

# **GMS News**

## **Spring 2017**

### **Weeks 1-9**



### **Contents**

Editorial	Norman Lowe	1
Overview GMS 2017 1 <sup>st</sup> Quarter	Evan Lynn	2
And now for something different: Caddisflies	David Baker	10
The new checklist – why bother?	Norman Lowe	12
Lappet Moth at Abergele in 1922	Duncan Brown	12
2017 Annual Conference Report	Norman Lowe	13
Decreasing biodiversity - a local case study	Duncan Brown	14
Specimens sought for genetic research	Callum Macgregor	15
Crossword 8	Nonconformist	15
Tailpiece	Norman Lowe	16
Communications & links		17
GMS sponsors		17

### **Editorial – Norman Lowe**

As usual, we had a very successful Annual Conference in early March – an account was given in the 2016 Annual Report but this is repeated here for those who might have missed it. One of the topics that was raised was the necessity for a change from using the long-established Bradley and Fletcher (B&F) numbers and names to the new checklist compiled in 2013 by Agassiz, Beavan and Heckford (ABH). So it seemed to me to be a good idea to explain the reasons for this – see my article later in this issue.

Once more we have a good and especially varied selection of articles for you. For perhaps the first time we have strayed into caddisfly territory as David Baker tells us about some of the species he finds amongst the moths in his trap – does this sound familiar? Then Duncan Brown has provided us with a couple of articles, firstly a short piece on the Lappet moth in Wales, then an uncomfortable account comparing his own experience of declining moth numbers with a published account of European biodiversity loss. And for crossword enthusiasts Nonconformist has contributed a puzzle that for me at least seems especially difficult. We also have a request for help with a research project in London and west Hampshire. This involves retaining specimens for study and we recognise that many recorders would not wish to do this. However if you would like more information, the contact details are given in the article.

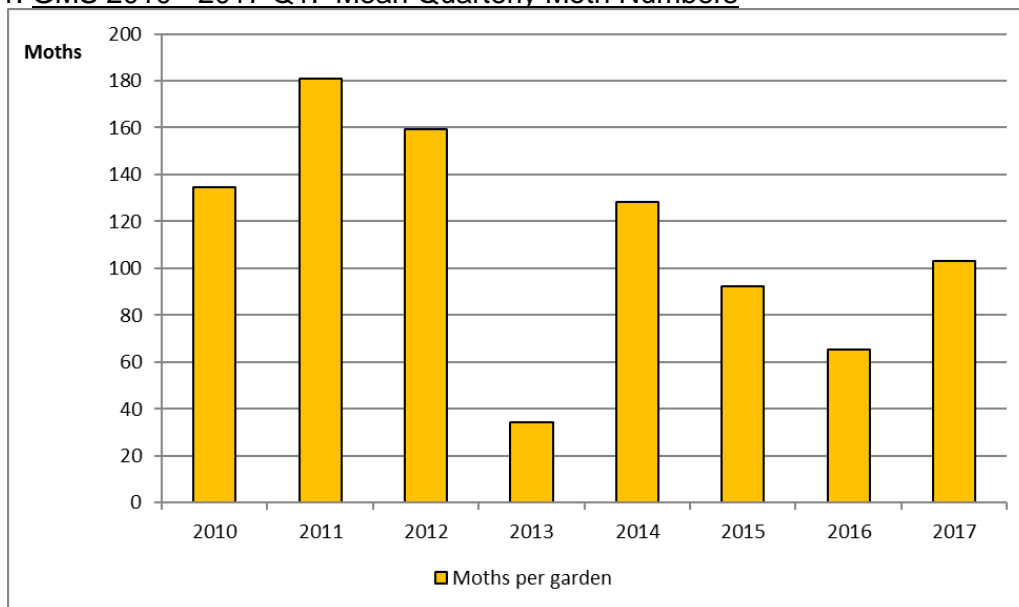
But we start with Evan Lynn's regular analysis of our results, concentrating of course on the spring moths, especially the Orthosias.

## Overview GMS 2017 1<sup>st</sup> Quarter – Evan Lynn

### Yearly Comparisons

Variable weather during the first quarter (March & April) had a direct bearing on moth numbers. After a cold start, warm air pushed up from the tropics for a week and then finally a bitterly cold airstream came down from the north. This resulted in low catches in northern regions, but the slightly warmer southern regions helped to compensate overall by producing larger catches. Moth numbers for the first quarter in the last eight years are summarised below (Fig 1), which shows that 2017 reversed the downward trend of the last few years, and had it not been for the cold weeks at the beginning and end of the quarter this year could well have equalled the relatively high numbers recorded in 2014.

Fig 1. GMS 2010 - 2017 Q1. Mean Quarterly Moth Numbers



### Temperature and Catches

The relationship between minimum night temperature and the number of empty traps is shown below (Fig 2). After a sluggish start with 120 empty traps in week 1, the situation improved markedly following a rise in temperature, contrasting with the sudden plunge (week 4) which seemed to have little effect on the number of empty traps, possibly explained by the presence of Hebrew Characters which seemed to fly regardless of temperature.

Fig 2. GMS 2010 - 2017 Q1. Minimum Night Temperatures and Empty Traps

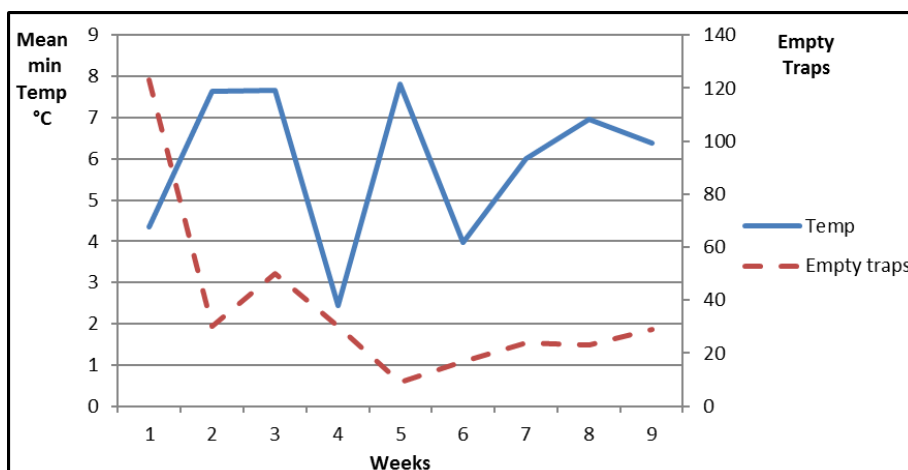


Figure 3 shows the distribution by Vice County of the mean number of empty traps throughout the GMS regions. The number of stars does not necessarily mean poor catches throughout the entire VC as there may actually be only one or two recorders having a poor season in that particular VC. Also a question mark means that no records were received from that VC in time for the information to be included in the analysis.

