



GLASGOW NATURAL HISTORY SOCIETY NEWSLETTER

November 2017

David Palmar
(Newsletter Editor)

Next Newsletter Deadline
10 January 2018

GNHS is a Registered Scottish
Charity Web-site:
www.gnhs.org.uk

John Knowler

We regret to inform members of the death on 24th October 2017 of Professor John Knowler, biochemist, GNHS President 2005-7, eminent ornithologist and vice-county moth recorder. A full obituary notice will appear in *The Glasgow Naturalist*.

2018 Subscriptions

Richard Weddle

Subscriptions fall due on 1st January 2018 (except for those who have joined since the start of the winter session). A subscription renewal form is enclosed with the Newsletter for those who don't pay by Standing Order; email recipients will receive a separate reminder by email. We would be grateful if you could pay your subscription as soon as possible, to save us having to send further reminders.

New Members

Richard Weddle

Since the last Newsletter we have welcomed the following new members: Roslyn Anderson (Partickhill), Dominic Hall (Dowanhill), Yasmin Parr (Dennistoun), Paul Cobb (Catrine), Ms S McCaskill (Govan), Gaye Todd (Milngavie) and Andrew and Natalie Chinn (Drymen).

The 2017 Bursary recipients also receive one year complimentary membership of GNHS (without *The Glasgow Naturalist*): Hannah Bischoff (Edinburgh), David Blades (Aberdeen), Magdalena Blanz (Kirkwall), Rebecca Cairns (Haddington), Susan Falconer (Cupar), Alexandra Krause (Lochwinnoch), Joanna Kruk (Kinghorn), Marcia Rae (Beaully), Miranda Shepherd (Kinross), and Jen Young (Burnside, S Lanarkshire).

GNHS/BRISC bursaries

Richard Weddle

As in previous years, GNHS and BRISC (Biological Recording in Scotland) are offering bursaries towards attending a training course in natural history field studies skills. This year there are an additional 3 bursaries available to those aged under 27 through a grant from SNH, so there will be ten bursaries in all. The bursaries will be for £200 or 75% of the cost of the course, whichever is the lower. The closing date for applications is January 31st 2018. For full details, and an application form, see www.bris.org.uk/Bursaries.php

General Correspondence to the General Secretary please: Mary Child

Contact Mary at mary@gnhs.org.uk

GNHS Indoor Meetings (in Boyd Orr Building unless noted)

At the start of most meetings there will be a short time when members can present their recent observations: these can be short talks (about 2 minutes), interesting specimens, or photographs.

November

Wednesday 1st, 5.00pm, Graham Kerr Building Lecture Theatre 1

Blodwen Lloyd Binns Lecture: The global conservation of freshwater fishes; Gordon McGregor Reid – note day, place and time!

Tuesday 14th, 7.00pm (members' contributions) for 7.15pm Lecture:
Cool biology – insights into the thermal world of vertebrates; Dominic McCafferty

Thursday 23rd, 7.30pm Bower (Botany) Building

Botanic Gardens Bicentenary Lecture (jointly with Friends of the Glasgow Botanic Gardens and the Glasgow Treelovers Society): Ancient oaks in the English landscape; Aljos Farjon, Royal Botanic Gardens, Kew – note day, place and time!

December

Tuesday 12th, 6.30 for 7.00pm

Christmas buffet dinner in Zoology Museum – see end of Newsletter for details and booking form; includes Lecture: A year in the life of Seven Lochs; Scott Ferguson

2018

January

Tuesday 9th, 7.00pm (members' contributions) for 7.15pm

Lecture 1: Freshwater biodiversity in the UK: how does Glasgow compare? Alan Law

Lecture 2: The 10 O'clock newts: investigating nocturnal patterns of the great crested newt; Erik Paterson

February

Tuesday 13th 7.15pm Photographic Night: members' slides or digital slide shows, plus results of this year's PhotoScene competition

GNHS welcomes contributions to the Newsletter from members, without which the Newsletter would be a poor production! It would be of enormous help in getting the Newsletter out in time if you could please send them either as plain text or in a Word file as Verdana 12 points, which saves them being reformatted by the Editor. Scientific names should be italicised if you have time.

Please send photos separately from the text as jpg files, and indicate where you would like them inserted into the text. The more photos, the better the Newsletter!

Thank you - David Palmar, Newsletter Editor

Excursion Reports

Rouken Glen Park, 18th May 2017

Bob Gray (including photos)

The small number of attendees was made up for by the interest and enthusiasm shown. At 58 ha (143 acres) it is one of the ten largest parks in Scotland. Recent park history began with the Osburn and Crum families who purchased the land from the Ayrshire Earls of Eglinton and made use of the power of Auldhouse Burn to drive the cotton and grain mills found in the glen. The Crum family finally took over the Rouken Glen lands in 1852 and Alexander Crum was mainly responsible for planting most of the mature trees found here from the 1860's. The area was sold in 1904 to A C Corbett, MP for Tradeston and subsequently Lord Rowallan, who gave the park to Glasgow. Glasgow leased it in 1984 to what has become East Renfrewshire council for a peppercorn rent for 125 years. A condition of the lease was that the area continued to be a park. £3 million of lottery funding was spent between 2014 and 2016 and last year it was awarded UK Park of the Year.

In the evening light we headed southwards up the glen passing firstly the site of the Newfield mill and then proceeding along the new walkway beside the old mill lade. Then, growing in the marshy area alongside the Auldhouse burn, we noted a large number of sizeable white willows (*Salix alba*) naturalised running (invasive) bamboo, and occasional Chilean rhubarb (*Gunnera manicata*). This walkway led us into the "Glen Walks" originally established by the Crums in the 19th Century for recreational purposes. These paths have been recently improved and in some cases re-aligned, which made mapping a bit challenging.

