Sheepdrove Organic Farm / Elm Farm Research Centre

Research at Sheepdrove Organic Farm

Project: SOF 022 (2004) Moths
Final Report – December 2004

Photo: Blood-Vein, *Timandra comae*
whose caterpillar eats docks
and other arable weeds.

1) Objective

To establish a benchmark record of moth species at Sheepdrove Organic Farm, using a Robinson Trap. Data from this programme will be used to complement other studies.

2) Introduction

The insect order of Lepidoptera was initially studied at Sheepdrove in the farm's 2003 Butterfly Survey. Now this moth sampling complements those findings so as to gain a better picture of what members of this group are present at the farm.

3) Method Summary

- Samples were taken with mercury vapour lamp moth traps, overnight at 3 points. (Cottage No.4 garden, boundary of fields W12/W13, and Sheepdrove Farmhouse courtyard.)
- Three seasonal sampling sessions occurred, in early summer, late summer and autumn.
- Specimens caught in the traps were identified and recorded the following morning, and digital photographs were taken where possible, for future reference.
- A spreadsheet of all the observation data was created on Microsoft Excel.

4) Results

4.1) Key Results

- There were a total of 40 moths identified to either genus or species.
- There is a strong variation between samples from different sites, both in terms of abundance and diversity of moths.
- Species number and diversity seems to be strongly influenced by nearby habitat, and nectar sources will be a very important part of that.
- Seasonal change was observed in the species composition of samples, such as with White Ermine prominent in May-June, Flounced Rustic becoming prominent in August, and Beaded Chestnut seen in October.
- Beaded Chestnut had the largest numbers recorded (36), closely followed by Flounced Rustic (35).
- The highest diversity in any one sample was 34 moth species at the back garden of Cottage No.4, on 8th June 2004. Diversity was highest here overall.
- Numbers of moths caught ranged from as many as 237 (at the garden of Cottage No.4 on 8th June) down to 2 moths (at field W12/W13 on 17th October).

4.2) Results in Detail

- Table 1 summarises the data.
- Table 2 shows the numbers of clearly identified moths.
- Table 3 lists larval food plants – i.e. what the caterpillars feed on.
- Graph 1 and Graph 2 illustrate the results, clearly showing differences between locations and seasonal changes.
- Tables A, B and C carry raw data from each moth trap sample.

This study focuses on 'macromoths,' a rather arbitrary grouping of around 900 moths that can usually be identified with the naked eye. Though not discussed here, data was also collected for other insects which came to the moth traps, such as lacewing, dung beetles and wasps. The data from Tables A, B and C shows the different moth types distinguished, both identified and unidentified, and this total diversity is represented on Graph 1 and Graph 2.

There were a total of 40 moths identified to either genus or species. These are shown on Table 2. There may be more than 20 more species, which, although not properly identified, are distinguished by description in the data tables. (Tables A, B and C.) Some of these were successfully photographed, which should allow further investigation into moth diversity.

4.3) Photographs of some of the moths

Top left: Flounced Rustic
Bottom left: Beaded Chestnut
Top right: Privet Hawkmoth
Bottom right: Buff Ermine

