

# Newsletter - January 2019

## Welcome

Welcome to the first UK Pollinator Monitoring Scheme newsletter! With reports of dramatic losses of insects occurring across the globe, and concern about what this means for wider biodiversity and ecosystem health, there has never been a more important time to document evidence of change in populations of pollinating insects.

PoMS is the only scheme in the world generating systematic data on the abundance of bees, hoverflies and other flower-visiting insects at a national scale (currently across England, Wales and Scotland). Together with long-term occurrence records collated by the [Bees, Wasps and Ants Recording Society](#) and [Hoverfly Recording Scheme](#), these data will form an invaluable resource from which to measure trends in pollinator populations and target our conservation efforts.

This newsletter provides an update on PoMS activities and results to date, and we are delighted to feature contributions from several volunteer recorders and colleagues from supporting organisations across the UK and beyond. Thank you to everyone who has contributed so far and we look forward to working with you all going forward and widening participating over the coming years.

Claire Carvell & Helen Roy,  
Centre for Ecology & Hydrology

Keep up-to-date with PoMS activities and progress reports at: [www.ceh.ac.uk/pollinator-monitoring](http://www.ceh.ac.uk/pollinator-monitoring)



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## PoMS highlights in numbers

During 2017 and 2018, PoMS has been generating new data from Flower-Insect Timed Counts (FIT Counts) and from pan trapping across a network of 1km survey squares. We describe the methods and initial results in more detail on the next pages, but across both years, some highlights are:

**1,307** FIT Counts submitted to iRecord by **168** recorders across England, Scotland and Wales

**631** pan trap samples collected in 2017; **731** in 2018

**14,347** insect visits to flowers recorded on FIT Counts over both years

**177** bee and hoverfly species identified from pan traps, bringing new records for many 1km squares

**45** volunteers for PoMS 1km squares completing **107** survey visits in 2018

**3** short 'how to' videos available via the webpage, along with all survey guides and forms for the FIT Count



*Epistrophe grossulariae* (Hoverfly)  
Photo: Martin Harvey

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## PoMS surveys 2017-2018: Results round-up

2017 saw the establishment of the Pollinator Monitoring and Research Partnership and launch of the Pollinator Monitoring Scheme, following two years of design and testing of survey methods. The PoMS team focussed on designing materials and infrastructure to support the FIT Count, and setting up the network of 75 random stratified 1km squares across Britain. This network covers a range of landscapes from those dominated by agriculture to more semi-natural habitats, upland and coastal areas. It is designed to be able to detect changes in insect numbers over a 5-10 year period, and is likely to fill a large number of gaps in current recording activity for many species. Squares in England and Scotland are also part of the National Plant Monitoring Scheme ([www.npms.org.uk](http://www.npms.org.uk)) and squares in Wales are part of the Welsh Environment and Rural Affairs Monitoring and Modelling Programme, to benefit from co-location with other long-term data on wild plants and habitat condition. During 2018, the FIT Count was promoted more widely with **new guides and online resources**, and volunteer recruitment and mentoring for the 1km square surveys began in earnest.

Summary statistics describing PoMS survey uptake and preliminary results have been published in progress reports that can be found on the **CEH website**. These also present latest results from the modelling of long-term occurrence records to estimate trends in distribution of bee and hoverfly species and create a pollinator 'Indicator' metric, which we will feature more in the next PoMS newsletter. Here we give an overview and pick out some survey highlights from each year.