Fig 3. GMS Q1 2017 - VC Map of GMS regions showing mean number of empty trap nights

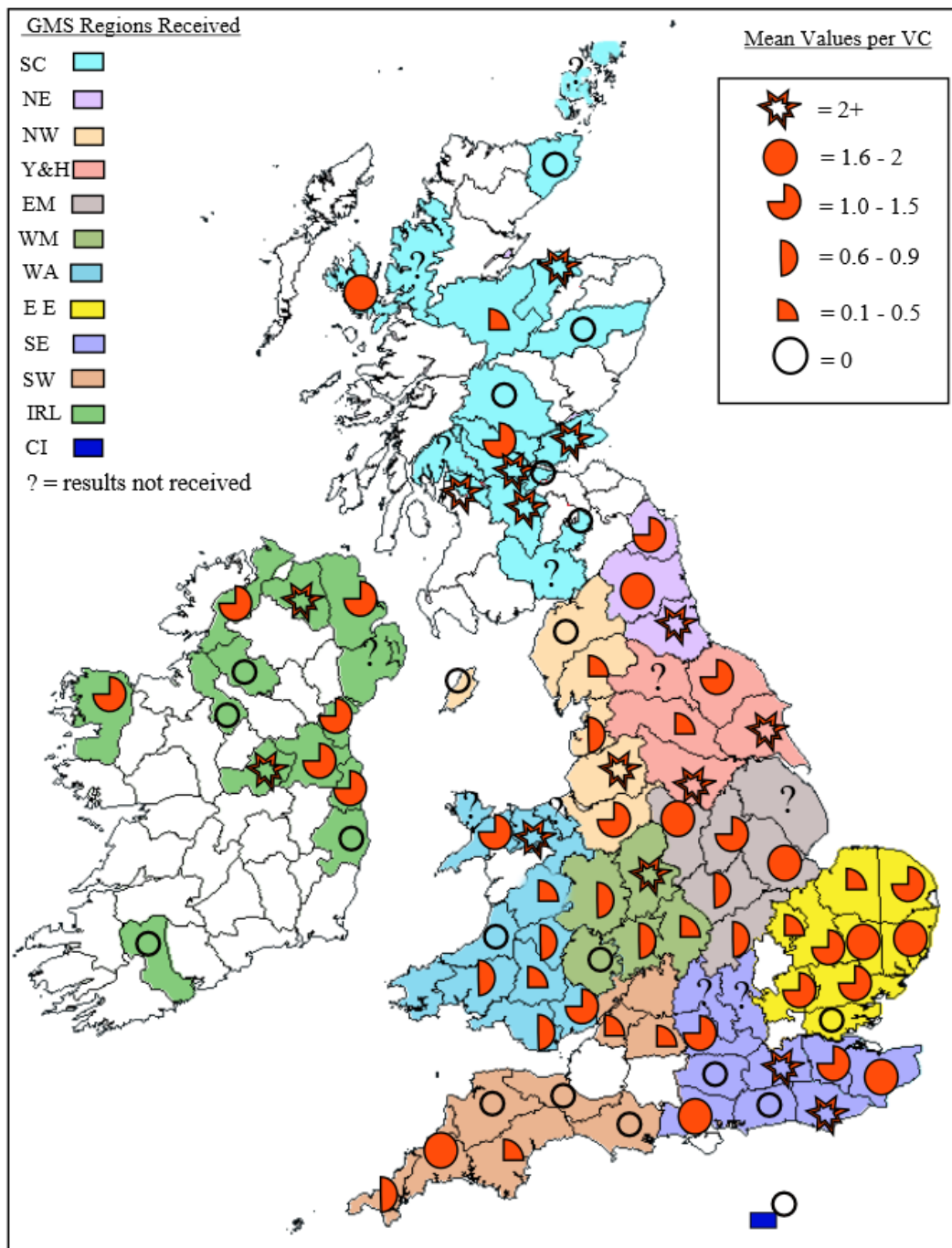
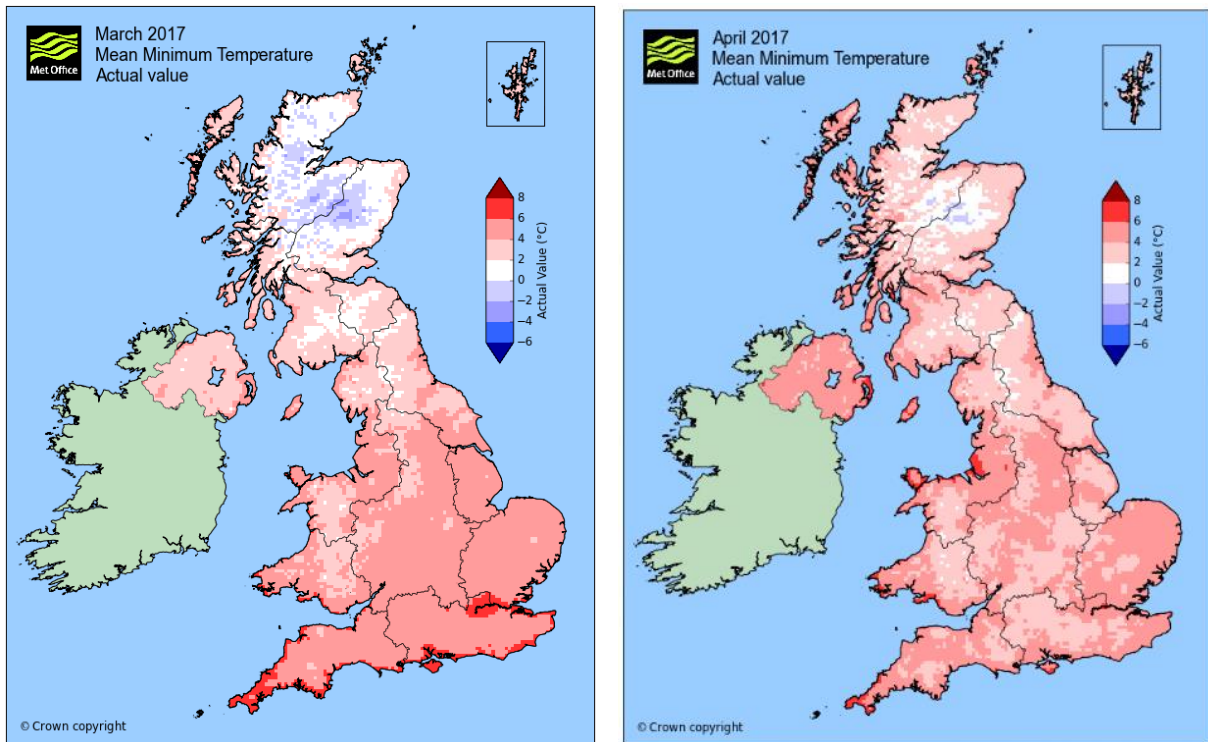


