Pembrokeshire Fungus Recorder

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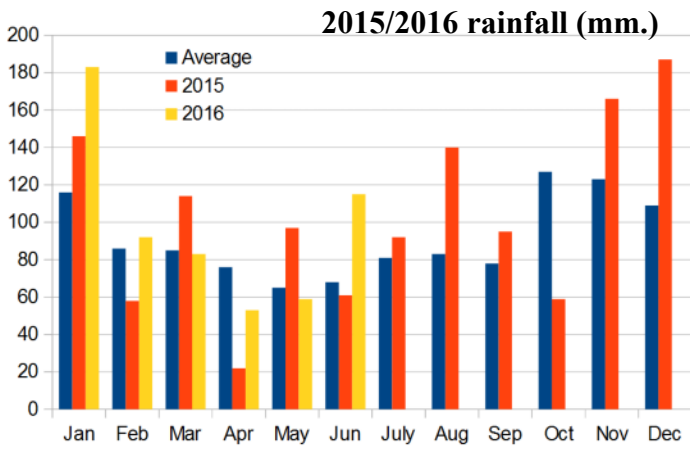
A collection of *Hygrocybe conica*: the blackening waxcap (see p.5)

Introduction

Overall rainfall in the quarter was close to average, though fungus records were relatively sparse.



Weather data courtesy of FSC, Orielton

Plenty of indoor mycological activity though, including the BMS biennial meeting for group leaders which was recently held at Northern College in Yorkshire. A report on this event, together with a notes from the Plantlife Wales lower plants and fungi sub-group, is included in this newsletter.

A report on the latest news on the International Union for the Conservation of Nature (IUCN) world-wide red list gives us hope for better recognition of fungi with the inclusion of several species recorded in the UK included in the first tranche of red-listed fungi.

Our January newsletter contained news of our excursion into the world of molecular biology with the Bento Lab equipment. This edition contains an update of our project involving study of the "blackening waxcap".

Devotees of Pat O'Reilly's publications will be delighted to know that the second edition of "Fascinated by Fungi" has recently been published. See page 4 for details.

David Harries, PFRN coordinator
(djh.somerton@gmail.com)
July 2016

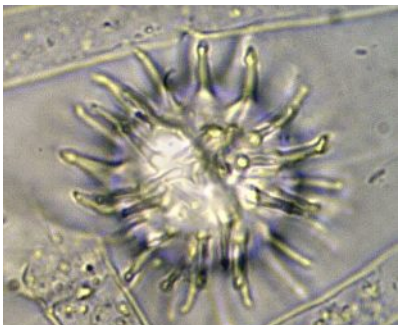
Fungus records

Relatively few records were reported in this quarter, though at least a few of our regular spring species put in an appearance:

Entoloma clypeatum, growing on soil under hawthorn, (pictured right) and *Calocybe gambosa* (St. George's mushroom) on soil at the base of a hedgbank. The St. George's mushroom was spotted on the 17th May, a little later than might have been predicted from the name.

Whilst exploring a damp patch of clay soil in marshy grassland, I found nice collections of two ascomycetes which favour this habitat. All had been recorded in previous years, but good to find them together.

Kotlabea deformis

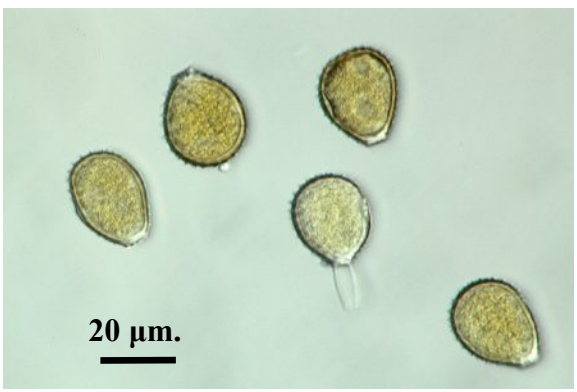


Boudiera acanthospora (spore pictured right)

Records from visiting mycologists are always welcome, and it was a great pleasure to hear from Jo Weightman (Herefordshire County Recorder) that we have a new Pembrokeshire site for *Hypocreopsis rhododendri* - Tycanol NNR. This brings the total number of sites in Pembrokeshire to 9.