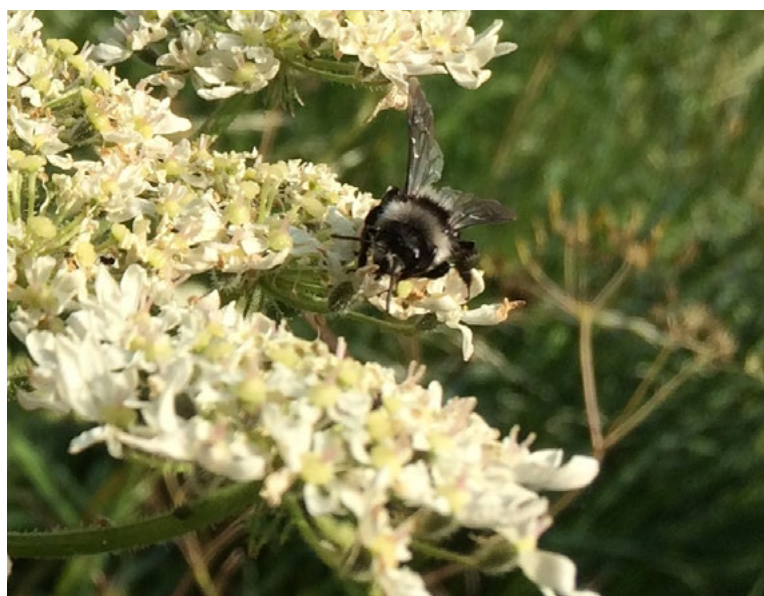
During 2017, PoMS team surveyors visited 72 of the 75 1km squares to confirm access permissions and map sampling locations. They conducted at least one, and in most cases two surveys on each square between June and early September, with a total of 127 survey visits for 2017. 631 pan trap samples were collected (more on these below) and on each survey at least two FIT Counts were conducted, giving a total of 336 FIT Counts.



Pan trap and view from a PoMS 1km square in the High Peak, Derbyshire. Photo: Catherine Jones

During the 2018 season a total of 144 survey visits were made to 65 1km squares. These included 107 surveys by volunteers (both with and without their PoMS team mentor) – a fantastic effort – and an additional 37 surveys by PoMS team surveyors to fill the gaps. As well as collecting more than 700 pan trap samples, this included 287 FIT Counts conducted as part of the 1km square survey. Typically the target flowers receiving the most counts on 1km squares are thistles, hogweed, buttercup and heather, but with many different species coming under the 'other flowers' category, particularly from the Asteraceae and Apiaceae families.

Below: *Andrena cineraria* (Ashy mining bee) on Hogweed. Photo: Claire Carvell





The 'public' FIT Counts gained momentum during 2018 and a total of 584 counts were received (to mid-November) from 110 recorders. Gardens were the most popular habitat in which to conduct FIT Counts, with 44% of counts recorded from gardens (in the countryside locations of 1km squares, a majority of counts (38%) were conducted on grassy verges or hedgerow edges). Flowers from the full list of target species were used throughout the season, including ivy which was added to the list for 2018 (a particular focal plant for the ivy bee, *Colletes hederæ*).

More than 5,300 insects were spotted during the public FIT Counts, with an average of 9.2 insects visiting the target flowers per ten-minute count. Several 'zero' counts were also submitted, and we encourage recorders to keep sending these in alongside larger counts, to reflect the true nature of flower-visiting insect communities in different locations. In general, insect groups making up the majority of flower visitors during counts are the bumblebees, hoverflies, other flies and small insects. As we explore these results through more detailed analyses, it will be interesting to see how the relative numbers and proportions of different groups recorded vary between habitat types and countries, and of course how these change over time.



*Bombus vestalis* (Southern cuckoo bumblebee) on Thistle. Photo: Nadine Mitschunas



Traditional hay meadow providing a variety of flowers for pollinators in June. PoMS 1km survey squares in England and Scotland are also part of the National Plant Monitoring Scheme which collects data to measure changes in plant abundance and diversity throughout the UK. Photo: Nadine Mitschunas

## What's in a pan trap?

Trapping is frequently used to monitor insect populations. This is partly because it can provide consistent, statistically valid results with less of the bias that is inevitably introduced by human observers; and partly because for many insects accurate identification to species level can only be achieved if specimens are examined under the microscope. PoMS is using pan traps for our 1km square sampling. These are small plastic bowls painted white, yellow and blue, filled with water and a little unscented detergent to reduce surface tension. Insects are attracted to the bowls in the same way as they are attracted to flowers and get trapped in the water.

