

## New five-year strategy for horticultural science

FOLLOWING PROFESSOR JOHN PARKER'S 2013 review of science at the RHS, a new five-year strategy has been developed by Director of Science Dr Alistair Griffiths and the Science team.

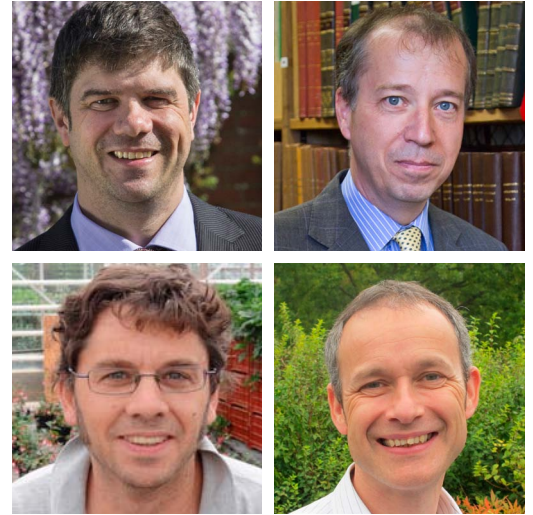
The strategy will focus on four themes (see panel), and is designed to respond to climate change, loss of biodiversity, and increasing biosecurity risks such as invasive alien species and plant pests. There will also be more focus on the sustainable use of natural resources and the services that gardens and garden plants provide.

“This strategy will deliver a major step-change in the quality of our independent and collaborative scientific research,” says Alistair. “It will help us provide the best information to enable anyone from beginners to professional

horticulturists to develop as a gardener.”

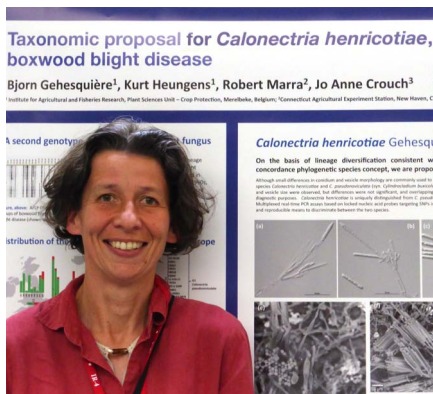
Staff for seven new posts will be recruited in the fields of horticultural taxonomy, information management, plant health and the environment. The existing Horticultural Informatics and Advisory teams will be combined under a new Head of Horticultural Information, while Dr Paul Alexander has been promoted to Head of Horticultural and Environmental Science, which will include the RHS's first ever Horticultural Climatologist. Dr Gerard Clover fills the new position of Head of Plant Health, in response to increased threats from pests and diseases, and Dr John David becomes Head of Horticultural Taxonomy.

Right (clockwise). Alistair Griffiths, John David, Gerard Clover, Paul Alexander.



### Four key themes

- ▶ **A global knowledge bank:** providing a single authoritative source for the naming and classification of cultivated plants and information to promote best practice.
- ▶ **Plant health in gardens:** identifying, monitoring and controlling garden pests, weeds and diseases.
- ▶ **Gardening in a changing world:** promoting environmentally sound gardening practices and the benefits plants and gardens provide.
- ▶ **Plant science for all:** providing good quality advice to gardeners, and engaging more people in plant science.



## RHS pathologist recognised in new species name

A new species of *Calonectria* (a fungus responsible for box blight) is to be named after Dr Béatrice Henricot (left), RHS Principal Research Scientist – Plant Pathology. Publicised at the 2014 “Box summit” in Washington, *C. henricotiae* was previously known simply as *Cylindrocladium* G2. In accordance with nomenclatural practice, the “h” and “t” in *henricotiae* will be pronounced, though usually silent in the surname. (See p. 7 for more about the summit.)

For more information about stories in this newsletter ▶ [johndavid@rhs.org.uk](mailto:johndavid@rhs.org.uk)

## News in brief

### SECOND HONOUR FOR RHS REGISTRAR.

RHS Assistant Dahlia Registrar **Ron Hedge** has been awarded a National Dahlia Society (NDS) Silver Medal for outstanding service. The

award recognises Ron's efforts to promote the dahlia worldwide among raisers and growers, especially through his work as a volunteer on the International Dahlia Register, which

he maintains in conjunction with International Dahlia Registrar Sharon McDonald. This currently contains 31,000 names and has run to 23 supplements since its first publication in 1969. Ron is also a qualified NDS judge, and has grown and shown dahlias himself for many years. Ron has worked on the Register since 1992; in 2013 he also received a medal from the International Society for Horticultural Science, to acknowledge his contribution to international cultivar registration.

