GMS News

Spring 2024

Weeks 1-9

Contents

Editorial

In my previous editorial I asked whether the huge amount of information being gathered by GMS recorders was being used effectively. I said that 12 peer-reviewed papers had resulted from our work, which seemed to me that it was being well used. However it now appears that there were only four previous papers. This highlights the need for more such papers which in turn means that we must draw on people with a wide range of skills over and above trapping and identifying moths.

Those of you who read the Newsletter from beginning to end will know that I am continually asking for opinions as well as articles. So I was pleased to hear from John Austin and Steve Roberts who took the view that our data pile could be worked harder and who offered to make a start on statistical analysis. But before this could be done the data needed cleaning up and this was a big task. It has now been done and the first result of the combined efforts is the article starting on page 11.

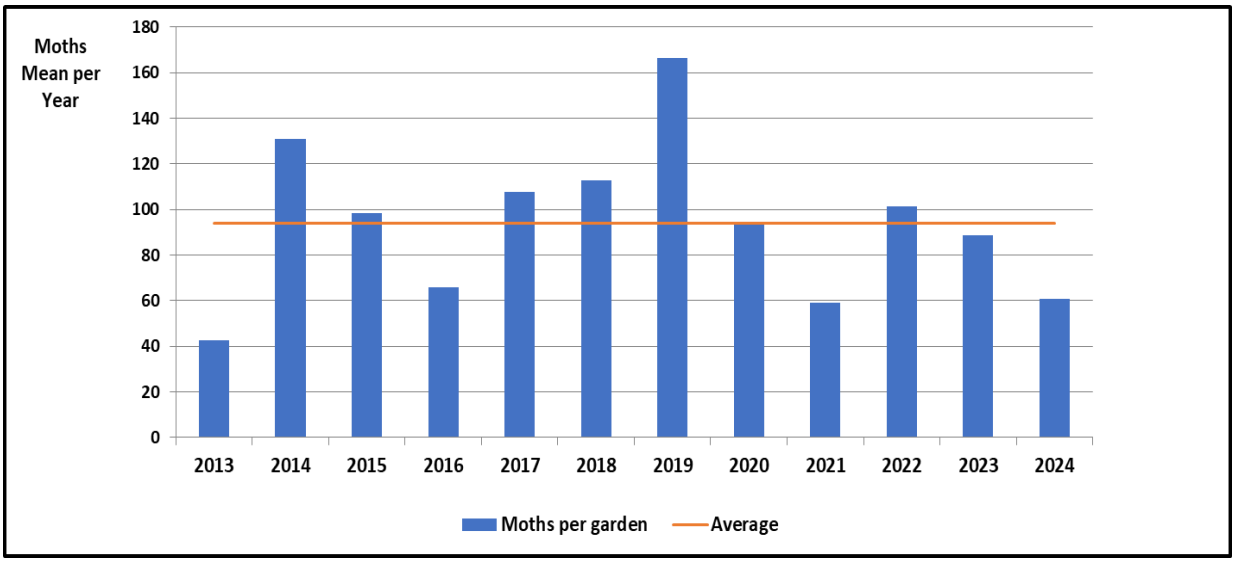
Elsewhere Evan has described the disappointing (for the most part) results of the Spring Quarter which left us all looking forward to warm, if not hot, weather in June. (Oh well…). And on a lighter note we have two articles looking at moth names and numbers. Then micro-moths make a welcome appearance in our regular puzzle corner. Finally, please note that we have a new website at the new address, which is https://gardenmothscheme.org.uk/ . Do have a look at it and let me have your views.

Overview GMS 2024 1st Quarter

Evan Lynn

Reports from the regional coordinators warned that this quarter would have very poor figures. They were right, but at least this year was better than 2013 (fig 1). The one ray of hope is that the cuckoos arrived and are continuing to call which indicates that there are enough long-haired larvae around to keep them alive and still here.

Fig 1. GMS 2024 Q1. Mean Quarterly Moth Numbers 2013 to 2024.

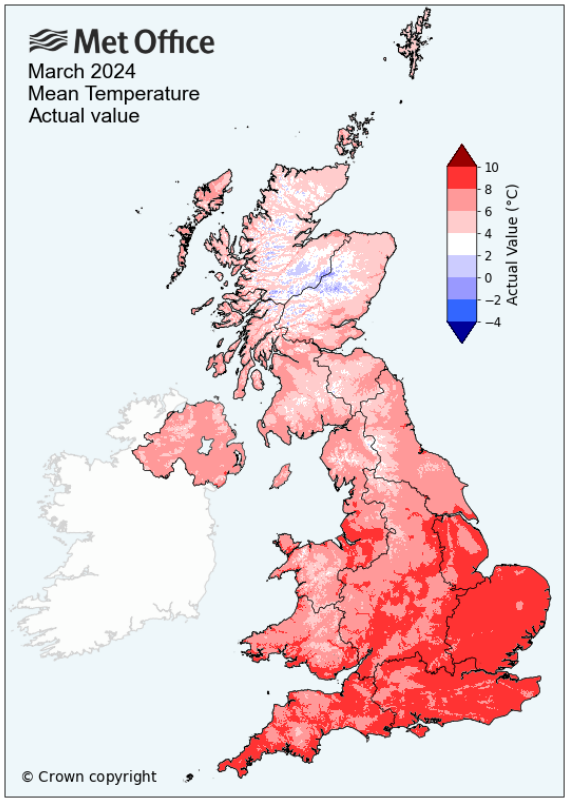


The weather this quarter showed similarities with 2021 with a series of low-pressure systems crossing the country. A Scandinavian high-pressure system built up in early March bringing cold dry conditions to the northern part of Britain, forcing the weather system further down the country. After this blocking high dissipated, the multiple wet and windy weather systems returned to the north. In March Scotland received 90% of its usual rainfall while County Down in Northern Ireland endured 145.9 mm. Towards the end of the month, warm south-westerly winds brought higher temperatures to mainly southern England and produced a north-south split with Scotland having cold and showery conditions.

April continued the unsettled theme with April showers living up to their name. The storm Kathleen arrived on the 5th bringing heavy rain to many places but the warm southerly winds raised the temperature for a while before temperatures dropped again with the last two weeks being cooler than average. Overall, the UK recorded 111.4 mm of rain which was 115% of the long-term average. Scotland and northern England were particularly wet with Edinburgh receiving 200% of its normal rainfall. These periods of heavy rainfall are expected to continue with global warming as every rise of 1°C in air temperature means that the air can contain 7% more water.

The above description can be summarised in the following charts.

. Fig 2. Mean Temperature for March & April 2024 (with permission of the Met Office).



