on three spruce species and three pine species.

Significant progress has been made in white spruce, where gains of 6 to 10 percent in height growth are currently available, and gains of 15 to 20 percent will come from improved first generation orchards. Black spruce genetic gains after one generation of selection are about 6 percent. A new program in Norway spruce will identify appropriate provenances for use in Minnesota.

First generation jack pine seed orchards are producing seed with gains of 8 to 10 percent in height growth. Gains of 15 percent or more are expected from second generation material. First generation height gain in red pine is 2 to 3 percent, and gains in future generations are also likely to be small. However, even small gains, when applied to large numbers of trees, will supply significant quantities of new fiber. Work in white pine is concentrating on both genetic resistance to blister rust infection and increased growth rates. Recent tests have shown genetic differences in susceptibility to blister rust, which will be further explored in the future.

Several challenges await applied tree improvement programs, including funding, time constraints, biological limitations, and gene conservation issues.

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