

**Butterfly  
Conservation**

Saving butterflies, moths and our environment



# Moths Count Newsletter 2015

## Towards the Atlas

The number of records in the National Moth Recording Scheme (NMRS) database now stands at 19.3 million! Since last year's newsletter we have received 79 refreshed vice-county datasets. So far half-a-million records have been imported but we still have 58 datasets to import so this number will increase substantially. One of the welcomed data refreshes received very recently was Oxfordshire which contained an additional 52,607 records, doubling the size of that county's representation in the NMRS dataset. Argyll, Bedfordshire, Dorset and Huntingdonshire datasets have also been updated in the past month. There are a couple of areas where data refreshes are overdue, but discussions with the relevant County Moth Recorders are reassuring; datasets are being worked on, records verified, duplicates removed etc. with a view to submitting them in the coming months. Datasets from Fife, Leicestershire & Rutland and Suffolk are also imminent.

When the National Moth Recording Scheme was established in 2007, one of our many aspirations was to 'add value' to the masses of data that the moth recording community generates. We wanted NMRS data to be used by academics and researchers to try to understand the distribution expansions and declines among Britain's larger moths. The NMRS is still in its relative infancy, but despite this it is pleasing to see these ambitions coming to fruition. Over the past few months two scientific papers have been published, both of which used and analysed NMRS data. One of these research projects was investigating northern range expansions of a wide range of taxonomic groups, including macro-moths. A summary of the findings can be found on page 14. The other research project looked at air pollution and its effects on lichens, bryophytes and lichen-feeding Lepidoptera. A synopsis of this work can be found on page 8.

The Common Agricultural Policy has recently undergone reform leading to the development of a new agri-environment scheme. NMRS data have fed into this process and this is another example of how the valuable data that you collect and share is being used to influence policy and improve conservation. Details about the new scheme can be found on page 6.



Striped Hawk-moth (M. Parsons)

The National Biodiversity Network (NBN) Gateway (<https://data.nbn.org.uk/>) changed in 2013 and no longer distinguishes between 'view' and 'download' access. This means that any data that are visible on the Gateway can also be downloaded by any user. Initially, we adopted a cautious approach to this fundamental change, in order to protect county datasets and the national dataset from misuse, to ensure that trust was maintained throughout the networks of volunteer recorders and to enable time for consultation. As a result, since then, none of the NMRS data have been visible to users of the Gateway, although it has remained available to conservation partners such as the government conservation agencies. This is regrettable but, we believe, a necessary response and one that was supported by most County Moth Recorders.

However, it is in keeping with the aims of the NMRS and Butterfly Conservation, to make records available for uses that will benefit conservation. So, as a first step and after further consultation with the County Moth Recorder network, we have recently taken the decision to make all historical (pre-2000) NMRS data (apart from records of nine highly threatened species) publicly accessible on the NBN Gateway at summary resolution; these should be 'live' very soon. All downloads are logged by the Gateway and are subject to the NBN Gateway terms and conditions. >>

>> Discussions with moth recorders and County Moth Recorders show that many would prefer an even more open approach. However, opinions vary greatly and compromise is necessary to maintain the integrity and success of the NMRS into the future. At present, more recent (year 2000 onwards) moth records will remain unavailable to the public via the Gateway. However, we hope to rapidly and significantly improve the ways that these up-to-date records can be viewed by recorders and the public via the Butterfly Conservation website.

Early indications are that this year is looking like a good one for immigrant moths, perhaps even a record-breaking one for species such as Bordered Straw. Small Mottled Willow has also had a spectacular season so far and there have been lots of Striped Hawk-moths and Ni Moths reported. Humming-bird Hawk-moths are also numerous at the moment; don't forget you can log your sightings of these amazing day-flying moths on the Migrant Watch website ([www.butterfly-conservation.org/migrantwatch](http://www.butterfly-conservation.org/migrantwatch)).

The NMRS online recording system has been live for almost a year now. This system is one of many available for moth recorders to use but as it is the 'official' NMRS system, data are downloaded from it and repatriated to the relevant County Moth Recorder. There is currently a plethora of online recording options available to moth recorders, but it is worth checking with your local County Moth Recorder if they access and verify data from a particular system before you start to enter all of your records into it. It's easy to assume that all records from all sources end up with the County Recorder and then on to the NMRS, but this is not always the case.

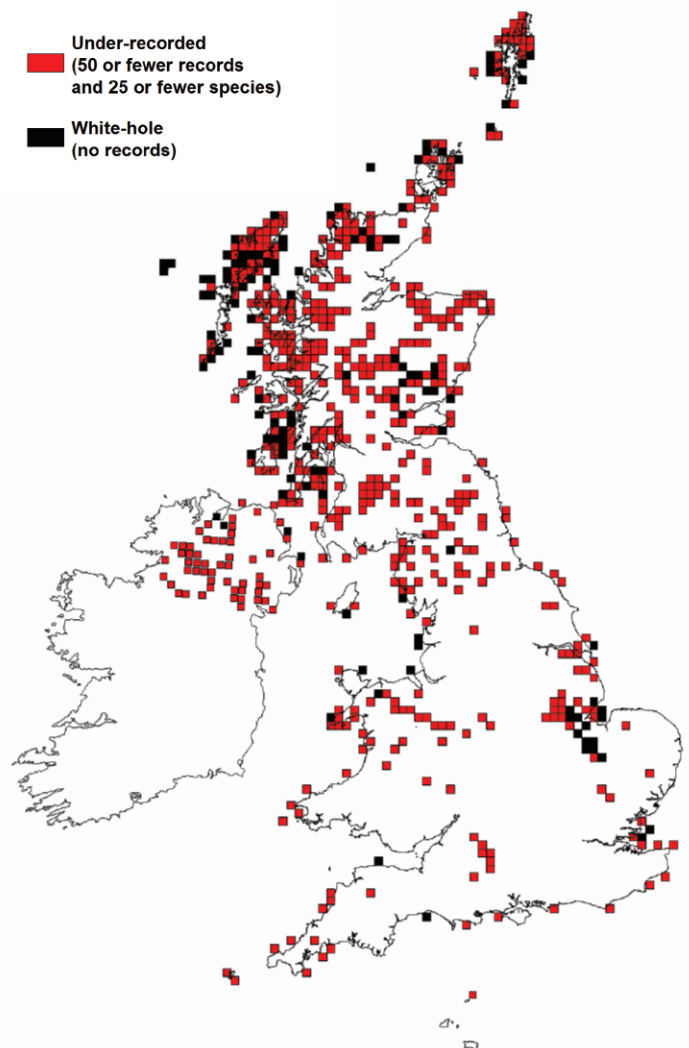
Social media such as Facebook, Twitter and Instagram are a good example of this. The use of social media is growing phenomenally and moth recorders might expect that the moth sightings posted on such sites will be harvested as records by the County Moth Recorder and thus incorporated into local and national datasets. Some County Moth Recorders do harvest these records and some do not. Data flow and data harvesting is becoming a minefield for County Recorders with the advancement of technology!