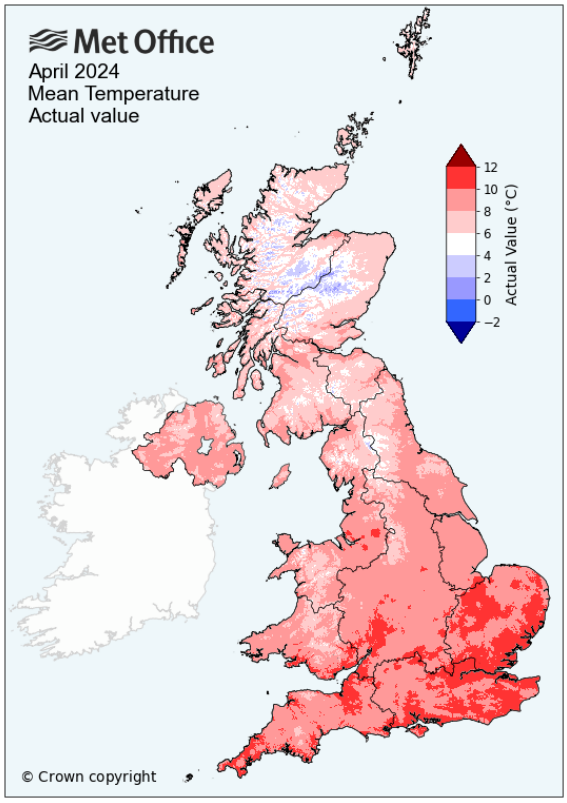
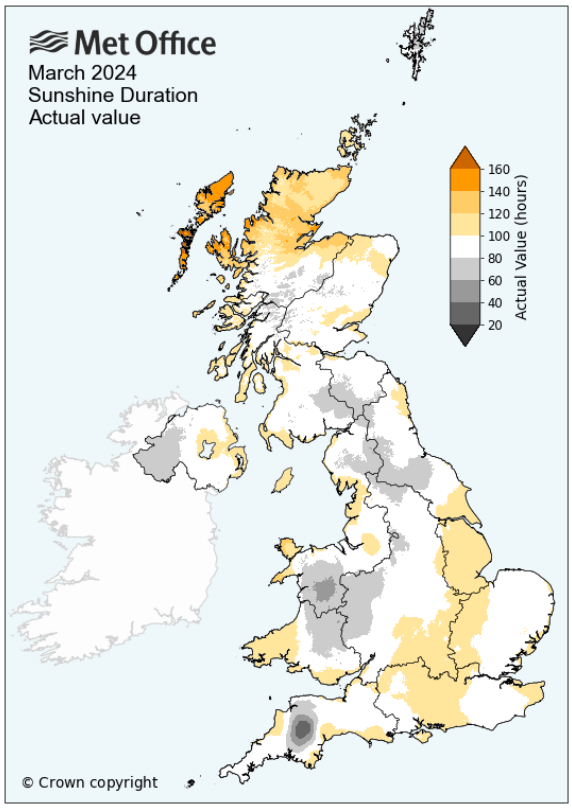


Fig 3. Hours of Sunshine for March & April 2024 (with permission of the Met Office).



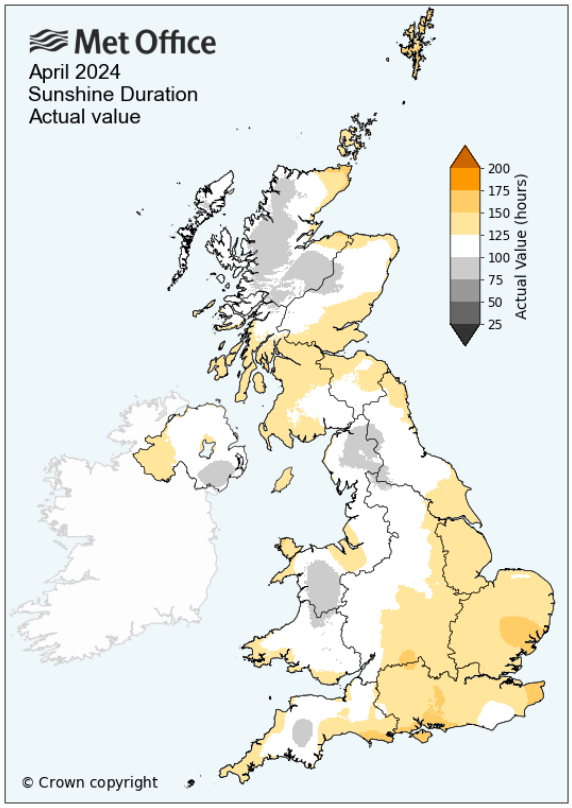
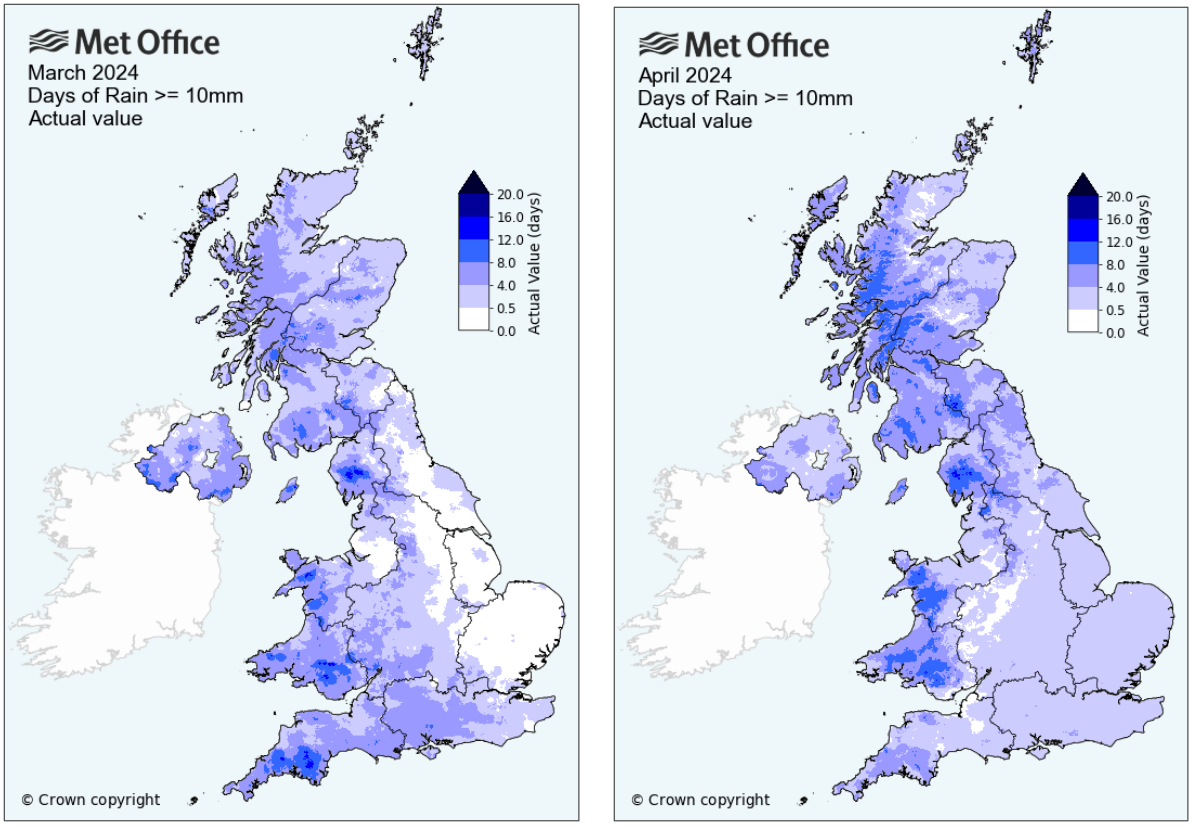


Fig 4. Days of Rainfall >10 mm for March & April 2024 (with permission of the Met Office).



While collecting the results from the regions it rapidly became apparent that catches would be low with many empty traps. One unfortunate recorder in the North East had eight empty traps and then the one successful night yielded only one moth. This was a regrettable combination of cold nights and intrusive street lighting.

The low returns for this quarter would suggest that empty traps are a major factor in the poor results. The number of empty traps for the four years since 2013 with the lowest number of moths caught is shown here together with the percentage of empty traps per year and the number of recorders with very low catches (table 1).

