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Can lemmings control the expansion of woody plants on tundra?

Lauri Oksanen (1,2), Tarja Oksanen (1,2), Johan Olofsson (3), Risto Virtanen (4), Katrine Hoset (1,2), Maria Tuomi (1,2), Kukka Kyrö (1,5)

(1) 2. Department of Biology, Section of Ecology, University of Turku, FI-20014 Turku, FINLAND, (2) Department of Sciences, Finnmark University College, NO-9504 Alta, NORWAY, (3) 1. Department of Ecology and Environmental Sciences, Umeå University, SE-90187 Umeå, SWEDEN, (4) Department of Biology, University of Oulu, FI-90014 Oulu, FINLAND, (5) 5. Department of Biology, Section of Ecology and Evolutionary Biology, University of Helsinki, FI-00014

The ongoing expansion of woody vegetation in the arctic, due to global warming, creates a positive feed back loop. Increasing abundance of woody plants reduces surface albedo both directly and via speeding up snow melt. Thus a successively greater fraction of incoming solar radiation is absorbed and converted to heat. Browsing mammals – both big and small – can prevent this by consuming woody plants. However, the grazer/browser community of many tundra areas is dominated by brown/Norwegian lemmings (Lemmus spp.) which eat graminoids and mosses and cannot use woody plants as forage. It would seem a priori likely that in such areas, mammalian herbivores speed up the expansion of woody plants by improving the chances of their seedlings to get established.
We studied the impact of lemmings on woody plants by constructing lemming proof exclosures within piece high-altitude tundra at Joatkanjávri, northernmost Norway. The exclosures were constructed in 1998, during a period of low lemming densities, in snow-beds, where Norwegian lemmings (L. lemmus) were the only ecologically significant herbivorous mammals. (Reindeer migrate through the area in May, when snow-beds are inaccessible for them; during the fall migration, the area represents a dead end and is therefore avoided.) We chose pairs of maximally similar vegetation patches of 0.5 by 0.5 m and randomly assigned one of each pair to become an exclosure while the other plot was left open. The initial state of the vegetation was documented by the point frequency method. In 2008, after the 2007 lemming outbreak, the same documentation was repeated; thereafter the plots were harvested, the vegetation was sorted to species, oven dried and weighed.
Exclusion of lemmings resulted to pronounced increase in community level plant biomass. Evergreen woody plants were especially favored by the exclusion of lemming: their above-ground biomass in exclosures was 14 times as great as their biomass on open reference plots. The results show that edibility plays a relatively small role for the vulnerability of woody plants to lemming impacts. As long as the plants are relatively small, like the evergreens were on our plots (the dominating species was the lingonberry, Vaccinium vitis-ideaea), they are mowed down by lemmings in outbreak years. The potential of lemmings to control the expansion of woody plants is thus likely to depend on the size of the seedlings of trees and shrubs and, therefore, on the frequency of lemming outbreaks