

New plant taxonomy forum highlights information challenges for horticulture

Delegates from around Europe assembled at Wisley in April for the first ever European Cultivated Plant Taxonomists Forum.

The three-day event was jointly hosted by the RHS and the Cultivated Plant Taxonomy Group (Hortax), a body of professional taxonomists with members from various European institutions.

“This is an important first step in bringing together knowledge of cultivated flora and providing a Europe-wide focus for discussion,” said RHS Principal Scientist and chairman of Hortax James Armitage. “Taxonomic research tends to concentrate

on the 400,000 or so species of flowering plants known in the wild. In the UK alone, we believe we have around the same number of cultivated taxa, but the research resources by comparison are tiny.”

Linking together online sources of information on garden plants was a central topic at the new forum. James believes nomenclature is the key to this process.

“Plant names will be the organising principle in any future projects to consolidate what we know about cultivated plants. Kew’s ‘The Plant List’ provides a basis for the 2002 Global Strategy for Plant Conservation, but

there is nothing similar for garden flora. So sorting out the confusion of names and synonyms under which cultivated taxa are currently traded and studied is essential to bringing together our scattered knowledge of garden plants.”

As well as questions of nomenclature and taxonomy, sessions at the forum covered the difficulty of funding taxonomic research, a study of the Spanish garden flora, and Kew’s online database resources. All the presentations can be viewed on the Hortax website (www.hortax.org.uk/european-cpt-forum.html). ♦



Taxonomy in action: Blooms of Bressingham’s *Geranium ROZANNE* (‘Gerwat’), Chelsea Plant of the Century, has worldwide sales of over 12m and a grant of Plant Breeders’ Rights (PBR). In 2010, after a seven-year licensing dispute, DNA and morphological research suggested there was little difference between this cultivar and ‘Jolly Bee’, distributed by Van Noort. As a result, trading in ‘Jolly Bee’ ceased. Thus a taxonomic distinction had significant commercial consequences for the two companies involved.



Giant leap for RHS as schools prepare to boldly sow

Thousands of UK schools are expected to take part in the Rocket Science project, launched at this year’s Chelsea. The UK Space Agency has joined with the RHS to send 2kg of rocket seeds into space, as part of Tim Peake’s mission to the International Space Station (ISS). On returning, the seeds will be sent to participating schools along with batches of seed that have stayed on Earth, and a series of experiments will be conducted to see how space travel affects germination and plant growth.

Photos: Hannah McKay (seeds); Tim Sandall (geranium).

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News in brief

Unusual invertebrates, bad news for English wine-makers, and a surge in reports of the latest threat to UK box hedges

Story has legs

A specimen of the Mediterranean banded centipede *Scolopendra cingulata* was received for identification by RHS Gardening Advice in April. It had been discovered while the enquirer was repotting an olive tree.

Usually found under rocks or in loose soil, this centipede is widespread in the Mediterranean. The specimen received was the Sicilian form, which is characterised by blue legs and a dark band along the dorsal surface. Like most species of centipede, *S. cingulata* is venomous, although less so than some others in the genus. At approximately 5cm, the specimen was a juvenile, but the species can reach 15cm when fully grown.

“Most olive plants sold in the UK originate in Sicily, so the centipede was probably a stowaway,” says RHS Principal Entomologist Andrew Salisbury. “It requires a southern European climate, and wouldn’t be able to survive out of doors in the UK.”



A juvenile Mediterranean banded centipede (*Scolopendra cingulata*) was received for identification by RHS Gardening Advice in April. The adult can reach 15cm when fully grown. Photo: Anna Platoni.

New threats to UK grapevines

The discovery of four new viruses on UK grapevines contributed to viruses securing 10th place in the top 10 plant diseases reported in 2014. The two most damaging are *Grapevine virus A* and *Grapevine leafroll-associated virus 1*, transmitted by mealybugs and scale insects. These viruses have the potential to affect the UK’s developing grapevine industry, though there is no evidence that they have spread to commercial vineyards as yet. The problems caused by the viruses include leafroll disease, stem pitting and fleck disease.

