SCIENCE FOR ENVIRONMENT POLICY

Translocation of wild plant species in Europe should consider future climate change

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Plant translocation (or 'assisted migration') is a nature conservation method used to help species cope with the anthropogenic pressures facing their communities — including the effects of climate change. This study examined plant translocations over the last 20 years in Europe and the Mediterranean basin, examining the distances, directions and climatic conditions of chosen destination, or 'host', sites relative to the plant's initial location. The findings suggest that, so far, little attention has been paid to climate change when choosing host sites for translocated species. Given its rapid advance, climate change should more strongly guide future action to ensure that translocated species can thrive even under host sites' projected future climate conditions.

Alongside the effects of ongoing climate change, anthropogenic pressures arising from agriculture, industry, transport and urbanisation are fragmenting natural habitats, putting increasing pressure on small, isolated populations of plants and animals. Some plants are particularly vulnerable due to their limited dispersal ability. In this context, plant translocations — the controlled movement of plant material from one area to another to reinforce, reintroduce or create a newly viable population — are a common practice used to rescue certain species from extinction, colonise favourable patches that would not be reached via natural dispersion, and aid restoration of degraded ecosystems.

Plant translocations can migrate plant species towards cooler climatic conditions to mitigate the negative impacts of future climate change. However, no study has yet compared how translocated plants' source and destination (host) sites differ in geography and climate. This study seeks to fill this research gap for European wild plant translocations by identifying the directions and distances of plant translocations, and pinpointing whether these were largely to cooler climates.

European Commission

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Translocation of wild plant species in Europe should consider future climate change (continued)

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The researchers analysed 638 source-and-host site pairs of plant translocations from 1980–2019 in Europe and the Mediterranean basin[1]. They visualised geographic distance and direction trends to see whether translocations were weighted to a particular altitude or compass point, noted climatic differences and similarities between source and host sites, and plotted these using a 'climate compass' created via statistical analysis of seven bioclimatic variables[2]. Translocation sites were spread across 15 countries, with distances from source to host site ranging from 0 to 661 km; however, most (82%) were less than 25 km due to ecological, legal and administrative constraints. France and Spain, for example, had smaller translocation distances compared with the whole dataset, largely due to legal and administrative constraints.

Host sites were not preferentially located in any geographic direction or altitude relative to source sites. Host sites had slightly colder climatic conditions than the source sites, but the researchers state that this appears to be due to efforts to counteract the already-felt effects of climate change, rather than to mitigate expected future changes. The climatic distance between source and host sites was generally smaller than would be expected at random within a geographic area. The researchers propose this may be to minimise differences in other ecological factors correlated with climatic differences.

The results show that previous plant translocations are consistent in mitigating the effects of climate change on plant species, as host sites were slightly cooler. However, the researchers note that climate considerations appear to have played only a small role in determining the host location in previous plant translocations; while all projects aimed to establish viable plant populations, co-objectives varied, including experimentation, ecological restoration and ecosystem service supply.

Given the rapid pace of anthropogenic climate change, climate should play a more important role in the selection of sites for plant translocations together with other ecological considerations, say the researchers. Prioritising climate in this way may increase the distance of future, compared to past, translocations, to improve the viability of plant populations in a warmer climate. However, translocation projects are complex, and non-ecological factors such as land ownership and management methods, and administrative, legal and economic constraints may lead to situations where site availability does not allow conservationists to consider climate-change predictions in translocations — a consideration for policymakers at both Member State and European levels.

1. The researchers obtained data on translocated plant and lichen populations from the TransLoc database and on seven bioclimatic variables from the WordClim database (v2.1), which holds climate data believed to be biologically significant.

2. These were annual mean temperature, temperature seasonality, maximum temperature of warmest month, minimum temperature of coldest month, annual precipitation, precipitation seasonality and precipitation of warmest quarter.