Exotic European (L. decidua), Japanese (L. kaempferi) and Duharian larches (L. gmelina), and their hybrids, have been planted in numerous small trials and operational plantings in this region. Estimated volume growth rates far exceed what is obtained by native conifers. Stands can reach small sawlog sizes in 16-20 years. In one instance a stand was harvested commercially at age 13.Documented results show that, with only basic management, planted larches can offer another option for carbon forestry in this region. The volume growth can be used for long-lived wood products instead of paper or energy as is expected with other short-rotation intensive culture (SRIC) species being studied in the Northeast. We compare estimated carbon storage results in a 60 year management period using these larches. We assess these against relevant benchmarks. Forest plantations offer only limited leverage on the regional carbon budget, but we believe larches deserve consideration as one option. Finally, larch leaf litter is nutrient rich and the species can be used in a variety of silvicultural roles. In terms of climate change, larch has other benefits as well; for example, because it loses its needles, the albedo (reflectance) of larch stands is much higher in the winter particularly when the ground is snow covered.

**LARCHES, CARBON CYCLE, AND CLIMATE**

I. If planting is considered a Carbon storage option, larch’s annual sequestration rates far exceed other conifers. 
II. High yields have been observed across North-South range of New England, giving larches a potential role in adaptive management.
III. Early yields for solid products enable C storage as wood in use.
IV. Potentially short rotations offer maximum flexibility to adapt to changing circumstances, compared to natural regrowth of natural stands.
V. Repeated replanting results in additional rootstocks being created after every replanting.
VI. The opportunity for income in the 15-20 year age range can significantly reduce the financial cost of C storage compared to other planted species.
VII. The Allelo of larch stands is higher than other conifers with snow on ground.
VIII. The GHG benefits of substituting wood for other materials are significant; larch offers this option where SRIC approaches do not.

**NATURAL REGROWTH VERSUS PLANTATION**

In USFS Gen. Tech Report NE-343, the analysts supplied FIA-based estimates for carbon sequestration in natural stands following clearcutting. These were used as default values in estimating carbon storage in natural stands. Comparing these with measurements by Gerhaher of a sample of stands over the Northeast shows that when larches are planted over 3 successive rotations, annual storage can be almost four times as high. This omits counting the multiple rootstocks left behind each time the larch is cut, and does not include carbon stored in solid wood products manufactured for any of the species, or the substation benefits of using wood rather than other materials (Matthews 2014).

**CONCLUSIONS**

I. The oft cited view that the best way to store carbon is to let stands grow forever is a misconception. The best way is to substitute wood for other materials.
II. For short rotations, larches offer annual average yields that are competitive with those measured for hardwood SRC species.
III. Over a 60 year period, a comparison of 3 successive larch rotations shows that the planted stands can sustain carbon MAATs that are almost 4 times as high as natural stands regenerating after clearcutting.
IV. The wood can be used, on a 20 year rotation, for solid wood products. For these comparisons we do not include carbon stored in wood, which would increase the difference. The substitution benefits can be substantial.
V. At any age beyond about 15 years, larch plantings can be cut with net revenue, yielding merchantable solid wood products, and replaced with other planted species or allowed to regrow to natural vegetation. Naturally regenerating stands do not offer this option.

**REFERENCES**


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