### NEW HEUCHERA RUST PROJECT.

In conjunction with Dr Erika Wedgwood from environmental consultancy ADAS, the RHS has secured Horticultural Development Company (HDC) funding to study the epidemiology and control of heuchera rust.

### Principal Research Scientist

**Béatrice Henricot**, who is the lead RHS investigator in this project, will look at designing a new diagnostic

test to help identify the source of the rust. Since 2010, the incidence of the disease in nurseries and gardens has increased significantly on a range of species and varieties, and it has proved extremely difficult to eliminate using cultural and chemical control methods. It is hoped that this two-year project will determine how and why heuchera crops are now becoming infected with a rust that was not previously a problem.

### RETURN OF ALDER LEAF BEETLE.

In April, RHS entomologists received an unusually high number (11) of enquiries about alder leaf beetle (*Agelastica alni*). This was previously considered extinct in Britain, as it had not been recorded for nearly 60 years, but became re-established in Cheshire in about 2003. The Entomology section had only received 10 enquiries on the beetle before 2014. This 7mm long metallic blue beetle feeds on alder foliage. It overwinters as an adult, and currently remains confined to Cheshire and surrounding areas. ■



The Nagoya Protocol (right) aims at sharing the benefits of genetic resources in a fair and equitable way, for example in the commercial exploitation of medicinal plants such as *Catharanthus roseus* (left). ■

## Update on recent EU legislation

### Invasive Alien Species Regulation

This was passed by the EU Parliament at the end of April 2014 and is set to come into force early next year. It aims to introduce common measures against invasive non-native species across the whole of the European Union recognising that a problem in one country can easily spread to others and that common action is required to control problem species. The strictest level of control is a total ban on possession of a species, and this will apply to any species listed as being of "Union concern". Other controls would apply and these will be mandatory on member states. The Commission will now begin work on preparing the list, which will need to be agreed by member states. Given the cost and administrative burden associated with a species of Union concern, it is not likely that many garden plants will be listed, although it could include some of the more rampant aquatics.

### The Nagoya Protocol

The Nagoya Protocol on Access and Benefit Sharing is an international agreement, and follows on from the Convention on Biological Diversity, which was passed in 2010. The relevant legislation was passed by the EU Parliament in September 2013 and is likely to come into force either late this year or in early 2015. The main provisions of the EU legislation place on users of genetic resources a requirement to carry out due diligence on any material they use and to be able to show that it has been obtained and used legitimately. ■

## Climate change survey results published

IN EARLY MAY RHS SCIENCE released [results from its climate change survey](#). This is the first part of a larger report on the impact of climate change on gardening in the UK, which will be published later in 2014.

The survey was conducted jointly by the RHS and the University of Reading. It took the form of an online questionnaire, and collected data from 1,007 respondents. The questionnaire was designed to collect quantitative information with closed questions (or multiple choice questions), but a large amount of qualitative data was also gathered, as respondents were encouraged to share their opinions.

The questions themselves covered among other things concern about climate change, perceptions of changing flowering times, and confidence in gardeners' own ability to adapt. Respondents were also asked what kind of information and support they would want from the horticultural sector, and what changes they would be willing to make in their own gardening practices. ■

### Some findings from the survey

- 98% are actively involved in gardening
- 86% think climate change probably / definitely happening
- 77% are concerned about climate change
- 74% are willing to replace favourite plants with something more suitable
- 70% expect to adapt to climate change
- 60% agree weather extremes will make gardening more problematic
- 59% think green summer lawns are not a priority

Top. Drought-resistant *Punica granatum*. 74% would be willing to adapt to climate change by replacing their favourite plants.

## Key role for RHS Science in Defra's national pollinator strategy

In March 2014 Defra launched a public consultation on the National Pollinator Strategy, which describes how the government aims to support, guide and facilitate the enhancement of habitat and food provision for pollinators.