The PoMS pan trapping protocol, with five sets of three bowls set out across each 1km square, has been carefully designed to minimise the number of insects caught, while still sampling enough individuals to measure changes over time. Typically the traps catch 3-4 bees and hoverflies per set of three pans during a 6-hour survey, though these numbers vary depending on various factors including location and time of year. There are studies showing that overall insect populations are not damaged by trapping at the scale and frequency of surveys like PoMS. The data provides robust evidence for change in insect abundance that can be used to inform conservation and environmental policy. Indeed, **BBC Radio 4** recently produced an insightful programme in which entomologists talk about why it's sometimes necessary to kill their subjects for the sake of science.

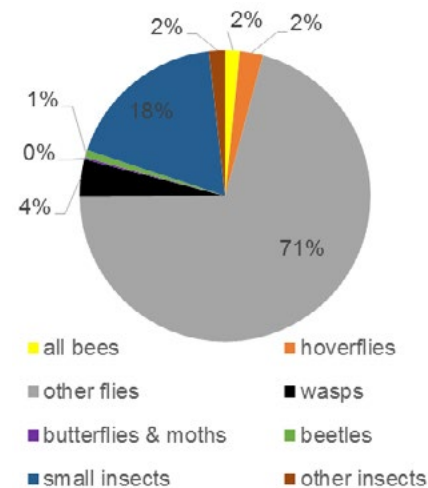
Insects from the PoMS 1km square samples are stored in small tubes of alcohol and returned to the CEH laboratories for subsequent analysis and curation. This includes a full count of all insects sampled in the pan traps, broken down by species group. All bees and hoverflies are then identified to species level by expert taxonomists, while other groups are stored as 'by-catch' for potential downstream identification.

During 2017 a total of more than 50,000 individual specimens were sampled in the PoMS pan traps. These included 803 bees belonging to 62 species, and 1,300 hoverflies belonging to 70 species or species aggregates. These represent the spread of taxa that we would typically expect to find across the sampled areas of Britain, with the caveat that

they will have missed some of the early season solitary bees due to sampling not commencing until June. The pie chart shows the average composition of a PoMS pan trap sample by insect group (the insects captured in three coloured bowls within a 6 hour survey). Note the large proportion of 'other' non-hoverfly flies, making up on average 71% of a sample, with the bees and hoverflies making up only around 4% of a typical sample.

During 2018 a total of more than 57,000 individuals have been processed from the 731 pan trap samples, and at the time of writing, species identifications are just complete with final data checks underway.

*Claire Carvell, Martin Harvey, Nadine Mitschunas and Bjorn Beckmann, CEH*



Average composition of a PoMS pan trap sample (taken from 2017 samples across England, Scotland and Wales).