There is only one way to ensure that your records make it into the County dataset and the NMRS and that is to submit your records to your County Moth Recorder, but do continue to share and promote moths via the forums, Facebook and Twitter as well.

Work is progressing towards the Macro-moth Atlas for Britain and Ireland, which we aim to publish in 2018. At the time of writing there are only 18 months remaining for field work to take place, historical records to be harvested and under-recorded areas to be targeted.

A recent analysis of NMRS data from the year 2000 onwards revealed that 96% of 10km squares in the UK, Isle of Man and Channel Islands have been recorded for moths, therefore only 4% (125) of 10km squares are 'white holes' with no recent macro-moth records at all (see Figure 1 below).

**Figure 1: Map showing NMRS white holes (black squares) and under-recorded 10km squares (red) from 2000 onwards.**



The best recorded 10km squares (combining the greatest number of records and greatest number of species) in the NMRS country by country are:

<b>England:</b>	<b>SU50, South Hampshire, with 125,689 records of 558 species</b>
<b>Scotland:</b>	<b>NS97, West Lothian, with 15,519 records of 338 species</b>
<b>Wales:</b>	<b>SS49, Glamorganshire, with 41,944 records of 484 species</b>
<b>Northern Ireland:</b>	<b>J43, Co. Down, with 18,356 records of 314 species</b>
<b>Isle of Man:</b>	<b>SC48, with 9,634 records of 399 species</b>
<b>Channel Islands:</b>	<b>WV27, Guernsey, with 48,616 records of 404 species</b>

The top five most well recorded 10km squares by country are shown in Table 1 below.

**Table 1: The most well recorded 10km squares (combining number of records and species) in the NMRS database.**

	10km square	No. of records	No. of species	VC name
England	SU50	125,689	558	South Hampshire
	SY79	72,913	511	Dorset
	SZ19	55,462	531	South Hampshire
	TL31	73,576	499	Hertfordshire
	TM46	65,903	503	East Suffolk
Scotland	NS97	15,519	338	West Lothian
	NN15	19,776	330	Main Argyll
	NT43	11,660	331	Selkirkshire
	NH80	10,587	335	East Inverness & Nairn
	NY26	10,770	332	Dumfriesshire
Wales	SS49	41,944	484	Glamorganshire
	SN69	24,389	434	Ceredigion
	SS59	22,294	461	Glamorganshire
	SH80	67,712	411	Montgomeryshire
	SN03	30,063	411	Pembrokeshire
Northern Ireland	J43	18,356	314	Co. Down
	J33	8,132	304	Co. Down
	J36	18,993	279	Co. Down
	H86	7,375	301	Co. Tyrone
	H85	6,631	302	Co. Armagh
Isle of Man	SC48	9,634	399	Isle of Man
	SC27	11,177	298	Isle of Man
	SC28	4,909	248	Isle of Man
	SC39	3,125	234	Isle of Man
	SC16	4,785	202	Isle of Man
Channel Islands	WV27	48,616	404	Guernsey
	WA50	6,067	989	Alderney
	WV65	11,033	411	Jersey
	WV37	12,582	392	Guernsey
	WV38	23,943	380	Guernsey

Eighty-two per cent of 10km squares are deemed to be reasonably well recorded i.e. they have more than 50 records and more than 25 species recorded in them from the year 2000 onwards (although these are arbitrary thresholds). The remaining 18% of 10km squares (545 squares in total) are what we consider to be under-recorded, having 50 or fewer records of 25 or fewer species. A substantial effort is required to boost the number of records and number of species for these squares; 460 (85%) squares require an additional 25 records and 15 more species to be regarded as well recorded.

One-third of Scotland's recorded 10km squares are under-recorded. The remoteness of many of these 10km squares is a significant contributory factor; they are difficult to reach, often mountainous, areas making moth-trapping very challenging! The picture in Northern Ireland is similar, just under one-third of 10km squares are under-recorded, again many of these squares are remote and moth recorders are thin on the ground. Butterfly Conservation Northern Ireland Branch has come up with an innovative way of supporting local moth recorders getting out to these squares. Contact John O'Boyle, Branch Chair, for more information ([Joboyl1@yahoo.com](mailto:Joboyl1@yahoo.com)). Both Scotland and Northern Ireland have some stunning scenery and make perfect destinations for adventurous mothing holidays!

Only 8% of England's 10km squares are under-recorded, one-third of which are in Cumberland (19), South Lincolnshire (10) and North Lincolnshire (10). The Grey Square Challenge being run by the Cumbria Biodiversity Data Centre is addressing the situation in Cumberland; they aim to have at least 100 macro-moth species recorded in each of the under-recorded 10km squares across Cumbria by 2016 for the forthcoming atlas.

Twenty of the 27 under-recorded 10km squares in Wales are in North Wales; eight of these squares are coastal and are largely sea. Andy and Melissa Banthorpe, County Moth Recorders for Bedfordshire, have been spending their holidays in North Wales to target some of these under-recorded areas. We are hoping to receive these records in the next data refresh from the County Moth Recorder. An article describing Andy and Melissa's adventures can be read on page 5.

The Isle of Man and the Channel Islands are very well recorded only having two and one under-recorded squares respectively.

The greatest number of white holes by country or region is in Scotland where there are 94 unrecorded 10km squares. There are 23 white holes in England, four in Northern Ireland, three in Wales and one on the Isle of Man.

The number of white holes vice-county by vice-county varies greatly with the greatest being 32 in the Outer Hebrides (See Table 2 below). Eighteen vice-counties have only one white hole. The majority of white holes (60%) are coastal 10km squares with less than 10% land cover; 25 of the 32 white holes in the Outer Hebrides (See Table 2 below) fall into this category. >>

**Table 2: Vice-counties with the greatest number of under-recorded 10km squares and white holes**

VC name	No. Under-recorded 10km squares	No. White holes
Outer Hebrides	37	32
South Ebudes	0	10
Shetland	23	8
Angus	0	6
South Lincolnshire	0	6
Cambridgeshire	0	5
North Ebudes	26	5
Orkney	16	5
West Sutherland	18	5
Clyde Islands	0	4
Cumberland	19	0
North Aberdeenshire	16	0
Tyrone	18	0
West Inverness	27	0
West Ross	18	0



>> As with the under-recorded 10km squares many of these white holes are in under-populated regions, with few moth recorders, and remote, upland areas especially in Scotland, Northern England and North Wales. A few of these white holes occur in areas of extensive arable farmland, particularly in Lincolnshire and Cambridgeshire which are probably not a terribly attractive prospect for moth recorders.

