Issue 10 Jan. 2025

The Thymes

The Official Newsletter of Botanical University Challenge

In this issue: *Extended deadline for BUC 2025 team registration! Meet the BUC2025 Chairs, memories of 2nd Student Botany Festival, meet the botanist Raffy Hall, fav plant Sedum villosum, botanical tattoos, BUC at BSBI, book & podcast reviews and more!*

BUC 2025 IN FEBRUARY

BUC is an annual competition between teams of university UG and PG students. BUC embraces the many facets of botany: plant ID, plant science, plant pathology, plants in history and culture, amongst other themes. The BUC 2025 online rounds will take place on 12, 17 and 26 February, followed later in the year by the semi-final and finals at University of Cambridge Botanic Garden (CUBG) on 20 August, all live streamed on YouTube - why not join in? The 3rd Student Botany Festival follows on 21- 22 August.

To reach the online quarter finals (26 February) there will be two knockout rounds (12 and 17 February) with multiple-choice questions. In the quarter final there will be more multiple-choice questions and the four top-scoring teams will go forward to the semi finals and finals. These live rounds (at CUBG) will involve free answer questions to reveal the champions and runners up in Botanical University Challenge 2025!

Dates

Call for BUC 2025 teams!

17 January: Team registration deadline

12 February: Knockout Round 1, online start 14:00
19 February: Knockout Round 2, online start 14:00
26 February Quarter Finals, online start 14:00

NB All BUC 2025 rounds will be live-streamed!

Follow us on Social media: X @BUCBotany
Instagram @botanicalunichallenge
Threads @botanicalunichallenge
Bluesky @bucbotany.bsky.social

STOP PRESS: Extended registration deadline for BUC 2025!

The extended deadline for BUC 2025 team registration is Friday 24th January 2025, but don't delay, register asap using the link below.

One team of 4 BSc, MSc or PhD students with one reserve can enter the competition from each institution. If you have any questions please email: j.mitchley@reading.ac.uk

Read more about BUC:
BUC Website

Watch past contests:

BUC YouTube channel

Enter a team for BUC 2025:

BUC registration form

Extended Registration Deadline:
Friday 24 January 2025

Meet some of the Chairs for BUC 2025!

There are three on-line rounds in February and the top scoring teams from each round will go through to the next round, ending with four teams heading to compete in the live semi-finals in Cambridge in August. Now, meet the distinguished botanists who will be asking the questions in February.

Professor Maarja Öpik is Professor of Molecular Ecology and Director of the Institute of Ecology and Earth Sciences at the University of Tartu, Estonia. Her research focuses interactions between plants and mycorrhizal fungi and she is particularly interested in the diversity of arbuscular mycorrhizal (AM) fungi, the Glomeromycota. She founded the public database MaarjAM which is a tool for identification of AM fungi. She will be Editor-in-Chief of the scientific journal *New Phytologist* from January 2025.

Maarja studied botany and ecology as an undergraduate at the University of Tartu, and continued research there into the diversity of AM fungi in perennial plants and their effect on plant performance that led to her PhD in 2004. She became a Professor in 2020. You can read more about her research here.

Professor Maarja Öpik

Professor Jennifer McElwain holds the 1711 Chair of Botany at Trinity College, Dublin. She is Director of the Trinity College Botanic Garden. She was elected a member of the Royal Irish Academy in 2017. Her research deals with the development and use of palaeobotanical methods to use fossil plants to reconstruct the evolution of Earth's atmospheric composition and climate on multi million year timescales. Her research also involves experiments on how modern plants respond to different levels of atmospheric carbon dioxide. Her research group study herbarium specimens to calibrate plant morphological and chemical responses to atmospheric change. She gave a lecture about her work at the Second Botany Festival in Oxford in 2024.

Jennifer completed her BSc in botany at Trinity College Dublin in 1993 and PhD research in paleobotany at Royal Holloway, University of London and was awarded her doctorate in 1997. Subsequently, she worked at University of Sheffield and the Field Museum of Natural History in Chicago before joining University College Dublin in 2006 and later, Trinity College in 2017. Read more about her research here.

