



cultivated plant taxonomy**news**

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The first European Cultivated Plant Taxonomists Forum

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Expanding into the future

James Armitage
EDITOR

The organiser of any gathering, from a meeting of nations to a family get-together, will know the feeling of anxious anticipation that unsettles the mind on the eve of the event. Will all the effort be worth it? Will it be a success?

In April 2015, at RHS Garden Wisley, I found myself the nervous convener of the first European Cultivated Plant Taxonomists Forum, prey to just such a sense of trepidation. I needn't have worried. Within moments of the delegates assembling I knew all would be well, such was the mood of mutual purpose and good cheer that here, at last, was an opportunity to talk to colleagues and discuss common problems.

Over the course of three days we heard 18 talks covering an impressive range of topics, giving thoughtful and thought-provoking perspectives on issues which ultimately affect everyone dealing with cultivated plants. The PowerPoint presentations associated with each of these talks can be found on the Hortax website (www.hortax.org.uk/european-cpt-forum.html). In addition the content of six of the talks are featured in this special edition of *CPT News*.

If a suitable venue can be found it is very much hoped that a second European Cultivated Plant



Taxonomists Forum can be held in 2017, shortly before the XII International Symposium on the Taxonomy of Cultivated Plants.

One of the things arising from the event in April was a decision to broaden the membership of Hortax to include anyone with an interest in cultivated plant taxonomy. Under this new arrangement the Group as it was previously constituted becomes the Executive Committee, which will continue to meet regularly. However, now there will be a wider membership who will receive agendas and minutes and have the opportunity to have their say by email. The hope is to bring together a community of people interested in the classification of cultivated plants and keep them better informed of relevant issues and developments. Membership is entirely without charge and if you would like to become a member of Hortax please contact hortaxgroup@gmail.com. Best wishes for a happy and healthy 2016. ■

Above: Delegates at the first European Cultivated Plant Taxonomists Forum, April 2015. The three-day event was jointly hosted by the RHS and the Cultivated Plant Taxonomy Group (Hortax), Photo: Barry Phillips.

Muddles and misapplications Taxonomic difficulties associated with bamboos in cultivation

Chris Stapleton has studied bamboos for many years in the Himalayas and has worked for US and UK botanic gardens. He is author of the Bamboo Identification website and here discusses what makes the taxonomy of these plants so troublesome and how progress can be made in resolving their classification in the future.

BAMBOO PLANTS ARE poorly labelled in European horticulture. In supermarkets, garden centres and botanic gardens inappropriate names are often in use. Genus, species, and cultivar may all be incorrect, and names for the

Left. A close up of shoots of *Phyllostachys nigra* at Jungle Giants, Shropshire. Photo. RHS / Tim Sandall.



Above. The main morphological distinction between temperate (left) and tropical bamboos (right) is considered to be that they have 3 stamens rather than 6. However, some temperate bamboos (e.g. *Sasa*) have 6 stamens. Photos. Chris Stapleton.

same plant can vary widely, especially between European countries.

Bamboos cultivated for centuries may still be grown under different names. Newly introduced bamboos are frequently even worse. Because their taxonomy has not been studied adequately, we often cannot identify bamboos in the wild. Consequently, when new bamboos are introduced, sellers may guess at names,

use names that refer to more desirable species, invent new unpublished species names or employ trade designations.

Splitting and weaving

We are in a mess, but why? Bamboos are certainly quite difficult to split into groups and classify, because groups are not well separated. Taxonomic groups at all levels have indistinct interwoven boundaries with overlapping characters and understanding of the characters that distinguish groups has been poor.

One reason for this is hybridisation. Even the

major groups of bamboo originated by hybridisation. Our current polyploid groups – the temperate, tropical and herbaceous bamboos – all arose as hybrids between diploid lineages. Hybridisation has obscured distinctions between interwoven groups ever since they first evolved. This has made it difficult to define and separate genera and species, even when substantial differences are apparent.

Within the temperate bamboos we do see plenty of variation. There are differences in compression of inflorescences, e.g. separating *Thamnocalamus*, *Borinda* and *Fargesia*. There are also differences in vegetative characters. The semi-flattened





Above. Collections of *Fargesia nitida* from 1895 (neotype; top) and 1999 (epitype). The species was not properly published and typified until 2015, 129 years after it was introduced to horticulture (1886).

Right. The compressed bracteate inflorescence of *Thamnocalamus*, contrasted with open, ebracteate *Borinda* (inset). Photos. Chris Stapleton.

internodes of *Phyllostachys* were recognised 150 years ago. Branching patterns and buds have more recently been found to show great variability, now distinguishing *Fargesia*, *Himalayacalamus* and *Thamnocalamus* clearly. Similarly, rhizomes are now better understood, different forms leading to different clumping or spreading behaviour, which is critical for horticulture.

So we have many characters, but which are most important? Conflict has arisen when researchers have prioritised different characters. Grass taxonomists favoured those of the familiar inflorescence.

Foresters and horticulturists preferred vegetative characters. Molecular biologists expected DNA to solve this conflict, but all temperate bamboos have very similar DNA.

The solution is to use all these characters together. This is called integrative taxonomy. However, groups are still often hard to separate, with members that have odd characters weaving and blending across boundaries. Hybridisation has certainly occurred between genera and species in the near and distant past. Moreover, temperate bamboos diversified relatively recently, and long periods between flowering

Right. *Phyllostachys* in flower. The long flowering interval of some bamboos leads to a slow rate of molecular evolution. In *P. bambusoides*, for instance, an interval of 130 years has been recorded. Photo. RHS / Tim Sandall.

reduces the number of generations. Only after many generations will DNA and physical characters become well differentiated.

