TRILEPIDEA

Newsletter of the New Zealand Plant Conservation Network

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Deadline for next issue: Friday 14 June 2019

SUBMIT AN ARTICLE TO THE NEWSLETTER

Contributions are welcome to the newsletter at any time. The closing date for articles for each issue is approximately the 15th of each month.

Articles may be edited and used in the newsletter and/or on the website news page.

The Network will publish almost any article about plants and plant conservation with a particular focus on the plant life of New Zealand and Oceania.

Please send news items or event information to **events@nzpcn.org.nz**

Postal address:
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Wilton
Wellington 6012
NEW ZEALAND

PLANT OF THE MONTH, p. 2

Carex carsei. Photo: Rowan Hindmarsh-Walls.

CONFERENCE REGISTRATION OPEN NOW!

We invite you to register for the 2019 Australasian Systematic Botany Society and New Zealand Plant Conservation Network joint conference to be held at the Museum of New Zealand Te Papa Tongarewa, Wellington, New Zealand in the last week of November.

Start planning now! Spaces in workshops and field trips are limited, so register early to get your top choices.

Check out the recently updated conference website to get all the important details about conference dates, venue, accommodation, programme, keynote speakers, field trips, workshops, silent auction, and more!

The conference theme, 'Taxonomy for Plant Conservation – Ruia mai i Rangiātea' aims to capitalise on the vast expertise of our two societies. There will be multiple upskilling workshops, three days of symposia, and a chance to explore Wellington's forests and rugged coastlines on our five different full-day field trips.

Feel free to contact the organising committee by email if you have any queries: plants2019nz@gmail.com, otherwise go to the conference website (https://systematics.ourplants.org/) to keep up to date with developments, or follow us on Facebook or Twitter for announcements.

We look forward to seeing you in Wellington in November!

Ngā mihi nui

Nā Rewi, Heidi and the Organising Committee

Thank you to our sponsors!

We would like to thank our sponsors that are showing their commitment to plant conservation networking by supporting our conference.

If you or your organisation is in a position to show your support please contact us for a sponsorship package today at info@nzpcn.org.nz

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PLANT OF THE MONTH – *CAREX CARSEI*

The plant of the month for May is the small wetland *Carex* species, *Carex carsei,* one of the more than 100 *Carex* species in New Zealand.

Carex carsei, Lake Hochstetter, Ahaura Valley, Westland, 13 December 2018. Close-up (top) and growth habit (bottom). Photos: Rowan Hindmarsh-Walls.

Carex carsei can be found around the volcanic plateau and Lake Taupo in the North Island and scattered down the South Island. It is scarce in Canterbury, Otago, and Fiordland. The sedge is a wetland specialist, including damp forest clearings and can be found from the lowlands to alpine, where it forms loose swards across open areas of ground or in shallow standing water. Without fruit the plant is indistinct and has slightly scabrid grass green leaves. The almost sessile fruiting clusters consist of three to five spikes with the male spike terminal on the stem, but this is often overtopped by the much larger female spikes, forming almost globose spikey heads which are quite distinctive.

In New Zealand the species is most similar in appearance to *Carex pumila*. Unlike *C. carsei* this is an almost strictly coastal species, generally found in sandy areas, while *C. carsei* is generally found quite far inland and at higher altitudes. *C. pumila* also has distinctive corky utricles.

Carex carsei has a conservation status of At Risk – Declining, as it has a wide distributional range, but is relatively sparse within this area, and has probably suffered from large scale wetland drainage and weed competition across its range. It is unlikely to suffer browsing pressure due to its habitat preference of very wet areas, amongst other unpalatable species.

The genus *Carex* is very large, with over two thousand species scattered all over the globe. In Aotearoa it is one of the largest vascular plant genera with (according to the NZPCN website) one hundred and sixteen native species, and twenty-five naturalised exotic species. The genus name *Carex* is the Latin name for a species of sedge, but now applied to the whole group. The genus was named by Carl Linnaeus in 1753. This species is named after Harry Carse (1857–1930), a Scottish teacher farmer and botanist, who moved to New Zealand in 1885 and spent a lot of his life botanising and describing new plant species in the northern part of the North Island.

