# NFBR

NATIONAL FORUM FOR BIOLOGICAL RECORDING

## Newsletter 59 – May 2020

# Contents



**Welcome** to Issue 59 of the National Forum for Biological Recording Newsletter.

This edition showcases the great work being done at all levels of the biological recording community - local (*Cantharellus* distribution in Pembrokeshire, pg. 5), national (Journey to the Moth Atlas, pg. 16) and internationally (Easy-to-use app provides boost for European butterfly enthusiasts, pg. 8). All these examples show how volunteer recorders and conservation organisations can work together to get the maximum conservation value out of every biological record.

Living under lockdown has been a challenge for all of us this year, but in the recording community we are fortunate that our favourite pastime is adaptable to the current circumstances. Whether discovering wildlife in your local area during daily exercise, deep-diving into the nature in your garden or simply looking out a window, I hope everyone has found some time and space to enjoy the solace of spring.

*Elaine Wright (Editor) editor@nfbr.org.uk*

*As always, if you would like to make a contribution to a future newsletter, please get in touch at any time. The next edition will be out in autumn.*

*Cover photo: Antler Moth © Teresa Frost*
*Learn about the new Atlas of Britain and Ireland's Larger Moths on pg. 16*

# NFBR News

*Elaine Wright*

## 2020 Conference

Unfortunately we were forced to postpone our April 2020 conference, due to take place at the World Museum in Liverpool. The event, themed around urban recording, is currently rearranged to 22nd - 24th October 2020. This date may be subject to change depending on how the pandemic situation develops. We will update our members with booking details or an alternative date when possible.

## Lockdown activities

If you have found yourself with more time on your hands during lockdown, whether due to furlough or being unable to visit your usual sites, there are plenty of online resources and garden based activities to help you stay connected with nature. Many organisations have come up with innovative ways to inspire biological recording from home and are facilitating learning without the need to meet face to face. Many of these resources have been listed on the South East Wales Biodiversity Records Centre webpage (aka my day job, please let me know of any gaps).

Suggestions include:

- Watching nature presentations, such as those of the Linnean Society
- Joining online learning events, such as Field Studies Council's Virtual Meet Ups
- Taking part in garden based surveys e.g. the Pollinator Monitoring Scheme
- Identifying specimens you have been saving for a rainy day
- Digitising your old records, for example by entering them on iRecord
- Writing newsletter articles, e.g. I am always looking for NFBR content!
- Reading journals and magazines such as those on Biodiversity Heritage Library
- Staying connected on social media, perhaps by joining the NFBR Facebook group

## Current NFBR Governance

NFBR has a board of seven trustees who form the Executive Committee, plus an Advisory Council. You can learn more about the individual Trustees and Council Members on the NFBR website.
Current members and positions held are as follows:

| Trustees | Advisory Council | |
|---|---|---|
| Sarah Whild (Chair) | Teresa Frost | Chris Raper |
| Jodey Peyton (Vice Chair) | Martin Harvey | David Slade |
| Graham Walley | Martin Hicks | Alan Stewart |
| Clare Langrick | Maria Longley | John van Breda |
| Paula Lightfoot | Damian McFerran | Zoe Randle |
| Simon Pickles | Steve Prentice | |
| Elaine Wright | | |

# Craig Slawson Obituary

We are very sad to report the passing of NFBR Council member Craig Slawson. The below obituary (and above photo) is taken from the website of Craig's employer, Staffordshire Wildlife Trust:

*"It is with extreme sadness we have to announce our colleague, Craig, passed away on Tuesday 11th February 2020 after a short spell in hospital.*
*Craig's impact on Staffordshire's biological recording, biodiversity and geodiversity has been hugely important. He was a font of knowledge and will be greatly missed.*
*Craig first worked for SWT in the early 1990s before moving to the Birmingham and Black Country Wildlife Trust to establish EcoRecord, the biological records centre for the West Midlands. Craig returned to Staffordshire in 2000 to take a role at Staffordshire Ecological Record, based with SWT. Craig's technical and taxonomic knowledge was vital in the development of SER. The biological records SER holds influences all aspects of SWT's conservation work from reserve management to our planning responses to the developing Nature Recovery Network.*
*This is Craig's legacy."*

Craig was an active member of NFBR, especially on Council, and worked on the NFBR website. He was well known in the biological recording community, especially for his database and data management work in the Midlands. He was also well known in geology recording, being active locally in the Staffordshire RIGS group and nationally as the webmaster and council member of the national UK GeoConservation. Craig produced the geological equivalent of Recorder in order to help standardise local geology recording. He will be remembered for his great biological and geological knowledge and his ever helpful responses to recorders needing data management advice across both disciplines. NFBR will certainly miss him and we acknowledge his important contribution to recording over many years.

# *Cantharellus* distribution in Pembrokeshire

*David Harries (DH)* and Adam Pollard-Powell (APP), PFRN*
**corresponding author: djh.somerton@gmail.com*

Introduction

DNA barcoding is a valuable technique supporting the investigation and identification of species and is increasingly becoming accessible to field enthusiasts and citizen scientists. A notable advance came in 2019 when the Royal Botanic Gardens, Kew, through their Lost and Found Fungi (LAFF) project, initiated a support program for local fungus groups wishing to carry out DNA barcoding of fungi.

Members of the Pembrokeshire Fungus Recording Network (PFRN), with support and training from Aberystwyth University and Kew, had previously established an in-house facility for the extraction and amplification of fungal DNA. An early output from this work was a study of the distribution of *Microglossum* in Wales (Harries et al. 2018). Following on from this, the team looked for opportunities to use DNA barcode techniques to improve knowledge of the distribution of specific fungal assemblages in Pembrokeshire. One of the authors (APP) had a particular interest in the chanterelle (*Cantharellus cibarius*) and, in 2014, had been the first to recognise the presence of *C. pallens* in the County. APP proposed that the PFRN established a program to collect, identify and map samples of *Cantharellus cibarius* and allies from selected sites in Pembrokeshire. This paper documents the outcome of that program.

Methods

(a) Field collection and identification

Collections were photographed in the field, documented, then dried at 40˚C and stored in sealed containers with silica gel desiccant. Spore size was determined using light microscopy on either a spore drop from fresh samples or a gill-face scrape from dried material rehydrated with water. Specimens were identified on the basis of appearance and spore size with reference to Kibby (2012). A representative selection of samples was set aside for DNA barcoding.

(b) DNA barcoding

DNA was extracted from fresh and dried material using a CTAB extraction method based on Doyle (1987). The ITS2 region was amplified using primers ITS3 (forward) and ITS4 (reverse). Amplification was restricted to this region as Olariaga (2017) indicates that sequencing the ITS1 region can be problematic for some members of this genus. Amplification of the DNA extract and subsequent quality checks using gel electrophoresis were carried out using a Bentolab portable DNA extraction unit (www.bento.bio). Sequencing of the barcode extracts was carried out at the University of Sheffield with the work funded by the Kew LAFF project.

(c) Phylogeny

The raw sequences were examined using FinchTV software and manually trimmed to remove unwanted portions and correct any miscalled bases. The resulting sequences were tabulated along with reference sequences for verified material (Olariaga, 2017) previously downloaded from the UNITE database (https://unite.ut.ee). The AliView program (https://ormbunkar.se/aliview) was used to align sequences and generate a phylogenetic chart.