DNA is useful to reveal convergent evolution (species which appear similar but are not closely related). Species of larger, older groupings such as broadly defined *Arundinaria*, *Sinarundinaria* and *Thamnocalamus* were shown to be less closely related than expected. More, smaller genera are now recognised. Isolated bamboos such as *Thamnocalamus tessellatus* from South Africa and *Arundinaria densifolia* from Sri Lanka were shown by their DNA to be unrelated to others such as *Thamnocalamus spathiflorus* from the Himalayas and *Arundinaria gigantea* from the USA. New genera were required, e.g. *Sarocalamus*, *Bergbampos*, *Oldeania* and *Kuruna*.

Stabilising influences

Building a consensus on names to recognise is not easy without strong DNA evidence, but names are now stabilising. Several important publications have helped along the way. *Bamboos of the World* (Ohrnberger 1999) compiled



all published names, following advice from around the world. It became a benchmark, and started a sense of stability. The *Flora of China* bamboo account (2006), supported by molecular phylogeny, described half the world's bamboos.

Since 1981 the American Bamboo Society Species & Sources List has documented bamboo species and cultivars for sale, like a bamboo equivalent of *RHS Plant Finder*. It now has nearly 500 entries and standardises names of bamboos in cultivation across the USA. Several other internet reference sources are also available, not all following standardised names. They

need improvement and consolidation.

Much work remains. A large number of plants in cultivation are not well known, and there are many new species and cultivars yet to be discovered, named and described. Collections need to be documented. Fieldwork is still necessary, undertaken collaboratively with local taxonomists. Information on bamboos in Europe needs to be harmonised and presented better. Funding difficulties and red tape remain problematic, but the knowledge, skills and technology are now available to stabilise and improve bamboo names. Mechanisms to support this work are required. ■

How can we ensure suitability in the naming of cultivars registered in statutory EU registers?

Jean Maison, Deputy Head of the Technical Unit with CPVO, argues in favour of an all-embracing database of cultivated plant varieties and urges greater cooperation in order to achieve it.

UNDER EUROPEAN LAW, cultivars (hereafter varieties) of agricultural and vegetable species have to be registered in so-called National Listings as a condition for marketing in the European Union. In order to be acceptable for listing, varieties must show Distinctness, Uniformity and Stability (DUS) and possess a suitable name (hereafter denomination). In addition, it needs to be demonstrated that varieties of agricultural species have an added Value for Cultivation and Use.

Breeders of any variety can also, if they wish, apply for National or Community Plant Variety Rights. The Community Plant Variety Office (CPVO) is responsible for the management of the Community Plant Variety Rights System which provides protection via intellectual property rights for new plant varieties. This system is based on the 1991 Act of the

UPOV Convention and is valid within the territories of the 28 member states of the EU.

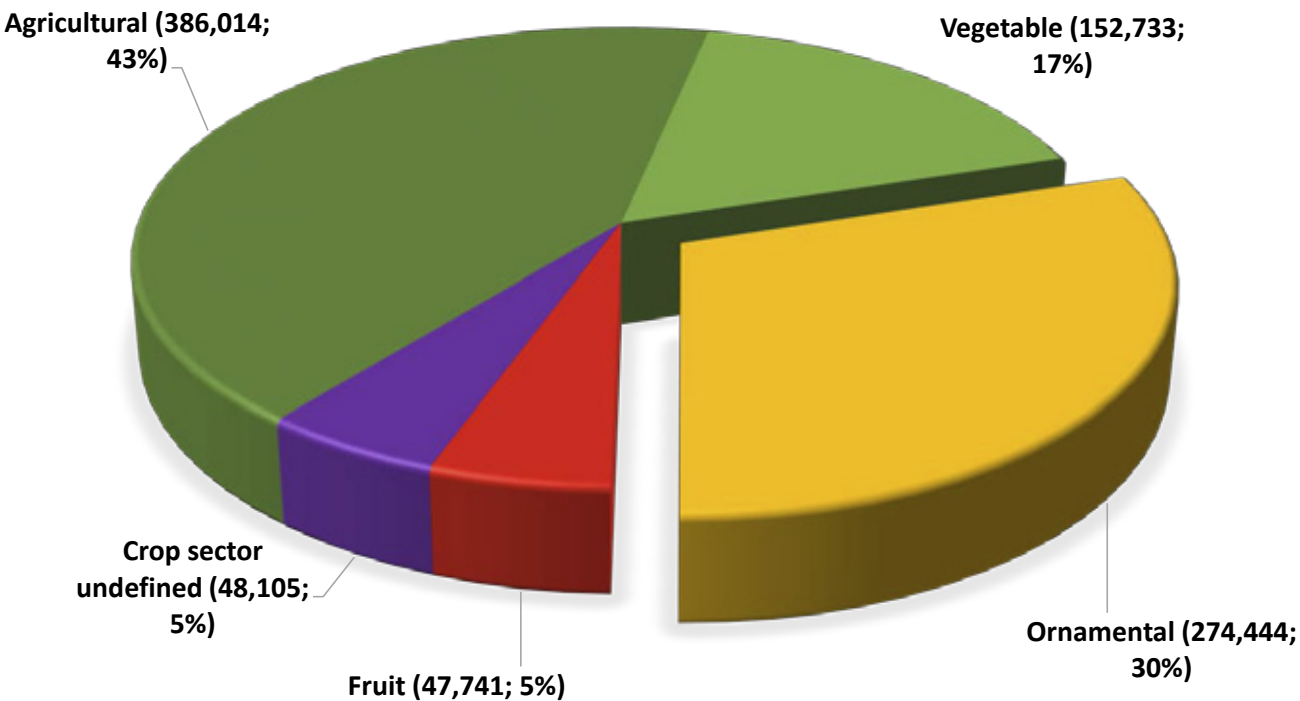
Avoiding nomenclatural confusion

Assessment of the eligibility of variety denominations for National Listing and for Community Plant Variety Rights protection is subject to the same legal framework and is implemented following a common set of rules. An important aspect of these rules is that there is an impediment to the designation of a variety denomination if it is identical to, or may be confused with, a denomination under which another variety of the same or of a closely related species is entered in an official register of plant varieties or if it has been marketed in a member state of the EU.