Together with stakeholders such as Friends of the Earth, the National Trust and the National Farmers' Union, RHS Science staff were involved in advising Defra on the draft strategy, while the RHS [Perfect for Pollinators](#) list was highlighted as the best list of cultivated plants for pollinators. Says Senior Entomologist Andy Salisbury, "The RHS has long been concerned about declines in pollinating insect populations. Now, in addition to home-grown initiatives such as the Perfect for Pollinators list, the RHS has been able to help inform government strategy on this issue." The final strategy will be launched in summer 2014, and the RHS will continue to be involved in its implementation. ■



PHOTO: BARRY PHILLIPS

## Record number of spring enquiries for Advisory

This spring was the busiest on record for Advisory, who logged nearly 16,000 enquiries between February and April. Some 6,000 enquiries were received in April alone, a level which usually isn't reached till June. Said Advisory's Guy Barter, "After the roaring end to March, it was pretty certain we would do well in April too,

weather permitting. A highpoint has been the renewed focus on email turnaround times, which appears to have increased customer satisfaction and uptake of advisory services."

The increased number of enquiries does not necessarily reflect the increase in membership. "Membership

has been growing for several years, but without a corresponding rise in enquiries," says Guy. "In theory we should see more enquiries as membership grows, but an increasing number of gardeners get their RHS advice from our webpages. So what with one thing and another the good April results are very creditable." ■

# What makes a good growing medium?



by **Gracie Barrett**

HORTICULTURAL & ENVIRONMENTAL SCIENCE

WE ALL KNOW THAT GOOD quality growing media are fundamental for producing top quality plants, but what key attributes actually constitute a “good quality medium”? How do we maintain these attributes when combining different materials to make peat-free or peat-reduced media?

The RHS–Horticultural Development Company (HDC) Fellowship, which has been under way for over a year, aims to get to the root of this question. Paul Alexander, Rachael Tanner and myself, together with some willing volunteers, have been busy setting up a large field experiment based at Deers Farm. This will investigate the impact of different growing media mixes on the growth of two hardy nursery stock species (*Viburnum* and *Hebe*).

Fifteen growing media mixes have been designed and then manufactured onsite, using various proportions of peat, coir, wood fibre, pine bark and green compost. In total over 3,600 litres of media were produced and used to pot up over 1,600 plants. All mixes were supplemented with the necessary base fertiliser, controlled release fertiliser, trace elements, wetting agent, lime and nitrochalk to make them suitable for the plants proposed. Each media mix will be fully characterised and the impact of these mixes on plant quality will be assessed over



Above. Paul Alexander and Gracie Barrett fluffing up wood fibre. Inset. The finished layout for the experiment.

the coming months. The experiment will run until the autumn when the HDC hardy nursery stock panel will visit Wisley to visually assess the plants.

PHOTOS: RACHAEL TANNER (FLUFFING, INGREDIENTS); GRACIE BARRETT (LAYOUT).

## What is the RHS–HDC Fellowship?

**A 5-year project to bring an early career scientist into horticulture and conduct research to develop more sustainable practices.**

## How will this research benefit gardeners?

**By providing clearer information on how best to manage water and fertilisers in peat-reduced and peat-free growing media.**

## When can we expect to see the results?

**The experiment will be harvested in the autumn. It is hoped that results will be disseminated early in 2015.**

The experiment will provide a valuable insight into the way in which different growing media materials interact to influence plant growth. This information is crucial for the development of effective, sustainable alternatives to peat-based growing media for both amateur and commercial growers alike. ■

Mix 6 (of 15). This mix will improve our understanding of how woody materials in growing media influence plant growth.



## The environmental benefits of good garden practice



**Sarah Duddigan is a 1st-year PhD student at the University of Reading, supervised jointly by Reading and the RHS.**

Carbon in organic matter in the soil is the largest carbon store on land, amounting to approximately 2,344bn tons, or around three times more than terrestrial vegetation contains. This means that proper management of soil organic matter is vital in mitigating climate

change, because it can potentially reduce the amount of carbon entering the atmosphere as CO<sub>2</sub> by locking it within the soil. Gardeners may be making a positive contribution to this, but could they do even more? Could the organic material (such as compost) they select have an effect on soil carbon?

This PhD utilises a long-term experiment at RHS Wisley. Different organic materials are applied annually to the same plots, and soil quality and plant performance (based on different annual plants) are being determined.