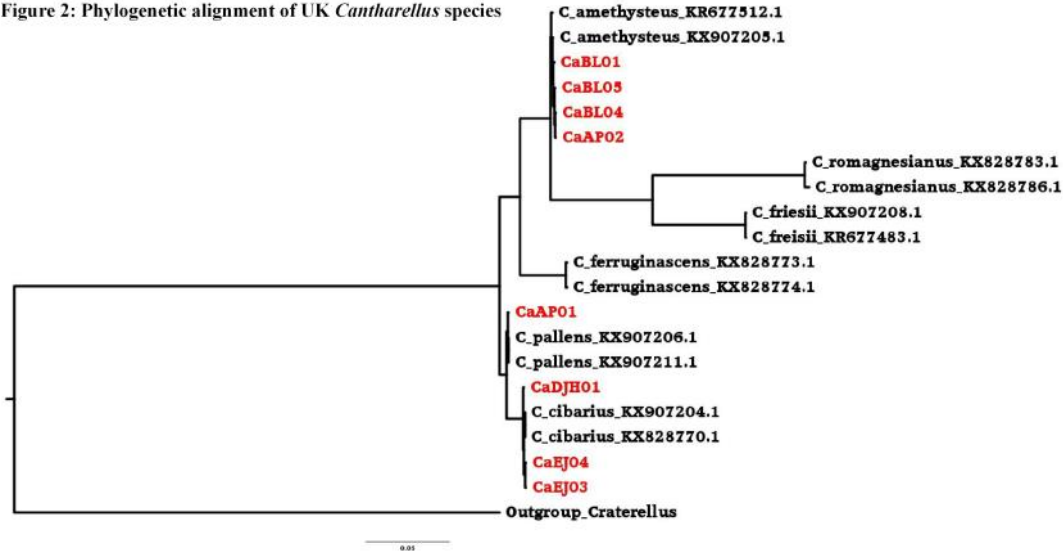
## Results

Fourteen chanterelle collections were made from August to October 2019. Examination showed that the collections represented three of the four species previously reported from the County: *Cantharellus cibarius*, *C. pallens* and *C. amethysteus* (fig. 1). *C. ferruginascens* was not recorded in 2019.

**Figure 1:** *Cantharellus cibarius* Fr. © David Harries; *Cantharellus pallens* Pilat © Adam Powell-Pollard; *Cantharellus amethysteus* (Quel.) Sacc © Hywel Evans

DNA sequences were obtained for eight samples representing each of the three species. The resulting phylogenetic chart (fig. 2) showed that the sequences for the Pembrokeshire collections aligned closely with the reference sequences (entries shown in red denote collections from this study).

Figure 2: Phylogenetic alignment of UK *Cantharellus* species



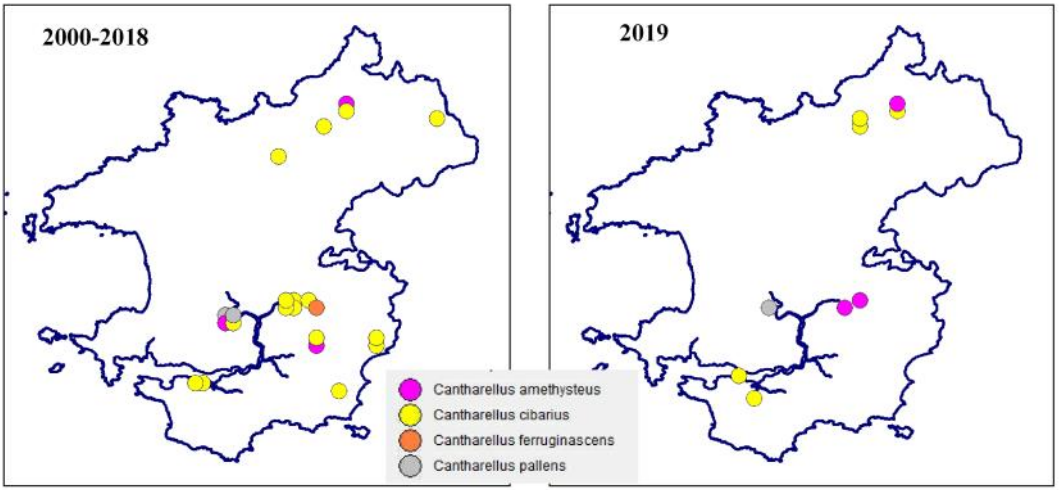



**Fig. 3: Distribution of *Cantharellus* species in Pembrokeshire**

Historic chanterelle records for Pembrokeshire were downloaded from the Fungus Records Database of Britain and Ireland (http://www.frdbi.info). After removal of duplicates, twenty three records covering the period 2000 to 2018 were used to create a distribution map for comparison with a map prepared using the records from this study (fig. 3).

## Discussion

The project extended our knowledge of the distribution of three *Cantharellus* species in Pembrokeshire and confirmed the validity of previous determinations carried out using traditional keys. One previously unknown site for *Cantharellus cibarius* was discovered during the study and *C. amethysteus* was recorded at two known *Cantharellus* sites for the first time.

This work demonstrated that projects based on DNA barcoding, and the subsequent analysis of the sequences, can be successfully carried out by field groups (citizen scientists).

A reference library of sequences has been established which will facilitate the identification of any new *Cantharellus* species found in the County.

## Acknowledgements

*The authors thank: Dr. Gareth Griffith, Aberystwyth University (IBERS), and Dr. Brian Douglas, Kew (LAFF project) for their continuing technical support and encouragement for DNA barcoding work by the PFRN, Ant Rogers and the Pembrokeshire Nature Partnership, for support for this project including funding of consumables used during the DNA study and Hywel Evans, Emyr Jones, Rob Mackeen and Arthur Rivett for samples and/or photographs.*

## References

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Kibby, G (2012). Fungal Portraits No. 52 Chanterelles and their allies. *Field Mycology 13(4).*

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# Easy-to-use app provides boost for European butterfly enthusiasts

*Simon Williams, UKCEH*

A new Europe-wide, multilingual mobile phone app will make it easier for butterfly enthusiasts to monitor trends of species across the continent and enable scientists to assess the impacts of environmental change on biodiversity.

It has been launched by the European Butterfly Monitoring Scheme – which is led by Butterfly Conservation Europe and the UK Centre for Ecology & Hydrology – as the traditional season for recording this diverse and popular group of insects gets under way.

The ButterflyCount app has the latest full list of the different butterfly species found across Europe – around 500 in total – and guides that are all available offline. It enables people to submit records in a variety of ways, though the preferred method is a 15-minute count. This is made easier thanks to a stopwatch feature as well as a GPS tracking facility so you do not need to submit your route or area surveyed. Recorders add sightings incrementally, by simply tapping +1 every time they see individuals of each species during a count.

All the features are translated into 15 European languages, with more being added. While the app requires users to be able to distinguish between different species, it will allow thousands of enthusiasts to track the trends in butterfly species across Europe, supporting biodiversity monitoring.

Dr David Roy of the UK Centre for Ecology & Hydrology (UKCEH) explains: "*We have put a lot of thought into the development of the app, to make it as easy to use as possible. The 'record as you go' functionality enables people to compile lists of species, and numbers seen at any location, with minimal effort.*"

The results will be entered into the European Butterfly Monitoring Scheme (eBMS) database and used to establish trends of species across Europe.

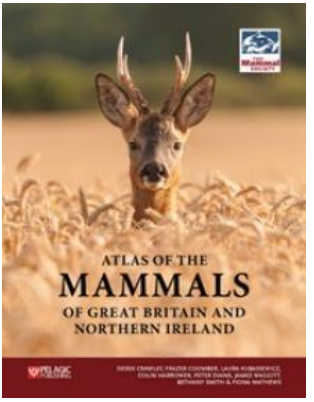
Dr Chris van Swaay of Butterfly Conservation Europe says: "*People play a vital role in improving our understanding of the world around us. Butterflies are accurate indicators of biodiversity loss or increase because they are sensitive to environmental change. Butterfly enthusiasts are therefore significantly supporting scientific research and, ultimately, local and national conservation initiatives to improve butterfly populations.*"

The ButterflyCount app is available for iPhones and iPads via the Apple app store as well for Android devices at Google Play. There are more details on the European Butterfly Monitoring Scheme website.

