



WWBIC Bulletin No. 31

Welcome to the 31st WWBIC Bulletin. As usual this edition highlights some of the important recording efforts that go on in our region. The contribution by volunteers to recording is invaluable. I hope you enjoy reading about them.

© Julian Wormald
Brook Lamprey (*Lampetra planeri*)



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And more . . .

'Citizen Science' and the wider role of west Wales mycologists in 2018

2018 was a busy and unusual year for fungi. The cold spring and exceptionally dry weather during the summer months was thought to be the reason why there was a poor showing of grassland fungi in the autumn whereas, in contrast, woodland fungi (especially mycorrhizal species such as *Boletus*, *Russula* and *Amanita* spp.) did well across the whole of south Wales. Rust recording in Carmarthenshire entered its twenty second year in 2018 and up to 2017 recording on a 1x1 km square (monad) basis was progressing very well with over 80% of the monads in the county visited. However, the unusual weather conditions last year resulted in a poor infection rate of rusts on flowering plants and ferns with a result that records were 35% down on previous years. This was due to many hedgerow plants dying off in the summer and also, because the weather was so dry, it is plausible that the lack of moisture on the leaf surfaces severely impacted on rust spore germination and subsequent growth and infection.

Despite these setbacks, during 2018, many mycologists in south and west Wales participated in many Regional and National projects as part of what is commonly called 'Citizen Science' which involves the participation of amateurs and volunteers. One of these projects is an investigation into the possibility of using a parasitic rust fungus to control Himalayan Balsam (*Impatiens glandulifera*). This work is being undertaken by research scientists working for CABI (Centre for Agriculture and Bioscience International based at Egham, Surrey). Himalayan Balsam is an extremely invasive plant across the UK colonising the riparian zones of many rivers and tributaries as well as other habitats. Controlling the species either using manual or chemical methods would be prohibitively expensive to implement across the whole of the UK so CABI is trialling the use of the rust fungus *Puccinia komarovii* var. *glanduliferae* as a biological control to reduce the plant's vigour, to slow its rate of spread or eventually eliminating it. RNS was invited by two of the CABI staff (Sonal Varia and Kate Pollard) to see how this work was progressing at one of the 25 UK field trial sites, which is in Carmarthenshire. Field work involved monitoring the pattern of rust infection on plants sprayed in the spring with spore suspensions of specific rust strains obtained originally from Pakistan and India. The trials are still ongoing but results are encouraging.



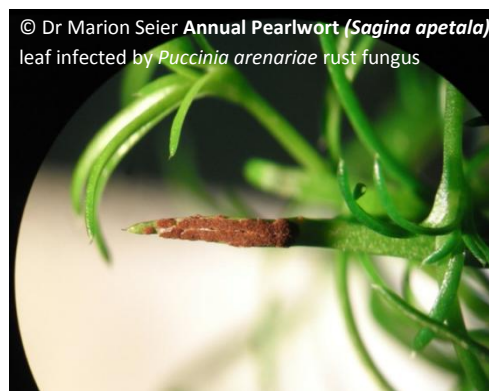
© Dr Sonal Varia
Himalayan Balsam (*Impatiens glandulifera*)



© Dr Sonal Varia
Himalayan Balsam (*Impatiens glandulifera*) leaves infected with *Puccinia komarovii* var. *glanduliferae*

CABI scientists are also using rust fungi to try and eradicate/control the spread of Annual Pearlwort (*Sagina apetala*) from Gough Island (one of our British Territories Overseas near Tristan da Cunha in the south Atlantic Ocean). In the UK, where it is native, Annual Pearlwort is a tiny, inconspicuous plant that grows in cracks in pavements, road verges and waste ground: it seems incredible that it could form such dense, choking vegetative mats on Gough Island. Gough Island is a World Heritage Site for its bird interest and the Pearlwort was introduced to the island little more than a decade ago but has spread so rapidly that the whole ecology of the island is now at risk. Present control is carried out by manually removing the plant from coastal cliffs by specialist teams of RSPB staff who abseil down on ropes. This is dangerous, time consuming and expensive and a form of biological control is now being proposed and investigated by CABI. In the UK, Pearlwort is infected with a rust fungus *Puccinia arenariae* which is more commonly found on Red Campion. CABI staff (under the supervision of Dr Marion Seier) asked RNS together with two other members of the Welsh Rust Group (Arthur Chater [Aberystwyth] and Debbie Evans [Bangor]) to collect rusted Pearlwort specimens from their areas and send them to CABI research laboratories. These strains of rust could then be tested against strains of Pearlwort obtained from Gough Island.

To date, CABI have successfully infected Pearlwort from Gough Island with the Welsh strains of rust and the work is ongoing.