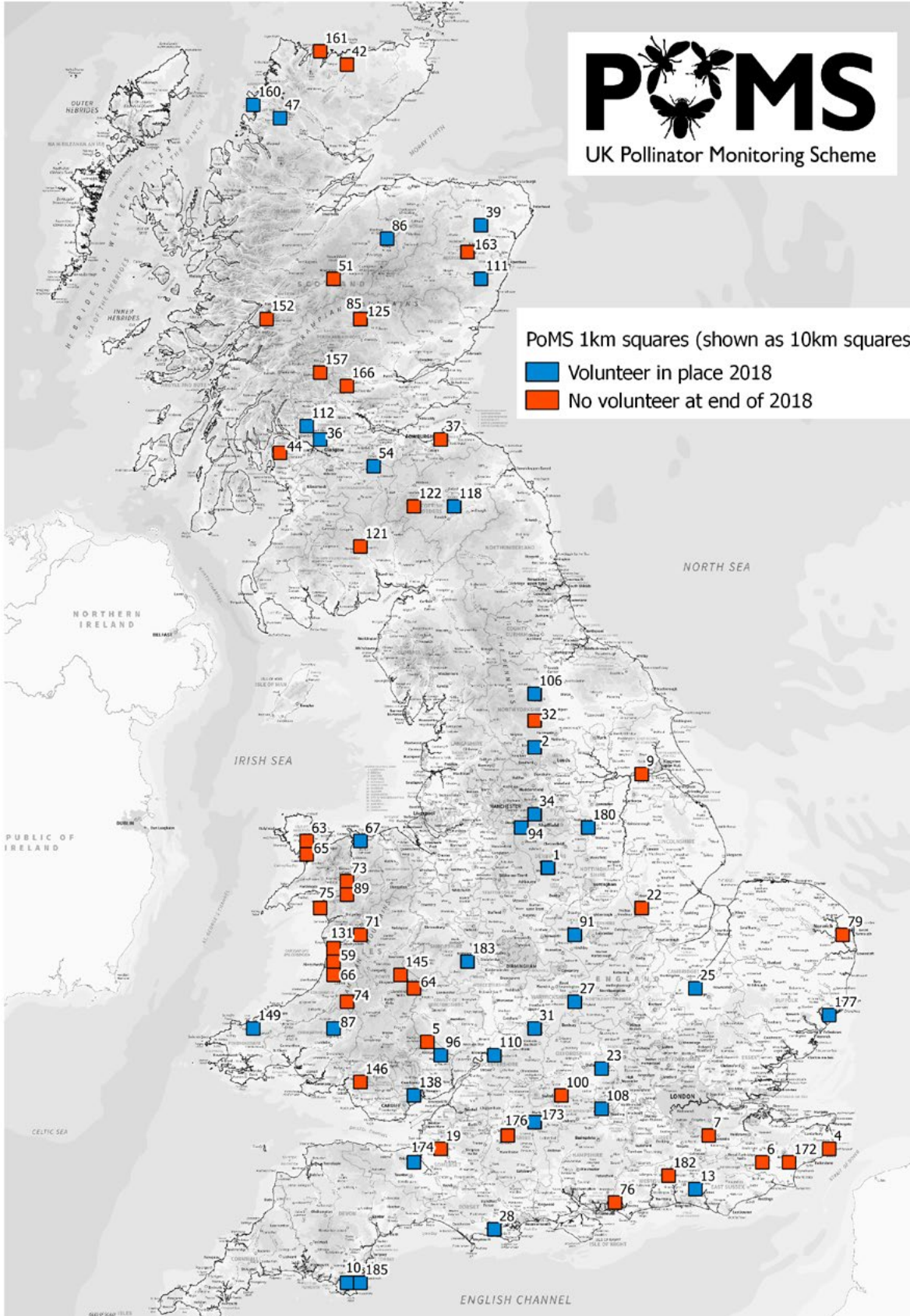
Insect specimens from pan traps, individually coded and ready for identification. Photo: Nadine Mitschunas



## Squares still to fill!

We are awaiting confirmation of exactly what levels of funding the PMRP will receive for 2019 and beyond. Providing the 1km square survey is still fully supported, we are appealing for volunteers to fill some of the gaps in coverage (shown in red on the map), especially in parts of Scotland and Wales. Achieving all four survey visits per year in as many squares as possible is critical to generate the high quality data required to analyse pollinator population trends in more detail over the longer-term.

Please get in touch to find out more [poms@ceh.ac.uk](mailto:poms@ceh.ac.uk)



## PoMS partner perspectives: Bumblebee Conservation Trust

The Bumblebee Conservation Trust are a fairly new charity, formed in 2006, and were set up in order to reverse the 'plight of the bumblebees'. One thing that quickly became clear was that in order to conserve bumblebees, we needed to know more about them – in particular, which species were where? Consequently, one of the first things the Trust set up was a standardised bumblebee recording scheme, BeeWalk.

We quickly started getting volunteers, and were soon at a stage where we had hundreds of volunteers recording thousands of bumblebees every month. But we also had a lot of people who felt they would struggle to identify bumblebees to species, or were keen to record bees but couldn't commit to BeeWalk.

