S9 Terrestrial insect abundance – moths

Some 1,300 species of moth have been recorded in Scotland (half the total for the British Isles). They occur from seashore to mountain-top, can be found in large numbers, have rapid lifecycles, and in many cases are highly sensitive to habitat and climatic conditions. A wide range of other species depend on moths for food, particularly bats.

Evidence

Moths have been monitored since 1968 by the Rothamsted network of light traps, which record numbers of moths caught every night from hundreds of locations across Britain, including more than 65 trap sites from Scotland. Annual changes in the numbers of moths caught are used to estimate population trends. The trend reported here, from 1975 to 2004, includes 185 species from 36 sites where traps operated for at least 5 years.

Trends of common and widespread moths in Scotland, 1975-2004

Moth abundance from the Rothamsted light trap network

Assessment

- Abundance of the 185 species from Scotland fluctuated markedly, with a 2.6% increase between 1975 and 2004.
- A greater proportion of species in Scotland (45%) show increasing trends than in Britain.
- The proportion of species declining at the highest rates (>30% decline over a 10-year period) in Scotland is similar to that of Britain (22% Scotland, 21% Britain).
Commentary
The overall population trend for common and widespread Scottish moths has fluctuated with little overall change. However, this arises, in part, from a number of rapidly-expanding species that have increased their range into or within Scotland, offsetting a proportion of rapidly decreasing species. If this pattern continues, biodiversity will decrease in the long term, and the moth community will be composed of fewer, more abundant species. Woodland species and species whose caterpillars feed on conifers appear to have fared best, while northerly species and species that overwinter as eggs fared worst. Declines suggest a wide range of ecological factors, such as land use change, climate change and environmental pollution.

Source data and updates
Recent analysis of this dataset has generated trends for hundreds of common and widespread moths for the first time (Fox et al., 2006; Conrad et al., 2006).

Data are from: Rothamsted Research light trap network; UK Scarce Moth Recording Scheme, run by Butterfly Conservation; UK BAP review co-ordinated by Butterfly Conservation; Butterfly Conservation Scotland and unpublished data.

Long-term trends are not affected appreciably even by extreme counts in individual years, so updates will be at 5-year intervals.

UK Indicators
The Scottish indicator has no current UK equivalent, although the abundance of 115 moth species is monitored alongside average summer temperature data as a component of the biodiversity context indicator on Changes in Abundance of Climate Sensitive Species for Environmental Change Network sites in England (Defra, 2006). This indicator suggests that moth abundance in England has declined since recording began in the mid-1990s.

References
Moth monitoring publications: http://www.mothscount.org/.