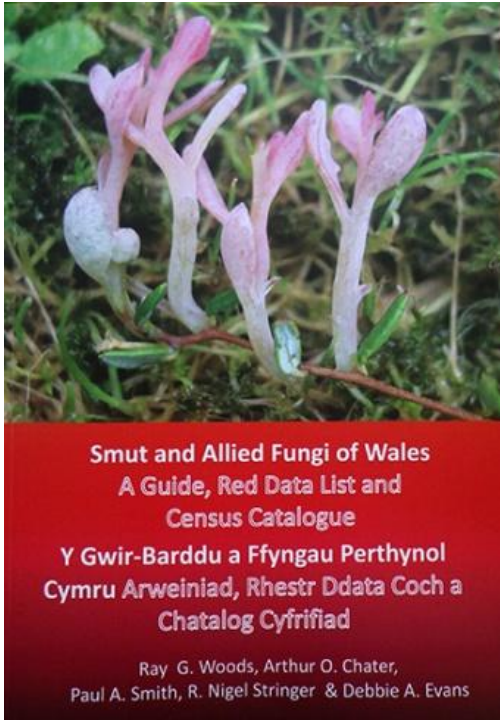


On the medicinal front, mycologists across south Wales are participating in helping a Ph.D. student (Jenny Shelton of U.C. London) with her investigations into the fungus which causes 'Farmer's Lung' *Aspergillus fumigatus*, a cause of serious lung problems in humans. This is a microscopic fungus which occurs on dead plant material and is prevalent in 'self-heating' systems such as composting straw. The air we breathe contains thousands of pollen grains, bacteria and fungal spores and these are largely dealt with by our immune system. However, people whose immune system is deficient, need specialised drugs to keep infections at bay and, at present, a group of triazole drugs are used to combat *A. fumigatus* infections. However, researchers are finding that some strains of the fungus are becoming resistant to these drugs and Jenny has set up a nationwide program to sample the 'air spora' at selected times of the year using what is in essence a 5cm x 5cm sticky pad placed outdoors for 8 hours. These pads are sent back to Jenny who will then get an idea of the number of *A. fumigatus* spores in the atmosphere across the UK and will also be able to culture the spore-derived colonies and test their resistance to existing and new drugs under investigation.

Another 'Citizen Science' project is being carried out by David Harries and his colleagues in the Pembrokeshire Fungus Recording Network. David, a retired chemist in the petro-chemical industry has been trialling equipment and developing a methodology (with technical help from Mike Crutchley) for the extraction of DNA from fungal tissue. The DNA is extracted, and the barcode section amplified, using a purpose-built piece of equipment (Bento Lab). The resultant barcode section is then sent to Dr Gareth Griffith in Aberystwyth University for sequencing. The position of the 'bases' making up the DNA chain in the sequence will help taxonomists to sort out the taxonomy of selected fungal species. David also works closely with mycologists at Kew and has, over the years, aided Kew scientists in their research into grassland fungi, his work having resulted in the discovery of species new to the UK. However, in 2018, he headed-up a project looking into the typification of a rare fungus of unimproved grasslands called *Microglossum olivaceum*. This is a section 7 species¹ considered to be of key significance to sustain and improve biodiversity in relation to Wales and a component of our declining waxcap grassland community. In the last few years continental workers have found out that *M. olivaceum* is a species complex made up of several different forms. David obtained specimens collected from all over Wales and using DNA methodology, was able to confirm that the Welsh populations were also composed of a mix of species and as a result Natural Resources Wales can now target specific species in their conservation programme.

DNA methodology is an important part of species taxonomy today and is now a basic function of research labs. RNS and David Harries have been advising/part-supervising under-graduate and post-graduates of Dr Gareth Griffith at Aberystwyth University. Research by the students into the taxonomy of rust fungi over the last few years, chiefly using material collected by the Welsh Rust Group, has resulted in one of the Ph.D. students (Liam George) discovering a new species of rust on a member of the Asteraceae.

¹ Species of Principal Importance for Conservation of Biological Diversity under section 7 of the Environment (Wales) Act 2016.



Other new species of parasitic fungi called ‘smuts’ have also been found in Wales. Arthur Chater over the last few years has been researching into the distribution of this under-recorded group of fungi in Ceredigion. His colleague and very close friend Paul Smith (Southampton University and BSBI Recorder for the Outer Hebrides) has sent smut specimens from Wales and Scotland to Dr Matthias Lutz, University of Tuebingen, Germany, where DNA sequencing has been carried out. As a result, new species to the UK have been described. Following on from the intensive survey work on smuts by Arthur and Ray Woods, they published (along with other authors) the latest addition in the ‘Red Data List’ Series which includes all the smut fungi found on plants in Wales, together with their conservation status and occurrence on hosts in all the Welsh vice-Counties. The book was launched at the First International Conference on Fungal Conservation at Kew in September 2018. Two hundred and sixty-five delegates from 35 countries attended and RNS, David Harries and Liam George presented poster displays and also gave talks on their work.

Bruce Langridge from the National Botanic Garden of Wales also attended the Conference and the Botanic Garden has also been active in supporting fungal research. At present, a Ph.D. student from U.C.W.

Cardiff is researching into the ecology and biology of **ash die-back disease** (caused by the fungus *Hymenoscyphus fraxineus*). Volunteers belonging to the Botanic Garden Conservation Group meet at weekly intervals and are helping the student with this survey work in the Garden which is one of many sites being monitored throughout Wales.

There are, I am sure, other examples locally where amateur conservationists are actively involved in-putting their mycological research or survey results relating to their specialist interest group into research on a regional and/or national scale. Much of this work goes unreported so it is important that members of wildlife organisations are congratulated on the valuable contribution they make to conservation issues in a wider context.

Reference

Woods, R.G., Chater, A.O., Smith, P.A., Stringer, R.N. & Evans, D.A. (2018). *Smut and Allied Fungi of Wales. A Guide, Red Data List and Census Catalogue*. A.O. Chater, Aberystwyth.

Nigel Stringer (RNS)

Garden Invasive

Colin (WWBIC manager) made an interesting discovery while digging his vegetable patch recently. In amongst the soil he spotted a bright orangey/pink flat worm which was immediately obvious as something different. Colin identified this species as *Australoplana sanguine* (Australian flatworm). As the name suggests this species is a native of Australia, it is an invasive to the UK and is a predator of our native earthworms.

This record appears to be a first for Pembrokeshire.

Kate Smith



Recording Slugs

Chris du Feu verifies slug records on iRecord, here are his top tips for what makes a good slug record and the information required for him to do his job.

All species records are valuable, even of common species where many records from one area can give useful information about phenology and local distributions. With modern computer technology we cannot have too many records. For species groups which are under-recorded, records are even more valuable. iRecord provides an excellent platform for ensuring that your records are sent to a secure national record bank and will become freely available on the NBN Atlas and elsewhere.