The CPVO Variety Finder

In order to implement this rule the principle has been established that in general there should be at least two

letters' difference between the denominations of related taxa. In order to test denominations for similarity in a practical way, a database and a search tool are necessary and for this reason the CPVO started the Variety Finder project. The ambition is that this database should contain varieties from all relevant statutory and non-statutory registers and be maintained so as to be as up to date as possible. In practice, it contains the Plant Variety Rights and National Listing registers of all EU (collected by CPVO) and non-EU (collected by UPOV) countries. It also contains data from some ICRA's, including KAVB, and commercial registers such as Plantscope and lists of names of woody and perennial plants in the Netherlands. The maintenance of such a large dataset requires full cooperation from contributors, who regularly send an update of their data to the CPVO. Nearly one million variety denominations from various sources are today included in the Variety Finder.



Number of records in the database by crop section. As of March 2015, more than 900,000 varieties had been recorded.

Upon entry of the proposal for a denomination, the system searches similar denominations of varieties of the same genus in the database. The similarity search tool works on the basis of simple statistical tests and ranks results by order of similarity in order to facilitate the work of the examiner. Nevertheless, each case needs to be considered individually and it is not possible for a computer to make the decision, since phonetic and conceptual aspects are taken into account in the analysis.

The system is freely available on the internet and widely used by breeders and national authorities. This situation is considered an improvement on the past, when national authorities all had to maintain a different database and tested denominations for similarity using different criteria.

Enhanced cooperation between statutory authorities

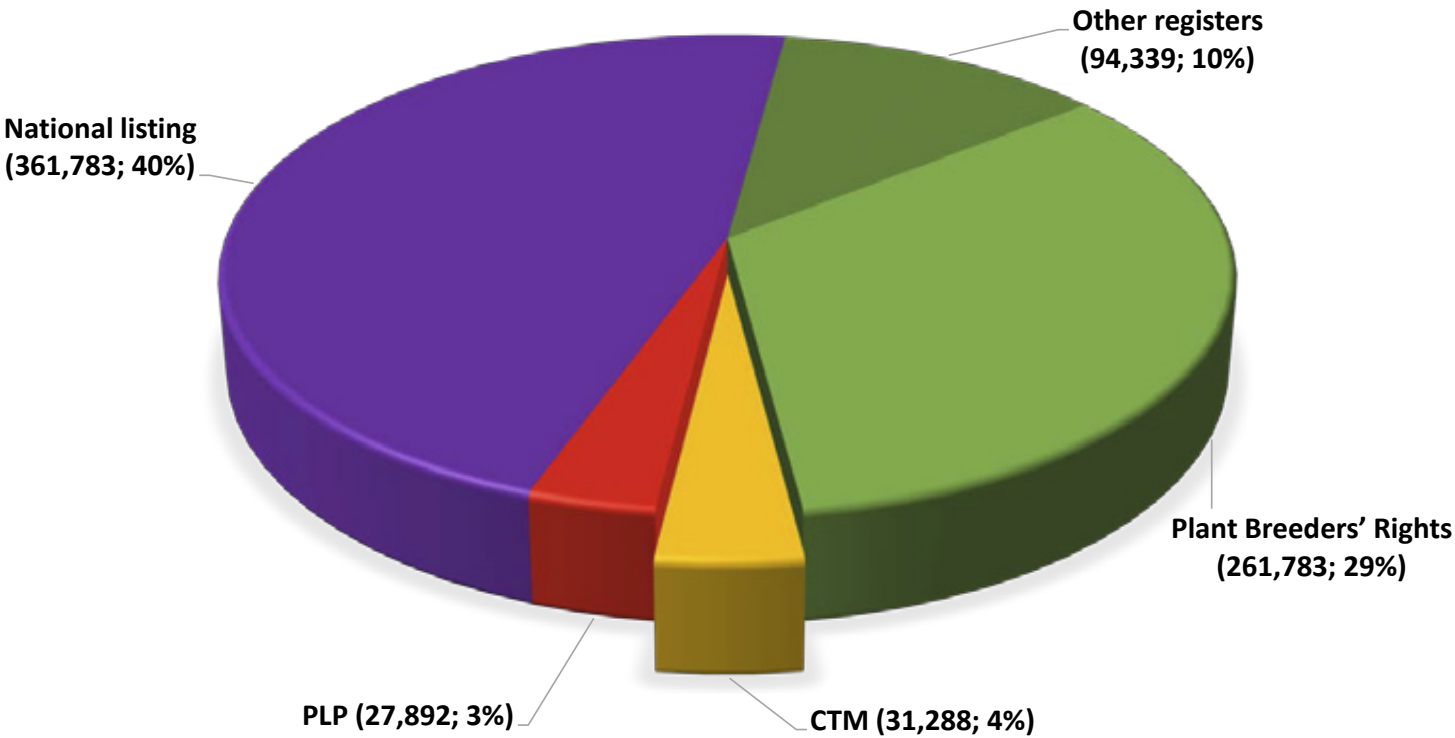
This service should contribute to the aim of having a unique denomination designating a

variety at all levels in the EU, in statutory and non-statutory registers. At the statutory level, national authorities all implement the same rules for the suitability of denominations and all use the Variety Finder. Though this has been the situation for some time, in the past there was a clear need for improvement because, though the rules are the same, they were not implemented in the same way by all statutory authorities. Consequently the CPVO launched the enhanced cooperation project and now national authorities have the ability, via the Variety Finder website, to ask for the opinion of the Office in respect of a denomination proposed under their national purview. However, the final decision remains at national level. All EU national authorities participate in the service and in practice,

