

## E-moth

### Moths Count Update September 2016

During the summer months migrant moths found themselves in the media spotlight. The invasion of a plague of cabbage ravaging Diamondback moths was jumped upon by political campaigners during the lead up to the Brexit vote. Then, of course there was the Ronaldo 'moth incident' where a Silver Y was said to be 'comforting' the injured player during the final of the European Championships tournament in July. It seems that the floodlights left on in the Paris stadium on the night before the game had attracted many thousands of moths, mainly Silver Ys, that had then settled on the pitch. The spectacle of clouds of moths erupting from the neatly mowed grass as the footballers took the field was one of the highlights of a dull 1-0 win by Portugal.



This is not the first time that swarms of moths have interrupted a major sporting event. Huge numbers of Bogongs *Agrostis infusa* were attracted to floodlights at the 2000 Sydney Olympics dive-bombing athletes as they competed.

#### UK Moth Recorders' Meeting 2017

Next year's meeting will be held on **Saturday 28 January 2017** at the [Birmingham and Midland Institute](#), central Birmingham. The programme is currently being drawn up; confirmed speakers include the award winning writer, journalist and former Environment Editor for *The Independent* Michael McCarthy. We are really pleased to have Michael speaking at the meeting about his book *The Moth Snowstorm*. In addition to this Bob Heckford and Stella Beavan will be talking about their adventures and discoveries in micro-moth recording. The full programme will be available in due course, please check [www.butterfly-conservation.org/UKMRM](http://www.butterfly-conservation.org/UKMRM) for details. As always, there will be plenty of time to mingle and chat with fellow moth enthusiasts. We will have the usual stall holders in attendance including [Atropos](#), [Hachiware Art](#), [Pemberley Books](#) and [Watkins & Doncaster](#) so you can stock up on mothing equipment, natural history books and other moth-related things. If there is anything specific that you might require, please contact the traders in advance who can take pre-orders for collection on the day.

Advance booking is essential via [www.butterfly-conservation.org/UKMRM](http://www.butterfly-conservation.org/UKMRM). We have moved to an online booking system to streamline the process and reduce queuing at the meeting registration desk. This new arrangement will require payment at the time of booking. The registration fee is £10.00 per person and includes morning tea/coffee and a buffet lunch all subsidised from Butterfly Conservation budgets. Of course if you do not have access to the internet alternative booking arrangements can be made on request.

We hope that you will continue to support the meeting and will find the new booking arrangements an improvement on the old system.

## National Moth Recording Scheme Update

The most exciting news from the National Moth Recording Scheme (NMRS) over recent months has been the addition of the first micro-moth records. The very first record to be added was of *Mompha miscella* recorded in Montgomeryshire (central Wales) in 1929.



The NMRS database now contains 20.4 million macro-moth records. Eighteen refreshed datasets have been received since April this year. Refreshes from East Perthshire VC89, Pembrokeshire VC45, Midlothian VC83 and Shetland VC112 were particularly welcome since it has been a while since we've had revised datasets from these particular vice-counties. In addition to this, we have also received 310,162 micro-moth records from seven vice-counties; South Somerset VC5, North Somerset VC6, Herefordshire VC36, Huntingdonshire VC31, Ceredigion VC46, Montgomery VC47 and Flintshire VC51. Over half of these records (57%) are from Huntingdonshire. We thank all of the County Moth Recorders concerned and their dedicated moth recorders for sending in their records.

Work towards the Atlas of Britain and Ireland's Larger Moths is progressing; it will contain records up to 31<sup>st</sup> December 2016. Please ensure that you submit your moth records to your County Moth Recorder in a timely fashion to ensure that he/she can meet the **31<sup>st</sup> March 2017** NMRS data submission deadline. We cannot guarantee that records received after this deadline will be included in the atlas.

There are currently 110 (3.6%) 10km squares for which the NMRS does not have any records for from the period 2000 onwards. It is likely that there are records for many of these 10km squares; however, they haven't yet filtered through the County Moth Recorder network to us or they are awaiting import into the NMRS.

