

[The Trinity College Dublin Botany Department Newsletter](#)

Projects and Funding



Matt Saunders has been awarded funding from Science Foundation Ireland as part of the **Terrain-AI project**. This project aims to improve our understanding of the impact of human activity on land use and how it relates to climate change.

Three new post-doctoral researchers will be joining the Botany Department in 2021 to work on measuring and modelling terrestrial carbon and greenhouse gas dynamics and integrating this data with Earth observation and remote sensing techniques. The work will focus on various land cover classes and uses, but will have particular emphasis on peatlands and wetlands.

Further information can be found [here](#).

Publications

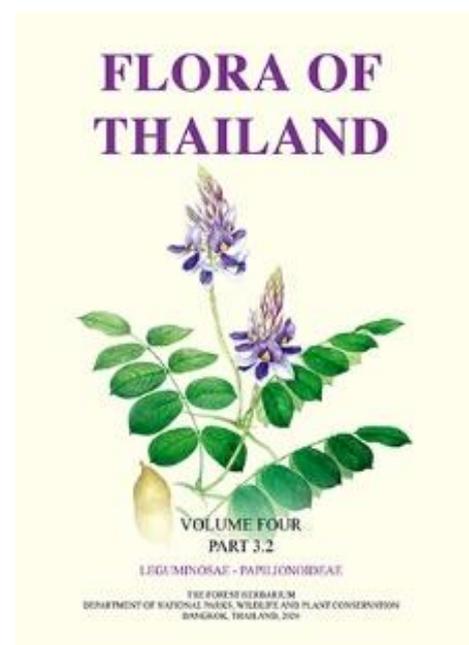
Nature Communications: **Trevor Hodkinson** was part of a team that sequenced and published the full genome of the bioenergy grass *Miscanthus sinensis*, article available in open access [here](#).

Frontiers in Ecology and Evolution: **Jordan Chetcuti** has published the second chapter of his PhD thesis as a paper in the special issue on “*Theoretical Approaches to Community Ecology*”. The paper entitled “[Habitat Fragmentation Increases Overall Richness, but Not of Habitat-Dependent Species](#)” uses individual-based modelling to look at the effect of habitat fragmentation per se on species with different specialisms and dependencies on the fragmented habitat, and is available in open access.

Flora of Thailand: Another issue of the collection, of which **John Parnell** is an editor, has just come out – it’s Volume 4(3.2). This volume was issued later than might be expected and out of sequence as the flora has now reached volume 14(4).

See: Balslev, H., Chayamarit, K., Newman, M., Barford, A., Esser, H-J., Simpson, D.A., **Parnell, J.** & Pattharahirantricin, N. with Phengkklai, C., Pooma, R., Suksathan, P., Chantaranothai, P., Pederson, H., Tamura, M.N., van Welzen, P.C., Utteridge, T., Haevermans, T., Middleton, D.J. & Kato, M. (2020). *Flora of Thailand* 4(3.2), 373-487 + XLVIIIpp. Bangkok, The Forest Herbarium, Department of National Parks, Wildlife and Plant Conservation.

Wulfenia: **John Parnell** also co-authored the paper “[Towards a floristic inventory of Bat Xat Nature Reserve, Vietnam: Thirteen new national records of vascular plants](#)”.



Journal of Bryology: **Melinda D. Lyons** published an article with her previous supervisor, **Daniel L. Kelly**, entitled “Rapid tufa deposition and bryophyte growth rates in Irish petrifying springs”.

See below for an informal synopsis:

‘We were petrified’ a bryophyte story

The results of this short article are of wider significance than might at first appear:

1. Mosses are here shown to be ‘ecosystem drivers’ – a claim widely recognised for the genus *Sphagnum*, but not often for other bryophytes (*Palustriella commutata*, take a bow!)
2. A superficially ‘unchanging’ habitat is shown to be, in fact, a highly dynamic one:
 - the physical environment changes:
 - through rates of tufa accumulation that exceed all prior estimates;
 - through remarkably rapid changes in microtopography – streamlets changing course, etc
 - the plant microcommunity changes:
 - through rates of bryophyte growth that, again, exceed prior estimates for this habitat;
 - through successional displacement of one moss species by another (dramatic ousting of ‘short turf’ acrocarps by weft-forming pleurocarps)



Tufa-forming seepage at Glinsk in 2011 (left) and two years later (right).