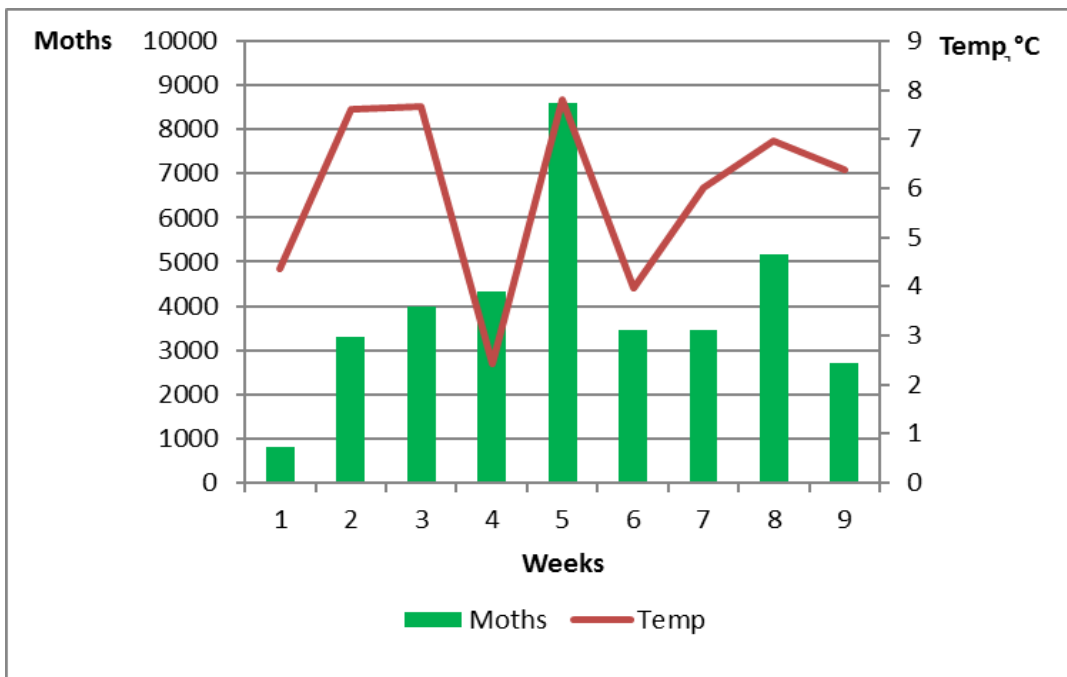
Figure 4 shows the maps of mean minimum temperatures for the UK for the months of March and April. While April temperatures should normally be higher than March, a plume of warm air from the tropics produced unseasonably warm weather in the second week of March. Conversely a tongue of cold polar air pushed southwards towards the end of April resulting in lower catches in the last week of this quarter.

Fig 4. Mean Minimum Temperatures for March & April 2017 (with permission of the Meteorological Office)



The total number of moths caught per week shows a strong correlation with minimum night temperatures (Fig 5). The variation in moth numbers throughout the quarter probably reflects the effect of the tropical and polar air masses that so influenced some of the weeks this quarter.

Fig 5. GMS 2010 - 2017 Q1. Minimum Night Temperatures and Total Moth Numbers



A comparison of the mean temperatures occurring in Scotland and the South West region is given in Figure 6. Apart from a few days between weeks seven and eight the two temperatures paralleled each other closely but the lines shown are separated by an average temperature differential of 5.2°C.

Fig 6 GMS 2010 - 2017 Q1. Mean Temperatures of Scotland and the South West

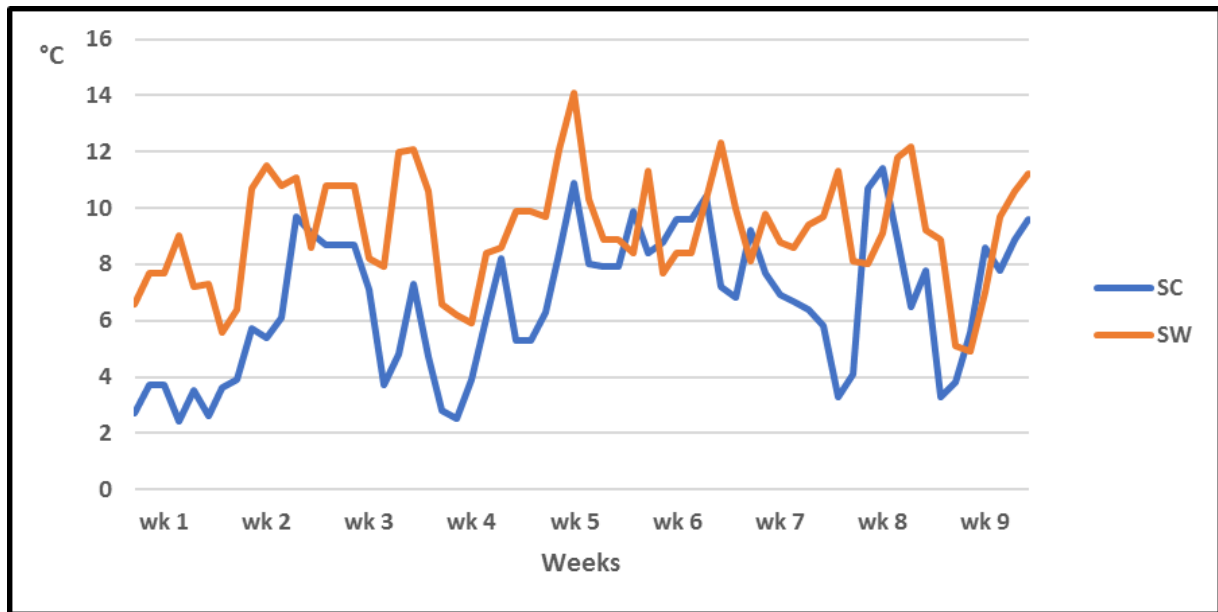
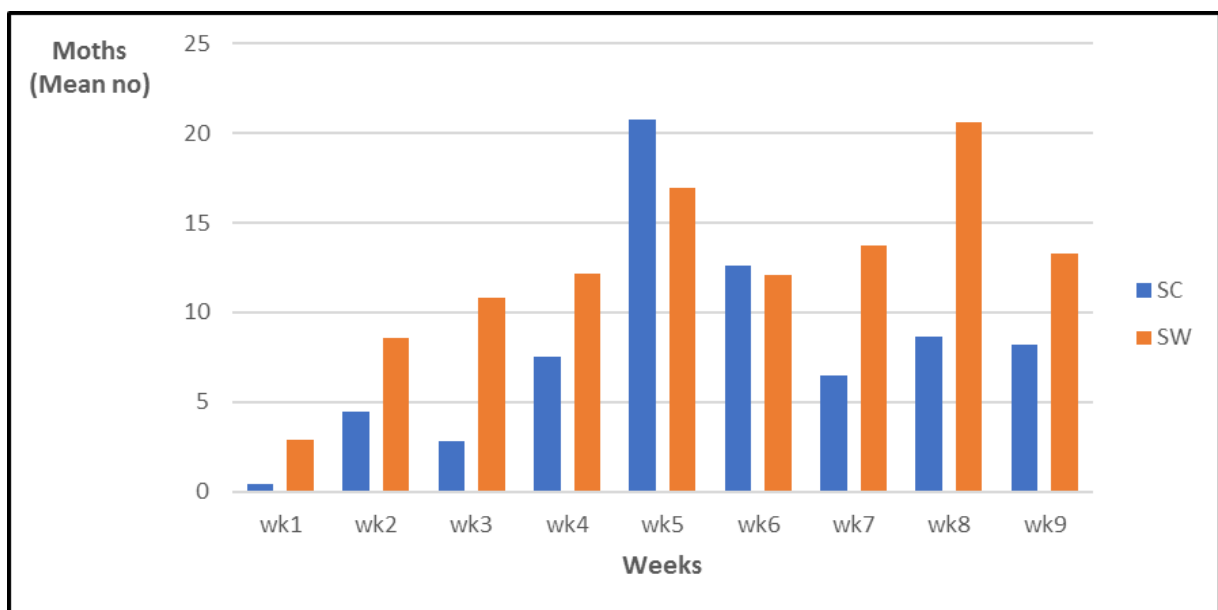


Figure 7 then shows the possible effect that this difference had on catches with those in Scotland responding more dramatically to rise and falls in temperature. It is important to emphasise though that other factors such as wind speed and direction may contribute. As can be expected the South West outperformed Scotland except surprisingly in weeks five and six when Scottish temperatures peaked.

