

Professional taxonomy

What's in a name?

Appearances can be deceptive

- Knowing what a plant is can help us in predicting things about it
- Standardised names allow us to share knowledge
- Accurate naming is essential in, e.g., biodiversity assessments, conservation, medicine and forensics



When is a cactus not a cactus?





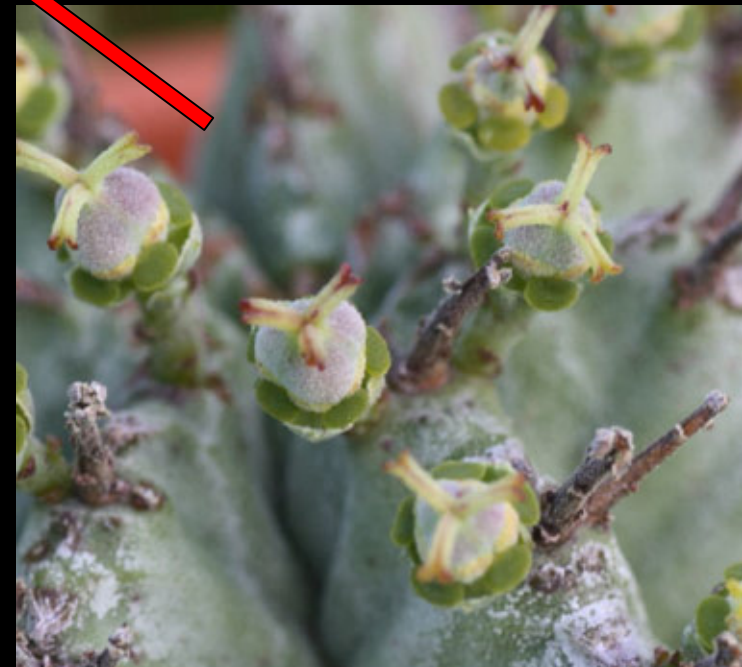
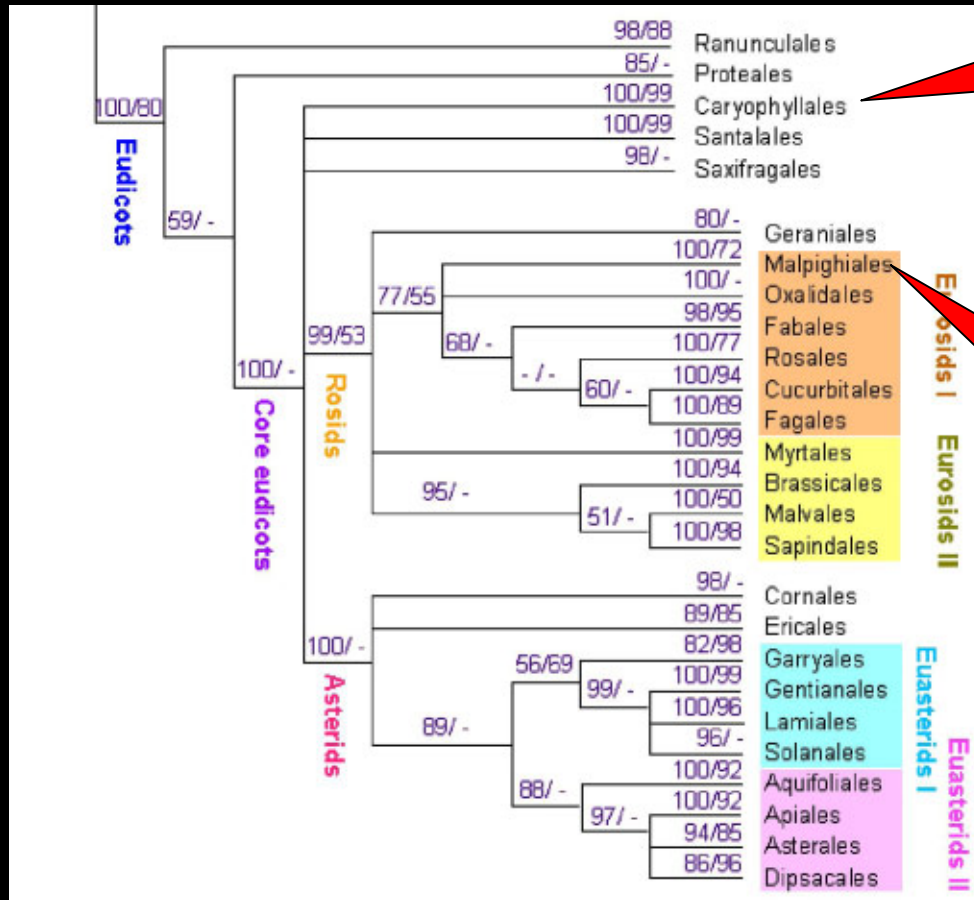
When it's a
spurge...