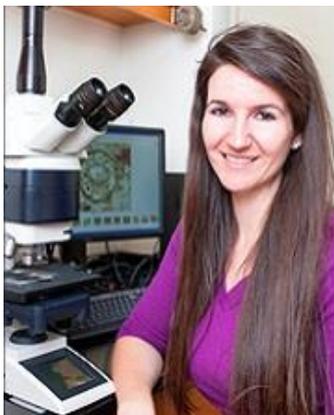
Didymodon tophaceus increased in height by 10mm in the first year (label 020, foreground) and *Eucladium verticillatum* by 15mm in the same period (label 021, background).

By the end of the second year (Right), both of these species had disappeared and the labels had been virtually overgrown by *Palustriella commutata*.



- Further dynamic change is inferred through cyclical succession, where the growth of the pleurocarp-dominated weft reaches a threshold at which it peels off - to create a fresh bare surface for colonisation.
3. This article deepens our understanding of a unique habitat that is of special conservation importance at European level.

Events and Activities



Carla Harper was interviewed a couple of weeks ago for **TCDSU Diversity in STEM campaign podcast**. Their description: ‘The campaign aims to highlight and support the diverse range of backgrounds and identities in STEM and the podcast aims to be a discussion with women like yourself and individuals of under-represented groups about their experience in STEM, their work and their views on how to make STEM more diverse and accessible.’

The podcast is available [here](#), and notably revealed how strong women in SciFi movies have inspired her to go into science.

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Carla also agreed to share another story with us:

Sleeping Carnivores by *Carla J. Harper*

Among the many subjects, e.g., fossils, botany, mycology, mushrooms, that I can happily “nerd-out” about for hours includes carnivorous plants. I have been an avid carnivorous plant enthusiast for years. Prior to moving to Ireland, I grew several tropical species for my teaching collection (Figure 1) and much like Charles Darwin, the students thought the plants were some of the most wonderful in the world. For me, one of the most exciting aspects of moving to Ireland was the idea of seeing native temperate carnivorous plants and potentially working with them.



Figure (1). Tropical carnivorous plant tank in Kansas circa 2018



My quarantine project over the summer was building a balcony mini-bog that had exclusively Irish native carnivorous plant species (Figure 2). There are several species of carnivorous plants that are native to Ireland, such as sundews, butterworts, and bladderworts (Table 1). The *Sarracenia purpurea* pitcher plant was introduced to Ireland by Benjamin St. George Lefroy in 1904 from Canada but is now considered a naturalised species. ¹

Figure (2). Overview of Zen bog in September 2020.

Table 1: Carnivorous plants occurring in Ireland ²

Common English Name	Latin Name	Irish Name
Common bladderwort	<i>Utricularia vulgaris</i>	Lus an Bhorraigh
Intermediate bladderwort	<i>Utricularia intermedia</i>	Lus Borraigh Gaelach
Southern bladderwort	<i>Utricularia australis</i>	Lus Borraigh Mór
Lesser bladderwort	<i>Utricularia minor</i>	Borraigh Beag
Common butterwort	<i>Pinguicula vulgaris</i>	Bodánn Meascáin
Pale butterwort	<i>Pinguicula lusitanica</i>	Leith Uisce Beag
Great butterwort; Large-flowered butterwort; Irish butterwort	<i>Pinguicula grandiflora</i>	Leith Uisce
Canadian pitcher plant; Purple pitcher plant	<i>Sarracenia purpurea</i>	Ascaid
Round-leaved sundew; Common sundew	<i>Drosera rotundifolia</i>	Drúchtín Móna
Intermediate sundew; Oblong-leaved sundew	<i>Drosera intermedia</i>	Cailís Mhuire
Long-leaved sundew; Great sundew; English sundew	<i>Drosera anglica</i>	Cailís Mhuire Mhór

¹ Kertland, MPH. 1968. *Sarracenia purpurea* as an introduced plant in Ireland. The Irish Naturalists’ Journal 16 (2): 50–51.

² Carnivorous plants – killers in the bog. © Irish Peatland Conservation Council, Bog of Allen Nature Centre, Lullymore, Rathangan, Co. Kildare. [Website](#) (last accessed 24 December 2020).

