

CARDIFF NATURALISTS' SOCIETY

Founded 1867

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Charity No. 1092496

LIST OF OFFICERS 2022 President Position vacant

Secretary

Mike Dean 36 Rowan Way, Cardiff CF14 0TD 029 20756869 secretary@cardiffnaturalists.org.uk

Treasurer

Rhian Kendall treasurer@cardiffnaturalists.org.uk

Membership Secretary Elizabeth Morgan membership@cardiffnaturalists.org.uk

Indoor Meetings Secretary

Hilary Wicks 029 20257012 indoor@cardiffnaturalists.org.uk

Field Meetings Coordinator Position vacant

Newsletter Editor Stephen Nottingham stephen@cardiffnaturalists.org.uk

Also on Council Mary Salter, Gill Barter, Marie Makepeace, Stephen Howe, Patrizia Donovan



http://www.cardiffnaturalists.org.uk www.facebook.com/groups/CardiffNaturalists Twitter: @CardiffNats http://cardiffnaturalists.blogspot.com

Cover photo: Emperor moths at Kenfig, April 2022. Phill Blanning.

Outdoor meetings

Cardiff Naturalists' Society will be organising a series of outdoor meetings in 2022.

Howardian Local Nature Reserve, Cardiff

Saturday 11 June 2022 2 pm

Howardian Local Nature Reserve, located on a former landfill site, is a 13 hectare (32 acre) wildlife oasis in the lower Rhymney Valley in Cardiff. The site comprises woodland, wildflower meadow, ponds and reed beds. Among the plants we will be looking at are orchids, and it is expected that an orchid expert will join us on our tour of the nature reserve. Meet at the Ipswich Way entrance.

www.howardianInr.org.uk

Howardian Local Nature Reserve, Ipswich Way, Penylan, Cardiff CF23 9AQ.

For all the latest information and additions to the CNS Meetings Programme see: http://cardiffnaturalists.blogspot.co.uk/p/ programme.html

2022 events

We hope to restart indoor meetings in September 2022, in meeting rooms at Cardiff University.. In the meantime, look out for online talks organised jointly by Cardiff Naturalists' Society and the Cardiff Group of the Wildlife Trust of South & West Wales (WTSWW). These start 7.30 pm, unless otherwise stated. Links will be sent to members via email.

Look out for details of further online talks in emails, via social media or on or our website/blog: http://cardiffnaturalists.blogspot.co.uk/p/ programme.html

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Bioscience Prize Award Winners

In the previous edition of this newsletter, we announced that Cerys Vick (below) had been awarded this year's Cardiff Naturalists' Society Bioscience Prize. This is awarded annually to the student submitting the best 2nd-year fieldwork course report in the Cardiff School of Biosciences, Cardiff University. You can read about Cerys Vicks's fieldwork on the following pages. The Bioscience Prize is awarded in memory of Professor Ursula Henriques, and also Dr Mary Gillham MBE who left her library to the Society; the sale of some of the books has supplementing the Bioscience Prize.



Bioscience Prize Award Winners to date

2022. Cerys Vick. Himalayan balsam and biodiversity along Cardiff's waterways.

2021. Lottie Moreland. Climate and the reproductive success of passerine birds.

2020. Francesca Rowlands. Parrot fish foraging on coral reefs in Tobago.

2019. Oonah Lessware. Coral reef fish assemblages and possible shifts in specialism in response to coral damage.

2018. Zoe Watts. The secret cleaners of the reef.

2017. Eve Treadaway. Factors affecting the 'soundtrack' of a lowland tropical rainforest in Malaysia.

2016. Poppy Mynard. The diversity of wood decay fungi in Sabah, Malaysia.

2015. Zoe Melvin. The effects of environment on mosquito diversity and abundance.

2014. Alex J. Mullins. The impact of tree diversity on the remaining woodland community.

2013. Imogen Fox. Social grooming in long tailed macaque societies (Sabah, Borneo).

2012. Zigmunds Orlovskis. Effects of different types of primary production on invertebrate feeding guilds in a river ecosystem.

2011. Zalina Bashir Ali. The effects of cleaning stations on dark damselfish territorial behaviour.

Cardiff Urban Ecology Field Course

Cerys Vick Cardiff Naturalists' Society Bioscience Prize winner 2022

At first, I must confess that after reading Francesca's wonderful narration of her field course to Tobago that mine may not be as tropical. Instead of a 2 week stay in the Caribbean my field course took place in the just as exotic Cardiff City across 5 days.