We believe the type of organic matter applied to soil can affect (a) soil properties and plant yield; (b) the quantity and composition of soil carbon; and (c) the microbial community (and its natural ability to potentially suppress soil-borne pathogens). This will be investigated using a number of chemical and microbial analyses, as well as DNA fingerprint analysis. Gaining a better understanding of these effects could help gardeners better manage their garden for their benefit and that of the environment. ■



**Nuclear Magnetic Resonance (NMR) spectrometer, used in the analysis of the composition of organic carbon.**

PHOTOS: SARAH DUDDIGAN (NMR); LAUREN EDWARDS (BASIL); TIM SANDALL (ROOTS).

## Using soil microbes to help produce novel, sustainable growing media



**Lauren Edwards is a 1st-year PhD student at Royal Holloway, University of London, supervised jointly by RHUL, Eco Systems Ltd, and the RHS.**

The overall aim of my project is to reduce peat use in commercial plant production and home gardens by improving current non-peat growing media. We will test the idea that addition of mycorrhizal fungi to non-peat media could increase the performance of non-peat media up to the standard currently achieved by peat.

We will grow various plant species in different combinations of non-peat mixes with and without mycorrhizas to determine their effect on plant performance. The experiments will test the mixtures using potted herbs and, because the compost mixes and inoculums are also available to the amateur gardener, experiments replicating their use in home gardens will also be conducted.

Already we have conducted a preliminary experiment with commercially grown potted basil (right), and this month a two-year dahlia field experiment will be set up at RHS Wisley. In June we will start a large home garden-style experiment at Royal Holloway with three popular bedding plants: marigold, petunia and antirrhinum. ■



**Above. The preliminary potted basil experiment. Inset. Dusting roots with mycorrhizal fungi, to increase nutrient uptake.**



## Advisors under cover: informing the national press

Advisory's **ANON** explains how free advice nets the RHS nearly £600K-worth of publicity each year

ANSWERING 60,000 MEMBERS' QUESTIONS EVERY year gives the advice team unique insight and knowledge. This expertise is put to use promoting the RHS in other publications.

For instance, we write and find pictures for the twice-yearly *Woman's Weekly Gardening Specials*. Questions and answers are created to popular seasonal gardening queries and these are read by up to 300,000 readers.

On the first Saturday of each month, the back page of the *Saturday Telegraph* gardening supplement offers 523,000 readers practical and scientific RHS insight. Recent topics have included propagation, fertilisers and Mediterranean planting, and comprise a problem solver, a masterclass and an interview with an RHS expert. The "secret" writers of these topics are Jenny Bowden, Nicola Bristow, Lenka Cooke, Tony Dickerson, Laurel Emms and Rob Stirling.



The *Evening Standard Online* offers RHS wisdom to around 230,000 readers. Jenny has answered 50 readers' questions on all aspects of London gardening since 2012, on subjects ranging from sourcing tree removal contractors, neighbourly weed problems and boundary disputes.

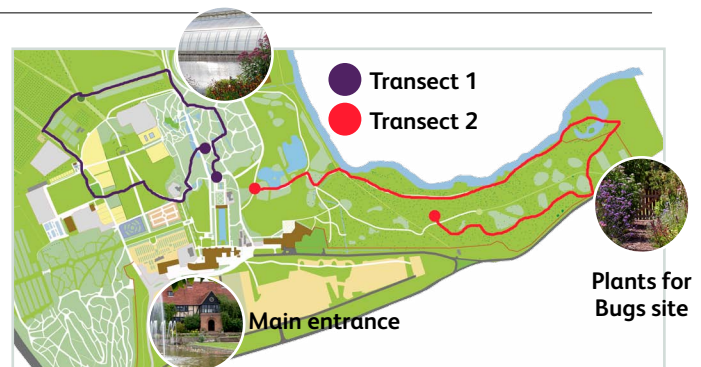
By convention, publicity has a nominal value related to the cost of advertising in the publication concerned. Sadly, no cash is received and no RHS costs are cut, but the surprising figures associated with our work are encouraging, and of course the RHS could scarcely afford to spend such sums on annual advertising: *Woman's Weekly*, £1,930; *Daily Telegraph*, £522,990; *Evening Standard*, £42,900. ■

Left. Press cuttings.

## Butterfly recording at Wisley

IN AN EFFORT TO INCREASE standardised biodiversity recording at RHS Garden Wisley, the Entomology section has started a programme of regular butterfly recording. The data collected will be a useful indicator of Wisley's butterfly population size and diversity, which is often said to be small, compared with the rest of Surrey.