Thanks to hard work and determination by moth recorders, white holes are gradually being filled. One such square was NC34 in VC108 West Sutherland, where two species were recorded by day in June 2013, 20 Common Heaths and a Broad-bordered White Underwing which was a VC first. It goes to show that if you are prepared to venture off the beaten track exciting discoveries can be made.

The one under-recorded Dorset 10km square is SY87; this is a mere 4.1 miles from Butterfly Conservation's Head Office! Although mostly sea, this square not only contains one of Dorset's most visited holiday attractions – Lulworth Cove, but there is stunning unimproved calcareous grassland habitat and it is crossed by the South West Coastal Path. The adjacent square is often visited by Butterfly Conservation staff who will now target the coastal fringe that falls into the white hole square.

If you want to help reduce the number of 'white holes' and add records and species to under-recorded squares please contact the relevant County Moth Recorder in the first instance to find out where these areas are and what the local priorities are. A list of the under-recorded 10km squares shown in the map (Figure 1) is available on request. Please bear in mind however, this may not be up-to-date as there may be records that we have not yet received from the County Moth Recorder network or uploaded into the NMRS database.

Zoë Randle, Butterfly Conservation

## Are you missing out on E-moth?

E-moth is an electronic newsletter from the Moths Count project. If you would like to receive it please contact Butterfly Conservation **01929 400209** or **info@butterfly-conservation.org** with your email address.

## Moth Night 2015

The annual celebration of moths and moth recording is taking place from 10th to 12th September with the theme of 'migrant moths'. Autumn is a great time of year to record moths; many resident species are on the wing with beautifully coloured and patterned wings to blend in with the autumn leaves. Warm winds from the Continent often help bring migrants to the UK during this time of year.

The great thing about migrants is that they can turn up anywhere so moth trapping in September is an exciting time. Sugaring and wine roping is another way to attract moths in the autumn particularly as natural nectar sources are relatively scarce. In addition to this, some species such as Red Underwing, Old Lady and Red Sword-grass are rarely attracted to light traps making sugaring and wine roping a great alternative to try to see these moths.

In 2009, a marking experiment was undertaken to investigate moth dispersal, this is being repeated this year. Moths will be marked at chosen locations in the days leading up to Moth Night, with the hope that some will be caught by recorders. If you find a moth marked with coloured paint, please photograph it and contact us via the website or 01326 290287.



Whatever you do or find on Moth Night please submit your records. As in previous years data submission is via the online system which can be found at [www.mothnight.info](http://www.mothnight.info). By popular demand we are also now accepting MapMate SQZ 'sync' files via the MapMate Web Server or as an attachment via email to [lhill@butterfly-conservation.org](mailto:lhill@butterfly-conservation.org). The new MapMate Moth Night 2015 Filter will be made available via a MapMate Patch in due course.

Moth night provides a great opportunity to engage friends, family and members of the public with moths. If you are running a public moth event or want to find a public moth event near you visit [www.mothnight.info](http://www.mothnight.info).

Moth Night is organised by Atropos and Butterfly Conservation in association with the Centre for Ecology and Hydrology.

## Filling a Welsh white hole

Over the last few years we have tried to take holidays where we can run a moth trap, and hopefully see some species that are new to us. In 2010, we decided on North Wales and found a nice looking holiday let that, looking on Google maps, appeared to be almost surrounded by woodland. The location is above Maenan in the Conwy valley just north of Llanwrst. On arrival that June we found there was old woodland nearby with various tree species, and we could run a moth trap. Indeed, this was encouraged by the owner who lives over the road.

We ran a 125w MV moth trap on alternate nights, and were pleased to catch Beautiful Snout on the first night. We have now stayed here five times, in different months of the year from spring to early autumn, and have booked to return this August. The worst visit for new moths was September 2012 when it rained most of the week; but we still ran a trap, and got out and about in full waterproofs looking for and identifying leafmines. So far at the site, we have recorded 153 species of macro-moth and 83 of micro-moth. It also turns out that it is one of the 10km white holes identified by Zoë Randle as needing coverage for the forthcoming macro-moth atlas!



Beautiful Snout (M. Banthorpe)

In 2011 and 2013, having arranged site permissions beforehand, we were also able to do some trapping away from the site. In 2011, this was confined to Forestry Commission areas, and this meant a few new species for us. In 2013, we received permission to trap at some unrecorded locations in the Snowdonia National Park. This resulted in finding new locations for Ashworth's Rustic and Weaver's Wave amongst a number of new species for us.



Cloaked Carpet (M. Banthorpe)

Trapping at a National Trust site close to our base not only provided a stunning view down over the Conwy valley (and a constant reminder to only walk one side of the white sheet!) but several examples of Dotted Carpet. This was well worth the half mile, mostly uphill, trek with generator and other mothing kit!

Wardens at two RSPB sites were very helpful and allowed lights to be run at Maltreath Marsh on Anglesey (VC52) and at Conwy (VC50). At Conwy we caught the first verified specimens of Obscure Wainscot in North Wales.

So with some lovely holidays in Snowdonia, we have had the opportunity to see and photograph many species new to us and also add records to the county database for Caenarvonshire (VC49).

Thanks are due to the local county moth recorders in north Wales, especially Julian Thompson (VC49) and Andrew Graham (VC48). Andrew runs the North Wales Lepidoptera website ([www.trawsgoed.com](http://www.trawsgoed.com)) with excellent species maps, and both he and Julian gave very useful advice on locations and who to contact to obtain permissions.



View of the Conwy Valley (M. Banthorpe)

**Andy & Melissa Banthorpe,**  
Joint Macro-moth Recorders for VC30 Bedfordshire



## Threatened moths and Countryside Stewardship

The new Countryside Stewardship (CS) agri-environment scheme for England is due to be rolled out from July 2015 onwards. Each agreement will last for five years (or 10 years for woodland agreements or those with complex tenure).

We have been working on developing guidance on the moths (and butterflies) for Natural England advisers. Our Farmland Butterfly and Moth Initiative Officer, Katie Cruickshanks will be working with Natural England staff to ensure that management for moths and butterflies is delivered successfully under the new scheme. This is a significant step forward as it is the first time that moths have been included in the targeting for agri-environment schemes.