Table 1. GMS 2024 Q1. Percentage of Empty Traps and the number of low catches in years with low moth numbers since 2013

Year	Empty traps	Possible nights	% Empty Traps	< 6 moths
2013	372	3429	11	1
2016	301	3051	10	0
2021	280	3348	8	0
2024	449	2520	18	4

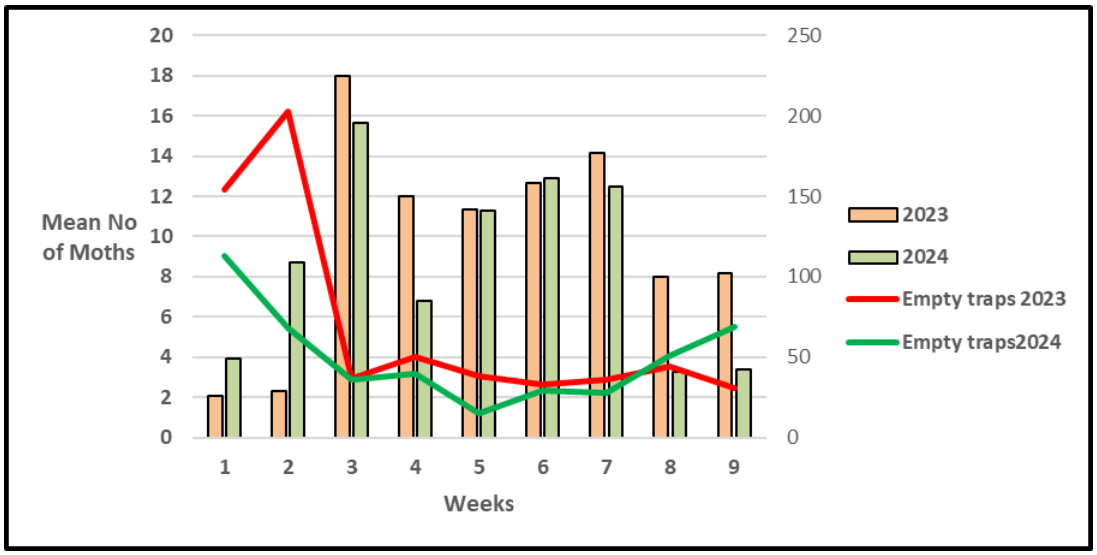
Certainly, this year performed badly for empty traps but is this explanation too simple? The number of moths caught last year (2023) was better but the number of empty traps was worse (table 2).

Table 2. GMS 2024 Q1. Percentage of Empty Traps and the Mean number of moths caught in 2023 &2024

Year	Empty Traps	Possible Nights	% Empty	Mean Catch
2023	626	2646	24	89
2024	449	2520	18	78

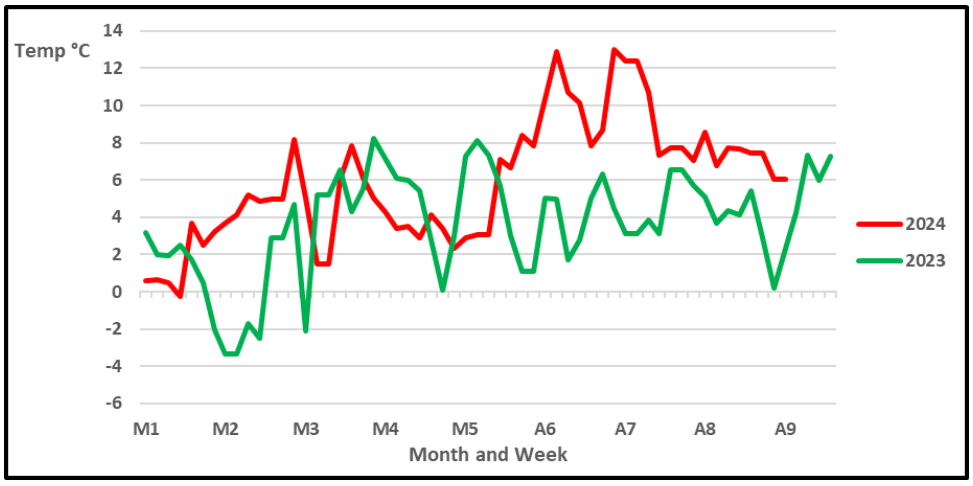
This is also shown below with the weekly mean number of moths caught together with the number of empty traps (fig 5).

Fig 5. GMS 2024 Q1. Weekly Mean Number of Moths Caught & Empty Traps in 2023 & 2024



The high number of empty traps together with the low number of moths caught in the first two weeks can possibly be explained in context with the minimum temperatures for these two years (fig. 6). As stated several times on the Garden Moth Website, lower temperatures yielded fewer moths.

Fig 6. GMS 2024 Q1. Average Minimum Temperatures in 2023 & 2024



Again, this may be too simplistic as you also have to consider the previous few years with their hot dry summers which could have taken their toll on the insect population. One example of this could be trees reducing their water loss by hardening their leaf cuticles and the increased concentration of chemicals making the leaf distasteful to the moth.

The performances of the top 20 core moths are listed here in Table 3 where the movement between the two years has been small, albeit up or down. The greatest losses have been in the number of gardens visited, with even the Hebrew Character and the Common Quaker down by 30 & 40% respectively.

Table 3. GMS 2024 Q1. Top 20 Core Moths

Position		Top 20	*Mean Per Trap*			Catching Frequency (%. of gdns)		
2023	2024	Species	2023 294 Gardens	2024 253 Gardens	Change	2023	2024	Difference
1	1	Hebrew Character	22.2	22.1	-0.14	98	68	-30
2	2	Common Quaker	18.2	18.2	0.06	36	77	41
4	3	Small Quaker	7.9	8.3	0.42	1	53	51
3	4	Clouded Drab	9.1	7.4	-1.77	72	64	-8
5	5	Early Grey	6.0	5.8	-0.21	87	49	-38
6	6	Brindled Beauty	2.4	2.3	-0.04	1	34	34
10	7	Oak Beauty	1.4	1.3	-0.01	89	36	-54
12	8	Twin-spotted Quaker	1.3	1.2	-0.02	49	30	-20
9	9	Double-striped Pug	1.5	1.1	-0.40	43	23	-20
13	10	Chestnut	1.0	1.0	-0.02	41	19	-22
17	11	Light Brown Apple Moth	0.7	0.9	0.22	96	32	-64
8	12	March Moth	1.9	0.8	-1.06	39	22	-17
28	13	Muslin Moth	0.3	0.8	0.59	0	22	22
34	14	Lunar Marbled Brown	0.2	0.7	0.56	35	15	-20
19	15	Powdered Quaker	0.6	0.7	0.06	0	23	23
14	16	Early Thorn	0.9	0.7	-0.24	31	26	-4
26	17	Brimstone Moth	0.3	0.6	0.30	34	13	-21
24	18	Streamer	0.4	0.4	0.05	29	15	-14
16	19	Dotted Border	0.8	0.4	-0.45	24	14	-11
42	20	Ruddy Streak	0.1	0.3	0.19	17	9	-8

The top 10 species for each region are listed below (table 4). My apologies to those who wish to convert to the micro vernacular names. Until there is complete consensus for these new forms I will continue to use the scientific names for them as it will be too difficult to compare regions, years etc if different forms have alternate names. Having an aversion to Latin I tend to use the vernacular names, but I was interested to see what the name for *Dyseriocrania subpurpurella* is. I found two: Common Spring Jewel and Common Oak Purple. No doubt this is from two authors which tends to complicate everything.