When it's a
spurge...

or a phone mast





Similar structures in unrelated plants can confuse identification and predictions about characteristics

-similarity due to shared function, not ancestry

e.g. succulent stems and reduced leaves in plants adapted to growing in arid areas (including cacti and some spurges)

pitcher plants have modified leaves for trapping and digesting insects



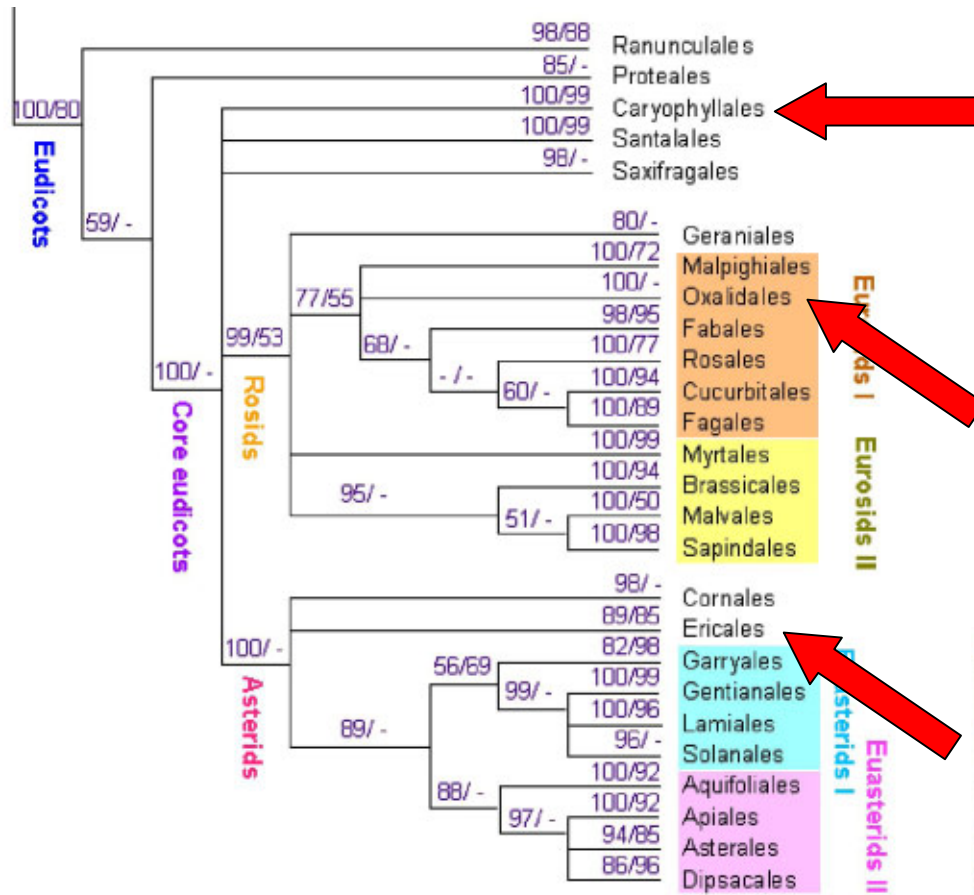
Nepenthes

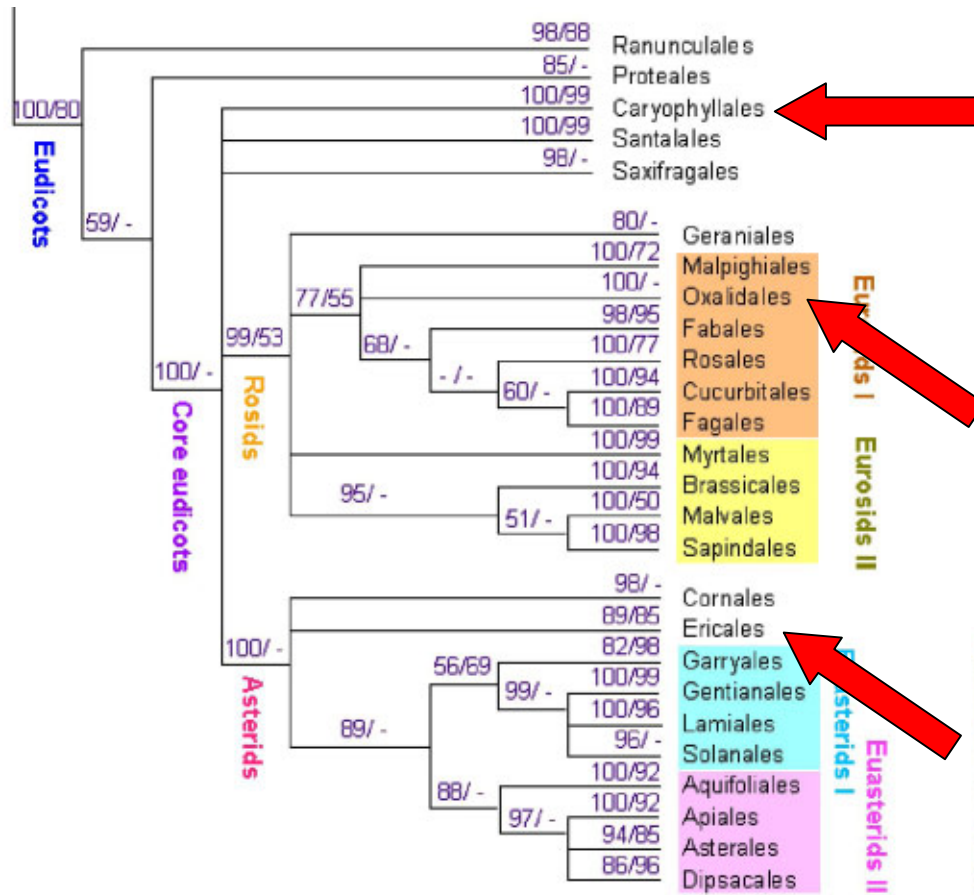


Cephalotus



Sarracenia



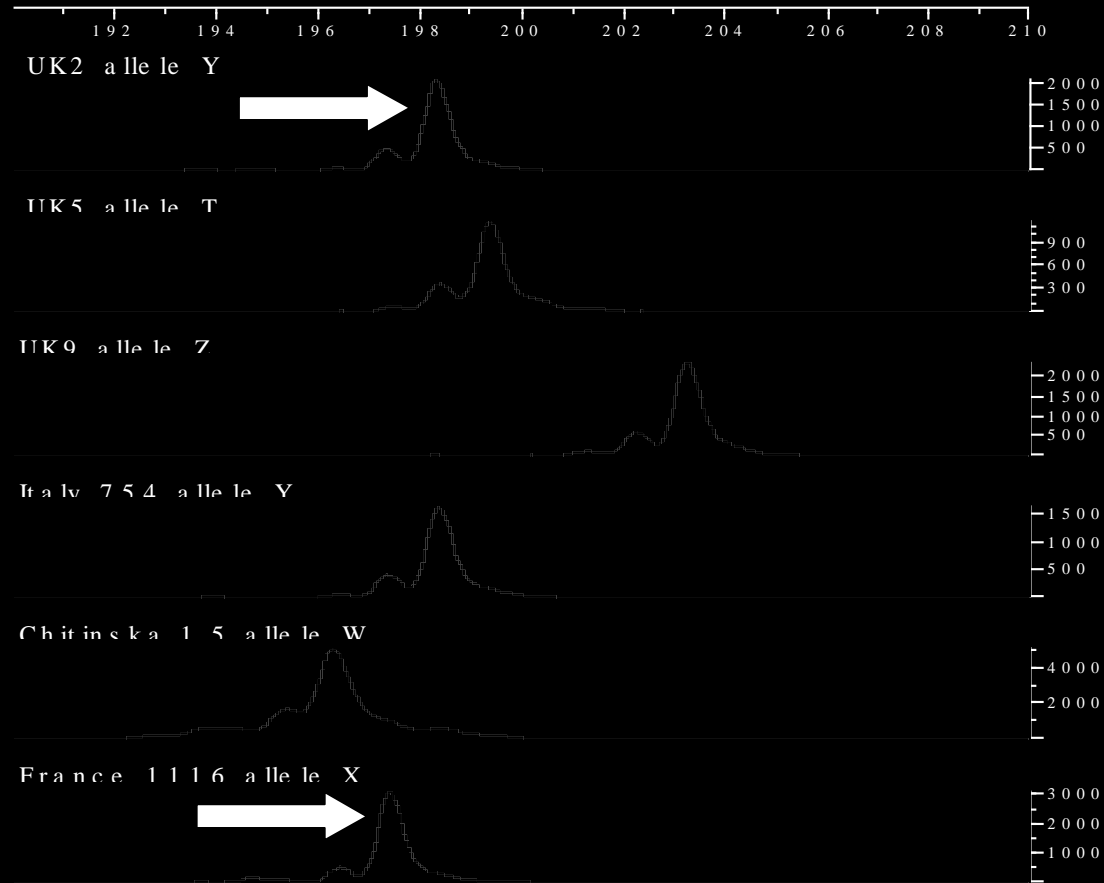