The transect\* route and methods have been planned so that the data is suitable for submission to the [UK Butterfly Monitoring Scheme](#) (UKBMS). The UKBMS is a nationwide survey which, through the work of volunteers, records on more than 1,000 sites, making it one of the most important data sets for monitoring insect populations in the UK. Two transects will be walked weekly at Wisley



during April–September, as long as the weather conditions meet the minimum required for recording. More information and the results will be published in a future issue. ■

\* transect: a route repeated periodically, along which observations are made.

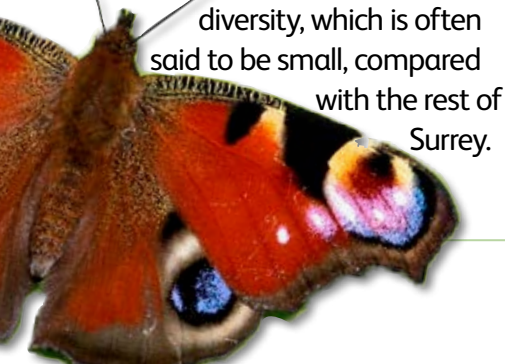


PHOTO: FIONA SECRETT (SEEDLINGS); CAROL SHEPPARD (PEACOCK BUTTERFLY).

## Following the Silk Road



by **Duncan Donald**

HORTICULTURAL TAXONOMY

IN EARLY APRIL I ATTENDED the 3rd International Lily Symposium, held in Zhangzhou, in southern Fujian province. As well as giving me a fascinating glimpse of life and horticulture in China, I met many lily enthusiasts – including all those Chinese who have so far registered cultivars (67) with the RHS, as well as key breeders from Korea and Vietnam, and from Dutch nurseries. I learnt a huge amount about the present state of lily research and cultivation worldwide.



**A tradition has built up in Zhangzhou of sculpting tazetta bulbs as they break dormancy, to create plants shaped to flower and leaf in fantastical forms, as works of art. Only minor attachments, to represent for example pairs of animal eyes or cockscombs, can be added; the main artistic effect comes from the plants themselves.**

I also spoke on cultivar registration at the preceding mini-symposium on daffodils on 31 March. I'd worked closely beforehand with Melanie Underwood (International Daffodil Registrar) to give the talk on her behalf – though the organisers' decision on the day to offer simultaneous translations instantly halved my time!

Zhangzhou itself remains the major centre for daffodil production in China, with c.600ha (nearly 1,500 acres) under intensive cultivation, and an estimated annual output of 35 million cut-flower stems and over a million bulbs exported throughout China and across the world (as 'Grand Emperor of China', Chinese sacred lily, etc.). Originating from the Mediterranean region, tazetta daffodils have been grown in China since the Tang dynasty (618–907 AD), and around Zhangzhou for at least 600 years – so Zhangzhou tazettas must be the world's longest continually cultivated daffodils. ■

## Path round the world



by **Béatrice Henricot**

PLANT HEALTH

Following the successful London Box Summit organised by the RHS in 2012, in May I went to [a second conference](#) on the subject in Beltsville, Washington,. Since the London summit, a PhD thesis on *Cylindrocladium* box blight has been published in Belgium and \$3m has been invested in research on this disease in the US. My hopes of attending an exciting meeting were high and I was not disappointed. It was proposed

that the two distinct genetic types of *Cylindrocladium*, G1 and G2, should be named as two distinct species (see front page). Key epidemiological findings, including the effect of temperature, leaf wetness duration and leaf age on the severity of infection, were presented. Based on those data, an epidemiological model to predict whether growers may need to consider preventive fungicide applications is being built. The effectiveness of sanitising agents in killing conidia and microsclerotia was also presented. There is ongoing work on identifying tolerant varieties and testing chemicals to manage the problem. The annual American Boxwood Society meeting followed the Box Summit, where we had a chance to visit the US National Arboretum and experience the

efforts made to breed varieties more tolerant to box blight.

I also attended the workshop on EPPO Diagnostic Protocols for fungi (held jointly with the Annual Meeting of the European Mycological Network) in Budapest in May. The EMN meeting included presentations on significant diseases from each represented country as well as talks on the ash dieback pathogen in Belgium and Croatia, the chestnut blight fungus in Georgia and a new canker disease on *Juglans* in Italy. As a new EMN member, I participated for the first time to present my work on the identification of a new *Phytophthora* species (*P. pachypleura*), which causes the death of *Aucuba japonica* in UK gardens. ■

## Recent publications by Science staff

Archer, M., & Halstead, A. (2014).