You can view the NZPCN website factsheet for *Carex carsei* at: http://www.nzpcn.org.nz/flora_details.aspx?ID=735

Rowan Hindmarsh-Walls

The fossil flora of Foulden Maar

Alex Fergus

Foulden Maar near Middlemarch in Otago is a site of international geological and paleontological significance. In order to imagine this site, it helps to have a little geological context. A maar is a small and usually deep volcanic crater. The crater which formed Foulden Maar dates from a volcanic eruption about 23 million years ago (Lee et al. 2016). The crater was subsequently infilled with water and became a freshwater lake. Anoxic conditions at the bottom of such maar lakes provide a prime environment for building extraordinary fossil records as biotic material falling from above is preserved at the lake bottom as fine-grained sediments accumulate over it. At Foulden Maar a finely laminated diatomite deposit resulted from this process, and between those laminate layers can be found what is probably the most important terrestrial fossil lake deposits from that period in the Southern Hemisphere (Lee et al. 2016). Foulden Maar contains the best-preserved plant, insect and fish fossil records from the early Miocene epoch (23-16 million years ago) in New Zealand (Lee et al. 2016).

Assoc. Prof. Daphne Lee from the University of Otago Department of Geology has led a team of students and scientists over the last fifteen years to delve into the fossilised secrets of Foulden Maar. They have begun to recreate a picture of a much lusher rainforest and lake ecosystem in what is now one of our driest climates. The Foulden Maar fossils reveal a lake surrounded by an evergreen Lauraceae-dominated forest; remarkably all tiers of the rainforest are present in the fossil record including a diverse understorey, as well as lianes, epiphytes and mistletoes (Lee et al. 2016).

From around 20m^3 of diatomite more than 100 species of plants from 35 families have been found to date. Not only is this significant in terms of recreating the paleo-ecosystem at site, but for many of those taxa these are the first and, in some cases, the only known examples of fossils for particular plant families (Lee et al. 2016). Many of these now extinct taxa also provide insight into New Zealand's biogeographical past, as elements of this paleo-flora are aligned to Australia, New Caledonia and South America.

If we were to return to the site around 23 million years ago the forest might have a familiar feel, but most of the species would be new. The forest canopy would have been dominated by a diverse mix of Lauraceae species, of which ten extinct taxa have been identified. Many of these were very alike our extant Tawa (*Beilschmiedia tawa*), Taraire (*Beilschmiedia tarairi*), and Mangeao (*Litsea calicaris*), both of the latter now found only in the upper North Island. Others were more closely aligned to *Cryptocarya*, which now has its nearest relatives in Australia. Emergent above the canopy were the recognisable forms of *Podocarpus* and *Prumnopitys*, however this broadleaved Tōtara was the extinct *Podocarpus travisiae* (Pole 2003) and the undescribed *Prumnopitys* sits somewhere between our own Matai (*P. taxifolia*) and the Chilean *P. andina* (Lee et al. 2016). Forests in the wider area had now extinct species of gymnosperms including *Dacrycarpus*, *Dacrydium* and *Phyllocladus*.

Growing in the subcanopy or around the lake edge, near enough to drop leaves, flowers or fruits into the lake, was the large leaved extinct Euphorbiaceae species *Malloranga fouldenensis*, most like the extant *Macaranga* or *Mallotus* in Australia (Lee et al. 2010). Following an eastern Tasman theme, an *Akania*-like species, most closely aligned to the extant Turnipwood from New South Wales (currently a single species in a monotypic genus) would have been present alongside *Hypserpa* (today only found as an Australian subtropical liane). Two new species of Proteaceae were present in or above the forest; one of these was like *Gevuina*, the Chilean hazelnut tree, and the other like the Australian *Alloxylon*. A species like our extant Pigeonwood (*Hedycarya arborea*) was found in the mix and significantly this represents the first fossil flower with associated pollen from that family. Similarly, the diatomite layers have yielded the very first fossil *Fuchsia* flower, anthers and associated pollen (Lee et al. 2016). This *Fuchsia* species (*F. antiqua*) had floral structures much like extant New Zealand *Fuchsia*, implying that our distinctive honeyeater bird-pollination syndrome was already established 23 million years ago (Lee et al. 2013).