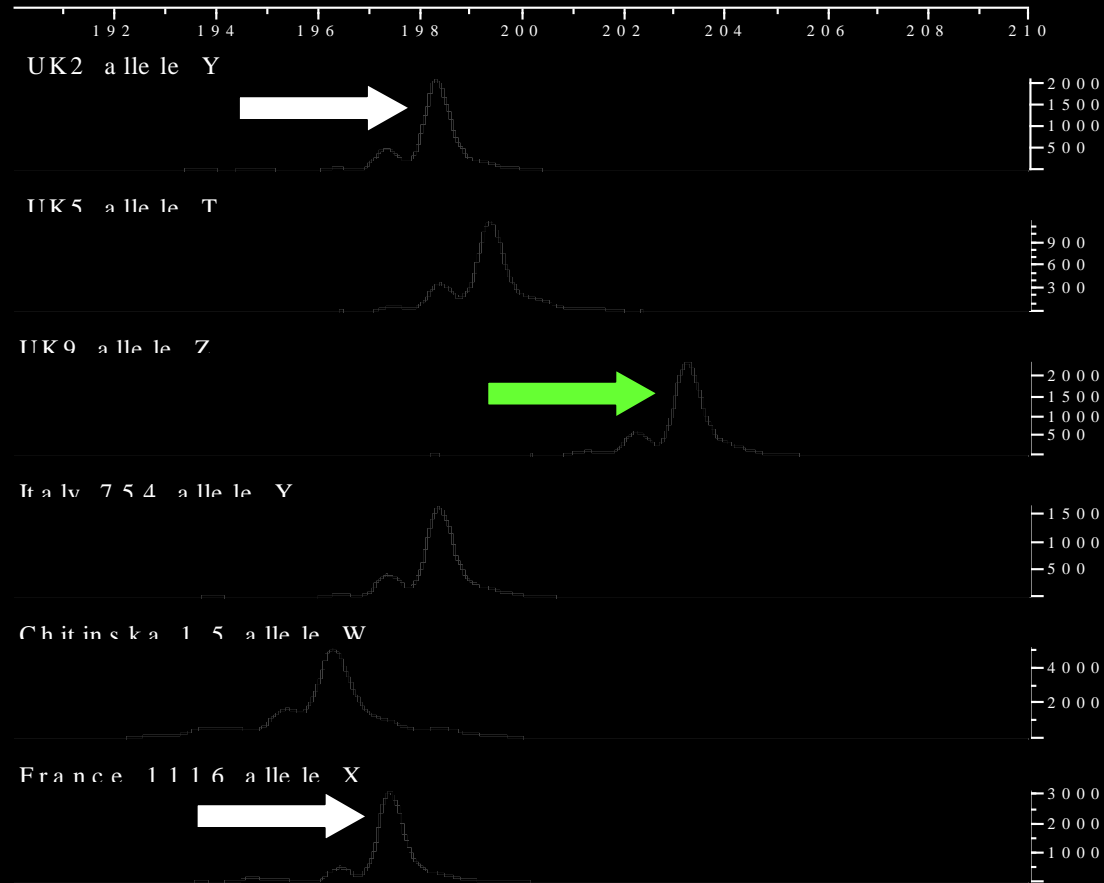
Lady's slipper orchid – one of
Britain's rarest plants



Excitement when new plant discovered near
Harrogate – but was it native or introduced?



common types in western Europe,
including all UK 'natives'