It soon became apparent that shelter in the glen and the presence of a deep, fertile soil rich in washed down minerals have encouraged the growth of some remarkable tree taxa, large in height and girth. This was particularly demonstrated by numerous Scots pine (*Pinus sylvestris*) and Norway spruce (*Picea abies*). Apart from Scots pine, most of the trees growing so well here are not native to Britain. Like the Norway spruce, European silver fir, limes, maples, walnuts and horse chestnut (in full bloom) are Miocene - Tertiary relics all forced by falling temperatures into refugia in the Caucasus mountains, just before the onset of the Pleistocene epoch some 2 million years ago. Many shade tolerant yews (*Taxus baccata*) (probably native) were in evidence. We found much

Norway maple (*Acer platanoides*) regeneration as well as that of the more usual ash (*Fraxinus excelsior*) and sycamore (*Acer pseudoplatanus*)

seedlings. We also came across a 1 m tall sapling of giant fir (*Abies grandis*) with its



Blue Atlantic cedar *Cedrus atlantica*
f. glauca

typical tangerine scent. The shrub layer contained, amongst other specimens, guelder rose (*Viburnum opulus*) (with serrated leaves as opposed to the entire leaves of the wayfaring tree (*V. lantana*) encountered recently on the Bothwell Castle excursion) and snowberry (*Symphoricarpos albus*).



Golden Lawson cypress
Chamaecyparis lawsoniana 'Lutea'

Some distance up the glen, after a right angle bend in the burn on the opposite bank we had a fine view of a big blue Atlas cedar (*Cedrus atlantica* f. *glauca*), a tall yellow Lawson cypress (*Chamaecyparis lawsoniana* 'Lutea') and a big silver pendent lime (*Tilia* 'Petiolaris').

Almost half way up the glen we located two mighty specimens of grand fir (*Abies grandis*). On the opposite bank can be seen the Giffnock sandstone and siltstone, exposed to view by lottery funded clearance of vegetation. Below these and also upstream are a series of fossil-bearing sedimentary layers, the Orchard beds, dating from some 325 million years ago in the late Carboniferous period when Scotland was located near the equator. Just upstream from here where a side stream enters, we looked unsuccessfully for crinoid fos

sils embedded in a thin layer of limestone. These remarkable geological features have led to a large part of the park being awarded SSSI status.



Male cones of Grand fir *A. grandis*

Between here and the top of the glen we found some very big trees (which have been measured) – Douglas fir (*Pseudotsuga menziesii*), oriental spruce (*Picea orientalis*), western hemlock (*Tsuga heterophylla*) and Sitka spruce (*Picea sitchensis*).



Pendent lime *Tilia* 'Petiolaris'



Oriental spruce *Picea orientalis*

It is the main cause of mortality in the tree in its native range in south-western Oregon and north-western California. We paused to note the characteristic one year cones and needle features, finding an occasional Sawara cypress (*Chamaecyparis pisifera*). Heading downhill from here

we found a long avenue of Caucasian lime (*Tilia x euchlora*) with their characteristic glossy leaves; then, silhouetted against the setting sun (10), the outline of giant sequoias (*Sequoiadendron giganteum*), blue Atlas cedar, giant firs and both Austrian and Corsican pines. (this last has been measured)



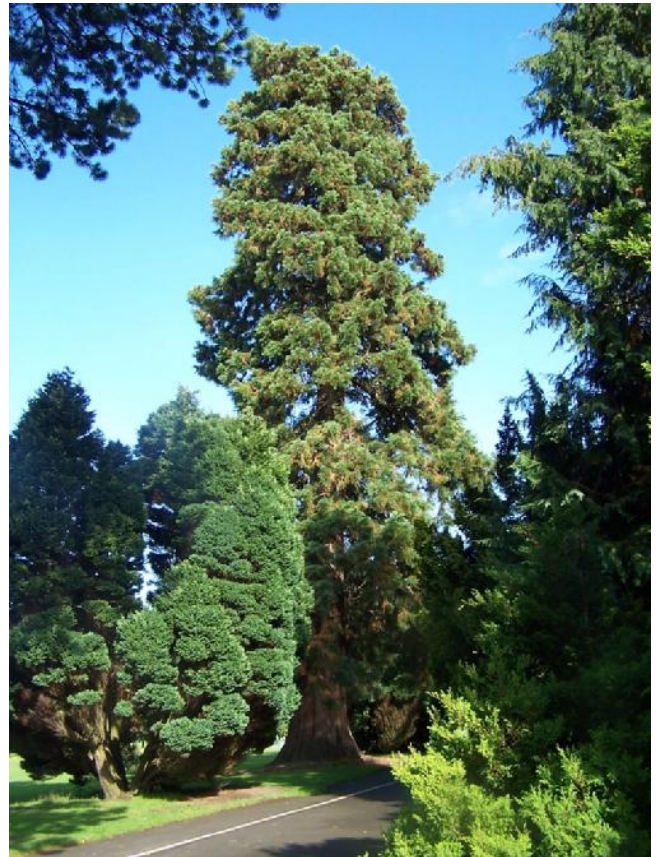
Phytophthora infected *C. lawsoniana*



Hungarian oak *Q. frainetto*

Opposite the site of the original mansion house three Hungarian oaks (*Quercus frainetto*) were planted and one of these, as well as a big hornbeam (*Carpinus betulus*) have been measured. Just south of the small orchard surrounded by a white willow hedge grow a number of different whitebeam (*Sorbus* spp.) taxa, whilst, to the east, have been planted a number of interesting trees including a Japanese umbrella pine (*Sciadopitys verticillata*), western red cedar (*Thuja plicata*) and what seemed to be the unusual 3-needled Mexican weeping pine (*Pinus* aff. *patula*).

Outside the nearby walled garden grow a very big Caucasian oak (*Quercus macranthera*), as well as the biggest giant sequoia in the park, both of which have been measured. Just east of here is a small wildlife garden within which grows a big sycamore and a dawn redwood (*Metasequoia glyptostroboides*) and outside of which grows a pedunculate oak (*Quercus robur*) planted in 2006 as a memorial to the centenary of the opening of the park by A C Corbett MP, previously mentioned.



Giant sequoia *S. giganteum*



Spaeth's alder *Alnus x spaethii*

Opposite is a small enclosed garden that contains an example of the rare Spaeth's alder (*Alnus x spaethii*), a hybrid with boat-shaped leaves, whilst a row of trees near here includes a hiba (*Thujopsis dolobrata*), endemic to Japan, and a Brewer spruce (*Picea breweriana*), a weeping spruce confined to some mountain tops on the Oregon/Californian border. Just north of the memorial grows a row of Lombardy poplars (*Populus nigra 'Italica'*) and a solitary, well-formed hornbeam (*Carpinus betulus*).