Fig 7. GMS 2010 - 2017 Q1. Mean Moth Catches of Scotland and the South West



## Statistics

Compared to 2016 this year's table of the top twenty moths (Table 1) shows a recovery in many species apart from the Common Quaker which dropped from pole position and the Small Quaker which also dropped one level to finish at level 6. In this table, the 2016 position refers only to the moths in the 2017 Top 20. In the full table last year some would have been outside that Top 20 – for example Shuttle-shaped Dart would have been somewhere around equal No. 100 since no moths were recorded at all then. Multiple factors are no doubt at work in the changes from year to year, including temperature on the nights in question, intensity and direction of the wind and, in the case of one recorder, new street lighting.

I have added two new columns to this table to help rationalise some of these changes. This has been prompted by a comment in the Annual Report where it was mentioned that my trap one night unexpectedly caught the equivalent of everyone else's entire winter catch. As a result, I have added the total number of records (not individuals) and the maximum number of moths caught in any one trap.

Table 1 GMS Q1 2017 – Top 20 Core Species

Position		Species	Mean per trap		% change	2017	
2016	2017		2016	2017		No of records	Max per trap
2	<b>1</b>	Hebrew Character	21.5	<b>28.4</b>	32.5	3994	76
1	<b>2</b>	Common Quaker	21.3	<b>20.3</b>	-4.9	2577	100
3	<b>3</b>	Clouded Drab	7.2	<b>9</b>	26	1741	33
5	<b>4</b>	Early Grey	3.9	<b>5.3</b>	33	1272	72
4	<b>5</b>	Small Quaker	3.4	<b>2.8</b>	-17	676	26
14	<b>6</b>	Brindled Beauty	1.2	<b>1.5</b>	19	467	13
12	<b>7</b>	Double-striped Pug	1.1	<b>1.4</b>	25.9	374	27
11	<b>8</b>	Early Thorn	1	<b>1.2</b>	24.7	375	8
10	<b>9</b>	Light Brown Apple Moth	0.9	<b>1.2</b>	41.2	311	15
6	<b>10</b>	March Moth	0.6	<b>1.2</b>	93.4	306	30
7	<b>11</b>	Oak Beauty	0.6	<b>0.9</b>	55.8	306	24
8	<b>12</b>	Twin-spotted Quaker	0.4	<b>0.8</b>	93.1	249	8
15	<b>13</b>	Dotted Border	0.4	<b>0.7</b>	101.3	227	25
18	<b>14</b>	Brimstone Moth	0.3	<b>0.7</b>	117.8	203	18
9	<b>15</b>	Chestnut	0.3	<b>0.7</b>	137.6	193	25
19	<b>16</b>	Muslin Moth	0.3	<b>0.7</b>	140.1	212	11
16	<b>17</b>	Shoulder Stripe	0.1	<b>0.5</b>	367.7	178	11
13	<b>18</b>	Powdered Quaker	0.1	<b>0.5</b>	652.9	175	7
17	<b>19</b>	Pine Beauty	0.1	<b>0.5</b>	847.8	89	29
20	<b>20</b>	Shuttle-shaped Dart	0	<b>0.4</b>	1416.2	135	8

Breaking these figures down into regions, Table 2 shows the mean number of the top ten moths for each region, with some doing better than others. The figure in brackets is the number of recorders for that region. As expected the Quakers and their allies occupy up to half the list in most regions but the Small Quaker, normally a very abundant moth, struggles to stay on some of the lists.

Table 2 GMS Q1 2017 – Top 10 Regional Core Species

Scotland (19)		Mean	North East (24)		Mean	North West (35)		Mean
Hebrew Character	23		Hebrew Character	31		Hebrew Character	27	
Common Quaker	18		Common Quaker	20		Common Quaker	22	
Clouded Drab	8		Clouded Drab	14		Clouded Drab	7	
Early Grey	3		Early Grey	4		Early Grey	5	
Brown Silver-line	1		Small Quaker	1		Small Quaker	3	
March Moth	1		March Moth	1		Twin-spotted Quaker	1	
Brindled Beauty	1		Chestnut	1		Double-striped Pug	1	
Chestnut	1		Powdered Quaker	1		Oak Beauty	1	
Pine Beauty	1		Oak Beauty	1		Chestnut	1	
Small Quaker	1		Double-striped Pug	1		Early Thorn	1	
Yorks & Humber (18)		Mean	Ireland (24)		Mean	East England (35)		Mean
Common Quaker	27		Hebrew Character	48		Hebrew Character	25	
Hebrew Character	27		Common Quaker	29		Common Quaker	24	
Clouded Drab	13		Clouded Drab	16		Clouded Drab	8	
Small Quaker	5		Early Grey	9		Early Grey	6	
Early Grey	3		March Moth	3		Small Quaker	5	
Common Plume	3		Double-striped Pug	3		Muslin Moth	2	
Chestnut	3		Pine Beauty	2		Double-striped Pug	2	
Lt Brown Apple Moth	1		Early Thorn	2		March Moth	2	
Powdered Quaker	1		Lt Brown Apple Moth	2		Dotted Border	1	
Early Thorn	1		Small Quaker	2		Shuttle-shaped Dart	1	
East Midlands (31)		Mean	West Midlands (31)		Mean	Wales (42)		Mean
Hebrew Character	21		Hebrew Character	37		Hebrew Character	52	
Common Quaker	19		Common Quaker	37		Common Quaker	27	
Clouded Drab	7		Clouded Drab	26		Clouded Drab	19	
Early Grey	5		Small Quaker	10		Early Grey	11	
Small Quaker	3		Early Grey	37		Brindled Beauty	7	
Lt Brown Apple Moth	3		Double-striped Pug	26		Small Quaker	7	
Double-striped Pug	2		Early Thorn	10		Early Thorn	3	
Common Plume	1		Lt Brown Apple Moth	4		Oak Beauty	3	
Early Thorn	1		Brindled Beauty	4		Shoulder Stripe	3	
Brimstone Moth	1		Oak Beauty	2		March Moth	2	
South East (47)		Mean	South West (41)		Mean	Channel Islands (1)		Mean
Common Quaker	26		Hebrew Character	35		Hebrew Character	30	
Hebrew Character	23		Common Quaker	23		Lt Brown Apple Moth	24	
Early Grey	8		Early Grey	8		Double-striped Pug	20	
Clouded Drab	7		Clouded Drab	5		Early Grey	18	
Double-striped Pug	4		Brimstone Moth	4		Least Black Arches	16	
March Moth	3		Lt Brown Apple Moth	3		Brimstone Moth	13	
Brimstone Moth	3		Double-striped Pug	3		Early Thorn	12	
Small Quaker	3		Muslin Moth	2		Rusty-dot Pearl	11	
Shuttle-shaped Dart	3		Small Quaker	2		Clouded Drab	9	
Lt Brown Apple Moth	3		Early Thorn	2		Shuttle-shaped Dart	8	



Table 3 below compares the records received from each region for the quarter. The minimum and maximum moth numbers both within and between regions over the nine-week period vary considerably, yet with some similarities, possibly reflecting location, type of trap and/or the individual micro climates. The number of gardens per region vary between 1 and 47 while the trapping effort (moth trap nights) is remarkably consistent. It is also commendably high suggesting that our GMS records are truly representative of the moths of UK & Ireland. The third table shows the preferred night for trapping. Although Friday is the official night three nights either side are acceptable, since we do recognise that everyone has a life apart from mothing.

