

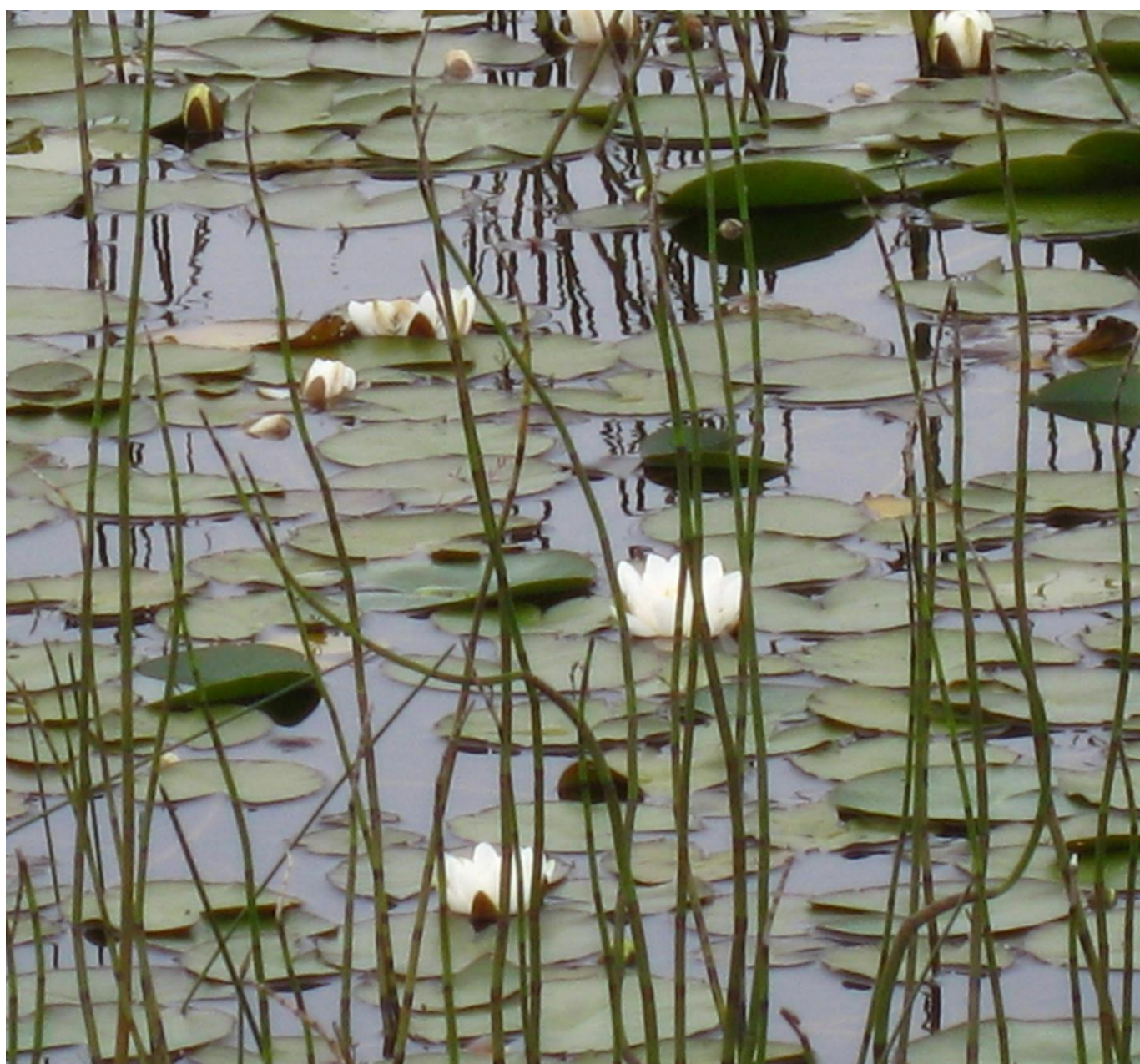


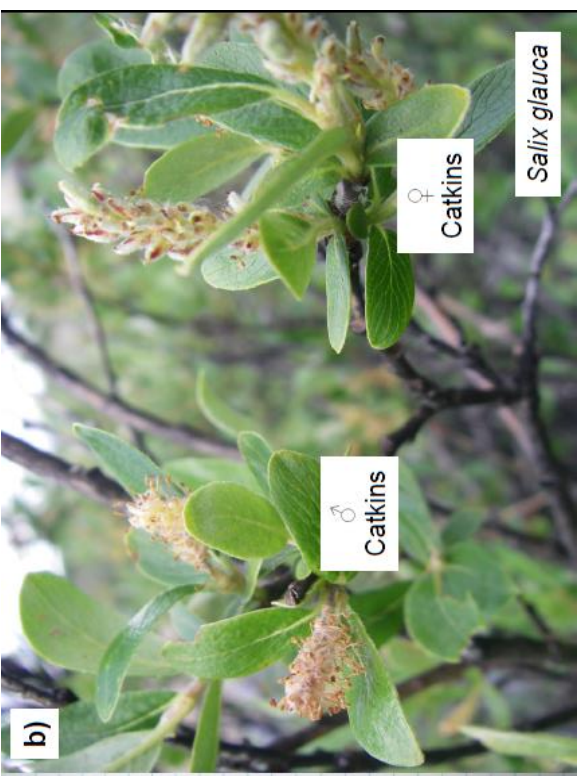
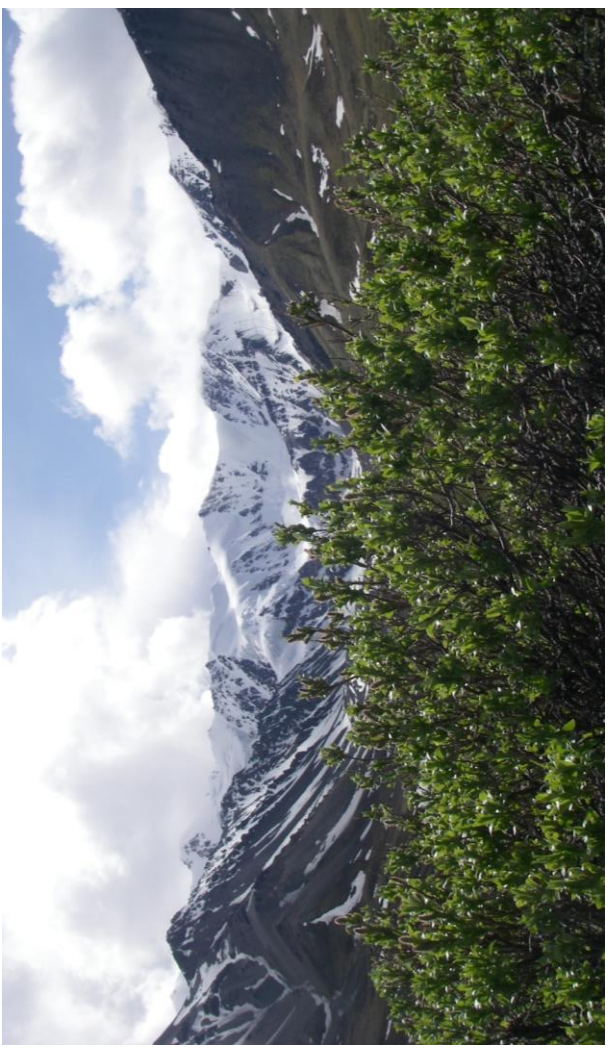
BSS News

The Newsletter of the
Botanical Society of Scotland

No. 103

September 2014







The Botanical Society of Scotland is a Scottish Charitable Incorporated Organisation (SCIO) (No. SC016283)

Front cover pictures

Outside

Nymphaea alba in a Uist lochan. Photo by Jane MacKintosh

Inside

Top left: “*Dickeya solani*” rotted potato tuber. See article on page 12. Photo by SASA. Crown Copyright.

Bottom left: Figure 1 from article on page 17. California waterwort (*Elatine californica* A. Gray.) Photo by Hamid Razifard.

Top right: Figure 1 from article on page 18. Willow shrubs such as these *Salix richardsonii* individuals in the Yukon Territory, Canada, have been shown to be increasing at many sites around the tundra biome. Photo by Dr Isla H. Myers-Smith.

Bottom right: Figure 2 from article on page 18. Two monoecious individuals from the dioecious willow species *Salix pulchra* (a) and *Salix glauca* (b). These individuals had both male and female catkins on the same plant, and some of these catkins had both female and male flowers. Photo by Dr Isla H. Myers-Smith.

Botanical Society of Scotland

(Incorporating the Cryptogamic Society of Scotland)

c/o Royal Botanic Garden Edinburgh

20A Inverleith Row, Edinburgh, EH3 5LR

Website: <http://www.botanical-society-scotland.org.uk>

You can follow the BSS on Facebook and Twitter via the website.

