



## Invasive alien plants threaten Antarctic biodiversity

According to new research, several areas of the Antarctic are at considerable risk from the establishment of 'alien' plants accidentally carried by visitors to the region. The findings demonstrate that invasive species pose risks even in remote areas and that these risks are likely to increase as the climate changes.

The biodiversity of Antarctica, one of the most untouched environments on Earth, is under threat from scientific and tourist visits to the area. Seeds, carried unknowingly by visitors to the Antarctic on their clothing or luggage, can develop into plants that affect the ecology of the region. The likelihood of alien plants becoming invasive and altering local ecosystems partly depends on the numbers of seeds entering the region and the probability that these seeds will grow and spread. Since there has been no comprehensive, quantitative assessment of seed numbers and the likelihood of establishment of alien species for Antarctica, this study gives an important insight into the potential risks faced by the continent.

The study calculated the number of seeds carried inadvertently on the clothing and bags of the scientists, tourists and their support staff during the first summer season of the 2007-2008 International Polar Year. To understand the distribution of risk across the continent, the Antarctic was divided into 81 grid cells representing ice-free areas, in which visitor landings occurred.

The likelihood that plants could become established was calculated by recording the origins of the plants: those from the sub-Antarctic or Arctic would be more likely to grow in the extreme conditions of the Antarctic. Weather and temperature conditions in the grid cells were also taken into account as these affect the survival of cold-climate plant species. The Intergovernmental Panel on Climate Change (IPCC) Special Report on Emissions Scenarios was used to estimate how future climate change may affect the risks into the future.

The chance that a plant is transported to the region depends on the type of visitor: scientists are more likely to carry seeds than tourists, for example, although reasons for this are not considered by the study. The average number of seeds carried was 9.5 per person. An estimated 31,732 seeds on tourists and 38,897 on scientists entered the Antarctic during the first summer, even though annual tourist numbers (33,054) are much higher than those of scientists (7,085). The seed and survey-based data, which recorded the origins of visitors, revealed that 49-61% (depending on visitor category) of seeds originate from environments that include species capable of surviving the extreme Antarctic conditions.

According to the study, the Western Antarctic Peninsula coast and nearby islands have the highest risk of alien species becoming established, owing to the type of plant introduced and the climatic conditions. This area will also continue to be at the most risk as the climate changes. One plant of particular concern is the meadow grass species *Poa annua*, which has spread from a research station to areas where few humans visit.

Tough 'bio-security' measures should be in place for the most at-risk visitor groups and areas identified by this study. The improved understanding provided by this study of the threat posed by alien invasive species across the Antarctic means management strategies can be put in place to reduce their negative effects both now, and in the future.

**Source:** Chown, S.L. Huiskes, A.H. L. Gremmen, N. J. M. *et al.* (2012) Continent-wide risk assessment for the establishment of nonindigenous species in Antarctica. *Proceedings of the National Academy of Sciences*. 109 (13): 4938-4943. This study is free to view at: [www.pnas.org/content/early/2012/02/27/1119787109.abstract](http://www.pnas.org/content/early/2012/02/27/1119787109.abstract)

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