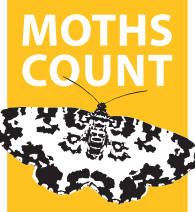


**Butterfly
Conservation**

Saving butterflies, moths and our environment

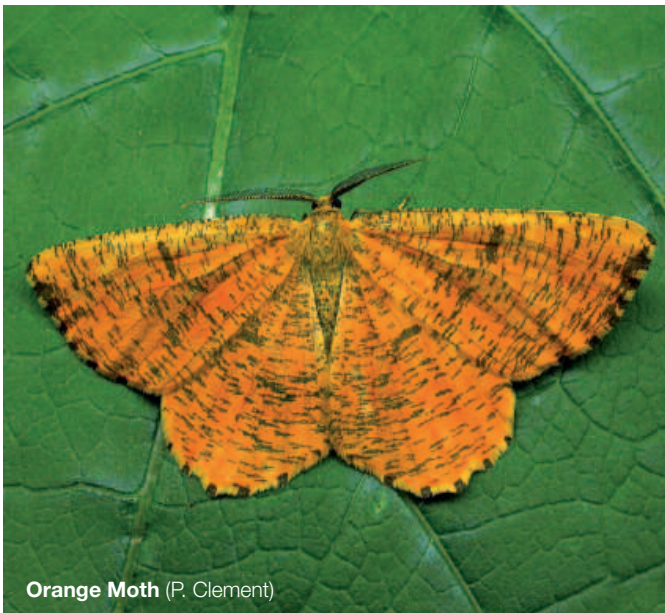


Moths Count Newsletter 2010

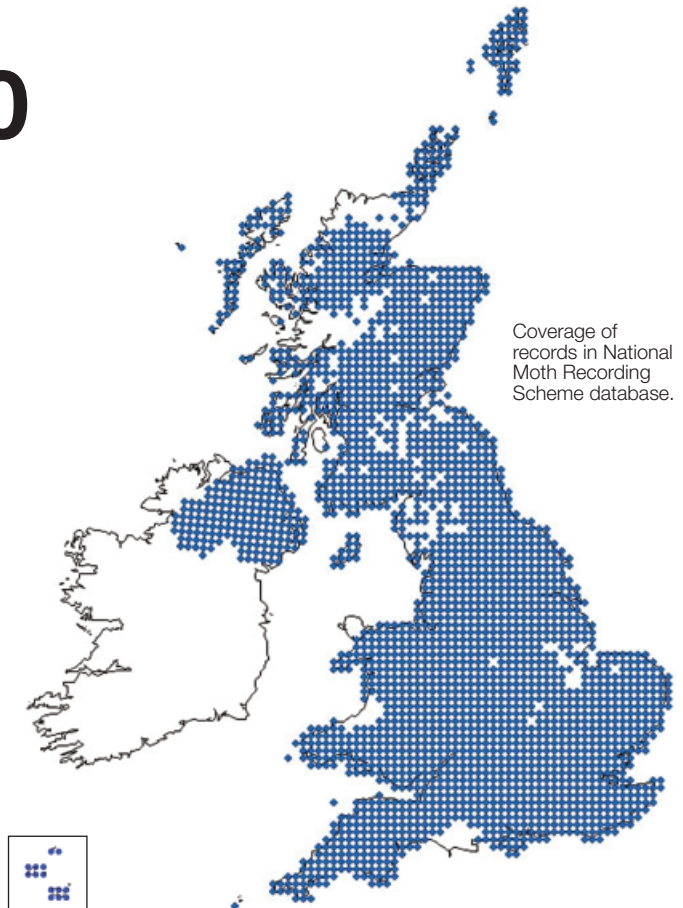
Millions of Moths Mapped!

One of the major outputs of the National Moth Recording Scheme is the publication of a Provisional Atlas of macro-moths. We aim to publish this (online and hard copy) by the end of August 2010. It will not be a glossy book, it will simply present new distribution maps for all species; the first for several decades. The Atlas is provisional. In other words we expect it to contain some errors and for there to be gaps in the coverage.

Enabling recorders to spot errors is one of the aims of the Provisional Atlas as is encouraging people to target future recording effort in under-recorded areas. The National Moth Recording Scheme (NMRS) is ongoing and improving all the time, so the Provisional Atlas should be seen as a stepping stone towards a full atlas featuring species accounts and colour photographs.



Orange Moth (P. Clement)



To enable timely publication of the Provisional Atlas, we asked County Moth Recorders to submit as many moth records as possible to us by 30 April 2010. We had a fantastic response to this request. An astonishing total of 9.1 million moth records from 114 vice-counties have now been collated into the NMRS database since the launch of the scheme in 2007.

The current coverage of all records is shown above. Huge thanks go out to the County Moth Recorders who have spent a great deal of time collating and verifying local datasets for submission to the NMRS. Thanks also go to everyone who records moths and sends records to their County Recorders. Without the efforts of so many individuals we would not have a National Moth Recording Scheme.

Although the deadline for submission of records (for inclusion in the Provisional Atlas) has passed, the NMRS will continue so please do keep sending your records to your County Moth Recorder. They will forward them to the scheme in due course. >>

>> Although the publication of provisional atlas is still a few months away, you can see provisional distribution maps for all macro-moths on the internet right now. One of the biggest successes of the past year was to make the NMRS data accessible in this way on the Moths Count website www.mothscount.org. These maps are valuable feedback to the moth recording community and enable moth recorders to see their own records in a national context.