Founded in 1836 as the Botanical Society of Edinburgh, the Society became the Botanical Society of Scotland in 1991. Meetings are held in Edinburgh, Glasgow, Aberdeen, Dundee, St. Andrews and Inverness. The Society incorporates the Cryptogamic Society of Scotland and so encourages the study of flowering and non-flowering plants. Activities of the Society include lectures, field meetings, symposia, surveys, and an annual exhibition meeting for exchange of information between botanists working in different areas. All people interested in plants are welcome to be members of the Society, including professional academic plant scientists, amateur field botanists and students. All members receive information about events of the Society, including programmes of lectures and field meetings, as well as a twice-yearly newsletter, *BSS News*. Standard membership also includes the scientific journal: *Plant Ecology & Diversity*, published by the Botanical Society of Scotland and Taylor & Francis.

Applications for membership of the Botanical Society of Scotland should be made to the Hon. General Secretary at the address at the top of this page. Please ask for a Banker's Order form if required.

Subscriptions fall due on 1st October each year:

Standard rate (with the Journal <i>Plant Ecology and Diversity</i>)	£40.00
Standard rate for undergraduate students (with the journal)	£30.00
Basic rate (without the journal)	£20.00
Basic undergraduate student rate (without the journal)	£5.00

Subscriptions can be paid by cash, cheque (payable to the Botanical Society of Scotland), or Banker's Order. Alternatively, you can pay by PayPal via the BSS website membership page:

<http://www.botanical-society-scotland.org.uk/content/bss-membership>

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Botanical Society of Scotland

EDITORIAL

Summer is passing so quickly and I hope that you have enjoyed the fine Scottish weather this year. Many thanks to the people who have contributed an article for this September issue. You might be able to tell that Jill at least has not been to many meetings yet this year, so did not manage to invite lots of people to write articles, and as a result this is a thinner issue than usual. I am sure it would much appreciated by Botanical Society members if more members spontaneously sent in articles or asked their friends, collaborators, and speakers at events that they have attended to send in an article. The past few issues have mainly included articles contributed by non members. While we hope that writing articles and receiving a copy of the newsletter containing the results of their labours might stimulate people to join the society, we wonder if the balance is right. Any suggestions for items that you would like to see in BSS news are very welcome.

We hope that you will join us in thanking everyone who worked hard to bring about the change in the status of the society but especially Chris Jeffree and Julia Wilson who have both played a major role in shepherding the BSS into a new SCIO. At the time of writing we are now a Scottish Charitable Incorporated Organisation although there might be a few remaining administrative hoops to jump. From now on the society must be referred to with the following text 'The Botanical Society of Scotland is a Scottish Charitable Incorporated Organisation (SCIO) (No. SC016283)'. As shorthand one can write 'The Botanical Society of Scotland (SCIO)'.

Jill Thompson and Jane MacKintosh

BSS & BSBI SCOTTISH ANNUAL MEETING

1 NOVEMBER 2014

The Botanical Society of Scotland & Botanical Society of Britain & Ireland Scottish Annual Meeting will be held on Saturday 1st November this year at the Royal Botanic Garden Edinburgh.

Everyone with an interest in Scottish botany, whether BSBI or BSS members or unaffiliated family and friends, is most welcome. There is a full programme of interesting botanical exhibits and talks to enjoy. Our main speaker is Professor Jonathan Silvertown, who will give a talk entitled "The crowd and the cloud: reinventing natural history".

As well as our regular features, including the Identification Helpdesk, the Photographic Competition and Summerfield Books, there will be a number of activities such as herbarium tours and mini-workshops.

For more information see the enclosed flier or BSBI or BSS websites.

URBAN FLORA OF SCOTLAND MEETING

2 NOVEMBER 2014

You are invited to attend a meeting of the Botanical Society of Scotland to discuss the design and management of The Urban Flora of Scotland project.

This meeting will be held in the Lecture Theatre of The Royal Botanic Garden Edinburgh, starting at 9:30 on Sunday 2nd November 2014.

The Urban Flora meeting is the day after the BSS/BSBI Scottish Annual Meeting on Saturday 1st November 2014, and in the same venue. We hope that many BSBI members will stay on in Edinburgh to participate in the Urban Flora meeting.

URBAN FLORA OF SCOTLAND - UPDATE ON PROGRESS

A sub-group of the Council has been meeting every month to plan our Citizen Science project, The Urban Flora of Scotland. To encourage wide participation, we will launch with a more citizen-friendly title such as The Flowers of Scotland. The title is still under discussion, and internally we are using The Urban Flora of Scotland.

We aim to stimulate botanical interest in Scotland by engaging the public in surveys of the plants they find in their towns and cities, the length and breadth of Scotland (see BSS News 101, September 2013). Most of our meetings have been to determine exactly how people will collect data and how we will verify, store, share and finally process the information using state-of-art software on mobile phones and the internet. Of course, some people will prefer to use pencil and paper and we must accommodate anyone who is keen enough to be a recorder!

Most importantly we need to take account of wildly differing levels of expertise, from school-children to people who are already quite skilled.

Imagine a would-be botanist Violet Bloom, walking down a street in Dundee with her smart-phone. She sees a sow-thistle growing from a crack in the wall. She's fairly sure it's a *Sonchus*, and she turns to her flora to identify it as *Sonchus asper*. She activates the App on her phone, types the first three characters S O N and up pops the full Latin and English names of the three sow-thistles that could conceivably be the right one. She ticks the one. The phone in the meantime has stored the date and location to the nearest few metres, and now asks her for the habitat, to which she replies WALL. Is the wall facing north, south, east or west? She checks SOUTH. Then it asks, how common is this plant: dominant, abundant, frequent, occasional or rare? She inspects the terrain within 10 metres and decides on RARE as no other specimen is in sight. She decides to take a photograph; the App deals with this. It will be used later in the verification process. If it's an excellent photograph it may be used much later in an illustrated flora we'll make. The whole process has taken a few minutes and later when her identification skills increase, it will take only seconds. She moves on.

That's how it will work, but Violet was not a complete beginner. Now imagine young Basil Bush, an eleven year old who has been assigned the task of finding where *Silene dioica* grows in Stranraer.

He's not even a would-be botanist, but a might-be botanist. It's part of a nation-wide school project to map the ten most common and 'easy' species in our towns and cities. He knows well what it looks like, as he has been given only ten species to learn! Off he goes, and this time he checks the 'starter' section of the App, just next to the 'novice' section. Once more, an interrogation process occurs, much as in Violet's case, and he takes a picture too.

Imagine these processes occurring many tens of thousands of times over several years. The software draws a map, organizes the data by habitat, compares it with data from the BSBI, throws up suspicious records for checking further.

We think we can achieve all these things and more. This first year has been almost entirely planning; this has been challenging and at times frustrating for those of us who wanted to be out in the field recording. Some of us have, however, already done some recording. These data can be entered later. Our bryologists for example have completed a comprehensive survey of the Water of Leith. But soon the software will be ready, and we are applying for funding to employ staff to co-ordinate the work and to help in the day-to-day running. Moreover, we are planning various events for next year, so that local groups can now include these in their programmes.

We will hold a Walls Week, 9-17th May next year, with the intention of making a strong start on the flora of walls, and we would like to hear from groups out there who would like to take part. First we have to engage the interest of as many local groups as possible, and with them, hammer out some of the remaining issues. So on Sunday November 2nd we will host an event at the Royal Botanical Gardens to bring together relevant people, and I hope that many of you will be able to attend.

John Grace
President - Botanical Society of Scotland
jgrace@ed.ac.uk

CONFERENCE: PLANT EVOLUTION IN THE UK

8 - 9 SEPTEMBER 2014

Workshop to identify challenges met and opportunities to build this community over the next decade



The motivation for the conference, sponsored by New Phytologist, is the under-representation of evolutionary biologists in the UK who work on plants. The aim of the conference is to bring together the community of UK researchers working on Plant Evolution, illustrate the exciting work that is going on in this area, strengthen links between UK research groups and consider how Plant Evolution within the UK can be developed in the future.

The conference will feature talks from leading UK scientists across the spectrum of topics in plant evolution, from Evo-Devo to Biogeography, with a plenary address by Spencer Barrett from the University of Toronto. There will also be the opportunity for presentation of contributed talks and posters. The website for the conference and for registration is:

<http://symposium.bio.ed.ac.uk/ukplantevolution2014/>

Richard Ennos
Edinburgh University

Plant Evolution in the UK Conference details:

Royal Botanic Garden Edinburgh

<http://symposium.bio.ed.ac.uk/ukplantevolution2014/>

Invited speakers, open speaking sessions and poster session

Invited UK speakers:

Mating system: Mario Vallejo-Marin (Stirling University)

Speciation: Richard Buggs (Queen Mary, University of London)

Evo-Devo: Beverley Glover (University of Cambridge)

Phylogeny: Toby Pennington (Royal Botanic Garden Edinburgh)

Polyploidy: Barbara Mable (University of Glasgow)

Biogeography: Bill Baker (Royal Botanic Gardens, Kew)

Population Genetics (Molecular ecology): Simon Hiscock (University of Bristol)

Population Genetics (Genomics): Rob Ness (University of Edinburgh)

Ecological Speciation: Patrik Nosil (University of Sheffield)

Invited International speaker:

Spencer Barrett (University of Toronto)



**Royal
Botanic Garden
Edinburgh**

New Phytologist Trust



THE UNIVERSITY *of* EDINBURGH

EDINBURGH'S FIRST PLANT SCIENCE NETWORK LAUNCHED

New network aims to raise the profile of Edinburgh's world class plant science research and harness the power of collaboration.