Professor Jennifer McElwain

Dr Mark Carine is Principal Curator-in-Charge of Plants, Algae and Fungi at the Natural History Museum in London. He leads the team that curates the museum's herbarium of five and quarter million specimens. As an undergraduate he studied Botany at the University of Reading and then gained his doctorate from the University of Oxford. Since 2001 he has been employed at the Natural History Museum.

His research focuses on the diversity and evolution of the volcanic oceanic islands of the Atlantic (from the Azores to St Helena) and, as curator of the Sloane Herbarium and other pre-Linnean collections at the NHM, he also has an interest in the history of botany and of collections. Read more about his work here.

Dr Mark Carine

Memories of the Second Student Botany Festival

Let's remember the amazing festival we enjoyed at Oxford in the warm, sunny August of 2024, and look forward to the next one in August 2025, at University of Cambridge.

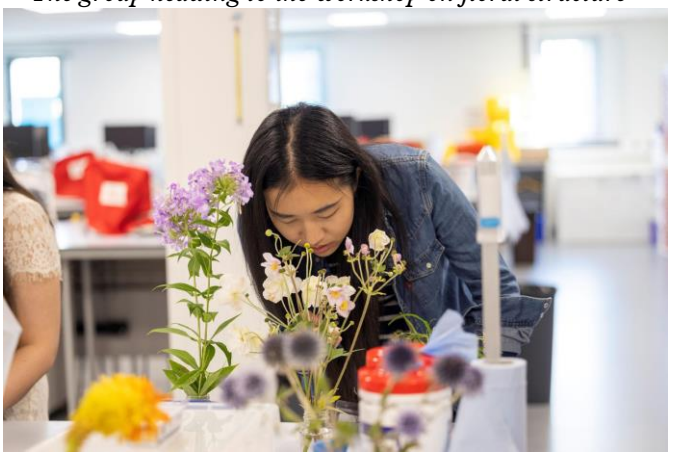
All images: Laura Bennetto

Looking at job opportunities in ecological consultancy.

Talking about job opportunities with plants

Dr Chris Thorogood talking ethnobotany

The group heading to the workshop on floral structure



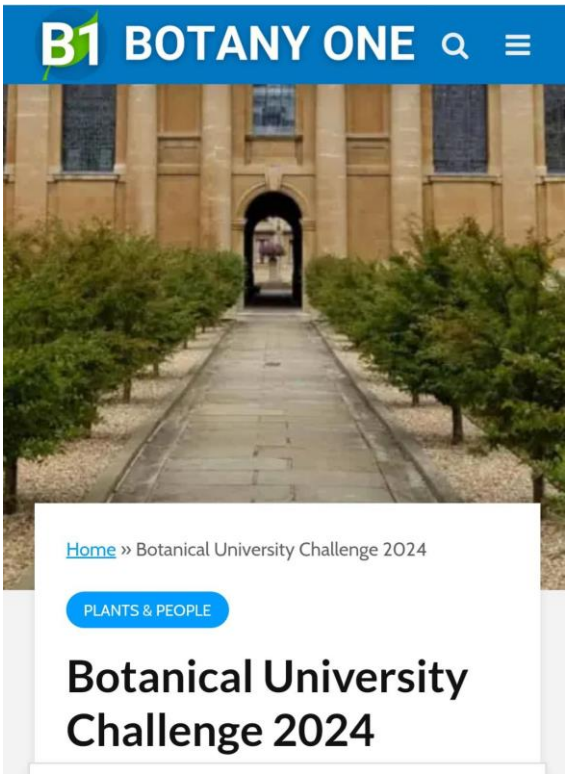
Studying floral structure

Discussion on first steps in academia

The attentive audience

BUC in the news

Botany One is the blog from the scientific journal *Annals of Botany*. It aims to be more accessible to the interested plant fan than the usual scientific journal and has different coverage. The blog hosts a mix of book reviews and news from publications across many different journals. The producer of *Botany One*, Alan Salt, was at the BUC finals in August 2024 and ran a work-shop about scientific writing in the Student Botany Festival that followed.