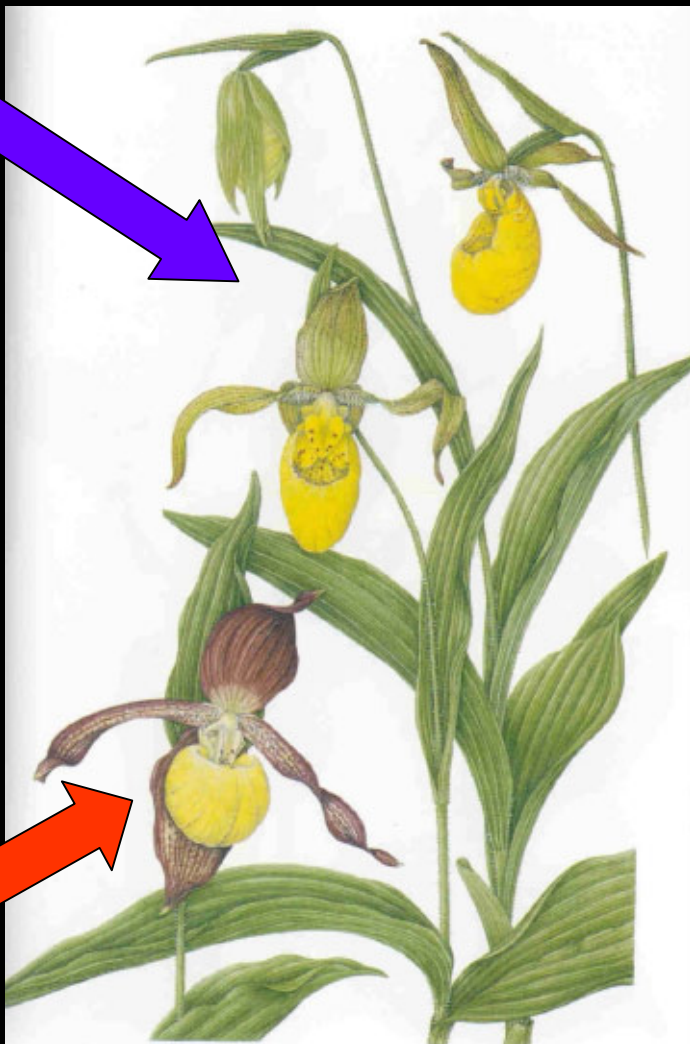
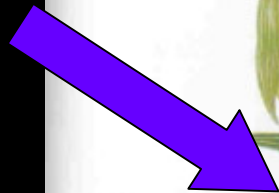


Harrogate plant didn't match –
phylogenetic studies showed it
wasn't even the right species!



C. calceolus in the traditional (broad) sense

parviflorum var. *pubescens*



calceolus



parviflorum var. *parviflorum*





North America



Eurasia



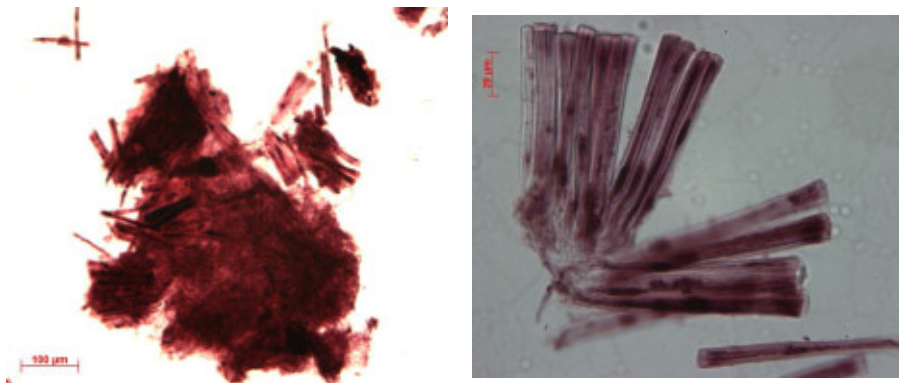
Yellow and brown flowered species have evolved twice

Change in conservation activity as a result

- All seedlings from cross pollination excluded from reintroduction programme
- Plant left where it was – too far from any true *C. calceolus*, so no risk of natural cross pollination.

