

Resolve nomenclature

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What should be resolved?



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Nomenclature in Trials

- **Identification** (correct plant – name combination)
- **Preferable name** (Following old or new taxonomical insights; e.g. *Aster dumosus* or *Symphyotrichum dumosus*)
- **Classification system** (cultivar groups, use species name or not, etc.)
- **How to deal with trade names**
- **Capturing the identity of cultivars**



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Important aspects

- **Fundaments of the nomenclature-system**
- **Developments in science**
- **Developments of the industry**



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Fundaments of the nomenclature system



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Binomial system

- **Names of species consist of two parts** (e.g. *Lavandula angustifolia* L.)
- **Developed by Linnaeus** (started in 1753)
- **Every species has one international name** (in Latin)



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Hierarchical system

- Taxa are hierarchical from each other

Family (e.g. Lamiaceae)

Genus (e.g. *Lavandula*)

Species (e.g. *Lavandula angustifolia*)

Subspecies (e.g. *Lavandula angustifolia*
subsp. *pyrenaica*)



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Evolutionary system

- Classification system is based on relationships of plants
- Species names partly represent relationships
 - *Lavandula angustifolia* >> much related
 - *Lavandula stoechas*



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Much variation in plant kingdom (more than 270.000 species)



Distant relatives



Asplenium scolopendrium

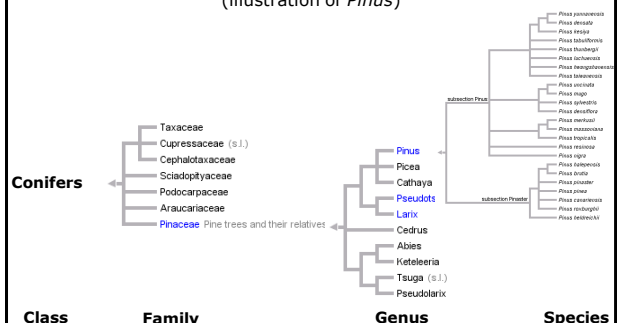


Paeonia lactiflora

Close relatives (e.g. Asteraceae)



Evolutionary tree of Conifers (illustration of *Pinus*)



Nomenclature of cultivated plants

- Based on the system of Linnaeus
- First official code in 1953
- Cultivar is basis



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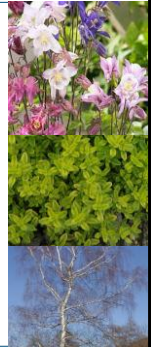
Cultivated plants

Recognized in taxonomy

- Cultivar
- Cultivar group or Group
- Grex (for Orchids)
- Graft Chimaera

Also used in practice

- Mixtures and series
- Provenances
- Cultivar types
- Trade Names and Trademarks



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International rules of plant nomenclature



Wild plants:
Botanical code
(ICBN) - 2006



Cultivated Plants:
Cultivated plant code
(ICNCP) - 2009

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Developments in science

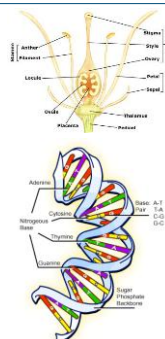


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Rise of DNA-techniques

Classification and identification

- Until 20th century by morphological characteristics (esp. flower)
- From 1950's also pollen morphology, chemical contents and chromosome numbers
- From 1980's DNA analysis
- Revolutionary for plant taxonomy



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Application DNA-techniques in taxonomy

Identification

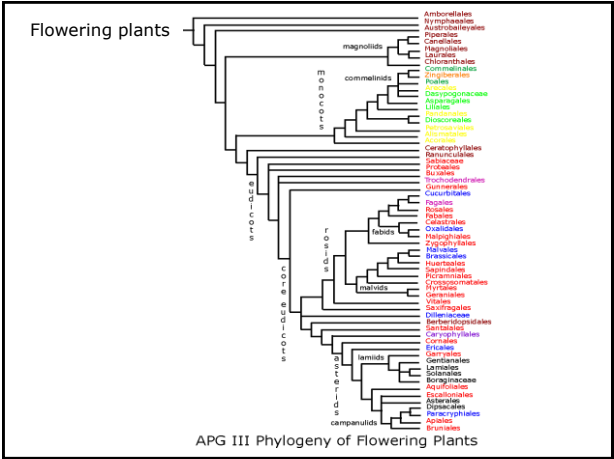
- Mature plants or flowers not necessary
- Check if species / cultivars are the same or not
- Identification after making a DNA-sequence-profile

Determining genetic relationships

- Determine the parentage of plants
- Making phylogenetic trees
- Work on one worldwide classification system based on DNA > Angiosperm Phylogeny Group (APG)



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Many new scientific publications

Figure 3. A ring transformation index (ATI) of isochlorogenic acid and the corresponding evolutionary advancement parameter (EAP) of isochlorogenic acid in the genus Hevea.