Alan wrote a blog about BUC and the 2nd Student Botany Festival and commented that it was unlike any other botanical event he had experienced; it was fun and noisy, with the student audience taking a very big part. You can read his full account here:

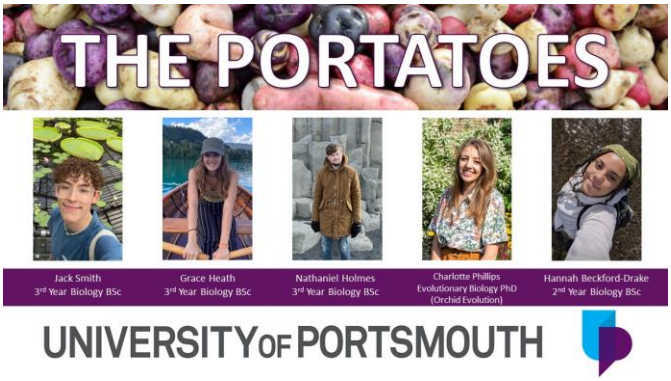
https://botany.one/2024/08/botanical-university-challenge-2024/

Botany One is happy to talk to people about new botanical research to include or contribute to the blog. You can contact Alan at: webmaster@botany.one

Team names and slides

One notable BUC tradition is that teams have names, and this is not any old name, but an amusing botanical one. Teams also provide a slide about themselves, and another about plants or botany at their institution and these are looped on the livestream. As inspiration for BUC 2025 teams, here are some of the best from last year.

Oh, and there is a prize for the best team name, nominated by the BUC audience!



Interview with a botanist: Raffy Hull

Dr Raphaela (Raffy) Hull is the Higher Education and Interpretation Co-ordinator in the Learning Department of the Cambridge Botanic Garden (CUBG). She studied as an undergraduate at University of Cambridge and also gained her PhD there. Raffy is leading the planning and fund raising for the 3rd Student Botany Festival to be held at CUGB in August 2025.

***The Thymes*:** Your background is in applying molecular biology to studying interactions between plants and arbuscular mycorrhizal fungi, which sounds very lab based and very technical. Now you co-ordinate interpretation in the Learning Department of the Cambridge Botanic Garden. What inspired you to make this change?

Raphaella Hull: I'm still very much working with plants and in the same place where I did my PhD. I was primarily working on rice but also strawberry and a sedge from the Tibetan plateau that does not form mycorrhizal associations. It's estimated that 80% of land plants form a relationship with mycorrhizal fungi. I liked that kind of universality and the stories that you can tell, about how fungi help plants in the soil and the importance of that relationship for ecosystems.

I really loved teaching and talking, as well as writing during my PhD. They were the things that I wanted to take through into a job. I did an internship at the National Botanic Garden of Wales in my second year. Half the time I was doing horticulture and the other half interpretation. I got my first experience of writing formally for a botanic garden, and I loved it. The job that I do now was advertised in the last year of my PhD. So I just went for it – and got it! I actually worked in it part time for about six months whilst I was finishing up my thesis, so I was doing two things which was pretty full on!

I get to work on loads of really interesting topics. It's quite research focused in that I do lots of mini research projects. I'm often having to find out about things that I don't know so much about. I also interact quite a lot with researchers in the department. So I don't feel like I've left academia entirely.

***The Thymes*:** Some people think that botanic gardens just grow pretty flowers, maybe with a few labels that say something about them. But you bring some other ideas about plants into the Botanic Gardens. Is that right?

***RH*:** Yes, it's a very varied job. We have a collection of over 8,000 plant species from all over the world. Many were collected from the wild, are endangered or have a particular research interest. It's a place to conserve, protect and celebrate plant diversity. I'm working on a bunch of interesting things at the moment. I suppose my biggest project is interpretation across the entire glasshouse range. We have plants that can't be grown outside in Cambridge. Some from high mountain regions, the tropics or arid desert environments, and we're looking at what stories we can tell about them to our visitors. I'm working with teams, primarily horticulture and curation, to pull out that information. That's a lot of fun, researching different geographical regions and environments and finding out about the climate and plant adaptations.

I'm doing small interpretation projects as well. For example, we've got lots of standing deadwood in the garden for biodiversity, and they just look like big, dead, tree trunks. We need to tell our visitors what's going on to create environments for different organisms. I've just launched a programme called *Plant Explainers*, with undergraduates and PhD students from the Department of Plant Sciences. They will be volunteer explainers at garden events stationed near plants, talking about them and the associated research. About 45 students have got back to me. So I'm going to have an army of plant explainers going into the New Year!

