

# ELL Taxonomy

Thurs 31 May 2012

## Aims of the day

Demystification and Illumination. Not to become experts but:

- to understand what plant classification is, and why it's useful
- to understand and respect the reasons botanical Latin names are used, but also be aware of their limitations

1<sup>st</sup> thing to clarify is the use of the word 'family' which has a particular meaning in botany. So beware of asking 'Is it in the same family?'. More about this later.

## What is Taxonomy?<sup>1</sup>

Taken from [www.nhm.ac.uk/nature-online](http://www.nhm.ac.uk/nature-online) and [www.kew.org](http://www.kew.org). See *Kew information sheet on Plant Names*<sup>2</sup>

Taxonomy is the science of identifying and naming species and organising them into systems of classification. The names given to species don't just tell us what they are called, but also tell us about how they are related to one another.

There are a lot of plants out there. Trying to get to grips with them without understanding a bit about their classification is like trying to master a language without learning any grammar.

Since the 1750s, species have been classified according to the sexual characteristics of their flowers. See *Kew information sheet on Flower Structure*<sup>3</sup>. Nowadays taxonomists have sophisticated technologies at their disposal to investigate the relationships between plants, like DNA sequencing, or scanning electron microscopes which reveal shapes of pollen grains that are typical to species.

## Why use botanical Latin plant names?

It's not just about cliquey jargon. A plant can have many common names even within one language, but the botanical name uniquely identifies it and is recognised internationally. eg

The plant *Alliaria petiolata* has many common names, including Garlic mustard, Jack-by-the-hedge, Garlic Root, Hedge Garlic, Sauce-alone, Jack-in-the-bush, Penny Hedge, Poor Man's Mustard...

The common name Marigold may refer to any of the following different plant species: [Wikipedia]

- Pot marigold *Calendula officinalis*
- Mexican marigold *Tagetes erecta*
- Tree marigold *Tithonia diversifolia*
- Desert marigold *Baileya multiradiata*
- Corn marigold *Glebionis segetum*
- French marigold *Tagetes patula*
- Marsh marigold *Caltha palustris*

Why might this matter?

- French Marigold is used in companion planting for many vegetable crops. Its root secretions kill nematodes in the soil and it is said to repel harmful insects, such as white fly amongst tomatoes.
- Calendula widely used in cosmetics and alternative medicine. It is used as food plants by the larvae of some Lepidoptera species including Cabbage Moth, so it is advisable not to plant it in vegetable gardens.

## Why do they have to be in Latin?

Latin has traditionally been the international language of science. Note that botanical Latin has evolved a long way from the language of the Romans.

## How do botanical names work?

In the 1750s Carl Linnaeus wrote a guide to the world's flora, in which he gave every plant a 2-part (**binomial**) name analogous to our surname and first name. This was a succinct alternative to the long Latin names of the time. His **binomial system** is still used today for the scientific names of all organisms. The first part of the name is called the **genus** and is always capitalised. The second part is called the **species** and is not capitalised.

So for example the scientific name for an apple is *Malus domestica*. That of the Peach is *Prunus persica*. The scientific name for you and me is *Homo sapiens*.

1 Nothing to do with stuffed dead animals

2 [www.kew.org/ksheets/pdfs/b2names.pdf](http://www.kew.org/ksheets/pdfs/b2names.pdf)

3 <http://www.kew.org/ksheets/pdfs/b4flower.pdf>

## Are botanical names meaningful and informative?<sup>4</sup>

Some words can be helpfully descriptive. Eg these species names:<sup>5</sup>

- *domestica* of / from the house
- *officinalis* of the officina (the monastery storeroom) ie real or supposed medicinal properties
- *aridus* growing in dry places
- *vulgaris* common
- *trifolium* three-leaved

However names can also be quite random; or frivolous (eg anagrams); or downright misleading (eg It turned out

Here is my favourite set of plant names:

- London Plane ***Platanus x acerifolia***
- Sycamore ***Acer pseudoplatanus***
- Norway Maple ***Acer platanoides***