Each case needs to be considered individually; it is not possible for a computer to make the decision, since phonetic and conceptual aspects are taken into account.



Nearly one million variety denominations from various sources are today included in the Variety Finder. Photo. Lesley Kane.



Number of records in the database by type of register. The database includes more than 100,000 records from commercial registers.

advice was given on more than 6,500 occasions in 2014, 90% of the time within 24 hours.

Cooperation with non-statutory authorities: the example of KAVB

In the bulb sector, breeders often first register new varieties with KAVB in the Netherlands before they apply for Community Plant Variety Rights. In the past, situations occurred where the denomination approved by the KAVB was later refused by the CPVO, indicating that more cooperation was necessary between the two bodies. The CPVO naming rules were outlined to representatives of the KAVB which now uses the Variety Finder to test its denomination proposals and regularly sends contributions to update the database. Its

participation in the enhanced cooperation service started in 2014 with the approval of the CPVO Administrative Council.

Future cooperation

To ensure consistent nomenclature, the CPVO recognises denominations of varieties registered by non-statutory authorities must be taken into account. However, it is difficult for statutory authorities to do this if such denominations are not available in the Variety Finder which is the central place to assess the suitability of denominations in their procedures. More cooperation is necessary in this respect through the exchange of data which could be rapidly advanced. The establishment of better links between databases could be explored in the future.

It is also important that the harmonisation work between the ICNCP and the EU set of rules is continued in order to reach common decision criteria for the suitability of denominations. Finally, the CPVO is always ready to exchange views regarding the interpretation of the legal framework in which it operates and reviews its rules from time to time. Such an exercise is expected to take place in 2016 and non-statutory authorities will be welcomed to join the discussions as part of breeders' associations.

The Swedish Cultivated and Utility Plants Database (SKUD)

For more than a quarter of a century **Björn Aldén** of Gothenburg Botanical Garden has been studying the taxonomy of cultivated plants. Here he outlines his work on the ornamental and useful plants of Sweden and discusses some present and future challenges.

What is SKUD?

The SKUD (Svensk Kulturväxtdatabas) database is loaded with information, and particularly with names of Swedish cultivated plants. It is therefore primarily a nomenclatural reference database, intended to cover all horticultural and utility plants found in Sweden.

SKUD was originally a pilot research project within the Swedish Program for the Diversity of Cultivated Plants, under the Swedish National Board of Agriculture. The initial goal was to establish a new national name standard for Swedish horticultural plants but it was soon found that this needed to be extended to all utility plants. The database is maintained by IT experts at the Swedish University of Agriculture and the data set is curated by three taxonomists working part-time. In spite of its national importance, SKUD lacks long-term funding. However, for the last two years some financial support has been available through the green trade, though much of the work is still voluntary.

SKUD deals with plants (including mosses and green algae), red and brown algae and fungi used for ornamental, agricultural, silvicultural, culinary, medicinal and cosmetic purposes, as well as

the production of oils, dyes and technical products.

The nomenclatural data consists of scientific names, horticultural names, common names and product names. The usefulness of each plant is detailed and its life form (annual, succulent, etc.) and natural geographic range provided.

the long-time ambition for SKUD is that it should account for any name of a plant that can be verified as ever having been cultivated in or imported into Sweden. Work with the database has presented a number of challenges of general interest which are discussed here.

“I strongly believe that some sort of standardisation is necessary. The question is, how?”

Alleviating the instability of scientific names

A few decades ago many botanists were claiming that changes to scientific names would rapidly decrease. They were wrong. Molecular data has increased our ability to reflect evolutionary history using systematics and changes in scientific name



Above. *Clematis* GOLDEN TIARA ('Kugotia') and *Potentilla fruticosa* MARIAN RED ROBIN ('Marrob'). Both plants have PBR, registered under code names, and are sold under more attractive trade designations. Photos. RHS Herbarium.



believe that some sort of standardisation is necessary. The question is, how?

Intermittently produced standards, like the European Name Lists, printed every 5th year, function as medium- to long-term nomenclatural guides, helping to avoid frequent name adjustments.

A more continuous means of providing a lag phase between name changes and their implementation in trade is available in SKUD where well-established names can be locked under the heading *Namn i handeln* ("name in trade"), though the currently approved name remains that accepted by modern taxonomy. For instance, *Sophora japonica* appears as a name in trade alongside the current name *Styphnolobium japonicum*. Information on when and why the name was changed in SKUD and for how long it is valid as a name in trade is given.

The time for which names in trade are locked is decided by the trade but there is a minimum of five years during which time nurseries can update to the current name if they wish.

Presenting horticultural names

As a young taxonomist in the 1970s, having worked with Greek alpine plants, and recently started as a tree and shrub taxonomist at Gothenburg Botanical Garden, I did not expect to be much involved with clones. But my institute took an interest in horticulture and I found myself studying cultivars as I have been now for the last 25 years.