Finally, not far from where or evening had started, James Milner-Whyte drew our attention to a cypress-like conifer with aberrant foliage. This was a Lawson cypress cultivar called 'Wisselii' which has '3D' foliage like the true cypresses (*Cupressus* spp.) instead of the '2D' foliage of its parent (*Chamaecyparis lawsoniana*). Near it was a golden leylandii (*x Cuprocyparis leylandii 'Castlewellan Gold'*).



Lombardy poplar row *Populus nigra 'Italica'*



With its multiplicity of different examples of trees this park deserves to be well publicised. Furthermore the Pavilion Visitor Centre is well worth a visit and makes available several natural history related leaflets.

Wisselii *C. lawsoniana*
'Wisselii'

Cardowan Moss, 20th August 2017

Alison Moss and Richard Weddle

We, 8 of us, were very lucky with our weather at Cardowan. It was overcast when we explored the woodland and pond areas in the morning and we enjoyed warm, sunny weather on the raised bog area after lunch, helping to add some attractive insects to our list.



Broom moth caterpillar with parasitic larvae – photo R Weddle

With Bob Gray's tree expertise, we were able to record 175 species of flowering plants and ferns. This included 47 species not on the data list for the site. We were asked to look for broad leaved helleborine which was soon spotted in several locations in the wooded part of the site. The path verges through the raised bog were particularly attractive with heather in flower, attracting bees and other insects including a small copper butterfly, several green-veined white and a selection of hoverflies. The abundance of insects here attracted house martins and swallows flying low over the bog.

There was a lot to see. We didn't venture too deep into the pond and marsh areas although sightings of various dragon and damsel flies, small frogs and toads gave evidence of the biodiversity resulting from these features. This included a buzzard and a heron having a squabble near our lunch spot. Betty Black listed 23 species of fungi including puffballs, jelly babies and black helvella. Cardowan Moss is definitely a good place to visit and it will be interesting to see how the wooded areas, largely planted in the 1990s, develop.



Lunch at Cardowan – R Weddle

The other insect highlights were: a cuckoo-bee (*Sphecodes monilicornis*) – it lays its eggs in the nests of solitary bees, and this was the first record for Glasgow and, we think, for SW Scotland; a rather striking ‘picture-winged’ fly *Chaetostomella cylindrica*; several of the less common hoverflies, including *Pipiza noctiluca* – only the second record in Glasgow; a caterpillar of Broom Moth parasitized by ichneumons; there were also a number of small Heteropteran bugs which were previously unrecorded in Glasgow, most likely because no one had bothered to look or had ignored them if they had found them.

Also, Laura spotted a cluster of water-vole burrows near the stream. In all we added 95 species to the list for the LNR; the updated list can be seen at www.gnhs.org.uk/biodiversity/CardowanMoss_splist.pdf

Wildfest at the Botanic Gardens, September 2017

Richard Weddle

In this bicentenary year of the Botanic Gardens, GNHS are encouraging wildlife surveys to update the 1997 reports published in *The Glasgow Naturalist* under the banner ‘On the Wildside: the Natural History of the Glasgow Botanic Gardens’. Two major events took place there under the auspices of RSPB’s Wildfest 2017 programme: a Bat and Moth Night on Sept 1st and a Bioblitz on Sept 2nd. Full reports of these events and other surveys which took place this year will appear in *The Glasgow Naturalist* in due course, so I’ll just mention a few salient points here.

101 species have been recorded in the Gardens for the first time this year; of these 71 are from the Bioblitz, and 51 of those are higher plants – recorded by the new BSBI Recorder of Lanarkshire, Michael Philip, and his team; one species worth mentioning is Pellitory-of-the-Wall which was apparently introduced to the Gardens some 30 years ago, but has not been formally recorded until now. The Bioblitz included a ‘worm charming’ event run by OPAL which yielded the first record for Glasgow of the Grey Worm (*Aporrectodea caliginosa*) – though there may be previous records that haven’t reached the BRC database yet.

The Bat and Moth Night yielded a Bulrush Wainscot moth (*Nonagria typhae*) that had previously been recorded in Glasgow only as a larva at Possil Marsh in 1983. The ‘Dawn Chorus’ walk recorded an apparently unseasonal Whooper Swan on the Kelvin – but we subsequently found that was likely to have been one of a pair that are semi-resident on that area (ie they don’t migrate). And finally the ‘Land Shrimp’ (*Arcitalitrus dorrieni*), the only terrestrial amphipod crustacean in Britain, was found in leaf-litter – the first mainland Scottish record of this species was by Geoff Hancock beside the Kelvin at Bunhouse Road in 2009.

There are a few specimens from the Bioblitz still to be processed – and there will be further surveys before the end of the year, but the interim updated species list for the Gardens can be seen at www.gnhs.org.uk/biodiversity/gbg_splist.pdf (the species recorded for the first time this year have ‘2017’ in the ‘Earliest’ column, of course)

We had great fun at the GNHS stall at the Botanic Gardens Bioblitz Over 200 people visited our table, and we had a selection of activities on offer, including animal track identification, a Records Tree for people to add their sightings (e.g. a dragon that one young man had apparently seen in the gardens) as well as some wildlife specimens, the most popular of which were the adder skins that fascinated adults and children alike. This was a good opportunity to get more people familiar with the society and what we do, as well as generally encourage people to pay a bit more attention to their natural surroundings, and we all enjoyed the day!



Thanks to all members who helped staff the stall and engage with the visitors.

The GNHS stall – photo Laura Allen



Above and below - The Biological Records Centre stall
© CSG CIC Glasgow Museums Collection



The GNHS stall – photo Laura Allen



Reports from GNHS members

A record of the Thorn-apple, *Datura stramonium*, from the Strathaven area

Geoff Hancock

A single plant of Thorn-apple, *Datura stramonium*, appeared growing adjacent to the henhouse at Craigmuir, Sandford, Strathaven in July 2017. Its presence is readily explained by the acquisition of some mixed seed of the kind normally given to small caged birds. Thorn-apple is a known component of bird seed mixes albeit as a contaminant. We had been given two bantam hens by a neighbour along with a bag of seed earlier in the year. Prior to this we have never fed our poultry with such mixes.