Consequently we were very happy to be involved with the development and then roll-out of the PoMS project. On the survey side, we'd been involved with an early form of the FIT counts through Open Farm Sunday, and they had proved to be an ideal way for people to get involved with pollinator monitoring. Group-level records (bumblebee, butterfly, beetle, etc) meant that recorders didn't need to be experts, and people could do the counts anywhere – in their gardens, at bioblitz events, at a school nature club – and at just 10 minutes long they weren't too much of a time commitment.

We're always keen to share records – they're collected to be used, after all – and this project would allow them to be analysed with thousands of others to get a real feel for how pollinators – not just bumblebees but flies, butterflies and more - were doing.

*Richard Comont, Science Manager  
at the Bumblebee Conservation Trust*

### Recorders' blog

*Reflections from PoMS volunteer, Richard Dawson (@arbarus), on his Derbyshire square*

Being new to biological recording (I am a visual artist by profession) undertaking a PoMS 1km survey was my first experience of such a project.

The whole experience was brilliant despite, or

actually because of, the challenging conditions of blazing temperatures and uneven terrain that 'my' square offered. The surveys were a great reason to get out into the hills for a number of days whilst carrying out a worthwhile task. The project certainly inspired me to make the effort to properly explore more of the local area.

Setting up the pan traps was swift and straight forward, leaving ample opportunity to investigate the *aculeate hymenoptera* fauna of the area, my own particular interest. I encountered numerous 'new to me' species and even got decent photographs of a few. Highlights include my first encounter with the elusive *Meloe violaceus* which I feel lucky to have seen, many *Anoplotrupes stercorosus* which has led to me recording dung beetles locally and a fantastic *Colletes succinctus* nesting aggregation which I returned to observe in more detail twice outside of my PoMS duties. It has also inspired my partner (who joined me on three survey days) to take on the National Plant Monitoring Scheme and survey a square near us, which will help me brush up on my plant ID skills.

Overall the experience was 100% positive and rewarding for many reasons, not least for the opportunity to be a part of a worthwhile and important piece of ecological research. I'm now keen to get more involved and am very much looking forward to undertaking next year's surveys!

*Below: *Colletes succinctus* (Heather mining bees) at their nesting aggregation. Photo: Richard Dawson*



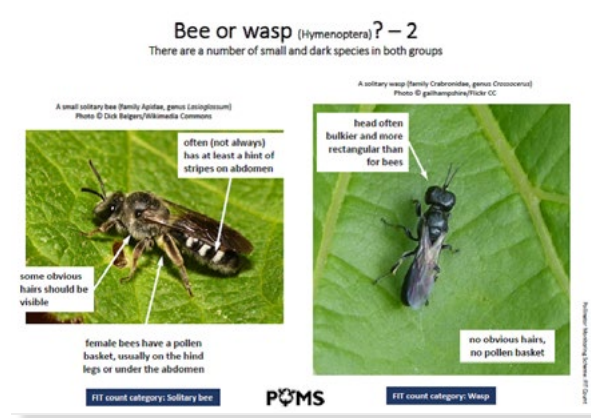


## Recorders' blog

*Looking for a truly relaxing way to spend your tea-break or a few minutes at the weekend? If so then why not take part in the Pollinator Monitoring Scheme? It only takes ten minutes and doesn't require much prior knowledge. Donatien Von Rohland, a graduate placement in Scottish Natural Heritage's Rural Resource team, reflects on how a little effort could make a big difference.*

I recently did the FIT Count survey at our Battleby office. It was very straightforward and really good fun. Here's the steps I took and which you could follow.

Before you even set foot outside, follow easy instructions on the Centre for Ecology & Hydrology website at <https://www.ceh.ac.uk/pollinator-monitoring>. You'll find all the information you need to do the FIT Count and submit your result. First up have a quick look at the information sheet, decide on which flowers to look at and test your knowledge on how to categorise pollinators between solitary bees, bumblebees, wasps, hoverflies, and others.