The online maps are linked to the National Biodiversity Network (NBN) Gateway. When we pass an updated NMRS dataset to the NBN Gateway (every few months), the maps are refreshed automatically. Thus there is a time lag between local datasets being submitted to the NMRS and those moth records appearing on the national maps. One of the great advantages of this approach is that the NMRS data can also be viewed by the many conservation organisations that make regular use of the NBN Gateway, so your records are also contributing to moth conservation. Another spin-off benefit is that the NMRS provisional maps now also appear in the species accounts on the UK Moths website (www.ukmoths.org.uk).

Unfortunately, unlike the NMRS, the National Biodiversity Network does not include the Channel Islands, so the important data sent by moth recorders there does not appear on these online maps.

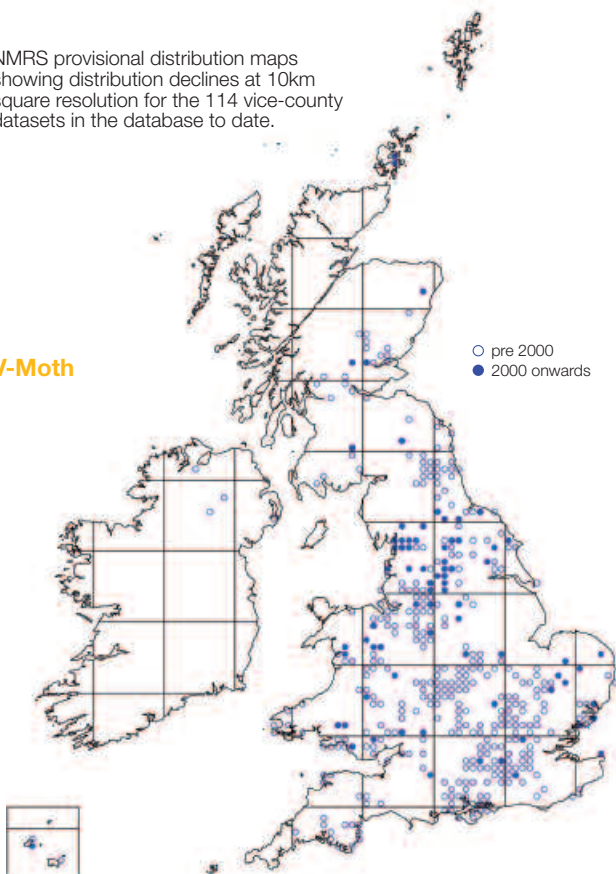
Rest assured, though, that the Channel Islands will be properly represented in the Provisional Atlas. The NMRS is now the largest dataset for any group of animals on the NBN Gateway. To date 7.6 million moth records from 98 vice-counties have been uploaded on to the Gateway.

Despite the huge progress over the past few years, the NMRS dataset is far from complete. There are a few vice-counties for which we have no data at all as yet and others with limited records. Some areas are under-recorded of course, but in other places the NMRS has only recent records and historical ones are still in the 'pipeline' or vice versa. This 'patchiness' in coverage is improving all the time but it does mean that it is too soon to undertake full-scale analysis of the NMRS database to see how each and every macro-moth species is faring. Nevertheless, as demonstrated with the range expansion maps in last year's newsletter, the fortunes of some species are already clear in the data. For example, several species show severe declines in their distribution over time, including the V-Moth and Double Dart (see maps below). These distribution declines mirror the population declines seen in the Rothamsted Insect Survey data reported in *The State of Britain's Larger Moths*.

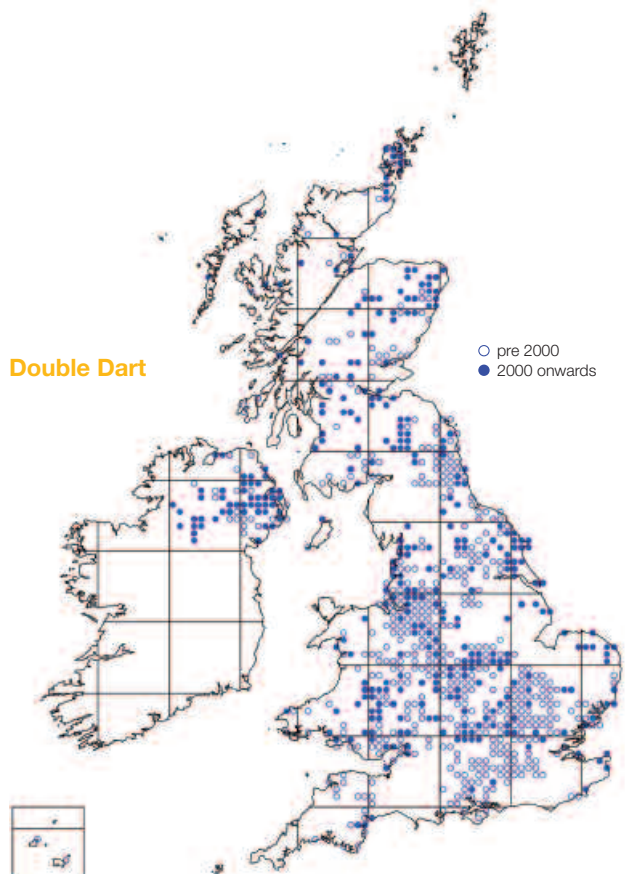
The NMRS database will continue into the future and will be a key resource in helping us to understand the impacts of changes in agricultural practices and climate change on our wildlife.

NMRS provisional distribution maps showing distribution declines at 10km square resolution for the 114 vice-county datasets in the database to date.