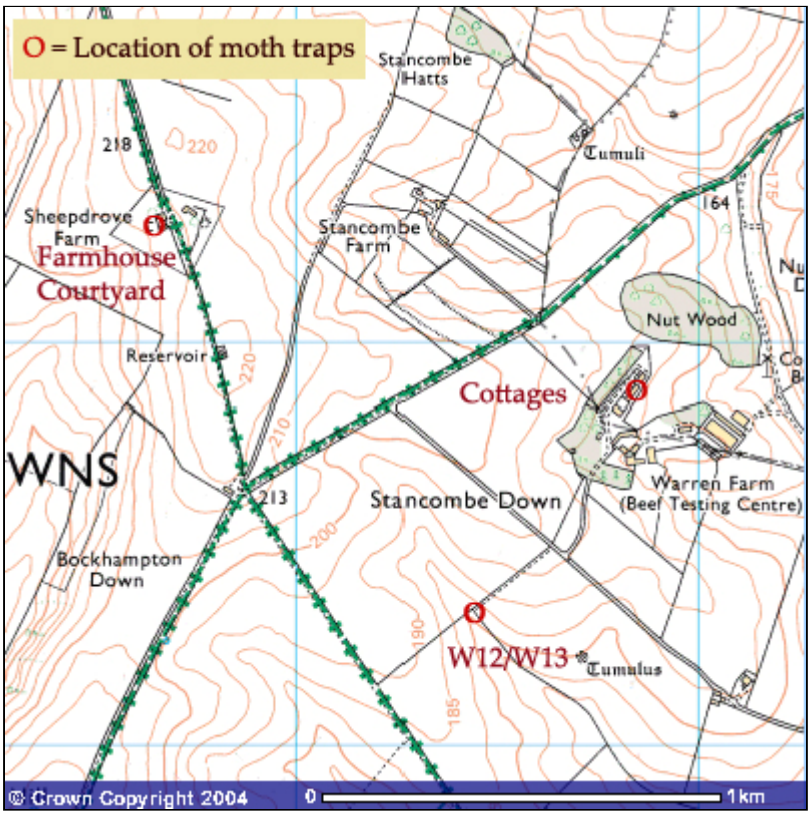
5) Discussion

5.1) Location of the Moth Traps

The positions of the moth traps are shown on Map 1. There are also habitat maps for each sampling site (Habitat Maps 1-3) showing major vegetation zones. Samples were taken with moth traps overnight from 3 points:

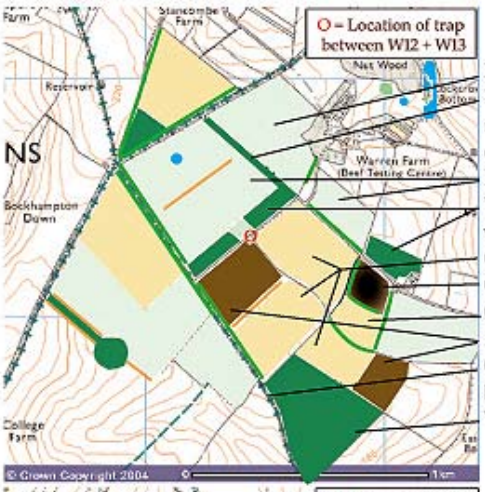
- On the boundary of fields W12/W13 (OS grid reference SU354813)
- Sheepdrove Farmhouse courtyard (OS grid reference SU346823)
- Cottage garden No.4 near Nut Wood (OS grid reference SU358818)

Map 1



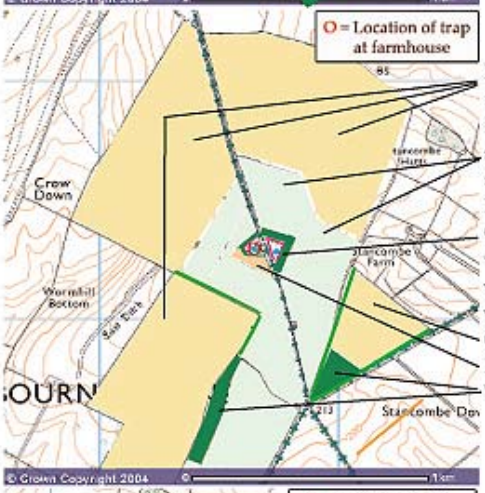
Location factors influencing the samples caught in the moth traps include: altitude, topography, vegetation heights nearby, obstructions to the light, local habitat composition, and exposure to wind. The traps are designed to attract moths with light, and collect a sample of them, as they fly into the trap, so the visibility of the lamp will be important.

The trap at W12/W13 was located in a low dip, but with open aspect allowing very good light visibility in all directions. The trap at the farmhouse had light obstructed by buildings on one side, and substantial hedge, but the light is very visible from the southwest, across a haymeadow, grazed downland, and the valley below. The visibility of the Cottages trap is strongly obstructed on one side by the cottage buildings, but placed centrally in the back garden, from where the trap's light is very visible across the field to the east, and within the house gardens.