My first acquaintance with coded nonsense names in the late 1990s made me quite upset, but since then I have

Right. *Calibrachoa* MILLION BELLS TRAILING PINK ('Sunbelkupi') (Million Bells Series). Though such names may benefit the breeder by suggesting some level of protection, the acceptance of them as free names that make sense is minimal. Photo. RHS / Graham Titchmarsh.

tried to take a calmer approach and deal with the realities of trade. I believe the didactic element of the ICNCP is very important and SKUD provides the fullest name possible, presented according to the ICNCP. Coded PBR names, such as *Rosa* (Floribunda Group) 'Poulac007', are treated as synonyms referred to the full name with its trade designation, as in *Rosa* (Floribunda Group) ALADDIN PALACE ('Poulac007').

Further to names treated in the ICNCP is added a Swedish entity, frökälla or fk ("seed source"), presented as, for instance, fk GÖTEBORG.

Is there a future for free names?

Over the years the ICNCP has tried to modernise in response to market realities. A big step was to allow coded PBR denominations as cultivar names. Another was to start giving recommendations on the use of trade designations.

However, it is still rare in commerce to see names presented as *Argyranthemum* MADEIRA CRESTED IVORY ('Bonmadcivy') or *Calibrachoa* MILLION BELLS TRAILING YELLOW ('Suncalkuki'). Though



these names may benefit the breeder by suggesting some level of protection, the acceptance of them as free names that make sense is minimal. Further, for those working with horticultural names, the effort needed to find PBR denominations is considerable. Breeders often hide denominations, using only trademarked designations. In doing so one could claim that they make their trademark generic and open to challenge.

An extension of this is a new phenomenon, namely breeders that skip the expensive PBR process altogether and only register a trademark to protect

single cultivars. How should we treat trademarks such as these – as cultivar names, thus challenging the trademark (perhaps a reasonable approach), or as trade designations, but with no actual name? This phenomenon is a fact – it occurs in hundreds, even thousands, of cases where trademark offices accept as trademarks word combinations which must also act as names. We really have no solution to this yet and it remains a significant problem facing those who classify cultivated plants. ■

Not every name is a name

Under the banner of "one cultivar – one name", Johan van Scheepen, taxonomist and Registrar of bulbous plants with the KAVB (Royal General Bulbgrowers Association), addresses some thorny issues concerning cultivars, trade names and trademarks.

There are several types of names used for cultivated plants:

- Cultivar epithets – rules regarding these names are either governed by the ICNCP or the regulations of the Plant Breeders' Rights (PBR) authorities and the Plant Patent (PP) Office in the USA. The latter two are based on the UPOV convention.
- Trade designations – these are "names" used in trade for cultivars and can be unprotected names, trademarks or registered trademarks. Only the last category is governed by any rules, in this case trademark laws and the relevant international treaties.

Just to make the difference clear between the above-mentioned categories: cultivar epithets identify the cultivar; the cultivar epithet can be used freely by everyone to indicate the specific cultivar. These denominations are registered with the relevant ICRA or PBR

authority, or listed in National Lists, or are not listed at all. These epithets are placed in normal script between single quote marks to make them stand out from the Latin part of the name. When a cultivar is protected by PBR some companies indicate this by adding PBR or PVR at the end of the epithet in superscript. Unfortunately there is no official symbol for PBR or PVR.

When they are trademarks, trade designations identify only the origin of a product and as such do not identify the product itself and are not identical to cultivar epithets. Trademarks are not freely available to use and are registered by trademark offices. Trademarks are not marked officially as such in the EU, but registered trademarks are marked in the USA as ®. TM is used in the USA for non-registered trademarks.

These different names each have a different scope and are therefore used in all kinds of ways. To establish infringement of a cultivar epithet needs, in general, a lot of specific knowledge. So detecting the infringement of PBR or PP in most cases is not easy. The use of a trademark (word mark) is much easier, although the



Left. *Alstroemeria* PRINCESS LEYLA ('Stapriley') is protected by Plant Breeders' Rights under EU PVR Grant 8114, and the "Princess" component of the name is a registered trademark.



Names such as Granny Smith, Elstar, Pink Lady, Fuji and Cox might be better understood if written as apple 'Granny Smith', 'Elstar', 'Cripps Pink' (Pink Lady®), 'Fuji' and 'Cox's Orange Pippin' (left; RHS / Lindley Library).

scope of the trademark will only become clear after a ruling of the court.

But it is not always easy to understand. *Zantedeschia* 'Black Star' was granted PBR in New Zealand in June 2004. However, the same cultivar was officially listed later that year as 'Brilliant' in the EU PBR register, and received USA Plant Patents as 'Edge of Night' and 'Black Star'. Up to 2019, Brilliant is a registered trademark in Benelux and Black Star was a registered trademark up to 2012. To complete this nomenclatural nightmare, Edge of Night is also a trademark. KAVB, the ICRA for *Zantedeschia*, has registered 'Brilliant' and has added the two other names as synonyms or trade names. The lesson to

be learned from this example: let everybody cooperate as much as possible to get one name for one cultivar. A global challenge!

These puzzles are not restricted only to ornamentals. It is quite common to find the following names together to indicate apples: Granny Smith, Cox, Elstar, Pink Lady and Fuji. These could be better understood when correctly written as apple 'Granny Smith', 'Cox's Orange Pippin', 'Elstar', 'Cripps Pink' (PINK LADY®) and 'Fuji'. And this list is only based on the European situation. Listing the correct names in research papers is sometimes more complicated than the research itself, as one has to keep in mind the different trademarks and names all around the globe.

