

New RHS climate change survey

IN CONJUNCTION WITH THE UNIVERSITY of Reading, the RHS has launched a survey to better understand how gardeners are reacting to changes in the UK climate and to discover whether they have been provided with the knowledge they need to plan their gardening in the future.

This survey is intended to provide the material for the follow-up to the RHS's 2002 report 'Gardening in the Global Greenhouse', which discussed potential challenges that gardens and gardeners in the UK were likely to face, based on climate change projections. According to more recent climate models, the projections have changed. Thus UK gardeners may well have to prepare for a different set of climatic conditions.

Says Claudia Bernardini, who is leading the project for the RHS, "We need to plan and prepare for what future changes might bring. The findings from this



PHOTOS: MIKE SLEIGH (DROUGHT); CAROL SHEPPARD (FLOOD)

survey will help us understand the perceived effects of climate change and the individual's response to those changes, a vital part of the new report and for new adaptation strategies in UK gardening practices." ■

► To take part in the survey, go to <http://blogs.reading.ac.uk/crg/climate-change-and-gardening>

The 2002 'Gardening in the Global Greenhouse' report predicted extremes of weather and more exotic plantings.



Andrew Halstead has left the building

After 41 years at Wisley, Andrew Halstead has hung up his pooter and Tullgren funnels for the last time and said goodbye to RHS Entomology.

Andrew came to Wisley as an entomologist in 1972, under Chris Brickell's directorship. During his time at the RHS, Andrew dealt with enquiries concerning not only invertebrates, but also birds, mammals and other

garden fauna. Following a recent promotion, as Principal Scientist Plant Health, he also took on responsibility for Wisley's pathology section.

A familiar figure on the Advisory stand at RHS shows, Andrew has always maintained an active media presence. He is also well known as a speaker on horticultural matters to clubs and societies in the region, as well as staff: during his last three months at the RHS, he gave no

fewer than 13 talks on subjects ranging from "bugs that bite back" to honeybee anatomy.

Andrew's farewell party on March 28 at Wisley was well attended by colleagues past and present. "This is truly the end of an era," said John David, Acting Head of Science. "Andrew's remarkable knowledge, experience and unique sense of humour will be missed by all who had the privilege of working with him." ■

For more information:

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In brief

RHS-SPONSORED STUDENT LUCY WENGER (see issue 15, p.5) has been awarded an MSc in Plant Diversity (with Merit) for her work on *Cordyline*. She has now taken up a position at the Eden Project, St Austell.

FUNDING SUCCESSES FOR PLANT SOILS INTERACTIONS.

The RHS has made a successful bid for a Biotechnology and Biological Sciences Research Council (BBSRC) **Industrial CASE PhD studentship**. CASE ('Collaborative Awards in Science and Engineering') studentships are training grants intended to allow top-quality bioscience graduates to undertake research which will lead to a PhD. Undertaken in collaboration with the University of Reading and Defra, the PSI studentship will examine the effects of different organic materials on soil carbon balance and soil microbiology, and will utilise the current Organic Matter experiment at Deers Farm, Wisley. "Examining these interactions will offer a unique insight into the value of soil management for gardeners," says Principal Scientist (Horticulture) **Paul Alexander**. "Organic matter is widely used by gardeners to improve soil quality, but it could also help sequester carbon, potentially helping to mitigate climate change."

Meanwhile, **Tijana Blanusa** has been awarded funding from the European Institute of Technology Climate-KIC programme for a **3-year PhD studentship** which will start in October 2013. Based at the University of Reading, this project will investigate the use of grey and recycled water in water management of plants and its effect on the provision of multiple ecosystem services (specifically cooling, rainfall and pollutant trapping). Tijana was also successful in securing funds for **two undergraduate summer studentships** for 2013 from the University

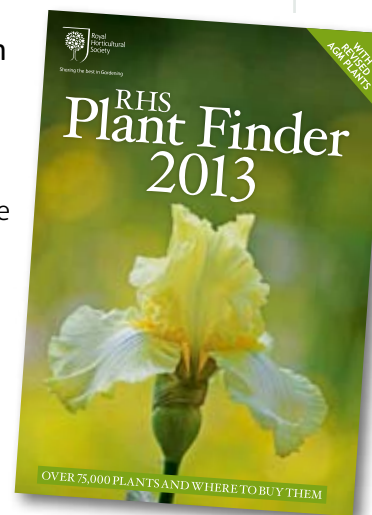
of Reading's Undergraduate Research Opportunities Programme (UROP). These will investigate emissions of volatile organic compounds from green roof species and opportunities for green roof food production.