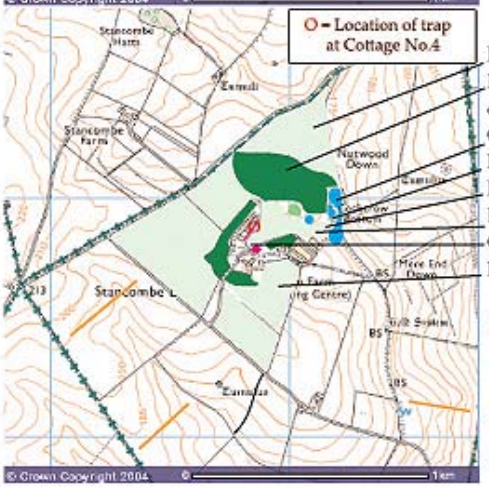
Habitat Map 1

Rotation grass ley (pig field).
Phacelia strips, wildflowers and rough grass along avenue plantation of 4 years age.
Rotation grass ley.
Woodland plantation of 4-years age, with rough grass and wildflowers.
Organic winter wheat.
Compost field.
Organic spring wheat.
Fallow under stewardship.
Chalk grassland and rough grass habitat along byways (sheepdroves).
Woodland plantation 10-14 yrs age.



Habitat Map 2

Non-organic arable on neighbouring farmland
Florally-diverse chalk grassland in stewardship, created in 1996 arable reversion project. NB Bockhampton Down was restored in 1992
Gardens (marked pink) with hedges, vegetable plots, small ponds, and with semi-mature and plantation woodland.
Organic arable (cereal)
Haymeadow
Woodland plantations



Habitat Map 3

Rotation grass ley
Nut Wood - ancient woodland with extension planting on N & W sides
Chalk grassland bank
Reedbed system
Rough grass and wildflowers
Permanent grass ley
Garden areas (marked pink)
Rotation grass ley

KEY
Garden
12m-wide wildlife mix strips
Hedgerows
Water habitat
Arable
Fallow
Grass ley
Woodland

Habitat Maps 1 - 3

5.2) The Results in Relation to Habitat

Many moth species can fly considerable distances, and some are international migrants, such as the Hummingbird Hawkmoth, often seen at the gardens at Sheepdrove in the summertime. So although the habitat surrounding a moth trap will be of importance, this factor is limited.

Photo: Hummingbird Hawkmoth seen feeding at the Physic Garden behind The Kindersley Centre.

The bright mercury vapour lamp attracts flying insects that could be inhabiting nearby vegetation, but might be passing by on their way to find a mate (attraction pheromones travel large distances) or in search of food, or perhaps migrating.

Nectar-producing flowers and other food sources are known to be a very important attraction to moths, and so the proximity of flowering plants is bound to influence where moths are captured in moth traps. Certainly the data supports this idea, because the best samples are from the cottage, where there is a flower-rich bank along the lane, a whole row of house gardens and the new Kindersley Centre gardens.

Host plants for larvae are crucial and these will also influence the trap samples, because the adults both emerge at and lay eggs at their associated species. It would be expected that a wide variety of plants would be more likely to generate a wide variety of moth species.

Many of the moths recorded are able to feed on a variety of plants during the larval stage so it is difficult for this report data to demonstrate an association between the location of larval food and trapped moths. Most of the more specialist species, such as Cinnabar (host plant ragwort), were only found in relatively small numbers.

In contrast to many other moths, Flounced Rustic and Lime Hawkmoth have their highest counts at the trap located between fields W12 and W13. The Flounced Rustic larva specialises in eating the roots and stem bases of grasses, sometimes eating cereal crops, and so this may explain the large numbers here. The low total numbers of Lime Hawkmoth (4) do not allow a similar conclusion about this species, whose caterpillar feeds on trees.

We might have expected those relying upon woody larval host plants to be seen trapped less often at the boundary between fields W12 and W13, compared to the other trap locations, although there is young tree plantation and hedgerow nearby.