***The Thymes*:** It sounds like you've got a lot of scope for developing projects yourself?

***RH*:** Yes. Within our team we come up with ideas on how to share the fun and excitement of plants in different ways.

***The Thymes*:** You mentioned that the really nice background on your Zoom screen was part of a community project. Do you have a lot of interaction with people in Cambridge outside the University?

***RH*:** Yes. We have projects with over 70 community groups. They come into the garden for workshops. This specific piece of art was done with a local charity called *Make, Do and Mend*. They worked with our community officer and an artist to generate this amazing canvas. It spans from the bryophytes, the mosses and liverworts, the first plants on land, right through to the flowering plants. It's a really beautiful illustration of how plants evolved over half a billion years. It really stimulates interest from visitors.

Meadow at National Botanic Garden of Wales / Gardd Fotaneg Genedlaethol Cymru

There's lots of different ways in which people come to the garden and are connected with the plants and work going on here. We have a big schools program and recently a grant has allowed us to pay for the travel of school groups to the garden. That's really increased the number and different types of schools that are able to visit. I'm also looking at increasing the engagement that we have with the university and other higher and further education institutes in the area to bring more people into the garden.

***The Thymes*:** It sounds like you're really passionate about plants. Have you got a favourite one?

***RH*:** I get asked this a lot. And I often say that I don't have a favourite. But when I was thinking about it I realized I had a favourite habitat. I love how plants coexist with one other. I suppose that makes sense with my interest in symbiosis which very much connects plants with one another. I particularly like how plants fit together in meadows of native grassland ecosystems. I mentioned that I worked at the National Botanic Garden of Wales, and they have some quite young meadows that they started to establish about 30 years ago. I couldn't believe how many different plant species and associated invertebrates there were in a small space.

I particularly like the hemiparasitic plants in that habitat. Ones like yellow rattle (*Rhinanthus minor*), and eyebright (*Euphrasia nemorosa*). I find it interesting how they work within the low nutrient environment of meadow soil, something that's also important for mycorrhizal symbiosis.

Eyebright (Euphrasia nemorosa). Image credit: Alicia Penny CC BY 4.0

Yellow rattle will attach their roots to nearby plants, particularly grasses, and take water and some carbohydrates that weaken those often quite dominant grasses. This leaves space for other, non-grass flowers to grow and really creates diversity. I find that so neat. It's one of the ways they cope with low nutrients. Symbiosis is another one. As soon as you elevate the nutrient levels you block symbiosis between plants and fungi. It's a reason why it's difficult to go back from a fertilized field to something species rich like a grassland, because it's very difficult to remove those nutrients once they're in the soil.

The Thymes: Thanks Raffy! You can watch the whole interview on our YouTube channel.

Botanical Book Reviews

By Catherine Martinez, University of Reading

***What Moves The Dead* by T. Kingfisher**

What Moves The Dead is a short and atmospheric horror novella featuring wonderfully written fungal body horror. While I usually am an advocate for embracing mycology and an appreciation of fungi, I found this novella a fascinating read as it plays with the alienness of fungi. Mycologist readers will delight in the descriptions of delicate hyphae curling through the body, while fans of Jeff VanderMeer's *Annihilation* and other environmental horror tales will appreciate the seamless blending of natural and supernatural.

***This Poison Heart* by Kalynn Bayron**

For anyone seeking botanical contemporary YA fantasy, *This Poison Heart* is definitely worth a read. The protagonist, Briseis, discovers a magical ability to grow plants with a touch alongside a sudden inheritance of a mansion that contains more than meets the eye. *This Poison Heart* blends mystery and fantasy with a love of poisonous plants, plus a warmth that Bayron brings to all her writing.

***Psalm For The Wild Built* by Becky Chambers**

This is one of my all-time favourite fiction books. *Psalm For The Wild Built* is a hope-filled novella of a tea monk and a robot meeting and walking through the woods together. If you are craving a soft exploration of what humanity needs and how we find humanity in others and ourselves, this may be it. Although not as botanically themed as the other recommendations, this novella captures the healing and peace that can be found in nature and how nature reclaims abandoned spaces. In a busy and often disconnected world, *Psalm For The Wild Built* takes the time to take a walk through the woods and ask what we need and how we can provide that for ourselves and others.