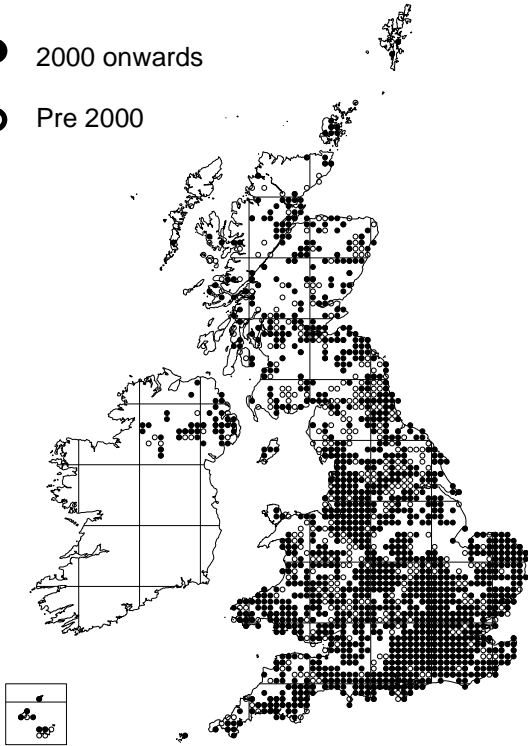
The number of under-recorded (i.e. 50 or fewer records and 25 or fewer species) 10km squares has reduced by five since April, there are now 510 under recorded 10km squares (18%). The most improved square is SN36, New Quay Head in Ceredigion (VC46) which has gone from two records of two species up to 82 records of 79 species.

Although the peak mothing season is coming to an end there is still plenty to do to contribute to the forthcoming Atlas. As the winter months approach some species to consider targeting are Mottled Umber, Winter Moth, Northern Winter Moth and December Moth. Provisional distribution maps from the NMRS are shown on the next page.

It appears from the maps that many recorders pack up their traps during the winter months and the moth distributions below are an artefact of recording effort. Northern Winter Moth looks like it has disappeared from large parts of Northern England, is this really the case or were moth recorders less seasonal historically? It would be great to get a clearer more accurate picture of these species distributions for the forthcoming Atlas.

● 2000 onwards

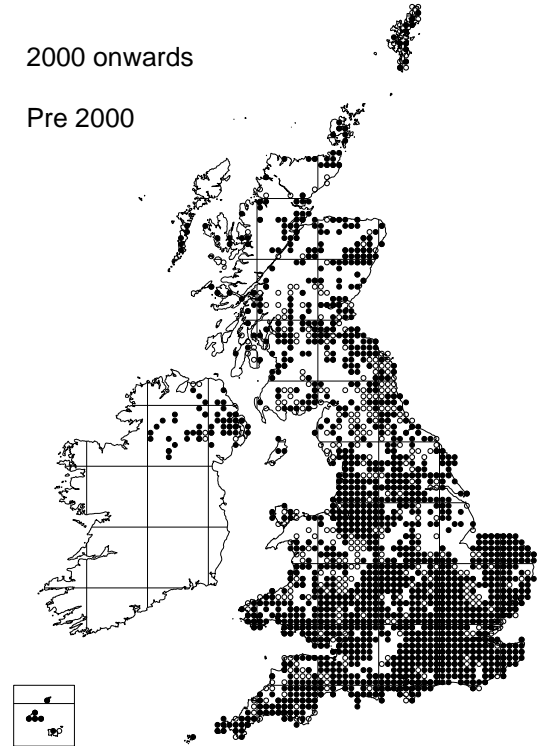
○ Pre 2000



Map 1: NMRS provisional distribution map of Mottled Umber at 10km resolution.

● 2000 onwards

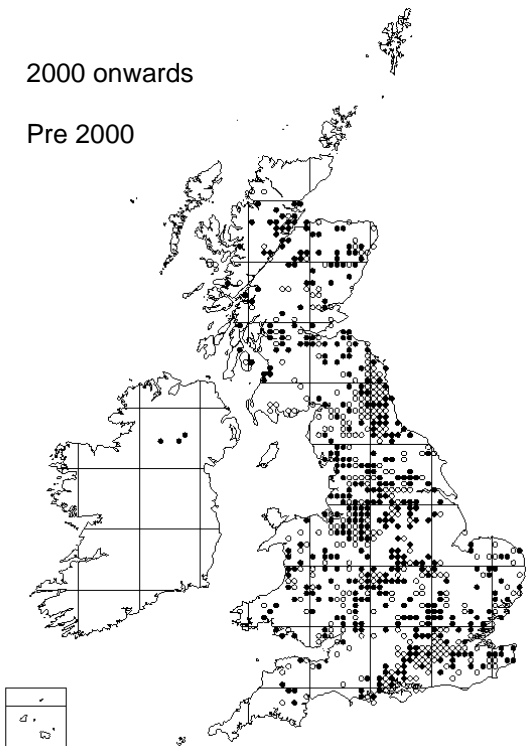
○ Pre 2000



Map 2: NMRS provisional distribution map of Winter Moth at 10km resolution.