*The development of the app has been funded by an EU Pilot Project, ABLE (Assessing ButterfLies in Europe), which is a partnership involving Butterfly Conservation Europe, UKCEH, the Helmholtz Centre for Environmental Research in Germany, Dutch Butterfly Conservation and Butterfly Conservation UK. This project will provide an analysis on the state of Europe's butterflies by producing trends for species in grassland, woodland and wetland habitats, as well as examining the impacts of climate change as well as EU policies and initiatives on butterfly populations.*

This article first appeared on the UK Centre for Ecology & Hydrology website.

# New atlas shows changing distribution of Britain's mammals




*Simon Williams, UKCEH*

A new book maps the distribution of terrestrial and marine mammal species across the country, and shows how these distributions have changed over the past 30 years.

*Atlas of the Mammals of Great Britain and Northern Ireland* has been produced by the Mammal Society and other contributors including the UK Centre for Ecology & Hydrology (UKCEH) and the Sea Watch Foundation. It aims to support scientific research and inform conservation efforts to protect mammals.

The atlas is fully illustrated with photographs and information on 84 species, including their ecology and identification, plus maps showing where they have been sighted. It is the first such atlas for 27 years and now includes information on the distribution of Britain's whales and dolphins, which were not included in the previous edition.

The book was produced following an analysis of 1.8 million records of mammals submitted by individuals, wildlife groups and other organisations to determine the current and historic distributions for these mammals.

Professor Fiona Mathews of the University of Sussex, who is chair of the Mammal Society, says: "*Iconic species such as the harvest mouse, water vole and red squirrel have undergone marked declines in distribution over the last 30 years, while others — including roe deer, polecat, and the non-native grey squirrel —- have become more widespread.*

"*Bats too have seen changes to their distribution, with Nathusius' pipistrelle now regularly found in Britain, possibly as a result of climate change.*"

Dr Colin Harrower of UKCEH, one of the authors, says "*This atlas is a fantastic resource, not only for the conservation and management of mammals, but also for researchers to better understand the status of this iconic group of animals.*

"*When used alongside the wealth of similar data for thousands of plant and insect species from dedicated wildlife enthusiasts, it can help identify the factors - such as climate change and habitat loss - that are leading some species to decline while others expand.*"

Dr Harrower says the number of records analysed in the current atlas was three times the number involved in the production of the previous edition, Atlas of Mammals in Britain, by HR Arnold, which was published in 1993 by the Institute of Terrestrial Ecology, a forerunner of UKCEH.

Derek Crawley of the Mammal Society and lead author of the atlas, says: "*We are extremely grateful to the citizen scientists, mammal groups, universities and other organisations who have helped enormously by sending in their records from across the country.*

"*Please don't stop recording. More than ever before, we need to keep a close eye on how mammals are faring and anything you can tell us makes a huge difference to the measures we take to protect them for future generations.*"

This article first appeared on the UK Centre for Ecology & Hydrology website.

# Local Environmental Records Centre Spotlight

*Each edition the NFBR newsletter celebrates one of the Local Environmental Records Centres [LERCs] in the UK. These organisations are centres for the collation, management and dissemination of biodiversity data on a local scale, making biodiversity information available to decision makers throughout the UK, alongside supporting Biological Recorders in a myriad of ways.*

Answers provided by Maria Longley, Community Manager.

**Greenspace Information for Greater London**, or GiGL for short, is London's local environmental records centre and we cover the administrative area of Greater London. This covers parts of various vice counties (VC16 West Kent, VC17 Surrey, VC18 South Essex, VC20 Hertfordshire, and VC21 Middlesex) which chart the growth of the metropolitan area.
Our office is close enough to the Houses of Parliament that we were able to walk over to hear Big Ben bong for the last time in four years back in 2017 or spot the peregrines nesting on one of the towers. The river Thames is also a mere five minute walk away or we can get to St James' Park during lunchtime to say hello to the pelicans.

***Tell us a bit about your LERC***

The London Wildlife Trust started the Biological Recording Project in 1996 with a view to see if a records centre is needed in London. By 2003 the aspiring records centre is named Greenspace Information for Greater London and by 2006 GiGL launches as a fully-fledged LERC. Then seven years ago, in 2013, GiGL becomes an independent social enterprise and is incorporated as a Community Interest Company. And in 2016 we complete the process to become an ALERC accredited LERC.
Partnerships are at the heart of our work and over the years we have worked with most of the 33 local authorities in our area as well as the regional Greater London Authority (GLA) and other land owners and NGOs. Like other LERCs species records are a large part of our work and we currently hold 5.2 million records in Recorder 6. A joint report between the GLA and the London Parks and Greenspaces Forum in 2003 led to GiGL being asked to broaden our remit to cover biodiversity data and open space data and these two, alongside habitat survey data, remain our core datasets to this day. The oft-quoted statistic about roughly 47% of London being green is drawn from these data.
We work closely with eCountability who run our data search service for us. GiGL is also an active member in our regional LERC network, ALERC, and the National Biodiversity Network.

***Tell us about your team***

Currently our team is 11 people strong (9.8FTE) to cover our work with partners with service level agreements, local community groups, students and recorders,


*Some of GiGL's Staff: Emma Knowles (Partnership Officer); Claudia Watts (Royal Parks Officer); Maria Longley (Community Manager); Andy Foy (Systems Manager), Ben Town (Community Officer); Eleni Foui (Planning Research Officer); Minhyuk Seo (Partnership Officer); Laura Kuurne (Database Officer)*

the eight royal parks in London, and a planning research project to understand and support the planning process regarding the use of biodiversity data in Greater London. We embraced the possibilities of remote working early on and have team members who live in Hampshire, Cambridgeshire, and Western Australia.

Our office space precludes us from having many volunteers, although we do have a few loyal long-term volunteers, and has pushed us to explore other options such as the online Zooniverse London Bird Records project that was profiled in a previous NFBR newsletter.

***Tell us about the local recording scene***

The London Natural History Society trace their roots back to 1858 when the Haggerstone Entomological Society members started to meet weekly in a local pub. These days the Society has several sections, including the London Bird Club, and an active programme of meeting and learning. They publish newsletters and The London Naturalist journal for members, and members are currently working on updating a London butterfly atlas and the London Flora. There are also several more localised natural history groups across the different boroughs who carry out biological recording on their patch.

Local parks and greenspaces are precious to people and there are over 600 Friends of Groups across the capital. The London National Park City idea and movement has been gaining steam and was officially adopted in July 2019 and they are a great advocate for our greenspaces. We are lucky enough to have the Natural History Museum on our doorstep and the Angela Marmont Centre for UK Biodiversity in the museum provides free meeting space for naturalists as well as access to the amazing reference collections, taxonomists, and curators.

*View from Greenwich Park © **GiGL***

***Tell us about how you support local recorders***

We try and support our local recorders in London and encourage the ongoing recording effort. We answer queries, provide species lists for sites, show gaps by mapping records for people, and signpost new recorders to existing groups and activities and training courses. Over the years we have done a huge amount of digitising paper records for groups and providing secure digital storage and backups of wildlife data. When requested we have also provided training in QGIS mapping and introductions to biological data management, as well as data support for local bioblitzes.

In 2018 we launched the very first London Recorders' Day with the Natural History Museum and FSC BioLinks as a day to celebrate local recording and share news about local projects. Our biannual newsletter has a popular feature called "Joy of Recording" where we profile a local recorder and their favourite haunts and species.