For a record to be useful it must be correct and that is where the verifier steps in. It is surprising how many people will mis-identify a slug. For instance a big black slug will be called Large Black Slug, *Arion ater*. In fact, it could be any one of at least four species of closely related slugs – all of which can be found in almost any colour black, brown, grey, orange, white or even yellow. Without further information a verifier cannot accept a record unless there is more evidence than the name of the beast. For all records from non-slug specialists, photographs are most important. Three images – one from above, one from below and one showing the right side, preferably with breathing pore open will show the important identification features. (Photograph of underside most easily taken through a sheet of clear plastic or glass.) With good photographs, something like three-quarters of specimens can be identified with certainty. In addition to this some notes will help confirm the identity of some species. For example, comments such as 'bright orange, liquid mucus', 'distinct keel and dark central band on sole', 'milky white mucus', 'rocked readily when provoked' will help confirm *Arion subfuscus*, *Tandonia budapestensis*, *Deroceras reticulatum* and *Arion ater* respectively. These comments will also help the verifier know that you know what to look for, and have looked for it.

What should you look for? For identifying slugs, Ben Rowson's FSC guide is essential. It will tell you what to look for and hence what sort of comments will be helpful to the verifier. You can contact me at chris.r.dufeu@gmail.com if you have questions about identification.

I look forward to receiving more records soon.

Chris du Feu

Invertebrate Training

A superb day of training was provided by the entomologist Liam Olds, in Penparcau this month. WWBIC have invested in four free days of training for people who wish to improve their invertebrate identification skills, and have funded four days of in depth teaching to be provided for the members of the "Nature of our Village" project in Penparcau, as well as other interested biological recorders.

Liam specialises in solitary bees, and luckily we had arranged the perfect weather to see them in! He helped us to find fifteen bee species on our local hill, Pen Dinas. These included the Nationally Scarce Red-girdled Mining Bee (*Andrena labiata*) which he found there last year, and also many new records for our area, including the Grey-patched Mining Bee (*Andrena nitida*), the Orange-legged Furrow Bee (*Halictus rubicundus*) and several wasp-like Nomad Bees. With Liam's help we were able to distinguish between Lathbury's, Gooden's and Marsham's, which was much easier to do in the field with an expert than attempting to work it out with a field guide.

We would like to thank WWBIC for their commitment to providing the highest possible quality of training to members of the public, ensuring that we have the best possible chance of making good quality records and playing our part in providing the data that powers nature conservation.

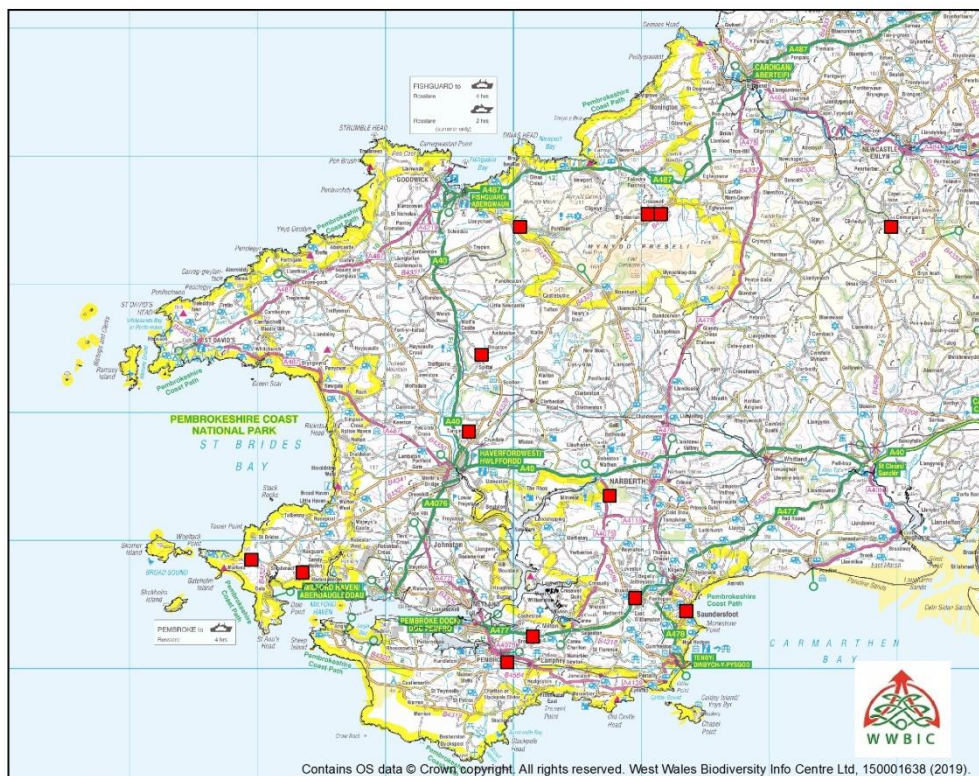


© Chloe Griffiths
Liam Olds with course participants

Chloe Griffiths
The Nature of Our Village Project

New Bat Recording Project

Deall Ecosystemau is a pilot project run by the Bat Conservation Trust (BCT) in Wales to help inform the future of bat monitoring programmes. The project allows volunteers to book a bat detector pack from one of six loan centres, three in Pembrokeshire and three in Gwynedd/Anglesey, for one week at a time based on a one-kilometre square. At the end of the survey, the data cards are sent to BCT for rapid initial analysis and a report is sent back to the person borrowing the equipment. Working with the local bat groups the data is later verified and the results sent to the Local Environmental Records Centre (LERC). The project is part funded by Natural Resources Wales and runs in partnership with the British Trust for Ornithology, local bat groups, and WWBIC/COFNOD. BCT are testing out a new low-cost full spectrum bat detector (Audiomoth) that will make acoustic bat surveys affordable for future citizen science work. Although the Audiomoths (www.labmaker.org) are still in the development phase, they are becoming very popular due to their low cost and we are hoping this will inspire people to buy their own.