Table 4. GMS 2024 Q1. Regional Top 10 Core Moths

Scotland (21)	Mean	%	North East (28)	Mean	%	North West (33)	Mean	%
Hebrew Character	12.0	34.1	Hebrew Character	13.3	45.2	Common Quaker	20.5	38.0
Common Quaker	6.2	17.7	Common Quaker	6.1	20.7	Hebrew Character	17.8	33.0
Clouded Drab	4.0	11.4	Clouded Drab	3.4	11.5	Clouded Drab	8.4	15.6
Early Grey	2.8	8.0	Early Grey	2.0	7.0	Small Quaker	8.0	14.8
Red Chestnut	1.4	4.1	Small Quaker	1.1	3.9	Early Grey	3.9	7.3
Chestnut	1.2	3.4	March Moth	0.4	1.3	Brindled Pug	2.3	4.3
Twin-spotted Quaker	1.0	2.9	Powdered Quaker	0.4	1.2	Twin-spotted Quaker	2.0	3.8
Yellow Horned	0.9	2.4	Chestnut	0.3	1.1	Oak Beauty	1.1	2.0
Small Quaker	0.7	2.0	Twin-spotted Quaker	0.3	1.0	Chestnut	0.8	1.4
Powdered Quaker	0.7	2.0	Double-striped Pug	0.2	0.7	*Dyseriocrania subpurpurella*	0.7	1.2
Yorks & Humber (14)	**Mean**	**%**	**Ireland (20)**	**Mean**	**%**	**East of England (26)**	**Mean**	**%**
Common Quaker	19.6	32.8	Hebrew Character	25.6	36.7	Common Quaker	21.8	21.8
Hebrew Character	17.6	29.4	Common Quaker	10.0	14.3	Hebrew Character	21.3	21.3
Clouded Drab	5.2	8.7	Clouded Drab	9.2	13.2	Small Quaker	13.5	13.5
Small Quaker	4.9	8.2	Early Grey	9.2	13.1	Clouded Drab	8.2	8.2
Early Grey	2.8	4.7	Red Chestnut	1.8	2.6	Early Grey	5.5	5.5
Brindled Pug	1.2	2.0	Early Thorn	1.5	2.2	Chestnut	2.4	2.4
Oak Beauty	0.9	1.4	March Moth	1.2	1.7	Light Brown Apple Moth	2.0	2.0
Light Brown Apple Moth	0.8	1.3	Dotted Border	1.2	1.6	Pine Beauty	1.8	1.8
Twin-spotted Quaker	0.6	1.0	Oak Beauty	1.0	1.4	Double-striped Pug	1.7	1.7
Diurnea fagella	0.5	0.8	Water Carpet	1.0	1.4	Brindled Beauty	1.7	1.7
East Midlands (44)	**Mean**	**%**	**West Midlands (19)**	**Mean**	**%**	**Wales (24)**	**Mean**	**%**
Hebrew Character	16.1	27.3	Common Quaker	31.5	31.4	Hebrew Character	31.3	25.9
Common Quaker	10.9	18.4	Hebrew Character	20.0	19.9	Common Quaker	16.2	13.4
Small Quaker	8.2	13.8	Small Quaker	11.7	11.7	Small Quaker	15.5	12.8
Clouded Drab	5.6	9.4	Clouded Drab	8.4	8.3	Clouded Drab	10.5	8.7
Early Grey	4.2	7.2	Early Grey	5.3	5.2	Brindled Beauty	9.0	7.5
Brindled Beauty	1.9	3.2	Brindled Pug	4.0	4.0	Early Grey	8.3	6.9
Oak Beauty	1.2	2.0	Brindled Beauty	3.0	3.0	Oak Beauty	2.8	2.3
Light Brown Apple Moth	1.0	1.7	Twin-spotted Quaker	2.1	2.0	Brindled Pug	2.5	2.0
Double-striped Pug	0.8	1.3	Oak Beauty	1.4	1.4	Shoulder Stripe	2.0	1.7
Common Plume	0.7	1.2	Lunar Marbled Brown	1.3	1.3	Early Thorn	1.9	1.6
South East (27)	**Mean**	**%**	**Southwest (25)**	**Mean**	**%**			
Common Quaker	21.6	25.0	Hebrew Character	28.6	26.3			
Hebrew Character	19.1	15.8	Common Quaker	21.9	20.2			
Small Quaker	8.9	9.3	Early Grey	7.0	6.5			
Early Grey	7.3	6.6	Small Quaker	7.0	6.5			
Clouded Drab	4.2	4.2	Clouded Drab	6.6	6.1			
Brindled Pug	2.9	3.2	Brindled Pug	4.3	3.9			
Brindled Beauty	2.9	2.4	Brindled Beauty	3.5	3.2			
Double-striped Pug	2.2	1.6	Brimstone Moth	2.8	2.6			
Lunar Marbled Brown	1.6	1.1	Muslin Moth	2.2	2.0			
Light Brown Apple Moth	1.5	1.0	Double-striped Pug	1.9	1.8			

While most people tend to concentrate on the winners, the ”also ran” contenders can be just as interesting (Table 5).

Table 5. GMS 2024 Q1. Lowest 20 Core Moths

Position	Lowest 20 Species	*Moths*
54	Turnip Moth	3
55	Common Carpet	3
56	Ruby Tiger	3
57	Flame Carpet	3
58	Common Marbled Carpet	3
59	Knot Grass	3
60	Scalloped Hazel	2
61	Poplar Hawk-moth	2
62	Buff Ermine	2
63	Peppered Moth	2
64	Cabbage Moth	2
65	Clouded Silver	1
66	Willow Beauty	1
67	Bright-line Brown-eye	1
68	Spectacle	1
69	Small Magpie	1
70	Coxcomb Prominent	1
71	Poplar Grey	1
72	Cinnabar	1
73	Lime Hawk-moth	1

The statistics for the entire GMS region show a slight downfall in the number of recorders taking part from last year, mainly due to ill health or inability to keep up with the requirements of the scheme. Luckily some years ago the catching night changed from Fridays only to three days on either side. The one-night requirement was made for good scientific reasons but proved to be too restrictive and to encourage more people to join, flexibility had to be introduced. This quarter some 60% were able to maintain Fridays but we in this house now prefer Sunday mornings so that we can encourage a local teenager to develop an interest in nature.

As already seen from the report the number of moths caught has been lower in the northern regions with Scotland, the North East and Yorkshire having totals in three figures while those in more western and southern ones are in four figures. There is also a depressing list of recorders who caught between zero and ten moths this quarter (table 6).

Table 6. GMS 2024 Q1. Regional Statistics

Region	Gardens	Moths	Moths	Moths	
		Total	Mean	Min	Max
SC	21	742	35	3	96
NE	28	823	29	0	124
Y&H	14	840	60	1	190
NW	33	2409	73	1	301
IRL	20	1417	71	8	334
EE	26	2651	102	9	371
EM	44	2602	59	9	253
WA	24	2921	122	26	383
WM	19	1907	100	19	669
SE	27	2455	91	2	270
SW	25	2812	112	12	350

Moth Trap Nights		
Possible	Actual	Percent
189	177	93.7
252	241	95.6
126	121	96.0
297	275	92.6
180	173	96.1
234	225	96.2
396	381	96.2
216	208	96.3
171	164	95.9
243	229	94.2
225	211	93.8

Night	Tues	Wed	Thurs	Fri	Sat	Sun	Mon
Days	67	89	151	1163	259	148	51
Percent	3	5	8	60	13	8	3

The list of additional species is low this quarter which is normal for the season and for the second year running the Oak-tree Pug is in pole position (table 7). The Great Prominent made a good showing in the East of England. It was a frequent flyer to our trap in Wales but is a regional species here.

There is a mix of vernacular and scientific names for some of the micros and I change them when a recorder volunteers a new one. At present, I do not have a list of the new names so I will have to wait to be informed.

