

Rare Seaweed

A rare seaweed was found during the Natural Resources Wales (NRW) annual rocky shore monitoring in 2015. Anne Bunker and Ben Wray found a patch of the green turf forming *Cladophora coelothrix* between two lower shore fixed quadrat positions at Pembroke Ferry on the south shore of the Milford Haven Waterway. A specimen was verified by Professor Juliet Brodie at the Natural History Museum.

Only recorded once before in Wales, on Bardsey Island, this filamentous seaweed has also been recorded on the south coast of England and east coast of Ireland but otherwise has a more southern distribution. This find may indicate a range extension due to warming seas.



Cladophora coelothrix

Paul Brazier, NRW's Intertidal Marine Ecologist says long-term data series such as the NRW intertidal marine Special Areas of Conservation (SAC) monitoring program are critical because they enable us to see changes over time, identify trends and to carry out our statutory duties under the Habitats Directive.

This highlights the importance of a field team, NRW staff and contractors, with the necessary identification skills to enable them to undertake the specialist monitoring. Most are able to identify species from many different groups ranging from crustaceans to molluscs as well as seaweeds.

Anne Bunker
Natural Resources Wales



PEMBROKESHIRE BIODIVERSITY PARTNERSHIP



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New Waterfront Accommodation for Otters

Pembrokeshire FRAME and Natural Resources Wales (NRW) are working together to enhance otter habitat on the Cleddau catchment, in particular their breeding sites by building up to 20 new log pile otter holts.

FRAME are a registered charity best known for providing work based training for disadvantaged participants through the furniture outlets they run. Less well known is that they provide a similar role through a woodland project called Blueskys where participants learn new skills in woodland management and gain relevant qualifications including their chainsaw ticket. While on any given site FRAME also undertake habitat improvement works such as coppicing, bench felling and fencing to manage access.



Geoff Liles describing how to lay out the internal chambers of a log pile otter holt to FRAME participants

We know that otters are doing well in Pembrokeshire, the most recent Otter Survey of Wales found signs of otters at 97% of survey sites. However, very little is known about breeding success and a recent study for NRW found that of the known and potential otter breeding sites, some had declined in quality and all had the same issue in common: a lack of secure, underground breeding holts. This seems to be particular to the Cleddau where

most of the breeding takes place above ground, usually in dense scrub. This makes the breeding otters particularly sensitive to disturbance and while cubs are young, predation.

FRAME are working to improve the situation by constructing a series of log pile otter holts across the catchment. The sites will have been surveyed to ensure the new holts are located in the best possible position and FRAME will then use materials sourced on site to make the holts. On sites which do not have sufficient sizeable trees to construct the holt, prefabricated holts made from recycled plastic boards are installed.

The next steps are to cover the structure with poles to make a roof and then brush to help the holt blend into its surroundings. This photo was taken after about 25% of the brush was put on.



Once the holts are completed and covered in brush they blend into the surroundings and after a year or so they are covered in brambles and are hardly noticeable. We hope that these structures will last and be used for 10-20 years or so and there is no reason why the recycled plastic box holts shouldn't last even longer.

Chris Lawrence
Natural Resources Wales



New Research Centre and Visitor Attraction in St David's

The Bug Farm is a brand new Research and Education Centre and Visitor Attraction based just outside St Davids, revolving around the theme of invertebrates and sustainable agriculture.

The Bug Farm is first and foremost a Research Centre, with work primarily focused on the future of sustainable food production and consumption, as well as the ecology of the farmed environment. We have official links with universities such as Oxford, Bristol and Aberystwyth and co-supervise student projects, with much of the fieldwork run at The Bug Farm.

We recently placed a rudimentary monetary value on (a small number of the) ecosystem services provided by dung beetles to the UK cattle industry: The extremely conservative figure we came up with was £367 million per year! It is important to show that the research can be put into practice and we are therefore also running the 100 acre site as a working farm which will, in the future, be used as a demonstration farm to showcase the research to farmers, policy-makers and the general public.