During the summer, I set up my mini-bog with three different sub-species of pitcher plants, round-leaved sundews, an oblong-leaved sundew, and an Irish butterwort. Over time and with the addition of a lichen-holding buddha, the bog became “Zen bog”. With the changing of the seasons and arrival of the holidays it has been a fun home experiment to track the changes in the carnivorous plants, especially seeing the dormant structures – because as botanists, we know that just because it is winter, botany never stops happening. For example, the sundews and butterworts produce hibernacula (or winter buds), which are densely packed leaves that unfurl after dormancy in the spring (Figures 3–8).

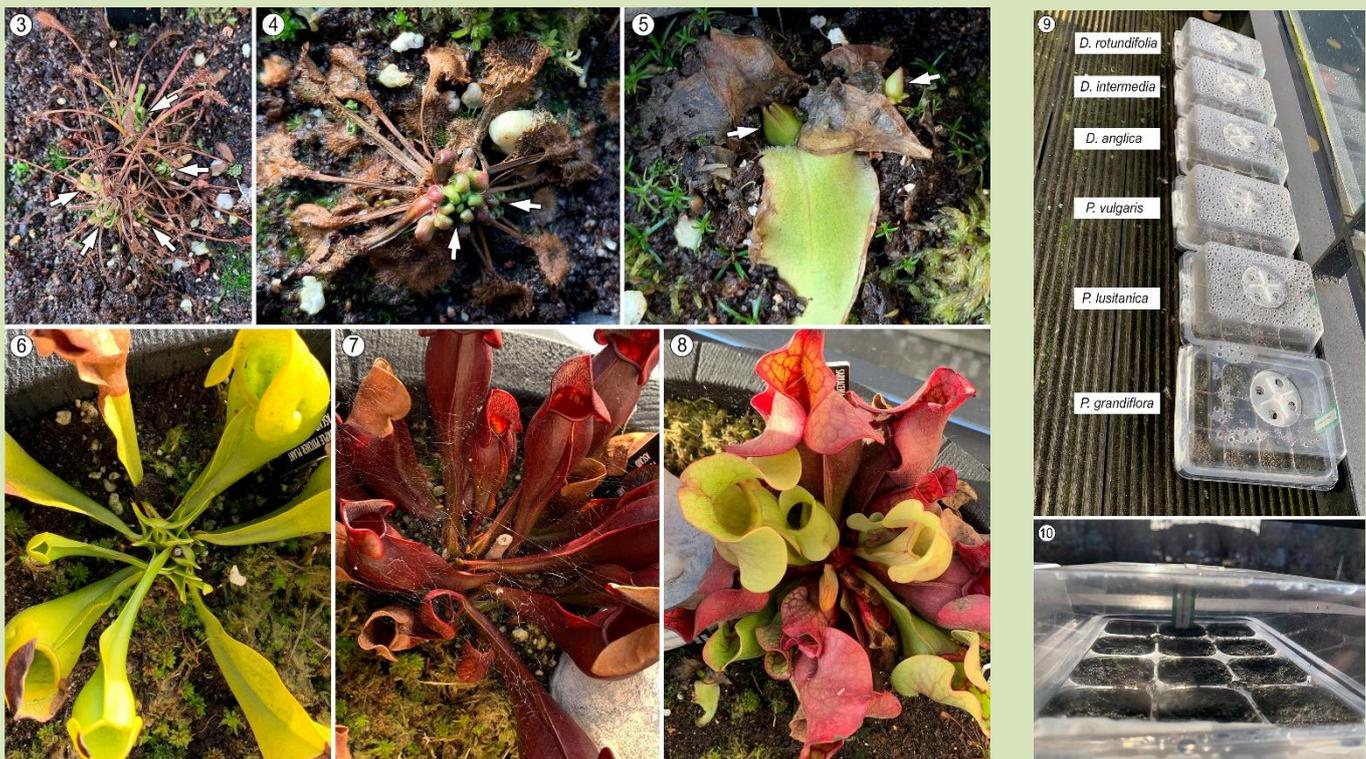


Figure (3) Hibernacula (arrows) in *Drosera intermedia* ; (4) Hibernacula (arrows) in *Drosera rotundifolia* ; (5) Hibernacula (arrows) in *Pinguicula grandiflora* ; (6–8) Reduced pitcher grown in *Sarracenia purpurea* spp.