Table 7. GMS 2023 Q1. Top 20 Additional Species

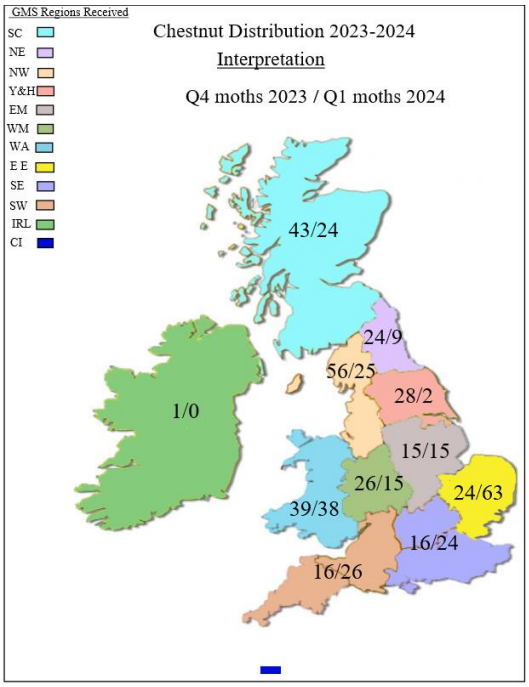
Latin/Vernacular	Total	SC	NE	Y&H	NW	IRL	Wa	WM	EM	EE	SE	SW	CI
Oak-tree Pug	66	0	0	1	5	1	12	17	8	21	1	0	0
Frosted Green	43	0	0	0	0	0	1	9	1	25	7	R	0
Belted Beauty	25	0	0	0	0	25	0	0	0	0	0	0	0
Common Spring Jewel	12	0	1	2	0	0	0	7	0	1	0	1	0
Hemlock Moth	12	0	0	0	0	0	0	1	2	8	0	1	0
Great Prominent	12	0	0	0	0	0	R	0	0	12	0	R	0
Yellow-barred Brindle	10	0	0	0	0	0	0	7	3	0	0	0	0
Early Tooth-striped	9	R	R	0	2	R	4	0	1	1	1	0	0
Beautiful Plume	8	0	1	0	0	0	0	4	2	1	0	0	0
Waved Umber	8	0	0	0	0	0	5	1	2	0	0	0	0
Oak Nycteoline	8	0	0	0	0	0	1	3	4	0	0	0	0
Sulphur Bark Moth	7	0	0	0	0	0	0	0	0	7	0	0	0
Acleris literana	6	1	0	0	0	0	0	3	0	0	0	2	0
The Engrailed	6	0	0	0	0	4	0	0	0	2	0	0	0
Mullein	6	0	0	R	0	0	1	2	R	R	3	R	0
Tawny Pinion	6	0	0	0	0	0	2	2	2	0	0	0	0
Acleris ferrugana/ notana	6	0	0	0	0	0	0	6	0	0	0	0	0
Epinotia immundana	5	0	0	0	0	2	3	0	0	0	0	0	0
Brindled Beauty	5	0	0	0	0	0	0	0	5	0	0	0	0
Lead-coloured Drab	5	0	0	0	0	0	0	3	1	1	0	0	0
Agonopterix heracliana	4	0	0	0	1	0	0	1	0	1	1	0	0

Chestnut (*Conistra vaccinii)*

This is one of a few moths with the longest life span as it overwinters as an adult. The vernacular name is self-explanatory referring to its chestnut colour. The scientific name "*Conistra"* means a place covered in dust, referring to the speckled, dusty appearance of its forewing, and "*vaccinii*" to the bilberry, a possible food plant.

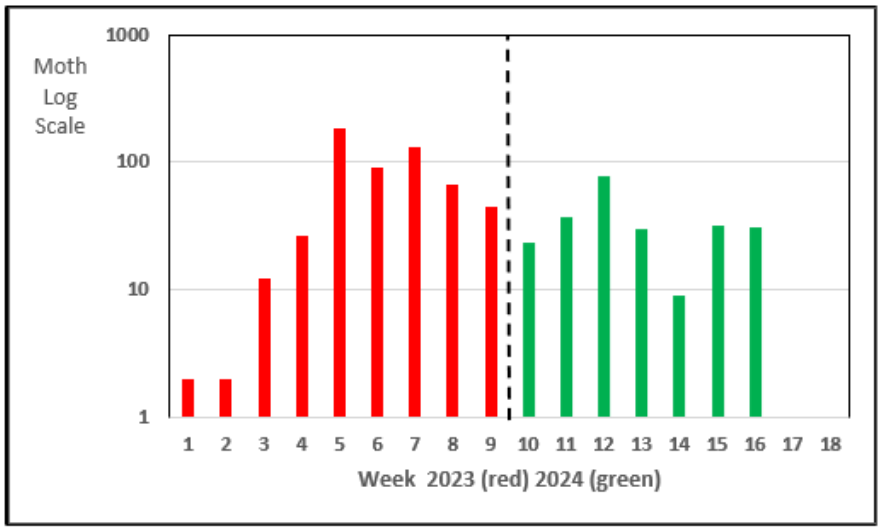
This species is widespread in Britain but not recorded in Orkney or Shetland. It is also widely recorded on the Isle of Man and the Channel Islands and well distributed in Ireland. Since 1970 its distribution has expanded considerably by 78%, especially in Scotland, and its abundance has also increased over the same period by over 41%. (Atlas of Britain and Ireland's Larger Moths).

Fig 7. GMS 2024 Q1. Chestnut Regional Distribution Q4 2023 – Q1 2024



It has one generation with a flight season spanning late September to the following May. The above figure shows its distribution last autumn and this spring (fig 7). Hibernation is known to be only partial and it has been seen, even in North East Scotland, to come to sugar on mild January nights. (Enjoying Moths by Roy Leverton). They build up their energy in the autumn before hibernating by feeding on the late blackberry fruit and Ivy flowers and are seen again in early spring on Sallow catkins.

Fig 8. GMS 2024 Q1. Chestnut Distribution 2023 -2024
(The logarithmic scale is used due to differences in Chestnut recorder numbers -143 [2023] & 80 [2024])



Mating occurs in the spring with larvae present from late April to June feeding at first on the leaves of various deciduous trees and later on herbaceous plants, including docks,

usually at night. They then construct a loose underground cocoon, pupating up to two months later. It can be found in broad-leafed woodland, hedgerows, scrub and many gardens. This small moth (wingspan 28-36 mm) can present in several different variations of pattern and colour but all show a distinctive round wing shape distinguishing it from most other brown noctuid moths flying in the autumn and early spring.

The Contribution of the Garden Moth Scheme to Science

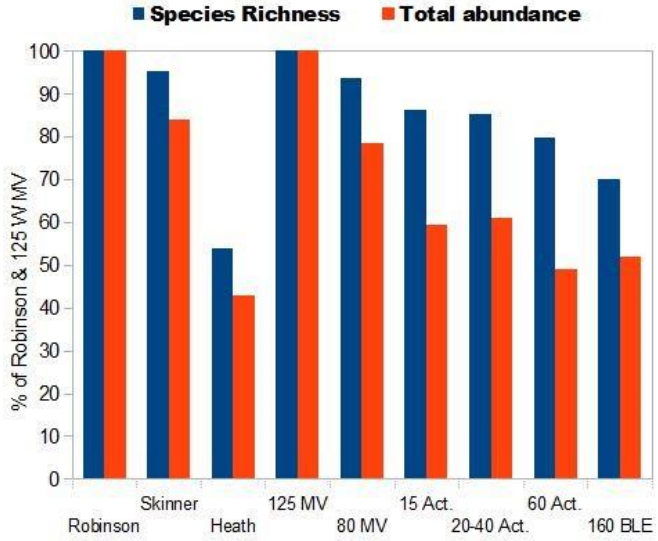
John Austin[1] and Steve Roberts[2]

The GMS started in the West Midlands in 2003 and expanded nationwide in 2007. Each participant gives information about the size of garden and other details as well as the type of moth trap. The scheme covers the commonest moths with an emphasis on the larger, more readily identifiable moths. The number of participants has increased over the years and as of 2023, there were 295 participants in the scheme. As readers of this Newsletter are aware, the purposes of the GMS are to monitor biodiversity as well as recording long term trends in moths to support conservation efforts. The GMS is an excellent example of "citizen science". This is the type of programme in which members of the public collect data which are then collated and used by professional scientists. Citizen science works well where the collection of data is labour intensive and would have been expensive to acquire by any other means. Other examples of citizen science include "happy whale", in which cruise ship participants observe cetaceans, (https://happywhale.com), Globe Observer, in which participants observe and photograph clouds to coordinate with simultaneous satellite observations, https://observer.globe.gov and Climate Prediction.net (https://climateprediction.net), which exploits citizens' spare computer capacity to run climate models. In many cases, the rapid expansion of citizen science has been stimulated by the rise in computer power (often left idle on people's laptops for example), as well as the rapid expansion in communications networks. These projects are usually led by professional researchers with the citizens being data collectors. In contrast, GMS is rather special in that it is instigated by and is controlled by the citizens, not the professionals.