The Royal Botanic Garden Edinburgh proved to be the perfect venue for the launch of the capital's new network for plant science, Edinburgh Plant Science (EPS).

Over 100 delegates attended the event on June 25th 2014 enjoying some stimulating talks from a diverse range of speakers who provided a holistic perspective of both the challenges and opportunities for plant sciences today.

EPS is a new network that brings together around 600 Edinburgh research active scientists, and provides wide-ranging expertise which can be used to address some of the most pressing challenges to our world - food security, environmental sustainability and related policy. EPS will become an active forum to stimulate interdisciplinary research collaboration and new training opportunities, and to raise the profile of the world-leading plant and social science research ongoing in and around the Capital.

Over the past couple of decades there has been a decline in interest in studying botany/plant sciences and a reduction in funding in research for agriculture. However, there has been a renaissance of interest in the role of plants as sources of food, feed, fuel and environmentally friendly high-value chemicals. This has led to a refreshed interest and investment in plant science, including the recent launch of the UK Agritechnology Strategy and around £160M of investment in technologies underpinning more sustainable agricultural practices. EPS is committed to delivering fundamental and translational research, education and outreach to ensure that new discoveries in plant sciences can bring benefits for human health, society and the environment.

The goal of EPS is to be *the* inter-disciplinary forum for plant and related science in the Edinburgh area and to be a vehicle that can rapidly mobilise interest, respond, and capture the opportunities arising for plant science and agriculture.

Collectively, EPS can address challenges from the molecular through to population levels, and address the complex environmental

and evolutionary pressures on plant development. Areas of specific expertise include: Conservation and Diversity; Crop and Translational Research; Climate and Environment; Immunity and Health; Epigenetics and Development; and Predictive Modelling.

EPS has eight member organisations: University of Edinburgh, the Centre for Social and Economic Research on Innovation in Genomics (Innogen), Royal Botanic Garden Edinburgh, Centre for Ecology and Hydrology, Science and Advice for Scottish Agriculture, Scotland's Rural College, the Forestry Commission and Heriot-Watt University.

EPS was formally launched by Professor Ian Graham, Head of the Department of Biology, University of York and Chair of Biochemical Genetics in the Centre for Novel Agricultural Products (CNAP), and Professor Lesley Yellowlees, CBE FRSE, and Head of the College of Science and Engineering at the University of Edinburgh and President of the Royal Society of Chemistry.

Dr Karen Halliday, Director of EPS and a reader in the Institute of Plant Molecular Sciences in the School of Biological Sciences, University of Edinburgh, says, "Edinburgh has the largest concentration of plant scientists in Scotland, if not the UK, and we have a great opportunity to further raise the importance of our research to solving many of the world's problems. We are passionate about plants and want to help ensure everyone understands their importance to our planet."

During the event, guest speakers from the agrochemical company Syngenta, the UK's Knowledge Transfer Network, Scottish Natural Heritage, Science and Advice for Scottish Agriculture and Innogen provided a broad view of plant sciences and its impacts – environmental, social and economic. Edinburgh graduate students also ran a very entertaining "Two-Minute Thesis" competition during the event to highlight the wealth of young talent in the region.

Anyone with an interest in finding out more about EPS can do so via the website www.edinburghplantscience.com and on Twitter @EdinPlantSci.

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WHY IS GIANT MEADOWSWEET SO DIFFICULT TO MATCH TO A SCIENTIFIC NAME, BE IT *FILIPENDULA CAMTSCHATICA*, *F. PALMATA*, *F. X PURPUREA* OR *F. RUBRA*?

This question arose following the posting of a photo to fellow Vice-County Recorders and friends of “a meadowsweet on steroids?” by Liz Lavery when she found a tall plant by a roadside in Galloway last summer. (See the image on the inside back cover). Two of us immediately replied “try *Filipendula camtschatica*”, with the sight of the image re-awakening memories of my coming across the species in a local park in my home town of Kirkcaldy during my early days of botanising.

The four names listed above are all hort* and have been used somewhat indiscriminately since the plants were first introduced many years ago, with “*F. camtschatica*” (correctly spelled) employed as an aggregate. The R.H.S. (1992) lists them - and others! - commenting that they are “suitable for streamsides and bog garden plantings ... and in moist, cool woodland or other naturalistic plantings”, apt choices. But the nomenclature has been horribly mixed up by horticulturalists over the years and it was *perhaps* owing to this that C.T.W. did not mention them at all in either the first edition of 1952 or the second ten years later; or it may just have been that a species was not recorded as being found ‘in the wild’ until 1966 [actually in Angus, VC90, at Kinnordy]. It was not until almost the end of the 20th century that an attempt was made to sort out the nomenclature mess, by Barnes (1998), distilled later by him around 2000, although it is apparent from the first edition of his New Flora that Clive Stace (1991) realised something was amiss, while the aliens expert Eric Clement pitched in a few years later with a good description of *F. x purpurea* (Clement, 2005).

With my interest in cultivated *Filipendulas* aroused, I resolved to compile a Vice-County list of occurrences in Scotland giving in particular the name under which they’d been first recorded - but when I accessed the BSBI Distributional Database (the ‘Ddb’), I realised there were far more localities than I had a note of, so I changed my mind to presenting a rather more personal view of the matter.

I mentioned above my own first involvement with Giant Meadowsweet, in 1969 finding a tall ‘feathery’ plant growing in the grounds of a local park, Dunnikier, formerly an estate, near a pond.

Completely flummoxed as to its identity I took a piece to the RBGE, where it was identified as "*F. kamschatica* " [the original spelling] by Miss C.W. ["Win"] Muirhead, who also happened to be the Recorder for VC85 at the time. Possibly because it was fairly obviously an introduced garden plant she did not publish the record and so I did not include it in my *Wild Flowers of Kirkcaldy* issued in 1970. It soon disappeared so that 'former relic' seems to be the best description of its status now.

I'd forgotten all about the matter until the summer of 2003; by then Richard Milne, a regular contributor to this magazine, was doing his post graduate studies at St Andrews and either in pursuit of them or as a means of relaxation, he took to scouring Fife for escapes and casuals. In July of that year he wrote to me to say "a *Filipendula* cultivated variety somewhere between *purpurea* and *kamschatica* (flowers pinkish white but leaves almost glabrous below)" was growing near the eastern entrance to the village of Torryburn (in West Fife) by the B9037 (pers. comm.) Later, on 31st July 2005 I collected material from the site, a single plant by a ditch at the edge of the old Craigflower Estate and sent it to Eric Clement - on the face of it, it appeared to be *F. x purpurea*, but Eric wrote back to say it was "too young" to be sure. The station has almost certainly been lost to recent housing, so that once more the status of the plant must read 'former relic'.

Having quoted a somewhat unflattering description of the plant at the beginning, it behoves me perhaps to remedy this by suggesting an alternative to 'Giant Meadowsweet'. Our Common native Meadowsweet (*F. ulmaria*) is also called 'Queen of the Meadow', especially in the Scottish Borders, and the species native to North America (*F. rubra*) is dubbed 'Queen of the Prairie'. Many of the plants introduced to Britain come from east Asia (about as far east as one can get), being native to Kamschatka (in Russia), Japan and Manchuria (R.H.S. 1992), so perhaps 'Kamschatka Queen'? - but without knowing what it looks like in its home territory, this is perhaps stretching things a bit, and/or too romantic a notion?

George Ballantyne
Kirkcaldy

*Postscript from George B. about the word "hortal": I've now checked Stern's Botanical Latin, and find that "hortensis=pertaining to gardens" and "hortorum=of gardens", so that, technically, one of these words is correct; however, I've definitely seen "hortal" used recently in the same

way and as it sounds OK, not to mention being less cumbersome, it seems to be being accepted.

References

- Barnes, P.G.(1998). Confusion in uncultivated meadowsweets, *Filipendula* Miller. *The New Plantsman*,**5**: 145-153.
- Barnes, P.G.(c.2000). [European Garden Flora]: *Filipendula* Miller (internet entry under Barnes-Botany.co.uk)
- C.T.W. (1952/62) *Flora of the British Isles*. Cambridge Cambridge University Press.
- Clement, E. (2005). *Filipendula x purpurea* Maxim. *BSBI News*, no 98:143-145.
- R.H.S. (1992). *New Dictionary of Gardening*.Vol 2. Macmillan Press.
- Stace, C. (1991) *New Flora of the British Isles*.1st Edition. Cambridge University Press.
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PROTECTING SCOTTISH POTATOES FROM THE THREAT OF INFECTION

Potatoes and their Global Impact

Potatoes are believed to have originated in the Andes, particularly the area of Southern Peru and Northwest Bolivia. They were introduced to Europe by Spanish explorers in the 16th century and, whilst initially their cultivation was slow to be adopted, potatoes soon became an important crop and food staple, so much so that it has been suggested that they contributed to the population boom of the 19th century. Potatoes have now become the world's fourth major crop after maize, wheat and rice; however, after centuries of selective breeding a lack of genetic diversity has left the potato vulnerable to disease.