The four viruses have been reported in new papers by RHS pathologists (see p.8), and the news has also attracted media coverage. Said RHS Head of Plant Health Gerard Clover, writing in the industry journal *The Grape Press* in April, “The discovery of four grapevine viruses not previously reported in the UK during an initial survey suggests there is no room for complacency. These



Symptoms of grapevine leafroll disease (inter-veinal reddening and downward rolling of leaf margins) on cultivar ‘Queen of Esther’ at RHS Garden Wisley. Photo: Gerard Clover.

viruses have the potential to spread and cause damage to the UK’s developing grapevine industry.”

Current RHS advice is for commercial vineyards and gardeners to be aware of the risk and to use only plants that are certified as being virus-free, in the hope that by introducing control measures now, the industry may be able to avoid significant losses in the future.

The developments will be discussed in September when Dr Clover attends the 18th Conference of the International Council for the Study of Virus and Virus-like Diseases of the Grapevine (Ankara, Turkey). ♦



Giant leap (cont.)

Organised as part of the RHS Campaign for School Gardening, with 4,000 schools already signed up, the primary aim of the project is to introduce

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students to structured scientific methodologies and the science behind horticulture. The rocket

(*Eruca sativa*) seed will remain on the ISS for at least three months. With the batches of ISS and control seed, schools will receive protocols for the core experiment, as well as information packs, posters and instructions for data collection. Schools will then upload their captured data to an online interface. The RHS will process this information and disseminate the results of the experiment. Material will also be provided for extension activities,

with topics including mutation and sustainability in space.

RHS Science has provided support with the experiments, the choice of plant and interpretation on the stand at Chelsea (above). The exhibit itself attracted a great deal of interest from visitors, VIPs and national media. Although the RHS's own stands are not eligible for awards, it was considered gold medal standard by the judges.

“We’ll be continuing to support the project scientifically,” says Director of Science & Collections Alistair Griffiths. “It’s really exciting to be working with the RHS Campaign for School Gardening and the UK Space Agency to help towards inspiring the next generation of horticultural scientists.” ♦

Snail fail

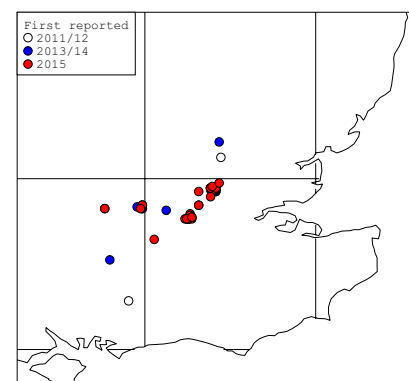
In December 2014 snail expert Tom Walker visited the Glasshouse at Wisley to record its snail population, and a report of his finds was recently received.

Five species of snail were recorded: *Kaliella barrackporensis*, *Hawaiiia minuscula*, *Discus rotundatus*, *Physella*

acuta and *Cornu aspersum*. The first two species are “hothouse aliens”, and *K. barrackporensis* (native to India and Madagascar) has only previously been recorded in the UK at the Eden Project, where the population is now thought to have died out. To confirm

Increasing reports of box tree moth

The non-native box tree webber was the most frequent enquiry for the Entomology section in May 2015, with 34 reports of caterpillars. This has doubled the number of reports since caterpillars were first found in private



gardens in 2011. Most of the records were from south-west and east London, with a few from the home counties. This moth is now firmly established and causing serious defoliation of box plants in these areas. Most of the reports have come from non-members via an appeal on the website (rhs.org.uk/advice/profile?pid=760).



Photos: RHS / Hannah McKay (space exhibit); RHS / Andrew Halstead (box tree webber).

Science staff news

Hayley Jones

Hayley Jones joined the Plant Health team in February as an Entomologist. Hayley recently completed her PhD on the dispersal ability (i.e. the capacity of individuals and populations to spread) of noctuid moths at Rothamsted Research in collaboration with the University of York.



Her PhD involved field work, moth identification, and studies of moth flight under different conditions in

the laboratory, culminating in statistical modelling of the relationship between morphology and flight.