***What are the top three sites you would recommend to visiting wildlife recorders?***

Walthamstow Wetlands was recently opened to the public for the first time in 150 years and the ten reservoirs are a haven for overwintering wildfowl. This urban wetland is a SSSI and is on the Ramsar List of Wetlands of International Importance.

Starting in Little Venice and ending at Limehouse Basin and the river Thames a walk along the **Regent's Canal** is a wonderful way of seeing several interesting green spaces. Perhaps you can spot the spider found in Mile End Park (*Mermessus trilobatus*) or see the African hunting dogs as you go past the zoo.

The largest area of open space in central south-east London, Greenwich Park contains some wonderful old trees, while Blackheath's common, which dates from the Middle Ages, supports a number of rare plants. You can use your Oyster card to travel to Greenwich Park by boat.

***Any highlights or achievements you would like to share from the past year?***

This summer we have been working on a brand new habitat database to hold our legacy habitat datasets and allow us to aggregate the information into the Integrated Habitat System (IHS). This will make the data translatable to UK Habitat classification, which will be relevant to work relating to biodiversity net gain. We have also released a brand new research and policy dataset under an open data licence which is a subset of the locations and names of open space sites in London.

The second London Recorders' Day had an increased number of attendees and talks ranged from wildlife crime to wildlife illustration. We also ran our first ever "lunch and learn" session for partners and hope to run more of them as it was very well received. This summer we were also involved in the creation and launch of the online Big Green London Map that allows people to search for green spaces nearby and find out more about them.

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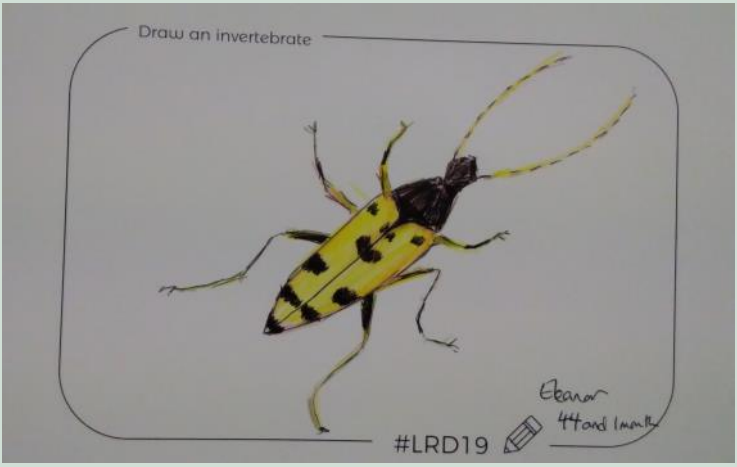


# NBN Update

*Mandy Henshall, National Biodiversity Network*

NBN Trust Strategy Review 2020

The NBN Trust is developing its next five-year strategy, to be launched in 2021. There have so far been two surveys asking for input from across the Network. The first survey was the very first step in what is a year-long review. The second survey is reviewing comments received to date and there will be further opportunities to input to the strategy update process throughout the year.

We are communicating on an ongoing basis, on the Strategy, with all members, Network News and NBN Atlas News subscribers and NBN Atlas users as well as via social media. If you are unsure if you are on our mailing list, it's quick and easy to sign up via the NBN website.

We really do value your input and support throughout this process, so thank you for your feedback and comments, so far.

NBN Awards for Wildlife Recording

The winners and runners up in the NBN Awards for Wildlife Recording 2019 were announced at the Albert Hall, Nottingham during an evening ceremony on Wednesday 13 November 2019.

These national Awards recognise and celebrate the outstanding contributions adults and young people are making to wildlife recording and data sharing, which is helping to improve our understanding of the UK's biodiversity.

The winners in the five Award categories were:

- NBN Young Person's Award – Michael Sinclair
- NBN Newcomer Award – Sue Taylor
- NBN Award for wildlife recording – Marine – Dawn Watson
- NBN Award for wildlife recording – Terrestrial – Ian Wallace
- NBN Group Award – Joy of Wildlife Group

The winner of the John Sawyer NBN Open Data Award was the Earthworm Society of Britain.

More information can be found on the NBN website.

NBN Conference 2020 – save the date

This year's NBN Conference is taking place on Wednesday 18 and Thursday 19 November at the Open University, Milton Keynes.

It will run in collaboration with iSpot which will be rounding off its 10 year anniversary celebrations. There are plans for an iSpot seminar / workshop on 17 November.

The theme of the NBN Conference is "The NBN Trust at 20 – Past, Present and Future".

More details and programme information will be available in due course.

FAIRs FAIR support for NBN Atlas

The NBN Atlas has been selected to receive support from FAIRsFAIR to improve the level of interoperability in its data holdings.

FAIRsFAIR – Fostering Fair Data Practices in Europe – aims to supply practical solutions for the use of the FAIR data principles throughout the research data life cycle and contributes to policies and practices for broader adoption of FAIR practices and in the development of standards for FAIR certification of repositories.

The NBN Trust will be involved in testing the specifications of the interoperability layer and will provide feedback to the development team on issues and/or suggestions to improve the specifications. The first implementation of the data repository features is planned to be ready in February 2021 and the second will be one year later.

NBN Atlas Isle of Man reaches one million wildlife records

The NBN Atlas Isle of Man has reached a record milestone with one million wildlife records available online.

NBN Atlas Isle of Man, as with all the NBN Atlases, is an online tool that educates and informs people about the natural world. It is supported by the Manx Biological Recording Partnership, a wildlife conservation partnership of organisations and individuals focused on collating terrestrial and marine Manx data, led by Manx National Heritage, the Department of Environment, Food and Agriculture and Manx Wildlife Trust. Much of its data comes from surveys carried out by the lead organisations, but also includes records from individual wildlife recorders and several specialist groups.

Beautiful Burial Grounds

Additional development has been implemented for the Beautiful Burial Ground project. This includes:

· enhancements to the interactive map where you are now able to view all available records,

· the burial ground search functionality is more intuitive, and

· a new overview section that is similar to the NBN Atlas' 'Explore your Area'.

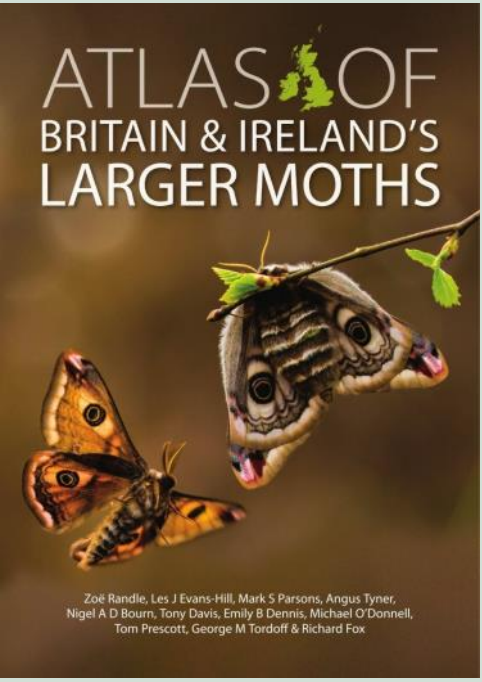
A further phase of development is expected later this year.

NBN Atlas habitat layers: recent additions

We have recently added 12 new habitat layers to the spatial portal [*England: Annex 1 - Alkaline Fen, Transition Mire, Quaking Bog polygons, Wood Pasture and Parkland Inventory, Priority River Habitat - Headwater Areas, Ancient Woodland; Scotland: Caledonian Pinewood, Pinewood zone, Scottish Wetlands Inventory; Wales: Habitat Network: Lowland Grassland Level 2 (Priority), Habitat Network: Lowland Heath Level 2 (Priority), Habitat Network: Upland Heath Level 2 (Priority), Habitat Network: Woodland Level 2 (Priority), Ancient Woodland Inventory 2011*].