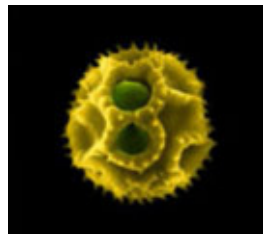
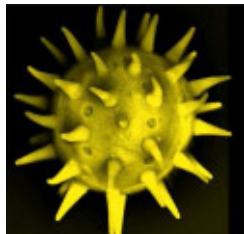
The torso in the Thames

- Comparison of fragments of plant tissue (bits of seeds and leaves) with intact specimens showed this to be a ritual killing of a boy

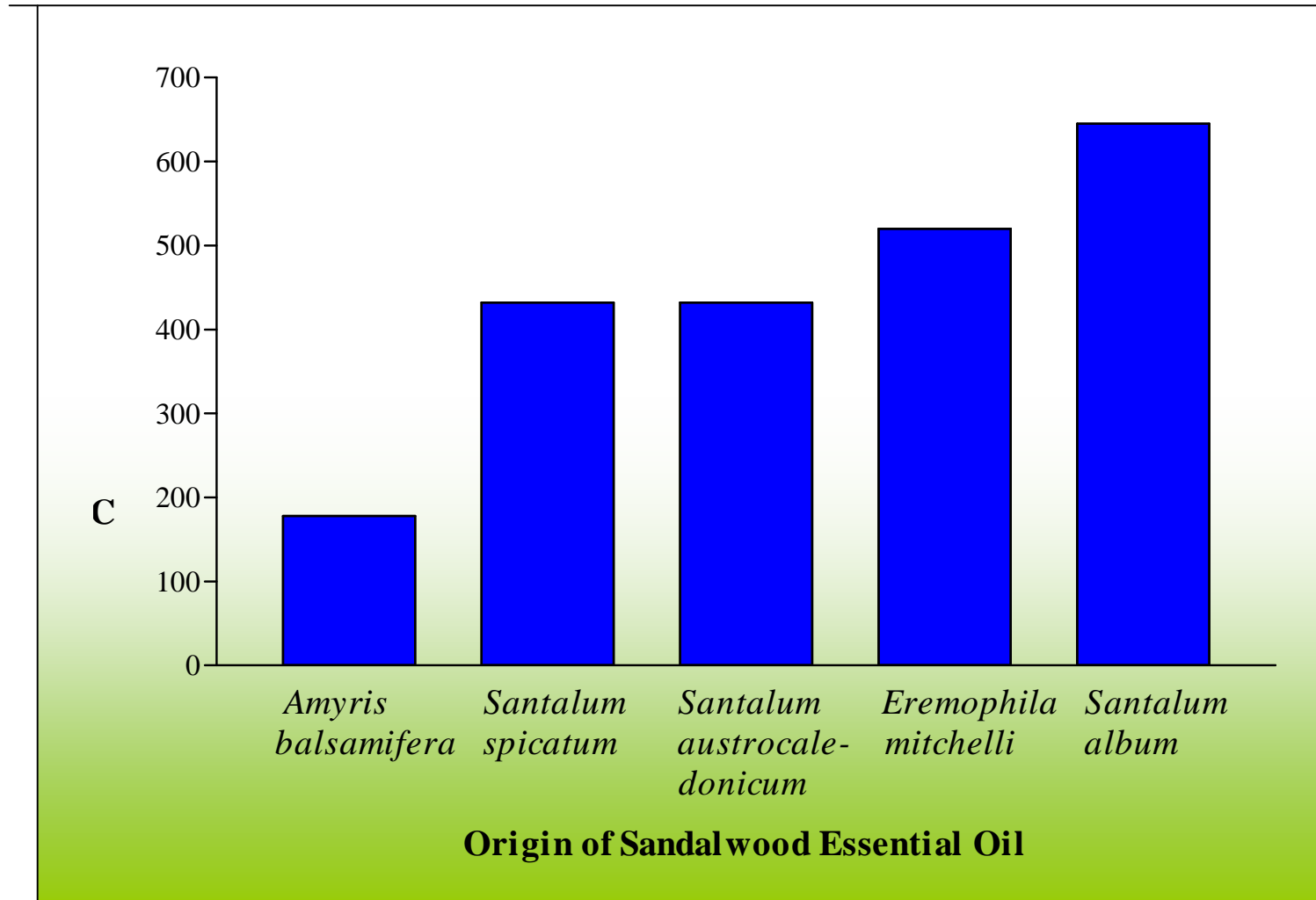


The torso in the Thames

- Comparison of fragments of plant tissue (bits of seeds and leaves) with intact specimens showed this to be a ritual killing of a boy
- Pollen grains from lungs showed that he had only recently arrived in Britain from West Africa