Table 3 GMS Q1 2017 – Regional Statistics

Region	Gardens	Moths				Moth Trap Nights		
		Total	Mean	Min	Max	Possible	Actual	Percent
SC	19	1367	72	12	311	171	162	95
NE	24	1996	83	0	298	216	210	97
Y&H	18	1715	95	7	286	162	158	98
NW	35	2667	76	2	329	315	294	93
IRL	24	3284	137	5	457	216	203	94
EE	35	3151	90	3	353	315	304	97
EM	31	2158	70	5	156	279	270	97
WA	42	6620	158	12	494	378	360	95
WM	31	3112	100	2	489	279	262	94
SE	47	5030	107	9	391	423	408	96
SW	41	4554	111	17	438	369	348	94
CH	1	299	299	n/a	n/a	9	9	100

Night	Tues	Wed	Thurs	Fri	Sat	Sun	Mon
Days	48	79	260	1754	415	321	101
Percent	2	3	9	59	14	11	3

### Orthosia spp.

Spring for us is heralded by the appearance of the willow catkins. This in turn is the signal for the moths of the *Orthosia* genus to come out of pupation and emerge to feed on these catkins which are probably the main nectar source for flying insects at this time of the year. These are welcome moths to us all, hopefully coming in large numbers, after a winter's dearth of moth recording and they are ideally camouflaged to blend in with last summer's dead leaves. Overwintering as pupae they are ready for a rapid emergence once the weather warms up enough to develop into adults. This enables them to get into the front of the feeding queue building up on the Willows and Sallows.

So, what do I mean by *Orthosia* spp.? For readers unfamiliar with Latin names I am referring to five of the commonest species flying during this quarter - Hebrew Character, Common Quaker, Small Quaker, Powdered Quaker and Clouded Drab – all members of the *Orthosia* genus. Figure 8 shows how the total number of these species are consistently higher than the total number of all other non-*Orthosia* species on the wing which is not surprising when you look back at the chart of the top twenty moths. Towards the end of the quarter numbers fall as the willow catkins are no longer producing nectar and pollen, and other moth species start to emerge in ever increasing numbers.



Fig 8 GMS 2017 Q1 Comparison of Orthosias with the Other Moths caught this Quarter

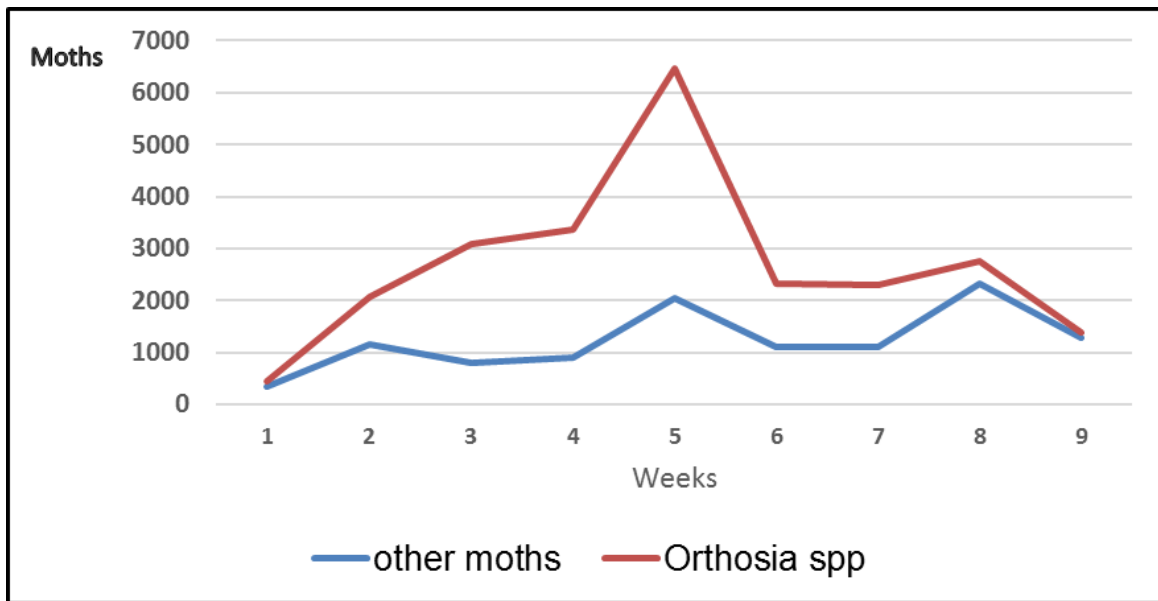


Figure 9 shows both the total number of Hebrew Character and the rest of the Orthosia spp that were caught this quarter. It is interesting to see how the two lines follow each other closely, possibly showing how the members of this genus appear to behave in a fairly similar manner throughout the spring. When the weather turned colder the numbers and variety of this genus visiting traps dropped but the ever-hardy Hebrew Character seemed to make an almost weekly appearance.