Whole plant with flowers, 25 cm high
17 September 2017

The distinctive nature of the growth form and its foliage makes the plant stand out even before flowering. Fruits have followed even though Scottish weather is not generally conducive to the growth of aliens that normally thrive in warmer conditions. Seeds form in the absence of cross-pollinating insect activity as this species can self-fertilise. We do not intend to destroy the plant and therefore will see if any seeds survive and produce more plants next year. In the absence of an 'Indian Summer' this year although the fruits are well-formed the seeds may not mature.

Scrutinising the three local floras reveals a few urban records of Thorn-apple from Glasgow and Paisley. The only previous mention in a rural context in the area appears to be of a plant that appeared in a turnip field in Coulter, in 1974. It is common in North America, although may originally have been native to Mexico, and has spread by trade around the world.

Fruits, taken on 17 October
2017



In my “day job” working at the University of Glasgow I use a single-celled fungus, a fission yeast called *Schizosaccharomyces pombe* (Figure 1), as a model organism in biological research to study the ability of cells to correctly replicate and divide. Such research is of interest as deregulated division is the hallmark of a variety of human diseases and conditions including cancer and malignancy.



Schizosaccharomyces pombe

But over a number of years I have developed, in part through my membership of the GNHS, an interest in other fungi and mushrooms, either because they are edible or are things of beauty.

A great boon to learn about a new group of organisms is the publication of a field guide which allows the confident identification of the species that we see. In the case of fungi and mushrooms I have found that the magnificent Pan MacMillan guide *Mushrooms* by Roger Phillips (ISBN-13: 978-0330442374) is excellent and allows me to identify most with

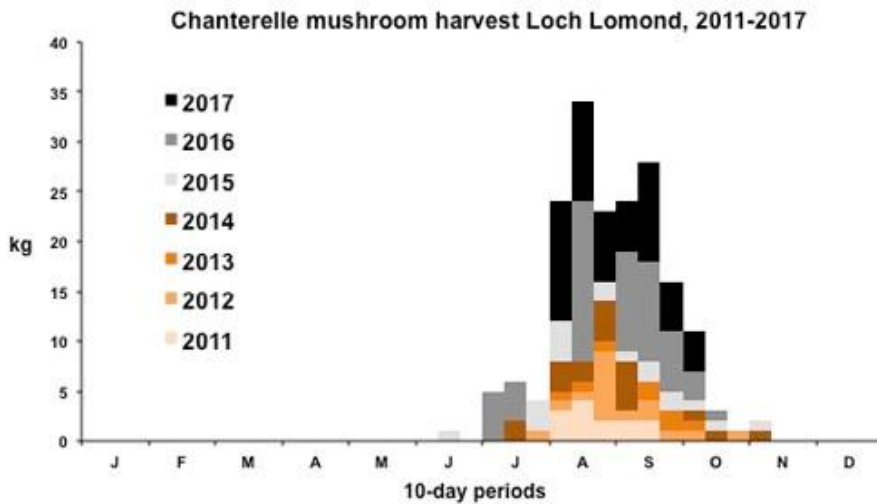
certainty. This is of course essential when considering potential edible species!

In the case of edible mushrooms, I have become moderately obsessive with one species, the Chanterelle *Cantharellus cibarius*. I find the flavour of Chanterelles exquisite, with them being one of my favourite gastronomic delights. Along with a friend we have found a “secret wood” at Loch Lomond where we have sustainably harvested Chanterelles each year since 2011 from July through to early November. As can be seen from the large amounts that we have collected Chanterelles can be a common, and even abundant, mushroom.



Left and above - Chanterelle *Cantharellus cibarius*
All photos – Chris McNerny

Furthermore, prudent harvesting has little impact on numbers, as we find more Chanterelles in our “secret wood” each successive year. With such large numbers my family cannot eat them all (“Dad...not Chanterelles AGAIN!”), and I give over half the harvest away. Many friends are now converts to the delicious flavour of Chanterelles.



To turn to other more unusual and beautiful mushrooms. Two species whose pictures I looked at in Roger Phillip’s guide and wished to see “in the flesh” (pun intended) were the Beefsteak Fungus *Fistulina hepatica* and the Collared Earthstar *Gaeastrum triplex*.

We were able to find a nice example of the Beefsteak Fungus in our “secret wood”

in September 2015 and it very much deserves both its vernacular and Linnaean names, looking remarkably like meat (*hepatica* means “liver-like”). “Blood” even apparently oozes, when you press the upper surface!

The final mushroom I would like to mention is the most unusual and rarest of the three in Scotland, the Collared Earthstar *Gaeastrum triplex*. I was lucky to see this species through a friend who had found some at Baron’s Haugh, near Motherwell, in September 2015. These are wonderful and curious looking mushrooms – a mixture of a puffball surrounded by a star. Interestingly, it appears that more observations of this rare species are being recorded around Glasgow, so GNHS members should keep an eye out for it.



Beefsteak Fungus
Fistulina hepatica



Collared Earthstar *Gaeastrum triplex*

I hope that this short “mushroom foray” by a beginner has been of interest, and encouraged members of GNHS to look for

fungi and mushrooms themselves, armed with a copy of Roger Phillips’ *Mushrooms*.

Late summer and autumn are the best time of the year to find many mushrooms, particularly after rain; so, the Scottish climate is ideal for them. I’ll be happy to pass any knowledge I can, but PLEASE don’t ask me for the location of my “secret Chanterelle wood”!

Chris.McInerny@Glasgow.ac.uk

Reports from BLB Bursary Recipients

Grass Identification

Magdalena Blanz

Currently in my first year of studying for a PhD, I am investigating historical and archaeological evidence of animal food and fodder in the North Atlantic Islands, for which I moved to the Orkney Islands. My work focuses on the consumption of seaweeds and grasses by terrestrial animals. When the first humans arrived on the Orkney Islands around 9000 years ago, forests would have been dominating the landscape. In contrast, today, Orkney is nearly entirely deforested, and has a grassland-dominated economy, with over 90 % of agricultural land being used for grazing sheep and cattle, and cereal production. Agriculturally improved grasslands are thus extremely common on Orkney, which may pose a threat to wild grasses. Since the introduction of livestock to Orkney around 6000-5000 years ago, the range and abundance of grasses thus changed dramatically, while the distribution of seaweeds would have been much more similar to that of today.



Students in the lab

identification skills, this also provided me with an excellent opportunity to meet and discuss with ecologists and volunteer recorders, and to learn about their different views on current conservation efforts, and sustainable land management.