In 2010, the United Nations estimated the global potato production to be 324 million tonnes and valued at US\$96 billion, with potatoes being grown in over 130 countries, totalling 18.6 million hectares. Over two-thirds of the world's potato production is consumed by humans (the equivalent of 33kg of potato consumed annually by each individual), with the remaining used for animal feed or for starch. The importance of potatoes in global food production was highlighted during the world food price crisis of 2007-2008 as its price remained stable. Although potatoes are a cheap and plentiful crop that grows in a variety of climates and

locales, due to its perishability only 5% of the world's potato crop is traded internationally; consequently, it has a minimal presence in world financial markets and was relatively unaffected by the developing economic problems of the time. The United Nations therefore referred to 2008 as the year of the potato.

The local importance of potato is extremely variable and rapidly changing; however it remains an important crop in Europe, where per capita production is the highest in the world. The most rapid expansion in production has been in South and East Asia with China becoming the largest potato producing country. Nearly one-third of the total potato production is from China and India. Scotland provides the ideal growing environment for the crop and most of the seed potatoes in the UK are grown in Scotland, which is a major exporter of potatoes and exports them to over 40 countries. The Scottish potato industry is worth over £100 million and contributes to the overall production in Great Britain, which is worth in excess of £3 billion.

Growing Potatoes and the Threat of Infections

Potatoes are generally grown from “seed” that are tubers grown specifically to be disease-free and which produce consistent and healthy plants. There are close to 4,000 varieties of potato and it has been bred to many standard or well-known varieties; each of which has particular agricultural or culinary attributes. Around 30 varieties are available in the UK. Commercial cultivars of potatoes have been derived from a restricted number of potato clones therefore a narrow genetic base exists with a limited range of resistance and reduced yields and tuber quality.

Since the establishment of potatoes as a crop there has been a steady increase in its pests and pathogens. Currently over 30 exist and are responsible for the loss of an estimated 22% of potatoes. Disease can arise at all production stages and the aggressiveness of pathogens varies, with the severity of disease dependent on the susceptibility of the host, the virulence of the pathogen and environmental conditions. The historically significant *Phytophthora infestans* (late blight), which was responsible for the Irish Potato Famine in 1845, remains an ongoing problem in Europe and the US. Since the 1990s the bacterial pathogens *Ralstonia solanacearum*, (bacterial wilt) and *Clavibacter michiganensis* subsp. *sepedonicus* (ring rot) have been the most economically significant potato pathogens; however the emergence of the bacterial

pathogen "*Dickeya solani*" poses a new threat to the health of the potato industry in Great Britain. ("*Dickeya solani*" is a provisional name as there is still some debate as to whether it is a species or a subspecies.) *Pectobacterium* and *Dickeya* spp. are the main causes of blackleg and tuber soft rot; however, "*Dickeya solani*" has rapidly become the principal cause.

Within five years of "*Dickeya solani*" emergence it became the primary cause of blackleg and soft rot symptoms. *Dickeya* sp. were first identified in the 1970s in the Netherlands; however these infections were primarily *D. dianthicola*. In 2005, "*D. solani*" a more aggressive species of *Dickeya* was isolated and found to cause disease over a wider climate range and at lower inoculum levels. This species quickly established itself and by 2010, was having a significant impact on the potato industry of Europe. Losses for that year from "*D. solani*" cost the potato industry of the Netherlands €25 million due to downgrading and rejection and Israel recorded yield reduction of 20-25% due to "*D. solani*". "*Dickeya solani*" was discovered in imported ware (to be consumed) crops in England in 2009 and in Scotland in 2010. In response, Scotland immediately implemented a policy of zero tolerance for *Dickeya* sp. to stop further introductions and the spread of the pathogens into Scotland. As a result, *Dickeya* sp. have so far, remained out of Scotland.

The significant impact of "*Dickeya solani*" and the potential for its spread warranted research into understanding its emergence, spread epidemiology and future impact. Research incorporated genetic analysis, molecular analysis and studies of the mechanisms of its spread, in addition to estimating its potential impact on crop growth and to develop control measures. This research has involved collaborators from SASA, the James Hutton Institution (Dundee) and Fera (York). Due to the rapid and diverse establishment of "*D. solani*" it was assumed that there would be much genetic variation among isolates. Molecular and genetic analysis, including sequencing of the genomes of three isolates from different geographical locations and environmental samples, showed the genomes (DNA) to be identical and the pathogen to be clonal.

Another important development was the design of a diagnostic test specific for "*Dickeya solani*". Accepted methods were time-consuming, expensive and could only identify that *Dickeya* was present, not which species. While Scotland has a zero tolerance for all *Dickeya* sp., this is

not the case for other countries; therefore, knowing the species of *Dickeya* present is important for how they decide to implement control strategies especially as “*D. solani*” is much more virulent and aggressive over a wider range of growing conditions. Control measures were developed by understanding how it is spread from infected tubers to its progeny and between planted infected and healthy tubers, and their daughter tubers. In addition, disinfectants commonly used in agriculture were studied to determine the effectiveness against “*D. solani*”. Studies of the spread of infection and disinfectant sensitivity shows how important it is to maintain good hygiene and growth practices within potato production, in order to limit and control the spread of *Dickeya* sp. Unfortunately a number of unanswered questions remain especially regarding the ability of “*D. solani*” to spread so rapidly and become a major pathogen. It is also apparent from the emergence and dominance of *Dickeya* sp. just how vulnerable the potato industry is.

The Safe Haven Scheme

The success of the British potato industry depends upon the maintenance of the high standard of health of the potato seed crop; therefore, it is fundamental that crops and seeds are kept free from diseases. If diseases such as ring rot and *Dickeya* sp., which are problematic in mainland Europe, were to enter the seed supply chain, it would be extremely hard to eradicate them and it would devastate the British potato crop. The seed supply chain is currently free from ring rot, *Dickeya* sp. infections and other diseases, but to maintain this high standard it is crucial that all involved in the potato industry, whether commercial producers or at-home gardeners, work together to prevent any contaminated seed being imported and entering the potato crops. The Safe Haven Scheme was established in 2004 to provide additional protection and reduce the risk of outbreaks, initially from the threat of ring rot and now expanded to include *Dickeya*-blackleg and brown rot. The scheme utilises scientifically robust protocols to ensure seed growing and handling is carried out to the highest standards of plant health and biosecurity and members are annually audited to ensure compliance of a series of standards which cover all potential infection points. It currently covers 60% of all seed production in Great Britain. Each year 10,000 tonnes of British seed potatoes are sold to gardeners. By sourcing seed through the Safe Haven Scheme, growers are assured of the origin, health and provenance of the potato seed and this will protect the British industry from non-indigenous diseases. Although

possible, it is not advised to use table (“eating”) potatoes to grow new plants as these tubers may have been grown overseas and carry disease risks. Also, the quality and health of the crop and its yield cannot be guaranteed.

Maintaining Our Strong Potato Industry

The significance of the humble potato cannot be underestimated nor its contribution to Scotland and Great Britain as a whole. The Scottish Potato Industry is one of the strongest in the world with an excellent reputation due to the health and quality of Scottish seed potato. Whilst the climate of Scotland helps reduce the threat of viral disease (due to low levels of aphids which transmit the viruses), the vigilance of the Scottish potato industry has kept the stocks free from bacterial diseases. Scotland is one of the few countries that can make this claim. The health of the potato seed must remain a national biosecurity issue as new potato diseases are constantly emerging and threaten the success of potato production as demonstrated by the impact of bacterial pathogens such as “*Dickeya solani*”, *Ralstonia solanacearum* and *Clavibacter michiganensis* subsp. *sepedonicus*. The Safe Haven Scheme reduces any serious consequences that may result by monitoring potato imports to ensure diseases are not imported into Britain and also by ensuring seed produced is both healthy and of a high quality; however its success depends on the co-operation and participation of all potato growers, commercial and non-commercial.

For further information please visit:

<http://www.potato.org.uk/growing/gardeners-guidance/growing-healthy-seed-potatoes-from-britain>.

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References:

Toth, I.K., van der Wolf, J.M., Saddler, G., Lojkowska, E., Hélias, V., Pirhonen, M., Tsrör, L., and Elphinstone, J.G. (2011) *Dickeya* species: an emerging problem for potato production in Europe. *Plant Pathology* 60: 385-399.