Encounter with a plant: *Sedum villosum* on Eigg

Marco Dobson, Edge Hill University

Now within the firm grasp of winter, trees have lost their colourful autumnal finery and the exuberant profusion of summer flowers is starting to become a distant memory. I have grown to love winter and embrace the changes we all witness, feeling the dropping temperature and atmospheric glows of the more reachable dawn and dusk, now that the days grow shorter. It is at this time of year when the special botanical moments of the past seasons seem most profound to me. One I remember very fondly is an encounter I had with a very charming and special population of *Sedum villosum* (hairy or purple stonecrop) on the Isle of Eigg off the Scottish West Coast.

Group of Sedum villosum plants, all pointing at the sun. Image credit: Marco Dobson

Never recorded on this island before, this small group of plants nestled in a patch of gravel atop a usually wet heath soil. They sang out to passers-by like tiny brilliant-red jewels adorning the gaps between stones. This was the first time the species had been seen in the vice county 104 of North Ebudes, and what a special sight it was! *S. villosum* is considered part of the British arctic-alpine flora, a vegetative community in peril, of our ever changing and gradually warming climate.

The species is classified as Near Threatened in Britain due to alarming declines over the past century. Unusually for a species in the *Sedum* genus, *S. villosum* is a lover of damp places, and can be found growing on stream sides or flushes.

The plants I saw during a summer drought were very short and compact, all flower heads leaning into the sun, giving them an animacy I have never-before witnessed. Their tight leaves were shocking red, more so than usual, likely due to the unusual west-coast drought. These plants were some of the most beautiful specimens I have come across in the British uplands, and it highlighted for me, the ability of plants to make a whole place feel so special! These times and memories are very valuable in the life of a botanist, and what makes them so special is the fact they are fleeting. Moments like this can enrich and define our seasons and are memories that can stick for life!

Close-up of one flowering plant of Sedum villosum. Image credit: Marco Dobson

BUC alumni at the British and Irish Botanical Conference 2024

Meriel Jones, The BUC Team

This year the Botanical Society of Britain and Ireland (BSBI) held its annual conference at the Natural History Museum, London, in November. It was an opportunity for many of the students who have taken part in BUC as well as other young botanists to meet up to share their plant enthusiasm. Billy Fullwood (University of Plymouth) chairs the BSBI Events and Communications group and was involved in planning the event, as well as being custodian of the roving microphone on the day. Rebecca Keeling (Eden Project University Centre) gave one of the talks and described her inspiring botanical journey following a career change, time in South America and then seeing an advert on Facebook.

Several students showed posters about their work and advertised them in one minute talks. To learn more you could read the poster and talk with the person over lunch or in another break. Oliver Spacey (University of Oxford) described his work with mistletoe, especially asking for records of sightings of this plant since it seems to be moving northwards in Britain. Maddy Fyers (Edge Hill University) is studying the genetics of long-bracted sedge, *Carex extensa*. This common sedge grows around the coast, particularly of western Britain and Ireland. She wanted to make contact with those who could send her samples from regions other than north-west England where she is based. Kian Hayles-Cotton (University of York) described his research into the resilience of UK woodlands. Finally Jonathan Mitchley (University of Reading) encouraged all to watch or participate in Botanical University Challenge 2025.

The BSBI had booked a room at a nearby pub so that those who had been at the meeting had a chance to continue to talk after the meeting ended, away from the London rain.

Young botanists at the *Hoop and Toy* pub after the BSBI Conference. Author Leif Bersweden is with the group. Image credit: Meriel Jones

You can check out the posters and talks from this meeting here

STOP PRESS: The 2025 British & Irish Botanical Conference will be held at Edge Hill University, Lancashire, on Saturday 29th November, so put the date into your calendar!

Podcast Spotlight: On The Ledge

ON THE LEDGE

THE HOUSEPLANT PODCAST

This podcast by Jane Perronne, author and journalist, focuses on house plants, and has an unusual inducement to sign-up; you'll be sent an in-depth guide to dealing with fungus gnats! Episodes interview expert guests and are devoted to a single species or issue. It covers houseplants worldwide including latest trends, edible houseplants and even tissue culture tips.

EPISODE 302: LATE NIGHT ON THE LEDGE - PLANT TATTOOS WITH DR MATT LODDER

Late Night OTL: Jane Perrone is joined by tattoo historian Dr Matt Lodder to learn about the role of plants in tattoos.