Fig 9. GMS 2017 Q1. Catches of Hebrew Character & other Orthosia spp

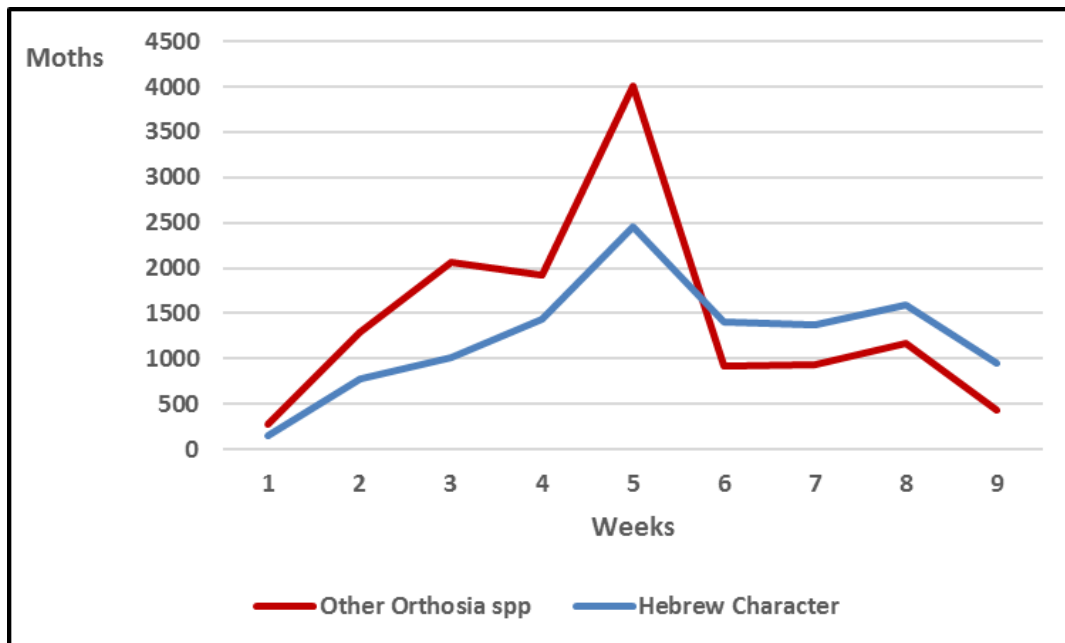
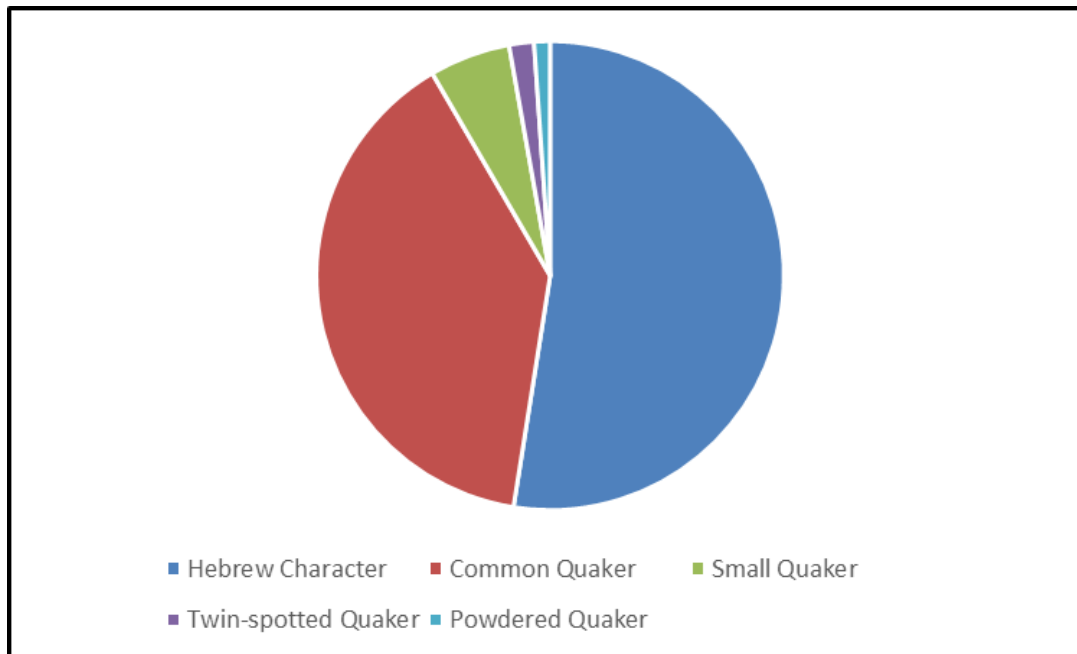


Figure 10 is a pie chart showing the relative abundance of the moths comprising this genus. It can be seen that Hebrew Character and Common Quaker are by far the most numerous with perhaps surprisingly small numbers of Small and Twin-spotted Quaker. However, recorders will probably find it less surprising that Powdered Quaker is the least common.

Fig 10 GMS 2017 Q1. Relative abundance of Orthosia species



New ideas for this report are always welcome and if anyone has a particular species, weather data or idea they would like to see included in the statistics please get in contact with Norman Lowe or myself.

### ***And now for something different: Caddisflies – David Baker***

When I first started trapping and recording moths I was baffled, at times, by what I thought could be micro-moths but which I was assured were caddisflies. Instead of being lepidoptera, or scale-winged, they were trichoptera or hairy-winged. Some I photographed, but mostly I ignored them, putting them into the release box or amongst the garden plants.

I tried to gain information from my collection of books and even tried the dreaded internet but without much success. Identification of the 190 or so species often requires checking the genitalia, as with many micro-moths, and this was certainly not in my remit. So, the small number of images remained in the “Query” section of my image files. In 2014 I had hoped that the newly published “Comprehensive Guide to Insects of Britain and Ireland” would help but it contained only two pages, briefly covering 11 species. Not very “comprehensive” but at least it did not carry the oft-used word “complete” as many book titles do.

In March 2016 at our joint Butterfly Conservation/Yorkshire Naturalists Union Annual Meeting two local specialist recorders of caddisflies gave a short talk and asked us moth-trappers if we could help them by providing specimens found during our trapping sessions. The specimens would require the date, site reference, habitat details in the same manner as we record details of our moth catches.

This awakened my latent interest! I sent my old “Queries” to them and resumed the photographing of newly trapped caddisflies whilst retaining a limited number of specimens to hand over at our next meeting. My selections were potted, put in the freezer for a day or two, then put in small self-made paper envelopes with dates, site references etc. The paper envelopes allowed the specimens to “breathe” and avoid mould from spoiling them over the next few months.

The results of my previous photo-selection included several recorded at home and a few photographed whilst spending a few days in the Galloway area of Scotland. The Scottish collection included the following:-



*Phryganea grandis*



*Limnephilus rhombicus*

The home selection included one of the “early-risers”, *Stenophylax permistus* which has once again entered my trap as I compile this article on 29 April 2017. It also included several other species which were identified for me, although some to genus level only. Photographs are not the be all and end all!



*Stenophylax permistus*



*Mystacides azurea*

Over the last year I have, therefore, had an added interest, although the time to empty my trap or traps can be a bit prolonged. As I found with some moths the identification is not always easy and I do not resort to insect genitalia determination myself but I can rely on the guidance of my new-found mentors.



*Limnephilus lunatus*



*Limnephilus marmoratus*



Is this an interest anyone else in GMS has taken up? Why not give it a go, it keeps the little grey cells ticking over!

Please note that I have used the word caddisfly in the same way that we use the word butterfly, and not caddis fly or caddis-fly. It would appear that possibly all versions are acceptable. More use for the little grey cells!

## ***The new checklist; why bother - Norman Lowe***

A number of recorders have told me that they are unhappy with the new checklist and numbering system and don't see the need to make a change to the numbers and names that we have been familiar with. So it seems to me that we owe you all an explanation.

I think that most people would accept that checklists are necessary so that we can all agree on which species is which. At first these were not accompanied by numbers, and indeed were usually published as part of reference books such as the two editions of Meyrick published in 1895 and 1927 (incidentally the 1927 Meyrick was at first my only information on the micros – rather challenging as the only illustrations are of wing venation!). The 1927 Meyrick classification was used as the basis of a comprehensive numbering system by Ford in 1949, and this was replaced by Bradley and Fletcher's list (B&F) in 1979, almost 40 years ago.

Since 1979 a lot of changes have taken place in terms of both the scientific names and our understanding of the relationships between the different moth groups. Not only that, but more and more species have been added to the British list and these have to be squeezed in somehow. The B&F method was to add letters, such as 2343a for Lesser Common Rustic, but this causes problems when trying to order them in programs such as Excel. Because of all this, a new checklist and decimal numbering system was produced by Agassiz, Beavan and Heckford (ABH) in 2013.