Map shows one kilometre squares surveyed in Pembrokeshire

The loan scheme started late last year with a pre-pilot study allowed BCT to test the auto id systems and processes, as well as to see how the project would run in practice. Thirteen one kilometre squares were surveyed for Pembrokeshire and there were an additional ten people who wanted to take part but couldn't as detectors were not available at the time they wanted to survey. Eleven one kilometre squares were surveyed in Gwynedd/Anglesey. The project overall, generated something in the order of over 500,000 sound files to sort out using various auto id systems which helped to reduce the amount of work. All the sound files that were positive for bats have now been looked at by BCT as part of the data verification process. Across the board, volunteers recorded common and soprano pipistrelles (which were by far the most commonly recorded bat species), brown long-eared bats, noctules, lesser horseshoe bats, barbastelles, and natterer's, daubenton's and whiskered/brandt's bats.

For more information see <https://www.bats.org.uk/our-work/in-wales/deall-ecosystemau-understanding-our-environment>

Steve Lucas
Wales officer, BCT

Carmarthenshire – the extraordinary movements of Marsh Fritillaries in 2018

It's not often that a long-threatened and declining species turns up in 73 additional fields in a county, even one the size of Carmarthenshire. That's what happened in 2018 and that's just the part we know about. So what has led to this amazing phenomenon? It's a fascinating story and made all the better that we still don't know all the answers. Wildlife Conservation is still a modern science and precise life-stage requirements ("auto-ecologies") in the wild for conservation priority butterflies in the UK, were mostly only fully researched within the last 25 years. Since then, climate change, air, water and land pollution by enrichment from intensive human activity, including agriculture, have also impacted butterflies. Speaking to leading plant geneticists in Wales, the general public is probably not aware of the increased competition for suitable butterfly habitats from "invasive" species – not just the aliens like Japanese Knotweed and Himalayan Balsam but Bramble is thought to grow a third more vigorously than a decade ago. Then there are the almost universal ryegrass monocultures with sheep and/or silage. If it were not for EIA Uncultivated Land Regulations, farms would probably have ploughed and re-seeded even more natural and semi-natural wildlife habitat. Cue the smallholders and others with land which doesn't have to be cropped to provide income – there is a significant and mostly positive role played by these in Carmarthenshire.

Since 2000, there has been an initiative by the then Countryside Council for Wales (now subsumed within NRW) to assess local landscapes for habitat suitability for Marsh Fritillaries (MF) across Wales to help fulfill EU, UK and Wales government biodiversity duties. Thus in South Wales, Glamorgan has been almost completely covered, plus parts of west Wales. So saying, the immediate area around Cross Hands was assessed in 2001, then expanded to a larger radius area (Mynydd Mawr) in 2009 and again in 2018. Meantime, with support of local biodiversity partnerships, we got Amman valley and several localities around Brechfa Forest assessed in last 5 years. These studies identified several thousand hectares of suitable habitat still extant across these locations but usually in private ownership. Of these only a small fraction revealed occupying populations of Marsh Fritillary butterflies, so with increasing member and volunteer interest, we set about trying to visit some of the most promising sites across Carmarthenshire.

Over the years, we've had some early successes, notably an initiative in 2005 to visit Small Pearl-bordered Fritillary sites in SE Carms, brought records of Marsh Fritillaries for a few sites! The 2009 Mynydd Mawr habitat assessment had revealed a dozen more occupied sites. Then for a few years most of our volunteer effort in Carms went into helping to manage our reserve at Caeau Ffos Fach and (later) the adjoining Median Farm. Meanwhile BC Wales' MF Surveillance programme concentrated on regular visits to assess MF population on a selection of known sites across Wales, allied with an initiative to re-visit all known MF sites every 5 years – which is where volunteers could help. However, the Carmarthenshire County Council/Wales Government funded habitat study around Brechfa Forest in 2016 showed habitat and MFs across a much wider part of the county than previously known, which gave us opportunities to involve volunteers and smallholders from wider Carmarthenshire, not just the Mynydd Mawr and Amman valleys area.

It's worth reflecting on MF metapopulation theory at this point. MFs occupy sites/fields from time to time but need a network of suitable habitat patches within easy reach to move to/from as their parasite and habitat condition changes often year on year. Some models suggest that roughly every seven years on average, local MF populations will "Boom" with up to 200 caterpillar webs present per hectare! A famous example in history is thousands of MFs erupting in Ireland in the 19th century, around the time of potato blight. Seldom are such densities found in Wales! We know from hard experience in South Wales that this movement is unpredictable for particular localities (metapopulations) and by no means synchronized across metapopulations. However, if parasite activity on caterpillars in spring is low (often attributed to dry, sunnier spring) and weather in flight period (late May into June) is favourable, movement of MF butterflies can happen then. Its success, of course, depends on the conditions being suitable in the local "arrival" sites. They need continuous Devil's Bit Scabious, caterpillar hibernation opportunities and minimal disturbance to persist into subsequent years. Cue 2018!

Flight period highlights, June of 2018.

It is difficult in a newsletter to provide accurate maps or grid refs for individual fields, given data protection and privacy of many sites. However, some of the flight period highlights included: a timed count, by five of us volunteers (Alan, Dai, Gareth, Paul & I), of 554 Marsh Fritillaries across 8 fields in Harford in north of county; 70 counted by myself and Rob Parry in a known small site near old railway in Cwmgors; 40 counted in another small meadow in Harford and Amanda Evans and I counting 46 at a new site near Llannon.

- New fields with adults only found in 2018 in Mynydd Mawr metapopulation = **4 new fields**
- New fields with adults only found in 2018 in other Carms metapopulations = **22 new fields**



©Richard Smith
Larval web searches



©Richard Smith
Marbled Whites in Trapp field with
larval webs



©Richard Smith
Early flowering Devil's Bit Scabious in
Brynamman hay meadow

Larval web count highlights, July to September 2018.

As it didn't rain between end of flight period in late June and early August, we had the unprecedented luxury of finding larval webs right through this period, in addition to normal period of mid August to late September. (The rain usually washes away webbing from early caterpillars clusters, but not in 2018, so they were very visible). Again, some highlights: Rob Parry got to 187 webs in those Cwmgors old railway fields and ran out of time; 50 webs at a new site near Trapp (Francis, Kath, Paul and I with Meryl from NRW – and now a new SSSI); 52 webs at that small meadow in Harford; Dave Bannister finding 9 webs at a new site near Brechfa; 25 webs in a lovely pingo field in Harford where none found previous two years and finally Amanda, Francis, George and I finding 3 webs in a great looking pasture north of Ammanford where we'd failed to find evidence last four years.

