Finnish butterflies show largest habitat shift on record

Animals and plants are shifting into new areas, possibly as a result of climate change. A Finnish study is the first to analyse recent shifts in the ranges of butterflies and reveals the largest recorded distributional shift for any insect worldwide.

Europe is already seeing the impacts of climate change on ecosystems. One of the 10 objectives of the Biodiversity Action Plan is to support biodiversity adaptation to climate change and research is needed to understand by how much animals and plants are shifting their habitat, whether there is a link to climate change and whether certain species are more at risk than others.

Butterflies are of particular interest to ecologists as they are very sensitive to environmental change, and are thus good indicators of wider changes. However, no studies on butterfly range shift have focused on changes during the last 10-15 years. In addition, very few studies have been carried out in northern latitudes, despite being an area where climate change is predicted to have large effects.

This study, conducted under the EU-funded ALARM project, analysed changes in the northern boundaries of the ranges of 48 butterfly species in Finland during two time periods: 1992-1996 and 2000-2004. It also investigated the relationship between the size of the range shift and various species traits such as body size, breeding habitat and the level of endangerment of the species.

Results show a clear increase in summer temperatures in Finland between the two study periods. They also demonstrate that butterflies shifted their northern range limits by almost 60 km, which exceeds all previously reported figures for insects worldwide. The range shift exceeded 300 km for three of the species. These observations suggest that recent climatic warming during the last ten years in Finland has had a strong influence on butterfly ranges.

According to the results, the non-endangered butterflies had expanded their ranges more than the endangered species. This suggests that the threatened butterflies are less able to adapt to climate change, which is a concern for maintaining biodiversity. From further analysis, it appears that butterflies living in forest edges (used as breeding habitat) and using woody plants to host their larvae exhibited the largest shifts in range towards the north, for example, the black-veined white, holly blue and poplar admiral. In comparison, those butterflies living and breeding in grassland habitats (including the large grizzled skipper, clouded Apollo and green-underside blue) show smaller shifts. Furthermore, grasslands are declining habitats in Finland.

The authors suggest that the availability of habitat may determine whether butterflies will be successful in shifting their ranges in response to the warming climate. They also warn that if the predicted changes in temperature do happen in northern Europe then much larger impacts on butterfly ranges may be expected.

2. ALARM (Assessing Large Scale Risks for monitoring biodiversity with tested Methods) was supported by the European Commission under the Sixth Framework Programme. See: [www.alarmproject.net](http://www.alarmproject.net)


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Additional information: The LIFE programme has co-funded several projects researching endangered butterflies species. For example, in Denmark, the United Kingdom, and Poland.