### Page from the PoMS Insect Guide

To make your quadrat, get two meters of string to make a 50cm by 50cm square and choose a nice flowery spot. We opted for the Common Knapweed – one of the distinctive big purple flowers on Battleby grounds. Complete the survey form and when you are ready start counting how many insects visit your quadrat over ten minutes. On cloudy days, you will get more bumblebees — while honey bees prefer the sunshine! One thing is guaranteed, you will find this very relaxing.

Register and submit your results at [www.brc.ac.uk/irecord/poms-fit-count](http://www.brc.ac.uk/irecord/poms-fit-count). It takes less than two minutes. Have a great time, wherever you choose to do your recording!

This piece was posted on the [Scottish Pollinators blog](#), dedicated to sharing information, tips, resources and good practices for pollinators across Scotland.

The Pollinator Strategy for Scotland can be found here: <https://www.nature.scot/pollinator-strategy-2017-2027>

## PoMS surveyor's perspective

*Nadine Mitschunas, CEH field team surveyor and PoMS mentor, shares notes from the field*

This field season was quite an exceptional one, with a very cold spring and a summer which was so hot and dry it made fieldwork quite challenging. In July the lack of rain started to be more obvious especially in central England with brown grass as far as the eye could see. Butterflies were abundant though and a few times I was walking through clouds of meadow browns, blues and peacocks reminding me of my childhood where butterflies seemed to be a lot more abundant than they are now.

In Westhay Moor in Somerset, one of our PoMS squares, volunteer Chris and I were walking through vast numbers of red and blue damselflies, sitting on leaves and other vegetation all around us, slowly ascending while we were walking past only to settle down soon afterwards. It felt like in a fairytale.

I have seen some beautiful hay meadows, buzzing with insects, still managed in the traditional way. Sadly not many of them are left, to see them only makes me more aware of what we have lost. Another botanical highlight was finding several flowering plants of the marsh mallow, a rare coastal plant which is quite attractive for bumblebees.

*Below: Marsh Mallow flowering on the South Coast. Photo: Nadine Mitschunas*



In one of our PoMS squares at the South coast I found a thriving nesting aggregation of the green-eyed flower bee, *Anthophora bimaculata*. The high-pitched buzzing sound the bees were emitting while flying alerted me to their presence. I later found the bees visiting ragwort flowering nearby, one of the few flowers which was hardly affected by the drought.



*Anthophora bimaculata* (Green-eyed flower bee)  
Photo: Nadine Mitschunas

The PoMS project not only attracted a lot of interest from passers-by and walkers who frequently wondered why I was walking around with wooden stakes sticking out of my rucksack and what I was doing with the colourful bowls dotted around the countryside, but also from various animals, tame and wild, such as cute baby alpaca and curious deer!

wildflowers and food crops, and wider biodiversity and ecosystem stability.

Buglife Cymru has recently launched the Wales Threatened Bee Report - the first report of its kind to examine the status of threatened bees in Wales. It has found that since 1854, seven of our bees have gone extinct, with the majority of these extinctions occurring in the twentieth century – some as recently as the 1970's. Alarmingly, a further five are currently on the brink of extinction in Wales, with many others having suffered serious range contractions, raising concerns about the future prospects of these species.

Action is urgently needed to restore populations of declining wild bees and prevent further extinctions in Wales. To achieve this, more detailed and accessible data on population trends is required. The Wales Threatened Bee Report highlights the considerable lack of knowledge and data on wild bee populations in Wales. The UK Pollinator Monitoring Scheme (PoMS) will contribute towards addressing current gaps in species population distributions and trends in Wales, gleaned information that is vital in coordinating efforts to conserve wild bees and other pollinators.