One of our giant flower beetles

The Bug Farm opened as a Visitor Attraction in October 2015. The main attraction is currently our Tropical Bug Zoo, where you get a personal tour through some of the world's most amazing invertebrates from our Burgundy Goliath Birdeater Tarantula (called Pauline), to Robert the Rainbow Stag Beetle! We bring this hidden life in the undergrowth alive and hopefully leave you with a newfound respect for the little creatures that run the World.



The Tropical Bug Zoo

When looking at the future of food security, we believe that farming and eating insects is part of the future. We are working with the chef, Andy Holcroft, who's advising UK government and he launched the on-site Grub Kitchen restaurant in October 2015 in order to put this into practice and educate from field to fork! However, it's not just insects on the menu: sustainably produced, local meat, lots of delicious vegetable dishes, and vegan delicacies also take centre stage. The restaurant has, since opening, received international acclaim and media interest as the UK's first edible insect restaurant and is now open as a café in the day, and as a stand-alone restaurant in the evenings (pre-booking required).

In 2016, we plan to host a regular series of lectures, workshops and events and we have some delights in store, including bee identification workshops with Dr Steven Falk, mosaic workshops with Maddie Janes, and book -



Grub Kitchen's popular signature Bug Burger



readings from authors including Sonia Cope-land-Bloom and M. G. Leonard, who launches 'beetle boy' in Spring 2016.

The Bug Farm Visitor Attraction will launch fully in spring 2016, with a whole host of exhibits and attractions. This is just the start of an exciting journey for us and we very much look forward to welcoming you all to The Bug Farm to join us on this journey.

Dr Sarah Beynon
info@thebugfarm.co.uk



Using Heathland Bedding to Facilitate Conservation Management

Each winter the National Trust (NT) undertake a programme of firebreak cutting work on the NT commons and coastal heaths around north Pembrokeshire. For the second year running we're making use of some of the arisings – as bedding for the NT owned herd of Welsh Black cattle at Southwood Farm, Newgale.

The condition of the heathland habitats in the North West Pembrokeshire Commons Special Area of Conservation (SAC) and St Davids SAC, both mostly owned by NT, is a serious concern. Conservation efforts since the 1990s have reintroduced active management onto

most of the land within these two SACs. Ponies have been used at all sites, complemented by cattle where possible. Fencing, cattle grids and livestock handling facilities have been installed to assist this grazing programme.

Despite this progress, the SAC conservation objectives for the heathland and associated grassland habitats have not been achieved. The number of available cattle and ponies is still insufficient to reduce the surplus of vegetation, and the heathland habitat remains largely too dense and uniform in structure.

This excess vegetation also increases the risk of wildfire sweeping across a wide area. The cutting of firebreaks can slow down the spread of fire, improving the odds of bringing it under control. By breaking up continuous thickets of heather and gorse into smaller blocks with curving, long edges, we're also creating the right conditions for some of the special heathland plants that depend on these open, edge micro-habitats, such as heath dog violet and lesser butterfly orchids.



It took one day in November to re-cut and extend the firebreaks on a quarter of the area of Tretio Common, part of the NW Pembrokeshire Commons SAC. Around 150 cubic metres of material was generated by this cutting work. Although the material is a by-product of conservation management, it has a practical use. Half of the pile was used immediately as bedding at



Southwood Farm. Provided that the material contains more gorse or heather than grass it performs well even when wet, so the remainder of the stockpile was left on the common until we need a top-up in the shed later in the winter.

Apart from making use of a by-product of other management, the beauty of this stuff is that it drains well, leaving a dry surface. The cattle stay clean, dry and healthy through the winter, conserving energy. There's an old farmer's saying – 'a dry bed is as good as a feed'.



Six month old Welsh Black steers on freshly laid heathland bedding

There's nothing new about this – it's still within living memory that the heaths provided bedding for livestock in north Pembrokeshire – but the technology has changed. After a couple of years on the muck heap, the composted bedding can be spread as farm yard manure. There have been no cases of gorse germinating in fields that have been treated in this way, and the pH is slightly alkaline, not acidic.

The National Trust hosted a Pembrokeshire Wildfire Group event for farmers at Southwood Farm in December, promoting the potential of this wonderful, free material, and we're currently assessing the extent of the potential resource across the National Trust heaths in north Pembrokeshire. If we can supply more farms with the bedding, we can expand our cut and collect work to support the ongoing grazing programme and give these priority habitat areas a much needed boost.