Our selection of habitat layers is being guided by suggestions from members of the NBN Atlas steering groups and other NBN Atlas stakeholders. Over the next few months we will continue to source and build-up the numbers of habitat layers available in the NBN Atlas. Please do get in contact with us at support@nbn.org.uk if you have any suggestions for habitat (or indeed any other) layers you would find useful to have access to in the NBN Atlas.

# Journey to the Moth Atlas: Producing the first ever atlas of larger moths in Britain, Ireland, the Isle of Man and the Channel Islands




*Dr Zoe Randle, Butterfly Conservation*

For as long as I, my colleagues and co-authors can remember, our working lives have revolved around getting the Atlas of Britain and Ireland's Larger Moths completed and sent to print.

This accomplishment has now been achieved and the book was published on 25th November 2019. You can order your copy here.

The atlas is beautifully illustrated with over 800 colour photographs and displays distribution maps showing current and historical records for 893 species. Distribution trends and abundance trends are presented along with the IUCN Red List status for Great Britain and for Ireland. Phenology charts have been produced for 866 species, the majority of these compare the flight period of the moth in the 1970s with 2000 to 2016. These provide some interesting insights into how some species are responding to climate change by changing their phenology, for example by flying earlier in the year, or by being able to have a second generation much further north than was possible in the 1970's.

I embarked upon this 'atlas phase' of my life with a fair degree of naivety but have learnt a great deal and am all the better for it. Along the way there have been personal and professional opportunities and obstacles to tackle and embrace, but I am pleased to say we made it. The feeling of the book having gone to press is one of great relief and major achievement.

This landmark publication, the first-ever atlas of larger moths in Britain, Ireland, the Isle of Man and the Channel Islands was produced in partnership with MothsIreland. It comprises over 25 million moth records from Butterfly Conservation's National Moth Recording Scheme (NMRS) and the MothsIreland dataset. The atlas includes records up to 31 December 2016, with the earliest record being that of Kentish Glory recorded in April 1741, therefore spanning an impressive 275 years of moth recording effort.

The moth auction

As you might expect then, this book is full of beautiful photographs of the 867 species featured. Interestingly it was difficult to source cracking photos of common and widespread species such as Heart and Dart. Is this because the appear-

ance this species could be considered to be that of a moth-ers moth, a bit brown, not particularly photogenic or interesting to look at, unworthy of a photoshoot? The same cannot be said for Scarlet Tiger, which was also one of the last images to be sourced, a moth that would give all butterflies a run for their money in the beauty stakes and well deserving of the front cover of Vogue! Tracking down good images for rare immigrant species was understandably tough, take Minsmere Crimson Underwing for example, there is only one British record, so a European colleague provided an image. In total over 70 photographers freely provided and allowed us to use their images in the atlas, we are very grateful to all of them – thank you.

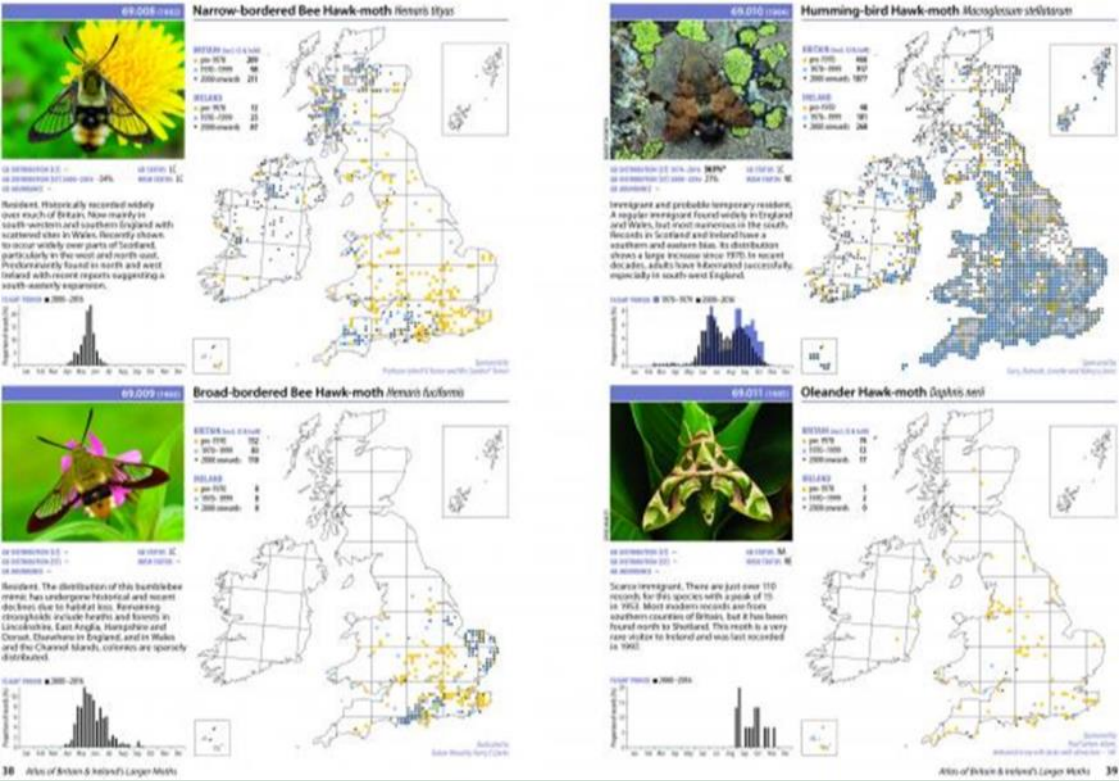
Funding also needed to be sought to help finance the production of the atlas. For the first time we tried an eBay style moth auction. Auction lots were advertised, and people could bid for their favourite species. In return they could have a personal dedication on the species page. A few species were highly sought after and we saw a bidding war, two species attracted 26 bids each. I was determined to bag the Satellite and my persistence paid off! Over 400 people and organisations joined in the moth auction and sponsored species, many thanks to all of you for helping us to raise the necessary funds for the atlas. We also secured funding from several trusts and corporate sponsors, again we thank them all for their support.

At the early design stages of the book, we had to consider its dimensions and weight with regard to postage costs, no-one wants to buy a book and then pay half of its cover price again in postage! With the huge number of species we needed to include in the atlas we didn't want to have to go to two or more volumes either, the book had to be affordable and desirable. Thus, space on each page was a premium and the species account text needed to be concise, around 336 characters including spaces. The text is an aid to interpreting the maps, trends and phenology (flight) charts, not regurgitating information that is readily available in the various field guides. It was quite a challenge to keep the text short and snappy.

Ensuring accuracy was key

The data in the NMRS are not collected in a standardised way, traps are run for different durations, there are various trap and bulb types, not everyone records abundance and many records are ad-hoc as the scheme accepts data for any moth, any life-stage, anywhere at any time. Fortunately, due to advances is statistical techniques it is now possible to generate distribution trends using this type of data. As a result, distribution trends for Great Britain were generated from the NMRS dataset. We had to exclude the Irish data as it is currently too sparse to produce meaningful trends, however, as moth recording is growing in popularity in Ireland, as it is elsewhere, and the number of records submitted annually is increasing massively, distribution trends for Ireland will be calculable in future.

We also wanted to include abundance trends in the atlas. In order to do this count data needed to be collected in a standardised scientifically robust way. The source of these data was the Rothamsed Insect Survey (RIS) light-trap network, the light-trap network has a standardised trapping protocol and traps are run on a nightly basis throughout the year and have done so since the late 1960s. Statis-




ticians at the Centre for Ecology and Hydrology generated these abundance trends for us to use in the publication. Again, these trends are GB only as there are currently too few RIS monitoring sites in Ireland to generate meaningful trends.