*Liam Olds, Conservation Officer (Wales),  
Buglife Cymru*

The Small scabious mining bee (*Andrena marginata*) is believed to have experienced a severe decline in Wales as a result of the loss of scabious-rich habitats on which it depends. Photo: Steven Falk

## Focus on Wales

### Wales Threatened Bee Report

Wales is home to nationally rare and threatened bee species and for some, Wales supports the last known populations in the UK. Wild bees (and other pollinators) face many pressures in our modern landscapes, from habitat loss, fragmentation and degradation, to pesticides and pollution, climate change, and disease. These pressures have caused severe declines in wild bee populations, raising concerns about the under-pollination of many





## Me and My Square

Located in north Carmarthenshire, my PoMS square is a microcosm of Wales. It's all pastoral land, with sheep the predominant grazers. Although there is some scattered acid grassland and low quality marshy grassland, almost all the grassland has been agriculturally improved, resulting in very little by way of nectar resources. Fortunately, the narrow lanes provide better hunting areas for timed FIT Counts, with abundant hogweed, whilst there is ragwort around farm buildings. This being Wales, there is also a small chapel, and the graveyard that surrounds it has the only true unimproved flower-rich grassland in the area. Black knapweed, red clover and common bird's foot trefoil can all be found here. Typical pollinators include common carder, tree and buff-tailed bumble bee, and hoverflies including *Eristalis* species and the large wasp mimic *Sericomymia silentis*. The hilly terrain made the survey hard work, but in return I got days out in glorious sunshine, talked to interested local people about pollinators, and saw lots of bees, hoverflies and butterflies. What's not to like?

*Dr Andrew Lucas, Natural Resources Wales*

Below: *Eristalis pertinax* (Hoverfly) on Cherry blossom. Photo: Martin Harvey



## Support for the PoMS from the Growing the Future project at the National Botanic Garden of Wales

Pollinators are one of our passions here at the National Botanic Garden of Wales and we were very excited to be involved with the PoMS project. Our PhD students have had another jam-packed year investigating the value of different garden seed mixes for pollinators and using DNA barcoding to examine the forage preferences of honeybees, bumblebees and solitary bees. The FIT Counts are a great interactive tool to engage with our visitors, with the added opportunity to strike up a conversation about our work on pollinators. Our Growing the Future project provided resources to translate the PoMS guidance materials into Welsh and we had experts on hand at our Pollinator Festival event in July to help visitors conduct FIT Counts, or encourage them to do so at a later date. With a wide diversity of plants growing here at the Botanic Garden and our Waun Las National Nature Reserve, the target flower species are in no short supply. We will continue to promote FIT Counts at various Botanic Garden events in 2019, including at our next Pollinator Festival on August Bank Holiday weekend (24-26th)...fingers crossed for good weather!

*Dr Kevin McGinn and Dr Natasha de Vere, National Botanic Garden of Wales*



## PoMS on tour

The PoMS team enjoyed promoting the Scheme at three major events during the hot summer of 2018. First at the Bristol Festival of Nature in June (where we were excited to see Nadine's videos broadcast on the big screen in Millennium Square!), then at Defra's Bees' Needs Week on the aptly named 'Carnabee' Street in London in July, and finally over four days at the BBC's massive Countryfile Live event in the grounds of Blenheim Palace.



Claire, Ujala and Jenny with PoMS and our travelling Tree bumblebee (*Bombus hypnorum*\*) at the Bristol Festival of Nature. Photo: Claire Carvell \*created by Lucy and Sarah Hulmes

We got to meet a broad range of people from families to school groups, community group leaders and NGOs, introduce them to the diversity and importance of insect pollinators and encourage them to take part in FIT Counts or 1km square surveys to contribute valuable data to PoMS. We were also really pleased with the turnout and enthusiasm for our fun and educational 'bee foraging game'. This involves transferring ping pong ball 'pollen grains' between flowers and a bucket 'nest', using a woolly black glove to mimic an insect's legs, both against the clock and against your rival competitor!

The game has proved a great way to demonstrate the potential effects of a variety of factors including flower type, loss of habitat, landscape configuration, foraging distance and bee health on nest or colony survival.