Unfortunately, the GMS has not stimulated the volume of scientific publishing that we would have expected given the quality of the database. As citizen scientists we can collect data, but

few of us have the research and data analysis skills to use these data fully. Some further comments on this are included in the final paragraph of this article. Nonetheless, there have been four important papers published, mostly from the earlier years in the database, and these are summarised in this article.

With many different types of light trap contributing to the database, there was initially a need to understand the influence on the numbers of moths recorded of the different trap designs and lighting and this was the aim of the work of *Bates et al. [2013].* To separate the effects of light trap and light bulb, a statistical model was constructed which also included a range of garden parameters reported by the participants of the GMS. The statistical model was then used to compare catches from the 3 different trap types and 6 different bulb types, allowing as far as possible for differences in the garden habitats where our traps were placed. Wide differences were determined, with the numbers of specimens caught decreasing in the order Robinson, Skinner and Heath.

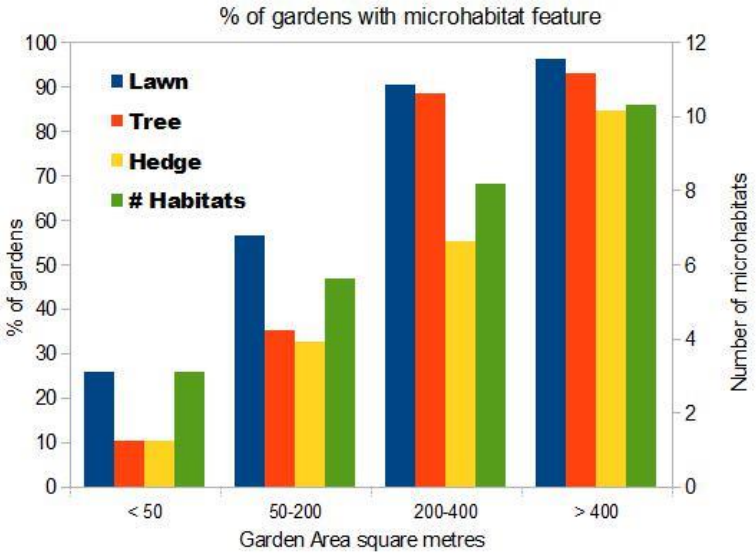


The image on the left is based on data from *Bates et al. [2013],* and shows the results of their analysis. Both species richness (number of species recorded) an abundance (number of moths) are include relative to the performance of the Robinson trap. The first three sets of columns show the influence of trap types. The Skinner trap performs almost as well as the Robinson trap with over 80% of the abundance and over 90% of species richness. The Heath trap in these figures yields only about half in species counts and abundance.

There were thought to be some retention problems with some species for the Skinner trap, but the Robinson trap caught more and retained more. The influence of bulb type is indicated in the next group of columns. The brightest (in the UVA) bulb used is the 125 W mercury vapour of the Robinson trap. For the actinic bulbs (15 W, 20-40 W and 60 W were the categories) the species richness is only reduced by about 20% or so, but the total abundance is much lower. This is only to be expected as the catchment area decreases with bulb brightness. Data from traps with blended bulbs (160 W Ble in the image, consisting of 80 W mercury vapour and 80 W tungsten filament) produced results lower than 80 W mercury vapour possibly due to statistical deviations associated with the small sample size. The analysis of *Bates et al.* used data from only 234 sites in 2020. The GMS design is far from optimal for addressing questions about trap design – a simple designed experiment comparing traps in the same location would be far better (and there are now several such studies in the literature), although to look at the range of traps and lighting used by GMS participants would be a fairly large undertaking.

Nevertheless it is reassuring that sensible results can be obtained despite the complexities of analysis required to make valid comparisons, and this study clearly demonstrated the need to adjust for trap and bulb in any analysis that compares between gardens. Of note, *Bates et al.* point to regulations which have now resulted in the ban of MV bulbs and since this time we have seen the introduction of LED lights of various sorts. It may be worth reviewing the variety of traps now in use in the GMS and the evidence available from designed experiments to see if our data can add useful information about the effectiveness of newer bulbs and designs. This would be particularly powerful if we had gardens that had changed traps and we could exploit the consistency of the GMS recording to analyse differences within gardens.

Allowing for the different moth trap characteristics, the other published papers have explored the impacts of environment on moth numbers. The effects of habitat differences for moths of different conservation status were explored by *Bates et al. [2014]*. The general conclusions were that coastal gardens tended to record both higher species counts and moth abundances than gardens in more urbanised locations. The same trends were found for moths classified as increasing, declining and vulnerable. The UK landscape consists of a highly developed patchwork of semi-natural habitat alongside agricultural and urbanised areas. Due to the wide range of factors determining moth counts, a statistical model needed to be developed which *Bates et al.* describe in detail. They also point out the effect of artificial lighting in urbanised environments which could have led to lower moth counts in those environments.

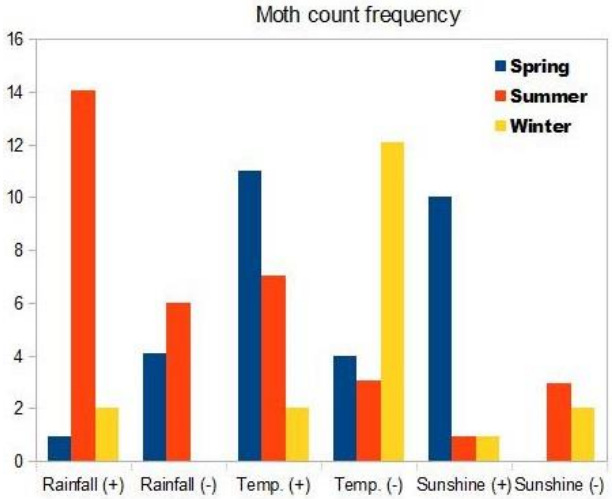


Relationship between garden are and the percentage of gardens with three key microhabitat features which were important parameters in the statistical mode The graph has been redrawn usir data From *Bates et al. [2014]*. Th figure demonstrates a very clear trend in increasing numbers of microhabitats as the garden size increases resulting in a richer biodiversity.

Light pollution has been in the National news in the last few years [Light pollution from street lamps linked to insect loss - BBC News](#) in influencing insect numbers. This can arise from the impact of urban light on nocturnal feeders, or it can affect the trapping efficiency by reducing the catchment area. The work of *Wilson et al. [2018]* used data from the GMS to examine the influence of night-time illumination on moth abundance. They used satellite data to catalogue gardens into three categories of high, medium and low illumination. Naturally, the high illumination sites coincided with urban areas but those sites would also have included multiple habitats making the analysis challenging. The authors therefore concentrated on the medium and low illumination samples which differed in the frequency of grassland and arable-land use. This enabled habitat effects to be statistically separated from lighting effects. While this is not necessarily the largest factor influencing moth abundances, they could demonstrate a real effect of light pollution difference in the medium and low light sites. Some of the main conclusions of this work are that changes in lighting technologies aimed at reducing carbon emissions are already providing opportunities to mitigate against the ecological effects of light pollution, especially when combined with the removal of inessential lighting, as also suggested in a previous study by *Gaston et al. [2012]*.

The effects of climate variables on moth numbers were examined by *Wilson et al. [2015]*. Again, using a statistical model they used 11 years of GMS data together with corresponding data from the Met. Office. Although the GMS as we know records the minimum temperature, this is just one meteorological variable of relevance, and by using Met. Office data a richer analysis can be achieved. The authors found the most influential factors to be daytime sunshine amount (presumably a measure of cloudiness), rainfall amount and mean daily temperature. Data from 50 species were used yielding 68 generations of moths (18 double brooded and 32 single brooded). Of the 68 generations, 66 generations were demonstrated to be sensitive to at least one of the three climate variables. Sensitivity to meteorological variables was not the same for each species. Some showed a positive correlation with temperature, others showed a negative

correlation and so on. For example, the authors cite *Conrad et al. [2002]* as showing that the Garden tiger moth has been adversely affected by warmer and wetter winters and springs. *Wilson et al. [2015]* needs to be read for a detailed species by species analysis, as there is too much material to summarise concisely here. Complications arise from a different sensitivity to different species at different stages in their life cycle. For example for some species a cold winter benefits the moth counts but for others a cold winter is detrimental. This can only be properly understood by a species by species analysis of climate effects. It is possible that with more years of data (so there are more "good" and "bad" seasons that climatic effects would be worth revisiting, especially as we could exploit the strengths of the multi-season recording in the same locations.



