

Aim *To monitor the abundance of butterflies using the transect methods of the Butterfly Monitoring Scheme*

Rationale Butterflies are one of the easier insect groups to identify and monitor and are known to respond rapidly to changes in vegetation abundance and quality (Thomas 1991). The Protocol adopted by ECN is that already in use for the national Butterfly Monitoring Scheme, operated jointly by the Institute of Terrestrial Ecology and the Joint Nature Conservation Committee and organised from the Biological Records Centre at ITE Monks Wood (Hall 1981; Pollard, Hall & Bibby 1986). This existing scheme will provide a strong background of information from approximately 15 years of sampling for comparison with ECN data. Analysis of the existing data has already shown interesting changes in the distribution and phenology of individual species (Pollard 1991) and significant relationships between butterfly population size and climate (Pollard 1988).

Method **Location**

A fixed transect route is set up at each site following the instructions in Hall (1981), and is strictly followed on each sampling occasion. The route is selected so as to be reasonably representative of the ECN site and will often follow existing paths or boundaries and include areas under different management regimes. If necessary, the route should be marked out to ensure that the same route is followed on each occasion. The length of the transect will depend on local conditions but should be capable of being walked at a comfortable, even pace in 30-90 minutes and will therefore usually be 1-2 km. The transect should be divided into a maximum of 15 sections, which may be of different vegetation, structure, or management and which are used as sampling strata. The length of each section is recorded on a map, together with information on habitat types and abundant plants, especially butterfly food plants. Management operations in the vicinity of the transect are also recorded. Changes in these characteristics are noted, so as to assist in interpretation of results.

Recording of the transect takes place weekly between 1 April and 29 September, between 10.45 and 15.45 BST. The temperature should be 13-17°C if sunshine is at least 60%, but if the temperature is above 17°C recording can be carried out in any conditions, providing that it is not raining. At northern, upland sites the appropriate upper temperature is 15°C. The use of more than one recorder would make recording easier at the peak of the season when high numbers of different species occur, or to provide cover for an absent recorder. Transects should be walked by someone with a good knowledge of the British butterfly fauna.

The transect is walked at an even pace and the number of butterflies which are seen flying within or passing through an imaginary box, 5 m wide, 5 m high, and 5 m in front of the observer, are recorded by species for each section of the transect, using the forms provided. Start time is recorded, as are the temperature, percentage sun and wind speed at the completion of the transect. Percentage sunshine is also recorded section by section as the transect progresses.

Time 0.5-1.5 h/transect (depending on transect length) for 26 weeks each year

Author *I.P. Woiiwod*

References

Hall, M.L. 1981. *Butterfly Monitoring Scheme. Instructions for independent recorders.* Cambridge: Institute of Terrestrial Ecology.

Pollard, E. 1988. Temperature, rainfall and butterfly numbers. *Journal of Applied Ecology*, **25**, 819-828.

Pollard, E. 1991. Changes in the flight period of the hedge brown butterfly *Pyronia tithonus* during expansion of its range. *Journal of Animal Ecology*, **60**, 737-748.

Pollard, E., Hall, M.L. & Bibby, T.J. 1986. *Monitoring the abundance of butterflies.* Peterborough: Nature Conservancy Council.

Thomas, J.A. 1991. Rare species conservation: case studies of European butterflies. In: *The scientific management of temperate communities*, edited by I.F. Spellerberg, F.B. Goldsmith & M.G. Morris, 149-197. Oxford: Blackwell Scientific.

Specification of results and recording conventions

The measurement variables listed below are those required for each IB sampling location at an ECN Site. Sites submitting data to the ECNCCU should refer to the accompanying Data Transfer documentation for the specification of ECN dataset formats, available on the restricted access Site Managers' extranet. Contact ecnccu@ceh.ac.uk if you need access to this documentation.

The first 4 key parameters uniquely identify a sample or recording occasion in space and time, and must be included within all datasets:

- [Site Identification Code](#) (e.g. T05) Unique code for each ECN Site
- [Core Measurement Code](#) (e.g. PC) Unique code for each ECN 'core measurement'
- Location Code (e.g. 01) Each ECN Site allocates its own code to replicate sampling locations for each core measurement (e.g. for different surface water collection points)
- Sampling Date (/time) Date on which sample was collected or data recorded. This will include a time element where sampling is more frequent than daily

ECNCCU 2001

Core measurement: invertebrates – butterflies (IB Protocol)

The following variables are recorded weekly from 1 April until 29 September:

Variable	Units	Precision of recording
<i>For the transect</i>		
Site Identification Code		
Core Measurement Code		
Location Code		
Recording (sampling) date		
Start time	BST 24-h clock	1 min
Temperature at end of recording	°C	0.1
Percentage sunshine	%	10
Wind speed at end of recording	Beaufort scale	
<i>For each transect section</i>		
Transect section number	numeric code (1-15)	
Species code	BMS code ¹	
Species name	common name	
Number seen	count	1
Habitat description	BMS method ²	

Recording forms

A standard BMS recording form is available from the Butterfly Monitoring Scheme (BMS), organised from the Biological Records Centre, ITE Monks Wood, Abbots Ripton, Huntingdon, Cambs PE17 2LS, UK.

Notes

1. The coding system should follow the standard used by the BMS.
2. Habitat should be described as explained in the BMS handbook, quoted below.
'A short description of the different habitat types in each section is useful for the transect records. It is also useful to have a short list of the plant species which are most abundant in each section. Particular attention should be given to butterfly food plants, eg nettles or violets, and popular nectar sources, such as thistles or teasels. The aim of these records is not to acquire quantitative information on the abundance of plants (which would be ideal but which is very time-consuming) but to help, in a general way, with the interpretation of results.'