Thirty-seven species of Section 41 (NERC Act 2006) moths are covered by this initiative. National Moth Recording Scheme (NMRS) data have been used by Natural England to indicate which farms should be prioritised for bespoke management for a sub-set (16) of these the moth species (those that occur on more than five sites nationally) including Striped Lychnis, Marsh Mallow Moth and Grey Carpet. Guidance notes covering life history and habitat requirements (as far as is known) have been produced for this suite of species.



Striped Lychnis field margin habitat (M. Parsons)



Dark Bordered Beauty (R. Leverton)



Striped Lychnis larva (P. Hall)

It has been challenging to produce these guidance notes, and to assess which options from a pre-defined list (supplied by NE) are appropriate, and how these can be tweaked (where required and within the constraints given) to encourage landowners/site managers to implement them on the ground. For the remaining 21 species (those that occur on five or fewer sites in England) for example, Betony Case-bearer, Dark Bordered Beauty and Reddish Buff, the intention is that advisers will seek specific guidance from specialists (including Butterfly Conservation staff) on a site by site basis where CS can be applied.

Landowners with expiring Higher Level Scheme agri-environment agreements will be encouraged to enter the new scheme. Compared to the previous scheme there is less money available overall, so it is expected that CS will be more targeted. We are extremely pleased that moths (and butterflies) are specifically highlighted in the new scheme, with the potential for positive outcomes for the target species.

This is a great example of how NMRS distribution records are being put to use to help with the conservation of threatened species.

**Katie Cruickshanks, Butterfly Conservation**  
**Mark Parsons, Butterfly Conservation**

## Prestigious award for moth recorder

On 22nd May, Bob Heckford received the HH Bloomer award at the Linnean Society of London. The award was established in 1963 from a legacy by the late Harry Howard Bloomer FLS and is presented to amateur naturalists who have made an important contribution to biological knowledge.

Over the years Bob has made a huge contribution to clarifying the unknown or poorly understood life histories of British micro-moths. He has published more than 200 papers in British entomological journals and in 2010 Bob was made a Scientific Associate of the Natural History Museum, London.

Bob has discovered a number of species new to the British Isles; one such discovery in 2004 was of a species of Nepticulidae in Devon, that was not only new to Britain but new to science! This previously-unknown species was named in his honour, *Ectoedemia heckfordi*.

One of his most recent and important contributions was as a co-author for the much-needed, new *Checklist of the Lepidoptera of the British Isles*, published in 2013. Such is Bob's reputation as a moth expert that, last year, he was among a highly select group invited to take part in a Bioblitz at Prince Charles's Highgrove Estate.

We congratulate Bob on his well-deserved award and the recognition of his dedication and passion for micro-moths.



Bob Heckford (right) receiving his award (© Linnean Society)

## 2015 National Moth Recorders' Meeting

The 5th National Moth Recorders' Meeting was held in January this year at the Birmingham and Midland Institute. In terms of attendance it was our best meeting yet with more than 200 people attending. The event was fully booked 10 days prior to the meeting and a waiting list was in operation! There was a varied program covering 'grass-roots' moth recording, findings from moth research projects and moth conservation. It was a fantastic day, feedback was extremely positive with some people saying it was our best meeting yet! The bar has been set high; I hope we can continue to build on the success of this meeting.



National Moth Recorders Meeting 2015 (J. Asher)

## Sixth National Moth Recorders' Meeting

Next year's National Moth Recorders' Meeting will be held at the Birmingham and Midland Institute, central Birmingham on **Saturday 30th January 2016**. This annual event brightens up the winter and provides an opportunity to meet up with friends and fellow moth recorders. Advance booking is essential via **[info@butterfly-conservation.org](mailto:info@butterfly-conservation.org)** or **01929 400209**. Further details will be revealed in due course.

**We hope to see you there!**



# Moths, lichens and air pollution

Lichens are sensitive to air pollution and sulphur dioxide (SO<sub>2</sub>), an acidic pollutant that has had a large effect on the range and abundance of many lichen species. As with moths, great efforts have been made by professional and expert amateur naturalists into recording lichen species distributions. These records have provided evidence of species declines and recoveries linked to air pollution. The environmental changes experienced by one group of species is likely to have knock-on effects to other associated groups; for example, a reduction in air pollution is likely not only to benefit lichens but also the moths that feed on them.

Recently a paper was published which compared data from the British Lichen Society and data from the National Moth Recording Scheme (NMRS). This research provided indirect evidence of an association between reductions in air pollution and increases in lichen-feeding moths.

Twenty-one species of lichen-feeding moth for which there were sufficient data to assess changes in national frequency were used in the analyses; Dotted Carpet, Brussels Lace, Round-winged Muslin, Dew Moth, Rosy Footman, Muslin Moth, Red-necked Footman, Four-dotted Footman, Dotted Footman, Orange Footman, Dingy Footman, Hoary Footman, Pigmy Footman, Scarce Footman, Buff Footman, Common Footman, Four-spotted Footman, Beautiful Hook-tip, Tree-lichen Beauty, Marbled Beauty and Marbled Green.

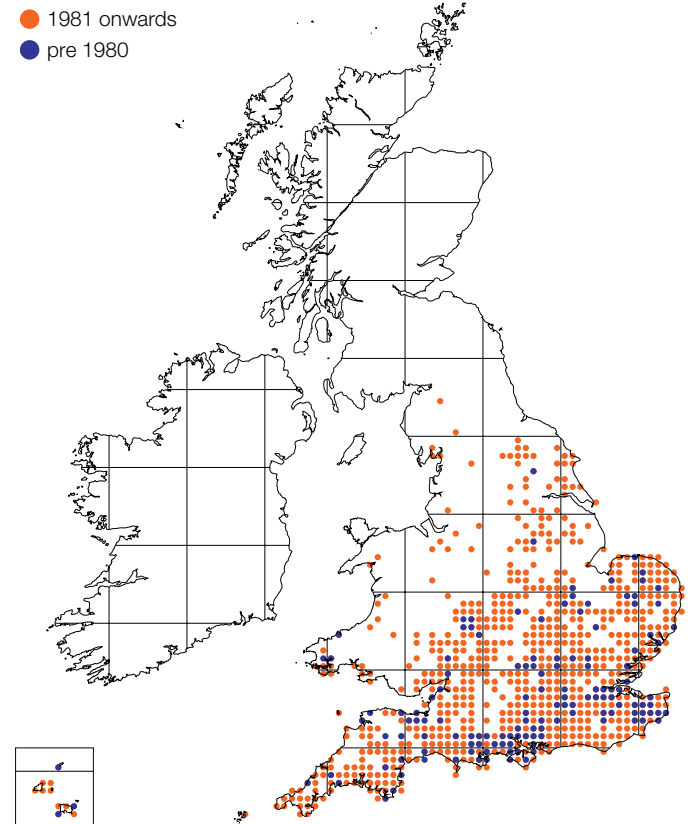


Orange Footman (P. Clement)