An interesting rust turned up on cow parsley in Pembrokeshire this year. *Puccinia chaerophylli* is reported in the Rust Fungus Red Data List for Wales (Woods et al, 2015) as widely naturalised on the pot herb sweet cicely but rarely recorded in the wild on its other host, cow parsley. Images below: leaf underside and spores.

Prior to this observation, there were only 3 recent records in Wales: all in the south west (Carmarthenshire, Cardiganshire). Thanks are due to Nigel Stringer for confirming the identification of this collection.



IUCN Red List

The IUCN Red List provides a list of threatened species in order to highlight the need for action to support their conservation.

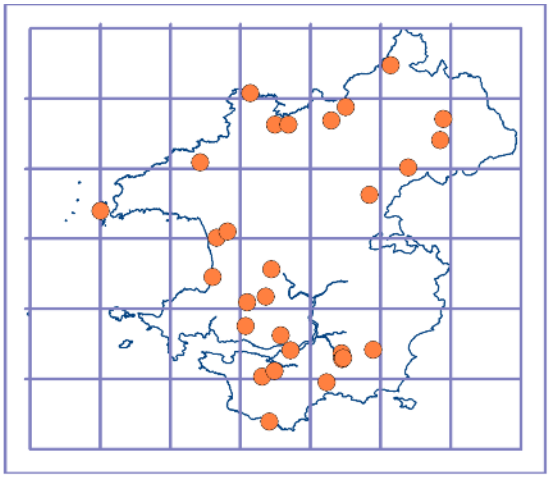
Until recently, fungi and lichens have been massively under-represented: a situation which is now being remedied through the IUCN Global Fungal Red List initiative.

This initiative aims to facilitate and coordinate a concerted effort by the global mycological community to get at least 300 species of threatened fungi assessed and classified as globally red listed. In doing so, the initiative will raise the awareness of fungal conservation among mycologists, the conservation community, policy makers and the general public.

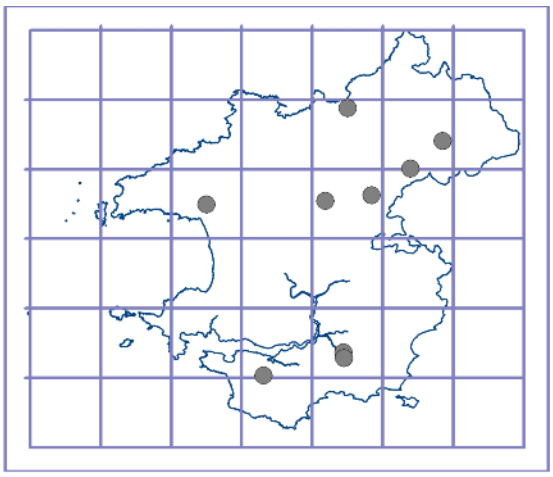
The latest information shown on the IUCN Global Fungal Red List initiative website reports that 34 fungus species have been assessed and listed on the IUCN red list.

Of these, two are of particular interest in Pembrokeshire: *Hygrocybe citrinovirens* (Citrine waxcap) and *H. ingrata* (Dingy waxcap). Two further species also occur in Wales - *Armillaria ectypa* (Marsh Honey Fungus) from a single site in Carmarthenshire, and *Tricholoma acerbum*, a woodland species often associated with oak.

Hygrocybe citrinovirens is widely distributed across Pembrokeshire and fruits reliably making it a useful indicator of good waxcap sites.



H. ingrata is recorded far less frequently - the last time it was recorded in Pembrokeshire was 2008 when conditions must have been particularly favourable as it was then found at 4 locations.



Armillaria ectypa is a rarely recorded wetland species which has been red-listed in 11 countries. The species is regarded as Near Threatened because of an estimated population size reduction of 25% over the last 30 years, a decline expected to continue as a result of habitat loss and degradation.