On the first evening we got to grips with the nomenclature of grass morphology, and how grass morphology may vary between different genera and species.

Much of the next days was spent outside, where we were shown 36 species of 25 different genera and an intergeneric hybrid, from a range of different habitats, such as limestone plateaus, limestone hillsides, wetlands, acidic soils and roadsides. For several species, identification was performed in the lab, as this required use of hand lenses and microscopes, in order to see the small glumes, awns, lemmas and other identifying

Soon after taking up my PhD studies, I was gradually able to identify more and more seaweeds, but grasses remained difficult for me to identify, as initially, they all looked very similar to me. This was exacerbated by my starting my PhD in October, so vegetative features were all I had to go by. However, thanks to BRISC/GNHS/SNH, I was able to attend a four-day FSC course on grass species identification at Malham Tarn this past July, instructed by Dr Sarah Watson-Jones. In addition to greatly improving my



Limestone pavement

features. The range of different keys available enabled me to find my personal favourite (Grasses, by Charles E. Hubbard).



Grass identification near Malham Tarn

My future recording work will involve the study of macroalgae at the tidal island Brough of Birsay, and the North Atlantic Islands in general, and coastal grasses, and how the species distributions of seaweeds and grasses are likely to have changed over the last 5000 years. Over the last year, I have also been involving other students in my research in order to share my new-found knowledge and enthusiasm for seaweeds and grasses and to help detailed investigations of selected species as part of archaeological and environmental studies in addition to ongoing recording efforts.

Photos – Magdalena Blanz - Magdalena.Blanz@uhi.ac.uk

Leatherback turtle (*Dermochelys coriacea*) egg temperature as a proxy for core body temperature to determine any environmental change and comparison to hawksbill turtles **Helena Strachan**

Introduction

Leatherback turtles (*Dermochelys coriacea*) are the largest species of marine turtle and the fourth heaviest reptile in mass. Adult turtles migrate from high latitudes where they feed, to the tropics and sub-tropics to nest. Therefore, they experience a range of external temperatures, suggesting a potential thermoregulatory problem. However, they are able to maintain a higher body temperature than their surrounding waters as a result of insulation and physiological adaptations such as gigantothermy and fatty tissue layers (Paladino *et al.* 1990). When feeding at high latitudes, they use their rear flippers to generate heat while swimming. When nesting in the tropics and sub-tropics, they must prevent overheating on the warm sand during body pitting and excavation (Burns *et al.* 2016).

Based on previous research (Burns *et al.* 2015), the temperature of newly laid leatherback turtle eggs can be used as a proxy for their core body temperature. The aim of this project was to use the temperatures of newly laid eggs as a proxy for core body temperature of leatherback turtles to compare data to previous temperature records taken by students in Trinidad, and determine any environmental trends. An additional aim was to compare core temperatures of leatherback turtles to the temperatures of hawksbill turtles (*Eretmochelys imbricata*) nesting in Tobago to determine any differences between species (provided by a parallel study by another student in Tobago).

Materials and Methods

This project was carried out on the beach of Fishing Pond on the East coast of Trinidad between the hours of 20:00 and 01:00, three nights per week, during the leatherback turtle nesting season. Sampling took place from June to early August.

Observations were made in pairs with one individual taking measurements of a female turtle whilst the other scribed. Using red LED light to minimize light disturbance, the beach was patrolled for female turtles which were in the early stages of constructing a nest. Data sheets were used to record the date, time, beach zone, any flipper tags present and laying time. When a female began laying, newly-deposited egg temperatures were recorded immediately, using a Fluke 62 max plus infrared thermometer, by extending an arm down the nest hole. It was also noted whether eggs were small or infertile. In addition, the temperature of the turtle's head, neck and flippers were recorded at the start and end of laying. Data collection methods were kept as non-invasive as possible by reducing contact with the turtle's rear flippers when recording.

Results

As the Trinidad expedition only ended in August and Tobago in September, data analysis is not underway yet. However, graphs have been constructed for each turtle sampled in Trinidad and hypotheses have been made about results. *Figure 1* shows the data collected from one, randomly selected, female nesting in July. *Table 1* shows the temperatures recorded for the head, neck, and flippers of the same turtle. In total, 46 females were sampled over the course of the expedition.

Hypothesis 1: There will be an increase in core body temperature of leatherbacks in comparison to previous collected data as a result of environmental change.

Hypothesis 2: The core temperatures of leatherback turtles will be higher than that of hawksbill turtles as leatherbacks are the larger of the two species.