Rosy Footman (M. Parsons)

NMRS Provisional distribution map for Orange Footman



Dew Moth showed a significant decline in its frequency of occupied hectads over time, but all of the other species increased in frequency, significantly so for two-thirds of these species. This, of course, against a background of generally declining moth populations. There were greater increases of lichen-feeding macro-moths in areas that had historically high pollution compared to low pollution areas. Rosy Footman, Muslin Footman and Hoary Footman showed non-significant declines in low SO<sub>2</sub> areas along with significant increases in historically high SO<sub>2</sub> areas. Dingy Footman and Buff Footman increased significantly in areas with both low and high SO<sub>2</sub> pollution. This suggests that air quality improvements are associated with increases in distribution of these moths in parallel with their lichen hosts.

There are other factors to consider which were not tested in this study, such as the impact of climate change, so we cannot yet say with certainty that reduced air pollution has driven the range expansion of lichen-feeding moths. Climate change may play a significant role and may be an additional contributory factor in the increased abundance and residency of largely migrant species such as Tree-lichen Beauty and Four-spotted Footman.

Zoë Randle, Butterfly Conservation

## Further reading:

Pescott et al., 2015 *Biological Journal of the Linnean Society*, **115**: 611–635



# Confessions of a moth-a-holic

As a young and amateur naturalist, I grew up aware that my interest in animals and the outdoors weren't common among my peers. Luckily I was never the type of person to get down over being different and my friends accepted me as I was.

Nowadays, I still find that I am in a surprisingly small (but growing) group – young women interested in moths. I find that many of my contemporaries are birders, or have been birders, and are now moth-ers as well. I seem to have skipped that birding phase; I do enjoy birdwatching and I do keep both life and year lists, and I have even been on a couple of twitches. However, I am of the firm belief that moths are far more intriguing, though I am yet to determine exactly why.

This interest may have something to do with the people whom I have spent time around. The lightbulb moment for me, when I realised that our British wildlife was pretty amazing, was throughout my university placement year working for the Field Studies Council. Following this year, I attended a few Lifelong Learning courses during my third year of university to improve my ecological knowledge and skills. One of these was on invertebrates, led by the very knowledgeable Phil Ward. As part of the course, we ran a moth trap, catching a good variety of species including a couple that particularly captured my attention, namely Puss Moth and Poplar Hawk-Moth.



Megan Shersby (Matt Adam Williams)

A couple of months later and I was house-sitting in mid-Wales, and wondering about doing some moth recording. I contacted the County Recorders who kindly lent me two traps. The weather was absolutely horrific for mid-summer; rain, wind and cold! In hindsight, that was probably for the best. If it had been a good summer night, I would've been overwhelmed! Instead, I caught around 12 species, and they were all identifiable, so it was good introduction to trapping and identifying by myself.



December Moth (M. Shersby)

After returning from studying Dwarf Mongoose behaviour in South Africa, I decided to get more into moths. Fortunately I was accepted onto a traineeship with Dorset Wildlife Trust, and moved to the Isle of Portland. What a season that was! Not least because (a) I had been lent a moth trap, and (b) I started attending a monthly workshop run by none other than micro-moth author, Dr Phil Sterling. In addition, I was able to assist on a larval search with Mark Parsons (for a micro with its sole UK site in Dorset), run a moth trap on Brownsea Island and spend some of my spare time up at the Portland Bird Observatory.

My love for moths has continued to grow and, working in environmental education and engagement, I consider engaging people with moths a personal mission. Sometimes it is through showing caterpillars to children, or explaining that yes, moths do actually fly during the day.

I recently wrote an article for the Radnorshire Wildlife Trust newsletter, where I described the use of social media as a naturalist. Whilst Facebook and Twitter do have their downsides, they are a fantastic resource to improve identification skills. Additionally, it is only because of social media that I became aware of moth meetings and events, and have subsequently attended conferences such as the National Moth Recorders' Meeting.

I can't be certain in saying that I prefer moths over butterflies. Both groups are beautiful, and fascinating to watch and learn about. Besides butterflies are basically just a group of moths, right?

## Magic (Moth) Moments

- My first solo moth trapping (2013) – leading to the culturally referenced blog post title: 'Moth Solo: A New Adventure, Return of the Ermine, and the Battery Strikes Back'.
- 63 December Moths during one night in a single trap (2014, Gilfach Nature Reserve).
- Finding moth-patterned clothing on sale in H&M (2014) – confirmation that I was obsessed with moths!
- Being given Emperor Moth caterpillars to rear (2015).

Megan Shersby

# Scottish Spring Moth Update

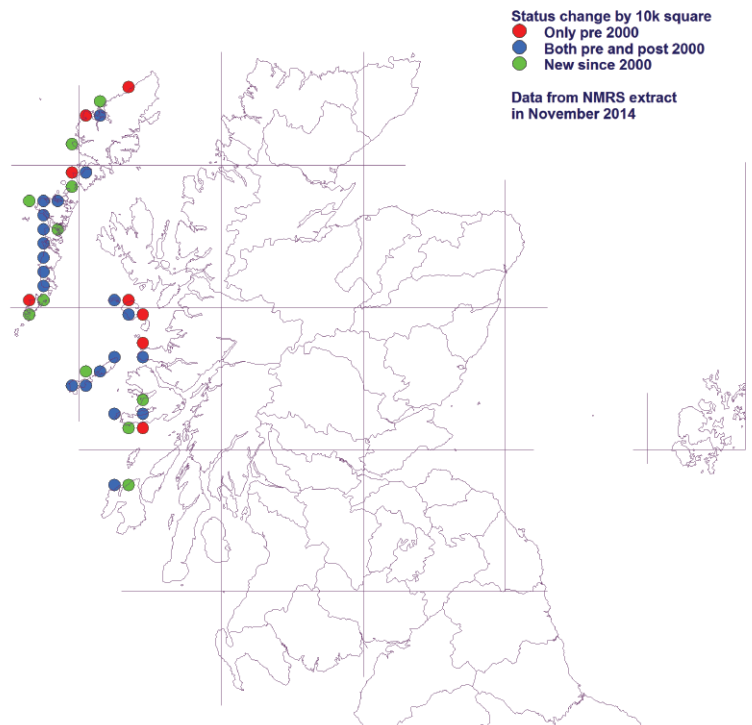
When I was initially coerced into writing this article my immediate reaction was what spring! The calendar showed it to be spring but the prolonged cloudy, cold and often wet weather, particularly throughout May, and scarcity of moths suggested it was still winter. By way of an example, Alan Skeates, the Moth Recorder on Mull, reported that a regular visitor to the island who books the same cottage for the same fortnight each year, and traps every night, recorded 550 moths in 2014, but only 31 this year! I ran four MV traps in good, sheltered habitat along Loch Arkaig on the 29th May but did not catch a single moth. Looking across the loch in the morning and seeing fresh snow low down on Ben Nevis highlighted just how cold it got during the night!