Top: *A. ectypa* © Philip Jones)

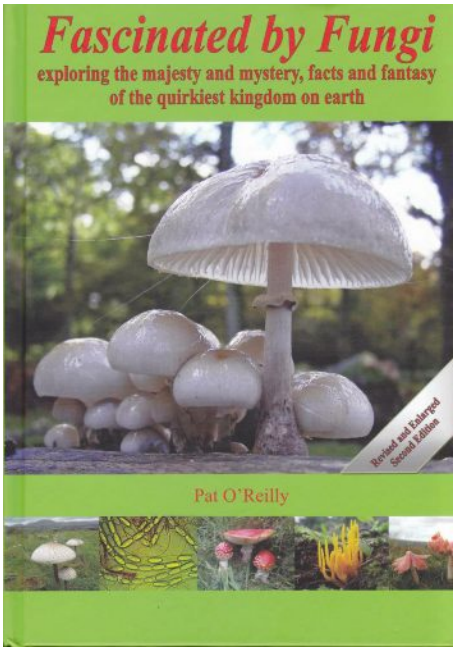
Left: Ffrwd fen © Colin Jones)

JNCC report that the species has been recorded from just 4 UK locations; one in each country. The Wales site is at Ffrwd Fen nature reserve, Carmarthenshire, where Philip Jones first observed the species in 2002 and has confirmed its continuing presence at the site nearly every year since.

Reference: The IUCN Red List of Threatened Species. Version 2015-4. www.iucnredlist.org downloaded on **13 June 2016**

Fascinated by Fungi - New Edition

Five years on from the launch of the best-selling volume "Fascinated by Fungi", Pat O'Reilly has published the second edition of this very well respected, comprehensive and thoroughly readable work. Pat has taken the opportunity to capture recent name changes resulting from DNA work on fungi and has included additional details on microscopic characters with examples illustrated in photomicrographs.



Anyone new to microscopy (or needing a refresher) will especially welcome an extended section covering choosing, setting up and using a compound microscope. The chapter includes guidance on the microscopy of basidia, cystidia and hyphal structures as well as illustrations of the different shapes and ornamentation of spores.

The first edition was an excellent buy for anyone interested in fungi. This one is even better.

Further details, including a time-limited special offer on signed copies of the new edition, can be found on the First Nature website (www.first-nature.com).

The Blackening waxcap project - an update

This note provides an update on progress with the Pembrokeshire Fungus Recording Network "Blackening waxcap" project described in PBP newsletter, Spring 2016.

To recap: last autumn PFRN enthusiasts collected specimens of the blackening waxcap from various locations across the County. After measuring the spores, and documenting habitat and morphological details, the collections were dried and stored as voucher material.

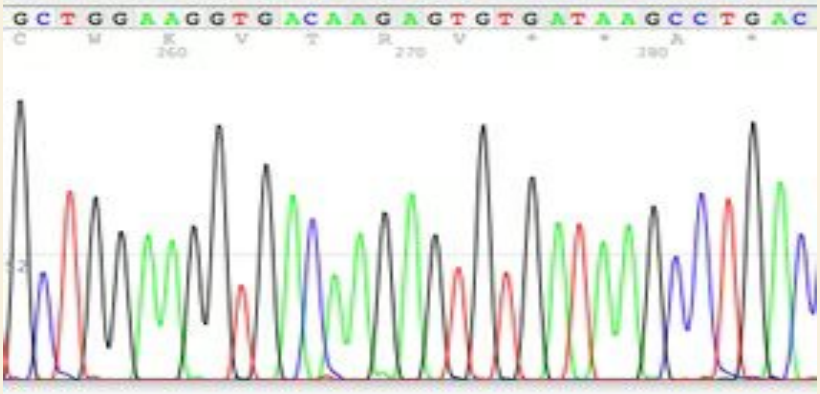
Earlier this year, we removed tiny sections from each sample and, using a protocol recommended by Gareth Griffith (Aberystwyth University), we extracted portions of DNA from 12 different collections. Following extraction of the DNA, we then used a process called polymerase chain reaction (PCR) to isolate a tiny "barcode" section of the DNA and amplify this portion to provide sufficient DNA for subsequent analysis. The extracted DNA barcode specimens were sent to Aberystwyth University where they were subject to a quality check (necessary to show the extracts contained sufficient DNA for analysis) and sequencing.