V-Moth



Double Dart



Moths Count Project Update

Aside from the creation of the National Moth Recording Scheme, the Moths Count project aims to promote moth recording and enlighten people to the beauty and importance of moths.

Over the past three and a half years, we've worked closely with the moth recording community, County Moth Recorders and many local groups. To date, 115 training events have been organised for moth recorders, new and old, across the UK, Isle of Man and Channel Islands. These have been attended by over 1500 people ranging from beginners to experienced moth-ers. As well as being fun and (hopefully) enhancing the skills and knowledge of the participants, the training events have helped to survey and monitor rare or threatened moths. A few further training events are planned for 2010 (see page 8 of this newsletter or the Moths Count website www.mothscount.org).



Chalk Carpet workshop (C. Best / Durham Wildlife Trust)

Four 'national' moth recorders' conferences have been held over the past year, quite a feat of organisation! A South Wales meeting took place at Kenfig National Nature Reserve in September 2009, followed by one in North Wales in March 2010. In addition, another English Moth Recorders' Conference was held in Birmingham (in January 2010) and, last but by no means least, came the Scottish Recorders' Gathering at Scottish Natural Heritage's Battleby Centre in April. In all, over 260 people attended these conferences. Once again feedback was extremely positive and the talks from both amateur moth-ers and academic researchers were excellent. Several people have commented on what a great opportunity these events provide to meet up with colleagues and friends.

Over the course of the whole Moths Count project, we've now held 11 such conferences and hope to fit one more in (in Northern Ireland) before the end of 2010. They are expensive and take a lot of organising, but have been very successful and much enjoyed by the moth recorders who've attended. We won't be able to continue this scale of activity in the future, but will certainly try to have at least one UK conference every year that focuses on moths and moth recording.

The much expanded and revamped Moths Count website, launched last summer, is a valuable resource for moth recorders and for members of the public alike. Information about moths, their conservation and moth recording (including a *Moth Recorders Handbook* and contact details for all the County Moth Recorders) can be found, as well as those all important online distribution maps. For beginners, there is a wealth of information about how to get started and a moth gallery to help identify common and conspicuous moths.

For those of us already interested in moths, it is odd and slightly sad that these amazing insects are often overlooked and misunderstood by the wider public. The Moths Count project has been working hard to change the misconceptions that people have about moths. Since 2007, we have run a series of free public moth events with the help of enthusiastic volunteer moth-ers and partner organisations. These events provided a great opportunity for people to experience moths first hand and quite often for the first time. In total, 95 public moth events took place during 2007-09, attracting over 2000 people. Not only did these events introduce moths to a large new audience, sometimes exciting discoveries were made. Last year, for example, *Cydia inquinatana* (a Tortrix moth) was recorded for the first time in Britain during a public moth event at RSPB Minsmere. >>



Cydia inquinatana (J. Higgott)

>> Garden Moths Count, our 'citizen science' survey aimed at beginners, also attracted the gardening public and their families to the world of moths. Almost 2400 people took part in Garden Moths Count 2009, which focussed on the Peppered Moth and Scarlet Tiger, and in the associated Humming-bird Hawk-moth online survey. Participation in Garden Moths Count has increased by 500% since its launch in 2007. Unfortunately, due to funding restrictions, the main Garden Moths Count survey will not be run this year.

However, the Humming-bird Hawk-moth survey is continuing so if you see a 'Hummer' please log your sighting at www.butterfly-conservation.org/migrantwatch. In addition, Butterfly Conservation is launching a new high-profile public survey called Big Butterfly Count (24 July -1 Aug 2010), which will include a number of day-flying moths (see www.bigbutterflycount.org for information).

Moths have continued to enjoy a favourable position in the media spotlight over the past 12 months. With help from Moths Count, BBC One's The One Show has regularly featured moths on primetime television, including a recent film about the incredible Death's Head Hawk-moth and its implication in the madness of King George III. Additionally, the Moth Lady (a.k.a. Zoë Randle) was interviewed for an unprecedented four consecutive evenings on Chris Evans' BBC Radio 2 evening show last summer, and events such as National Moth Night and Garden Moths Count have attracted coverage in dozens of newspapers and magazines.

Last October numerous Members of Parliament and Lords attended the fourth annual Moth and Bat Evening held at the House of Commons. The Broadcaster and Butterfly Conservation Vice President Nick Baker told MP's of the importance of moths and bats and Zoë Randle updated attendees on the National Moth Recording Scheme. The evening was hosted by Madeleine Moon MP, Butterfly Conservation, the Bat Conservation Trust and the Heritage Lottery Fund.



Above (left to right) Butterfly Conservation's Head of Moth Conservation Mark Parsons, Chairman Maurice Avent, Madeleine Moon MP, Nick Baker and Moth Recording Co-ordinator Dr Zoë Randle (Photograph courtesy of Heritage Lottery Fund)

It has been a very busy year since our last newsletter and there is more to come. Keep up with all the news by subscribing to E-moth, our free email update. Contact nMrs@butterfly-conservation.org or **01929 406009** if you would like to be added to the mailing list.

Future of Moths Count

The funding for this phase of the Moths Count project comes to an end later this year. It is very difficult to find funding sources to continuing existing projects, particularly in the current economic climate, so inevitably there will be some scaling back of both the team and activities. Butterfly Conservation will continue to promote moths and moth recording and is committed to the future of the National Moth Recording Scheme. A funding appeal to raise money for ongoing moth and butterfly recording has been launched by Butterfly Conservation this year. If you can make a donation, please visit www.butterfly-conservation.org or contact us on **01929 400209**.