Pale dog violet – quick to take advantage of open ground after fire or cutting

You can see a video of how we're developing Southwood Farm, featuring the heathland bedding here:

<https://youtu.be/VmpEleFoOgA>

Andrew Tuddenham
National Trust



Pembrokeshire Blackening Waxcap Study

A citizen-science project providing an insight into DNA techniques

Molecular studies, such as the analysis of the DNA in biological material, are becoming increasingly important as taxonomists attempt to unravel the relationships between genera, species, varieties and forms of organisms. Nowhere is this more important than in the field of mycology where we largely rely on the collection and inspection of fruit bodies - many of which only appear during favourable fruiting seasons.

The sequencing of a tiny fragment of DNA can be used to generate a "barcode" for a fungus. The extent to which barcodes vary between two samples can be used to help determine how closely related they are. DNA sequencing methods thus provide data which complements the information collected



from macroscopic and microscopic characters which was traditionally used to support the construction of phylogenetic (evolutionary) trees.

Such analyses may reveal more than one “cryptic species” hidden under a single species name - leading to interesting challenges for taxonomists seeking to name such species. However, even where molecular studies indicate genetic variation, this alone may be unhelpful unless this variation can be linked to distinguishing morphological characters or ecological traits.

This article introduces a project established by a small team of amateur field mycologists to provide an insight into the practical application of molecular techniques in a Pembrokeshire context.

We selected the blackening waxcap (*Hygrocybe conica* sensu lato) as our target species as it is widely distributed and easily identified in the field. Over the years there have been different interpretations of the blackening waxcap assemblage depending on whether the author was a “lumper” or “splitter”. Recent work at the Royal Botanic Gardens, Kew and Aberystwyth University (Cannon P.F. *et. al.*, 2013) indicates that it should be treated as a species complex which may contain up to 6 individual taxa in the UK.

The project breaks down into four key activities:

- (a) Collecting specimens of the blackening waxcap from across the County, examining the specimens and documenting their macro and micro features.
- (b) Assigning the records to different “groups” according to the morphological and habitat preferences of the collections, and mapping their distribution.
- (c) Extracting, purifying and amplifying the DNA from collections in each provisional group to produce material suitable for sequencing.

- (d) Working with specialists at Aberystwyth University to obtain and interpret DNA barcode sequences from selected specimens in the study.

2015 proved to be a difficult year for grassland species with fewer fruit bodies showing at many sites compared with other years. In spite of this, we have 18 collections of fruit bodies from a cross-section of sites across the County: more than enough for us to establish and test our DNA extraction and amplification protocols. Further collections will be made in autumn 2016.

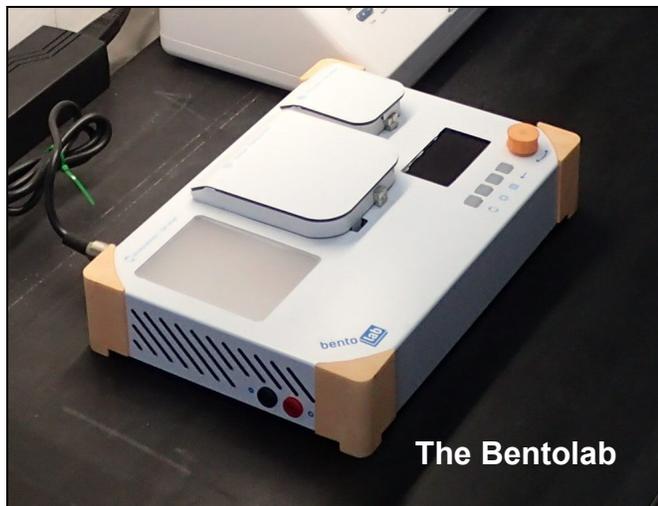
Work is progressing on documenting the microscopic and macroscopic features in order to group the different apparent forms of blackening waxcap. Macroscopic features appear to show several different morphological types as illustrated below.