However, we did have some decent spring weather in April and one of our key spring specialities, Kentish Glory, took advantage of this short window. It was first reported on 10th April and then for a week between 16th and 22nd April, with a single straggler on 15th May. This highlights how difficult it can be to survey and monitor Kentish Glory with just a short but variable annual flight period. Butterfly Conservation Scotland (BCS) has started to work more closely with Forestry Commission Scotland (FCS) on Kentish Glory since they manage important woodlands that are home to the moth at Culbin Forest on the Moray coast, in Perthshire, Deeside and Badenoch. Due to this, FCS have designated Kentish Glory a "Secondary Species" of conservation interest. This is an exciting development that highlights the commitment of FCS to undertake management, survey, monitoring and research into the moth.

It has been similarly frustrating trying to record another of our key species, Small Dark Yellow Underwing, although, to date in 2015, despite the poor weather the moth has been found at four sites, three of which are new locations, although all these are single sightings involving just one individual moth.



Belted Beauty (T. Prescotti)



Thanks to Mark Cubitt for the Belted Beauty distribution map from the East Scotland Butterfly Conservation Branch website (<http://www.eastscotland-butterflies.org.uk/mothflighttimes.html>).

Another key spring species that is more or less confined to Scotland in the UK is Belted Beauty. Here it is a machair specialist and therefore restricted to the west coast of Scotland, occurring on the Outer Hebrides as well as Islay, Coll, Tiree, Mull, Iona and the Small Isles. Sanna on the western tip of Ardnamurchan is its only known location on the Scottish mainland.

In 2014 BCS undertook surveys of Belted Beauty on the neighbouring islands of Canna and Sanday. Previous records showed that the moth had been recorded sporadically on twelve years between 1936 and 2007. However, despite an absence of seven years, a visit in mid-April recorded 79 Belted Beauty; 77 on Sanday and two on the southern tip of Canna. These comprised 60 females and 19 males. The moth was also reported on the neighbouring island of Rum this spring after an absence of 10 years.

Returning to Mull, there are highlights to report despite the poor season. These include the first ever Mull record of Rannoch Brindled Beauty, another scarce Scottish spring specialist with a flightless female. In addition, a new Mull site for Barred Tooth-striped was discovered.

So, while Scotland's weather certainly makes mothing more challenging, the results can be extremely rewarding.

Tom Prescott, Butterfly Conservation Scotland



# Extreme mothing in Wales

I talked at the National Moth Recorders' Meeting in January about recent survey work on threatened moths in Wales. The talk was sub-titled 'working at height' as it dealt with two species which dwell in lofty, hard to reach places.

The Silurian moth has been the subject of numerous surveys in the Black Mountains, at the eastern edge of the Brecon Beacons National Park, where it was discovered in 2011. We reported on this in the 2013 Newsletter, but since then some exciting discoveries have been made. In April 2014 a bunch of dedicated volunteers, along with Butterfly Conservation and Natural Resources Wales staff, carried out larval surveys on three mountains where the moth had never been recorded. Two of these, in the Black Mountains, proved negative despite some promising habitat.

We were less optimistic about the third site. Blorenge Mountain has been light trapped on several occasions with Silurian in mind, but without success. We were therefore surprised and delighted to find 15 Silurian larvae at the northern end of the hill, where there are some large stands of Bilberry. This site lies between the Abertillery and Black Mountains populations and could be an important link between them.

In the summer of 2014, Dave Grundy and colleagues again trapped for adult Silurian moths on the Hatterrall Ridge, but in a location further north than previous successful efforts. After several years of similar sessions blighted by poor weather, Dave was delighted to find the conditions on the survey night were mild and still, which resulted in an impressive 126 Silurians being recorded – far more than on any previous occasion. Another record-breaking survey took place in April 2015, when 91 Silurian larvae were found in the northern part of the Darren Lwyd ridge – an area not searched previously. These are the most northerly Silurians ever found in the UK. Another surprise was that three of the larvae were feeding on Crowberry, a previously unreported foodplant. This just goes to show that we have much to learn about this beguiling little moth. We now know Silurian to occur in 24 1km squares, compared to just five squares known prior to 2011. It is clearly an abundant moth in a few small areas, but can be puzzlingly absent from other suitable-looking patches nearby.

The Scarce Hook-tip is also tricky to survey. The moth is restricted to ancient Small-leaved Lime woods in the lower Wye Valley. Although it is relatively easy to catch the adults in light traps it has proved very difficult to locate the larvae, with only one documented record in the past 100 years.



Silurian feeding on Crowberry (C. Manley)



Beating for caterpillars in the canopy (G. Tordoff)

The suspicion is that they are canopy-dwellers, and so have evaded recorders trying to find them from the ground. The only way forward was to hire a mobile elevated work platform, or 'cherry picker', to get into the canopy of the lime trees.

Two days in August 2014 were spent tapping lime branches over a beating tray. Only three Scarce Hook-tip larvae were recorded, but this should be regarded as a triumph given the lack of success from ground level in the past. The larvae occurred high on mature trees, between 13 and 17m above ground, with none found lower down despite much survey effort. These results support the theory that this is a canopy-breeding moth, although further work is needed to give more confidence to the results. Such surveys are important to reveal the ecology of the moth and allow us to make recommendations for future woodland management to benefit it.

# Moths and artificial lighting

In last year's newsletter Dr Ties Huigens referred to research on the long-term effects of different colours of artificial light on moths as well as other plants and animals. This results of some of this work relating to moths, being undertaken by Dutch Butterfly Conservation, other NGO's, Wageningen University and research Centre and the Netherlands Institute of Ecology, has recently been published in three separate scientific papers by Van Geffen *et al.* This article summarises the key findings.

## Artificial light, diapause inhibition and sex-specific life history changes

The larval stage of development is extremely important for moths; unfavourable conditions lead to lower caterpillar growth rates, advanced pupation, (pupating earlier in the year) and reduced pupal mass. In turn these factors affect adult fitness including life-span, flight ability and breeding success. It is likely that artificial light will have an impact on the timing of second generation caterpillars entering pupal diapause as the shorter day length is the main environmental cue for this process.