So, even accepting that the new list was needed, why should GMS adopt it? The fact is that the old names and numbers will slowly fade away. Who now remembers that the Large Yellow Underwing was once known as *Noctua innuba*, or the Lesser Yellow Underwing as *Noctua curtisii*? Or, for that matter, that The Rush Veneer (B&F 1398) was 124 in Ford's list. As a result of the publication of the ABH list, any moth book published since 2013 has used the new names and numbers, which will mean that any new lepidopterists for whom these books are their first introduction to moths will have no knowledge at all of the old names. Finally, it's very important that our hugely valuable dataset is able to be used as easily as possible by future workers who will undoubtedly be using up-to-date names and classifications.

So, sorry about the inconvenience, but we think the change had to be made!

## ***Lappet Moth at Abergele in 1922 – Duncan Brown***

As part of our ongoing record collecting for our on-line weather and phenological diary initiative *Y Tywyddiadur* under the auspices of Cymdeithas Edward Llwyd's *Llên Natur* (nature lore) project, from time to time we come across hitherto possibly missed historic natural history records which might be of interest to us today, if not of significance.

Thus, in a diary of obscure provenance brought to our notice by Alun Williams, possibly by the Anglican priest of a parish in or near Tywyn, Abergele we came across the following record by a diarist who was obviously a competent (if often destructive!) naturalist:

**11 August 1922. Lappet moth found in [Gwrych castle, Abergele] garden**

While I have no direct personal experience of this species, recent distribution maps show it to be confined to the south and east of Britain and having only a weak foothold in the extreme south and east of Wales. It not only has to be useful to ensure that this record is not reburied once again out of the view of naturalists, but also that we have an opportunity to reassess what appears to me to be an unusual record of an easily identifiable species.

I invite your comments with a question - where else if anywhere has the Lappet moth been seen in Wales, and when?

## ***GMS Annual Conference 2017 - Norman Lowe***

As usual, many people came early to the 2017 Garden Moth Scheme Annual Conference in order to get the opportunity to have a good look at the stalls. This year Mark Tunmore had a large selection of books and journals from Atropos Books and Izumi Segawa brought her range of Hachiware Art lepidopterous badges, fridge magnets etc.

The formal proceedings began with an introduction by Peter Hugo followed by a round-up of the 2016 GMS results from Norman Lowe. He reported that the number of recorders was slightly down on recent years but was still over 300 and showed a good geographical spread throughout the British Isles.

The next presentation was by Jason Newton from the Scottish Universities Environmental Research Centre who described his proposed survey of the isotopic composition of the wings of the Brimstone Moth throughout the British Isles. He explained that this technique could be used to establish where each moth had spent its time in the larval stage. Similar work had been done on other insects such as the Monarch butterfly and had provided information on migratory movements in North America. He requested help from recorders, especially from those parts of the study area where few or no volunteers had as yet come forward.

After lunch, during which more people crowded round the sales stands, Peter Hugo gave a light-hearted introduction to the county of Gloucestershire, illustrated by many pictures of the scenery, habitats, characteristic moths and noteworthy personalities of its moth world. Then John Wilson provided us with an update on the work that he does on analysing the enormous amount of data that resulted from the 10 years of GMS national recording. This time he investigated the effect of street lighting on GMS moth numbers, coming to the conclusion that recorders in dark sky areas did record somewhat larger numbers of moths than those with more street lights. Not surprisingly, the reasons for this are complex!

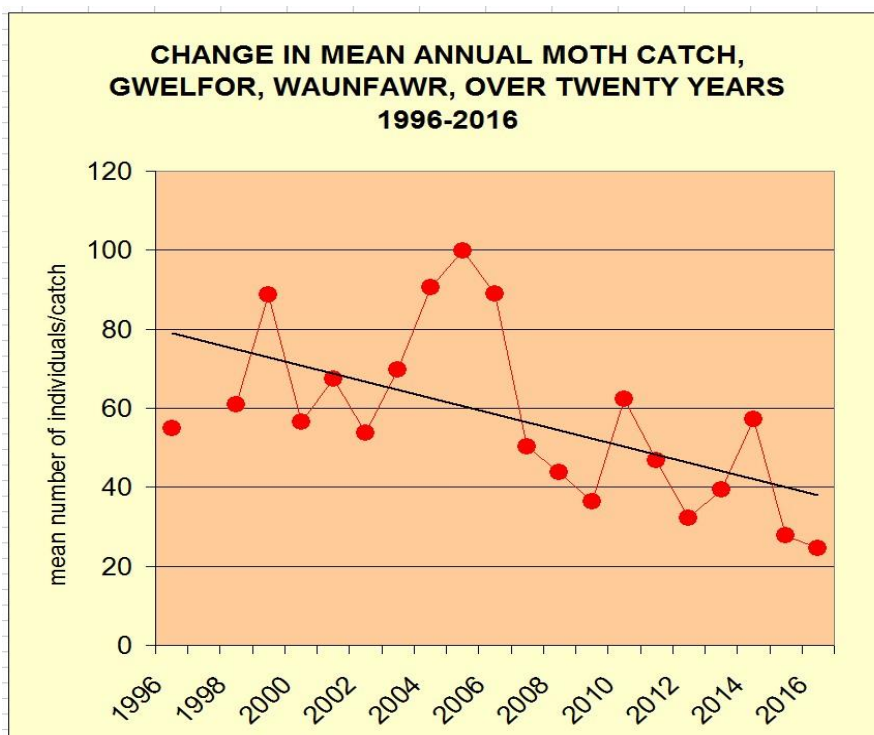
After a short tea break Dave Grundy gave us an insight into his extraordinary enthusiasm for moth trapping, describing both the range of inaccessible locations he visited in Britain during 2016 and the enormous variety of scarce species he recorded. Finally Norman Lowe took a brief look forward to 2017 and posed some questions to the audience. Some members were a little uncertain about the decision that had been taken about using the new ABH checklist names and numbers but it was generally recognised that this was the way forward. But all members agreed that we should in principle make available our GMS records to Vice County moth recorders.

The conference closed with tea and biscuits provided by a small band of volunteers who kept us wonderfully fed and watered throughout the day. Thanks to them and to the work done by the organisers, Ken Cservenka and Tony Perry, the day ran like clockwork.

## Decreasing Biodiversity - A local case study – Duncan Brown

The recent article on biodiversity declines on European nature reserves by Gretchen Vogel in Science (link below) will be no surprise to most GMS enthusiasts in a general sense but will nevertheless be very disturbing when one is confronted by hard evidence. The article made me reflect that some of us may be sitting on moth data long preceding, but including, the GMS era, and with luck copies kept (as in this case) of all species recorded, not just the GMS target species. These data could very simply be used to test the postulates of Vogel's paper at a very local level.

My own data collected systematically from my garden in the upland village of Waunfawr, in the Snowdonia foothills near Caernarfon, goes back to 1996. I have recorded the results and metadata of every trapping session over that period both in my garden and elsewhere. I therefore present in the graph below the annual mean number of moths of all species caught in each trapping session annually in my garden. I have included only those sessions for which an MV light was used. The annual means are based on an average of 27 sessions.