● 2000 onwards

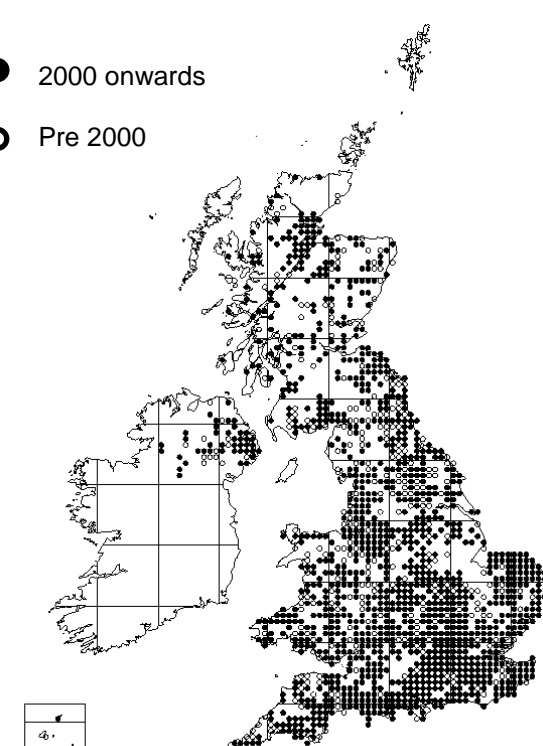
○ Pre 2000



Map 3: NMRS provisional distribution map of Northern Winter Moth at 10km resolution.

● 2000 onwards

○ Pre 2000



Map 4: NMRS provisional distribution map of December Moth at 10km resolution.

## Impacts of street lighting on garden moths

Artificial night lighting has long been a cause of concern for moths. Due to the characteristic flight-to-light behaviour performed by many moths, street lamps can inhibit their foraging and reproduction as well as have a direct impact on survival. With rapid changes to lighting policy and infrastructure currently underway in many British cities, there is an urgent need to understand how moths are being affected.

One example of a city undergoing extensive street lighting changes is Birmingham. In 2010 Birmingham City Council embarked upon a 25-year highway infrastructure improvement programme. Throughout the city, traditional low-pressure sodium (LPS) and mercury vapour (MV) street lamps are gradually being replaced by light-emitting diode (LED) lamps in residential areas and high-pressure sodium (HPS) lamps on major traffic routes. These changes are leading to city-wide increases in bright, broad spectrum street lighting and local shifts in UV emissions. But what does this mean for local moth populations?

To find out, myself and a team of researchers from the British Trust for Ornithology (BTO) and the University of Birmingham conducted garden moth surveys before and after street lamp replacements took place in two Birmingham neighbourhoods. We compared the results to changes in a third neighbourhood where street lamps remained the same. This meant we could work out the true impacts of the street lighting changes over and above differences caused by natural variation between the different locations and years.

We discovered that the switch from LPS lamps (which only emit light across a very narrow part of the light spectrum) to the broad spectrum HPS lamps led to an increase in local moth diversity in nearby gardens (see Figure 1). The newly installed HPS lamps seem to stimulate flight-to-light behaviour in a greater range of species, attracting a larger diversity of moths into the local neighbourhood. Interestingly, the replacement of MV lamps with LEDs resulted in fewer geometrids visiting gardens. We suspect that this is because the reduction in UV emissions that resulted from the switch lessened geometrid attraction.

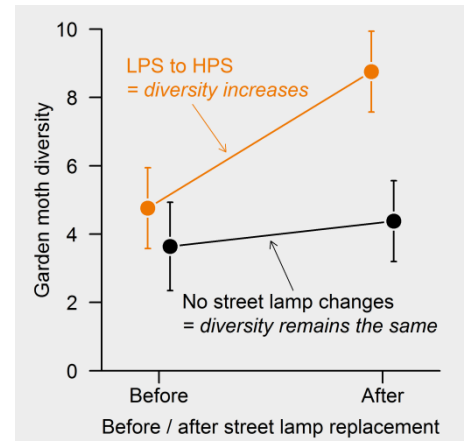


Figure 1: The impacts of recent street lighting changes in Birmingham on the diversity of moths attracted into gardens.

We also examined how garden moth communities were affected by other general characteristics of the surrounding street lighting, such as its proximity to the garden. We discovered that macro-moth attraction to gardens was greatest when street lamps were positioned at high densities, whereas micro-moths were most affected by street lamp proximity and the density of UV-emitting lamps specifically.

So it seems that changing street lighting regimes, both in terms of actual street lamp replacement and modifications to lamp positioning, can affect the total moth community in a variety of ways. But generally, moths are attracted to suburban gardens with closer, more dense and more spectrally diverse local street lighting.