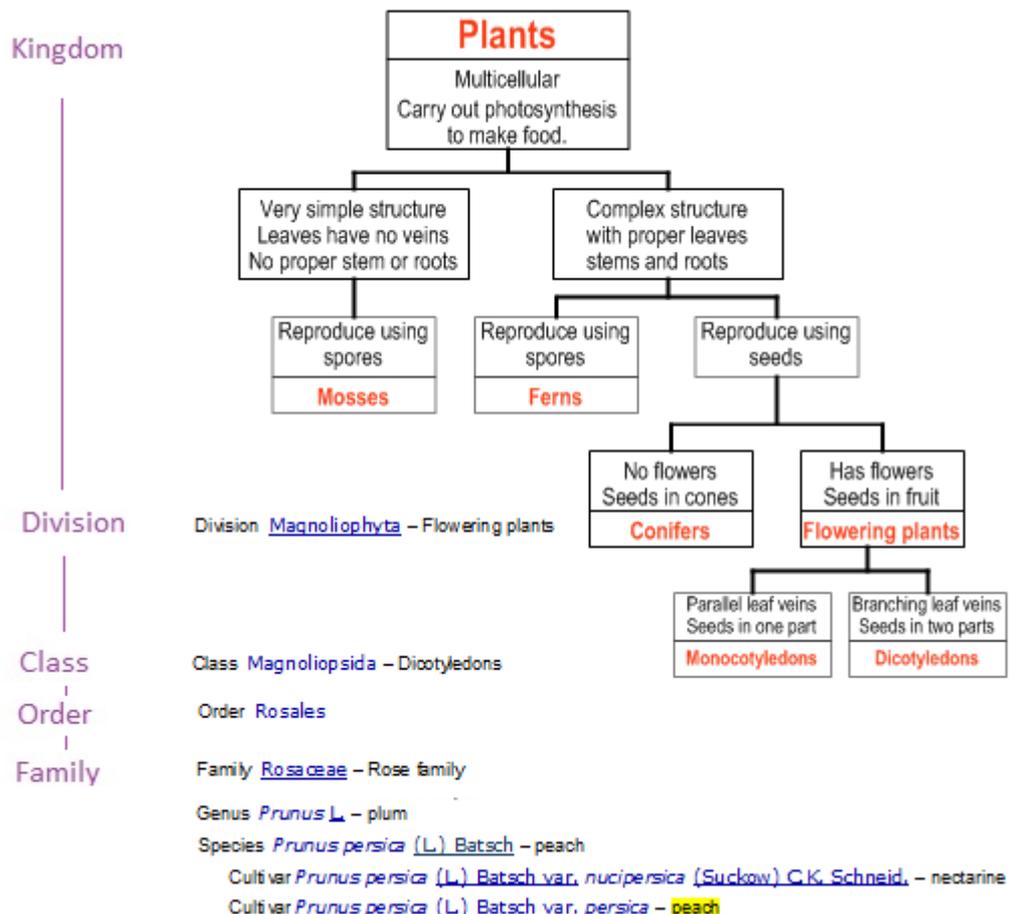
And delightfully: The name 'Sycamore' is used for a Maple in the UK, but a Plane tree in the USA

the peach came from China, not Persia); or entertaining...

There are plenty more delights to be found at <http://www.curioustaxonomy.net/>. Like *Damnaxanthodium calvum* – referring s to the problem of distinguishing daisy look-alikes; and Rev. Samuel Goodenough's 1808 description of Linnaeus: "To tell you that nothing could equal the gross prurience of Linnaeus's mind is perfectly needless. A literal translation of the first principles of Linnaean botany is enough to shock female modesty".

## How do the botanical names help with classification?

The plant classification hierarchy goes something like this: Kingdom, Division, Class, Order, Family, Tribe, **Genus, Species**, Subspecies, Cultivar... So the genus name tells us where a plant fits in the family tree.<sup>6</sup>



<sup>4</sup> Sometimes

<sup>5</sup> [http://en.wikipedia.org/wiki/List\\_of\\_Latin\\_and\\_Greek\\_words\\_commonly\\_used\\_in\\_systematic\\_names](http://en.wikipedia.org/wiki/List_of_Latin_and_Greek_words_commonly_used_in_systematic_names)

<sup>6</sup> Try looking up any plant on: <http://plants.usda.gov/classification.html>

Don't be overwhelmed. We only need to get to grips with **Family, Genus, Species** and **Cultivar** (= Cultivated Variety). And note that you don't have to learn the botanical names to understand and make use of the family relationships.

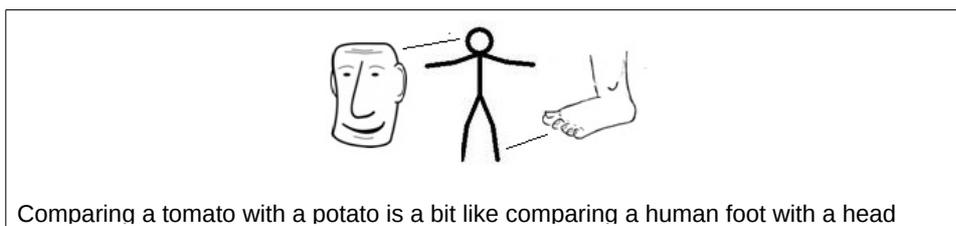
## Beware of reading too much into the relationship...

Genera (plural of genus) are grouped into **families**. Note that the term 'family' has a particular meaning in the classification, and doesn't necessarily pin a plant down to a small group. For example the Rose family contains more than 2800 species.

Family names have been standardised to a typical genus name + 'aceae' (meaning having the nature of). Many books (and people!) still use old names. If in doubt consult an updated source, like Wikipedia. For example the Cabbage family used to be called 'Cruciferae' but is now called 'Brassicaceae'.

## Looking for family resemblances

To look at them, it is not immediately obvious that the Potato *Solanum tuberosum* and Tomato *Solanum lycopersicum* are closely related. But are we making a reasonable comparison?