Several other plant families have multiple representatives in the paleo-forest at Foulden Maar. From the Elaeocarpaceae, an *Elaeocarpus* species grew alongside a relative of the extant Australian *Sloanea*. From the Rutaceae three species have been found; a *Melicope* like species, another resembling the

extant New Caledonian *Neoschmidia* and a new species and genus named in honour of Foulden Maar itself, *Fouldenia staminosa*. From the soapberry family (Sapindaceae) a Titoki (*Alectryon*)-like species has been found, as well as a *Cupaniopsis*, a genus found across the tropical Pacific today. Making up the remainder of the forest were species belonging to or very similar to the genera *Ackama*, *Dysoxylum*, *Gymnostoma* (most of these species from the Casuarinaceae are now found in New Caledonia), *Laurelia*, *Meryta*, *Myrsine*, *Pittosporum, Pseudopanax*, *Syzygium*, and *Weinmannia* (Lee et al. 2016).

In the understorey, shrubs of *Alseuosmia* and a probable *Coprosma* could be found, while *Ripogonum* and a possible *Metrosideros* climbed toward the canopy. Growing on rocks, or as a low epiphyte, was the fern *Davallia*, the genus now only present in New Zealand (ignoring adventives) at a single site in Puketi Forest and on Manawatāwhi (the Three Kings Islands). While monocot leaf fossils are very rare internationally, seven taxa have been found at Foulden Maar (Lee et al. 2016). *Typha* and *Cordyline* would have fringed the lake, while *Luzuriaga* was probably epiphytic alongside *Astelia*, *Dendrobium* and *Earina*. The presence of two orchids in the Foulden Maar fossil assemblage is hugely important. These finds represent the first vegetative orchid fossils known in the world, and are the oldest records for the subfamily Epidendroideae, and both the first New Zealand and Southern Hemisphere fossil records for Orchidaceae (Conran et al. 2009). The findings identify a potentially important role for Zealandia in the diversification of Orchidaceae.

The paleo-ecosystem narrative captured above highlights Foulden Maar as an exemplar, one of so few New Zealand opportunities to piece together a 23-million-year-old complex rainforest and lake ecosystem. Notably, elements of Australian, New Caledonian and South American floras feature heavily. This information alongside climate signals also captured in Foulden Maars record, allow insight into biogeographical processes, climate change responses and the evolution of our flora. The finds described above represent a tiny fraction of the material that remains in the ground at Foulden Maar, a fossiliferous treasure trove that has the potential to rewrite our understanding of the origins of the New Zealand flora.

At the time of writing the future of Foulden Maar is uncertain. Foulden Maar is part of a small-scale mining site, and the diatomite which the fossils are preserved within has multiple uses, including as a stock food supplement. The site is on private land belonging to Plaman Resources Limited. The company has applied to the Overseas Investment Office for permission to purchase the neighbouring property, and a report leaked to the Otago Daily Times revealed that the intention of purchasing the neighbouring property is to make the mine more commercially viable. This has prompted fears that Plaman Resources Limited intends to mine Foulden Maar in full. As of 29 May the Dunedin City Council voted 11:2 to:

1. Recognise the significance of the fossil record at Foulden Maar
2. Support its preservation and protection as a scientific resource;
3. Requests options with urgency for giving effect to this

A campaign to save Foulden Maar is underway, with information available at the links below.

https://savefouldenmaar.co.nz/

https://our.actionstation.org.nz/petitions/save-foulden-maar

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ASBS-NZPCN 2019 Conference in Wellington: Updates

Planning and organising for the 2019 conference are now in full swing! Registrations are now open, as per the front page article. Following up from our presentation at the 2018 ASBS Conference in Brisbane (which was then published as an article in the Dec 2018 ASBS Newsletter), we've got a few updates to share with you regarding the 2019 conference.

2019 Conference at a glance

- Conference title: "Taxonomy for Plant Conservation – Ruia mai i Rangiātea"
- This is a joint conference of ASBS and the New Zealand Plant Conservation Network
- Our venue is the Museum of New Zealand Te Papa Tongarewa, Wellington, New Zealand
- Dates: 24-28 November 2019
- Overview: 5 full days including presentations, workshops, field trips, and public events.
- Follow us on Facebook, Twitter and Instagram
- Get more details and subscribe to updates on the conference website
- Please support our sponsors!