Left, *Stachys byzantina* 'Big Ears'. New RHS research will examine the possible contribution of volatile organic compounds emitted by green roof species such as *Stachys byzantina* to climate change, and whether this affects their value as temperature-lowering plants in the urban environment.

THE 27TH EDITION OF *RHS Plant Finder* will be published online and in bookshops on April 11, listing a total of 77,160 plant names, together with details of 555 nurseries.

This number of nurseries represents a welcome increase on the 2012 figure. Says Compiler Judith Merrick, "It is of particular satisfaction that we have arrested the decline in nursery numbers this year. We hope that this upward trend can be maintained for future editions."



A significant change in this edition is the removal of the double year date on the cover, which had caused much confusion in the past, and the adoption of a single year. The 27th edition will therefore be *RHS Plant Finder 2013*. This should be clearer for gardeners in the long run, and could also help sales, as there was some evidence that the double date gave the impression of a biennial publication.

The new edition also reflects the results of the recent Award of Garden Merit (AGM) review, as well as the new RHS hardiness ratings system. It includes 4,300 plants new to *Plant Finder*, the most widely offered of which are:

1. *Geranium* 'Azure Rush'
- 2.= *Cirsium rivulare* 'Trevor's Blue Wonder',
- 2.= *Rosa* BOSCOBEL ('Ausconsin')
- 4.= *Choisya* × *dewitteana* 'Aztec Gold'
- 4.= *Rosa* HEATHCLIFF ('Ausnipper')
- 4.= *Rosa* TRANQUILLITY ('Ausnoble')

Above. RHS Senior Designer Mark Timothy has created a brighter jacket design for the new edition, which should help to distinguish it from previous "double date" editions.

RHS helps make sense of plant science

Access to the knowledge of RHS scientists is now possible through an online plant sciences expert panel. Twenty-three other leading horticultural research institutes including the James Hutton Institute, Rothamsted Research and Cambridge and Warwick universities complete the panel, which was set up through the charity **Sense about Science (SAS)**. Anyone can submit their plant science-relevant questions to the panel; with the exception of general horticultural advice, no question is off limits. From GM crops and ash dieback to bees and pesticides, queries are directed to the most relevant panel member and responses are made available on the SAS website and via Twitter.

Sense about Science, as the name suggests, works in partnership with scientists, policy makers, press and members of the public to make discussions around science accessible to everyone. Says **Sarah Al Beidh**,

the RHS representative on the Plant Science panel, “Responses to questions are intended to be jargon- and waffle-free, but without dumbing down. The panel is therefore a great mechanism for RHS scientists to make their plant science knowledge

available more widely as well as an opportunity to further develop our scientific profile.”

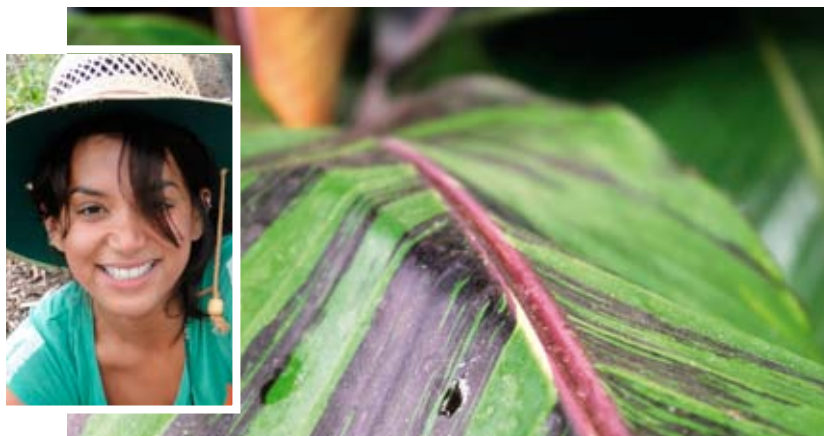
Responses to questions are intended to be jargon-free, but without dumbing down.

