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The cover illustration shows

table shaped juniper from Kola Peninsula
drawn by A.O.Kihlman in 1887

Cover design by
Jari Hietanen
Revival of Ravaged Mountain Birch forests by Epirrata Autumnata in Northern Lapland

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Mountain birch (*Betula pubescens* subsp. *Czerepanovii*) grows as narrow altitudinal zones above the conifer timberline and forms vast forests and brushwoods in the hemi-arctic region of northern Fennoscandia. In the mid-1960’s, the caterpillars of the geometrid moth (*Epirrata autumnata*) caused extensive damage especially in the birch forests of Utsjoki by eating tree leaves in consecutive years. The recuperation of the biotypes has been slow in many places as a consequence of many reasons including intensive reindeer herding. Today nearly half (2354 km²) of the total damaged area in Utsjoki by eating tree leaves in consecutive years. The recuperation of the biotypes has been slow in many places as a consequence of many reasons including intensive reindeer herding. Today nearly half (2354 km²) of the total damaged area (5000 km²) is classified as upland heath or scrub biotypes with standing or fallen rotten birch trees. Afforestation of these secondary heaths and revival operations in slow-growing, open-forest birch forests of Utsjoki area are under consideration and planning by Metsähallitus (Finnish Forest and Park Service) together with the Utsjoki municipality and local reindeer herding associations.

Keywords: mountain birch, herbivore, *Epirrata autumnata*, damage, afforestation, reindeer herding

Is Climate Warming at the Pine Timberline?

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An exceptional mid-winter climatic warming was encountered in the timberline regions in the 1990s: the monthly mean temperature for December-March increased by 1-2 °C and the annual mean temperature by 0.5 °C compared to the mean for the whole century. The warm period stimulated discussion about the status of the climate in Finland and launched a dendro-climatic subproject in a timberline research project being conducted at Metsäla.

The results of studies suggest that the early 1990s was an exceptionally warm period of time, but still within the range of normal climatic variation. The June-July temperatures of the past two decades were below the average for the 1900s. Since the 1970s November has been cooler than average, and December and January of the 1980s were coolest of the entire century.

Analysis of the causes highlighted a phenomenon called the North Atlantic Oscillation (NAO). It is the main global factor controlling the timberline climate. Warming caused by the greenhouse effect can not (at least not yet) be recognized as having led to rising temperatures or to increased tree growth.

Regeneration Dynamics of Understorey Vegetation after Disturbance at Treeline Region

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Disturbances can influence vegetation dynamics and species composition considerably. Gaps may become suitable environments for sexual reproduction, which is otherwise rare because of abundant vegetation. We investigate regeneration strategies and dynamics of understorey species after human-induced disturbances (clear-cutting, trampling) and environmental changes (increase of nitrogen) at Pallas-Ounastunturi region, Kilpisjärvi and Kuusamo. The studies include experimental disturbances, monitoring studies and environmental manipulations through nutrient addition and transplant gardens. Along with plant ecophysiology, population and community level changes are being monitored. We hypothesize that resource allocation patterns, life form, and morphology of species are important factors in the revegetation process after disturbance.

Response of Pine and Birch Seedlings to Solar UV radiation in the Subarctic

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The response of *Betula pubescens* Ehr., *B. pendula* Roth, and two provenances of *Pinus sylvestris* L. to solar ultraviolet (UV < 400 nm) radiation were investigated in a UV exclusion field experiment during the 1997-1999 growing seasons in Finnish Lapland (68°N). The seed-grown seedlings were grown under UV-B exclusion (a clear polyester filter) and UV-B/UV-A exclusion (a clear acrylic plate) as compared to control treatment (a polyethylene filter) and ambient plants (no plastic filter). The mean daily maximum solar biologically effective UV-B irradiance (UV-BE) was 88 mW m⁻², 68 mW m⁻² and 91 mW m⁻² for 1997, 1998 and 1999. A number of growth and biomass variables, PSII (Photosystem II) efficiency and total concentration of N were recorded during and/or at the end of the experiment.

Exposure (191 d) to solar UV radiation over three growing seasons did not cause many statistically significant UV effects in the growth or biomass of the seedlings. The only significant impacts of UV exclusion were found in *P. sylvestris* provenance Enontekiö. During the first growing season, the UV-B/UV-A exclusion treatment significantly accelerated the height increment (18-20 %) of *P. sylvestris*, and in the same seedlings, the UV-B exclusion treatment resulted in significantly increased dry weight of 1-year-old needles (45-57%) after the second growing season. These UV impacts could not be seen at the end of the experiment or in any other species. The low concentration of N in current foliage was related to increased dry weight, but not to solar UV radiation (control