Important dates to diary

- From now: If you are planning to collect plants in New Zealand during your stay, make sure you get your permit applications in soon. See our website for more details.
- From now: Source some items for our silent auction (see related article in this newsletter).
- Early April 2019: The conference website will be fully updated with registration costs, field trip and workshop options, and other important information to help you plan. Get helpful information now on transport and accommodation options from our website—if you know you are coming, book accommodation now.
- 23 April 2019: Early-bird registration (with reduced registration fees) will be officially open!
- 23 August 2019: Abstracts are due. Early-bird registration closes. Standard fees will apply from this date.
- 24-28 November: The conference is on!
- Various dates from Oct-Dec 2019: A number of other conferences and events of potential interest to conference attendees are happening in Wellington and elsewhere in New Zealand around the same time as our conference. For those planning to come to the conference, why not stay a bit longer in New Zealand to take advantage of these other opportunities? Check out the latest list on the conference website.

Confirmed workshops

We will be offering seven half-day or full-day pre-conference workshops on Sunday 24 November. Please note: all workshops will need to have a minimum number of participants to go ahead, and spots will be limited, so register early to make sure you don't miss out on your first choice. For more information on these workshops, please check the conference website regularly from early April.

Workshop #1: Wikipedia Edit-a-thon on Australasian endangered plant species

An Edit-a-thon is an all-day attempt to improve Wikipedia's coverage of a particular topic. Led by experienced Wikipedia editors Mike Dickison and Siobhan Leachman, participants will learn how to edit pages, correct mistakes, add references, and upload photos. Complete beginners are welcome; training and troubleshooting is provided. This edit-a-thon will focus on adding content on **New Zealand and Australian endangered plant species** to Wikipedia. Our goal for this full-day workshop is to collectively improve the representation of Australasian endangered plants in Wikipedia.

Workshops #2 & #3: Botanising with iNaturalist—workshops for beginners and advanced users

iNaturalist is the world's biggest online community dedicated to recording all species. Being a botanist in the iNaturalist community is both great fun and useful; we connect people to nature and grow both

botanical knowledge and future botanists. There will be two half-day iNaturalist workshop options, a morning workshop for beginners, and an afternoon workshop for advanced users. You may sign up for one or both! The morning workshop will give you an introduction, starting from scratch and get you up to speed as both an observer and an identifier on iNat. The afternoon workshop will focus on how to take your iNat use to the next level, including bulk operations, curating the iNaturalist species tree and nomenclature, managing projects, dealing with threatened species, and other advanced functions. Both workshops will be led by Jon Sullivan, who is the site admin of iNaturalist NZ–Mātaki Taiao and a trustee on the charitable trust that operates iNaturalist NZ. His day job is an ecology lecturer at Lincoln University.

Workshops #4 & #5: Plant identification workshops

Otari Native Botanic Garden and Wilton's Bush Reserve is the only public botanic garden in New Zealand dedicated solely to native plants. It is also home to the largest forest remnant in Wellington City. Come along and experience this national treasure as we host two half-day workshops running morning and afternoon on the day. These workshops will give participants the opportunity to look closely at New Zealand ferns in the field and under the microscope with the Te Papa Botany team (WELT), and to do some field botanising in the forest with the Wellington Botanical Society. There will be guided walks telling the story of the forest, gardens, and the unique New Zealand flora. Botanists from Landcare Research and the Department of Conservation will also be helping out on the day. It will be a fantastic day for beginners and experts alike!

Workshop #6: Basics of Illustration

Simple drawings are a very effective form of scientific communication: after all, a picture is said to be worth a thousand words! Photographs do not always provide a suitable visual aid. This workshop is meant for those who would like to produce simple illustrations, but think they cannot draw or don't know how to get started. We will work with photographs to create illustration-quality line drawings. You will learn some basic drawing techniques using pens. Composition, scale and preparation for digitisation will be discussed. By the end of the workshop, you should have some line drawings that you can be proud of and would not hesitate to include in your publications, laboratory manuals or teaching resources. The main goal of this workshop is for participants to create simple line drawings as an alternative to photographs so as to improve communication of scientific observations.

Workshop #7: Science Communication Skills

Confirmed field trips

Field trip organisers: Anita Benbrook and Tim Park

We can now confirm we will have a total of five different, full-day field trips on offer for Wednesday 27 November. Please note: all field trips will need to have a minimum number of participants to go ahead, and spots will be limited, so register early to make sure you don't miss out on your first choice. For more information on these and other field trips, please check the conference website regularly from early April.

