

Submitted Abstract

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Title	Microhabitat Preferences Of Seedlings Of Larix Decidua, Pinus Uncinata And P. Cembra In Calcareous And Siliceous Treeline Sites In The French Alps.
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Abstract

Seedling establishment is crucial for elevational shifts and local increases of tree cover in treeline ecotones, but the characteristics and availability of safe sites for tree-species establishment in alpine ecosystems are not well understood. The conditions that constitute a safe site are likely to vary between tree species, e.g. in edaphically dry sites only topographically wet microsites may be “safe”. We aimed at describing the microhabitat preferences of the conifers *Larix decidua*, *Pinus uncinata* and *Pinus cembra* on mountain slopes of two different geologic origins in the French Alps. We selected two sites with calcareous and two with siliceous parent material. At each site, we selected 50 individuals at the upper treeline ecotone and compared their microsites with 50 randomly-placed reference microsites in terms of the substrate, ground cover, meso- and microtopography, and the type, size, direction and distance to the nearest shelter. A microsite was spatially defined as a circle of 0.6 m radius around the individual. We found that seedlings were not randomly located at the study sites: at the siliceous sites, seedlings preferred growing among rocks or on bare ground, or surrounded by dwarf shrubs or other low vegetation, while at the calcareous sites, only a preference for rocks and low vegetation was found. Rocks were the main type of shelter at all sites. Terraces and shrubby vegetation played a smaller role, and the direction of the shelter seemed to have no clear pattern. Our results show that microsite preferences are consistent between sites with different bedrock types and hence edaphic conditions as well as between species. Generally, our results emphasize the importance of safe sites for successful tree regeneration in the treeline ecotone. This implies, on the one hand, treeline advance patterns are modified by microtopographic features, and on the other hand, that trees can take advantage of the great variety of environmental conditions found in the alpine zone. However, although tree individuals were found abundantly at our high-elevation study sites, the majority of them were either only a few years old or showed a krummholz growth form, staying within 1 m from the ground. Yet with the warming climate, growth into tree stature is expected to become increasingly feasible in the alpine zone, so that tree-species establishment may increasingly lead to an advance of forest into formerly tree-less alpine vegetation.