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Some new insights

- Water lilies more primitive than Magnolia's
- Apiaceae and Asteraceae are most developed in evolution (not Orchids)
- Monocotyledons no separate evolutionary group from dicotyledons they are derived from primitive dicotyledons

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Changes on family level

Old names (Cronquist)	New names (APG III)	Remarks
Aceraceae Hippocastanaceae Sapindaceae	Sapindaceae	Aceraceae and Hippocastanaceae are removed
Apocynaceae Asclepiadaceae	Apocynaceae	Asclepiadaceae is removed
Buddlejaceae	Scrophulariaceae	Buddlejaceae is removed
Scrophulariaceae	Orobanchaceae Paulowniaceae Plantaginaceae Scrophulariaceae	Many genera are moved to Plantaginaceae
Malvaceae Tiliaceae	Malvaceae	Tiliaceae is removed
Betulaceae Corylaceae	Betulaceae	Corylaceae is removed
Caesalpinaceae Fabaceae Mimosaceae	Fabaceae	Caesalpinaceae and Mimosaceae are subfamilies
Liliaceae	Liliaceae Melanthiaceae Colchicaceae Asphodelaceae Hemerocallidaceae Asparagaceae Alliaceae	Some traditional systems (e.g. Brummit) already did

Changes on genus or species level

OLD NAME	NEW NAME
<i>Cornus stolonifera</i>	<i>Cornus sericea</i>
<i>Cimicifuga</i> spp.	<i>Actaea</i> spp.
<i>Thuja orientalis</i>	<i>Platycladus orientalis</i>
<i>Pernettya</i> spp.	<i>Gaultheria</i> spp.
NEW PROPOSALS	
<i>Aster nov-belgii</i>	<i>Symphotrichum novi-belgii</i>
<i>Sophora japonica</i>	<i>Styphnolobium japonicum</i>
<i>Dicentra spectabilis</i>	<i>Lamprocapnos spectabilis</i>

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Developments in the industry

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Intensification of breeding

■ Complex ancestry cultivars

- More and more cultivars are derived from two or more species
- E.g. *Rosa*, *Rhododendron*, *Magnolia*, *Echinacea*, *Heuchera*, etc.

■ Influence on cultivar names

- *Echinacea* *purpurea* 'Hot Summer' or *Echinacea* 'Hot Summer'
- *Heuchera* *xbrizoides* 'Red Spangles' or *Heuchera* 'Red Spangles'
- Use of cultivar groups
- *xAlcalthea suffrutescens* 'Parkallee' (cross between species of two genera; *Alcea* and *Althaea*)



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Increase of international trade

■ More and more exchange between countries

- Today in USA, tomorrow in UK, NL, D, etc. (and vice versa)

■ >> uniformity of nomenclature very important



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Use of trade names

■ Trade names for cultivars

- *Caryopteris* *xclandonensis* 'Inoveris' (GRAND BLEU)
- *Caryopteris* *xclandonensis* GRAND BLEU ('Inoveris')
- *Rosa* 'Korbin' (ICEBERG)

■ Trade names for series of cultivars

- E.g. SURFINIA Petunia's



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Practice 1.....



Practice 2.....

One cultivar with many names:

- *Rosa* 'Korbin'
- *Rosa* ICEBERG ('Korbin')
- *Rosa* SCHNEEWITTCHEN ('Korbin')
- *Rosa* FEE DES NEIGES ('Korbin')
- *Rosa* BIANCANEVES ('Korbin')



Not only roses.....

- *Hydrangea macrophylla* 'Rambo'
- *Hydrangea macrophylla* LUSI ('Rambo')
- *Hydrangea macrophylla* MAGICAL TOPAZ ('Rambo')
- *Hydrangea macrophylla* STURDY RAMBO ('Rambo')
- *Hydrangea macrophylla* RAMBO BLAUW ('Rambo')
- *Hydrangea macrophylla* RAMBO ROSE ('Rambo')
- Etc.?



Practice 3.....