- New fields containing larval webs found in 2018 survey in Mynydd Mawr area but outside current SPG (project area) boundary = **31 new fields**
- New fields containing larval webs found in 2018 survey in Mynydd Mawr area but within current SPG boundary = **5 new fields**
- New fields with larval webs found in 2018 in other Carms metapopulations = **10 new fields**

Keeping going into 2019.

Even with a generous volunteer mileage budget agreed by our branch committee for 2018, we just didn't get to all the sites we would have liked to. Given that larval webs were found in so many new sites, we hope that they will spill over into sightings in 2019, which means it should be possible to visit additional Carmarthenshire sites this year and to find MFs present. We hope to start in late May and first half of June with visits to find adults in flight period and then continue initiative through the larval web season of August and September. So if you might be available to help and join like-minded people, do let us know.

Incidentally, although we concentrated on Carmarthenshire, given its already recognized importance for MFs in Wales, a handful of new sites were also found in both Ceredigion and around Seven Sisters in Neath Port Talbot. Quite a stunning episode in times of Marsh Fritillaries in Wales!

Richard Smith
Butterfly Conservation

Backstage at the Oxford University Museum of Natural History

Something I have only recently found out is that, if you give people notice, it is often possible to go backstage at natural history museums and get private access to their collections. I first tried this a couple of years ago at the OUMNH, when I was interested in seeing all the UK species of hoverflies. Our wildlife recording project in Penparcau aimed to identify and record as much of our village's flora and fauna as possible, particularly the less well-recorded species, and for this I needed to up my hoverfly game!

I emailed the Head of Life Collections, Darren Mann, to see if it would be possible to visit him and see my target species, I was delighted to be invited to go in and see the collections they hold in the rooms not normally accessible by the public. When I arrived, I was met by James Hogan, a very friendly member of staff who himself was Collections Manager and got to walk through a very Hogwarts door to a room bursting with collection cases, and with, it must be said, a distinct odour of preserving chemicals.

The wealth of UK hoverflies was laid out before me and I was able to examine them with a lens to get a better idea of what to look for in the field back in Penparcau. As an added bonus, I got to meet Darren too, who spent several hours talking to me about Dung Beetles and gave me some excellent identification materials to share with members of our group. This meeting led to our running 2 Dung Beetle sessions on Pen Dinas, and a young member of our group finding a really good one!

I was back at the OUMNH again at the end of April this year, and this time needed to see the UK ladybird species. Our group has taken a particular interest in recording these insects and has managed to find 4 species in our village for the very first time (the Orange Ladybird, the Pine, the 18-spot and the 10-spot) and to re-find the 11-spot and the 14-spot, neither of which had been recorded in the village since 1987. Ladybirds can have quite considerable genetic diversity in terms of their patterns and markings, which can make them challenging to identify in the field if they have an uncommon pattern formation. I wanted to see the museum's collection of ladybirds, with its multiple pinned individuals of the same species, in order to get an idea of the sort of variation that was possible. I have the fantastic "Field Guide to the Ladybirds of Great Britain and Ireland" and took the opportunity to annotate this book with all the possible patterns for each species, thanks to James who set me up with 3 trays of ladybirds and a microscope.

Having access to collections like these is enormously useful, and I would urge anyone else who is working on particular taxonomic groups to go and see what is out there, don't be shy, there are many wonders, and a warm welcome, behind those Hogwarts doors!

Chloe Griffiths
The Nature of our Village Project



© Chloe Griffiths
James Hogan from the OUMNH with a pinned collection of ladybirds

Aderyn Recorder Module Training

Four recorders recently participated in a workshop held at WWBIC to learn more about the Recorder Module on Aderyn. The Recorder Module is a feature designed specifically for VC recorders, it allows them access to and enables them to interrogate records within their area of interest. Access is geo-locked to the relevant vice county and taxonomic group. Kate led the workshop and demonstrated the various aspects of this module to the group. Participants then undertook a couple of exercises to practice using it.

As well as providing access to records held by all four LERCs this tool will be useful in helping to 'clean up' the database, VC recorders will be able to identify erroneous records and download records they don't already hold which will help with verification.

Kate Smith

PFRN Training

The Pembrokeshire Fungus Recording Group (PFRN) recently held a one-day workshop which covered an introduction to rusts and the use of DNA barcoding techniques on fungi. The workshop, run by Nigel Stringer and David Harries and hosted by WWBIC, was fully subscribed with 12 participants from Pembrokeshire and Carmarthenshire.

Nigel opened proceedings with a presentation on rusts which described their life cycle and spore stages and illustrated the substantial economic impact of rust attacks on commercial crops such as coffee and wheat. The talk then moved into the field of DNA barcoding with reference to recent work at Aberystwyth University in which DNA barcode sequences were used to demonstrate the presence of a previously unrecognised species. Following the talk, Nigel led a walk at nearby Pen Back farm which provided an opportunity for the group to learn more about rusts visible at this time of the year. A bonus was the chance to see examples of the rarely recorded Hay-scented Buckler-fern (*Dryopteris aemula*). The walk concluded with lunch at the Cowshed Pizzeria before returning to the WWBIC meeting room.



The afternoon session commenced with a presentation by David on the use of DNA barcodes with particular reference to the steps necessary to get from a fungus sample to a DNA barcode. The group was shown the Bento Lab instrument which was launched last year by Bento Bioworks as a unit combining the kit needed for DNA extraction and amplification into a single affordable package. The Wales olive earthtongue project, which was initiated by the PFRN in 2017, was used to illustrate the way in which barcoding can be used to provide information about the distribution of species which were previously regarded as part of a species complex. The presentation was followed by a practical session during which the participants split into small groups which alternated between inspection of rust specimens with Nigel and extraction of DNA supervised by David. The DNA extractions were carried out using a quick extraction method based on recently published protocols for extracting DNA from a range of materials including plants and animals. The method is currently being trialled by Kew (Lost and Found project) and the PFRN in order to confirm that it is suitable for use by field mycologists in the UK. Following the event the samples were subject to further processing to amplify the DNA barcode from the DNA. A quality control check using gel electrophoresis showed that all 8 samples yielded either good or acceptable amounts of DNA: an excellent result for first-time extractions.