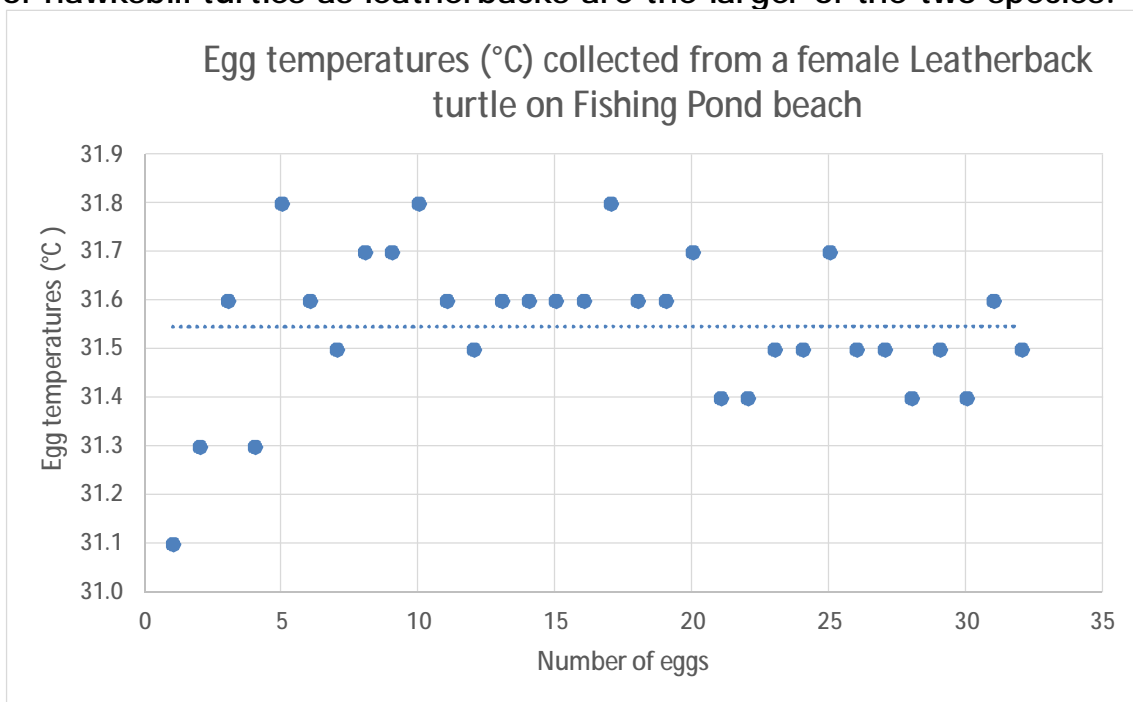


Figure 1: Scatter graph showing the number of eggs measured and their temperature for an individual female leatherback turtle.

Position on Body	Temp at Start of Laying	Temp at End of Laying
Top of head	27.9	27.4
Neck upper	28.6	28.7
Front left flipper base	28.2	28.3
Front right flipper base	28.3	28.3
Rear left flipper base	30.0	30.1
Rear right flipper base	28.8	28.4

Table 1: Table showing the temperatures recorded for the head, neck, and flippers of a randomly selected individual female leatherback turtle at the start and end of laying.

Figure 2 shows the average egg temperatures recorded for both leatherback and hawksbill turtles from 2013 to 2016. The data collected this year will be compared to this to determine any differences between species and change over years (image from M. Kennedy).

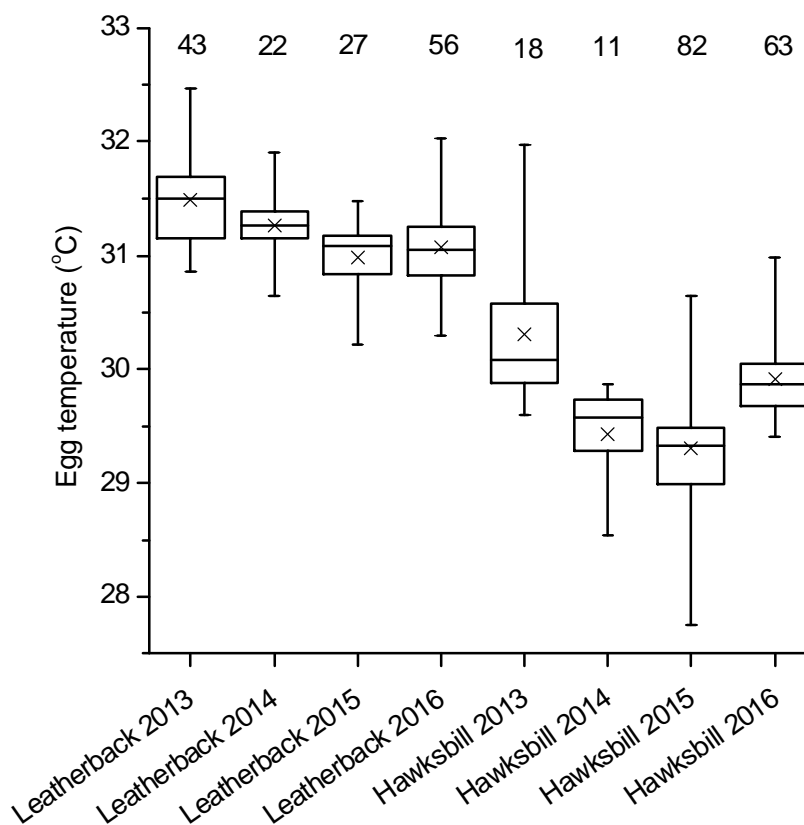


Figure 2: Box plot indicating egg temperatures recorded in leatherback and hawksbill turtles from 2013 to 2016.

Discussion

Using infrared thermometers, the temperatures of newly deposited eggs were recorded from nesting leatherback turtles. This data was used as a proxy for their core body temperature and compared to previous records to highlight any evidence of environmental change. This may be shown by an increase in their core

temperature, which has already been recorded as there was a slight increase in temperature between 2014 and 2015 (Burns et al. 2015). This could potentially be a result of environmental changes.

Leatherback turtle temperatures were also compared to hawksbill turtles nesting in Tobago. Their difference in body temperature is interesting as leatherback turtles have a different thermoregulatory process as they migrate to the northern and southern oceans out of the nesting season. In comparison, hawksbill turtles are confined to the tropics and sub-tropics and so the two species may respond differently to local environment changes. The core temperatures of leatherback turtles will likely be higher than that of hawksbill turtles as leatherbacks are the larger of the two species and therefore have more fat tissue layers. Based on last year's research, the data collected also supports this hypothesis (Burns et al. 2015).

- *Recorded leatherback turtle core body temperatures = 31.4 ± 0.05 °C*
- *Recorded hawksbill turtle core body temperatures = 30.0 ± 0.13 °C*

A full report will be available at the beginning of 2018 which will include all projects carried out in Trinidad with analysed results.

Acknowledgements

Glasgow Natural History Society for providing funding through their Blodwen Lloyd Binns Grant.

Malcolm Kennedy for advising on the project.

Roger Downie for advising the Glasgow University Trinidad Expedition 2017, of which this project was a part.

The Trinidad Expedition team for assisting with data collection; Ewan Beveridge, Zoe Bridge, Ruth Carter, Lucy Clark, Adam Czyzewski, Claire Gallacher, Kirsty Martin, Ellen McMurchy, Jessica Melrose, Hilary Mulholland, Rory Pendreigh, Rory Thomson & Emma West.

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BSBI recording for Atlas 2020: preliminary report on fieldwork in West Sutherland, June – August 2017, with the help of an accommodation grant from the Blodwen Lloyd Binns Bequest Fund **Ian M Evans**

1. The Vice-county Recorder for West Sutherland (VC 108), Ian M. Evans, and his co-worker Gwen Richards, both live in Assynt, in the extreme south-west of the area. All the remaining under-worked 10 km squares in the Vice-county are in the east, between two and four hours drive away, which makes day visits impracticable. Accordingly we booked, for three separate weeks, in June, July and August 2017, self-catering accommodation at Rhitongue (NC6059), at the modest cost (for a three-bedroom cottage) of £200 a week. All other costs, including travel and subsistence, were borne by us.