In July 2015 we learned of an innovative project looking for participants willing to carry out field trials of a portable DNA extraction unit: Bento Lab. The programme is run by a start-up group based at University College London with a vision to open up access to biosciences for everyone. The product is a portable mini-lab which incorporates much of the specialist equipment needed to carry out the DNA amplification process and subsequent checking of the DNA product. The test unit is being trialled in 20 citizen science projects worldwide during the latter part of 2015 and early 2016.



We successfully applied to join the pilot programme which provides us with cost-effective access to a prototype instrument, backed up with technical support. The Pembrokeshire Biodiversity Partnership and Natural Resources Wales contributed towards the cost of participating in this project.



The Bentolab

Information collected during the study will be forwarded to the mycology team at Aberystwyth University where it will contribute to the DNA database of grassland fungi being established as part of their ongoing research programme. Local field mycologists will gain a better understanding of the principles and techniques involved in the molecular study of fungi. The Bento Lab developers will receive feedback on the operability and suitability of their equipment for citizen science projects.

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.

David Harries

Pembrokeshire Fungus Recording Network



Orielton Field Studies Centre

2015 was a busy year at the Field Studies Council (FSC) Orielton Field Centre. Our woodland thinning initiative is taking shape. We have significantly broken up the dense deciduous canopy, removing 265 cubic metres of timber, in an effort to let more light in and encourage a greater species diversity on the forest floor. There's still a lot of trees though!

Our seeded meadow is developing nicely with bi-annual mowing. There's a range of plants including yellow rattle and eye bright. Fungi have been benefiting too. As a result of our 2014 autumn fungi bioblitz, we were advised to mow our grassy field more regularly and leave the cuttings on it more often. We also stopped mowing in September, just in time for the mushroom season. The impacts of this slight change in management were obvious when it came to the 2015 fungi bioblitz: loads of mushrooms! These included 12 waxcap species of which two are rarely recorded: *Hygrocybe colemanniana* and *Hygrocybe aurantiosplendens* (Harries, D., pers. comm.).



Shelter Building in the woods

We have been running our usual array of secondary and primary school field courses this year, with many customers from near and far returning each year. We also host university trips. Saint Andrew's university staff made a discovery on a local shore of the invasive species of kelp, Wakame, and we have informed local phycologists.



As well as managing our grounds and teaching school students, we also run a range of natural history courses for adults. Some are broad, such as 'Spring Wildlife Watch' at Orielton and 'Exploring Pembrokeshire' at Dale Fort (our sister Field Studies Council centre in Pembrokeshire). Some are very specific, such as the micro-moth course at Orielton and marine sponges at Dale.

For local primary age children and their parents, we run a monthly Wildlife Group which meets on the last Saturday afternoon of each month, 2 - 4 pm, for pond dipping, woodland adventures and much more! Dale Fort also host a Wildlife Group on the second Saturday of each month from 10 am – 12 noon.



Rockpooling or fossicking at West Angle Bay.

We are always keen to increase our involvement with local schools, groups and individuals so please get in touch if you have any enquiries.

Martha Boalch
Orielton Field Centre
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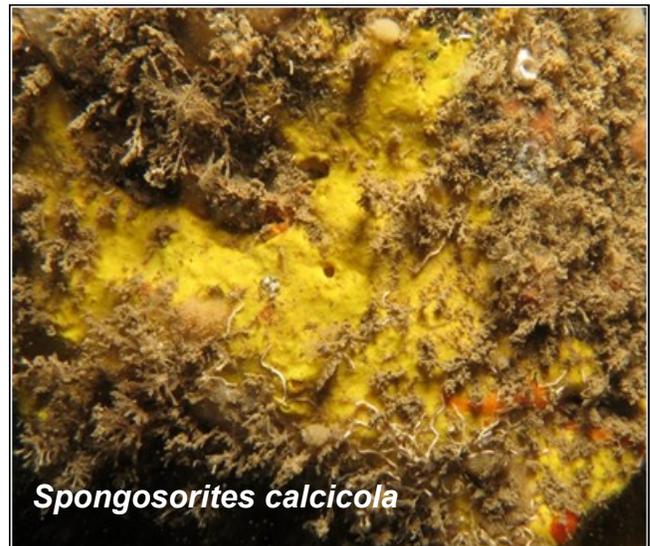