One Trade name for two cultivars or more:

- Origin recognisable
 - *Hydrangea macrophylla* 'Hobella' (HOVARIA)
 - *Hydrangea macrophylla* 'Homigo' (HOVARIA)
- Keeping name for new cultivars
 - *Vinca minor* ILLUMINATION ('Cahill')
 - *Vinca minor* ILLUMINATION ('Cahill')



Trademarks: protection of names

- Names of species and cultivars can not be protected
- Only trade names can be protected
 - *Caryopteris x clandonensis* 'Inoveris' (**GRAND BLEU®**)
 - **SURFINIA®** 'Pink Vein' >> *Petunia* 'Pink Vein'
- Protection possibilities for different area's
 - International > WIPO
 - EU > OHIM
 - Benelux > Benelux merkenbureau
 - Germany > Deutsches Patent und Markenamt
 - Etc.



Plant Breeders Rights

- Only for protection of new cultivars (genetic ownership)
- Protection always in certain area and for a certain period
 - EU > CPVO
 - National > national organisation
- Information can be out-dated
 - always check at registration agencies
- Indication with PBR
 - E.g. *Aster ageratoides* 'Starshine' PBR

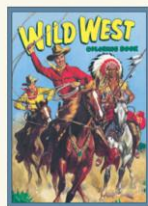


Consequences PBR for nomenclature

- Cultivar names (denominations) of statutory offices is official for the area concerned. This overrules the ICNCP.
- Rules for most statutory offices correspond for 98% with the ICNCP
- Sometimes different statutory offices approved different names for the same cultivar
 - *Hydrangea aborescens* 'Spirit' is PP name in USA; but name was not accepted by CPVO > in Europe: *H. aborescens* 'NCHA1'

Concluding remarks Trade names

- Commercial possibilities
- Nomenclature becomes more complex
- Against principles of the Linnaeus-system (not hierarchic)
- Watch out for a Wild West in nomenclature (no rules & limitations)
- Indication of cultivar name as the identifying name is very important



New reality

- *Geranium* 'FTS001' PBR eu
- *Geranium* LUSI ® nl (= 'FTS001' PBR)
- *Geranium* MAGICAL TOPAZ ® uk (= 'FTS001' PBR)
- *Geranium* BLAUER HEINZ ® D (= 'FTS001' PBR)
- *Geranium* PETIT FILE ® F (= 'FTS001' PBR)
- *Geranium* FUJI ® Japan (= 'FTS001' PBR)
- *Geranium* MAGICAL TOPAZ ® uk (= 'FTS002' PBR NL)
- *Geranium* BLAUER HEINZ = ??????

Difficulties to resolve nomenclature



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Different views

- Difference between taxonomical publications
- Different interpretation of rules (e.g. ICNCP)
- Difference between statutory offices
- Difference between registration authorities (e.g. Plantfinder and List of names of woody plants)



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Conflicting interests

- Science
 - One name for one plant
 - The best system that represents genetic relationships
 - Names can change by new results
- Industry
 - No changes of names
 - Commercial use of names
 - One plant can have more names



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Complexity of modern nomenclature

- Cultivated plants more and more moving from the wild plants
- Amount of cultivars (e.g. *Rosa*, *Hosta*, *Heimerocallis*, etc.)
- Trade names don't fit in the hierarchical system

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Solutions

Better communication and coordination

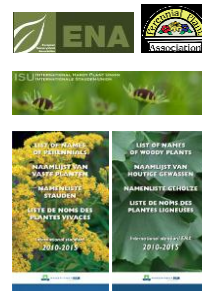
- Between statutory offices
- Between statutory offices and ICNCP (& ICRA'S)
- Between science and industry



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Lists of names of woody plants & perennials

- Woody plants
 - International use
 - Under auspices of ENA
 - Every 5 years new editions and every 10 years taxon. changes
 - Scientific basis but must be useful for the industry
 - Trade names (which ones?)
 - Planning of implementing new botanical names
- Perennials
 - Under auspices of ISU / PPA
 - Etc.



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Importance of trials for nomenclature



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Solve problems on identification

- Cultivars not true to name
 - *Caryopteris ×clandonensis* 'Kew Blue'
 - *Ribes sanguineum* 'King Edward VII'
- Different clones for one cultivar
 - *Hedera helix* 'Arborescent'
 - *Aucuba japonica* 'Variegata'



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Capture identity of cultivars

- Good descriptions (Important!)
- Herbarium (optional)
- Pictures (Important!)
- DNA – profiles (Optional; expensive)
- Living collection (Important!)



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Example: *Taxus ×media* 'Hicksii'

- Conflict between grower and recipient
- DNA comparison with material of living collection
- Conflict resolved



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Update classification system

- Classify cultivar under correct species
- Or not when it is a hybrid
- Classify cultivars in cultivar groups



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Example: *Weigela*

- Dwarf Group
- Variegata Group
- Aurea Group
- Purpurea Group
- White-flowered Group
- Red-flowered Group
- Pink-flowered Group
- Bicolor Group



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Thank you for your attention!