Sarah Al-Beidh

Some questions answered by Sarah so far:

- How did lemon thyme become lemon?
- Is this the beginning of the end for the deciduous tree, vis-à-vis global warming?
- Is there any other special reason why banana leaves are so big, except struggle for light?

► www.senseaboutscience.org



PHOTOS: CAROL SHEPPARD (INSET); NEIL HERWORTH

Above. **Sarah Al-Beidh**, Science & Advice KTP Associate, represents the RHS on the Sense about Science Plant Science panel. Recent questions put to the panel have ranged from whether GM crops could be used to combat climate change to why banana leaves are so big.

RHS organises training day for amenity horticulture professionals

RHS Wisley was the venue for a training day in March for those who work professionally in amenity horticulture, including head gardeners, garden designers and contractors involved in garden maintenance. The event attracted 57 participants, including RHS staff from Rosemoor and Harlow Carr and a contingent of seven from English Heritage.



BOB MARTIN (ABOVE); RHS LINDLEY LIBRARY (MUSA)

The event was organised by **Tony Dickerson** of Advisory (right). In a packed day, topics covered by experts included new pests and diseases (**Andrew Halstead** and **Béatrice Henricot**, both RHS), updates on the EU Sustainable Use Directive on Pesticides (**John Allbutt of BritRisk**), and health & safety responsibilities under criminal and civil law (**Mike Fielder**, RHS). Optional mini-tours of the Wisley site over an extended lunchtime included consideration of the chemical store, glasshouse irrigation, biosecurity and amenity weed control. “This training day for professionals was a new venture for the RHS,” says Tony. “The content and networking opportunities proved especially popular with head gardeners.”

For more information about RHS Science news ► johndavid@rhs.org.uk

Assessing the invasive threat of non-native bluebells



by Dawn Edwards

BOTANY

THE PERCEIVED THREAT TO POPULATIONS of the British native bluebell, *Hyacinthoides non-scripta*, posed by escaped non-native garden bluebells is often reported. However, the RHS has concerns that this threat may be overstated. Certainly populations of the native species at RHS Garden Wisley, which have been growing alongside non-native ornamentals for many years, do not appear to be suffering from competition or *in situ* hybridisation.

Native bluebells remain widespread in the countryside and whilst non-native bluebells have established outside gardens, fears of the loss of native bluebells due to hybridisation and competition do not appear to be founded on robust research. Most non-native recordings are from urban areas and edges of woodlands and it therefore seems highly probable that they are the result of casual introductions, either as garden waste or deliberate planting.

Difficulties in assessing the distribution and interaction between bluebells are compounded by taxonomic uncertainty over the identity of non-native garden bluebells. Those referred to as Spanish bluebells, *H. hispanica*, are distinct from plants in the wild that are known as *H. hispanica*. They may be horticulturally selected derivatives or perhaps even hybrids. This in turn raises questions over the identity of *H. × massartiana*, said to be the hybrid between the native and Spanish bluebells.

Eradicating non-native plants is a costly undertaking and a process of prioritisation needs to take place according to an assessment of threats through rigorous scientific study. The RHS's research into alien plants seeks to address this and the Society has much to offer in educating gardeners as to the correct way to dispose of garden material. ■



Above. Native *Hyacinthoides non-scripta* (left, with distinctive deeply curled tepal tips) and hybrid *Hyacinthoides × massartiana*. Uncertainty regarding the identity of non-native bluebells and levels of hybridisation with native populations is likely to remain until molecular markers clarify taxonomy and quantify genetic threat.

Identifying bluebells in Britain

| Native | Non-native |
|---|---|
| Pollen creamy white | Pollen blue to green-blue |
| Flowers narrowly tubular with tepal tips deeply curled back | Flowers a more open bell-shape with tepal tips less recurved |
| Inflorescence nodding (distinctively curved) at the top with most flowers hanging from one side of the stem | Inflorescence is more erect with flowers arranged around the stem |
| Flowers strongly sweet-smelling | Flowers have little scent |

Hybrids show a range of intermediacy between parent species so distinguishing native from non-native bluebells can be difficult, but there are characters that assist their separation. Examination should occur as flowering begins because characters can change as they mature.