When a breeder has registered and received PBR for his promising new cultivar, the future might still be darkened by trademarks or protected designations of origin. It does happen that trademark owners or parties acting for protected designations of origin claim more than they have. It is a game where bluffing comes as much into play as lawful rights since in many cases it is regarded as too expensive to go to court. The different laws and regulations are drawn up to cope with the present day situations. It is vital with the registration of a cultivar epithet that not only other epithets in the same denomination class are taken into account but also trademarks and the protected designations of origin, but equally the reciprocal process



Zantedeschia
BLACK STAR

- ▶ 'Black Star'^{PBR} NZ June 2004
- ▶ 'Brilliant'^{PBR} EU Nov 2004
- ▶ 'Brilliant' KAVB registration 2005
- ▶ 'Edge of Night' PP 2004
- ▶ 'Black Star' PP 2004
- ▶ Brilliant® in Benelux up to 2019
- ▶ Black Star® trademark up to 2012
- ▶ Edge of Night trademark

should be performed when a trademark is deposited or a designation of protected origin is granted. It would be an advantage if the nomenclatural rules drawn up by each of the bodies regulating plant names were, as far as possible, the same. The KAVB expressed this wish at its 150th anniversary symposium on nomenclature. Today the KAVB and CPVO work closely together to try to ensure the maxim "one cultivar - one name" is upheld. Cooperation with all other organisations involved is now needed more than ever, in order to realise this maxim for industry, amateurs and the general public. ■



Understanding man-made plants: what do we need, to do cultivated plant taxonomy?

Valéry Malécot is Associate Professor of Botany at Agrocampus Ouest in Angers and a member of the Horticulture and Seed Research Institute (IRHS), where he works on the taxonomy and nomenclature of wild and cultivated plants. Here he asks fundamental questions about what is required to classify cultivated plants.

CULTIVATED PLANT taxonomy is the scientific study of the diversity and variety of plants made and cultivated by people, as well as the relationships

existing between them. It also includes naming and classifying them, and has a very strong historical content. As used here, “man-made plants” indicates all the plants

that are grown for their produce, including staple crops, fruit and vegetables (less than 100 genera), as well as ornamental plants (in excess of 1800 genera).



Left. Front cover of the 1911 catalogue of the Parisian nursery Vilmorin-Andrieux, showing *Cineraria* hybrids “À Grand Fleur Étoile” (RHS, Lindley Library).

Far left. Vegetables in a trug (RHS / Jason Ingram).

As with any taxonomic study done on wild taxa, cultivated plant taxonomy requires access to bibliographical information, dry (herbarium) and living collections, and an ever-increasing amount of descriptive data (from morphology to molecules).

With regards to bibliographic information, there is available a huge volume of literature, dispersed between nursery catalogues, *indices seminum* and articles in gardening journals and encyclopedias. However, within this volume of literature, information on a particular taxon may be very scarce. Additionally, some of these sources, such

as catalogues, indexes or newspapers, are available only in very small numbers. We do have a large number of databases that record cultivated plant names (IPNI, Mansfeld's Database of Agricultural and Horticultural Crops, Grin Taxonomy, the RHS Horticultural Database, Naamlijst van houtige gewassen en vaste planten, Vegebase, PLUTO database, ICRAs' databases), but even with such a diversity of databases, we may lack a large subset of what has been named. To understand the complete coverage of names in a genus effort must be concentrated in comparing sources. For example, the

Buxus ICRA records 1043 cultivar names, while for that same genus, the RHS database has 235 entries, with 293 on the OCVV database (merging the PLUTO database and the Naamlijst). The respective numbers for *Bougainvillea* are 323 (ICRA), 289 (RHS), 421 (OCVV), but the overlap between these lists is not evaluated. If this work is most pressing for cultivars and other infraspecific names, even at the specific level Reveals (2012) shows the importance of digging into the cultivated plant literature. On this point, we also clearly lack good and extensive records of what is cultivated and available in many countries (except for crop plants that do have mandatory national lists, and ornamentals in the UK with *RHS Plant Finder*). Making such records or even undertaking the more complex task of writing horticultural Floras appears to be a very important step.

As regards collections, living collections are not that common (relative to the books already discussed), and clearly their longevity is correlated to their administrative status. Public collections live longer than those in private hands but even then there are difficulties in keeping alive all accessions. Additionally, access to living plants in collections is physically limited compared to that permitted for other collections by the modern technologies of the internet and digital scanning. In several such collections, access to original collection information is difficult because of time.



Tulip cultivars, from Johann Wilhelm Weinmann's *Phytanthoza iconographia* (1737-1745). Collections of horticultural drawings such as those in the RHS Lindley Library are an important resource for cultivated plant taxonomists. Photo. RHS, Lindley Library.

Horticultural trainees at RHS Garden Wisley using the RHS Colour Chart to assess flower colour in a herbarium specimen. Photo. RHS / Paul Debois.



Herbarium collections of cultivated plants are even less common: some are relatively well known and promoted (B.K. Boom at L, WSY), but in most herbaria cultivated material is relegated to the end of the generic folders and is only rarely checked by specialists of the genus. When compared to names indexes, it can be seen that both living and herbarium collections conserve only a small proportion of what was selected (for example there were at least 344 selections of Noisette's roses during the 19th century; by 1902 only 54 were still in existence).