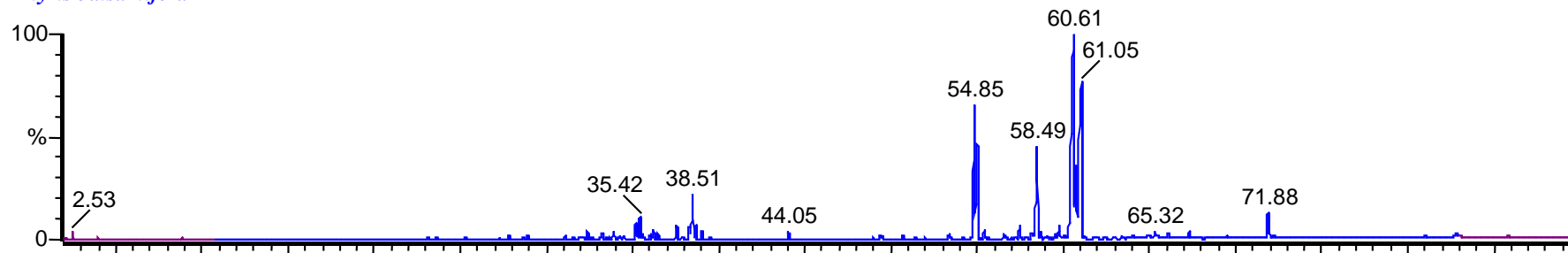
Cost



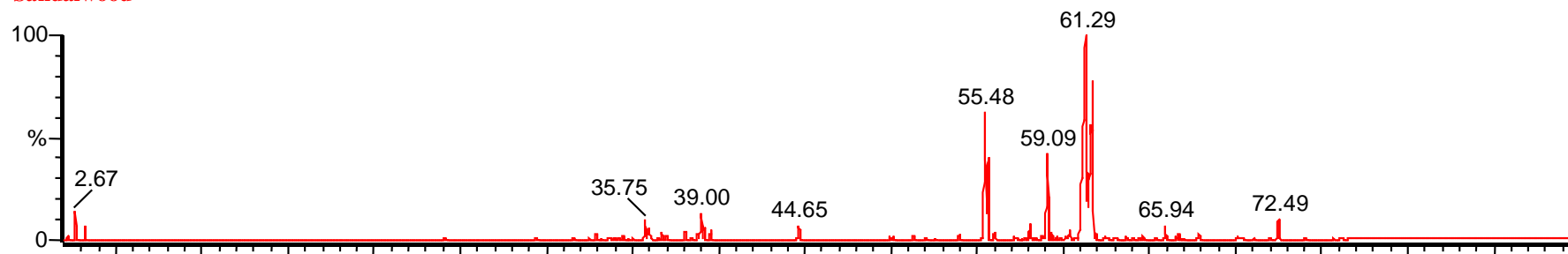
ROYAL
BOTANIC
GARDENS
KEW

GC-MS Chromatograms of Three Trade Sandalwood Samples

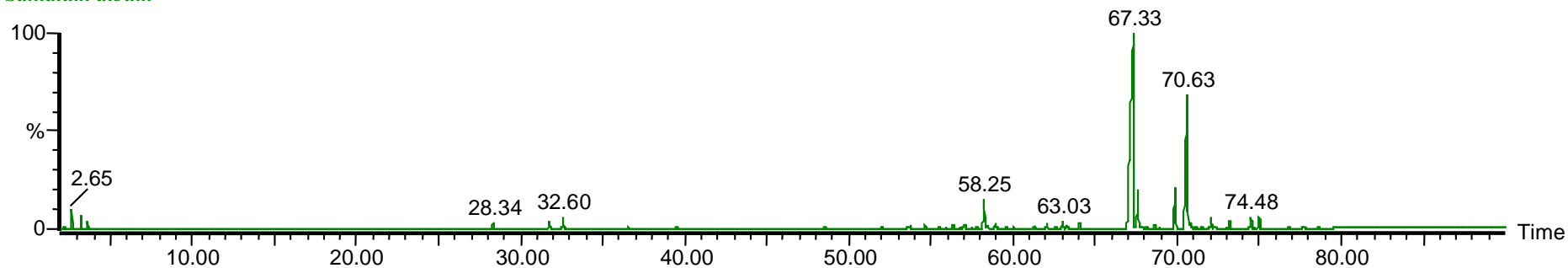
Amyris balsamifera



'Santalwood'



Santalum album



Illicium verum (star anise) – don't eat your pot pourri!



← Freshly steamed fruits are dried in sun



Dried fruits used for medicinal purposes and food →

Is Chinese star anise adulterated with
Japanese star anise?