Sponges, Biodiversity and Ecosystem Health in the Skomer Marine Conservation Zone

In 2015 we completed our four yearly in house survey of sponge species. Skomer is one of the richest areas in the UK for sponge diversity and with each survey, additional species new to science are being found. The number of species recorded from the Marine Conservation Zone

(MCZ) has been steadily increasing over the last 30 years and currently stands at around 122. Four species are on the nationally scarce species list, while seeming to be common within the MCZ and several species present are known to be undescribed. Research is currently being carried out on these groups.

In 2015 two sponges were found that are believed to be new to science, *Phorbas sp* and *Microcyona sp*, these were found at Thorn Rock. Other notable species recorded were *Spongosorites calcicola* (described from Rathlin Island in 2007 and only found in Ireland and one location in Scotland) and *Prosuberites longispinus*, which is known from the Mediterranean and recorded in Pembrokeshire only once before (Skomer 2008). Both of these were found in The Wick.



Spongosorites calcicola



Microcyona sp.



We are also pioneering a more rigorous approach to species recording by taking DNA samples and making a major contribution to the DNA database for UK sponge species. At the moment there is very little DNA information for UK species. We are doing this work with Portsmouth University and are hoping this will act as a very important resource for future biodiversity surveys.

In 2013, we first noticed a few individuals of *Cliona celata* (Boring sponge), change appearance from its usual bright yellow colour to black and decayed. This is a disease nicknamed the 'black death' in sponges. We have been collecting samples and documenting its appearance. Samples have been sent to Portsmouth University who have analysed the microbial community in healthy, partially infected and fully infected (black) sponges. The differences are quite stark and have caused a lot of interest in the scientific community. A scientific paper is being produced from this work and it may provide a future, non-lethal method of assessing "health" of communities by looking at the microbial community hosted within sponge species. This is quite an exciting area for further research.



A sponge biodiversity report will be completed along with a full project status report on all monitoring projects completed in the Skomer MCZ during the 2015 season –

these will be available in April 2016 – please let us know if you are interested in having a copy.

Kate Lock

Natural Resources Wales

kate.lock@naturalresourceswales.gov.uk



Visit us on Facebook at:

<https://www.facebook.com/PembrokeshireBiodiversity>

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SIR BENFRO**



Biodiversity Events January—April



Date	Title	Information	Contact
30 – 31 Jan	RSPB Big Garden Birdwatch	See what birds you can spot in your garden and contribute the results to this national survey.	https://ww2.rspb.org.uk/discoverandenjoy/nature/discoverandlearn/birdwatch/
03 Feb	Life on Skomer Island - Catholic Church Hall, Cardigan.	Talk by Richard Kipling – former Skomer Island Field Assistant and Author. 19:30	01239 621600
06 Feb	Spotting Waders, Cetaceans etc. - Fishguard	Walk on Fishguard Outer Breakwater to look for purple sandpipers, cetaceans etc. Meet at Parrog car park (Goodwick) SM947381 10.30 am.	01646 278966; biojohn@tiscali.co.uk
08 Feb	Studying Wheatears in the Preselis -Cashfield Community Centre	Talk by Paddy Jenks.	John Steer— 01646 278966; biojohn@tiscali.co.uk
21 Feb	Soup and a Stroll – Welsh Wildlife Centre, Cilgerran	Join our local wildlife experts for a guided walk around Teifi Marshes Nature Reserve, followed by a warming homemade soup served by the Glasshouse Cafe.	Booking is essential, please call 01239 621600
14 March	From Water Shrews to Water Buffalo – Cashfield Community Centre	An update of the Wildlife Trust reserves in Pembrokeshire, a talk by Nathan Walton (Wildlife Trust officer for Pembrokeshire).	John Steer— 01646 278966; biojohn@tiscali.co.uk
30 March	John Muir Award Family Discovery Days – various locations	Get started on your John Muir Award journey. Come and explore these amazing wild places, see how the John Muir Award works and pick up lots of tips to take on your own John Muir style adventure! 1.30pm-4.30pm	BOOKING ESSENTIAL 01834 845040
01 April	Bushcraft Bitesize - Carew Castle	Join our National Park Ranger on this outdoor fun adventure. Teach your action figure how to survive, find shelter and forage for dinner. Perfect for the budding bushcraft enthusiast. Bring suitable clothing, and a picnic. 10.30am-1.30pm	BOOKING ESSENTIAL 01834 845040
01 April	Discover Dark Skies at Carew Castle	Explore the night sky at our family-friendly event. Learn about the solar system, visit the planetarium, try night sky photography with photographer Drew Buckley and admire the stars through powerful telescopes. 7pm-11pm	BOOKING ESSENTIAL 01646 651782