The focus of my field course was urbanisation, including all of the ecological factors that are associated with this ever increasing land use change. During the first couple days the key areas of the topic were introduced to us including, habitat fragmentation, light pollution, invasive species and finding a place for nature in a concrete world. It was during these talks that the impact of invasive species spiked my interest. I therefore decided to design an experiment to try and understand the impact of Himalayan balsam (*Impatiens glandulifera*) - a plant I am sure you are all aware of and can identify (Figure 1) - on the botanical diversity surrounding it, particularly along the River Taff in Cardiff.

Armed with my tape measure, an identification app, wonderful PhD student and a quadrat I went out to my first site and began the daunting task of identifying plants, which I must admit originally looked like a load of leaves to me. In fact I was quite surprised how quickly you can 'get your eye in' so to speak, as what appeared like large bundles of leaves quickly became ash, aster, cow parsley, dog's mercury, false oat grass and hairy stem grass. Although I could never be certain, as I was far from an expert and identification apps have their limits, I concluded that I had found around 80 different plant species across these 3 days. Furthermore, I had gone from never noticing a Himalayan balsam to seeing it everywhere I went!

The aim of my project was to count the number of different botanical species surrounding Himalayan balsam, as well as at 3m, 6m and 9m away from it, both up and down stream. I tested the hypothesis that the presence of the invasive species reduced the number of species (diversity) within the surrounding areas.



Figure 1: Picture of Himalayan balsam (*Impatiens glandulifera*) in full flower. Taken on 23 June 2021 alongside the River Taff in Cardiff, not far from Pontcanna Fields.

I also investigated many variables, including Himalayan balsam coverage, distance from river, general foliage coverage, distance from reference point, disturbance in the area, location, and naturally the presence of the Himalayan balsam.

Background to Study

Since and during the Industrial Revolution (1760-1840) the global human population has grown exponentially. This increase from ~ 1 billion during the 1800s to a predicted 9.7 billion by the year 2050 (United Nations 2019), has also led to a change in human global distribution. With a shift to a predominantly urban global population occurring around 2007. This has led to a process of urbanisation. Native populations decrease, becoming small and fragmented, and natural habitats merge with urban components such as tarmac, bricks and managed land (Fang and Wang 2013; Lövei *et al.* 2019). This movement of the population in addition to the fusion between both old and new habitats often leads to the creation of new conditions and the introduction of new species. The introduction of non-native species is an important aspect of human-induced environmental change (Sandlund *et al.* 1999) and has increased globally since the 1800s (Sax *et al.* 2005).

The outcome of these introductions are often contested. Some believe that these introductions can have mutualistic and/or facilitative effects on the ecosystem (Molina-Montenegro *et al.* 2008; Cook-Patton and Agrawal 2014), whilst others say they can be detrimental, causing local extinctions, spreading quickly and dominating the environment (Williamson and Brown 1986; Sandlund *et al.* 1999; Lapointe and Brisson 2012).

It is generally acknowledged that invasive species tend to be highly adaptive both through phenotypical plasticity and evolution (Whitney and Gabler 2008; Davidson *et al.* 2011), making them highly adaptive to disturbed habitats, such as newly urbanised environments.

Due to the increased susceptibility of freshwater waterways to both natural disturbance and urbanisation (Riley *et al.* 2005), the association between biodiversity and invasiveness, the lack of a definitive answer on the impact of species such as this, alongside the historic presence of

Himalayan balsam along British waterways, this field course focused on the biodiversity surrounding four urban waterways in Cardiff, in both the presence and absence of Himalayan balsam.

Materials and Methods

The four sites selected were: Bute Park, due to its dense stands of *Impatiens glandulifera*; the Ely River, due to the absence of the study species but high disturbance; Cardiff Bay due to its different species composition; and Nant Fawr woods which have two habitat types, woodland and meadow and a varying degree of Himalayan balsam.

Samples were taken between the 23rd and 25th of June 2021, when many grasses were in flower aiding in their identification. A reference plant was chosen (*I. glandulifera* in its presence and a selected plant in its absence) and the number of species in quadratic samples (1m x 1m) were then taken along a transect at the reference plant, 3m, 6m and 9m either side of the individual (Figure 2). Each sample also included site characteristics such as a disturbance level, quadrat coverage, Himalayan balsam coverage, and distance from river (all assigned by me) alongside upstream or downstream.

All statistical analysis was carried out with the software package R (Version 3.6.1). A Wilcoxon rank sum test was conducted to investigate a significant difference between the number of species in the presence and absence of Himalayan balsam. General linear models (GLM) were conducted to investigate the possible relationships between the number of species and the various recorded characteristics.



Results

After running the Wilcoxon rank sum test and countless GLM models, making comparisons with all the different characteristics, varying combinations and visualising the data (Figure 3) it quickly became apparent that there was no significant difference between the presence of Himalayan balsam on the botanical diversity in Cardiff, or at the very least not one that could be detected with my study.