Experiments were set up and Cabbage Moth caterpillars, which are nocturnal, were subjected to different low intensity lighting regimes at night; green, red, white or darkness (control). Growth rate, maximum caterpillar mass, age at pupation, pupal mass and pupal duration were the variables measured during the experiment.

Caterpillar growth rates were not affected by artificial lighting. However, the different lighting regimes had a significant effect on the mass of male caterpillars, with those subjected to white light having lower mass than those under red light or in the dark control. In addition to this, male caterpillars exposed to white or green light pupated earlier and had lower pupal mass than male caterpillars in darkness. In females there was no effect of artificial lighting on age at pupation or pupal mass.

The duration of the pupal stage was significantly reduced for both sexes under green or white light compared to those in darkness. In the dark (control) treatment, the first adult emerged 110 days after pupation. But, by this time, 85% of moths under green light and 83% of moths under white light had already emerged. This difference is likely to be caused by artificial nocturnal lighting inhibiting the initiation of pupal diapause.



Cabbage Moth (T. Morris)

This research shows that artificial light affects the life history and seasonal timing of moths. The early pupation exhibited by both males may have damaging effects on their fitness, for example, shorter life-span, reduced flight ability and reduced breeding success. The disruption of pupal diapause can lead to a mismatch of adult emergence and favourable seasons and higher mortality as Cabbage Moths that do not enter diapause over the winter are unlikely to survive. These effects can be mitigated against by using artificial red light which had little or no effect on the moths.

## Artificial lighting disrupts sex pheromones

In another study the effect of low intensity artificial lighting on sex pheromone production in Cabbage Moths was investigated. Production of sex pheromones in Cabbage Moths is regulated by a neuropeptide, the release of this neuropeptide is regulated by light, and it is therefore possible that the production of sex pheromone may be affected by artificial light.

In this experiment female Cabbage Moth pupae were exposed to different nocturnal lighting regimes, green, red, white or darkness (control). After emergence, the pheromones produced by three-night-old females were analysed using gas chromatography. The results from this study show that artificial light strongly reduced sex pheromone production and changed the composition of the sex pheromone blend; the relative amount of the main attracting pheromone was reduced whilst the relative amount of deterrent pheromone was increased. This was the case for green, red or white artificial light, suggesting that mitigation of the effects of artificial light by using light of different wavelengths is limited.

The changes in the blend of pheromone due to artificial light have implications for moth reproduction. 'Calling' female Cabbage Moths may not be attractive to the males, which could lead to reduced mating success and have serious implications for moth populations. An important next step for this research is to test the attractiveness of the pheromone blends on male Cabbage Moths.



### Artificial lighting inhibits Winter Moth mating

Female Winter Moths have reduced wings and are flightless. After emergence from the pupa, they climb up the trunks of Oak trees and emit a sex pheromone to attract flying males. Artificial nocturnal lighting may have an effect on this behaviour.

In field experiments Oak tree trunks were lit up with either green, red or white light or kept in darkness (control). Funnel traps were used to catch wild female Winter Moths, they were dissected to look for a spermatophore, evidence of mating. The results show that significantly more females were caught on un-illuminated trees and on the dark side of illuminated trees. In addition to this, more than half of the females caught on non-illuminated tree trunks had mated compared to 14% in green light, 16% in white light and 28% in red light.

There were effects on male Winter Moths too. Significantly fewer males were attracted to a synthetic Winter Moth pheromone lure placed on illuminated tree trunks compared with dark trunks. It is not difficult to imagine that the reduced response of males to females and the reduced activity of females when subjected to artificial light might lead to reduced population levels, although this is yet to be proved.

This study is the first to show that light pollution can inhibit moth mating in the wild. The study may underestimate the scale of the effect as the light intensity used in the experiment was approximately 10 lux, whereas street-lights are much brighter (up to 60 lux).



### Conclusion

Flight-to-light behaviour in moths is relatively well studied and is thought to be one of several major threats to moth populations due to increased predation risk; injury or death from colliding with hot lamps, disorientation and exhaustion, as well as resting in places that make them visible to predatory birds by day.

This recent work in the Netherlands enables us to start to understand the ecological consequences of light pollution on moths. These studies clearly show that even low levels of artificial night lighting can alter moth life histories, sex pheromone composition and mating behaviour and success. Although, it is reasonable to think that these effects could influence moth population levels, as yet the scientific evidence for this is lacking.

It is important to remember that the effects of artificial lighting on moths do not operate in isolation; other factors include increased predation risk as a result of flight-to-light behaviour, habitat loss and degradation, land use change and climate change. Combined, it is likely that these factors are having a cumulative detrimental effect on moth populations and are contributory to the declines in common and widespread moths in the UK and Netherlands.

**Zoë Randle, Butterfly Conservation**

#### Further reading

van Geffen *et al.*, 2014. *Ecology and Evolution* **4**: 2082–2089

DOI: 10.1002/ece3.1090

van Geffen *et al.*, 2015 *Insect Conservation and Diversity* **8**: 282–287

DOI: 10.1111/icad.12116

van Geffen *et al.*, 2015 *Ecological Entomology* DOI: 10.1111/een.12202

## Micro-moth maps updated

The vice-county distribution maps of 756 micro-moths were digitised early in 2014 thanks to a grant from the Department for Environment, Food and Rural Affairs. These have recently been updated from the Microlepidoptera Review of 2013 published in the *Entomologist's Record and Journal of Variation*, and now include records up to 31st December 2013. They can be found on the Moths Count website ([www.mothscount.org](http://www.mothscount.org)).

The grant also enabled us to create PDF's of all of the hand annotated micro-moth maps. We are looking for funding opportunities to complete the digitisation of the remaining maps and to develop a full national micro-moth recording scheme. We are very grateful to John Langmaid and Mark Young for making the original paper maps available and to Dave Green for undertaking the digitisation work.

## Macro-moths and northward range shifts

In response to climate change, many southern species are shifting their range margins northwards. National Moth Recording Scheme data were recently analysed, alongside distribution data from 20 other taxon groups from bees and beetles to birds, to investigate the extent of these poleward shifts in Britain.

Changes in the locations of the northern limits (range margins) of species' distributions were studied over two time intervals spanning the past 40 years; interval one compared range margins recorded in 1966-1975 with those in 1986-1995 and interval two compared 1986-1995 to 2001-2010. Variation in recording effort was controlled for in each taxonomic group, with three levels of recording effort determined; recorded; well recorded and heavily recorded. The variation in temperature during the study period was also analysed.