SASA (Science and Advice for Scottish Agriculture) <http://www.sasa.gov.uk>

Food and Agriculture Organisation of the United Nations <http://www.fao.org>

The Potato Council <http://www.potato.org.uk>

WATERWORKS OF THE WORLD

A request for collections of Waterworts (*Elatine* L.) for a Global Systematic study

Waterworts (*Elatine* L.) are a genus of aquatic flowering plants with about 25 species worldwide (Tucker 1986). Along with bergias (*Bergia* L.), waterworts are classified as members of Elatinaceae. They usually grow in the shallow areas of ponds and lakes as well as vernal pools. Most of the waterworts complete their life cycle in submersed form. However, mudflat forms of two species (*E. minima* (Nutt.) Fisch. & C.A.Mey. and *E. californica* A.Gray) have also been found by the authors. Similarly to many groups of aquatic flowering plants, waterworts are thought to have evolved from terrestrial ancestors (Davis and Chase 2004). Many species of waterworts, e.g. three-stamen waterwort (*E. triandra* Schkuhr), show a great degree of morphological plasticity depending on the water level of their substrate. Furthermore, all waterworts, except *E. alsinastrum* L. are extremely small plants. Their maximum height usually does not exceed a few centimeters (Figure 1 - see image on inside front cover). Due to these facts, many cases of misidentification and questionable reports of new species of waterworts have occurred in the botanical literature. We aim to provide a comprehensive revision for the genus through a PhD dissertation project. The revision will provide information on the morphology, anatomy, chromosome numbers, distribution, and evolution of all waterwort species worldwide.

To reach that goal, we needed to have access to plant material from all the waterwort species reported so far. Starting in 2010, we have collected or obtained plant material of 17 waterwort species out of 25. Therefore, we would like to make a request for plant material from specimens of the following species: in particular, samples of Scottish populations of *E. hydropiper* Schkuhr and *E. hexandra* DC. If you are travelling then *E. brochonii* Clav. (Mediterranean Basin), *E. fassettiana* Steyerl (Venezuela), *E. fauquei* Monod (Western Africa), *E. gratioloides* A.Cunn. (Australia, New Zealand, and Papua New Guinea), *E. macrocalyx* Albr. (Australia), *E. macropoda* Guss. (Mediterranean Basin), *E. paramoana* Schmidt-M. & Bernal (Colombia and Bolivia), and *E. peruviana* Baehni & J.F.Macbr. (Peru and Bolivia) are also of interest.

To be able to extract DNA, we prefer freshly collected plant material and/or well-preserved herbarium specimens that were collected

after 1985 from Scotland and other countries in Europe, as well as waterworts from other continents. Naturally, we would be happy to include the plant collectors in the scientific publications made possible through their contribution.

Collecting and processing waterworts, like many aquatic plants, is slightly more complicated than terrestrial plants. Great care should be taken when collecting and preserving waterwort specimens. Due to the fact that mud and other debris on the plants might degrade the plants quickly, the plants should be washed thoroughly right after collecting in a tray filled with water. Plants should then be spread on waterproof paper, using water, in order to preserve their ideal morphology. The mounted plants can be dried in a plant press using newspapers, cardboards and blotter paper. The blotter paper and cardboards need to be changed at least once a day for up to 6 days. If possible, it is ideal to preserve one or two individuals in a few grams of silica gel (in a zip-lock bag) and post it along with the dry specimens.

For posting the specimens, please use the faster international mailing services (e.g. DHL) because the cheaper services usually take a long time to deliver to the US. We would be happy to compensate for the postage costs. The latest date we may accept the specimens is September 2016. The specimens will be deposited in the George Safford Torrey Herbarium at University of Connecticut, with the collector's name printed on the labels. No import permit is required by United States Department of Agriculture for waterwort specimens.

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References:

- Davis Ch. C. and Chase M. W. (2004). *Elatinaceae are sister to Malpighiaceae; Peridiscaceae belong to Saxifragales*. American Journal of Botany (Botanical Society of America) **91** (2): 262–273.
- Tucker G. C. (1986). *The genera of Elatinaceae in the southeastern United States*. Journal of the Arnold Arboretum 67: 471–483.
-

A BOTANIST IN NORTH AND NORTH EAST GREENLAND

Rod Corner provided the following amended report of his illustrated talk to last year's BSBI/BBS Scottish Annual Meeting held at the Royal Botanic Garden, Edinburgh, on 2 November 2013.

Greenland is part of the continent of North America but the flora of eastern Greenland is more closely related to that of Europe. Rod showed photographs of many British species growing in the Greenland landscape, including dwarf birch *Betula nana*, bog blaeberry *Vaccinium uliginosum*, arctic bearberry *Arctostaphylos alpinus*, alpine foxtail *Alopecurus magellanicus*, saxifrages *Saxifraga* spp. and, surprisingly, lady's-smock *Cardamine pratensis* agg.

A major factor influencing the climate is the frigid East Greenland current which is the major outlet from the Arctic Ocean and which carries large quantities of pack ice down southwards. Away from the coast however, where summer conditions are warmer, south facing habitats, often irrigated by melt water from long lasting snow drifts, can support a herb rich community. These habitats are always worth investigating as they can support some rare more southerly species at the northern limit of their range such as goldilocks *Ranunculus auricomus*, the lady's-mantle *Alchemilla glomerulans* and alpine cat's-tail *Phleum alpinum*. Greenland has plenty of wildlife and the botanist must keep a look out for polar bears and the occasional bull musk ox defending its territory

Rod Corner

SHRUBIFICATION: AN ECOLOGICAL TRANSITION IN THE TUNDRA

Climate change is altering tundra ecosystems and one of the most dramatic examples of this is the increase in shrub cover. Climate change in tundra ecosystems is projected to continue, with 4 – 7°C warming over the next 100 years and a significant unknown, is whether shrubs will continue to rapidly respond to the warming climate, or whether climate or biological factors will begin to limit the rate of future vegetation change across the tundra biome.

Tundra ecosystems are those that occur above the treeline either with latitude, in the Arctic, or with elevation, up a mountain slope. Tundra ecosystems exist around the planet, but are restricted to polar latitudes or high elevations. Their plant communities can be remarkably similar in the alpine tundra in Colorado, the European Alps and arctic tundra in the Canadian High Arctic, or on Svalbard. Tundra ecosystems can most often be classified as grasslands, but it is the shrubs – the “trees” of the tundra – that are the species that have the potential to dominate many tundra ecosystems as the climate warms.

Willow shrubs such as the *Salix richardsonii* individuals shown in Figure 1 (see inside front cover) in the Yukon Territory, Canada, have been shown to be increasing at many sites around the tundra biome.

Many of the same tundra species exist across large geographic regions, with some being nearly circumpolar in their distributions. Shrub species such as *Cassiope tetragona*, *Empetrum nigrum*, *Salix richardsonii* and *Betula nana* can be found at sites around the circumpolar Arctic. These shrub species respond to the same climate and biological factors such as growing season temperatures, growing season length, extreme weather events, nutrient availability, rates of herbivory and other disturbances. Because of these similarities in plant composition and biological response, tundra ecosystems could potentially respond to climate change in a much more coordinated manner than more diverse and heterogeneous plant communities in more southerly biomes.

An increase in shrub species could have profound impacts on nutrient cycling and the flow of energy in tundra ecosystems. For example, shrubs can shade the ground surface in summer keeping soil temperatures cool, while in winter the shrub canopies can trap snow to insulate the soil profile and retain the summer warmth. These changes

to soil temperatures could relatively enhance microbial decomposition rates in winter and slow the same biological processes in summer. Such feedbacks would have unknown consequences for carbon storage and release from tundra ecosystems.

Shrubs canopies are often darker than the surrounding tundra ecosystem, particularly in winter and spring when shrub stems extend above the snow surface. This darkening of the soil surface relative to shrub-free tundra can lead to a decrease in the albedo, i.e., the reflectance of the ground surface. The change in albedo could lead to more solar radiation becoming absorbed as heat. This may result in regional warming that could further promote the growth of shrub species, and potentially feedback to enhance climate warming at the global scale.

Shrub species are often relatively long lived with individual stems of some species surviving up to 300 years old. Many species are clonal so the genetic individual could actually be much older than 300 years in many cases, perhaps similar in age to the many thousand year old poplar clones that were recognized through genetic work. In addition to remarkable longevity, tundra shrub species can also form biological connections with other individuals of the same species through mycorrhizal networks below ground. These connections could mean that the functional biomass of shrub species could extend beyond the individual in some tundra ecosystems.

Willows (*Salix*) are some of the most interesting of the tundra shrubs. Willows are very diverse in northern ecosystems relative to the other plant taxa; there are over 50 species of willows in the Yukon Territory alone, with more than 20 species occurring above the treeline. Willows often display very variable plant traits. Some species can hybridize with each other, and they can be polyploids, making identification and genetically-based taxonomy a challenge.

Willows are dioecious, having both male and female plants, and yet the sex determination mechanism remains unknown as these species do not have sex chromosomes and sex-linked genetic markers have not yet been identified. Willows often show a female-biased sex ratio with two female willows for every male. This predominance of female plants remains a botanical mystery, as evolutionary theory would suggest even sex ratios or male-biased sex ratios should be advantageous in marginal growing conditions and peripheral populations.

Labile sex expression has been observed in willow species. Figure 2 (see inside front cover) shows two monoecious individuals from the dioecious willow species *Salix pulchra* (a) and *Salix glauca* (b). These individuals had both male and female catkins on the same plant, and some of these catkins had both female and male flowers.

The unique botany of tundra shrub species, and willows in particular, will influence their responses to climate and other changes in tundra ecosystems. We still do not know the role that local genetic adaptation might play in limiting the response of shrub species to improved growing conditions. We also do not know how climate warming might influence nutrient availability and moisture stress in tundra ecosystems, which could feed back to promote or limit the growth of shrubs.