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Neonicotinoid insecticides, bees and the EU



by Andrew Salisbury

ENTOMOLOGY

DECREASES IN BEE POPULATIONS ARE well documented and of great concern. The decline in honeybee health results from a mixture of diseases and parasites (particularly *Varroa* mite), and habitat loss. The widely used neonicotinoid insecticides are also under suspicion; however, there is conflicting evidence on the threat posed under normal growing conditions. A campaign by some NGOs in the UK has led some DIY and garden centre chains to voluntarily remove some products.

In a January 2013 report the European Food Safety Authority concluded that three neonicotinoids (clothianidin, imidacloprid and thiamethoxam; see panel, right) posed a greater risk to bees and that more data are needed to update risk assessments. A proposed suspension of these active ingredients for most uses was voted on by EU member states in March. The vote was inconclusive: 13 favoured restrictions, nine voted against, while Britain and four other states abstained. The European Commission could force restrictions through by summer 2013 unless a compromise is agreed.

The RHS is closely monitoring the situation and will respond swiftly to any recommendations and regulations from the EU, UK government and its agencies. Our aim is to always encourage the use of alternatives to chemical controls where they are likely to be helpful. ■

► For the latest Defra position, go to: www.defra.gov.uk/environment/quality/chemicals/pesticides/insecticides-bees



Above. **Swarming honeybees, which are in decline. Bumblebees** (inset, on echinacea) **are maintaining their numbers and distribution.**

FAQs

- **What are neonicotinoids?** Neonicotinoids (pronounced with the emphasis on -cot-) are insecticides chemically related to nicotine.
- **How do they work?** “Neonics” are systemic pesticides (i.e. they are absorbed by the plant and remain active in all its tissues). When ingested, they block receptors in the insect’s central nervous system, which causes paralysis and death.
- **Which products contain neonicotinoids?** There are four neonicotinoid pesticides available for home garden use: **acetamiprid** (various Bug & Rose Clear products), **thiacloprid** (various Bayer products), **imidacloprid** (Bayer Provado Lawn Grub Killer) and **thiamethoxam** (Plant Rescue Bug Killer Ornamental Plants). **Clothianidin** is used in some professional agricultural products.
- **Why does the press coverage emphasise the effects on bees?** With the notable exceptions of Australia and New Zealand, the decline in bee numbers is almost global. This is in part due to modern farming practices which result in fewer floral resources in the landscape. In the case of honeybees, the *Varroa* mite and other parasites and diseases play a major part in the decline. Some research indicates that, as well as their lethal effects, neonicotinoids may have sub-lethal effects on bees (e.g. on homing behaviour and signalling) that could lead to colony declines. However, the evidence that this happens in field situations is not clear.

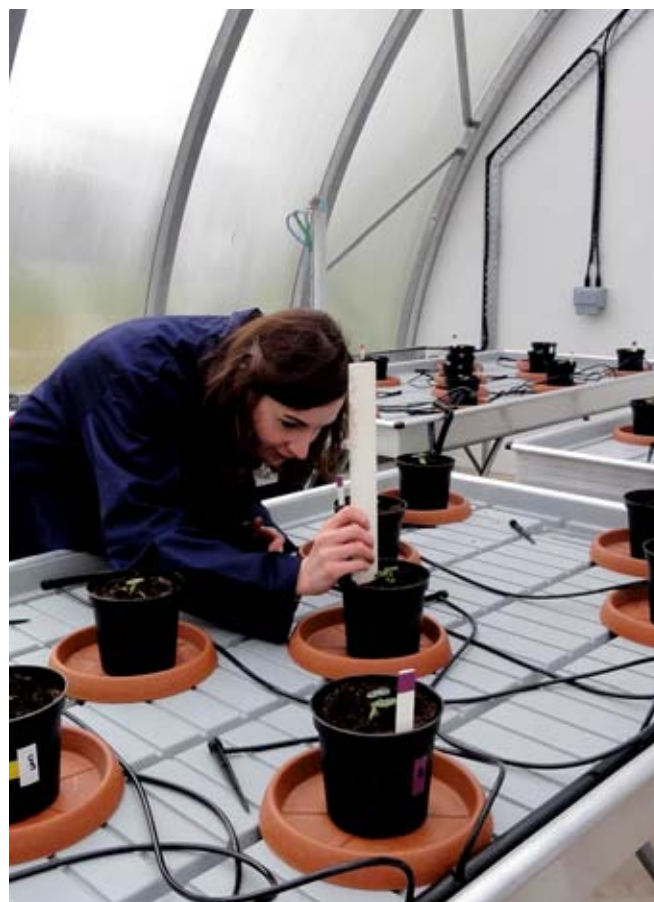
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PHOTOS: ANDREW HALSTEAD; CAROL SHEPPARD (INSET).