2. We were joined by botanist Ro Scott from the Black Isle in August and by entomologist Stephen Moran from Inverness for a couple of days in both July and August. In 21 days fieldwork we made some 3400 records from twenty-six 1 km squares, spread very widely across the area, from Strath Vagastie, south of Alnharra (NC5327) to Forsinain in Strath Halladale (NC9048). We also took the opportunity to liaise with the newly-formed Tongue, Melness and Skerry Wildlife Group and led or helped with their first three field meetings, one in each month.

3. Fieldwork during June was as follows, with particularly interesting finds (in the local context) listed:

17th Strath Vagastie (NC5327, *Betula nana*)

18th Achanlochy, Strath Naver (NC7158, *Vulpia bromoides*, *Ajuga pyramidalis*, *Anagallis tenella*)

19th Trantlemore, Strath Halladale (NC8952, *Barbarea intermedia*, *Platanthera chlorantha*)

20th Aird Torrisdale (NC6762, *Sinapis arvensis*, *Puccinellia distans borealis*)

21st Wildflower Walk at Lamigo with TMS Wildlife Group (14 present) and Strathan Skerry (NC6463, *Ligusticum scoticum*)

22nd Aultivulin (NC8167, *Parnassia palustris*, *Primula scotica*, *Saxifraga oppositifolia*) and Brawl (NC8066, *Oxytropis halleri*)

23rd Lamigo Bay (NC6563, *Botrychium lunaria*, *Dactylorhiza x formosa*, *Platanthera chlorantha*).

4. Field work during July, likewise:

8th Strath Vagastie (NC5328, *Puccinellia distans distans*)

9th Smigel Burn, Strath Halladale (NC8957, *Gentianella campestris*, *Platanthera chlorantha*)

10th Loch Meadie (NC4939, *Drosera x obovata*, *Arctostaphylos alpinus*) and Meadie Burn (NC5038, *Carex limosa*, *Diphasiastrum alpinum*)

11th Skail, Strathnaver (NC7146, *Ajuga pyramidalis*, *Cirsium heterophyllum*, *Sisymbrium officinale*)

12th Creepy Crawly Walk from Tongue to Caisteal Bharraich with TMS Wildlife Group (6 present, including six-year-old, led by Stephen Moran, 115+ species of invertebrates recorded)

13th Melvich/Portskerra Pier (NC8865, with County Lepidoptera Recorder Graham Crittenden, *Vicia sylvatica*, *Scilla verna*)

14th Rhitongue (NC5959, *Goodyera repens*) and Talmine (NC5863, *Gentianella amarella septentrionalis*, *Platanthera bifolia*).

5. Fieldwork during August, likewise:

- 12th** Achadh nan Eas, Strathnaver (NC6637, *Ulmus glabra*, *Veronica scutellata*)
13th Millburn, Strath Halladale (NC8855, *Dryopteris expansa*, *Trientalis europaea*)
and Forsinain, Strath Halladale (NC9048, *Galeopsis bifida*, *Lycopodium clavatum*)
14th Ardachaidh, Kyle of Tongue (NC5755, *Carex extensa*, *Sparganium natans*)
15th Skelpick Burn, Strathnaver (NC7453, *Carex pauciflora*, *Polystichum aculeatum*,
Utricularia stygia)
16th Strandline Shell Collecting at Midfield with TMS Wildlife Group (22 present, including two visiting families) and Midfield/Achininver (NC5765, *Carex capillaris*, *Juncus balticus*, *Primula scotica*, *Sagina nodosa*)
17th Carn a'Mhadaidh, Tongue (NC5249, *Arctostaphylos alpinus*, *Vaccinium uliginosum*) and Loch an Dherue, Tongue (NC5348, *Nitella flexilis*, Stephen Moran collected invertebrates)
18th Weather inclement in the morning, but lists were made by IME and GR at Moine House (NC5160) and by RS at Lochan Leacach (NC6857) and the mouth of the River Borgie (NC6861). We should to thank Ian Smart, Keeper at Loch Loyal Lodge, for transport to and from the area which made our visit on 17th possible.

6. Some botanical records await confirmation by referees, when they will all be inputted and passed onto the BSBI. A considerable number of faunal records were also made during our visits, including moth records from a trap deployed by GR at our base at Rhitongue. These will be inputted in due course and passed on to the Highland Biological Recording Group, of which all four participants are members.

7. The last two year's botanical fieldwork have achieved a basic target of three 1 km squares recorded in each 10 km square, but it is hoped that it will be possible to improve on this in a further season's fieldwork in 2018. It should be pointed out that there are still huge swathes of country in West Sutherland, especially between the large straths, the higher plants (and other aspects of the natural history) of which have never been recorded, but this is, of course, the case with much of the Scottish Highlands.

8. The participants in this year's fieldwork would like to thank the Glasgow Natural History Society for the generous grant towards their expenses. We were fortunate in that the weather was in general kind, and that we were able to visit and record some stunningly beautiful and remote areas. The work is ongoing and our modestly-priced accommodation is booked for next year!

Ian M. Evans

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BSBI Vice-County Recorder for West Sutherland (VC 108)

Exposure of European polecats (*Mustela putorius*) in Britain to *Toxoplasma gondii*, *Leptospira* and Canine Distemper Virus: could infectious disease be a limiting factor in population recovery? Kari-Anne Heald

The European polecat (*Mustela putorius*) almost became extinct in Britain in the early 20th Century, as a result of marked predator control. The species is now expected to become re-established throughout Britain barring any serious threats. Threats to this recovery include several infectious diseases associated with carnivore population declines (Santos *et al.*, 2009) and virtually all recent outbreaks of disease in endangered wildlife have been caused by pathogens which can infect multiple species (Thorne and Williams, 1988). The project, therefore, looked at exposure to infectious, multi-host pathogens: *Toxoplasma gondii*, *Leptospira spp.* and Canine Distemper Virus, and discussed whether they could affect population recovery.