This figure (using data from *Wilson et al. [2015]* summarises the effects of the three climate variables on moth counts during the flight season. Only the statistically significant examples are included and the results are broken down into the prior season indicated by separate bars: Blue – Spring (weeks 14-26); Re – Summer (weeks 27-43) and Yellow bars – Winter (weeks 44-13). Moth abundances increased most frequently following a colder winter, wetter summer and a sunnier and warm spring.

In summary, the papers published to date have covered most of the major issues affecting moth populations: weather, habitat and background lighting. However, since these studies were published, the amount of data available from the GMS has approximately doubled, and we are now starting to have enough data to look at long-term trends. Here we hit the downside of a citizen-led project in that we need to interest those with the professional research skills and tools to help us to analyse and interpret the data. The lack of availability of funding to carry out the work is always likely to be a factor and scientists and statisticians have to put time and effort into research topics that their employers will support.

We now have a rich data resource, but it is one that requires particular multi-disciplinary expertise and time to analyse. Interestingly, much of the expertise about moth natural history is held by non-professionals – combine this with statistical and computational skills and we have something that could be real citizen-science and provide valuable insights into both the natural history and fate of these insects in a world with climate change. In this vein maybe we should ask those of you providing the data and those of you who know your moths – what are the scientific questions you would like to see addressed?

Acknowledgements. This article was written on the suggestion of Norman Lowe who also made some helpful comments.

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https://doi.org/10.1007/s10841-018-0052-1 *(Sadly this is not open-access, but some of the authors are GMS people so can provide you a copy on request)*

[1]John Austin is a retired climate change scientist and traps moths for the GMS in Berkshire.
[2]Steve Roberts is a biostatistician with a suburban garden on the Lancashire/Cheshire border.

British Moths and Palindromes

Nonconformist

On the morning of 4th April this year, 2024, I found a very early Swallow Prominent on the window frame of my dining room. This was 4 weeks earlier than any previous sighting and whilst deliberating around this fact I noticed that the identification number formed a palindrome, i.e 71.017. How this thought had avoided my quizzical mind since the latest checklist was accepted in 2013 I know not. This then prompted me to search through the British moth listings to see how many palindromic numbers were in use in the complete checklist.

This time it was a puzzle for Nonconformist to solve, instead of set, and as the Editor is always asking for Newsletter content I decided to reverse my role and start the search which resulted in the finding of a total of 27 palindromic numbers within the list, of which 17 covered the micro-moths, and 10 the macro-moths.

So:- Out of this total how many had I recorded? The answer turned out to be only 9, of which 3 were micro-moths as depicted below.


40.004 Mompha propinquella


49,094 Bactra lancealana


49.294 Notocelia uddmanniana

Now, what about the macros? Firstly I show the moth which started this diatribe, i.e. the Swallow Prominent. and alongside it an image of what I believe to be a November Moth.

71.017 Swallow Prominent

70.107 November Moth

However, the November Moth is now subject to the "aggregate" classification because of its similarity with the Pale November Moth and the Autumnal Moth and my image may well be debatable.

Well, oddly enough, I have actually seen 50 per cent of the listed macros, although my next subject has to be shown as a larva. The adults are too similar to the Grey Dagger be accepted without a genitalia examination and I will not suffer all the "Daggers" I catch to such a traumatic end. So, firstly, here is an image of a Dark Dagger larva and then the image of a possible Dark Dagger subject to the unfortunate examination.

73.037 Larva of Dark Dagger

73.037 Dark/Grey Dagger

70.207 Clouded Border

73.137 Fen Wainscot

Well, that's it. The final two images bring the puzzler hopefully to a satisfactory result?

What's in a Name?

David Baker

Upon reading the latest edition of "Yorkshire Butterflies and Moths 2023" I was drawn to an article which attracted my immediate attention. The views reflected mine and I contacted the author, the County Macro-moth Recorder, Dr Charles Fletcher for his permission to use within a Garden Moth Scheme newsletter. Charlie is also a recorder for the GMS. Of course, I then required permission from our Editor. There has been a recent occasion when one of our recording team used the "new" Micro-moth common names for the Quarter 1 reports instead of simply using the xls sheet as sent out. This caused a short term problem. This leads me to the following query. **Quote:-**

Should I use vernacular (common) names for micros?

There is a long-standing tradition that macro moths should have vernacular names. Many of these names go back over two hundred years. Wainscots and Footmen, Brocades and Rustics evoke pictures of Georgian and Victorian times, and these names are now part of our history. Everyone knows what you are talking about when you refer to a Common Footman. The same does not quite apply to micro moths. Fewer than 200 of these have long-standing vernacular names, mostly the large and easily-identified species or those considered to be pests. These names are included in the AB&H checklist and are used and understood by the majority of moth enthusiasts. There have been several initiatives over the years to invent vernacular names for the other 1400+ micro moths. The first post-Victorian attempt was Heslop's *Indexed checklist of the Lepidoptera with the English name of the 2313 species* in 1947. This was somewhat ridiculed and in 2002 Porter published *A Label and Checklist of British Micro-lepidoptera with Vernacular Names*, loosely based on Heslop's work. In 2017 Jim Wheeler published *Micro Moth Vernacular Names: A Nomenclatural Checklist of British Microlepidoptera* in which he suggested alterations to many of Porter's names. We now have a new edition of our splendid *Field Guide to the Micro-moths of Great Britain and Ireland*. It is a super book and everyone should have a copy of the new edition. The authors however, in their infinite wisdom, have included vernacular names for all the micros, displayed prominently in bold type, and to compound matters have carried out major alterations to a large percentage of names – presumably because it is over a week since they were last changed. We now have the situation where some moths have four or more vernacular names. We now receive records of Wakeley's Dowd, London Dowd and Large Pale Masoner (all apparently *Blastobasis lacticolella*) and we haven't a clue what any of them are. The birding community are delighted there is now a moth called "Beautiful Twitcher" though a Google image search of the name might raise a few eyebrows. The Field Guide tells us that this current initiative is to help people who are "put off by scientific names." We find this a little patronising and another example of the current trend for "dumbing down" natural history. The next step will no doubt be to ban five-year old boys from talking about Tyrannosaurus Rex and Stegosaurus. In future they must use the terms "King Tyrant Lizard" and "Roof Lizard" until they are changed in the new Dinosaur Field Guide next month.

So to answer the question in the title of this article in a single word - no. The purpose of using names is to facilitate communication, and if you effectively use a foreign language, it is going to be difficult to understand you, especially when you submit records to a county recorder. There is already one county moth recorder (and probably more) who routinely bins all microlepidoptera records without a scientific name! Instead, invest in a copy of Maitland Emmet's wonderful "The Scientific Names of the British Lepidoptera – their history and meaning." (Note "Scientific Names", not "Latin Names" – half of them are Greek). It's a quite brilliant book which you should keep in your loo where it can be dipped into every day instead of wasting time doing Wordle.