1. Old-growth forests of Wainuiomata and Remutaka (travel by bus; good fitness required)
2. Coasts, freshwater lake and lowland beech forest across the harbour (travel by bus; good fitness required)
3. Rugged south Wellington coast & ecological restoration (travel via 4WD vehicles on rough terrain)
4. Matiu/Somes Island plants and wildlife (travel via ferry; easy walking)
5. Otari-Wilton's Bush, Te Papa herbarium and Bush City (travel via bus; easy and accessible to all).

Please don't hesitate to get in touch with us (plants2019nz@gmail.com) with any queries or ideas you have. Looking forward to seeing as many of you as possible in November in Wellington!

Heidi Meudt & Rewi Elliot - 2019 ASBS-NZPCN joint conference co-organisers

2019 ASBS-NZPCN Conference Charity Auction: Items required! Can you help?

Matt Ward, NZPCN Secretary – mattdavidward@gmail.com

I am happy to announce we will be having a charity auction at the 2019 New Zealand Plant Conservation Network (NZPCN) and Australasian Systematic Botany Society (ASBS) "Taxonomy for Plant Conservation – Ruia mai i Rangiātea" joint conference running this November in Wellington, New Zealand. The charity auction is a fundraiser that the NZPCN has carried out successfully at our conferences since 2013. The funds raised from the auction will be split 50/50 between our two societies and used to bolster the allocated research funds of each society. The NZPCN will split its share of the funds raised between the 'David Given Scholarship' and the 'John Sawyer Plant Conservation Fund' (http://www.nzpcn.org.nz/page.aspx?nzpcn_awards).

The ASBS will use the funds raised to bolster its Scientific Research Awards, which currently include the 'Hansjörg Eichler Scientific Research Fund' and the 'Marlies Eichler Postdoctoral Fellowship' (http://www.asbs.org.au/asbs/research-funds/index.html).

The auction will be silent, allowing some level of mystery as to whom you may be bidding against when you wish to win a must-have item. Each conference attendee will be given a number in their conference pack for use when bidding. Bidding will simply involve adding your number and the dollar value you wish to bid on a sheet next to the item, which will be on display at the conference. It's a fun and exciting way to support your societies! Depending on the number of items up for grabs, the conclusion of each auction may occur in a staggered fashion to prevent any conclusion confusion. More running details will be established closer to the date.

To make the auction a success, we rely on worthy donations from individuals, businesses, institutions and agencies. This is where you can help! If you can donate an item, or have a suggestion for a donation, please let me know. Items which garner substantial interest include artwork, experience vouchers, books, outdoor gear, handmade uniqueness, etc. You can see what was on offer at our 2015 conference here:

[http://www.nzpcn.org.nz/page.aspx?nzpcn_events_conference_2015_auction]. Te Papa Press has kicked things off by kindly donating three fantastic NZ-themed hard back books.

There is an excellent chance of the silent auction having extra-interesting items this year with the trans-Tasman tie-in, so let's make the auction a ripper and raise as much as possible for our societies' worthy funds. Please contact me on the above e-mail address with any queries or to make your donation!

Revision of "Above the Treeline: a nature guide to alpine New Zealand."

My co-authored book: "Above the Treeline: A nature guide to alpine New Zealand" is now out of print and the publishers, Potton & Burton, have decided to republish it in a revised and slightly enlarged version, with somewhat more space allocated to the images.

This provides an opportunity to have more of the plants illustrated and also to improve some images where possible. Accordingly, I invite anyone who wishes to contribute images to contact me for further details at: alan.mark@otago.ac.nz.

UPCOMING EVENTS

If you have events or news that you would like publicised via this newsletter please email the Network (events@nzpcn.org.nz).