The Moths Count team would like to thank everyone who has been involved in the project; moth recorders and volunteers who have run public moth events and training events, photographers for the use of images in our publicity material, project partners who have provided both in-kind and financial support.



Moths Count team (left to right) Richard Fox, Laura McLellan, Susan Anders, Zoë Randle and Les Hill (L. Stuckey)

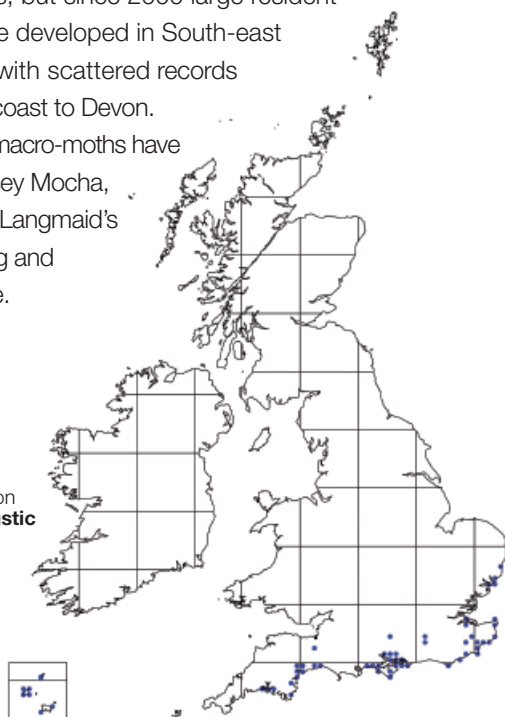
Without the assistance of so many individuals and organisations, none of the many achievements would have been possible...thank you all!

Over a Century of Change

The British landscape has altered significantly since 1900 and it is unsurprising that at the same time the Lepidoptera of Britain has undergone considerable change. In total, 540 species have been added to the British list (approximately 5 species per year!), although this includes occasional occurrences, taxonomic changes and species that have not become established. In 2003, Mark Parsons reviewed the changes to the British fauna of moths and butterflies during the twentieth century. He reported that 89 species became established (or re-established) in Great Britain, whilst 66 species went extinct. Of these extinctions, all but four, the Large Blue (which has subsequently been successfully re-introduced), Mazarine Blue, Black-veined White and the Large Tortoiseshell, were moths.

Earlier this year, Mark updated the assessment of colonisations and extinctions by considering further changes over the past 10 years (2000-2009). A further 24 species (only one of which is a butterfly, the Red Admiral) are considered to have become established in the wild since 2000. Among the macro-moths, these include Clancy's Rustic (see map below), which was first recorded in Kent in 2002. In 2004 three were recorded and in 2005 a total of 160 were found (Waring and Townsend, 2009)! This moth is now resident in southern coastal counties from Dorset to Suffolk and spreading rapidly. The establishment of this moth in such a short period of time is astonishing. The Tree-lichen Beauty has also rapidly colonised. Up until 1991 only three had been recorded, all presumed to be immigrants, but since 2000 large resident populations have developed in South-east England, along with scattered records along the south coast to Devon. Other colonising macro-moths have included the Jersey Mocha, Dusky Peacock, Langmaid's Yellow Underwing and Sombre Brocade.

Provisional distribution map of **Clancy's Rustic** from National Moth Recording Scheme database



Above Clifden Nonpareil colonised Britain in 1935, went extinct in 1964 but seems now to have re-colonised (c. 2005). It is possibly established in Sussex, Hampshire and Dorset (L. Hill)

In Scotland, the status of the Pine-tree Lappet is currently being debated. It was first recorded in Inverness in 2004 and subsequent surveys have shown a well-established breeding population. However, it is unclear at present whether this moth is a recent colonist through accidental introduction or an overlooked resident.

Factors which have influenced these lepidopteran establishments are accidental imports through the horticultural trade and, of course climate change, which has enabled natural immigrants to get a toe hold on our wet and windy islands. The increased popularity of moth recording is important for more rapid detection of colonisations and extinctions.

Sadly, it's not all good news; during the past decade two further moth species were declared extinct in Britain; the Bordered Gothic and the Brighton Wainscot. The last sightings of resident moths of both these species were in 2001, although singletons, thought to be immigrants, of Bordered Gothic have been recorded in Britain since then. Additionally the Orange Underwing is now considered extinct here, with the last known resident sighting in 1994.



Clancy's Rustic (L. Hill)



Bordered Gothic (D. Green)

More Information:

Parsons 2003. *Entomologist's Record & Journal of Variation* **115**, 49-66.
Parsons 2010. *Entomologist's Record & Journal of Variation* **122**, 13-22.
Waring and Townsend 2009. *Field Guide to the Moths of Great Britain and Ireland*. British Wildlife Publishing.

Fan-foot Festival

Launched in 2007 and now in its final year, Butterfly Conservation's South East Woodlands Project is working with woodland owners to ensure long-term sustainable woodland management and to halt the decline of some of our rarest woodland-specialist species. In East Sussex, the project has worked hard to encourage coppicing and sensitive woodland management. As a result we have developed good relationships with woodland owners and gained access to survey over 5,000 hectares of private woodland.

A key moth in this area is the Clay Fan-foot (*Paracolax tristalis*), a Nationally Scarce UK BAP priority species. It favours sunny but sheltered areas where trees have been felled or coppiced and regrowth has begun although, frustratingly, its exact life-strategy and habitat requirements are not yet fully understood.