PoMS videos on the big screen at Bristol's Millennium Square. Photo: Claire Carvell



Don your antennae, wings and hairy legs for the PoMS bee foraging game! Photo: Claire Carvell

Altogether, with these events and other engagement activities including training events across GB led by PoMS partners, articles and social media coverage, we estimate that PoMS reached an audience of well over half a million people! It would be fantastic to engage a higher proportion of these in getting involved and contributing data for 2019.

Jenny Christelow and Claire Carvell, CEH



## PoMS overseas

Ecologists at CEH and the Joint Services Health Unit, Cyprus, through their Defra Initiative Darwin Plus funded project, **RIS-Ký** (Researching Invasive Species in Kýpros) project, are developing approaches to monitor pollinating insects across Cyprus. This project has a specific focus on the Western Sovereign Base Area which includes the Akrotiri saltlake and its environs. The resources developed through PoMS have inspired our plans for Cyprus.

We have been working with Cypriot and UK pollinator experts, alongside the educational experts from the **Akrotiri Environmental Education Centre (AEEC)** to develop two schemes based around the PoMS FIT Counts. One of the schemes has been designed for young children and we have been thinking of exciting and innovative approaches to engage them with pollinator ecology and effects of non-native species on these important interactions. The other scheme is more closely linked to the PoMS FIT Counts and we hope to that many people will get involved in collecting baseline data on interactions between pollinators and (native

and non-native) plant species. This scheme, PoMS-Ký (Pollinator Monitoring Scheme in Kýpros) will be launched at a BioBlitz event being held in at the AEEC on 27/28 February 2019. This BioBlitz is being co-led by the RIS-Ký team in collaboration with a new COST Action, Alien CSI. We are looking forward to evaluating and reviewing the approaches over the next year and contributing information on pollinating insects for use by many different people across Cyprus going forward.

Jodey Peyton and Helen Roy, CEH

**PoMS-Ký**

The PoMS- Ký team looking for pollinators in Cyprus. Photo: Kelly Martinou



## Thanks

The UK Pollinator Monitoring Scheme is run by the UK Pollinator Monitoring and Research Partnership (PMRP), comprising the Centre for Ecology & Hydrology (Claire Carvell, Helen Roy, Martin Harvey, Nadine Mitschunas, Bjorn Beckmann, Nick Isaac, Gary Powney, Angus Garbutt, Eleonora Fitos, Chris Andrews, Alan Gray, Lucy Ridding and Stephen Freeman), the Bumblebee Conservation Trust (Richard Comont), Butterfly Conservation (Tom Brereton, Zoe Randle), British Trust for Ornithology (Dawn Balmer, Andy Musgrove), Hymettus (Paul Lee, Mike Edwards), the University of Reading (Simon Potts, Mike Garratt) and University of Leeds (Bill Kunin). It is jointly funded by Defra, the Welsh and Scottish Governments, JNCC and the PMRP partners. Alongside co-ordinating survey activities, namely the Flower-Insect Timed Count and 1km square surveys, the PMRP aims to facilitate use of PoMS data more widely in research, conservation and survey planning.

We would like to thank Jan Winder and Ellen Lamborn for joining the PoMS survey team for 2018, mentoring volunteers and covering surveys on unallocated squares. Taxonomists Ivan Wright and Martin Harvey provided species identifications for the bees and hoverflies sampled in 2017. Thanks to Jenny Christelow, Ujala Syed and Hannah Lacey (CEH) and Buglife (in particular Scott Shanks) for their help promoting PoMS at events this summer. Thanks also to Natasha de Vere and the Growing the Future project, National Botanic Garden of Wales, for kindly sponsoring the translation of FIT Count resources into Welsh.

Finally, a huge thanks to all the volunteers and supporters of PoMS who undertook (and submitted!) FIT Counts or 1km surveys in 2018, as well as the landowners who allowed access for PoMS surveys – the scheme could not run without their dedicated commitment.



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**Hymettus**



[www.ceh.ac.uk/pollinator-monitoring](http://www.ceh.ac.uk/pollinator-monitoring)

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