David Harries

Pembrokeshire Fungus Recording Network (PFRN)

WWBIC Carmarthenshire Recording Day

On 13th May we spent a day in the glorious spring sunshine at Caermalwas Fach, north Carmarthenshire, for WWBIC's first recording day of the season.

It was a relaxed and well-attended day in beautiful surroundings, with especially breathtaking views of the Brecon Beacons. The 78 acre sloping site features a variety of habitats, including mixed grasslands, streams and woodland. Species recorded included a drinker moth caterpillar (*Euthrix potatoria*), 14-spot ladybirds (*Propylea quattuordecimpunctata*), marsh marigold (*Caltha palustris*), skylarks (*Alauda arvensis*), and a cuckoo (*Cuculus canorus*). The highlight of the day was a sighting of a hare (*Lepus europaeus*) running down the field!

Thank you to the Wildlife Trust of South and West Wales for co-organising the event – and for bringing an excellent selection of cakes! Our thanks also to the landowner.

Sophie Pope



WWBIC Recorders Forum

On 2nd March 2019 we met at the Harlow Room, Welsh Wildlife Centre, Cilgerran for the WWBIC Annual Recorders Forum. On arrival there was an opportunity to chat over tea and coffee and at 10.30am Jane Hodges opened proceedings and welcomed everyone. Colin then gave the annual WWBIC update.



© Toni Henwood
Ian Hughes speaking

Ian Hughes was the main speaker at this year's event. Ian, a naturalist and artist, lives with his family in Ceredigion and with his son runs Lifeforms Art. Ian humorously described how it all began for him in taxidermy he then went on to work at Dudley zoo and eventually for the English Nature Species Recovery Programme. Ian's talk was titled, "Creative approaches to conservation - three little pigs" the three little pigs being; Ladybird spider (*Eresus sandaliatus*), Scarlet Malachite Beetle (*Malachius aeneus*) and Glutinous snail (*Myxas glutinosa*). Ian worked to conserve, breed and translocate all three of these species using creativity and ingenuity. He described his successes and failures and informed us about their behaviour and ecology.

The programme then allowed for a 20 minute discussion/open floor period where we sounded out interest in the possibility of an all Wales Recorders Forum and a workshop on the Aderyn Recorder module as well as WWBIC starting up a small grant scheme for recorders. A delicious lunch in the Glasshouse cafe then followed with plenty of time for attendees to catch up.

David Harries' talk titled, "DNA barcoding - a new and exciting opportunity for field enthusiasts" began the afternoon session. David described the procedure for extracting DNA from fungi a process he and some members of PFRN had been trained in by Gareth Griffiths at Aberystwyth University. Samples are then sent off for sequencing. David brought with him and described the Bento Lab that PFRN had been involved in trialling. This device provoked a lot of interest and discussion.



© Colin Russell
David Harries describing Bento Lab

Clive Hurford followed up his talk from last year's Forum with a brief update about the Living Wales EarthTrack App. He demonstrated how the App worked and what information can be input.

Emily Foot, Wildlife Trust Officer for Ceredigion gave us a whistle-stop tour of the twenty reserves she manages. She described some of the techniques required to manage the different habitats and mentioned some of the species recorded at these sites.

Barbara Brown, Wales BSBI Officer, brought us up to date with BSBI Atlas 2020. This is the third Atlas, the second being published in 2002. Barbara explained how data was being gathered, displayed statistics on record numbers and gave examples of species that are declining and increasing.

Huw Jones summed up what had been a varied and informative day and closed the event.

Kate Smith

EarthTrack and Living Wales – Training session on the use of mobile apps for recording environmental information in Wales.

Training on the use of the Earth Track App, June 5th 2019.

The EarthTrack Mobile App has been developed through Aberystwyth University's Living Wales project (wales.livingearth.online) to facilitate near real time collection of land cover, land cover change, environmental variables and biodiversity. Such data supports routine and continuous characterisation, mapping and monitoring of landscapes from Earth Observation (EO) data. EarthTrack also provides observers with capacity to record data on themes of local priority in Wales, such as the breeding distribution of yellowhammers, pollinator-rich habitats and species-rich arable fields.

To use EarthTrack, some training is required both on the content of the app and its use for recording environmental information. For this reason, the Living Wales project will be holding a two hour training session on June 5th 2019 at the following locations:

Aberystwyth University (starting at 10:00)
Cilgerran Wildlife Centre (starting at 15:00)
Orielson Field Centre (starting at 19:00).

Each training session will last approximately two hours, with users initially loading the app onto their phones, and then given a short practical session on the recording process.

Please contact by email Clive Hurford (email: churford5@gmail.com) if you would like to attend the training.

Note that the app is only currently operational on android phones.

Clive Hurford, NRW

The Water buffalo are back... with a new friend!

The Water buffalo have once again made a welcome return to Teifi Marshes nature reserve. This year they have also been joined by 'Rusty', a life size wire sculpture of one of these fine beasts made by local sculpture artist Geoffrey Powell. The sculpture has been installed overlooking the grazed area of marsh and can be seen by visitors when passing the enclosure. Rusty and the three Water buffalo are settling in nicely and once again the animals are proving their worth as an important conservation tool in maintaining and enhancing the marshland habitat for the variety of species that depend on it.

Geoffrey has been a long-standing volunteer and supporter of the Wildlife Trust and made the sculpture in his own time and at no cost to the Trust. From conception to completion, it took several months which included taking pictures of live Water buffalo, making a small-scale wire model, doing a life-sized drawing and welding the steel bar.