HDC fellowship research well under way

THE RHS-HDC FELLOWSHIP has now been running for nearly six months. Established in conjunction with the Horticultural Development Company, the principal aim of this project is to improve the sustainability of plant production for both amateur and professional growers. Gracie Barrett took up her post in November and has already established her first experiment in the RHS Field Research Facility, investigating how various peat-free growing media interact with liquid fertilisers to influence plant quality. The experiment will run until May, and it is hoped that it will provide us with an insight into how plant growth is impacted by different combinations of growing media and sources of nutrition.

Gracie has also visited a number of professional nurseries and growing media manufacturers around the UK and Ireland. "These visits have allowed us to gain a better understanding of the challenges facing the wider horticultural sector and to appreciate that growing media are only one component of a complicated production system," says Gracie. "The visits have also improved our awareness of the advantages and disadvantages of some of the professional peat alternatives available and of the qualities required by all growers, namely consistent and reliable growing media. These findings will inform our programme of research."



PHOTOS: RACHAEL TANNER (MEASURING PELARGONIUMS); BEATRICE HENRICOT (HONEY FUNGUS)

Above. Gracie Barrett measuring pelargoniums in the new Field Research Facility. These weekly measurements will allow Gracie to assess the quality of plant growth between different experimental treatments and thus help to identify which growing media / fertiliser combinations give the best plant growth.

SLUGS AND SNAILS ONCE AGAIN TOPPED Entomology's annual "top ten pests" list, generating almost twice as many enquires as the number 2 pest, cushion scale. "The dominant feature of 2012 was the weather," said Andrew Halstead, outgoing RHS Principal Scientist Plant Health. "This was the second wettest year in the last hundred years; pests that like damp conditions therefore did well. Last summer the demand for slug controls, especially nematodes used as a biological control, sometimes exceeded supplies."

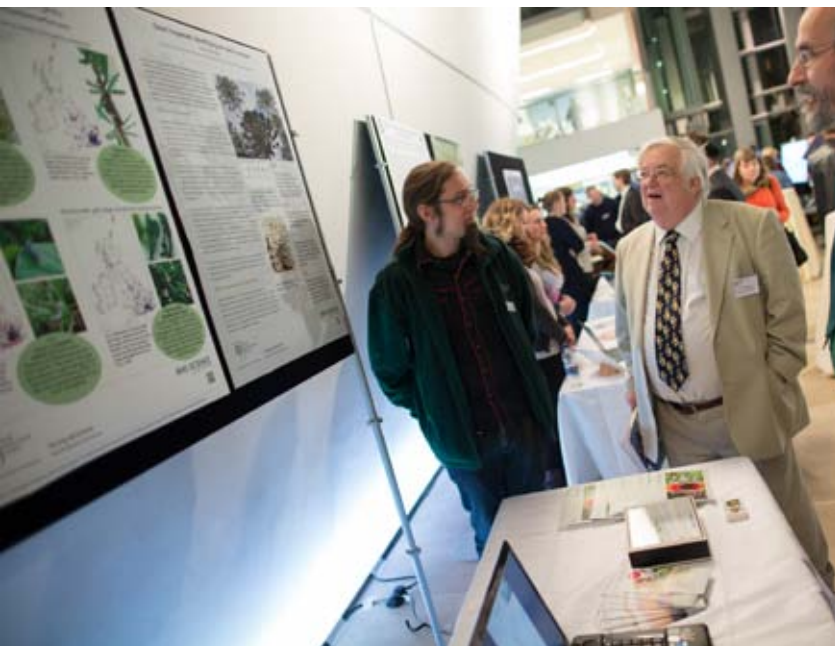
The wet weather also affected pathology enquiries: Plant Health recorded the highest number of cases of *Cylindrocladium* blight on box since it was first sighted in advisory samples in 1998. The fungus requires high humidity to infect and spreads over short distances through water splash, so the weather has been conducive to the disease. For the same reasons, many fungal leaf spots have also done well.