A dramatic biome-level change of increases in tundra shrubs, sometimes referred to as shrubification, is underway in the Arctic, but there are still many critical gaps in our understanding of the ecology and biology of these important and increasingly dominant tundra species.

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THE THRILL OF BOTANY

My interest in plants began just over a year ago and since then I have acquired a knowledge of British flora that any botanist would be pleased with. Being a member of the BSS, I have been lucky enough to make friends with some of the best plant scientists and their expertise has been instrumental in my understanding and enjoyment of botany. There are various aspects of botany that I enjoy and this article highlights a few.

One of the main enjoyments of botany for me is the finding of interesting plants; I liken it to seeing a celebrity on the street. I'll never forget the time I found my very first Bee Orchid (*Ophrys apifera*). Myself, Richard Milne and Maria Chamberlain were down in Easingwold for the Gatsby Plant Summer School, we had gone out early to a brown site

behind a brickworks to find plants for our identification workshop. Richard had gone ahead whilst I began looking at the surrounding flora; suddenly I heard an excited voice yell 'Bee Orchid!' I immediately spun around and started towards Richard, at which point my foot completely disappeared into soft clay. When I eventually did get over to it, I hunkered over it like an excited schoolboy. Photos of it don't give you any sense of scale and it was smaller than I had expected, but none the less beautiful. I reached out and touched it and was surprised to learn that it was rather firm and soft. Alas I didn't have my camera and we had to return to the school, but after a day of lessons I pestered Maria enough to take me back to the site and get a proper photo of this fantastic plant.

I am a keen photographer and I often go out on plant photography expeditions with our very own Dr Chris Jeffree, who is a very accomplished photographer. Chris has taken me under his wing somewhat and given me the chance to photograph plants that I wouldn't necessarily have the chance to, being a student without a car! Some of my photos have been featured in this issue of BSS news. I also keep a 'plant scrapbook' in which I press plants I find, laminate them onto card and stick them into my book along with notes of species name, where I found them, etcetera. In addition I also run a successful plant identification blog which has over 200 followers.

Though new ways of enjoying plants are constantly revealing themselves, I recently went on a wild food foray with the lovely Nanya Milne and some members of the public. We collected lots of wild food and had a big meal at the end of it. Since then I have enjoyed a number of wild food meals including a fantastic sorrel soup made by Maria Chamberlain and a beautifully presented wild salad made by Chris and Julia Jeffree, picked from their spectacular garden. Even my girlfriend, Lauren Wayland, has taken up an interest. Using my identification expertise and Richard Mabeys '*Food for Free*', she has made gooseberry jam, wild raspberry lemonade and nettle soup.

These are but a few of the aspects of botany that I enjoy, many of you will enjoy similar things and some of you may enjoy others. I am still at university and I hope to get a job doing something like this when I graduate, but whatever career I end up in I know that the thrill of botany will last for the rest of life.

Ewan Cole

PHYTOLEXICON CRUCIFORMIS B.S.SCOT EX WORD

In this crossword there are sixteen botanical names, mostly angiosperms but including an extinct pteridophyte, and four fungi; eleven words of botanical, ecological or biochemical terminology; and other words to fill in the gaps. Words do not read across grey squares or thick lines. I hope you don't find it too easy!

My project to cultivate Sudoku has so far come to nothing. That notable Victorian botanist, Edward Lear, discovered a whole alphabet of plants, now lost to cultivation. If they can be rediscovered I hope that crossword and sudoku plants may be found growing nearby. I am therefore planning a botanical expedition to The Land Where The Bong Tree Grows. The last recorded expedition took just over 52 weeks, but I'm hoping mine won't take quite so long. The crew will have to include someone wise and with good aviation skills, and an experienced rodent operative. I'll need commercial sponsorship: a jar of honey and plenty of money wrapped up in a five pound note would be about right – no, better make that a €50000 note, there has been inflation since the 1890s.

Crucifer

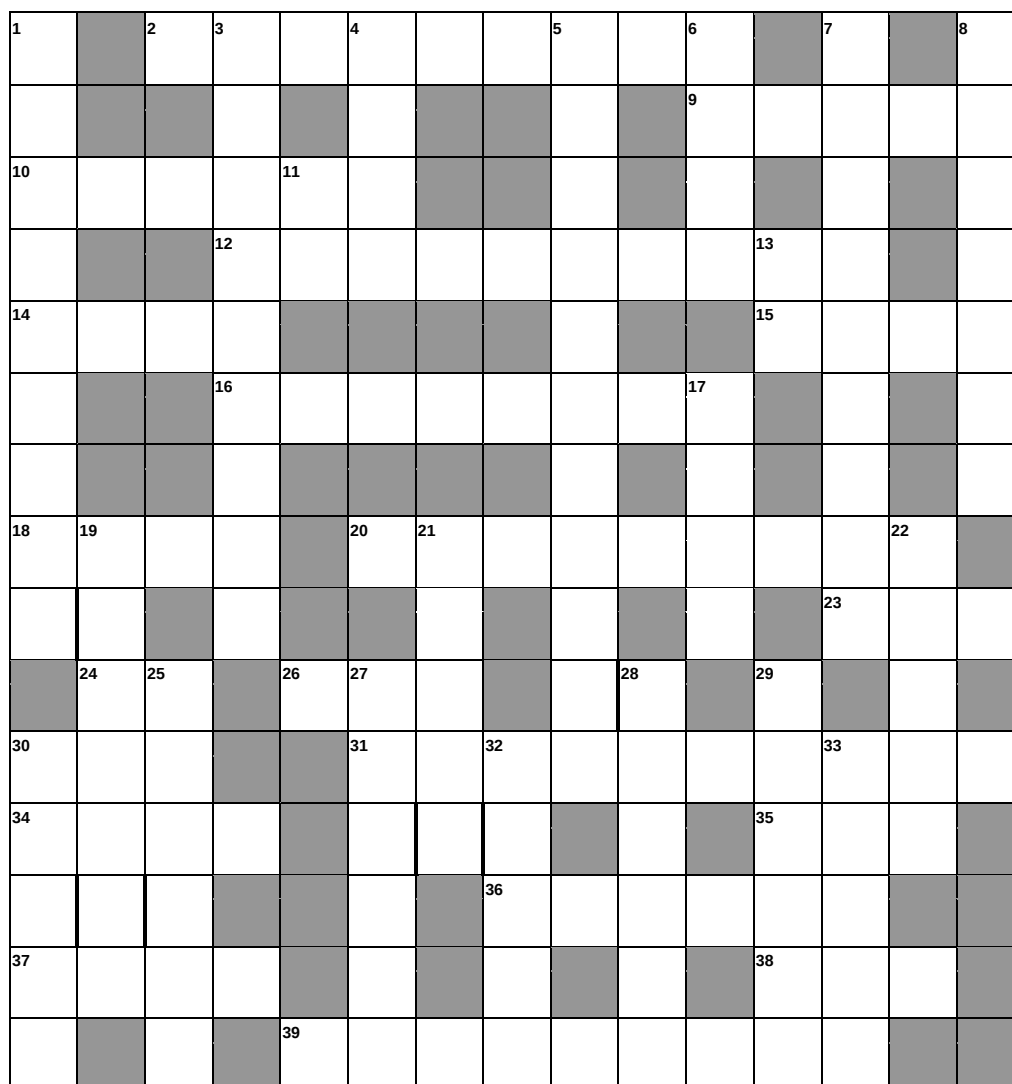
ACROSS

- 2 Description of leaf a spicy herb consumed? (9)
- 9 Muttering on stage as plant starts aching stiffness of joints. (5)
- 10..Item of clothing perhaps worn by botanist when collecting *Rubus*. (6)
- 12 See 1d.
- 14 Phenomenon occurring in Maharashtra (India) during monsoon, and very good for plants. (4)
- 15 Where one might find *Cocos nucifera* etc. growing in a tolerably halophytic environment. (4)
- 16 Alga found from Greenland (icy!) to latitudes nearer the equator, perhaps (Phaeophycophyta) (8)
- 18 Fruit that are slightly mad or hard cases. (4)
- 20 Crush a *Ulex* with agony; 'E's been got rid of with saxitoxin poisoning, and is bioluminous! (Dinophyceae) (9)
- 23 Receptor found in comfrey emerging from soil. (3)
- 24 First pair of 20a depart. (2)
- 26 Not this if 14a, or in sundry other meteorological conditions. (3)
- 30 Useful gas supplied by fairy godmother perhaps. (3)
- 31 Lazy O₂ ne'er stops a harmful photon – until it is rearranged. (5, 5)

- 34 Island in Forth that's not very long. (4)
- 35 Liquid refreshment obtained from *Saccharum officinarum* in three ways! (3)
- 36 Nitrogen oxides found in a "99" perhaps, but certainly not in 31a. (6)
- 37 Grave discovery in lethal, airless environment. (4)
- 38 Brief nomination of University College London. (3)
- 39 Marion may name alga (*Phaeophycophyta*) (9)