Figure 3: A boxplot of the number of species in the presence and absence of *Impatiens glandulifera* at varying distances from the reference plant, including the raw data points.

Discussion

Due to the large number of characteristics that affect a botanical species, selecting those that could be relevant was challenging. The site characteristics were chosen based on convenience and time restraints; however they appeared as the study progressed to be disconnected from each other and not best suited to the aim nor sampling strategy. For example, disturbance has often been argued as the main contributor to not only the success of invasive species establishment but also its impact (Connell 1978;Cardinale and Palmer 2002; Dornelas 2010; Barlow *et al.* 2016). However, due to the poor distribution of disturbance level samples both within and across sites, there was a bias in the data.

This meant that there was not enough power for the inclusion of this characteristic within GLM modelling. The method of assessing disturbance was also subjective and based on the current appearance of the land. Many methods of measuring disturbance require comparisons with historical data, such as vegetation coverage, invertebrate population or species abundance models (Watt 1998; Kimberling *et al.* 2001). Due to the restrictions of this field course this was not possible but if that data were available a better measurement could be given, enabling it to be controlled for in the statistical model. Another method that may have given a better indication would be to measure footfall within each site, as this gives a quantative measurement of the disturbances not a qualitive measure of the ground condition; however, the significance of this over the allotted time frame would also likely have been insufficient.

Due to the ability of Himalayan balsam to transform its surrounding area, including but not limited to the surrounding microbiome, soil pH levels, erosion, pollination and nutrient cycling (Richardson *et al.* 2000; Stefanowicz *et al.* 2018; Martinez-Cillero *et al.* 2019; Coakley and Petti 2021), the effect of the species could differ substantially between stands never mind locations. Combining the natural diversity between sites with the diverse effects that Himalayan balsam could be inducing on its surrounding habitat increases the likelihood of its presence having a facilitative effect in one site, a detrimental one in another and a neutral effect in another. Controlling for location would aid in preventing this from causing a statistical error however again the sampling bias prevented this.

Other issues included sampling in quadrats (small representation), incomparable sites (although you want to detect a difference you need to ensure it is a biological one not a sampling bias), lack of species specific data (although collected, running an analysis based on the composition of the species found within the area as opposed to count would take months not days), lack of historical data (due to the historical presence of the species the ecosystem may have 'settled' i.e. the impact was so long ago it could not be detected now through purely observation).

Conclusion

Although it is, of course, entirely possible that the lack of a significant result was due to there not being one, and that Himalayan balsam has no effect, all of the noted limitations need to be taken into account. I believe that the only way to truly understand the impact of this species would be through a site-by-site historical survey based study, aided by species composition analysis such as the presence of native vs non-native species in its presence and lab experiments / literature review exploring the close contact effects that this species can have across habitats and between species.

Acknowledgments

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The article by Francesca Rowlands mentioned in this article can be found in CNS newsletter no. 119, May 2020, pp 20-27.

Back issues of the newsletter can be found in the publications archive on our website:

http://www.cardiffnaturalists.org.uk

Charles Lapworth and Peter Price

Rachel Brown, archivist at the Lapworth Museum of Geology, wrote to the Society to tell us about her project: "In August 2021 an Archives Revealed funded project began at the Lapworth Museum of Geology, University of Birmingham, to catalogue the Charles Lapworth archive collection, which is believed to be the most complete record of any natural historian other than Charles Darwin and the most complete of any UK geologist. Rachel Brown, the Lapworth Project Archivist, is chronicling the project's progress and sharing highlights from the collection in a series of blogs, the first of which gives an introduction to Lapworth, his archive and the project. The project blog can be found at https://lapworthmuseum.wordpress.com/, and will be highlighted alongside other archive content on the Museum's Twitter and Facebook pages (@LapworthMuseum)."

And the connection with our Society? The archive contains letters exchanged between Charles Lapworth, when he was the first Professor of Geology at Birmingham University, and Peter Price (1824-1892), the 12th President of Cardiff Naturalists' Society. The correspondence is currently being catalogued (and may form the basis of a future article on CNS links with the Museum of Geology). The CNS website has a very useful biography of Pete Price and his achievement (https:// cardiffnaturalists.org.uk/htmfiles/150th-10.htm), which includes successfully advocating for the opening of a public library in Cardiff.



Peter Price, 12th President of the Cardiff Naturalists' Society.

May in Bute Park, Cardiff

Photos by Linda Morris.





Kestrel at Merthyr Mawr

Mary Salter shared her photos of a kestrel, taken at Merthyr Mawr in March 2022, on our Facebook page.