Biodiversity Events

January—April



Date	Title	Information	Contact
02 – 03 April	Weekend of Adventure – Skomer Island	Based around the islands ever popular trails, we have an exciting, self-guided, riddle solving treasure hunt happening on 2nd and 3rd April. Answer the clues to lead you to the next goal and find the hidden cache. Once you get to the Visitors Centre answer the bonus questions to find the mysterious bonus cache!	No booking – Just turn up on the day.
06 April	Bushcraft Bitesize - Castell Henllys	Join our National Park Ranger on this outdoor fun adventure. Teach your action figure how to survive, find shelter and forage for dinner. Perfect for the budding bushcraft enthusiast. Bring suitable clothing, and a picnic. 10.30am-1.30pm	BOOKING ESSENTIAL 01834 845040
07 April	Bushcraft Bitesize - Stepside	Join our National Park Ranger on this outdoor fun adventure. Teach your action figure how to survive, find shelter and forage for dinner. Perfect for the budding bushcraft enthusiast. Bring suitable clothing, and a picnic. 10.30am-1.30pm	BOOKING ESSENTIAL 01834 845040
07 April	Twilight at Colby	Discover the beautiful Colby Woodland Gardens, near Amroth. Follow the paths in search of woodland wildlife as darkness falls on this one mile family friendly stroll. 7pm-9pm.	BOOKING ESSENTIAL 01834 811885
08 April	Reptile Ramble Bosherton	Join our National Park Ranger as he introduces you to some of Pembrokeshire's most elusive reptile residents. Children must be accompanied. Participants advised to wear wellingtons. 10.30am-noon	BOOKING ESSENTIAL 01834 845040
10 April	Castlemartin – more than meets the eye	The Castlemartin Range is a jewel in the south of the National Park, and access is made available through the Ministry of Defence. Secret coves and majestic coastal scenery sit side by side with lost farms and watery mills. By minibus: A tour of the old farms and mills, coast and country. Some short walking sections. 9.30am-4pm	BOOKING ESSENTIAL 01834 845040
13 April	Herbal Histories: Past and Present - Carew Castle	Learn about herbs and their uses, both now and in the past, on a tour of our herb garden. 2.30pm–3.30pm Included in normal admission.	BOOKING ESSENTIAL 01834 845040

PBP Contact Details

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Pembrokeshire Biodiversity website:

www.pembrokeshire.gov.uk (search - biodiversity)

Wales Biodiversity website:

www.biodiversitywales.org.uk

Biodiversity Newsletters

Mae'r cylch-lythyr hwn ar gael yng Nghymraeg, cysylltwch â Ant am gopi cymraeg.

PBP would like to thank all those who contributed to this newsletter. If you would like to write an article for the next newsletter please contact Ant.

Opinions expressed in this newsletter are those of the author of the article and may not represent the position of the wider Partnership or its constituent members.

PBP Members

County Landowners Association



Pembrokeshire Rivers Trust



Farmers Union of Wales



Pembrokeshire Coast National Park Authority



Farming and Wildlife Advisory Group



Pembrokeshire Local Action Network for Enterprise and Development



Keep Wales Tidy



Prince's Trust Cymru



Royal Society for the Protection of Birds



National Farmers Union – Wales



The National Trust



Natural Resources Wales



The Wildlife Trust of South and West Wales



Pembroke 21C Community Association Limited



Llywodraeth Cymru
Welsh Government

Pembrokeshire County Council



West Wales Biodiversity Information Centre