The justifications for testing for the specified pathogens are:

Toxoplasma gondii (*T. gondii*) is a protozoon with a worldwide distribution and can infect all endothermic vertebrates. Clinical toxoplasmosis is uncommon but signs vary from mild enlarged lymph nodes and fever, to serious neurological complications and even abortion and death. Furthermore, clinical toxoplasmosis can occur as a result of immuno-suppression, stressors or low genetic diversity.

Leptospirens have been isolated from almost all mammalian species on every continent barring Antarctica. *Leptospira spp.* are bacteria. The species are divided into a large number of serovars. The disease, leptospirosis, is caused by a pathogenic serovar. It is possible to be clinically susceptible to one serovar whilst being a reservoir for another. Host maintained leptospirens cause minimal damage to the host unless they are immuno-compromised: this includes neonates and females in late pregnancy, or where there are concurrent infections. Thus, maintenance hosts may be asymptomatic whilst incidental hosts may suffer severe or lethal hepatic, renal or cerebral dysfunction.

Canine Distemper Virus (CDV) is a morbillivirus. It is suggested that the mustelid virus is not antigenically distinct from the canine virus. The resultant disease is called distemper: symptoms are related to dermatological, respiratory and neurological systems. Once infected, the outcome of disease ranges from sub-clinical to lethal, with lifelong immunity if the animal survives.

To investigate exposure to these pathogens, 149 polecats were collected from across Britain, which had died due to road traffic accidents. Due to damage from trauma or scavenging, serum and tissues could not be collected from all individuals. Serum samples were collected from 131 polecat carcasses and organ samples were collected from 79 carcasses.

The BLB Bequest grant was used to test the serum samples for exposure to *T. gondii* and to 12 *Leptospira* serovars, from three species: *Leptospira interrogans* Autumnalis, Bratislava, Canicola, Icterohaemorrhagiae, Pomona and Saxkoebing; *Leptospira borgpetersenii* Ballum, Hardjo bovis, Tarasovi, Javanica and Altodouro and *Leptospira kirshneri* Grippytyphosa. Testing for exposure to CDV was originally planned as part of the study, however, serum samples were degraded and not suitable for this test. Instead, brain and lung were screened for infection with CDV by PCR. To assess factors which may affect exposure: season, gender, and location

data were entered as explanatory variables, in a generalised linear model with a binomial error distribution, for each of the pathogens in turn (exposed/unexposed).

The seroprevalence to *T. gondii* was 71.8% (94/131; 95% Confidence Interval (CI) 64.2%-79.4%). Season, gender and location had no significant association with exposure to *T. gondii*. This high sero-prevalence may be explained by diet and the consumption of infected prey. The bulk of the polecat diet is made up of rabbits, which can be frequently infected with *T. gondii* cysts, and is the most likely source of exposure. This high *T. gondii* seroprevalence has the potential to result in reduced fecundity and longevity of polecats.

The overall seroprevalence to *Leptospira* spp. was 14.5% (19/131; 95% CI 8.6%-20.4%), with exposure to three out of twelve serovars tested: Bratislava (7.6%; 95% CI 3.2%-12.0%); Saxkoebing (6.3%; 1.9%-10.7%) and Icterohaemorrhagiae (1.5%; 0%-3.5%). We found that season, gender and location had no significant association with overall exposure to *Leptospira* spp. The low seroprevalence recorded in this study compared to previously published studies (seroprevalence of 65.4% in polecats in France (Moinet *et al.*, 2010) could reflect a low prevalence within reservoir populations or low contact with these reservoir hosts. In this case, exposure is found to serovars which have reservoirs within rodent populations. Also, the test used measures IgM, which is the first antibody produced in an infection, therefore, only recent exposure would be recorded. This is the first known report of polecat exposure to *Leptospira* in Britain and a longitudinal study would assess this exposure further, whilst more information is needed to determine whether polecats are maintenance hosts or incidental hosts.

All organ samples tested negative for CDV (95% CI 0.00%-0.05%; n=0/79). This is the first known information of polecat exposure to CDV in Britain and the results are very encouraging, as mustelids are considered to be very susceptible to CDV. However, because vaccination against CDV is not a current requirement for dogs imported through the PET travel scheme, unvaccinated dogs could be a source of entry of the virus into Britain. If the virus entered wildlife from the domestic dog population, it is possible that the naïve British carnivore guild could form a reservoir population for this virus. Even if the virus did not cause mortality itself, it also causes immunosuppression which could prompt concurrent, clinical toxoplasmosis.

Based on the evidence of exposure to *T.gondii* and *Leptospira* in European polecats we have detected in this study, future studies could assess whether these pathogens are associated with disease and any impact of exposure on polecat populations. Additional metadata, such as stomach contents, age, meteorological data and farm surveys related to domestic animals, rodent control, farm maintenance and toxins, would provide further information on possible routes of infection and risk factors for exposure. Surveillance studies would be useful to monitor any disease outbreaks, particularly utilising veterinary information regarding domestic dogs infected with CDV.

The work will be submitted to the *Journal of Wildlife Diseases*.

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Christmas Social – 6.30 for 7.00pm, Tue 12th Dec 2017 **Janet Palmar**

This year Council has decided to hold the Christmas Social in the Zoology Museum in the Graham Kerr Building, with the talk in Lecture Theatre 2 afterwards. Following its previous popularity, we are again trying a "bring a dish" formula. Everyone brings enough savoury or sweet food for at least two servings (for example, couples can bring four servings of one dish.) The food is laid out, and everyone can have a taste of any dishes they choose. Please again bring your own knife, fork and spoon which will make setting up the tables and clearing away much easier. No good at cooking or run out of time with all the arrangements for Christmas? – no problem, just buy cakes or cold meat!

Although there are kitchen facilities which can heat food, it might be simpler to choose dishes which can be served cold. There will be no charge for the evening, but it is essential to let me know if you intend to come, so that we can set out the right number of tables and chairs. It would also be most helpful if you can let me know what type of dish you intend to bring, e.g. savoury, salad or sweet.

Please fill in the form and return it to me by the November 23rd meeting.

GNHS Christmas Social – 6.30 for 7.00pm, Tue 12th Dec 2017
Bookable as soon as possible please by sending the form below to Janet Palmar

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Name(s) (please print)

Address.....Postcode.....

Email address Phone no.....

I/we intend to bring (describe type of food - savoury, salad or sweet) and my/our own knife/knives, fork(s) and spoon(s).

.....for.....people