We launched the *Fan-foot Festival* in 2008, as a series of surveys to raise the profile of this important (if not very colourful) UKBAP moth and to assess its dependence on coppicing. The Festival has encouraged local moth experts to visit coppiced woodlands during the moth's July flight period. Over the last two years, 18 coppiced woods in East Sussex have been visited. Where possible, light traps have been positioned in a line, 50 metres apart, so that they can potentially attract moths from a variety of different woodland habitat structures.



Clay Fan-foot (S. Wheatley)

Clay Fan-foot moths were recorded in two thirds of the woodland sites surveyed in 2008 and 2009, with far greater numbers appearing at the traps situated in recent coppice rather than in uncut or more mature woodland or even on rides or paths. At one wood near Peasmarsh, an incredible 50 Clay Fan-foot were recorded on 7th July 2009, in two-year-old Sweet Chestnut coppice. This is the most recorded in Sussex since 1958. Three nights later (10th July) and seven miles to the east, a further 52 were recorded, again in two-year-old Sweet Chestnut coppice.



Steve Wheatley searching for Clay Fan-foot larvae (M. Parsons)

Encouraged by this important find, Butterfly Conservation staff and volunteers returned in April this year to look for the larvae which, intuition would tell us, must be abundant. We searched leaf litter on the ground and in coppice stumps, but didn't find a single larva. The mystery of the moth's larval stage remains, making it difficult to provide advice for its conservation. More research is being undertaken throughout 2010.

Effort has not been restricted to just this Fan-foot; we have also encouraged searches for the Nationally Scarce Dotted Fan-foot *Macrochilo cribrumalis* and the Common Fan-foot *Pechipogo strigilata*, a UKBAP priority species. Even the more abundant, but still delicately attractive, Small Fan-foot *Herminia grisealis* gets a special mention when we find it. A further 348 moth species, including 11 which are Nationally Scarce, have been recorded during the Festival. In each case the Project Officer has communicated the results back to the landowners, raising the profile of moths and generating further enthusiasm and action for conservation of woodland species and habitats. As a measure of this, applications for Felling Licences to restore coppicing have doubled since the start of the South East Woodlands Project (information from the Forestry Commission) and many woodland owners have requested more surveys.

This important work would not have been possible without the South East Woodlands Project which has provided the opportunity to secure access agreements with local landowners and coordinate these targeted surveys.

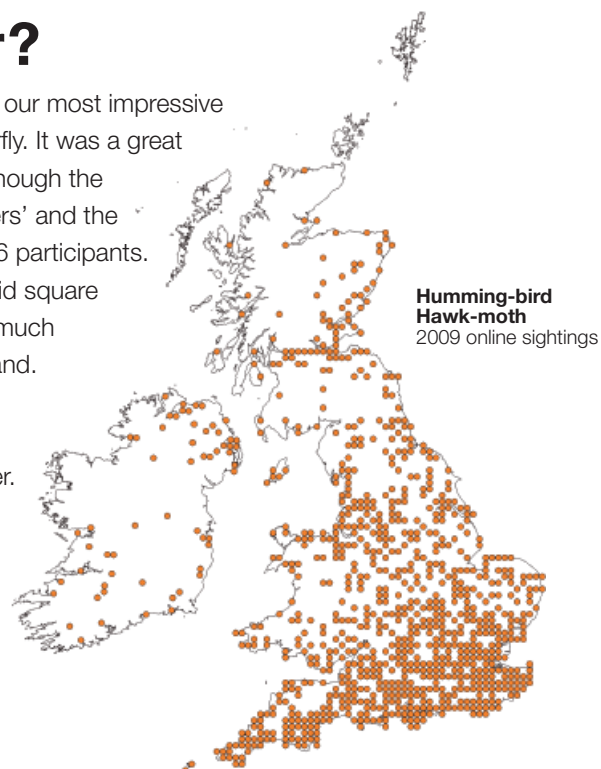
Butterfly Conservation are grateful to the Heritage Lottery Fund, Tubney Charitable Trust and our other funders who have made this project possible and enabled this important work to be undertaken. Thank you also to the woodland owners who have allowed us unprecedented access to survey and to the volunteers who have helped with the surveys. Will 2010 will be the 'Fan-foot Finale'?

Steve Wheatley
Rother Woods Project Officer,
South East Woodlands Project,
Butterfly Conservation

Will it be a Hummer summer?

Throughout 2009, Butterfly Conservation ran an online survey for two of our most impressive migrant insects, the Humming-bird Hawk-moth and Painted Lady butterfly. It was a great success with a total of 14,829 records submitted by 10,451 people. Although the Painted Lady stole the show last year, it was not a bad year for 'Hummers' and the online survey received 1,986 reports of this spectacular moth from 1,836 participants. The distribution of these records is shown on the map (right) at 10km grid square resolution. The moth was seen widely across southern Britain, but was much scarcer in the north and no records were submitted for Orkney or Shetland.

Nevertheless, the species was recorded on the north coast of mainland Scotland. Hummers were seen from 9 February through to 24 November. Although many arrived in mid to late June, the peak of sightings was in August, as is typical for this species.



Thanks again to everyone who took part in the 2009 survey. The survey continues during 2010, when we hope that it will be the turn of the Humming-bird Hawk-moth to wow the nation!

Please continue to log all your sightings of both these incredible, inter-continental insects at www.butterfly-conservation.org/migrantwatch.



National Moth Night

Amazingly, two National Moth Nights have come and gone since last year's newsletter. The eleventh National Moth Night was held over two nights, 18 and 19 September 2009, with a migration theme and a unique nationwide moth-marking experiment. A full report, including the results of the marking study, appears in the Spring 2010 issue of *Atropos*. A very impressive total of 22,700 records were received from more sites than ever before - nearly 1100!