Ensuring the accuracy of the distribution data was a vital part of the atlas production process. We produced distribution maps for all of the species featured in the atlas and circulated these to Butterfly Conservation staff and a panel of regional experts for scrutiny and potential 'dodgy-dot' spotting. Once these possibly erroneous records were highlighted, they were referred back to the County Moth Recorder network for further investigation which resulted in acceptance or omission of said records. Thanks to the checkers and the County Moth recorders for responding every time.

This book is an absolute treasure trove of information detailing the changing fortunes of our resident and immigrant moths. I hope it will be considered as an essential addition to every moth recorders' personal library.

Acknowledgements

*We would like to thank the County Moth Recorder network and moth recording community, the photographers, species sponsors, trust funds, corporate sponsors, Rothamsted Insect Survey, the Centre for Ecology and Hydrology, NatureBureau/ Pisces Publications and everyone else who has had a role to play in the production of the Atlas of Britain and Ireland's Larger Moths.*

This article first appeared on the Butterfly Conservation website.

# The science behind the Moth Atlas

*Dr Zoe Randle, Butterfly Conservation*

In November 2019 Butterfly Conservation, in partnership with MothsIreland, published the Atlas of Britain and Ireland's Larger Moths.

A total of 25.6 million records of 893 species from the National Moth Recording Scheme (NMRS) and MothsIreland datasets, spanning the period of 1741-2016 were combined, bringing together 275 years of survey effort by the moth recording community across the UK, Ireland, the Isle of Man and the Channel Islands. Here, we outline how the data on distribution, abundance and seasonal changes were analysed and presented in this new publication.

## Distribution trends

Distribution trends for Great Britain were calculated at 1km x 1km grid square resolution using NMRS records from 1970-2016. NMRS data is generated without a standardised trapping methodology or sampling regime and is therefore subject to distribution bias in time and space. These factors need to be taken into account when estimating changes over time[1] and the new occupancy modelling approach[2] used to calculate the atlas trends, addressed these concerns[3].

To ensure the distribution trends were reliable, data selection was guided by certain criteria. Species were excluded if there were fewer than 100 records over the date range, or where the mean number of annual records of a species per decade were less than 20, or through expert judgement[4]. The final verification was based on expert opinion. This identified that the occupancy modelling approach for Ireland was not appropriate at this time, as the data is insufficient to produce reliable trends, and therefore only trends for GB were published.

Following these steps, we produced GB long-term distribution trends (1970-2016) for 390 species. Of these 390 species, 121 (31%) exhibited statistically significant declines. Statistically significant increases were shown in 148 (38% of the total) species and a further 121 species (31%) had no significant changes in distribution. The extent of distribution change was variable with 46 of the 121 species (38%) declining by at least 50% and 36 of the 148 (24%) species more than doubling their distribution.

## Abundance trends

Abundance trends were calculated from the Rothamsted Insect Survey light-trap network dataset. Rothamsted Research have been running a network of standardised, automated light-traps across Britain, in a variety of habitats since the 1960s. Long-term trends were generated for nocturnal moths from 1970-2016 to match the time period used for the distribution trends. Scientists from the UK Centre for Ecology & Hydrology calculated long-term trends using the Generalized Abundance Index approach which enables seasonal count data from multiple sites to be analysed to compile abundance trends, using all the data collected[5]. A procedure known as bootstrapping was used to establish the statistical significance of the abundance trends. Robust trends were generated for 397 species, of these, 136 species (34% of the total) decreased. Conversely 45 species (11% of the total) showed statistically significant increases in abundance. Over

half of the species (54%) showed no significant changes in abundance. As with the distribution trends, the extent to which species' abundance changed was variable. Of the 138 declining species, 108 (79%) decreased in abundance by more than 50%. Of the 45 species increasing in abundance 35 (77%) more than doubled in abundance during the 1970-2016 period.

## Phenological changes

A preliminary assessment of phenological change for Britain and Ireland's univoltine larger moths was undertaken. To avoid effects of recording effort bias[6], we used the mean flight date approach[7] rather than earliest or peak flight dates. Moth records from the NMRS and MothsIreland datasets (excluding the Channel Islands) were used to calculate mean flight dates for two time periods: 1970-1979 and 2000-2016. Winter-flying species were excluded as they have flight periods which span two calendar years, as were species with fewer than 30 records in one or both time periods; 405 species met the criteria for the analysis. Mean flight dates were, on average, 4.8 days earlier for 2000-2016 compared with 1970-1979. A total of 329 species (81%) of those assessed were shown to be flying earlier in the year now compared with the 1970s and 76 species (19%) are flying later. There were considerable changes for a minority of species, 12 are now flying at least 14 days earlier in the year compared with the 1970s and 13 are flying at least seven days later than in the 1970s.

## Concluding remarks

The atlas provides a timely insight into the status of Britain and Ireland's larger moths. Rapid changes are occurring, many species are experiencing significant increases in abundance and distribution, while others are declining in one or both measures. A potent cocktail of drivers arising from human activity are likely to be responsible for these patterns of change[8]. Continued recording and monitoring is vital to contribute to conservation action and keep abreast of the changing fortunes of Britain and Ireland's larger moths.

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This article first appeared on the Butterfly Conservation website.

# Recording Scheme Spotlight

*Each issue the NFBR newsletter celebrates one of the many and varied National Recording Schemes in the UK. These schemes help to ensure accurate species identification, help with dataflow and are an essential part of the British wildlife recording community.*

This time we are featuring the Botanical Society of Britain & Ireland written by Kevin Walker (BSBI Head of Science) and Louise Marsh (BSBI Communications Officer).

For over 150 years the Botanical Society of Britain & Ireland (BSBI) has been the main scientific body studying the taxonomy, distribution and habitats of wild plants on these islands. It is probably most famous for its national distribution atlases, the first of which was published in 1962 (Perring & Walters, 1962), and pioneered the mapping of species on the Ordnance Survey's national grid that became available to the general public in the 1950s. For the first time, the maps showed where species occurred on a 10 x 10 km (hectad) scale revealing patterns in relation to geology, climate and human land use as well as historic losses prior to 1930. This approach has now become the standard throughout the world. The second atlas, published in 2002, was also one of the first national atlases to look

*BSBI meeting Rutland Water © Mags Crittenden*

*New Year Plant Hunt 2020 © Joanna Wright*

at national change in species distributions, revealing a dramatic decline in arable species and habitat specialists associated with infertile soils, due mainly to agricultural intensification since the 1960s (Preston et al., 2002). Fieldwork for our third atlas is now complete, and BSBI staff are currently checking the records that will underpin the distribution maps for around 4000 taxa: these will be made freely available online towards the end of 2021.

The main strength of the BSBI has always been its national network of dedicated and expert botanical recorders. These include our vice-county recorders (at least one for each of the 153 vice-counties that make up Britain and Ireland) who take the lead in botanical recording in each vice-county, often producing county floras, a tradition that can be traced back to John Ray's flora of Cambridge published in 1660, as well as County Rare Plant Registers and lists of axiophytes (indicator species) that underpin plant conservation in some counties. Over the last decade, the BSBI has increasingly focused its activities on the wider membership and the general public through projects designed for botanists of all abilities, such as the New Year Plant Hunt, Garden Wildflower Hunt and the National Plant Monitoring Scheme, as well as through field meetings, local groups, online training and social media (see below).

