

Not even freezing cold stops alien species in high altitudes

March 4 2014, by Anna-Lena Lindskog



Ecologist Ann Milbau

They hitchhike with us under the soles of our shoes and muddy car tires. Harsh and cold climates don't seem to stop alien plants from establishing themselves in high altitudes, where they now successfully penetrate the alpine vegetation, a study at Umeå University and University of Antwerp shows.

"Alien plants often gain advantages in their new environment because they lack natural enemies, and in this case the lack of strong competitors amongst [alpine plants](#) may be the key to success for generalist native species," says ecologist Ann Milbau, assistant professor at the research station Climate Impacts Research Centre in Abisko, Sweden.

In a study published in the journal *PloS One* she has, together with Jonas Lembrechts, scientist at University of Antwerp, Belgium, investigated how plants normally growing in lowland terrain can spread at higher altitudes in subarctic mountain areas in Norway.

Mountains have so far been seen as the last natural ports of refuge, where alien species should have difficulties to establish themselves due to the harsh climate. They have been thought to be outnumbered by alpine plants adapted to survive cold, wind and short summers.

However, research at Umeå University's climate research centre in Abisko and University of Antwerp shows that alien plants are no longer rare above the arctic circle.

"We humans have something to do with that, says Jonas Lembrechts. Aliens start their conquest in the lowlands and follow human roads and walking tracks into the mountains. Hidden in the mud attached to our cars and shoes, they easily find their way up to the alpine zone."

The vegetation in the mountain regions is not prepared for this, especially not at higher altitudes, according to the study. In lower terrain the new species stick to the roadsides, while further up they swarm out into the undisturbed vegetation.

"The higher vulnerability of the alpine nature probably results from a lower resistance," says Jonas Lembrechts. Alpine plants in the far north are not prepared for the invasion of competitive species from the valley.

"Most likely, these alien lowland species are becoming increasingly successful in alpine terrain due to the warmer weather we have experienced in the past decades," says Ann Milbau. Climate warming and increasing human disturbances in high latitude mountain regions may further increase the pressure from introduced [species](#) in the coming years.

The scientists conclude that mountaineers and hikers should be aware that they carry undesired co-travellers under their feet when they explore pristine areas. To clean shoes and other equipment before the trip is a good way to preserve the vegetation in the areas they plan to visit.

More information: "Alien Roadside Species More Easily Invade Alpine than Lowland Plant Communities in a Subarctic Mountain Ecosystem," by Lembrechts JJ, Milbau A, Nijs I, *Plos ONE* 9(2) e89664, [DOI: 10.1371/journal.pone.0089664](https://doi.org/10.1371/journal.pone.0089664)

Provided by Umea University

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