Next came National Moth Night 2010 on the early date of 15 May. Although there can be an impressive range of common and scarce species flying in mid-May, the spring weather was not kind and early indications are of relatively low numbers of moths. Nevertheless, interest in National Moth Night from moth recorders and the public remained strong, undaunted by the fickle climate.

The theme of moths and bats added interest this year, with the Bat Conservation Trust joining Atropos and Butterfly Conservation to run the event. Scores of public events were organised, many offering both moth trapping and bat detecting to double the excitement for participants.

The media were also fascinated by this unlikely alliance of predator and prey with National Moth Night discussed in primetime breakfast shows on BBC1, Radio Two, Radio Four and Five Live, as well as on a dozen local radio stations during the day. If you recorded moths, bats or both on 15 May, please submit your sightings via the online forms at www.nationalmothnight.info



Free 'Concise Guide to the Moths of Great Britain and Ireland' book plus three months free membership when you join today!

Butterfly Conservation is delighted to offer all new members 15 months' membership subscription for the price of 12 - that's three months free when you **join online** by direct debit paying annually or monthly.

Plus, you will also receive the 'Concise Guide to the Moths of Great Britain and Ireland' book by Martin Townsend and Paul Waring. All the resident and immigrant macro-moths described and illustrated in a handy easy-to-use format. Illustrated by Richard Lewington.

This is a fantastic opportunity to belong to the UK charity saving butterflies, moths and our environment. You will also receive some excellent benefits including:

- A new member welcome pack
- A personalised membership card
- **Butterfly**, our exclusive magazine, fully illustrated with award-winning photography, this magazine has the latest news on Lepidoptera
- Garden moths and caterpillar leaflets
- Free membership to your local Branch

To become a member, simply visit the Moths Count website (www.mothscount.org), click support us and follow the link to become a member. Choose the Direct Debit paying method and please enter 'MOTHNEWS' in the promotional code box to receive your free book and three months free membership.

If you encounter any problems or have any questions about this offer then please contact Butterfly Conservation on **01929 400209** or info@butterfly-conservation.org.

Moth Recording Training Events 2010

Butterfly Conservation is organising a programme of free moth events as part of the Moths Count project, funded by the Heritage Lottery Fund and many other organisations. There may be additional events listed on the website at www.mothscount.org

The following training courses have been organised to cover a range of expertise. Many are suitable for beginners - if in doubt please check when booking. Warm clothing and a torch are needed for evening events. Most of the events are free and all require advance booking: unless otherwise stated in the listing below, booking is via **01929 406009** or nmrs@butterfly-conservation.org

ENGLAND

South East England

19 June 2010 *Moth conservation* led by Martin Harvey. Lee Valley Regional Park, London. 19:00 onwards. Advance booking essential via Lee Valley Information Service 08456 770600.

21 August 2010 *Moths of wetland habitats* led by Martin Harvey. Lee Valley Regional Park, London. 19:30 onwards. Advance booking essential via Lee Valley Information Service 08456 770600.

North West England

24 July 2010 *Introduction to moth recording* led by Graham Jones, in association with Lancashire Wildlife Trust. The Barn, Preston, Lancashire. 10:00–15:30. Advance booking essential via Graham Jones gjones@lancswt.org.uk or 01772 318371.

SCOTLAND

4 July 2010 *Pug identification day* led by Mark Young and Roy Leverton. Aigas Field Centre, Beauly, Inverness. 10:00-16:30. Advance booking essential via Tony Mainwood tony.mainwood@btinternet.com or 01408 633247.

NORTHERN IRELAND

18 June 2010 *Moths & moth recording in Fermanagh* led by Dave Allen, in partnership with the Derrygonnelly Field Studies Council Centre, County Fermanagh. 20:00 onwards on the Friday night followed by a morning session on Saturday. There is accommodation available at the Field Studies Centre. For more details and to book please contact Catherine Bertrand on bcni@btconnect.com 07584597690.

PLEASE REMEMBER THAT ALL PLACES ON TRAINING COURSES MUST BE BOOKED IN ADVANCE.

Hawk-moths

Hawk-moths are special. Their sheer size inspires awe. Most are larger than any insect has a right to be, at least in Britain. Next is their build. Everything about them is designed for speed – long but narrow forewings and relatively small hindwings to reduce drag, with a bulky yet streamlined thorax and abdomen to house the huge muscles and energy reserves needed to power their flight. Many are migrants that can travel remarkable distances, capable of setting off in North Africa and reaching Shetland or even Iceland. So they can turn up anywhere, to delight and amaze. This adds to their charisma. Even the humblest backyard in some benighted inner city may briefly host the rarest and most spectacular of migrants - species that many dedicated lepidopterists will never be lucky enough to see.



Elephant Hawk-moth caterpillar (N. Sherman)

Fortunately we have resident hawk-moths too. Several are so widely distributed that almost anyone can look for them with a fair chance of success. To date I have seen twelve of the 17 species (excluding accidental importations) on the British list. In every case the memory of that first sighting remains sharp and fresh, even after 50 years or more. Take the newly-emerged Poplar Hawk-moth found on a garden wall on my way back from primary school in Salford, then carried home in my school cap, excitement barely overcoming trepidation.