Barred Hook-tip has expanded its range northwards (P. Clement)

For all levels of recording effort that could be analysed, the majority of taxonomic groups shifted northwards. In time interval one, the mean rate of range change across all the groups for well recorded hectads, was 23.2km per decade northward shift in the range margin and in time interval two 18km per decade.

One of the important findings of this study, was that the rate at which species range margins are shifting northwards varied over time. Interestingly, the average shift for the macro-moths was only significantly northwards during the second time interval. During interval two, macro-moth range margins shifted northwards at rates of between 25.8 km per decade (measured from the heavily recorded hectads) and 31.6km per decade (measured from the well recorded hectads).

**Zoë Randle, Butterfly Conservation**

### Further reading:

Mason *et al.*, 2015 *Biological Journal of the Linnean Society*, **115**: 586-597

## Moths in Northern Ireland update June 2015

It has been a fairly poor year for moths in Northern Ireland thanks to the cool weather, but this has not dampened the enthusiasm of our moth recorders. We have been working with several different groups to get more people looking more closely at the moths around them.

### Highlights include:

In Portglenone, a traditional 'white hole' with very few records or recorders, we were able to work with the development group and local residents over the May Day Bank Holiday. Moth traps were leant out to folks around the area the evening before the popular Bluebell Festival in Portglenone Forest. Moths caught were displayed at the festival the next morning to raise awareness locally of the wealth of species around us, before being safely released.

The Heart of the Glens Landscape Partnership Scheme ran a very successful pollinator training event in mid-May to help train up and encourage a small band of new recorders in moths, bumblebees and butterflies. The course involved trapping various locations around the glens over three consecutive nights, including both back gardens and priority habitats. Participants got to work together to get to grips with their species and are now continuing to encourage one another with a fledgling moth group now up and running.



At Faughan Valley in County Derry/Londonderry, mothing and butterfly recording was one of the key elements of the local heritage ambassadors training scheme in May. Participants who had spent the week learning about local built heritage were delighted and amazed at the wealth of nocturnal wildlife around them they hadn't ever encountered before.





Catherine and her moth trap (C. Bertrand)

In County Down we teamed up with the Mourne Mountains Landscape Partnership (MMLP) to hunt for the Beautiful Brocade. Rediscovered accidentally in my garden last year, the Beautiful Brocade had not been seen in Northern Ireland for more than 100 years, with only vague references to 'the Mourne Area' in the historic literature. We encouraged local residents to let us adopt their gardens around the time the moth had been seen in 2014, and are very grateful to all those who contacted MMLP expressing interest. We have trapped in ten locations in 2015, focusing around the original location.



Beautiful Brocade (D. Green)

The McKinney family were delighted to discover they had these rare beauties in their garden, with two Beautiful Brocades turning up on the night of 14th June, about 1km from the original location. A second location was discovered accidentally, much closer to Newcastle, County Down, by Dan Bailie who found them in his garden trap, right in the middle of town. We hope to continue this project in the coming years to widen the known area for this species.

All of these projects have encouraged local people to become ambassadors for moths in their local areas and greatly increased interest and awareness, as well as gathering useful records for the forth-coming Britain and Ireland moth atlas.



Brindled Twist (P. Courtney)

## Garden moths – surprises can lurk in the most commonplace locations

Gardens can sometimes be sneered at as being too general a habitat to pick up special species, but for many of us they are an important area of personal and local interest. For one of our new moth recorders, Peter Courtney, his garden has gifted him a special local record this summer:

“One balmy morning while pottering in my garden, I chanced upon a micro-moth, resting on a Rowan leaf. I was immediately struck by the freshness of its colours. I deposited the moth and the leaf it had been on into a pot to identify and it was then that I noticed the edges of leaf were rolled into a sort of funnel shape. Examining the underneath, I saw how the elongated part of the leaf formed an envelope around a case, secured by silk.

Having no field guide, and little or no identification skills with micro-moths, I took some photographs, and put these on Facebook. [Butterfly Conservation Northern Ireland Branch has a very active facebook group where there is a lot of support and help with identification].

Later that day Steve Nash let me know I had found a Brindled Twist (*Ptycholoma lecheana*). The following day our NI moth-verifiers, John McClean and Andy Crory, told me there have been seven previous records of this species in Northern Ireland from just two locations, and that mine was the first for County Down.

My garden is not particularly notable, just a normal sort of garden in Carryduff, a small town just south of Belfast, so this is a very exciting species for me to encounter, quite by chance. It has encouraged me to take more time to observe the plants and their potential inhabitants, rather than focusing my attention on just the moth trap. Who knows who else waits to be discovered here? ”

**Catherine Bertrand, Butterfly Conservation**

## STOP PRESS: The Angus Moth Project

The Angus Moth project has been awarded a grant of just over £39,000 by Museums and Galleries Scotland. This is a partnership project led by Leisure and Culture Dundee and the grant will help fund a Project Officer to digitise the Lepidoptera collections held by The McManus: Dundee's Art Gallery and Museum, the University of Dundee and Montrose Museum. The mobilisation of these data will enable greater access to the information.

There are currently no historical (pre-2000) moth records in the National Moth Recording Scheme (NMRS) for Angus; this grant will reverse this situation. Butterfly Conservation congratulates David Lampard (Curator for Geology and Zoology at Leisure and Culture Dundee, and County Moth Recorder for Angus (VC 90) and his team for securing these funds. We look forward to these data reaching the NMRS in due course.



Museum specimens to be digitised (D. Lampard)

## Special Offer: 12 months Membership – absolutely FREE!

To say thank you to all our Moths Count supporters we're offering one full year's free membership of Butterfly Conservation.

Join online today by Direct Debit at [www.butterfly-conservation.org/join](http://www.butterfly-conservation.org/join) with promo code **MC100** or call **01929 406015** to receive your welcome pack including postcards, car sticker, our exclusive booklet on gardening for butterflies and moths and information on our reserves.

### Membership benefits include:

Butterfly magazine three times a year, regular e-newsletters, local Butterfly Conservation Branch membership with regional newsletters, plus invitations to local walks, talks and events.

NO money will be taken in your first year, and we'll contact you when it's time to renew. If you decide not to continue supporting our conservation work, just let us know and we'll cancel your membership.

\*Offer available to new members who sign up by direct debit before the 31/12/15 and who have not taken advantage of a previous offer.

### Already a member?

Browse our range of moth and butterfly gifts at [www.butterfly-conservation.org/shop](http://www.butterfly-conservation.org/shop). 100% of the profits go to Butterfly Conservation to fund the important work we do saving butterflies, moths and our environment

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