EPISODE 295: HOUSEPLANT STUDIOS AT THE CHELSEA FLOWER SHOW 2024

STYLING HOUSEPLANTS

Check out Jane's pick of her favourite Houseplant Studios at the Chelsea Flower Show

EPISODE 288: AIR PLANT CHAT AND HOW TO GROW A PINEAPPLE PLANT

FOLIAGE HOUSEPLANTS

I talk air plants with expert grower Don Billington, and I take on a listener question about a poorly pineapple.

She started the podcast in 2017 and is taking a break at the moment while she gets new projects underway. These are another book and contributing to the new Scribehound Gardening

(https://www.scribehound.com/gardening/)

However, with over 300 episodes, there is plenty to hear – or re-hear - On the Ledge!

More on your favourite podcast app or go to https://www.janeperrone.com/on-the-ledge

Botanical tattoos

Andrew Gdaniec, University of Reading

Also known as “Cactus Andrew”, as a child I was very keen on cacti and I started collecting succulents when I was four. Later this hobby changed into an obsession and then into work and now I’m studying Caribbean cacti for my PhD at University of Reading.

I never really thought about tattoos, but when the idea came to me the only option was to have something cacti related! Tattoos for me must embrace meaning, they should express the identity and interests of the bearer of the tattoo. So, my tattoo design showed my obsession with travelling as a cactus explorer through 4 species:

Opuntia polyacantha - to express my interest in the hardy Opuntias which can survive to -20 degrees.

Schlumbergera truncata - the Christmas cactus, one of the first I grew as a kid and it reminds me of my childhood.

Harrisia martini – Caribbean plants from where I carry out my PhD research.

Leuenbergeria quisqueyana - Rose of Bayahibe and is the national flower of the Dominican Republic where I started my Caribbean exploration.

The tattoo also includes the first description of *Pilosocereus royenii* from *Species Plantarum* by Linnaeus, also a landscape with Saguaro cacti (*Carnegiea gigantea*), and a compass, magnifying glass and a hummingbird, one of the pollinators of cacti.

I used Pinterest to seek designs, and I recommend taking time to check what you want, then wait a while and come back to see if you really want it - because a tattoo is not just for Christmas, it stays with you forever!

Then bring these ideas to the tattoo artist, and they’ll tell you if it’s possible or not. My tattoo was done by two different artists, and you need to look at their work and make sure they do the kind of work you want, in my case botanical illustration.

Cacti inspire me for their uniqueness and adaptability. Native to the Americas, they thrive in diverse environments, from arid deserts to snowy volcanoes and rainforests. *Schlumbergera* has leaves, while others evolved spines. Remarkably, they can store water for a long time, surviving extreme conditions, including mist-fed deserts and the Arctic. A fascinating plant family with incredible resilience and variety for all to enjoy!

Botanical Brain Teasers!

Prepare for BUC 2025 online rounds with these questions from past Botanical University Challenge contests

1. What is this species of plant?

a) Burnet Rose (*Rosa spinosissima*)

b) Field Rose (*Rosa arvensis*)

c) Rockrose (*Helianthemum nummularium*)

d) Dog Rose (*Rosa canina*)

e) Sweet Briar (*Rosa rubiginosa*)

2. **Which of the following yellow Asteraceae produce asexual seeds?**

a) Hawkweeds (*Hieracium* sp.)

b) Cat's-Ears (*Hypochaeris* sp.)

c) Hawkbits (*Leontodon* sp.)

d) Hawk's-Beards (*Crepis* sp.)

e) Coltsfoot (*Tussilago farfara*)

3. **Where in the world is the Poinsettia (*Euphorbia pulcherrima*) native?**

a) South Africa

b) USA and Canada

c) Central America and Mexico

d) Mediterranean Europe

e) India

4. During photosynthesis, where does the evolved oxygen come from?

a) Carbon dioxide

b) Sucrose

c) Phosphate

d) Water

e) ATP

5. What is a turion?

a) A bud that can develop into a new plant

b) An accumulation of silica in a leaf cell

c) An annual plant that germinates in the autumn

d) A membrane dividing the segments in a seed pod

e) A type of horticultural basket

Image credit: Wikimedia Commons, Lytton John Musselman CC BY-SA 3.0

6. Which of these statements about *Hydnora* is true?

a) It feeds on insects

b) It feeds from the roots of other plants

c) It is a fungus, closely related to truffles

d) It is native to South America

e) It has an unusually large chloroplast genome

Answers on the last page!