DOWN

- 1 and 12a. Exasperated by the absence of Ed, I train gaga alga to be source of carrageen (*Rhodophycophyta*). (9, 10)
- 4 and 3d. A sum worked out by old physicist yields important banana cultivar, now threatened by pathogenic fungus. (4, 9)
- 5 Composite ox first, then King of Arms follows unsteadily to find an ancient plant in an Aberdeenshire village. (*Psilophytales*) (11)
- 6 Flower I adore concealing orchid. (4)
- 7 Cheap tea I stirred to reveal liverish group pf plants. (9)
- 8 Can this plant I hold in esteem be liable for cultivation as an antihelmitic? (*Myrsinaceae*) (7)
- 11 Former spouse, half of Holly. (2)
- 13 Thanks for a tantalising atom! (2)
- 17 Plant depicted back to front in mural. (4)
- 19 I urge an alternative to medicinal squill. (*Liliaceae*) (7)
- 21 My lazy roommate holds back cereal. (5)
- 22 Wooden vessels taken from ancient Greek. (5)
- 25 Male, reproductive family type? Appears so at root. (6)
- 27 Scrambling plant overrunning railway may aid devotion. (6)
- 28 I enter bird to fly from nasty narcotic. (6)
- 29 A thousand Romans come after *Rubia* salad -- for a meal? (6)
- 30 Sounds like I will walk to the altar. (5)
- 32 Alright, end with a constant, circular track of an African antelope. (5)
- 33 Sounds like: "Why abbreviate University application form to find desert plant? (*Agavaceae*) (5)



A SHORT FLORA OF BERWICKSHIRE

By Michael Braithwaite

This hardback book to be published privately in October 2014 will be of 432 pages liberally illustrated in full colour with photographs and distribution maps. English names for the wildflowers are shown alongside the Latin names throughout the book. The page size is 18 x 24.5 cm to allow the book to be handled comfortably.

The main sections are (i) an illustrated botanical tour of Berwickshire, (ii) full species accounts for a selection of 415 species, including 1x1km distribution maps in a variety of formats showing the historical records as well as recent records and (iii) a full checklist for 1,573 species and other taxa with status, habitat and 1km frequency.

Further sections cover the history of botanical recording in the county, various aspects of recent change in the flora and supplementary analysis. As Berwick upon Tweed does not fall in Berwickshire its flora is discussed in a separate section.

The Botanical Society of Britain and Ireland has arranged grant assistance enabling the cover price for this limited edition book to be set at £20 plus £5 post and packing. To avoid disappointment please order early. A flyer with order form is available on the BSBI website under Berwickshire, or just send a cheque made out to me, as below.

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FROM A BOOK TO BEYOND

During ten years studying at the University of Aberdeen, as well as undertaking field trips in the tropics and subtropics, I became aware that people are usually only taught about plants from their respective areas. This of course makes sense, you learn about the plants which grow in your area.

I remember nearly 10 years ago as a first year undergraduate student at the University of Aberdeen going on the annual first year fieldtrip to Aberdeen's field centre at Bettyhill in Sutherland. A lovely part of Scotland which holds much for any budding botanist as it has an unusual flora - montane plants growing near the coast. It was organised and taught by the former Regius Professor of Botany Professor Ian Alexander, who had run it for many years and he had an intimate knowledge of the local Sutherland flora combined with anecdotes about the local history, which brought everything to life. We learnt the local flora quite thoroughly and other students, as well as myself, were happy that most of the time we could put a name to a species. A few days later upon returning to Aberdeen and walking around the university Cruickshank Botanic Gardens, with plants growing from around the world, I felt a little dejected that very little seemed familiar.

Once you go new areas the plants change, exotics also complicate things, and learning new floras and individual exotics takes time and sometimes requires some knowledge of the world's flora and general plant classification. Local floras and field guides often have an outdated taxonomy, contain only the most common native plants and/or are geared for the specialist, which can make it daunting and confusing for the beginner. In addition, the increasingly lack of traditional botany being taught at universities in the UK means the skills gap is widening.

When I began my PhD at the University of Aberdeen, and based primarily at Royal Botanic Gardens Kew, I wanted to broaden my botanical knowledge, and thought teaching was the only way. In 2010 I ran a plant identification course at the University of Aberdeen which was due to be spread over ten workshops involving a combination of short lectures and flower dissection sessions with notes provided. Unfortunately, the course was cancelled after four workshops due to poor health. I promised the participants that I would provide the remaining notes for the cancelled workshops and bind them together. Many (!) months later I completed the notes in the form of a 'book'. This preliminary manuscript, for me at least, was a beginner's guide to the world's flora and how to navigate it. I had wandered widely in Kew looking at the strange bits and bobs of the plant world adding further notes, images and developing synoptic keys to all flowering plant families.

I ran and organised further courses at the University of Aberdeen in 2011, with help from Greg Kenicer, the Head of Education at the Royal Botanic Garden Edinburgh, and in 2012 with help from Mark Paterson, the Curator of Cruickshank Botanic Gardens at the University of Aberdeen. Each year the courses attracted around 45 participants ranging from undergraduate and postgraduate students to university technicians and staff. The content and keys of the book were tested during these courses and feedback from participants was crucial to what the book was becoming. I settled on an e-version as its main outlet to make it more practical in the field and useable. With further revisions and advice over many months it now contains accessible botanical information about the world's plant families and much of its generic diversity.

The book, called 'The Flowering Plants Handbook', helps anybody with basic botanical knowledge to identify flowering plants to family and genera in a few 'easy' steps. Some plants will be identified correctly

quickly, whilst others may require some retracing of steps and take a little more time. The advantage of this book is that it helps the user learn about the classification system and plant diversity anywhere in the world during the identification process making plants more accessible than ever.

James Byng
Director of Plant Gateway
Honorary Research Fellow, University of Aberdeen

The book is available to buy and download from www.plantgateway.com for £10

TRAMS AND *RESEDA LUTEOLA*

While travelling on the new Edinburgh tramway on its first day I noticed large quantities of *Reseda luteola* (Resedaceae), starting at a point between Balgreen and Bankhead tram stops and continuing to the Airport terminus. *R. luteola* is a plant that I remember well from my schooldays in Essex, but I have rarely if ever seen it in Scotland, and certainly not in such quantity, so I returned for a closer look. It seems to be entirely confined to waste ground that was disturbed during the construction of the tramway, and is rather unevenly distributed. It is scarce (but not absent) on land that looks to have been deliberately seeded with grass, and thrives on stone ballast in a depression between the tramway and the railway near Bankhead tramstop and also in dense grass at Ingleston Park & Ride tramstop. It is even present in a few places in the Edinburgh Park commercial area despite the nearby ground being cultivated as a lawn. There are widely distributed patches several square meters in extent where it could be described as the dominant or co-dominant species.

Aerial photography would have been the best way to estimate the population, but unfortunately my helicopter was in for servicing, so I counted the plants in areas measured with a knotted string at Ingleston Park & Ride tramstop, where the density of plants appears on casual inspection to be typical of fairly densely populated areas along the tramway. I calculated a mean density of about 0.6 plants m⁻². This estimate is not statistically reliable since the variation was great, the sample was small and my sampling technique crude. However, it would

suggest a population of several thousand plants along the whole tramway, which agrees with my subjective impression when looking out of the tram.

Stace states that *R. luteola* is found on 'open grassland, disturbed, waste and arable land mostly on base-rich soils; throughout most of BI' including south-east Scotland. *Plant Life of Edinburgh and the Lothians* states that it is local but widespread in parts of the Lothians, and J. Muscott (1989) stated that it is on old shale bings in West Lothian. I suspect that its seeds may have been brought with bing shale used as a foundation for the tramway, and the plants may have been growing there for several years.

I have gleaned from the Internet that its seeds weigh about 2.2×10^5 g, that they must germinate on the surface of bare soil if they are to survive, and that they are viable for not more than 3-4 years in the soil. When the shale was dumped the vast majority of seeds would surely have been buried too deep to germinate. The area between Balgreen and Bankhead has been residential for many years, and the tramway runs along a low embankment between the railway and a road. Elsewhere, in places where *R. luteola* is also now present, embankments were not necessary. At Ingliston Park & Ride, and I think in other places, it is growing in dense grass about 30-40 cm. high, through which cover the soil cannot be seen at all. How do its seedlings survive? It is absent from vegetationally similar rough verges that I know elsewhere in Edinburgh.

At present most of the land around Ingliston Park & Ride is arable, but there are indications that the area will become a building site quite soon. I guess that the present high density of *R. luteola* may decline rapidly, but it may persist in some places for quite a long time. Botanists may wish to monitor its status in forthcoming years, and I hope they will find this note useful.

Reference:

Muscott, J. (1989). *A Checklist of flowering plants and ferns of West Lothian*. BSS. This and *Plant Life of Edinburgh and the Lothians* are in the RBGE Library.

There now follows the second version of Trams and *Reseda luteola*. It should be recited with one's tongue placed firmly in one's cheek!

The trams are here! They've come at last.
Let's now forget the fractious past,
The blame and counter-blame, the spats,
The arguments and tit-for-tats;

Now let us set all that aside,
Now venture forth, eager to ride
In heavenly car so smooth to glide
With grateful passengers inside –
Did I say car? No! Chariot of fire
Conveys us at our heart's desire.

