EARLY RED SPRUCE REGENERATION AND RELEASE STUDIES IN THE CENTRAL AND SOUTHERN APPALACHIANS

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The aftermath of exploitative harvesting and destruction by fire during the 1920s was first encountered by forest researchers employed by the Appalachian Forest Experiment Station (AEFS) based in Asheville, NC. Two of the more productive researchers were Clarence F. Korstian and Leon S. Minckler, and their studies remain instructive today. This presentation will review their primary conclusions.

Clarence F. Korstian was employed as a silviculturist by the AFES in 1922. His first assignment was to describe conditions on cut-over and burned red spruce stands on the newly formed Monongahela National Forest (WV) and Pisgah National Forest (NC), to outline the reproductive potential of these stands, and to give practical guidance for restoration of this forest type. He compared naturally released, partially released, and unreleased red spruce on cutover stands and found that even for stems that had been suppressed for more than 50 years, fully released red spruce seedlings and saplings could increase annual basal area by as much as 161 percent after 35 years, comparable to stems that had never been suppressed. Trees with large, well formed, pointed crowns and dense foliage responded more quickly and attained higher growth increases than trees with small, rounded crowns and thin foliage. Between 1923 and 1931, Korstian, along with E.F. Frothingham, also initiated a series of planting trials to determine the best species combinations for reforestation of cutover lands. Initially, 20 native and exotic species were tested, and four (red spruce, red pine, balsam fir, and Norway spruce) were considered suitable for reforestation efforts.

Leon Minckler completed and reported on much of this work. In 1945, he presented 3-year results of additional planting trials. Minckler recognized that competing vegetation constituted the biggest obstacle to planting success, and he delineated three common types of sites: 1) those with dense (≥ 80 percent) herbaceous (e.g., bracken, hay-scented fern) and shrubby (blackberry) vegetation, often the best growing sites; 2) young stands of brushy hardwoods (pin cherry, red maple); and 3) burned rocky sites with thin pockets of soils and sparse (< 40 percent) vegetation. Of the 10 treatments tested on type 1 sites, seedling release during the first growing season yielded the greatest survival and growth. For brushy hardwood stands, overhead release again yielded the greatest success. Depending on vegetation density, additional releases were required during the third and potentially the fifth summers, however small openings (5 ft) were as successful as larger openings (10 ft). On severely burned sites, direct seeding of red spruce and balsam fir were relatively successful, however use of normal planted 2-1 nursery seedlings were as successful as super planting stock, fertilizer, rooting hormones, or plant growth regulators. On these sites, the immediate objective was establishment of future seed trees, not reforestation. Ten-year results summarized by Wahlenberg (NC) and Clark (WV) were consistent with Minckler's earlier observations. Practitioners engaged in red spruce restoration should carefully review the results of these and other early researchers.

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