Or that long hot summer when no less than three Humming-bird Hawk-moths patrolled the flower beds in our local park. Risking the wrath of the park keepers, I finally managed to catch one with my pullover, flattening several geraniums in the process. Then came the snake-like caterpillar of the Elephant Hawk-moth (a fearsome sight to a small boy), followed by joy when the rose-pink and green adult emerged in all its glory on my bedside table the following spring. Was I still dreaming? No, this was real!



Bedstraw Hawk-moth
(D. Green)



Narrow-bordered Bee
Hawk-moth (R. Fox)

Moving south to Sussex increased the number of potential species. Privet Hawk-moth topped my wish-list but proved elusive. Finally I spotted one from a moving bus - they really are that big! It wasn't my stop but I got off anyway, and later had to explain to an incredulous foreman exactly why I was late for work. Even larger was the *Convolvulus* Hawk-moth lured by a vast bed of *Nicotiana*. I stood transfixed in the twilight while this huge moth gave a display of precision flying as it hovered to feed at the blooms, stationary one moment, the next accelerating too quickly for my eyes to follow. In the dusk it seemed to dematerialise then reappear instantly elsewhere.



Death's-head Hawk-moth (L. Hill)

Even relocating to the Scottish Highlands did not preclude new sightings. That remarkable mimic Narrow-bordered Bee Hawk is locally common here, given a sunny May morning. Twice a Bedstraw Hawk-moth has visited my garden flowers. And last autumn brought perhaps the greatest prize of all, a magnificent Death's-head Hawk. Admittedly I cheated, racing off to 'twitch' one found by someone else, after being alerted by a phone call. Well, would you have resisted the temptation?

Roy Leverton

Migration in the fast lane

A study published recently in *Science* (Chapman *et al.* 2010), led by researchers at Rothamsted Research, sheds new light on the flight behaviours that enable moths and butterflies to undertake long-distance migrations, and highlights the remarkable abilities of these insect migrants.

Many moths and a few butterflies migrate to Britain and Ireland each year from permanent or over-wintering strongholds around the Mediterranean. How such small insects manage to carry out journeys over several thousands of kilometers in a relatively short time has long fascinated scientists, and we are starting to get a clearer picture of the extremely sophisticated strategies that these species have evolved.

The new research used two specially-designed entomological radars situated in southern England to monitor the migration patterns of high-flying migrant Lepidoptera, and to study their in-flight behaviour in relation to the wind. These radars detect individual insects flying between 150 m and 1200 m above the ground, where the wind speeds are so fast that the insects' speed and direction of movement will be heavily influenced by the air streams in which they travel. But the new study showed that the migrating moths and butterflies are far from being at the mercy of the wind.

Using data from about 100,000 individual radar-detected migrant Lepidoptera, the research showed that during 'good' migration years (2000, 2003 and 2006) there were seasonal peaks of migratory activity in May–June (corresponding to the spring arrival) and then again in August–September (the autumn departure). The main migratory Lepidoptera identified were: (1) the Silver Y *Autographa gamma*; (2) the Large Yellow Underwing *Noctua pronuba*; (3) Hawk-moths (Sphingidae); and (4) day-flying migratory butterflies (probably mostly Painted Ladies *Vanessa cardui* and Red Admirals *V. atalanta*). The moths flew by night, the butterflies by day, but apart from this difference they all showed a remarkable similarity in their flight behaviour.

All four groups showed a highly significant preference for migrating on winds blowing towards the north in the spring, and towards the south in the autumn, and therefore they were carried on the wind in seasonally-favourable directions. But they were not just passively blown downwind. Further analysis showed that the moths and butterflies oriented their flight headings in such a manner that they added their own air speed to the wind speed (so that they travelled significantly faster than the wind), and also compensated for small degrees of drift away from their preferred north–south headings.



Furthermore, Silver Y moths tended to fly at the altitude of the fastest wind speeds, which varied from 200 m to 1000 m above the ground (with an average of 425 m). This meant that they achieved extremely rapid movements, averaging about 50 km per hour and reaching a maximum of 100 km per hour! At this speed, the migrant moths will be able to cover huge distances in a single night's flight.

In collaboration with the Met Office, we modelled the effect of these flight behaviours shown by Silver Y moths in comparison with passively-transported inert particles drifting on the wind. The moths' behaviour enabled them to achieve migratory movements that were, on average, about 50% longer and 20° closer to their preferred direction. In other words, the behaviour of the moths made a big difference. This new study illustrates how insects successfully undertake long-distance migrations in favourable directions.

The high-altitude moth migrations were enormous. During the study period of this research (2000–2007), it is estimated that over two billion individual moths were involved in windborne movements into and back out of the UK. Climate change is likely to significantly alter the frequency of insect migrants, including introducing some agricultural pests that are completely new to the UK. Thus, a better understanding of insect migration strategies is increasingly crucial in helping to secure food supplies in the long term.

More information:

Chapman *et al.* 2010. *Science* **327**, 682–685.

Dr. Jason Chapman
Plant and Invertebrate Ecology Department,
Rothamsted Research

Daytime mothing - hundreds of species to see!

If you don't have the equipment or opportunity to find moths by light-trapping at night, don't despair. Guy Meredith, a moth recorder from Gloucestershire, extolls the virtues of mothing by day.

There are *hundreds* of species which can be found in the daytime as adult moths: those that normally fly in the daytime, those that will fly if disturbed from vegetation, and some more which often rest during the day in visible positions such as tree trunks. Since concentrating on moth recording in 2002, I have found 757 species during the daytime in Gloucestershire or just over the county border. 602 of these species were found as live adults: 179 macros and 423 micros. The remaining 155 species were found mostly as larvae or as identifiable leaf mines made by the tiny larvae of some micro-moths. In 2009 alone I found 470 species in the daytime, 350 as adults, and there are still plenty of species which I haven't yet found, even some quite common ones!