I step aboard the wondrous tram
And take my seat, wherein I am
Enthronèd as I were a king.
Delightful tram, thy praise I sing!
Transport of delight, take me to Bankhead
Or bear me heavenward instead.

And as I speed to heaven let me not forget
The tram brings in its train the lovely mignonette,
Reseda luteola, that yellow dyestuff yields,
And grows beside the tramway in narrow grassy fields.
Whence came the fair *Reseda*
That grows where trams may glide?
Did it buy a ticket
Or did it hitch a ride?

I think it came from Philpstoun,
From ancient oil-shale bing,
And when men brought the old shale
Its seed they too did bring.

So let us praise the tramway
That distributes the seeds
Of mignonettes and other flowers,
Not nasty, noxious weeds!

Roger West

SCOTLAND'S NATIONAL PEATLAND PLAN

More than 20% of Scotland is covered by peat. Our peatlands make a major contribution to our landscape, and define the wild character of much of northern and western Scotland. But peatlands occur throughout the country, with many bogs and fens just a short distance from most of our towns and cities.

However, these areas contribute much more than dramatic scenery or green oases in our industrial heartland. As stores of carbon they are supremely important in helping to tackle climate change; as homes for nature they are special and unique; and as the raw ingredient of rural farming, tourism and crofting they are vital.

They are also places where archaeological remains can lie preserved for hundreds, or even thousands, of years. Many other benefits flow from them, especially where they are in good health - clean water, lower flood risk, beautiful landscapes, and other defining characteristics of wild Scotland.

Some of the uses are distinctively Scottish - including the contributions of peat to the whisky industry and as a traditional fuel where trees were scarce. Scottish Natural Heritage (SNH), working with Scottish Government and a range of stakeholders, has drafted a National Peatland Plan to highlight the importance of our peatland. SNH draws attention to the poor state of large areas, and proposes building on existing initiatives to secure their sustainable use, management and restoration.

SNH also sets out some proposals for research and awareness-raising. To achieve these objectives SNH needs the help and support of all those with an interest in ensuring that our peatland is managed as a national asset which benefits society as a whole.

So whether you own or manage an area of peatland, represent others who do, or simply enjoy their open spaces, their wildlife or their tranquillity, SNH is seeking your views on this draft Plan in a consultation running till Friday 12th September 2014. You can see the Consultation paper on the SNH website:

<http://www.snh.gov.uk/docs/A1306595.pdf>.

BOTANICAL NOMENCLATURE TRAINING COURSE, ROYAL BOTANIC GARDENS, KEW



The Royal Botanic Gardens, Kew is organizing a one week Botanical Nomenclature course from 26–30 January 2015. The course is part of the Distributed European School of Taxonomy (DEST) Modern Taxonomy Programme and is aimed at postgraduate students and early-career researchers in taxonomy.

Programme

Taught by Kew specialists with extensive practical experience, the course looks in detail at the essential principles of plant nomenclature according to the Code of Nomenclature for algae, fungi and plants (ICN). By the end of the week, participants will be able to apply good nomenclatural practice when undertaking taxonomic revisions, compiling checklists etc. This will be achieved by lectures illustrated with examples from the ICN, workshop sessions applying what has been learned to “real life” cases, and by encouraging participants to discuss nomenclatural problems they have encountered.

Duration and location

The course runs from Monday–Friday for one week: classes are taught in Kew’s Herbarium, Library, Art & Archives (situated next to the Main Gate to the Gardens); about 15 minutes’ walk from Kew Gardens Underground station (District Line/London Overground) and 10 minutes’ walk from Kew Bridge station (South West Trains).

Course costs

The course fee for non-Kew staff is 600 euros: this covers teaching costs and course materials; funds for travel to Kew and subsistence must be sought elsewhere.

Applications should be made by 10 OCTOBER 2014 using the registration form on the DEST website:

<http://www.taxonomytraining.eu/content/botanical-nomenclature-3>

Further information and copies of this poster can be obtained from the course coordinator: Katherine Challis (k.challis@kew.org).

CROSSWORD SOLUTION

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BSS NEWS – INFORMATION AND GUIDELINES FOR CONTRIBUTORS

The Newsletter of the Botanical Society of Scotland
ISSN 0967-5922

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Aims of BSS

The chief aims of BSS News are to communicate with the membership, to keep members informed and to act as a vehicle for members' contributions on all things botanical. By these means members can keep in touch with each other. There is also a further aim of providing interest, entertainment and stimulation for BSS members. Sometimes this may involve contributions from non-members. All contributions are welcome.

Scope of the newsletter

The content of BSS News is as kaleidoscopic as possible around the botanical theme and we are keen for this variety to continue. For a list of ideas for contributions see the BSS website (www.botanical-society-scotland.org.uk) and the following list, but please don't feel constrained by it. New ideas are welcome. Regular contributions include the following items:

- Reports of field excursions (leaders please take note) picking out the botanical highlights.
- Descriptions and recommendations of other botanical sites in the UK or abroad. (It might help people to plan their holidays.)
- Articles of current or historical interest, including ethno- and archaeobotany.

- Biographical profiles of botanists.
- Botanical poems.
- Botanical notes, news items, announcements of future events, reports of meetings attended, correspondence, small ads., etc.
- Book reviews.
- Crosswords and quizzes.
- Illustrations, including paintings, photographs and line drawings (the latter to be in black ink on white paper). Subjects could include plants, habitats, people, events, or even witty cartoons if they are your forte!

Guidelines for contributors

Don't worry if you cannot comply with all of the following guidelines. Just send what you can and the Editors will make adjustments.

File name for email submissions and web uploads

Please include your own name and indicate article content in the file name. Also add your name, preferred title and affiliation etc. to the end of your article.

Text

The Newsletter is set up on a PC and saved as a document in MS Word 2010. Although it is printed on A5 pages it is set up on A4 pages using Arial font (size 15 for major text, 18 for main headings and 14 for acknowledgements and references). Margins are set at 2 cm (sides), and 2.5 cm (top and bottom), with headers and footers at 1.5 cm. Text is justified and single-spaced.

Text figures

Illustrations for the text can be line drawings, maps or graphs in black ink on white paper. Black and white photographs can also be reproduced. There is no colour reproduction in the text. Hard copy or digital images can be accepted.

Cover pictures

The cover is the display area for colour pictures (paintings, photographic prints or digital images). Original artwork will be returned to the author after careful use. Please ensure (and indicate in your correspondence) that you have appropriate copyright permission and permission from any people in photographs for publication in BSS news.

Submission

Please send your contributions to the Receiving Editor in any of the following forms:

- 1 E-mail attachment. This is the preferred option but, if you have many images, please send the images on a CD.
- 2 CD.
- 3 Hard copy (computer print-out and original artwork).
- 4 If you have no access to a computer, a typewritten or handwritten manuscript will be acceptable.
- 5 Through the template on the BSS website: <http://www.botanical-society-scotland.org.uk/content/bss-news-newsletter-botanical-society-scotland>.
- 6 If you are not a BSS member receiving the BSS News then please send a postal address to receive your complimentary copy of the newsletter.

Send email with text and photographs to: jill.thompson99@gmail.com.

For emailed pictures, please add the name of the photographer and the subject to the file name of the photograph. For photographs in articles, please add information and the credit to the photographer at the end of your article.

Send hard copy and CDs by post to:

Dr Jill Thompson
C/O Botanical Society of Scotland Newsletter
Royal Botanic Gardens Edinburgh
20A Inverleith Row
Edinburgh
EH3 SLR

When sending something by post please phone 0131 258 2358 or email jill.thompson99@gmail.com to let Jill know something has been posted.

The LAST deadline for the next issue will be 15th January 2015. Earlier submission would be appreciated.

Back cover pictures

Inside

Top left: Filipendula, Giant meadowsweet. See article on page 9. Photo by Liz Lavery

Centre left: Sedum acre, Wall Pepper, at North Berwick. Photo by John Grace.

Bottom left: Allium ursinum, Ransoms, at the Hermitage, Edinburgh. Photo by John Grace.

Top right: Plantago coronopus, Buck's-horn Plantain, at North Berwick. Photo by John Grace.

Upper centre right: Smyrniolus olusatrum, Alexanders, at Yellowcraig Sands. Photo by John Grace.

Lower centre right: Montia sibirica (a North American Alien) at the Hermitage, Edinburgh. Photo by John Grace.

Bottom right: Quercus robur, Pedunculate oak. Photo by Dave Stokes.

Outside

Photos by Ewan Cole

Top left: Calendula officinalis taken at Kew Botanic Gardens

Top right: Triglochin maritima taken at Tentsmuir Beach, Fife.

Upper centre left: Lythrum salicaria taken at Inverleith Park.

Upper centre right: Ophrys apifera taken at Easingwold, Yorkshire.

Lower centre left: Verbascum phlomoides taken at Down House, Kent

Lower centre right: Viola lutea taken at Kingussie, Aviemore

Bottom centre left: Chris and Julias Wild Salad © Chris Jeffree.

Bottom centre right: Tramella mesenterica taken on Blackford Hill, Edinburgh