Another key strength of the BSBI has always been its expertise in plant taxonomy. The Society has over 100 expert 'referees' who act as the main point of contact for plant families or difficult groups such as eyebrights, dandelions, hawkweeds and brambles. These are all national experts in their field; BSBI members enjoy exclusive access to the referees as part of their membership package, and are encouraged to send them photographs or specimens for determination. Some produce handbooks on specific groups or plant families, which are published as a series by BSBI. In recent years the BSBI has also produced free online resources for botanists of all abilities, such as our Plant Crib and many other ID help sheets available via our identification webpages.

New Year Plant Hunt

Now in its ninth year, the New Year Plant Hunt (NYPH) encourages all plant-lovers, from beginners to experts, to head out in the depths of winter, either alone, with friends and family, or as part of a botanical recording group, and record as many

*New Year Plant Hunt © Louise Marsh*

*NPMS training session © Louise Marsh*

wild or naturalised plant species as they can find in bloom during a three-hour walk in their local area. Records are submitted via an app (online recording form) and appear on an interactive map, along with a list of most frequently recorded species and a Top Twenty list of the longest species lists from across Britain and Ireland. In 2020, 1,741 recorders submitted a total of 14,724 unique records of 615 species.

Although the NYPH started out as a fun outreach activity at a time of year when it's tempting to stay indoors, it is starting to yield valuable data on phenology. Before the NYPH, very little research was carried out into how many species normally bloom during midwinter, whether they are blooming 'late' or 'early', and how species are responding to changing weather patterns as a consequence of climate change. Each year's NYPH results are analysed by the Head of Science, and compared with previous years and against Met Office data. The resulting analyses are published on the BSBI website. The media coverage generated by the NYPH helps raise the profile of the BSBI and introduces its work to new audiences; it also gives newcomers to recording a taste of what is involved and of the level of support available to recorders via social media, online resources and recording applications. More info: https://bsbi.org/new-year-plant-hunt.

Garden Wildflower Hunt

While the NYPH tries to coax plant-lovers out of their houses, Garden Wildflower Hunt (GWH) has the opposite aim! Launched early in April 2020, just a fortnight after lockdown, GWH aims to get recorders looking afresh at their own gardens, yards, balconies and allotments. Participants use an app (online recording form) to record which wild or naturalised plants they can spot and anyone without access to any outdoor space is encouraged to consider what they can see from their window, perhaps using binoculars. As well as the plant species itself, recorders enter data on the habitats in their gardens, and the growth stage of the plant (from buds or leaves right through to 'dead'!)

GWH isn't just about giving plant-lovers an activity during lockdown and helping them keep their botanical ID skills sharp, or helping newcomers get started with plant identification. The project also aims to help BSBI find out which wildflowers are growing in our gardens, so we can understand more about their distribution,

ecology and phenology. As with the NYPH, results will be analysed by the Head of Science and published on the BSBI website. A side effect of GWH has been the new webpages set up in response to recorders' enquiries about what does native mean, what is 'wild' and, of course, what is a 'weed'? More info: https://bsbi.org/garden-wildflower-hunt.

National Plant Monitoring Scheme

Although BSBI atlas-style recording continues to provide vital information on how our flora is changing, it (as well as a number of other unstructured recording schemes) suffers from a number of spatial and temporal biases in recording coverage that can potentially confound the actual changes that are taking place (Isaac et al., 2014). In response to this, BSBI along with Plantlife, the UK Centre for Ecology & Hydrology and JNCC, have launched a new habitat-based plant monitoring scheme (the National Plant Monitoring Scheme) for the UK (Pescott et al., 2019). This is now in its sixth field season and attempts to monitor changes in abundance of indicator species within fixed plots located in around 30 priority semi-natural habitats in a random sample of 1 x 1 km (monads) grid squares. Plot locations within grid squares are chosen in an unbiased way, thereby improving the robustness of the data collected. Crucial to the Scheme's success has been the ability of volunteers to record at three levels of ability: beginners, intermediate and expert. Close-working with regional partner organisations involved in land management such as the National Trust, national parks and AONBs has been another key to its success, especially in remote areas.

Over the last five years around 15,000 surveys have been undertaken as part of NPMS, with around 1500-2000 plots monitored in around 400 1 x 1 km squares annually. Early findings have included the effects of the prolonged summer drought in 2018 and extensions to the range of species known to be responding to climate change. The results have also shown the extent to which modern habitats are dominated by nutrient-demanding species such as Stinging nettle and Cleavers, the most frequently recorded species in the survey (40% and 33% of all plots). Conversely, the most frequently recorded non-native species, Sycamore and Himalayan Balsam, were only recorded from 4% and 2% of plots and arable field margins and hedgerows the most 'invaded' by non-native species. More info: https://bsbi.org/npms

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*Philaenus spumarius*

# Spittlebug Survey 2020

*Dr Alan Stewart and Dr Claire Harkin*

Did you know that the 'cuckoo-spit' that you see in spring is produced by the immature stage (nymph) of a spittlebug or froghopper? It is thought that the spittle is produced to protect the nymphs from drying out and from their predators. Once the nymphs emerge as adults, usually in late June, they leave their spittle 'nest' behind and become free-flying. The name froghopper reflects the fact that their face is rather bulbous and therefore froglike, and that they are one of the most powerful jumpers in the animal kingdom. There are ten species of froghopper in Britain. The so-called Meadow Spittlebug, *Philaenus spumarius*, is one of our commonest insects and has possibly the broadest diet of any insect, being known to feed on more than 400 species of plant.

Interest in these insects has recently been heightened by the fact that they all feed on the liquid contents of the plant xylem tissue and are therefore capable of transmitting various plant diseases that reside there. One of these, the bacterium *Xylella fastidiosa*, has recently been responsible for the death of millions of olive trees in southern Italy. Fortunately, the *Xylella* bacterium has NOT been found in the UK, but there is a danger that it could be accidentally introduced in imported plants (especially lavender, rosemary and olive trees).

We urgently need good data on two aspects of these insects to understand better how the *Xylella* bacterium would spread if it were ever introduced into Britain: the geographical distribution of the different species of spittlebug and what plant species that they feed on. Last year, we ran a very successful national survey, funded by the Biotechnology & Biological Sciences Research Council (BBSRC) and coordinated through the RHS, focused on gardeners recording spittle on their garden plants, especially lavender and rosemary. This year, we want to encourage naturalists and the biological recording community to collect records from more natural habitats in the wider countryside.

Can you help? It would mean recording cuckoo-spit when you see it and especially the plant species on which you find it. Your plant identification skills will help us collect vital information. Please consider contributing to this important survey. Much more information and an online form for submitting your sightings can be found on our website at: www.Spittlebugsurvey.co.uk.

# Growing it on – a game of patience

*Sarah Whild, NFBR*

It's great to get an immediate identification when recording – either because you, or someone else knows what it is. Sometimes a voucher specimen is necessary, and we send that off, and wait with bated breath for the response from the referee.

But sometimes, the life cycle stage isn't at the right point for an identification, or, if it's a piece of plant, it's often not survived the postage very well. Last year, I received a bag of violets, with a tentative identification of *Viola x bavarica*, the hybrid between Early Dog-violet, and Common Dog-violet. Unfortunately, the petals had shrivelled, but there were some roots, so I took my chances and popped them in a pot on the window ledge.

That spring and summer, I was rewarded with Common Dog-violet, flowering prolifically, and setting fertile capsules full of seed, then in later summer producing the cleistogamous flowers that never fully open, and self-fertilise, also producing fertile capsules full of seed.

So, puzzled, I reported to Ruth, an expert botanist in our county, that her hybrid was not a hybrid, and was Common Dog-violet.

The plant withered over the winter, and, finally, gave up the ghost in February. I was about to empty the pot, when I noticed a tiny violet shoot at the edge, so I left it to see what would grow. The leaves looked pretty much like Common Dog-violet, so I awaited a repeat performance. However, the flowers were most definitely not Common Dog-violets, and had dark slender spurs typical of Early Dog-violet, and barely branched veins on the lower petals – the clincher was that they failed to set seed. I've been waiting a month for seed set, but so far, it is completely sterile, so I was delighted to report to Ruth Dawes that she had found the hybrid – after a year's worth of waiting.