For anyone starting out in daytime moth-recording a book covering the macro-moths is essential, but you will soon find that this doesn't cover many of the species that are commonly seen. There are books and websites giving just a selection of micro-moth species, but this can lead to incorrect identifications if you are unaware of similar species which are not illustrated. Specialist books are available which collectively cover all the various moth families found in the UK, but some of these books seem quite expensive. Seem expensive? Well yes, individually they can cost a lot more than a book covering all the macros. If you think of it in terms of entertainment though, each book should give you many years of use so a price comparable with going to a big concert or sporting event lasting just a couple of hours is actually very good value for money.

Rather than trying to cover all micro families from the outset, it is easier (and less expensive initially) to build up over several years. It's probably best to start with the Pyralids, because this family includes the commonly-seen "grass moths" and several other conspicuous day-flying groups such as the colourful little moths in the genus *Pyrausta* and the China-marks which can be found in wet areas. In addition to books you will probably need a digital camera with a good close-up macro mode, a fine-mesh net, some specimen tubes and a small magnifying lens (x10). Catching and keeping specimens for identification (even if you later release them) is necessary for many micros and a few of the macros. Wing markings may be sufficient but you can't carry all the necessary books in a rucksack! Of course, don't collect specimens at a site unless you have permission to do so.



Beautiful China-mark
(G. Meredith)



Esperia sulphurella
(G. Meredith)

So few people search specialised habitats for micro-moths that there could be a lot of scope for finding species that are new to your area, or which haven't been recorded for several decades. You don't need to be an expert to find such species, you just need to spend time out in the countryside. Reading up on species you've not seen can pay dividends, but about half of my finds are by chance, including some UK rarities. Anyone can make such finds, but you will only know you have a "good record" if you are able to identify the specimen or if someone else, such as the County Moth Recorder, is able to do this for you.

Most moth-ers tend to think of their hobby as a primarily nocturnal one, but get out there in the sunshine and you'll be amazed at what you can find.

Guy Meredith
Moth Recorder

Lepidoptera Conservation Bulletin Number 10

The latest edition of the Lepidoptera Conservation Bulletin (*number 10*) is now available to download from

www.butterfly-conservation.org/lepidopteraconservationbulletin

The Bulletin summarises the work carried out by Butterfly Conservation and many partner organisations over the course of the year and the resulting advances in our understanding of the UK Biodiversity Action Plan Priority Species, both moths and butterflies, including information on distribution, habitat requirements and management. This year's edition includes updates on conservation efforts for a broad selection of highly threatened moths across the UK as well as articles about recording and other topics, and a selected Bibliography of recent publications.

iSpot – helping people learn how to identify wildlife

The Open University has launched iSpot (www.ispot.org.uk), a website to help beginners learn how to identify wildlife, and then go on to get involved in wildlife survey and conservation. On iSpot, people can upload digital photos, and/or descriptions, of the species they've seen, and are encouraged to try identifying it themselves. Others can click a button to show agreement with the suggested identification, or if it's not correct they can add an alternative species name. The site has been developed by the Open University's Biodiversity Observatory team, led by Professor Jonathan Silvertown, as part of the Open Air Laboratories project (OPAL) funded by the Big Lottery Fund.

iSpot can be used by anyone for their own identification puzzles, but we are also looking for people to help identify observations from others. If you can spare a bit of time perhaps you can confirm identifications made by beginners on the site, or help solve some of the trickier identification questions (or say when

a safe identification can't be arrived at from the details provided). It's entirely up to you how much time you wish to devote to this of course; there is no expectation that any one person will have to respond to lots of observations on the site.

To get involved you'll need to register on the iSpot website (this is free to do). If you are a County Moth Recorder, or represent a moth group, then we can provide you with a 'badge' for that group, so that whenever you contribute to the site your logo appears, with a link back to the group's website. To get badges set up please contact Martin Harvey via M.C.Harvey@open.ac.uk.

The signs are that iSpot is being successful in encouraging new people to take an interest in observing and recording wildlife, and if we can also help promote local and national moth recording schemes so much the better. iSpot is not intended to become an online recording system, but we are working with recording



Pryeria sinica (J. Dobbins)

Above This moth is a first for Britain. It was discovered in 2009 by Katie Dobbins (age 6) in Berkshire and identified via iSpot

schemes and the National Biodiversity Network to see how best we can ensure that data posted on iSpot is forwarded to the relevant recording scheme/s.

For information about the Open University short course, "Neighbourhood Nature", which is associated with iSpot, see: http://www.ispot.org.uk/s159_info

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Business Friends of the project include:

Anglian Lepidopterist Supplies www.anglesps.com, Apollo Books www.apollobooks.com, B and S Entomological Services www.entomology.org.uk, Bioquip www.bioquip.net, British Wildlife Publishing www.britishwildlife.com, MapMate www.mapmate.co.uk, Watkins & Doncaster www.watdon.com

Moths Count is a partnership of many organisations, individuals and businesses, led by Butterfly Conservation. Principal funders include the Heritage Lottery Fund, Butterfly Conservation, British Entomological and Natural History Society, City Bridge Trust, Countryside Council for Wales, Environment Agency, Natural England, Northern Ireland Environment Agency, Royal Entomological Society, RSPB and Scottish Natural Heritage. Many other organisations are involved, providing support and helping to host events. Full details at www.mothscount.org

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