Right. Honey fungus topped the list of disease enquiries.

Plant Health top 10s for 2012

| Pests | Diseases |
|------------------------|--|
| 1 Slugs / snails | 1 Honey fungus |
| 2 Cushion scale | 2 Pythium |
| 3 Vine weevil | 3 Leaf spots |
| 4 Ants | 4 Rusts |
| 5 Glasshouse mealybugs | 5 Phytophthora |
| 6 Soft scale | 6 <i>Cylindrocladium</i> blight of box |
| 7= Woolly aphid | 7 Saprophytic fungi |
| 7= Cypress aphid | 8 <i>Volutella</i> blight of box |
| 9= Fuchsia gall mite | 9 Root and stem rots |
| 9= Lily beetle | 10= Scabs |
| | 10= Powdery mildews |





Night at the Museum

On 20 March, RHS Science took part in the National Biodiversity Network's "Quarter of a billion records project" evening at the Natural History Museum. The event was very well attended by journalists, academics, policy makers and representatives of NGOs, and RHS Senior Entomologist **Andrew Salisbury** (above, left, with John Muggleton, ex-Secretary of the British Entomological and Natural History Society) was kept busy all evening explaining the scope and variety of the RHS's science work.

The NBN (www.nbn.org.uk) is a partnership of conservation organisations, government agencies, and local record centres with the aim of "sharing biodiversity data and making it freely and publicly available". The RHS provides data on biodiversity in its gardens and on invasive pests and diseases.

The RHS display included animated maps and posters promoting "citizen science" surveys of invasive garden pests and diseases (lily beetle, rosemary beetle, berberis sawfly, hemerocallis gall midge and pear rust), as well as Botany's recent work on giant hogweed (*Heracleum* spp.).

For more information about Science publications:

► johndavid@rhs.org.uk

Recent RHS Science publications

Armitage, J. D. (2013). Longshore thrift. *The Garden* 138 (4):47–50.

Cubey, J.J. et al. (2013). *RHS Plant Finder 2013*. London: RHS.

Donald, D. (2012). New Clematis Registrations July 2011–June 2012. *The Clematis* 2012: 181–184.

Donald, D. (2012). *The International Clematis Register and Checklist 2002*, 4th Suppt.

Fantozzi, F., Monaci, F., Blanusa, T., Bargagli, R. (2013). Holm oak (*Quercus ilex* L.) canopy as interceptor of airborne trace elements and their accumulation in the litter and topsoil. *Environmental Pollution* (*in press*).

Henricot, B. (2013). Box Blight. *The Garden* 138 (3): 84–86.

Leslie, A.C. (2013). Notes from the International Registrar 2012. *Rhododendrons, Camellias and Magnolias, 2013*: 128–131.

Salisbury, A. & Halstead, A.J. (2012). Blue mint beetle, *Chrysolina coerulans* (Scriba) (Chrysomelidae) breeding in Cambridgeshire. *The Coleopterist* 21:145–146.

Whitehouse, C. (2013). *Kniphofia* in South Africa. *The Plantsman* 12(1): 28–33.

RHS Science in the media

Andrew Halstead was interviewed in January on BBC Radio Kent on the "top 10 pests" of 2012, and also by BBC Radio Berkshire's Anne Diamond Show, covering new pests, the RHS 'Perfect for Pollinators' campaign, and National Gardening week. **Janet Cubey** was interviewed about *RHS Plant Finder* on BBC Radio Kent on 7 April. **Guy Barter** meanwhile spoke to Simon Mayo on BBC Radio 2 in February about Wisley's daffodils, and also featured in BBC2's 'The Great British Food Revival' on 7 March, discussing the great British pea.

RHS Horticultural Advisors play a prominent part in the new series of RHS gardening podcasts, available free from iTunes at: <https://itunes.apple.com/gb/podcast/the-rhs-gardening-podcast/id605769651>.