Hayley also completed a research internship with the Laboratoire d'Écologie Alpine in Grenoble and has developed her skills in science communication and public outreach through her activities as a STEM (Science, Technology, Engineering and Mathematics Network) ambassador.

Yvette Harvey

Yvette Harvey (usually known as Tivvy) started with the Horticultural Taxonomy team in February as Keeper of the Herbarium (WSY), replacing Chris Whitehouse, who left last year. She joins the RHS from RBG Kew, where she worked as a curator and researcher

for almost 30 years, latterly as Deputy Manager of the Wet Tropics of Africa team.

During Tivvy's time at Kew she gained a Master's in Museum Studies and taught collections management, preventative conservation and global plant-collecting on Kew's International Herbarium Techniques course. She also worked on the move of collections into the new E-Wing at Kew. This experience is expected to be particularly useful in the transition to the new Hilltop buildings for science and learning at Wisley.

Tivvy has made numerous field trips to Africa, and has published conservation checklists for Cameroon. She has also conducted vegetation surveys within the region and helped build

new national herbaria. One of her first publications was in *The Plantsman*, and she has since published papers



in the *Kew Bulletin*, as well as contributing to various floras.

"I am very excited to be joining the WSY team," says Yvette. "I'm really looking forward to the challenge of rehousing our current herbarium, alongside strengthening it as the world's premier collection of pressed cultivated plants." ♦

Photos: © Paul Little (Tivvy); RHS / Anna Platoni (Hayley).

Ron Hedge stands down after 23 years

Earlier this year, after more than 20 years of working as a volunteer on the Dahlia Register, Ron Hedge decided to stand down as Hon. Assistant Dahlia Registrar.

In that time he worked on 26 supplements to the Register, as well as helping to process registrations and serving on various RHS trials assessment groups. As reported in issue 20, his work was recognised in 2014 by the award of a National Dahlia Society (NDS) Silver Medal for outstanding service in promoting dahlias worldwide, while in 2013 he received a medal from the International Society for Horticultural Science for his contribution

to international cultivar registration. Ron is also a qualified NDS judge, and has grown and shown dahlias himself for many years, including 'Grange Prélude'. He was recently made a Vice President of the American Dahlia Society.



Said Head of Horticultural Taxonomy John David, "Ron has been a tremendous support to the Society in acting as an assistant to RHS Registrars over the years and encouraging dahlia growers and breeders to register their plants. His knowledge not only of dahlias but also of the people involved has been invaluable. In his thoroughness and attention to detail Ron has been a great asset to the Register and we will miss his cheerful presence in the Library." ♦

Ron (seen here on the far left) assessing dahlias during an RHS trial. Photo: Anna Stankiewicz.



The new Greening Grey Britain display at RHS Garden Wisley, which shows how a green space can accommodate hardstanding for parking. Photo: Richard Sanford.

RHS research gets Britain greening

RHS scientific research and advice underpins the new Greening Grey Britain report, launched at this year's RHS Chelsea Flower Show.

Highlighting the continuing loss of front gardens and plant cover to paving and parking space, the report presents ways in which gardeners can help to reverse the trend by planting hedges, climbers, and container plants, as well as making room for greenery in unused corners. The RHS believes this will not only improve the nation's health, but also benefit wildlife, protect against flooding, and mitigate the effects of pollution and climate change.

The report draws on research by the Horticultural & Environmental Science



Left. The report draws on RHS research into plants which mitigate the urban "heat island" effect, such as *Stachys byzantina*. Photo: Carol Sheppard. Right. Wren chick. The loss of front gardens means there are fewer places for birds to nest and find food. Photo: Mike Ballard.

team into ecosystem services and the benefits plants provide, and in particular on the work of RHS Principal Scientist – Horticulture Tijana Blanuša's team at Reading. These services include regulation of temperature and humidity, and insulation of buildings (see issue 23, p.7).

"For the first time, the balance has tipped towards less than 50% of front gardens being 'green,'" says Principal Horticultural Advisor Leigh Hunt. "Hard surfaces absorb heat during the day and release it during the night. This is part of the 'heat island effect', which can also contribute to poorer air quality." Hard surfaces also increase run-off during storms, and aggravate subsidence by reducing water absorption.