This new addition compliments another sculpture made by Geoffrey of a frog leaping into a pond. We are very grateful for Geoffrey's energy in creating the sculpture and it has fast become a key feature and attraction on the reserve.



Nathan Walton
Wildlife Trust Officer, Pembrokeshire

Brook Lamprey

At WWBIC we've had three Brook Lamprey sightings reported to us by members of the public in the last couple of weeks. It's not a species we get many records for so when Julian Wormald sent us some photos (and video footage) of this intriguing species it had to go on the front of the newsletter. Here's Julian's account of his encounter with this normally elusive species and what he's learnt about it since.

As we returned to the stream after lunch out on Good Friday, our eldest granddaughter called out, from ahead of us, that there were three eels in the stream. Doubtful, I reached the bank side and indeed she was right. Barely four feet from where we stood were three intertwining eel like fish, about six inches long and the thickness of a finger, sinuously twisting and focusing their activity on a very small area of the gravelly stream bed. As we all made it to the viewing point, it became clear that this was a prelude to spawning, and Fiona spotted that the fish were using flexing body movements and physically picking up stones in their mouths to fashion some sort of shallow depression. My limited knowledge of eel ecology included the fact that all eels migrate to spawn in the Sargasso sea, that unique area of the Atlantic that has no immediate land borders, defined by four different rotating ocean currents someway East off the coast of North America. So maybe these weren't eels at all?

Then they must be lampreys! How exciting since none of us had ever seen one before, and here in front of us they were performing their mating and spawning ritual, completely unfazed by our presence, noise, and even stick waving by the youngest of our clan. After several minutes watching we moved downstream and I kept looking for any more. I spotted one dark form swimming purposefully upstream. An hour or so later at the spawning site, there were indeed four fish present. Returning on my own, just before dusk, the number had risen to 8, I think, though it's difficult to count a writhing mass of lampreys...

Good Friday was the night of a full moon.....and being clear, warm and dry, I was intrigued to see the state of affairs the following morning, so around sunrise at 6.10 a.m. I walked back down to the stream. They'd all gone. It was only when looking at the second You Tube clip below, that I realised that the accumulated plant debris in the spawning site, just downstream of the larger stones, wasn't "just plant debris", but a collection of caddis larvae which had moved into the site for breakfast eggs!



It's taken me several days to find out more about the ecology and life cycle of the lampreys we saw – the smallest of the British lamprey species, the Brook Lamprey, *Lampetra planeri* (from the Latin, *lambere* = to lick; and the Greek, *petra* = stone, *Planer* being a German naturalist). Indeed I'm including several links later on, because no single source seems to have complete information in them. This is in part because no one has yet managed to rear them in captivity – it's been possible to collect eggs from such spawning sites, or mature adults and strip spawn them, but after the eggs have hatched, their remarkable life cycle involves the juvenile larval forms, known as ammocoetes, settling in parts of the stream bed with muddy or silty deposits. They bury themselves with just their mouths at the surface, and then spend the next 5 years or so feeding on plant and animal debris like small invertebrates, algae and even pollen which washes past.

So they never migrate to sea, and never attach with their suckered mouths to parasitise larger fish, unlike their British cousins the larger river and sea lampreys. I didn't realise this when I recorded the voiced over YouTube clip, so please excuse this error!

What's more, after these several years of largely secretive and hidden development, they metamorphose. Though there's no great detail I could find on this, it's only the adult form which develops the typical round suckered

mouth which you can see being used to shift pebbles in some of the images here. At the same time, their alimentary tract atrophies, so the adult lamprey which emerges from this metamorphosis in late summer or autumn, never actually feeds at all over the winter and into spring. It simply hides and moves around the stream, largely by night, waiting for the spring triggers of warming water – over about 11 degrees C, and some think the pull of a full moon, to migrate further upstream for spawning.

During the brief mating episodes, the female will often anchor herself with the suckered mouth to a pebble in the mating redd, whilst the male anchors himself to the back of her head, using his sucker. Then he wraps around her body bringing their joint anogenital openings into close proximity, and there is a short period of vigorous vibration during which time eggs are released, fertilised, and some will end up being buried under gravel during this process.

Other eggs will wash downstream. In any event, surviving viable eggs will hatch into larvae after just 3 to 4 days. Once mating has been completed, the adults die within a few days – or indeed are taken by predators. Fortunately we haven't seen a heron here for several days, since the lampreys would have made easy pickings. I should add that Lampreys and their closely related cousins the marine Hagfish, which have similar round mouths with rasping teeth, are some of the oldest species of vertebrates on the planet. They diverged from the mainstream of vertebrate evolution perhaps 500 million years ago, and have several distinctive features:

- Firstly they are the only surviving forms of jawless fish – so whilst all other vertebrates which developed later on have hinged jaws for chewing, lampreys and hagfish simply have their round suckered mouths. They are thus known as cyclostomes or agnathans, to separate them from all other vertebrates with hinged jaws – the gnathostomes.
- Secondly they have primitive gill slits on each side of the head, (7 in lampreys, 12 in the case of hagfish) and a simple eye and nostril.
- They lack bilateral appendages like fins or limbs. All other vertebrates have these – or at least did before they became vestigial or “lost” as in eels or snakes. Other fish and tetrapods have matching paired fins, legs or arms.
- They don't have a conventional vertebral column with articulating mineralised or cartilaginous vertebrae. Instead much simpler cartilage like nodules give their adult body structure. In part this contributes to their extremely flexible body.
- Lampreys have both a primitive innate and also an adaptive immune system, though this is entirely different to that found in other vertebrates.
- Unlike most other fish, lampreys lack any scales.
- Lamprey larvae, their ammocoetes, are effectively blind for all the years that they live, feeding buried in silt or mud. Their eyes at this stage are like those of hagfish, small, and buried beneath the skin with a very poorly differentiated retina. Only at metamorphosis into the final adult stage, after all those years of blindness, does the eye develop to end up quite similar to that of other vertebrates, erupting at the body surface, developing extra-ocular muscles, though no intra-ocular ones, a conventional type eye lens, and a fully functioning retina. Meanwhile the cornea splits into both sclera and dermal layers, which means that the eye can move relative to the rest of the skin, as it does in other fish. Hagfish eyes remain extremely primitive structures throughout their lives.
- Finally they don't have conventional vertebrate brain development, though do possess the precursor of a distinct neural crest.