Careers and Courses

Meriel Jones, The BUC Team

This is the time of year when thoughts turn to what to do in the summer vacation. Earning money is obvious, but also whether it is possible to get experience of a post-degree career. For plant-orientated students, the annual free to attend week-long **Gatsby Plant Science Summer School** for the plant-curious at the end of June-beginning of July is worth exploring, as well as the **Rootstock Summer School** in mid-July for plant enthusiasts to dive deeper. Places on these are limited so ask your Gatsby Mentor about options.

Experiencing the field or laboratory as a **summer student or intern**, ideally paid, gets you behind the curtain and into the world of plant research. Talking to career researchers, technicians, horticulturalists and research students can be invaluable to give you ideas for career moves. How to find these opportunities? Your own university or organisation should advertise them to you early in 2025. However, asking your personal tutor or approachable academics is a way in. Organisations such as the British Society for Plant Pathology fund summer students but requires an application by the academic supervisor and student together.

If you take a summer course or studentship, remember to add these to your CV not only as evidence of your interest in science but as experience of teamwork, communication, networking or research skills.

JOKE THYME!

What did the botany DJ say?

Turnip the volume!

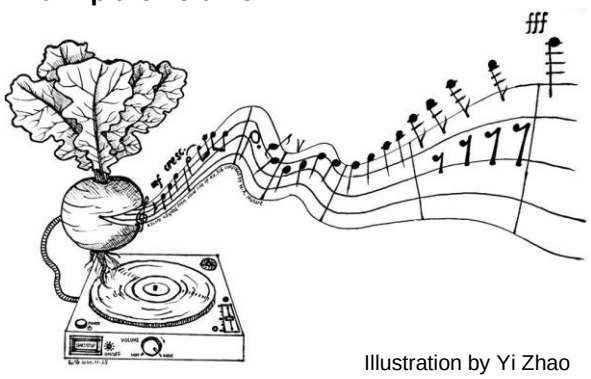


Illustration by Yi Zhao

Got a botanical joke or pun? Send it to us!

ABOUT *The Thymes* TEAM

Layout and Design: Helena Brown (RBGE) & Rabinoor Khurana (Dundee University)

Graphics: Yi Zhao (University of Cambridge).

Editors: Meriel Jones (University of Liverpool, retired), John Warren (Associate Tutor FSC), Jonathan Mitchley (University of Reading).

Contribute to *The Thymes*

The last issue, Number 9, was a bumper 15 pages thanks to students contributing! As usual, they described their thoughts about competing in BUC. In addition, others wrote about their plant passions and experiences. To do this, we met together at the Second Student Botany Festival as well as through on-line meetings and email. The result was recommendations of books and podcasts about plants, experience of a Field Studies Council course and favourite plants as well as plant places and activities. Read more in this issue!

Behind the scenes, the newsletter had been designed and put together by Hattie Roberts at Lancaster University. However, having moved on in her science career, she has handed this role on to Helena Brown (Royal Botanic Garden Edinburgh) and Rabinoor Khurana (University of Dundee).

This is not an exclusive group of writers and production team! Anyone else who wants to contribute just email: botanicaluniversitychallenge@gmail.com

Helena Brown, Meriel Jones and Rabinoor Khurana at Second Student Botany Festival, Oxford August 2024.

OUR BUC 2025 SPONSORS

BUC 2025 is an ambitious project with three online rounds followed by live finals and the 3rd Student Botany Festival at Cambridge University Botanic Garden. The BUC Planning Team are currently investigating opportunities from a range of sponsors. If you have ideas for potential sponsors please email: botanicaluniversitychallenge@gmail.com

Date of Next Issue: April 2025

Answers to the Botanical Brain Teasers:
(NB All have featured in previous BUC contests)

1.Burnet Rose (*Rosa spinosissima*)
2.Hawkweeds (*Hieracium* sp.)
3.Central America and Mexico
4.Water
5.A bud that can develop into a new plant
6.It feeds from the roots of other plants