"RHS research has made a big difference to our scientific understanding of why gardens are good for our towns, cities and villages. This new campaign builds on the work that began ten

years ago with the first 'Front Gardens' report and continued with 'Gardening Matters: Urban Gardens' in 2011. Now members and public are being asked to pledge to reduce 'grey' and increase 'green' by telling us what they plant."



As well as planting tips for those who want to create green spaces, the report and website page (rhs.org.uk/ggb) include design solutions and advice on materials where the only option is to retain some hard surfaces. The campaign will continue with a Science and Communities garden at Hampton Court Palace Flower Show, to show the difference between a "grey" street and its "green" alternative. ♦

New developments in registration and horticultural taxonomy

The benefits of cultivar registration are increasingly being recognised around the world. Here we look at two regions where RHS registrars have widened their reach.

A first orchid hybrid from Chile...

Recently RHS International Orchid Registrar Julian Shaw received the first ever application to register a hybrid from Chile.

Headed by Prof. Gabriela Verdugo and Mauricio Cisternas at the Jardín Botánico Nacional, El Salto, Viña del Mar, a group of researchers have been working to produce new terrestrial hybrids suitable for a cool temperate climate using native Andean orchids. They crossed *Chloraea crispa* with *Gavilea longibracteata* to create the new hybrid genus

× *Chlorogavilea*, and have given their plant the grex epithet *Máxima*.

The new hybrid would be suited to alpine house culture in the UK. It grows 60–70cm high, and produces a spike of 18–20 flowers.

“This is a particularly interesting development,” says Julian. “Chilean plants are a very important component of UK horticulture, particularly in the SW of Britain. Spectacular terrestrial orchids to go with the other Chilean introductions would be a welcome new

dimension in our gardens.”

He attributes the previous absence of Chilean registrations to the climate. “Chile is very dry and hot to the north, and cool and wet to the south, whereas Brazil with the Amazon region has a much more orchid-friendly climate.”

The FIA–Chloraea Project (as the enterprise is known) hopes to introduce another three new hybrids next spring. ♦

Photo: Gabriela Verdugo.

...and a first Chinese clematis registration

As reported in issue 20, the last few years have seen a burgeoning of lily breeding in China, using imported Dutch expertise for techniques such as embryo capture. However, although China is also home to many of the clematis species used in breeding new (particularly large-flowered) garden varieties over the past 150 years, the only Chinese cultivars named so far are those raised in the West from material collected there, such as ‘Bells of Emei Shan’ and *C. montana* ‘Peveril’. That is, until now.

Last month a selection raised from *C. courtoisii* seed, wild-collected from Zhejiang Province, was registered as ‘Daiyu’ by the Jiangsu Province Institute of Botany and Chinese Academy of Sciences in Nanjing. *C. courtoisii* is a close relative of *C. florida*. “Considering its great beauty, it has been surprisingly slow to feature in cultivation in Europe,” says International Clematis Registrar Duncan Donald. “Ton Hannink in the Netherlands recently started hybridising it, however, for example raising ‘Seena’.” ♦



Rare viewing of major German rhododendron collections

In May the International Rhododendron Registrar was invited by Karl and Latchmin Hübbers to visit their garden in Kranenburg, Germany, and study the many elepidote rhododendron and deciduous azalea cultivars they have raised in situ.

This collection is remarkable for the number of plants that consist of different grafted elements on the same plant, a technique used here in part as a space-saving device. The Hübbers also grow some rarely seen species, including *R. maoerense*, with almost greyish lavender-coloured flowers, as well as a large collection of *Kalmia* cultivars, of which Karl is the world-leading breeder.

Studying their collection of rhododendron literature also provided the Registrar with a mass of data on many previously unrecorded German and Polish cultivars, all of which will be added to the Checklist.

