**RRES Press Release 29 April 2022 Moths disappearing from UK woods faster than from farms or cities**

*Forest populations halved during 1968-2016 compared to average national losses of a third*

Moth numbers have declined more in UK woodlands over the last half century than in any other habitat, according to a new study.

A team of scientists led from Rothamsted Research found that [populations have more than halved in broadleaf woodland](https://resjournals.onlinelibrary.wiley.com/doi/10.1111/icad.12578), compared to average losses of 34% across the rest of the country.

Habitat loss, pesticides and urban light pollution have all been implicated in insect declines, but these results show the greatest losses are occurring in broadleaf woodland, a UK habitat type that in fact increased in area during the study period and is relatively shielded from the effects of chemical and light pollution.

The authors – who also looked at the possibility that over-grazing by deer and less woodland management might be responsible - say the reasons for the declines are still unknown, but climate change may play a role.

Lead author, Dr Dan Blumgart said: “Climate change is known to have contributed to the national decline in moths and it is likely that this has driven at least part of the decline observed in woodlands.

“But this can’t explain why the declines have been worse in broadleaf woodland compared to other habitats. We might expect the shade provided by woodlands to help buffer against the effects of climate change, but that is clearly not the case.”

Based on data from more than 400 species and over eight million individual moths, the study looked at four indicators of moth population health in woodland and six other habitats over the period 1968-2016.

Alongside the number and total weight of moths collected from each species, the team measured species richness, which is a measure of the number of species, and species diversity, which takes into account the number of species present as well as how many individuals of each species there are.

Broadleaf woodland was the only habitat in which all four measures declined severely, with abundance down 51%, biomass down 52%, species richness down 14%, and species diversity down 15%.

This contrasted with smaller nationwide declines in abundance (34%) and biomass (39%), whilst species richness didn’t change, and species diversity actually increased by 10%.

These national figures for species richness and diversity are indicative that, despite their declining numbers, moths are expanding their ranges northward – another indication that climate change is impacting their populations.

Other habitats in the study included arable land, improved pasture and urban areas.

The decline in moth abundance within broadleaf woodland (-51%) was more severe than that of any other habitat, including intensively farmed habitats, with arable showing a 7%-, and improved pasture, a 28%, decline.  VIDEO on YouTube by Dan Blumgart

Further analysis showed that abundance in broadleaf woodland was stable up to the late-1980s, after which it declined severely, whilst losses from woodlands in the south were also greater than in the north.

The team also compared woodland moths based on their feeding habits, predicting that moths that feed on plants vulnerable to reduced management or grazing by deer would have been most likely to have declined.

“We thought that the decline in broadleaf woodlands could be due to changes that have resulted from less woodland management and increased deer density: namely, more shading and intensive grazing and browsing,” said Dr Blumgart.

“We hypothesised that these changes would have reduced the quantity of forbs, shrubs and shade-intolerant plants that are more vulnerable to grazing and shading, leading to a decline in moth species feeding on those plants compared to moths feeding on trees, grasses, lichens and shade-tolerant plants.”

Contrary to the hypothesis, species that feed on forbs and shrubs hadn’t declined in woodlands any more than those that feed on grasses, trees or lichens, he added.

The data for the study came from the Rothamsted Insect Survey, which has been monitoring UK insect numbers using a network of light traps since 1968.

A total of 8,829,484 moths from 266 sites over 49 years, were included in the habitat analyses, whilst a total of 10,963,959 moths belonging to 427 species from across 384 sites, and 49 years, were used in the analysis of feeding habits.

After broadleaf woodlands, the most severe declines occurred in urban areas, with a decline in abundance and biomass of 44% and 46%, respectively.

Despite these losses, species diversity in urban sites actually increased by 24%. Species feeding on lichen did especially well in urban areas, likely due to an improvement in air quality over this time which has helped lichen populations to increase.

The study is published in the journal [Insect Conservation and Diversity](https://resjournals.onlinelibrary.wiley.com/doi/10.1111/icad.12578).

**Publication**

Blumgart, D., Botham, M.S., Menéndez, R. & Bell, J.R. (2022) Moth declines are most severe in broadleaf woodlands despite a net gain in habitat availability. *Insect Conservation and Diversity*, 1– 14. Available from: <https://doi.org/10.1111/icad.12578>