A key ongoing concern is the possibility that by attracting large numbers of moths into suburban areas, street lamps could have a damaging effect on their populations if these areas have insufficient resources to support moth survival and reproduction. The next step will be to investigate whether this is actually the case.

Judging by our findings, there is unlikely to be a 'one size fits all' solution to curb on-going impacts of artificial lighting on moth communities. None-the-less it remains important that lighting engineers, city planners, ecologists and policy makers work together to optimise street lighting for people while minimising the impacts on biodiversity. At least for moths, perhaps we can all play a part in minimising some of the adverse effects of street lighting by providing ecologically important habitats in our gardens.

You can find out more about this research by reading the open access published article: [Plummer, K.E., Hale, J.D., O'Callaghan, M.J., Sadler, J.P. & Siriwardena, G.M. \(2016\) Investigating the impact of street lighting changes on garden moth communities. Journal of Urban Ecology, 2 \(1\), juw004. DOI: 10.1093/jue/juw004](#)

## Conservation updates

As always seems to be the case, survey/monitoring work this summer has been hampered by the weather, with cool, wet and windy conditions (sometimes all three) providing a significant challenge, combined with or resulting in many species occurring later than usual due to a cool spring. This has, on occasion, meant more than one visit to individual sites as it has proved difficult to judge when a given species should be about. For example, we normally aim to visit a Somerset site to monitor the Liquorice Piercer *Grapholita pallifrontana* and its foodplant, Wild Liquorice *Astragalus glycyphyllos* around the beginning of June. On 1 June this year we counted 59 plants, many of these small, and saw no moths. This compares to a count of 198 plants on 4 June 2015. On 6 June 2016, 102 plants were counted with two moths found, and on 17 June (showing a couple of potential volunteers what to look for) ten adults were seen fairly quickly (no foodplant count was undertaken on the last date).



*Grapholita pallifrontana* (Oliver Wadsworth)

Whilst on the Liquorice Piercer there have been some further discoveries. Guy Meredith has been systematically searching Gloucestershire sites for the moth through targeting locations for the foodplant. Guy found probable larval feeding signs in the autumn 2015 at four sites, and has now revisited these confirming the presence of the moth at all of them. Guy also found a site just into Oxfordshire and, with Butterfly Conservation (BC) staff, confirmed the presence of the moth here. Guy added further sites in Gloucestershire looking for larvae during the late summer 2016, bringing his total number of sites for the species in Gloucestershire to seven and, thus, the species is now well and truly established as part of the county's fauna! In addition, Marc Botham located the moth at a new site in Berkshire and BC staff found a third site in Somerset. We now believe the moth to be present in c.30 sites in the period from 2000 onwards. It is probable a few more sites could be located following Guy's example through locating populations of the foodplant, perhaps with the help of local botanists or the Botanical Society of Britain & Ireland (BSBI) county recorders.



*Coleophora vibicella* (Mark Parsons)

Over the years we have spent considerable amounts of time monitoring and advising on the Large Gold Case-bearer *Coleophora vibicella* (and also other species associated with Dyer's Greenweed *Genista tinctoria*). BC staff visited the Isle of Wight to discuss management of the various sites, meeting National Trust and Natural England staff. Here the moth occurs over a wide area on the north of the island, most of the sites with some degree of conservation management. One issue that was discussed was a cutting regime for one MoD site where grazing is not currently an option and as a consequence it is planned the site will involve a 3 or 4 year cutting rotation. On the mainland there is mixed news. Following high numbers of larval cases on transects at the Dorset site in 2015, the species has appeared to have crashed, suffering a c.90% decline, with just seven cases found. One glimmer of good news here is that a small strip mown last year supported good stands of young Dyer's Greenweed, which although currently not suitable for the moth could be in just a very few years. We hope to have a site meeting here in the autumn with NE and others to discuss a way forward. At one of the Hampshire sites, despite advice to the contrary, a large area of the site was cut, leading to a big drop in larval case numbers. At another site, where access has been difficult over the last few years, there are concerns for the species continued survival, with none seen by a third party when the site was visited. At the West Sussex site numbers were down compared to previous years, the reasons for this are uncertain, but could be due to a change in the grazing regime.

Drab Looper *Minoa murinata* surveys were undertaken during the latter half of May at several sites in Dorset and south Wiltshire. Numbers recorded were low compared to recent years, for example only four were recorded at Grovely Wood, Wiltshire, on 26 May, compared to 21 on 21 May 2015. The species was recorded in five of the seven sites surveyed. A brief report was compiled which included management recommendations, and circulated to the relevant site managers. It was encouraging to see management had been undertaken following earlier recommendations on at least a couple of the Forestry Commission sites visited, along with sensitive management at the sole RSPB reserve surveyed. Numbers outside this area also seemed rather low and whilst we have not yet received all records in England we are also aware of the moth being found in West Sussex, Hampshire, Herefordshire and Worcestershire. In Wales, the species was seen at just three sites in Monmouthshire, with a high count of five individuals; this well down on usual. It is considered that the weather conditions have played a significant part in the low counts recorded.