In addition this visit presented an opportunity to meet the pre-eminent German rhododendron scholar Walter Schmalscheidt and to see the magnificent rhododendron collection at Bad Zwischenahn for which he was responsible for many years. The collection holds about 2,000 species and cultivars and is exceptionally rich in older selections. Mr Schmalscheidt was a key contributor to the 2004 *International Rhododendron Register and Checklist*. ♦

New Reading PhD takes forward long-term RHS *Narcissus* project

In January, Jordan Bilsborrow began the second PhD project on *Narcissus*, funded by the RHS and the University of Reading, and supervised by Dr Alastair Culham (Reading) and Dr John David (RHS). This is part of the RHS's work towards a long overdue monograph of the genus.

Jordan graduated in 2014 from Edge Hill University, Lancs, following which he worked as a research assistant at the university on a project using leaf section data to separate the UK taxa of sedges in the genus *Carex*. Jordan also worked as a volunteer at The University of Manchester Herbarium where he got a taste for taxonomy.



Jordan's research is concentrating on the sections *Jonquillae* and *Apodanthi*, and he has already conducted fieldwork in Morocco to sample two Moroccan endemic taxa, *N. rupicola* subsp. *marvieri* and *N. rupicola* subsp. *watieri*, within section *Apodanthi*. He also collected other *Narcissus* species from the High and Middle Atlas Mountains from sections *Tazzetae* and *Bulbocodii*. The specimens collected will be used in molecular analysis. He is now completing laboratory training which will enable



N. rupicola subsp. *watieri*, in situ in Morocco (above) and from nursery stock (left). Photos: Jordan Bilsborrow (Morocco), Tim Sandall.

him to analyse the specimens, and will be using techniques developed in the previous PhD project completed by RHS botanist Kálmán Könyves, concentrating on section *Bulbocodii*.

Over the summer Jordan will use markers designed at Reading to test if they are capable of successfully identifying a wider range of *Narcissus* cultivars. He also plans to collect specimens of the autumn-flowering *Narcissus viridiflorus* (section *Jonquillae*) later this year, after sourcing funding. In the meantime Jordan is immersing himself in the literature and checking herbarium material. ♦

In April, as part of the Fellowship* programme, RHS Horticultural Scientist **Gracie Barrett**, RHS Head of Horticultural & Environmental Science **Paul Alexander** and **Neil Bragg** (ex-chair of the Horticultural Development Company) visited fellow researchers at the universities of Arkansas and North Carolina. RHS Science spoke to Gracie and Paul about the trip. Photos: **Paul Alexander**.

What was the purpose of the trip?

The main reason was to discuss and learn about the processes and methodologies American researchers are applying to growing media research in order to further improve our own research. We were also keen to discuss opportunities for future collaborations and visit American nurseries and media manufacturers to better understand their commercial production pressures.

industry operates on a much vaster scale than in the UK. Not many researchers are working on growing media solutions for industry and gardeners over here; there are many more in the US.

Chippings with everything: growing media in the USA

Why did you visit these particular universities? Both have substantial horticulture departments, with 100+ plant science students, and Paul had already met Prof. Michael Evans (Arkansas) and Asst Prof. Brian Jackson (North Carolina) at conferences. Both are leading horticultural growing media researchers in the US.

In terms of growing media, the US

Do US researchers have the same interest in peat alternatives? Most growing media in the US market tend to be wood-based, primarily composted or aged barks. There is some use of Canadian peats, but generally they're considered too expensive due to the associated haulage costs so tend to be used in very specialised situations. One key problem facing US horticulture is the



Gracie and Paul visited two bark substrate processing sites in North Carolina: Oldcastle Lawn & Garden and Pacific Organics. "The scale of operations is immense," says Paul. "The container load is the basic unit of transportation on site."

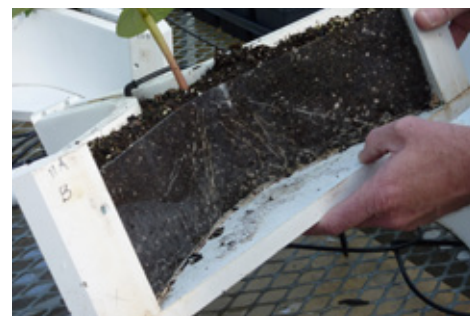
increasing use of wood for energy production, which means there is less woody material available for horticulture. This obviously pushes up prices. So there's pressure on US growing media researchers and manufacturers to explore other alternatives, such as short-rotation wood streams, e.g. loblolly pine in the southern and eastern states.