Figure (9) Overview of cold stratification propagation domes ; (10) Inside of *Pinguicula grandiflora* propagation dome

I am also attempting to start temperate carnivorous plants from seeds for the first time. As anyone who has grown carnivorous plants from seeds can attest, they are either very easy or really difficult. Tropical species are fairly easy to grow from seed, however, temperate species require a cold stratification – a period, minimum 4 weeks, where the seeds need to be kept damp and cold (-6° to 4° C) in order to germinate. There are several ways to do this^{3,4}, but I am trying this outside in small seed propagation domes (Figures 9–10), in trays of rain water from November through March – fingers crossed!

³ California Carnivores. Seed sowing tips. Website: <https://www.californiacarnivores.com/blogs/growing-tips/76461253-seed-sowing-tips> (last accessed: 24 December 2020).

⁴ May, A. The cold stratification process: For germinating seeds of temperate *Drosera* species. Website: http://www.growsundews.com/sundews/Germinating_and_Growing_Sundews_from_Seed.html (last accessed: 24 December 2020).

If you are interested in growing carnivorous plants at home, here are a few general tips to get you started:

- Always use distilled water, RO water, or rain water. Tap water, bottled water, and water that has been filtered at home will not work—over time, it will kill your plant. Carnivorous plants have evolved to thrive in environments with poor mineral soils, thus the minerals in tap water will eventually kill the plants.
- Never use regular compost or potting soil with carnivorous plants. Each plant requires a different soil formula but in general, they need a 50:50 ratio of peat and sand, or peat and perlite.
- Never use unglazed terracotta pots for carnivorous plants, these will leach out salts that will kill the plants over time. Small plastic pots with plenty of drainage work best.
- Most carnivorous plants like to be in standing water, i.e., a small water filled tray at the bottom of the pot. There are some exceptions like *Nepenthes* (monkey-cups; tropical pitcher plants) that like to be watered frequently but do not want to dry out.
- Most carnivorous plants need very bright light. South-facing windows are best – outside is even better.
- Certain carnivorous plants, such as Venus flytraps and the temperate species in this post require a winter dormancy. Ireland is a fantastic place for this due to winter temperatures! Place them outside from November through February.
- Despite the name, the Venus flytrap is not the best plant for biological control for fruit flies or fungal gnats. In its natural environment, the Venus flytrap captures more passive prey such as caterpillars or beetles, rather than flying insects.
- A better choice for biological control is butterworts or sundews.
- More information [here](#).

Conservation and sustainability considerations:

- Always buy carnivorous plants or carnivorous plant seeds from a reputable source. Do not buy from somewhere that poaches plants from the wild.
- Buy peat or sphagnum moss that is collected or grown from sustainable sources.

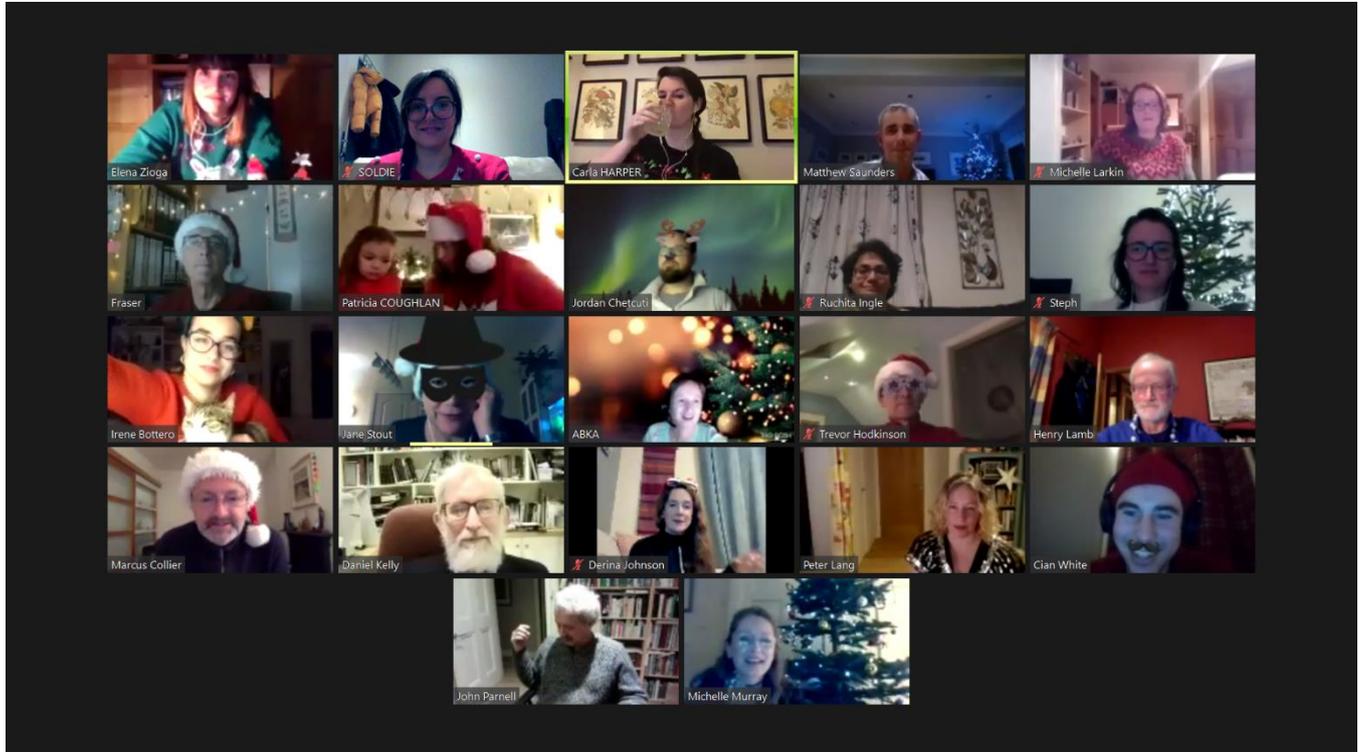
Here's hoping that these sleeping carnivores will wake up to a fantastic New Year! Another exciting plant that I am keeping an eye on is my very young (less than 2 cm in height) *Nepenthes attenboroughii* (Figure 11). More updates will be included in the spring or summer. Wishing everyone a very happy and safe holiday season and looking forward to seeing everyone in 2021!