All 12 extracts produced sequences: 11 of which were of high quality and demonstrated our local procedures for extracting and amplifying the DNA worked well.

Sequencing

Sequencing provides the "barcode" information - a sequence of letters which represent the 4 bases which act as markers along the DNA chain.

The portion of DNA used for barcoding has sequences which are sufficiently similar to demonstrate that specimens belong to the same genus, but have minor differences that allow different species within the genus to be separated.



Example chromatogram showing an extract of the output from a DNA sequencer. The order of the 4 bases (CTAG) which define the specimen are shown along the top of the chromatogram.

The beta-test Bento Lab unit we described in the last report has now completed its 6-month trial and been returned to the suppliers.

Later this year we will receive one of the first production models as a replacement. On receipt of the new equipment we will resume our exploration into the fascinating world of molecular biology.

Bento Lab

Described by the developers as the first complete DNA laboratory, suitable for a beginner to a professional. It comes with a PCR thermocycler, a centrifuge and a gel electrophoresis box and power supply with blue LED trans-illumination - all controlled by an intuitive interface.

Acknowledgements

Particular thanks are due to the Pembrokeshire Biodiversity Partnership/Natural Resources Wales for providing financial support, Gareth Griffith and colleagues at Aberystwyth University for their continuing encouragement and technical support, and the Bento Lab team for accepting us onto their pioneer programme.

Conservation News

Report on the Plink Wales lower plants & fungi meeting: 21st June 2016

Welsh State of Nature Reporting System

The Wales Biodiversity Partnership is currently compiling information on the conservation status of priority fungi and lichen species and habitats in order to update the Wales State of Nature Report. Shelley Evans and Peter Roberts agreed to collate and forward information for Section 7 species (previously Section 42) together with recommendations for additional species which should be considered for the the list.

Wales Environment Link (WEL) species champions

WEL has nominated various Welsh Assembly members as champions for selected species of conservation concern. It was noted that a BBC report (see extract below) was not very complimentary about the prospect of a member being champion for the " purple earthtongue". Plantlife will follow up the nominations so that contact can be made with anyone championing a fungus.

BBC website: *Wales' rarest species of animal, bird and plant are being assigned an assembly member each to champion their cause.....AMs will be given opportunities to take part in visits and conservation activities and will be expected to promote their species in the Senedd.*

.....The butterfly Small Blue might appeal to another of the Conservatives, but conservationists will be hoping politicians do not worry too much about being associated with the Grizzled Skipper, the fungus Purple Earth Tongue, or the Common Toad."

The Atlas of Living Wales

There are plans for an Atlas of Living Wales website which will hold information on species of conservation concern. The system is based on the existing Atlas of Living Scotland and will be managed by the National Biodiversity Network with funding from Natural Resources Wales and the Weslsh Assembly Government.

Plantlife Wales waxcap project

Plantlife has been successful in obtaining Heritage Lottery Funding for the first stage of a Wales-wide waxcap project. [Post-meeting we were advised that Anita Daimond (Gwynedd Archaeological Trust) had been appointed as the Wales Waxcaps Development Officer].

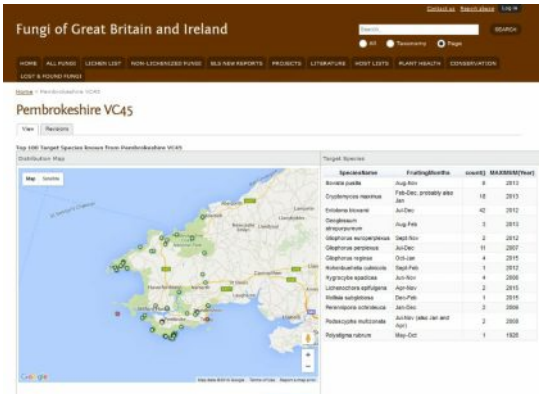
Report on the BMS Group Leaders' Meeting: 24th to 26th June 2016