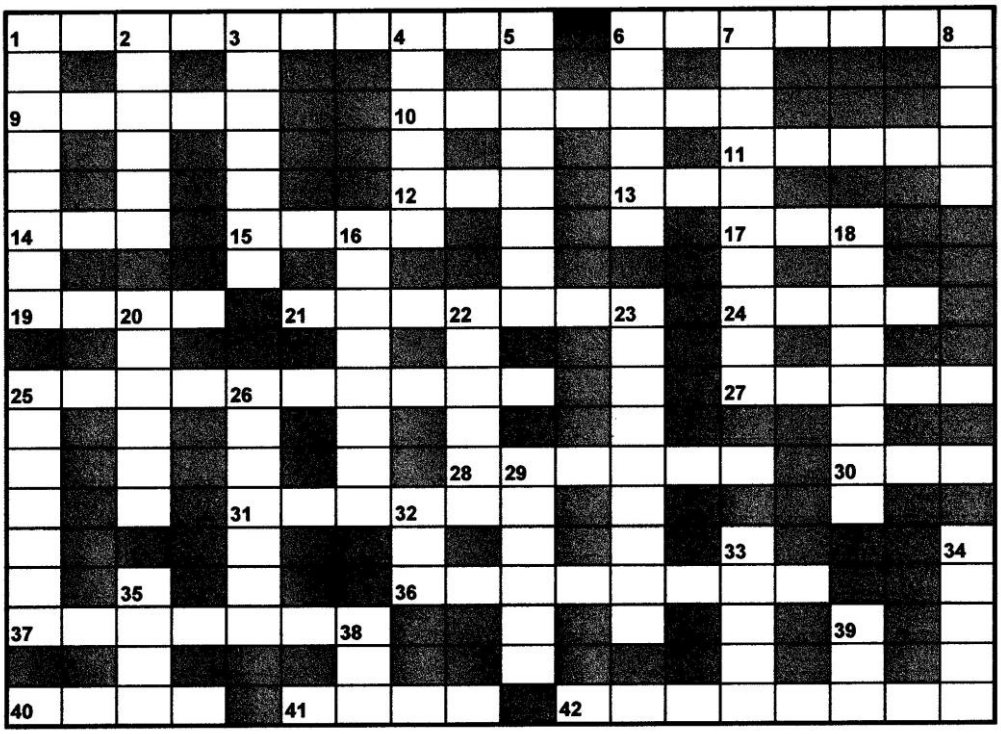
I am sure that all our recorders have a view on the matter, just as I am sure that we will all have to "grin and bear it" as my old Gran used to say. I leave it with you!

Puzzle Corner

Micro-moth Crossword No.1 **Nonconformist**

For a change I have ventured completely into the Micro-moth world and all the answers can be found in the “Gospel according to Saint Mark and Saint Phil”, otherwise known as “The Field Guide to the Micro-moths of Great Britain and Ireland, Second Edition”. They all form a part, or whole, of the vernacular name of one of our micro-moths.

I can only assume that many of you will soon use these vernacular names which are, to my mind, much better than the suggestions of previous years made by other authors. However, for me, to paraphrase Mr Micawber, “Neither a borer nor enchanter be”. So, in my notes when trapping I will still use P. ruralis and E. postvittana etc. Good luck!



Clues Across.

1.A pointer to the meadows should lead to this Bevan-boy.
6. A person involved in some jobs cures could aid several species.
9 & 33dSurely only a tout sold this digital flower.
10.A creature which reportedly developed from an oxen-hip.
11.This long implement certainly belonged to a pleased geriatric.
12.This is what my wife calls me when puzzling with the crosswords.
13.See 34d.
14 & 25d.Our little titch Percy could unravel this type of thing with no problem.
15 & 38d.I can tell when this little thing has roosted on my garden plants.
17.See 35d.
19. The Caterpillars live upon brackish plants initially and then seem in a hurry.
21.The replacement bus held relief for certain embarassed looking passengers.
24.An amphibian of ubiquitous type returning before taking on a linen outfit.
25.Singing the Clan ode, Ian decided to get on the grey express.
27.Unfortunately this delicate moth was found on the window dying.
28. This creature has a habit of taking a secret meal from our crops.

30. A host for many species found in hotel management circles.
31.This beauty would even come back from a well battered damaged plant.
36.Even in a naked state the interrogated won't spit out the required answer.
37.See 22d.
40.Emil ran a mile and then changed into his coloured outfit.
41.See 28a
42 & 29d.It could be the last man out in his fine white robes.

Clues Down
1.Even racing to the docks the ship can't tail its partner across the ocean.
2.You may even have to use a felt tarpaulin to attract this back into the trapping site.
3 & 17a.As Ken wrote, you have to search the leaves for this old cinema specimen.
4.The regal pineapple plant is unlikely to grow in these regions.
5.Och aye, if it cost this much it must be from over the border!
6.Species requiring a backward glance at a Tibetan robe.
7. Heathland lover possibly sent from Rome by St.Dopiest XI.
8.Our particular Princess expressed a desire to obtain a hat and drinking aid.
16.Old Sid and young Len brought two pennies to buy a precious stone early in the year.
18.Would Harry Potter's wand keep this species from attacking Hogwarts seeds.
20. A moss loving moth starts life under plant leaves and not detritus.
22 & 37a. Because of the unusual weather conditions the cold, crude, case was re-arranged.
25.See 14a.
26. Don gave maid this delight to show his intentions.
29.See 43a.
32.See 9a.
33 & 13a.I actually won a trip across the border to a Garden Centre to find this.
34, & 35d, A species using a map on hill to locate the oak trees.
35.See 34d.
38.See 15a.
39.Several species can be found within the bounds of the seal inhabited island.

Answers

Moth Wordsearch No. 6

E	P	D	R	E	D	N	E	L	S	C	A	R	C	E	D
U	O	O	F	I	E	R	Y	I	A	E	L	N	V	A	R
R	D	R	L	K	E	T	L	T	X	H	C	A	E	P	U
T	H	Y	M	E	R	U	E	I	O	L	W	L	Y	D	I
S	A	T	I	N	R	A	L	S	N	A	N	G	L	E	D
I	N	A	W	I	U	E	D	S	X	I	N	G	N	R	X
M	N	S	A	N	H	G	R	U	B	N	I	D	E	E	N
R	U	N	R	I	R	B	E	E	E	R	T	E	D	P	I
O	L	A	T	A	A	T	A	F	L	E	A	L	R	P	H
F	E	I	S	L	Y	U	E	H	O	T	L	I	A	E	P
N	T	S	S	P	T	S	S	S	B	A	R	A	G	P	S
O	E	A	P	I	T	N	O	U	S	C	A	R	U	Y	C
C	M	T	F	O	X	A	E	R	T	I	A	G	G	L	O
M	A	U	O	R	E	F	N	T	E	L	O	N	N	R	T
A	L	N	A	M	E	G	I	R	R	E	I	I	I	A	C
Y	F	E	L	I	N	E	P	B	E	D	R	U	L	E	H

Across
Red, Slender, Scarce, Fiery, Peach, Thyme, Satin, Angle, Angled, Edinburgh, Bee, Tree, Bar, Tip, Snout, Scar, Fox, Gem, Feline, Bedrule.
Up and Down
True, Pod, Reed, Saxon, Druid, Satyr, Conformist, Annulet, Nine, Peppered, Straw, Sphinx, Asian, Scotch, Nut, Plain, May, Fan, Pine, Tissue, Rush, Lobster, Ingrailed, Latin, Delicate, Garden, Ling, Early.
Diagonal
Dark, Clay, Rosy, Six, Ten, Silurian, Exile, Wax, Wave, Lead, Beautiful, Balsam, Grass, Fen, Ear, Festoon, Large, Pug, Dingy.
The anagram of the unused letters, marked in red, gives us the LUTESTRING.

Communications & Links.

We have a new **GMS Website** which can now be found at
https://gardenmothscheme.org.uk/
In it are 5 Sections:
Home – the introduction
Information – lists the Regional Coordinators and gives some help with identification
Communications - includes past newsletters
Links – how to access our Facebook material and a link to UK Moths
Downloads - access to the regional recording forms and instructions.

Facebook Page - https://www.facebook.com/GardenMothScheme

Facebook Group - https://www.facebook.com/groups/438806469608527/ - currently with more than 2900 Members (not all active GMS participants) – open membership – all recording forms, instructions and micro-moth identification guides are available in the Files section.

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