Drab Looper (Patrick Clement)

Several readers are likely to be involved in the pheromone lure testing for the Forester *Adscita statices* led by Ashen Oleander (Canterbury Christ Church University). Several BC staff have also been involved surveying sites, with mixed results, and also noted the attraction of Cistus Forester *A. geryon* to the lure. We have also helped Ashen secure Argent & Sable *Rheumaptera hastata* samples, through permission from Natural England. These samples are now stored and will be analysed in due course, hopefully leading to the development of a lure for this species which could be used in 2017. A lure for the Scarce Vapourer *Orgyia recens* was also tested by BC and RSPB staff in Norfolk, and volunteers in Yorkshire. Results thus far have been disappointing and it is intended to modify the lure for further testing next year.

Fiery Clearwing *Pyropteron chrysidiformis* has had a mixed year, with record egg counts at two sites and high counts at most other sites in north Kent but very low numbers being recorded in east Kent. One of the traditional sites in east Kent now has very little foodplant and this is undoubtedly the reason for the very low numbers of eggs found at this site. Discussions with the new site warden do however give hope that the situation will improve.

Three BC staff contributed to a [paper](#) on the Dark Bordered Beauty *Epione vespertaria* published in PLoS ONE (11(6): e0157423. doi:10.1371/journal.pone.0157423), the paper led by Dr Peter Mayhew (University of York). This covered the recent decline of the species at Strensall Common, Yorkshire, highlighting that between 2007 and 2014 the moth's density reduced by an average of 30-35% annually over the monitored area, and its range in this area contracted. It is suggested that the decline of the moth's population coincided with, and was likely driven by, changes in the host-plant population, and that a reduction in grazing pressure in parts of the site would aid host-plant recovery. The paper highlights the importance of constant monitoring of rare or priority insect species, and the potential conflict between bespoke management for species and generic management for habitats. The story was covered in The Guardian and The Herald (in Scotland), as well as by BBC Radio York.



Dark Bordered Beauty (Mark Parsons)

Over the last few years we have been surveying for and encouraging survey of several of the Priority micro-moth species in order to gain a better understanding of their status. Below are distribution maps for four of these, *Phyllonorycter scabiosella*, *Epermenia insecurella*, *Grapholita pallifrontana* and *Agrotera nemoralis* which are also Section 41 (NERC Act, 2006). We are keen to encourage further

survey for these and other Priority micro-moths species. Please let us know if you are aware of any additional sites for these species and ensure all records are forwarded to the relevant county recorder, as these will be incorporated into the National Moth Recording Scheme in due course.

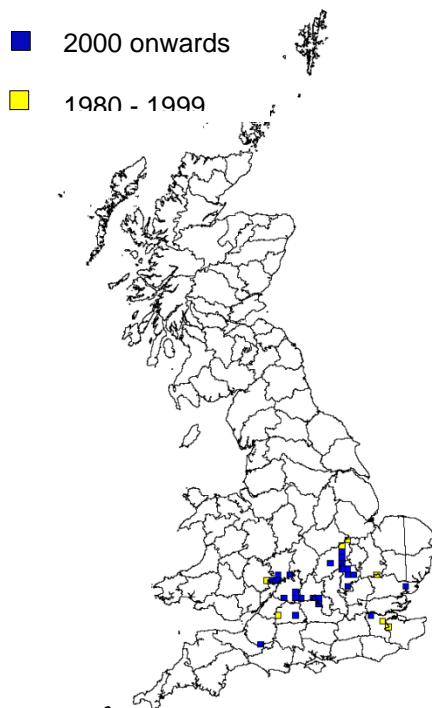
With this account we have included distribution maps of several Priority micro-moth species these are all Section 41 (NERC Act). Those covered are *Phyllonorycter scabiosella*, *Epermenia insecurella*, *Grapholita pallifrontana* and *Agrotera nemoralis*.



NMRS provisional distribution map for *Phyllonorycter scabiosella* at 10km resolution



NMRS provisional distribution map for *Epermenia insecurella* at 10km resolution



NMRS provisional distribution map for *Grapholita pallifrontana* at 10km resolution



NMRS provisional distribution map for *Agrotera nemoralis* at 10km resolution

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