Dr. David Minter, BMS Vice-President, opened the event with a talk which explored the way in which politics, science, education and infrastructure all have a part to play in fungal conservation. Of particular concern was the way in which institutions fail to give fungi a status comparable with that given to plants and animals but instead continue to use the term "lower plants". He challenged all present to contribute to raising the profile of fungi and fungal conservation at every opportunity

New BMS Fungus Records Database

The new package is undergoing final trials before release to recorders. Work on updating and synchronising the current checklist of fungus names with the UK species inventory (held by the Natural History Museum) has just been completed and final testing is underway to ensure there are no technical issues. This work will ensure consistency between the fungus names used by the NBN and those currently used by field mycologists.

Kew



Dr. Martyn Ainsworth briefed the gathering on organisational changes at Kew including the return of Dr. Bryn Dentinger to the US. Dr. Brian Douglas brought the meeting up to date on progress with the "Lost and Found" project and encouraged recorders to visit the L&F website to see the newly added sections including individual Vice-County pages with annotated distribution maps. (www.fungi.myspecies.info)

Fungal education and Outreach

The work of the Fungal Education and Outreach Committee was covered by contributions from Dr. Eleanor Landy and Meg Scully. Eleanor outlined FEO's work to promote knowledge of fungi and fungal science, then looked in more detail at the programme of reformatting or redesigning and upgrading the extensive range of BMS education material to provide a more user-friendly format. Meg then gave an enthusiastic overview of her role, and in particular encouraged support from BMS groups for UK fungus day.

Yorkshire Mycota

Chris Yeates, the Yorkshire County Fungus recorder and ascomycete specialist, gave a talk on his work on a Yorkshire mycota. This is intended to be a photographic reference (including superb photomicrographs) covering 1,000 species found in Yorkshire. The product will be a worthy reference of value to amateurs and specialists alike.

The impact of DNA sequencing on the work of field mycologists

This was a discussion topic led by Dr. Derek Schafer supported by contributions from Carol Hobart, Martyn Ainsworth and David Harries

Derek illustrated the impact of DNA work on taxonomy with reference to changes to the *Coprinus* genus and outlined the stages involved in taking a sample through from extraction to sequencing and construction of a phylogenetic tree. He made the point that DNA sequences form only part of the information needed to define boundaries between species and must take account of the macro and micro work traditionally associated with taxonomy: a concept known as "integrative taxonomy".

Carol gave examples of the way in which she was using DNA studies for hypogeous fungi and emphasised the value of collaboration with other scientists in programmes leading to the publication of new species. She pointed out that although we often see new species described following DNA work, it may also be the case that species are lost in cases where they are shown to be insufficiently separated from others to justify species status: an example in this case being the loss of *Tulostoma fimbriatum* which she had described as new to Britain following a collection of non-typical material in 2011.

I gave a talk on the practical issues involved in carrying out DNA extractions and subsequent operations in your own laboratory (see article in this issue of the newsletter).

A discussion on the subject highlighted concerns from some that there could be a move towards a two-tier system with traditional field mycologists relying on field skills and microscopy whilst others had access to molecular techniques. It was noted that a similar situation must have existed before microscopy became more widely available as a mycological tool. The point was made that field mycologists would continue to play a vital role in collecting, identifying and submitting good quality voucher material to support DNA studies by institutions such as Kew. The Kew L&F project was mentioned as an example of this.

Foraging for fungi.

The background to this was a series of "Future of Foraging" workshops being held across the country and arranged by Natural England. Concern was expressed that mycological organisations had not been invited to participate, though had found out informally. Two meetings had already been held - both of which had been attended by individuals from local groups.

Concerns were expressed that NE was promoting foraging as a way of connecting people with nature, and that the Foraging Partnership was planning to develop a code of conduct for "sustainable foraging" without having any evidence that the activity (for fungi at least) is actually sustainable.

[This discussion point should be seen in the light of concerns of overpicking (often commercial) in woodlands close to large centres of population - especially the south east of England. It was noted that the situation is somewhat different in Scotland.]