Horizon scanning exercise to identify likely invasive non-native species in the Antarctic Peninsula region

Horizon scanning exercise to identify likely invasive non-native species in the Antarctic Peninsula region

**Information Paper submitted by the United Kingdom**

Summary

The United Kingdom presents the results of a horizon scanning exercise to identify invasive non-native species likely to threaten biodiversity and ecosystems in the Antarctic Peninsula region. Marine invertebrates dominated the list of highest risk species, with flowering plants and terrestrial invertebrates also represented.

Background

Antarctic environments are increasingly at risk from non-native species, with the Antarctic Peninsula region (here taken to encompass the Antarctic Peninsula, South Shetland Islands and South Orkney Islands) consider to be at greatest risk (see ATCM XXXV WP5). High levels of human activity by national operators and the tourism industry may increase the likelihood of non-native species being introduced, while climate change may increase the likelihood of the introduced species establishing and becoming invasive (ATCM XXXV WP5; ATCM XLII IP27 and ATCM XLII IP32). Demonstrating the vulnerability of the Antarctic Peninsula region to introductions, all known non-native species in Antarctica are found within the region (see ATCM XXXIII IP46).

The CEP Non-native Species Manual (Edition 2019) Annex ‘*Guidelines and resources requiring further attention or development*’ highlights the need to identify potential non-native species that present a high risk to Antarctic environments. Specifically, Parties are encouraged to ‘*Generate a list, with suitable descriptions, of potential non-native species based on the experience of the sub-Antarctic Islands (or other relevant environments) and the biological characteristics and adaptability of the “effective” colonisers*.’

The aim of this Information Paper is to provide the Committee with an update of recent research to identify invasive non-native species likely to threaten biodiversity and ecosystems in the Antarctic Peninsula region (see Hughes et al., 2020; Figure 1).

Species likely to invade the Antarctic Peninsula region

An international team of taxonomic and Antarctic experts undertook a horizon scanning exercise to identify the species that are likely to present the highest risk to biodiversity and ecosystems within the Antarctic Peninsula region over the next 10 years. Literature review, expert opinion and consensus approaches were used during the workshop in Cambridge in October 2018, which was supported by the UK Government through the GB Non-Native Species Secretariat and Natural Environment Research Council (NERC-UKRI). One hundred and three species, currently absent in the region, were identified as relevant for review, with 13 species identified as presenting a high risk of invading the Antarctic Peninsula region (see Table 1).

Marine species dominated the list of highest risk species. Marine invertebrates and algae can present a particular problem as they can be transported to Antarctica attached to ship hulls and can be exceptionally difficult or impossible to remove once established. Mussel species were top of the list as they can survive in some polar waters and can spread easily. When they establish, they can dominate life by smothering the native marine animals that live on the seabed.

Flowering plants and terrestrial invertebrates, including species found on sub-Antarctic islands, were also considered likely to invade. Although some of the sub-Antarctic islands have been invaded by rats, mice or other vertebrates, invasion of the Antarctic Peninsula region was not expected within the 10-year timeframe of the study. However, rats and mice could survive within research station buildings, making vigilance for signs of these species (e.g. droppings and gnaw marks) essential.

Conclusion

Without the application of appropriate biosecurity measures, rates of introductions and invasions within the Antarctic Peninsula region are likely to increase, resulting in negative consequences for the biodiversity of the whole continent, as introduced species establish and spread further due to climate change and increasing human activity. Therefore, further development and application of biosecurity measures by all stakeholders active in the Antarctic Peninsula region is recommended, including surveillance for species such as those identified during this horizon scanning exercise. Application of the methodology used in this research may also help identify species likely to invade other regions of Antarctica.

Supporting reference

Hughes, K.A., Pescott, O.L. , Peyton, J., Adriaens, T., Cottier-Cook, E.J., Key, G., Rabitsch, W., Tricarico, E., Barnes, D.K.A., Baxter, N., Belchier, M., Blake, D., Convey, P., Dawson, W., Frohlich, D., Gardiner, L.M., González-Moreno, P., James, R., Malumphy, C., Martin, S., Martinou, A. F., Minchin, D., Monaco, A., Moore, N., Morley, S.A., Ross, K., Shanklin, J., Turvey, K., Vaughan, D., Vaux, A.G.C., Werenkraut, V., Winfield, I.J., and Roy, H.E. (2020). Invasive non‐native species likely to threaten biodiversity and ecosystems in the Antarctic Peninsula region. Global Change Biology. 10.1111/gcb.14938. Available at: <https://onlinelibrary.wiley.com/doi/full/10.1111/gcb.14938>.

**Figure 1.** Non-native species can be transported to the Antarctic Peninsula Region by different pathways. Marine invertebrates, terrestrial invertebrates and flowering plants are all considered likely to invade. However, Antarctic conditions are currently probably too extreme for vertebrates, such as rats and mice, to survive.

Diagrama

Descripción generada automáticamente

**Table 1.** List of the invaders most likely to impact the Antarctic Peninsula region in the next 10 years.

|  |  |  |  |
| --- | --- | --- | --- |
| No. | Species | Common name | Broad Group |
| 1 | *Mytilus chilensis* | Chilean mussel | Marine invertebrate |
| 2 | *Mytilus edulis* | Common blue mussel | Marine invertebrate |
| 3 | *Protaphorura fimata* | Springtail | Terrestrial invertebrate |
| 4 | *Nanorchestes antarcticus* | Mite | Terrestrial invertebrate |
| 5 | *Halicarcinus planatus* | Flattened crab | Marine invertebrate |
| 6 | *Ciona intestinalis* | Sea vase | Marine invertebrate |
| 7 | *Leptinella scariosa* | A buttonweed | Terrestrial plant |
| 8 | *Botryllus schlosseri* | Colonial Ascidian | Marine invertebrate |
| 9 | *Carcinus maenas* | European shore crab | Marine invertebrate |
| 10 | *Undaria pinnatifida* | Asian kelp | Marine algae |
| 11 | *Leptinella plumosa* | A buttonweed | Terrestrial plant |
| 12 | *Chaetopterus variopedatus* | Parchment worm | Marine invertebrate |
| 13 | *Mytilus galloprovincialis* | Mediterranean mussel | Marine invertebrate |