Figure (11) Small *Nepenthes attenboroughii* plants with pitcher initial (arrow).

Botany Christmas Party

Nothing can stop the Botany Department from having a Christmas Party, not even the ~~crazy weird~~ unusual situation we were in this year. It is one of the most expected event of the year, and our members, once again, did not disappoint, showing diverse jolly ornaments for the “ugly jumper / Christmas glam” theme.



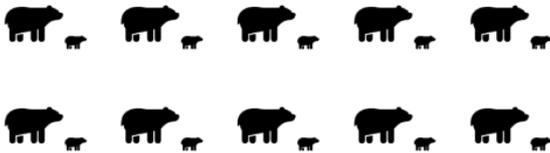
For entertainment this year, instead of the usual secret santa and drinking game, the amazing **Carla Harper** created a pub quiz! The **winners of the trivia** were:

- 1st place: **Jane Stout**, won a 50 EUR one4all gift card
- 2nd place: **Jackie Stone**, won a 30 EUR one4all gift card
- 3rd place: **Fraser Mitchell**, won a 20 EUR one4all gift card



EcoEvo Blog Posts

Want to learn more? Check out the [EcoEvo Blog](#), where Trinity's Botany and Zoology departments discuss their work and reflections in research. The latest posts include ...



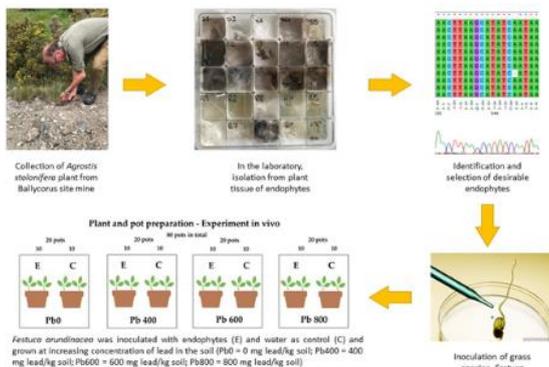
[The Opti-Mum condition: How brown bears use humans to prolong maternal care](#)

by Sabrina Teo



[How Being Obvious Can Make You Discrete](#)

by Isabel Walsh



[Endophytes for Heavy Metal Bioremediation](#)

by Erika Soldi



[Secondary Metabolites of Fungi: Friend and Foe](#)

by Carla J. Harper

PHYTOBYTES needs your input! Whether you are student or staff, please send any news you have, big or small, to Marine Valmier (valmierm@tcd.ie) with the subject heading "Phytobytes". Let's share the latest news and always be aware of what is happening at Botany!