Description of material is very important in cultivated plant taxonomy as morphological differences may be very small. Molecular markers have been of incredible value in sorting out living collections, but are less applicable to herbarium samples. Trials and DUS testing are also very useful in comparing material, even if applying only to living plants they may result in some

important works comparing the various cultivars.

Finally, cultivated plant taxonomy works in a strong historical context. Not only because of the age of the literature required, but because it concerns both plant speciation and human selection, the former is commonly represented today as phylogenetic trees, implying millions of years of evolutionary divergence and the latter occurring in the relatively short timescale of a few centuries or, at most, millennia. In addition, cultivated plants often have a much more reticulate ancestry because of recurrent crossing. Cultivated plant taxonomists must try to name and classify under these peculiar circumstances, where some taxa (particularly those vegetatively propagated such as interspecific hybrids) may be known by only a handful of genotypes.

From this survey, we can see great opportunities for those dealing, wholly or in part, with cultivated plant taxonomy.

From genetic resource networks to botanical gardens, through plant protection authorities and scientific or horticultural societies, all of us are in need of good names indexes, an availability of relevant literature, records of cultivation, and homogeneous descriptions. In a similar way to what is being achieved with wild taxa (see, for example, Euro+Med, Fauna Europaea or FishBase), at the heart of our requirements is the need to compile descriptions and records of occurrence linked through scientific names. The applications arising from an integrated system of this sort are many and various. We hope that such a structure may be established in the coming years. ■

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Stretching nomenclature

THE PROVISION OF NAMES IN A FECUND FAMILY

Grexes are names widely used for orchid hybrids and are considered by some to have potential wider applications. But is their status in the taxonomic hierarchy clear? **Julian Shaw**, International Orchid Registrar, offers his thoughts.

THE APPLICATION OF most plant names, including genera, species, varieties, Groups and cultivars, is based on the interpretation of a type or description. Only among hybrids do we find parentage-based, non-typifiable, non-described categories. These are the **nothogenus**, or hybrid genus, a condensed formula representing the parental genera involved, and the **grex** (plural greges or grexes), a collective name applied to all progeny arising from a particular hybrid cross.

The Latin word grex originally referred to a “flock” of sheep. The term was introduced by William T. Stearn, who in 1953 had drafted the first ICNCP, and also coined the term cultivar. In the late 1950s, he formally introduced the collective term grex to apply

to the progeny of a particular hybrid. Subsequently it was used extensively for orchid hybrids, and hybrids in other plant groups, including *Rhododendron* and bromeliads.

The insistence by OHRAG (the RHS Orchid Hybrid Registration Advisory Group) that grex parents must be at species rank appears to be based on an assumption that grex and species are equivalent ranks. This creates nomenclatural problems in three areas, which will be briefly considered:

1. Change of rank in a previously accepted grex parent, e.g. species becoming subspecies;
2. The lack of collective names for grexes with infraspecific parents;
3. No rank co-ordination possible with grex × natural hybrid backcrosses.

Consider how hybrids of *Paphiopedilum godefroyae* × *P. adductum* can be named:

- ▶ *P. godefroyae* var. *godefroyae* × *P. adductum* var. *adductum*
- ▶ *P. godefroyae* var. *leucochilum* × *P. adductum* var. *adductum*
- ▶ *P. godefroyae* var. *godefroyae* × *P. adductum* var. *anatum*
- ▶ *P. godefroyae* var. *leucochilum* × *P. adductum* var. *anatum*

P. godefroyae var. *leucochilum* and *P. adductum* var. *anatum* have both been recognised at specific rank, and still are by some authors. Consequently the possible hybrids are named grexes when their parents become species and disappear (become nameless) when the parents become varieties. In



× *Sophrolaeliocattleya* Camden grex, painted in 1897 by Nellie Roberts (RHS, Lindley Library). *Sophrolaeliocattleya* was the first trigeneric hybrid.

order to stabilise nomenclature, this calls for a sub-grex category.

Subsequently, the ICNCP Commission was approached to request a sub-grex – i.e. a parentage-based unit. Curiously, they responded by raising the grex above the rank of Group, so that grexes could contain Groups – i.e. description-based units. The positive effect is that now it is possible to name new infra-grex Groups, but only by description-based units. The negative effect is that it is impractical to operate since no rapid change of rank

comparable to a botanical *comb. nov.* is possible. Instead a laborious descriptive publication is required, but the data to do this is often unavailable.

Making the grex widely available?

The IUBS Code Commission, meeting in Beijing in 2013 had a formal proposal to extend the use of grex to all other plants, which initially met with a positive response. However, it felt there were problems in simply applying the current orchid-centric rules on grex

Hybrid genera

Like grexes, hybrid genera require neither a type nor a description for valid publication: only a statement of parentage is required.

In 1776 J.G. Kölreuter (1733–1806) published the first hybrid genus, *Lychni-Cucubalus* for *Cucubalus* × *Lychnis*.

Almost a hundred years later, in 1872 Maxwell T. Masters, editor of *Gardeners' Chronicle*, published × *Philageria* for *Lapageria* × *Philesia*.