Look at the flowers of members of the Solanaceae family; eg tomato, potato, bell pepper, goji, aubergine; and you'll see more of a family likeness. (5 petals and 5 stamens.) **So always remember to compare like with like.** Note: In 1753 Linnaeus listed 23 species of the Solanum genus. Now there are thought to be more than 2000.<sup>7</sup>

## Back to the peach



Scientific classification: Family: Rosaceae

Genus: Prunus

Species: P. persica

Binomial name: *Prunus persica* (L.) Batsch

**A small selection<sup>8</sup> of its family tree**

## Will any of this knowledge enhance your life?<sup>9</sup>

### It will explain the use of horticultural techniques

Crop rotation: Relies on growing plants in family groups.

Grafting: family relationships are important to understand scion–rootstock compatibility.

### It is essential for foraging and botanising

Wildflower books are arranged by plant family, and all field identification is much easier if you know how to look

From **Miles Irving: The Forager Handbook**

*I have found it much easier to identify a plant once familiar with the characteristics of the major families; I also find that it is a great aid to memory knowing which other plants a particular plant is related to.*

for family resemblances.<sup>10</sup>

Eg: 'The Cabbage family contains no poisonous species'. So when I identify and nibble a species of Brassica, I have the reassurance of knowing that it's not dangerous, even if it's unpalatable.

<sup>7</sup> <http://www.nhm.ac.uk/nature-online/science-of-natural-history/taxonomy-systematics/history-taxonomy/session5/index.html>

<sup>8</sup> There are about 430 species in the genus Prunus

<sup>9</sup> Yes

<sup>10</sup> [www.wildflowers-and-weeds.com/Tutorial/Patterns\\_in\\_Plants.htm](http://www.wildflowers-and-weeds.com/Tutorial/Patterns_in_Plants.htm) has some nice drawings and photos illustrating family likenesses

The Mint family: 'with no really dangerous plants and no similar poisonous plants, this is a safe plant family with which to work.'

The Carrot family contains poisonous species, so 'take the necessary time to learn to distinguish between them'

### It will give you a general feeling of **enlightenment**

You'll find this explains all sorts of things that have been causing you confusion, even if you didn't realise it. eg

#### Similar common names can lead to false assumptions about relationships

- Valerian ***Valeriana officinalis*** is known for its medicinal use as a sedative, but Red Valerian ***Centranthus ruber*** is a common local plant with no medicinal properties
- Jerusalem Artichoke ***Helianthus tuberosus*** is often confused with Globe Artichoke ***Cynara cardunculus***
- Rhubarb ***Rheum*** species is not related to Rhubarb chard, a colourful form of ***Beta vulgaris***
- What tree do I mean when I use the name 'Laurel'? It can refer to ***Laurus nobilis***, the fragrant bay leaf used in cooking, or to the Cherry Laurel ***Prunus laurocerasus***, a very commonly (but not wisely) planted shrub that's chock full of cyanide

#### More name confusion...

The genus ***Nasturtium*** is different from the common name Nasturtium

Common Name	Botanical Name	Family
<u>Nasturtium</u>	<i>Tropaeolum majus</i>	Nasturtium family
Water cress	<u><i>Nasturtium officinale</i></u>	Cabbage family

Confusion in the Geraniaceae family:

Common Name	Botanical Genus Name
Hardy Geranium / Cranesbill	<u><i>Geranium</i></u>
<u>Geranium</u> / Storksbill	<i>Pelargonium</i>

### Find out more...

You can visit the 'family beds' at Kew - currently being reorganised to reflect taxonomy updates!

#### References and further reading:

Classifying plants and fungi at Kew: <http://www.kew.org/science-conservation/diversity-challenge/plant-fungi-classification/index.htm>

[TheSeedSite.co.uk](http://TheSeedSite.co.uk) Full of interesting information about seeds, plants, botany and here in particular...

<http://TheSeedSite.co.uk/Families.html> ...about plant families

An excellent read from The Natural History Museum: What's in a name? A history of taxonomy

[www.nhm.ac.uk/nature-online/science-of-natural-history/taxonomy-systematics/history-taxonomy](http://www.nhm.ac.uk/nature-online/science-of-natural-history/taxonomy-systematics/history-taxonomy)

Why Plants Change Their Names <http://www.kew.org/science/names.html>

And of course, the marvellous Wikipedia [http://en.wikipedia.org/wiki/United\\_Kingdom](http://en.wikipedia.org/wiki/United_Kingdom)

Big changes for names: <http://www.kew.org/news/kew-blogs/herbarium/big-changes-for-plant-names.htm>

#### Really nerdy...:

One-week Botanical Nomenclature course at Kew: [www.kew.org/learn/specialist-training/courses-a-z/botanical-nomenclature-training/Botanical-nomenclature-course.htm](http://www.kew.org/learn/specialist-training/courses-a-z/botanical-nomenclature-training/Botanical-nomenclature-course.htm)

The International Association for Plant Taxonomy (IAPT) [http://www.iapt-taxon.org/index\\_layer.php](http://www.iapt-taxon.org/index_layer.php) including

The International Code Of Botanical Nomenclature