How does this emphasis on wood-based growing media affect the research?

One major factor is understanding how every aspect of the production process can impact upon the finished growing media. With wood-based media, different mixes can be created using different proportions of different particle size ranges. However, some of Brian's research has shown how even the wear on the teeth of the wood grinder can impact upon the nature of the resultant wood particles, which affects how those particles work when mixed as growing media.



Left. Research into hydroponic salad production at the University of Arkansas. Below. A mini “horhizotron” used for horticultural research in North Carolina. This equipment is used to study root development and distribution.



Does that mean US research is less relevant to what we do at the RHS?

On the contrary – one main focus of our current research at Wisley (especially through Gracie’s Fellowship) is to characterise fully how different materials respond in growing media and to understand the physical properties of

“This trip has given me a wealth of ideas for future growing media research at Wisley, and I’m extremely grateful for the RHS Bursary which made it possible. Seeing such vibrant and productive centres for horticultural science has opened my eyes to just what we could achieve here in the UK!”
Gracie Barrett

mixes (pH, conductivity, porosity, water-holding qualities, etc.). Though not so common in the UK, this is also the main

focus of US researchers – identifying the key components, and how they can be manipulated to improve performance. So the US research will in fact provide a benchmark for our own work in this area.

How else could this help RHS research and UK gardeners?

There is a wealth of experience in the US in terms of growing media research and a great deal of scope for collaboration and stronger connections. We can learn enormous amounts from what has been undertaken in the US and apply much of it to the UK.

At a practical level, we can get ideas from their experimental thought processes and some of their specialised laboratory equipment. There is also something to be learned from their methodologies – for instance,

the factoring in of industry realities, such as the effect of ageing equipment.

You say you also visited growing media manufacturers and nurseries. Were they very different from those in the UK?

In most of the visits, the most obvious difference was the scale of production. The growing media manufacturers were producing on a massive scale. It was also interesting to see very large-scale nursery production (over 70 acres’ protected cropping), using primarily wood-based growing media. This contrasted with a very specialised hydroponic salad producer which was supplying high-end retailers and restaurants but run very much as a small family business. ♦

* The Fellowship is a 5-year programme co-funded by the RHS and the Agriculture & Horticulture Development Board – Horticulture (AHDB Horticulture, formerly the Horticultural Development Company).

New web-based system for *RHS Plant Finder* nurseries

For many years nurseries have been able to make their annual *RHS Plant Finder* returns electronically using the bespoke Data Capture Program (DCAP). Originally this was installed by nurseries from four 3.5in floppy diskettes, and more recently from a single CD-ROM. In 2014 it was decided to move the DCAP online, with an application developed by Strange Software Ltd, who wrote the original program.

Using data from the RHS Horticultural database (*BG-BASE*), the online DCAP allows nurseries to select the RHS-preferred names for the plants they offer. As with previous versions, nurseries can also add new plants (often new to cultivation) as well as collectors' codes and personal comments. Each nursery is given a secure login to the website which they can access from any internet-connected computer, as well as mobile devices. Once the nursery has

submitted their return, the *RHS Plant Finder* compiler is informed by email and can then download the data from the secure servers and check it back into the Horticultural Database.

"For the first time *RHS Plant Finder* staff can see at a glance which nurseries are working on their returns," says compiler Judith Merrick. "This means we can target nurseries that might need a reminder to submit their data before the closing date." Principal Data Manager Rupert Wilson is equally sanguine. "The new online DCAP meets the expectations of the modern online society, is technology-agnostic [i.e. should work with any platform], reduces costs, increases data security and improves workflow. As with any new product, it will need to be refined, but it represents a significant first step towards a more flexible approach in processing nursery plant data." ♦



The new *RHS Plant Finder* was published in April. Perhaps the most significant nomenclatural change in this latest edition is the separation of North American and some Eurasian species of *Aster* into distinct genera, including *Symphotrichum* (most N. American Michaelmas daisies), as in *S. novae-angliae* 'Septemberrubin' (above). Photo © Dorling Kindersley Ltd.

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