Now, I rarely delve into entomological realms – being a botanist, I know my limitations. However, I do specialise in clothes moths, thanks to inheriting a woollen Berber carpet, and having noticed over the years, large bare patches appearing. Mike Shurmer kindly confirmed that the culprit was *Tineola bisselliella*, the Common Clothes Moth. I found that they had diverged from their main aim of destroying my bedroom carpet, and had delved into a silk throw that belonged to my mother. Their saving grace was that they made cocoons out of the material, and these were intricate and beautiful. I became a bit of an expert at finding the larvae (as they were active at night), by crawling round with a torch, and er, dispatching them. This has become an annual task, but it is one that has become slightly more rewarding on the recording front. Brown House Moths *Hofmannophila pseudospretella* have also joined the party, but my entomological grandstand came on Shropshire Ento-Day on 26th January this year.

I wore my ento-hat, a woollen cap with insect brooches on it. On a trip to the loo, I noticed in the mirror that the peak of the cap seemed to be alive – it was covered with moth larvae. Luckily Mike Shurmer, our county micro-moth recorder, had a pot, and we picked off several – including a couple that seemed to be wandering around like cased caddis, carrying a little black woollen case around them. Mike was excited this was the case-bearing clothes moth, *Tinea pellionella*, of which there were very few records. I took the pot home, and discovered that my hat collection had become prime moth habitat. My father's tweed trilby had gone, as had a vintage silk and wool train guard's cap (don't ask, I collect weird hats), but I picked the cases out of the remains. They were packed up in a pot with some cat fur, some silk and feathers, and left to pupate and emerge.

So, I now have a pot full of dead moths, waiting for the end of lockdown so they can be determined. I'm happy to be patient, and they can be added to the house list, eventually. On reflection, I think I found the violet experience more relaxing, but I now know that I have to keep my vintage hats in sealed boxes! And the emergence of *Tineola*, sitting on the wardrobe doors, or on the ceiling, is one of those things I shall just have to live with.

# News Snippets

*Martin Harvey, BRC*

A short round up of some news from the UK biological recording community.

The **Sarcophagidae Recording Scheme** has now been launched, led by Daniel Whitmore, Charles Griffiths and Nigel Jones. This family of flies includes 64 species of "fleshfly", so named because some of the species have larvae that develop in carrion. Others are parasitoids, and there are a wide range of behaviours and life histories across the family. A draft identification key is available from the membership area of the Dipterists Forum website.

Another family of flies now has a recording scheme, having previously been a study group. This is the spiny-winged flies in family **Heleomyzidae**. This family also includes some carrion feeders, as well as species associated with decaying vegetable matter and seaweed etc., and a draft key is available from scheme organiser Ian Andrews.

The **Soldierflies and Allies Recording Scheme** ran its 'bee-fly watch' project for the fifth year in 2020, and the number of records contributed this year is the highest ever, no doubt due to a combination of more people finding out about the scheme, the good weather, and people with gardens paying closer attention to the visiting insects during the lockdown period. The Dark-edged Bee-fly has been recorded throughout lowland areas of Britain again, and the more restricted Dotted Bee-fly continues to expand its range to the north and east, with new county records including an astonishing one from north Derbyshire, some 100km north of any previous record. Results can be found on the scheme's website.
ID guides for the Soldierflies and Allies Recording Scheme have also been updated this year, with excellent photo guides available on their website.

The **UK Beetle Recording website** provide a home for The Coleopterist journal. Recently a number of back issues of the journal, and its predecessor The Coleopterists Newsletter, have been made available as PDFs to download. In addition, a searchable contents page and cumulative index to the journal have been brought up-to-date. The journals contain lots of material of importance for beetle recording, often including identification guides and news of newly found species. This can all be accessed via the website.

At last year's NFBR conference we had a very informative and entertaining talk from Lee Knight of the **Hypogean Crustacea Recording Scheme** on "Recording under the ground". The website for the scheme has recently been refreshed and contains information about these enigmatic underground creatures, and access to the scheme's data.

You can now join the **British Myriapod and Isopod Group** online, by signing up on their website for the free newsletter mailing list.

On social media, the Scarab Beetle Recording Scheme has joined Twitter and the Cranefly Recording Scheme has a new Facebook group.

The following individual scientific papers, based on biological data collected by national schemes and societies, may be of interest:

**Outhwaite, C.L., Gregory, R.D., Chandler, R.E. et al. 2020. Complex long-term biodiversity change among invertebrates, bryophytes and lichens. *Nature, Ecology & Evolution* 4, 384–392.**

Analysis of long-term trends across a wide range of species groups: "Here, we present and analyse trends in the UK distributions of over 5,000 species of invertebrates, bryophytes and lichens, measured as changes in occupancy. Our results reveal substantial variation in the magnitude, direction and timing of changes over the last 45 years."

**Terry, JCD, Roy, HE, August, TA. 2020. Thinking like a naturalist: Enhancing computer vision of citizen science images by harnessing contextual data. *Methods in Ecology and Evolution*. 11: 303– 315.**

Uses data from the UK Ladybird Survey to investigate the potential for adding contextual information such as date and location to machine learning processes for image recognition: "Metadata is a key tool for human naturalists. We show it can also be harnessed by computer vision systems. Contextualization offers considerable extra information, particularly for challenging species, even within small and relatively homogeneous areas such as the British Isles."

**Michael J.O. Pocock, Mark W. Logie, Nick J.B. Isaac, Charlotte L. Outhwaite, Tom August. 2019. Rapid assessment of the suitability of multi-species citizen science datasets for occupancy trend analysis. *bioRxiv* 813626 (preprint).**

Analysis of what 'rules of thumb' can be applied to species datasets to assess their suitability for occupancy modelling at different spatial scales: "Although ... citizen science data are opportunistic and unstructured, occupancy analysis can be used to quantify trends in distribution. However, occupancy analysis of unstructured data can be resource-intensive and requires substantial expertise. It is valuable to have simple 'rules of thumb' to efficiently assess the suitability of a dataset for occupancy analysis prior to analysis."

**Pescott, O.L., Humphrey, T.A., Stroh, P.A., and Walker, K.J. 2019. Temporal changes in distributions and the species atlas: How can British and Irish plant data shoulder the inferential burden? *British & Irish Botany* 1(4): 250-282.**

A review of various approaches to statistical modelling of species data as applied to vascular plants: "Species distribution atlases often rely on volunteer effort to achieve their desired coverage, an activity now typically discussed, at least in academia, under the general theme of "citizen science". Such data, however, are rarely without complex biases, particularly with respect to the estimation of trends in species' distributions over many decades. The data of the Botanical Society of Britain and Ireland (BSBI) are no exception to this, and both careful thought in data aggregation (spatial, temporal, and taxonomic) and appropriate modelling procedures are required to overcome these challenges."

# National Forum for Biological Recording

The National Forum for Biological Recording is the premier UK organisation for practitioners engaged with biological recording across the UK. Membership includes individual naturalists, national organisations and recording societies, local records centres and their staff. This gives it a unique perspective and an important role.

Whether you are an experienced naturalist or taking your first steps in biological recording, we want to hear from you.

To offer an article for a newsletter, please contact our Newsletter Editor: Elaine Wright on editor@nfbr.org.uk

To join the NFBR, please contact our Membership Officer and Treasurer: Clare Langrick on membership@nfbr.org.uk

For all other enquiries about NFBR please contact our Chair: Sarah Whild on chairman@nfbr.org.uk

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