Sadly my results offer no comfort against Vogel's overall thesis. They show an estimated halving of moth numbers over the twenty years. In fact the decline in my garden could be even more dramatic because means in the earlier years tended to include more winter samples when moth numbers are naturally smaller thus depressing the values disproportionately in those years. I excluded all sessions in which no moths were recorded. There is a hint that 2007 may have been some kind of turning point, but this needs further confirmation. The 1996 value is based on one session only and there were no MV-derived sessions in 1997.

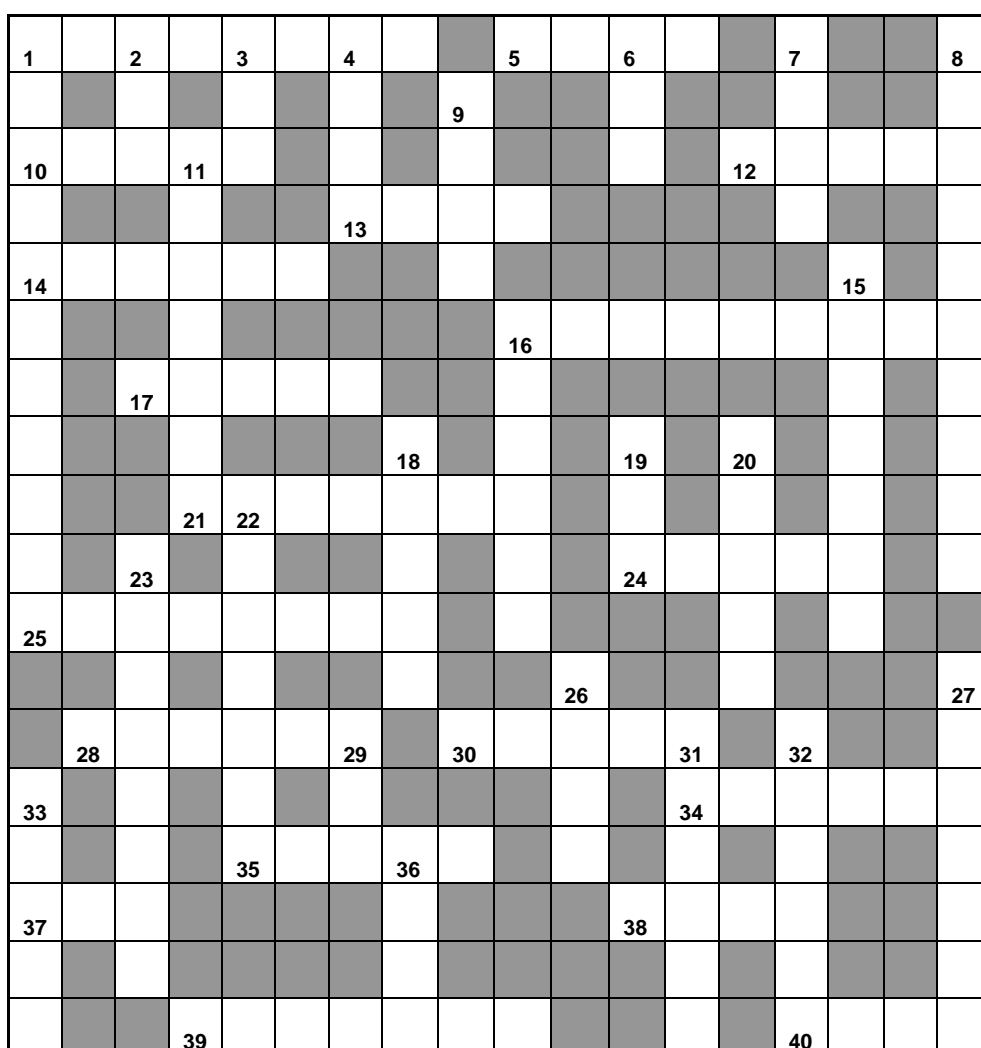
I commend this simple treatment of any long term existing systematic data to all those who may have them available.

## Specimens sought for genetic research- Callum Macgregor

Researchers from the Universities of York and Liverpool are seeking moth-trappers in London and Hampshire to assist with sampling for a study into the effects of climate change on the evolution and genetic diversity of British moths and butterflies. Specimens are required of a small number of common species from specific locations within England. Unfortunately, some lethal sampling is therefore necessary, but required sample sizes are small to minimise any risk of population effects.

If you trap in the London or west Hampshire areas and are interested in helping, please contact Callum Macgregor for more information on 01904 328623 or by emailing [callum.macgregor@york.ac.uk](mailto:callum.macgregor@york.ac.uk).

## Crossword No. 8 by Nonconformist



Across

- 1, 18d.      Tightly held moth needs to heed tired brow.  
           5      See 9d, 15a.  
 10, 14a.     Recorded as a result of a trinket deal.  
           12     Elsa tingled when holding this beauty.



- 13 William returns to stage in a colourless outfit.
- 14 See 10a.
- 16 See 33d.
- 17 Possibly it was the cat that caught this wave.
- 21 Used generically for 1a and 32d in tandem.
- 24 An early dweller in the antipodes.
- 25 Shape from the wide open acres centrally placed.
- 28 See 26d , 39a.
- 30 See 40a.
- 34 Singularly expensive headgear.
- 35 Another early dweller but from nearer home.
- 37 A sign of the digital age.
- 38 An alternative colour from the ball user.
- 39 See 26d , 28a.
- 40, 30a. Some mothers find these in a gross tank.

#### Down

- 1 When sick rub talc to regain the healthy moth.
- 2 Probably bred without the influence of Hymenoptera.
- 3 Type of gear but without a leader.
- 4 I'd spotted this large flyer.
- 6 It's usual habit is to be within undergrowth.
- 7 Still occurring in anthropomorphic layers today.
- 8 Certainly the antithesis of our author.
- 9, 5a, 19d. Cruel lion goes to deposit jewel as men grab sack.
- 11 The generic name of this alcoholic?
- 15 Prickly white fur treated with lime, soy etc.
- 16 Announce a goddess with old British currency.
- 18 See 1a.
- 19 See 5a, 9d.
- 20 A currency found in porridge?
- 22 Fancy listening in to this group of twisters.
- 23 Surely strong enough to be from the "deli" caterers.
- 26, 39a, 28a. Look on a wood-lit temple wall to find our visitor.
- 27 Filmy wearing apparel once found along with kind hearts.
- 29 Normal, but can be annoying in 3 down.
- 31 Hunt for their dispersal low amongst the willow bushes.
- 32 Some risk-takers would bare all to do this!
- 33, 16a. Watch Hugh fly dry with dire mixed results to find this specimen!
- 36 Wing markings specific to a Colorado Valley moth.

## **Tailpiece - Norman Lowe**

Once more, Wales has contributed significantly to this edition (apart from the caddisflies and crossword). This isn't a problem of course, so keep it up, Wales. But please could those of you in other parts consider penning something for the next issue – whatever it might be! Send any contributions to me at [norman@enviro-consulting.com](mailto:norman@enviro-consulting.com)

## Communications & Links.

GMS Website - <http://www.gardenmoths.org.uk/> - the Communications section gives information on the regional coordinators; the Downloads section provides access to Identification Guides, Annual Reports and Newsletters, as well as all the regional recording forms and instructions.

Facebook Page - <https://www.facebook.com/GardenMothScheme> - we now have over 1000 'Likes'!

Facebook Group - <https://www.facebook.com/groups/438806469608527/> - currently almost 2000 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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