Julian Wormald

Julian's video footage can be viewed here:

<https://youtu.be/kCJPtExLT9w>

<https://youtu.be/ejJQ5cP8-hk>

LERC Wales

The Consortium of Local Environmental Records Centres Wales, which we refer to as LERC Wales, is now in its fourth year and has proven to be a great success in our relationships with national partners. All our national data service and provision agreements now go through LERC Wales these being with; Welsh Government, Natural Resources Wales, the North and Mid Wales and South Wales Trunk Road Agents and two statutory providers, Dwr Cymru and Network Rail.

Key to this success has been the creation of the all Wales database of species records merged from all four individual LERCs and of course, the development of the Aderyn reporting system which we have updated you on through this newsletter. The ease with which our partners can access the wealth of species data in Wales is unmatched in any other part of the UK. As with all technological developments, to stay still is to move backwards and Aderyn and the eMapper system are both undergoing continuous development. In order that we can maintain this position and support the development needed, LERC Wales has employed a part-time developer, John Robinson, based in SEWBReC who has been working with staff both there and with BIS in Brecon.

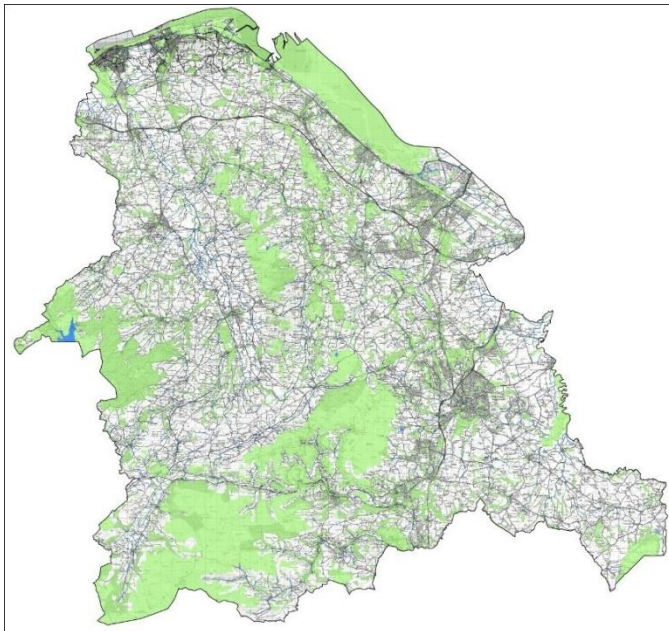
Currently, the cost of John's post is being shared by the four LERCs but with the need for ongoing maintenance and development in mind, the LERC Wales Board is looking into sustainable funding mechanisms to support this unique service.

Colin Russell

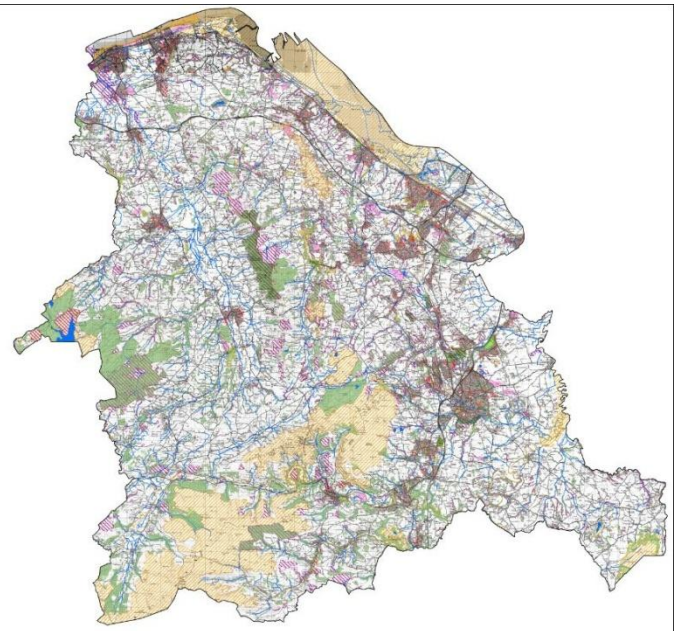
Green Infrastructure Asset Mapping

WWBIC have collaborated with COFNOD, the LERC for North Wales on a green infrastructure asset mapping project for their region. Green infrastructure assets can be described as the network of natural and semi-natural features that exist in and between our villages, towns, cities and the wider countryside. Some examples of these are parks, woodlands and grasslands, sports fields and courts, allotments and accessible countryside. A wide range of data was collected by COFNOD for the project which was sourced from the local authorities (Flintshire, Denbighshire and Wrexham councils), Ordnance Survey, NRW, Lle and Woodland Trust. This equalled 52 unique datasets that were processed by WWBIC to create a digital green asset map of North-East Wales. This map will be used by the local planning authorities and ecologists in North-East Wales to inform their decisions.

Map of Green Assets



Map of Categorized Green Assets



Lower resolution images for illustration purposes only

Toni Henwood

And finally. . .

At the NBN Conference on Wednesday 21st November 2018 LERC Wales was announced runner-up for the Lynne Farrell Group Award for recording wildlife.

Equipment for Loan

WWBIC has two Longworth Traps and a trail camera we are prepared to loan to local recording groups. At the time of writing, the trail camera is set up at Rhydhowell Farm visited by the Pembrokeshire Recording Group recently. If you are interested in borrowing these items, please get in touch with us.

Thanks to everyone who has contributed to this newsletter. If you have any feedback or comments please email kate@westwalesbiodiversity.org.uk



@wwbic1



West Wales Biodiversity Information Centre