Cardiff Local Nature Partnership

The Local Nature Partnership (LNP) Cymru project is a partnership between the Wales Biodiversity Partnership, Welsh Council for Voluntary Action, Local Environment Records Centres, and all local authorities and National Parks in Wales. It aims to help reverse biodiversity decline and promote the value of nature, to help create a resilient and nature-rich Wales.

The Cardiff Local Nature Partnership was established to support and promote activities to protect and enhance nature across Cardiff.

If you would like more information about the LNP Cymru project or wish to join the Cardiff LNP mailing list, please contact the LNP coordinator: Samantha Eaves, Forest Farm Conservation Centre, Whitchurch, Cardiff CF14 7JJ.

Biodiversity.Team@cardiff.gov.uk

Nature in Cardiff

Cardiff has a wide range of different habitats and wildlife species, many of high value. Statutory and non-statutory designations reflect this value, and these include: 2 Special Areas of Conservation (SACs); 1 Special Protection Area (SPA); 1 RAMSAR Site; 17 Sites of Special Scientific Interest (SSSIs) and 6 Local Nature Reserves (LNRs).

Other sites are non-statutory because they are regulated by policy rather than legislation. In Cardiff these are known as Sites of Importance for Nature Conservation.

Some of the more notable protected species in Cardiff include the Otter (*Lutra lutra*) which is present on all three main rivers rthroughout Cardiff, 10 species of bat, some of which are present throughout the city, some populations of Great Crested Newt (*Triturus cristatus*), and an extensive Dormouse (*Muscardinus avellanarius*) population, mostly to the north and east of the city.

A Guide to Cardiff's Biodiversity

Cardiff Local Nature Partnership have produced a booklet to help people appreciate Cardiff's biodiversity. The 'Biodiversity of Cardiff' booklet is split into five sections:

■ Biodiversity - an explanation of biodiversity and how it is being protected and enhanced in Cardiff and throughout the UK;

History - explains the underlying geology of Cardiff - the basis of all our habitats, and how biodiversity has been recorded over the last century;
Habitats - deals with some of our more prominent habitats, explaining

how they came to be here and highlighting some of the animals and plants that can be found in them;

■ Special Protection - explains how habitats and species are protected through legislation and policy;

■ Getting involved - ideas on how to experience biodiversity in Cardiff and where to go for further information.





Early purple orchid at Kenfig. Photo: Phill Blanning.





Mute swans and a redshank, Cardiff Bay. Photos: Phill Blanning.

Project Splatter

Project Splatter is a citizen science project that maps wildlife roadkill across the UK, by collecting data on its location through reports made by members of the public. You can report roadkill, such as birds, mammals, amphibians and reptiles here: https:// projectsplatter.co.uk/

As of 2022, Project Splatter had received over 89,000 individual roadkill records. These have been analysed to determine the impact of roads on UK wildlife and to identify hotspots. They provide regular reports and updates on their findings on social media, their website and in scientific publications. Project Splatter collaborates with several other organisations, including the Cardiff University Otter Project.

Wales Resilient Ecological Network

Wales Resilient Ecological Network (WaREN) is asking the public to help them tackle invasive species across Wales. Invasive nonnative species have been introduced by humans, intentionally or unintentionally, beyond their natural range. Their spread threatens native biodiversity and can cause damage to the environment, the economy, human health and the way we live.

WaREN is establishing a sustainable network of Local Action Groups (LAGs) in Wales to enable delivery of effective actions on local invasive species issues, and in priority hotspot areas. It will produce tools to support effective collaborative actions, including toolkits, training programme, surgeries, knowledge sharing forum and funding opportunities, to enable preventative measures to reduce the spread of invasive species, such as Himalayan balsam, across Wales.

WaREN II, the project's second phase is funded by the Welsh Government Sustainable Management Scheme, and will run until June 2023. Further information:

https://www.northwaleswildlifetrust.org.uk/waren

Wildlife Photographer of the Year

The Natural History Museum in London's acclaimed Wildlife Photographer of the Year exhibition is on tour. It returns to the National Museum Cardiff on 27 May 2022 and continues to 29 August 2022.

The exhibition features 100 images that showcase Earth's extraordinary diversity and the fragility of the natural world. Using the power of photography, the competition inspires people to think differently about their relationship with nature and become advocates for the planet.

This year's Wildlife Photographer of the Year competition received over 49,000 entries from all over the world. Judged by a panel of industry-recognised professionals, the images are selected for their creativity, artistry and technical complexity.

Booking is open (via Eventbrite — see the National Museum Wales website).

General admission: £10 | Concessions: £7 | Free to under 16s and Amgueddfa Cymru Members

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Deadline for submissions to next newsletter: Monday 22 August 2022



Song thrush. Photo by Mary Salter.

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