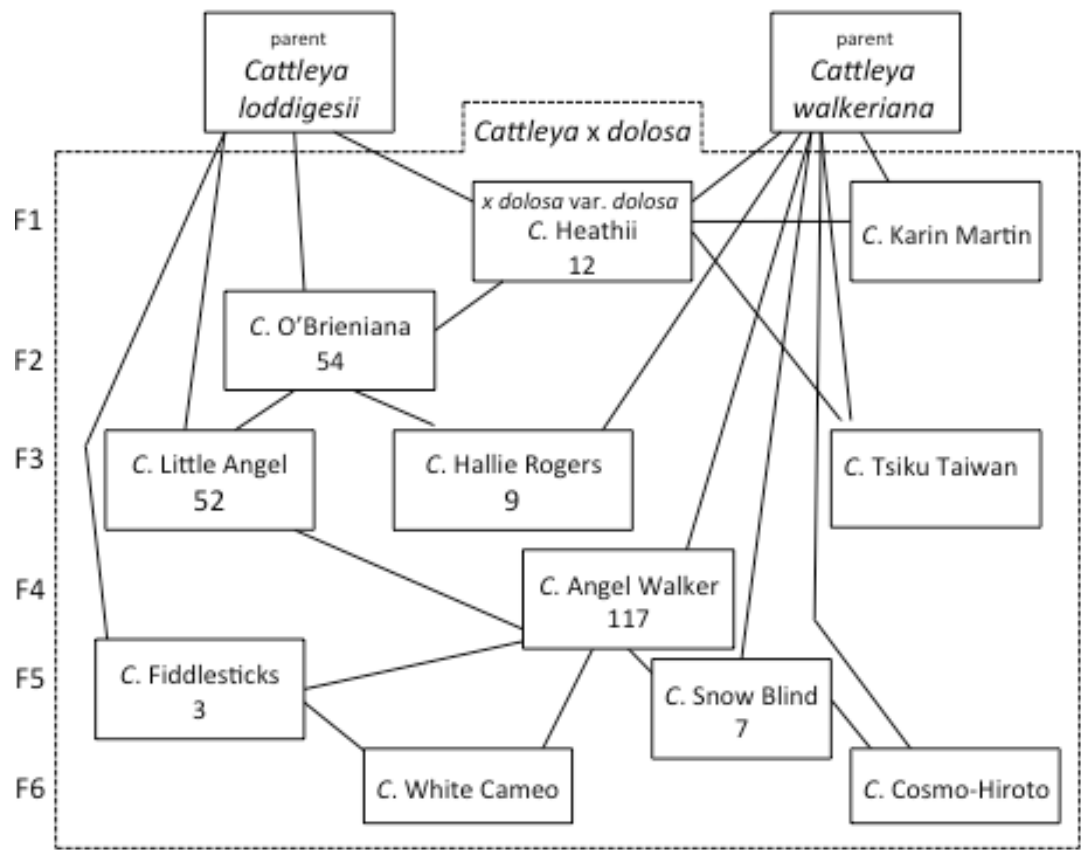
Oct 1897 saw publication of × *Sophrolaeliocattleya* Hurst, the first trigeneric hybrid.

By the early 1900s × *Brassolaeliocattlonitis* had become the first quadrigeneric hybrid name.

In 1910 E.A. Bowles proposed the use of eponyms with *-ara* terminations for three or more multigeneric names; × *Potinara Gard. Chron. ser. 3, 71: 98, 107* (4 March 1922) was the first of these.

In 1950 the Stockholm Botanical Congress adopted *-ara* terminations under the ICBN.

formation to other plants. Additionally, it was perceived there was a wide degree of variation in the way a number of other user groups would like to use grex or had been using grex-like units already.



Inside a nothospecies: the progeny of *Cattleya loddigesii* (top right) × *C. walkeriana* (bottom).



Hence there is currently a quandary facing the IUBS Code Commission: should the ICNCP specify a remit for grex use for every group of plants for which it is employed, so that, for instance, bromeliads, *Brugmansia*, orchids, *Nepenthes* or *Saxifraga* would each operate a somewhat different definition of a grex?

Speculation over this question leads to another interesting consideration: what rank is a grex? Interesting insights can be gained from comparing a grex with a nothospecies of the same putative parentage. A grex and a nothospecies with the same parentage are not equivalent units because a nothospecies includes all backcrosses, whereas each backcross is a separate grex. Consequently a

grex and a nothospecies can no longer share the same epithet, and a grex representing a backcross is below species rank.

In the example above, all the grexes within *Cattleya x dolosa* are below species rank. This means that all their progeny to any generation, indicated by the number in the box, will all be below species rank.

Thus the grex, as used in orchids, is a single unit in horticultural taxonomy which is actually equivalent to a mixture of ICN ranks, with the consequence that a rule limiting grex parents to species rank is meaningless.

It might be possible to recognise the infraspecific rank of the parents of grexes

by the provision in the ICNCP of a sub-grex as a parentage-based unit or, alternatively, by accepting that the grex is in effect rankless; but there would remain still the challenge of how to make the grex available for use in all plant groups. The micro-legislative approach would involve creating numerous rules and definitions so that each group of plants had its own variant of the grex. This seems unlikely to work in practice when it is considered that in spite of fairly tight regulation in orchids, the grex has become a multi-rank taxon. One wonders if the grex is already rankless and, consequently, if it would work as a free-floating unit, without tight definitions. ■

CPT News

CPT News is circulated free of charge worldwide to over a thousand botanic gardens, institutions, libraries and individuals with an interest in cultivated plant taxonomy. It is a great way of publicising your work and stimulating interest in the classification of the plants that we grow. If you have a news story or article that you would like to contribute, please contact James Armitage (jamesarmitage@rhs.org.uk).

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About Hortax

Hortax, formed in 1988, is a small committee of European plant taxonomists and horticulturists with a professional interest in the classification and nomenclature of cultivated plants.

The committee meets to discuss topics of relevance to the *International Code of Nomenclature for Cultivated Plants* (ICNCP) and seeks to find solutions to the plentiful problems presented by humanity's attempts to classify the plants it grows.

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