This expected effect does not seem to be shown clearly in the results, indeed there are too few data to conclude anything on this, and we see differences between results for the species using woody host plants. On examination of the results on Table 2 and Table 3, a bias in favour of Sheepdrove Farmhouse and the Cottage No.4 Garden might be suggested for Broom Moth, Pale Tussock and Privet Hawkmoth, but this is not at all the case for Buff Tip or Poplar Hawkmoth, and appears the opposite for Lime Hawkmoth and Pale Prominent.

Three woody-plant species were found only at locations near varied and mature woody plant habitats, but these were only seen in single specimens. The single example of the Eyed Hawkmoth (sallows, willows, poplars, apple) was only observed at the Cottage No.4 Garden. For both Barred Sallow (field maple and beech, sometimes oak) and the oak-eating Grey Shoulder Knot, only 1 was seen of each, at Sheepdrove Farmhouse courtyard.

Sheepdrove Organic Farm - Moth Trap records 2004

Table A.

Location: Border between fields W12 & W13

OS grid ref: SU354813
Trap type: Robinson
RECORDER: Jason P Ball

	NUMBERS IN EACH SAMPLE			
COMMON NAME	**25-May-04**	**18-Aug-04**	**17-Oct-04**	Total Numbers
Angle Shades				0
Beaded Chestnut			1	1
Blood-Vein				0
Bordered Sallow				0
Broom Moth				0
Buff Tip	*2*			2
Burnished Brass				0
Cinnabar	*4*			4
Common Swift				0
Common Wainscot	*1*			1
Dark Arches	*1*			1
Drinker				0
Ermine, Buff				0
Ermine, White	*9*			9
Eyed Hawkmoth				0
Flame				0
Flame Shoulder				0
Flounced Rustic		*19*		19
Heart and Dart				0
Large Yellow Underwing		*2*		2
Lesser Broad-Bordered Yellow Underwing				0
Lime Hawkmoth	*2*			2
Mesapamea spp (could not decide which species)				0
Pale Prominent	*1*			1
Pale Tussock				0
Poplar Hawkmoth	*1*			1
Privet Hawkmoth				0
Rosy Rustic		*1*		1
Ruby Tiger				0
Setaceous Hebrew Character		*2*		2
Shark				0
Silver Y				0
Small Elephant Hawkmoth				0
Straw Underwing		*2*		2
Treble Lines				0
Yellow Line Quaker			1	1
Unidentifiable due to damage or faded markings		*1*		1
Individuals unidentified because they flew away		*0*		0
(unidentified with descriptions below:)				0
wave, like riband wave	*1*			1
green chalk carpet appearance	*1*			1
cream wave along wing length	*3*			3
another moth like riband wave pattern	*2*			2
				0
TOTAL MACROMOTH Numbers	*28*	*27*	*2*	
TOTAL MACROMOTH Species	*12*	*5*	*2*	

6) Conclusions

The results are encouraging for Sheepdrove Organic Farm's approach to managing positively for biodiversity. Our samples include species that benefit from the range of habitats being conserved and created.

This suggests that benefits to biodiversity in the group of Lepidoptera will be supported by the current nature conservation projects at the farm. (See Table 3.) Long term improvements can be anticipated particularly for those moths which use woody species as the larval food, because in years to come Sheepdrove will see its recently established hedges, woodland and gardens mature.

The recent establishment of new woodlands, hedge planting, bespoke sown strips of wildlife mix (12-metre wide mixes with native wildflowers, grasses and crops together), Phacelia strips, uncultivated rough grass field margins, beetle banks, new water habitats, and management projects for chalk grassland diversity, and ongoing increases in habitat improvement, will all contribute to the conservation of moths and butterflies.

Monitoring of Lepidoptera using repeated studies in years to come will help to assess the success of Sheepdrove in the work for biodiversity. To date, the team working on ecological research have agreed that workload is the limiting factor, and it is proposed that the studies of butterflies and moths are each done in alternate years. This will also allow for changes in Lepidoptera communities in response to development of the habitats.