Population dynamics of social wasps (Hymenoptera: Vespidae) in the RHS Garden at Wisley, Surrey. *Entomologist's Monthly Magazine* **150**: 19–26.

**Armitage, J.D.** (2014). Challenges associated with recognising infra-specific variation in a hierarchical system of classification. *New Journal of Botany* **4**(1): 42–47.

**Donald, D.R.** (2014). *Clematis* registered in 2013. *Clematis International 2014*: 13–22.

— (2014). *Clematis* raised by Robin Mitchell (1924–2012). *Clematis International 2014*: 26–45.

**Edwards, D.** (2014). Notes from Wisley (v.c. 17): a brief discussion of putative hybrids between *Arum italicum* Mill. and *A. maculatum* L. *BSBI News*. **126**: 35–36.

**Henricot, B., Pérez Sierra, A. & Jung, T.** (2014). *Phytophthora pachypleura* sp. nov., a new species causing root rot of *Aucuba japonica* and other ornamentals in the United Kingdom. *Plant Pathology*. doi: 10.1111/ppa.12194

**Leslie, A.C.** (2014). Notes from the International Dianthus Registrar. *Carnation Year Book 2014*: 32–33.

**Roy, H.E. et al. incl. Salisbury, A.** (2014). Horizon scanning for invasive alien species with the potential to threaten biodiversity in Great Britain. *Global Change Biology*, doi:10.1111/gcb.12603

**Shaw, J.M.H.** (2014). A new *Camellia* from Vietnam. *Rhododendron, Camellias and Magnolias 2014*: 120–122.

— (2014). A revised identification for *Magnolia* HWJ533. *Rhododendron, Camellias and Magnolias 2014*: 123.

— (2014). *Sander's List of Orchid Hybrids*, Addendum 2011–2013.

— (2014). The splitting of *Aster*. *The Plantsman* **13**(2): 120–125.

**Underwood, M.** (2014). *The International Daffodil Register & Classified List (2008)*. 6th Supplement.

**Whitehouse, C.** (2014). Proposal to conserve the name *Cliffortia filicaulis* (Rosaceae) with a conserved type. *Taxon* **63**(2): 440.

## RHS Science in the media

- **Alistair Griffiths** appeared on BBC One's Countryfile, 11 May, talking about gardening in a changing climate and the results of the RHS climate change survey (see p.3).
- A story in which Chief Horticultural Adviser **Guy Barter** put the record straight on [a number of gardening myths](#) was covered in over 75 publications, reaching an estimated audience of 1.5m.
- The RHS Science response to proposed EU legislation on alien invasive species was covered in a live BBC One News at Six broadcast from Wisley. The story was featured across BBC local radio, and also on the World Service, where **Guy Barter** was interviewed. **Alistair Griffiths** meanwhile discussed the nature and definition of invasiveness on BBC Radio 4's [Inside Science](#) programme.
- Entomologist **Andy Salisbury** [commented in the Independent](#) on the preliminary findings of the Plants for Bugs project. The Times also covered the story.

PHOTO: MIKE GRANT

THREE MAJOR NEW RHS SCIENCE publications appeared during April and May. The first was the 8th edition of the **Hillier Manual of Trees and Shrubs**, the first new edition since 2002 and the first to be published by the RHS and edited by the Society's botanists. Some 1,500 new entries were added, including *Xanthocyparis vietnamensis*, first described in 2002. Perhaps the most significant new feature in this edition is the harmonisation of its nomenclature and taxonomy with that of **RHS Plant Finder 2014**, also published in April. This shows a significant increase in the number of nurseries listed, with 555 in the 2013 edition rising to 578 in 2014. Lastly, the latest three-year addendum (the 12th) to **Sander's List of Orchid Hybrids** appeared in May. Compiled by RHS International Orchid Registrar Julian Shaw, it includes all new orchid names registered between 2011 and 2013, amounting to 9,728 hybrids over 820 pages.



Left to right: John Hillier, Roy Lancaster, Richard Sanford, James Armitage, Neil Lancaster and Dawn Edwards, the team responsible for the new *Hillier Manual*.