Botanic Gardens Australia New Zealand (BGANZ)

9th Congress: Te Papa (Wellington). 20–23 October 2019 Plants from the past – Plants for the future. https://www.confer.nz/bganz2019/ This conference will explore the role of Botanic Gardens in science communication & story-telling, plant conservation, managing collections and displaying plants. Join us – or submit an abstract to contribute your ideas. Botanic Gardens Australia and New Zealand (BGANZ) is the peak body representing all botanic gardens in Australia and New Zealand. BGANZ promotes the interests and activities of all Australian and New Zealand botanic gardens through its 140 member gardens, enhancing the state of botanic gardens internationally. The 9th BGANZ Congress will be attended by over 20 Directors, General Managers and Presidents of botanic gardens from Australia and New Zealand. More than 50 botanic gardens are expected to attend.	**More information:** https://www.confer.nz/bganz2019/

Auckland Botanical Society

Meeting: Wednesday 5 June, 7.30pm. **Talk**: Plants and CO2 – More than meets the eye. Annual book auction will take place prior to talk.	**Speaker:** Sebastian Leuzinger.
Field Trip: Saturday 15 June, 10.00am until 3.00pm. Lichen Workshop for beginners and those wanting to upskill. **Meet**: Unitec, Carrington Road Gate 4, Building 114.	**Leader:** Dan Blanchon, ph: 09 815 4321 ext. 7355.
Meeting: Wednesday 3 July at 7.30pm. **Talk**: Orchids.	**Speaker:** Carlos Lehnebach.

Waikato Botanical Society

Meeting: Monday 17 June at 6.00pm – AGM and talk. **Talk**: Botanical travels on the Big Island of Hawai'i.	**Speaker:** Catherine Beard.

Rotorua Botanical Society

Field Trip: Saturday 8 June to Piripai Spit, Whakatane. **Meet:** 8.00am at the Convention Centre carpark, Fenton Street, Rotorua or 9.00am at The Hub Whakatane. **Grade**: Easy.	**Leader:** Sarah Beadel, email: sarah.beadel@wildlands.co.nz, ph. 07 345 5912 or 021 924 476.
Meeting: Monday 17 June at 6.00pm – AGM and talk. **Talk**: Rare plant conservation in Hawaii.	**Speaker:** Lara Reynolds.

Wellington Botanical Society

Field Trip: Saturday 8 June to East Harbour Regional Park – Northern Forest. **Meet**: 9.45am at the corner of Marine Parade and Cheviot Road, Lowry Bay. **Bring**: Morning tea, lunch and drinks, walking shoes or boots and wet weather gear.	**Co-Leaders:** Jill Goodwin, email: jilljillgoodwin@gmail.com, ph. 021 211 7720 or Ian Goodwin, email: ianiangoodwin@gmail.com, ph. 021 529 461.
Meeting: Monday 17 June. **Talk**: Unique habitats and plants of Ata Whenua – The Fordlands. **Speaker:** Rowan Hindmarsh-Walls.	**Venue:** Lecture Theatre M101, ground floor Murphy Building, west side of Kelburn Parade.

Nelson Botanical Society

Field Trip: Sunday 16 June – Grampians. **Meet:** 9.00am at Cathedral steps. Please contact Penny in advance if you intend to participate.	**Leader:** Penny Palmer, email: stevepenny@xtra.co.nz, ph. 03 539 1329.
Meeting: Monday 17 June at 7.30pm. **Talk**: Takapourewa/Stephens Island. **Speaker:** Andy MacDonald.	**Venue:** Jaycees Room, Founders Park.

Canterbury Botanical Society

Meeting: Saturday 8 June at 10.30am. AGM followed by talk and then a shared lunch. **Speaker:** Wolfgang Bopp, recently appointed Director of Botanic Gardens and Garden Parks in Christchurch.	**Venue:** St Ninians Presbyterian Church Hall, 9 Puriri Street, Riccarton.

Botanical Society of Otago

Field Trip: Saturday 8 June to Okia Reserve, Otago Peninsula. Meet: 9.00am at the Botany Department carpark or 9.30am at the Okia Reserve carpark (end of Dick Road).	**Contact:** John Barkla, email: jbarkla@doc.govt.nz, ph. 03 476 3686.
Meeting: Wednesday 12 June at 5.20pm **Talk:** Revegetation of Wangaloa Coal Mine Reserve. **Speakers:** Cathy Rufaut and Professor David Craw. **Venue:** Room 215, 2nd Floor, Zoology Benham Building, 346 Great King Street.	**Contact:** Allison Knight, email: alli_knight@hotmail.com, ph. 027 487 8265.