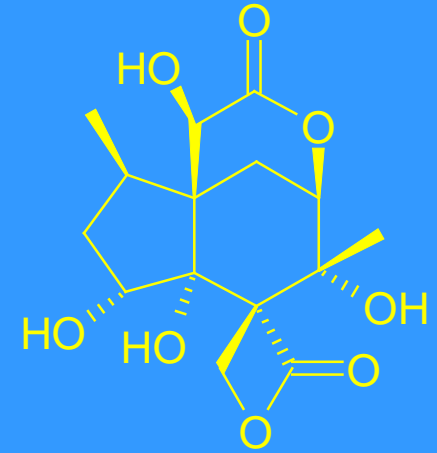


Illicium anisatum
Japanese star anise



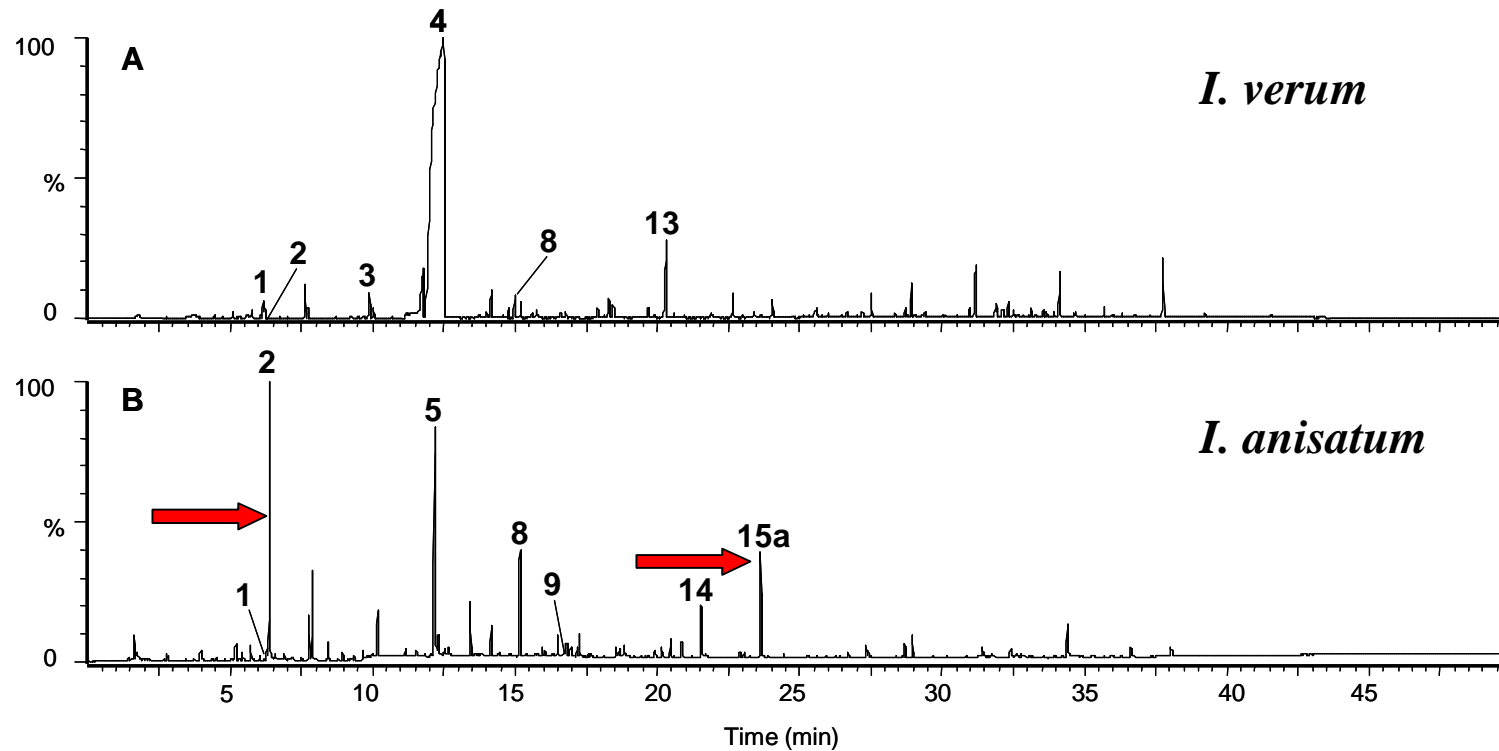
Illicium verum
Chinese star anise

Japanese star anise



- ❖ *Illicium anisatum* L.
- ❖ Associated with adverse effects: emesis, bradycardia, hallucinations, convulsions
- ❖ Neurotoxic sesquiterpene lactones e.g. **anisatin**

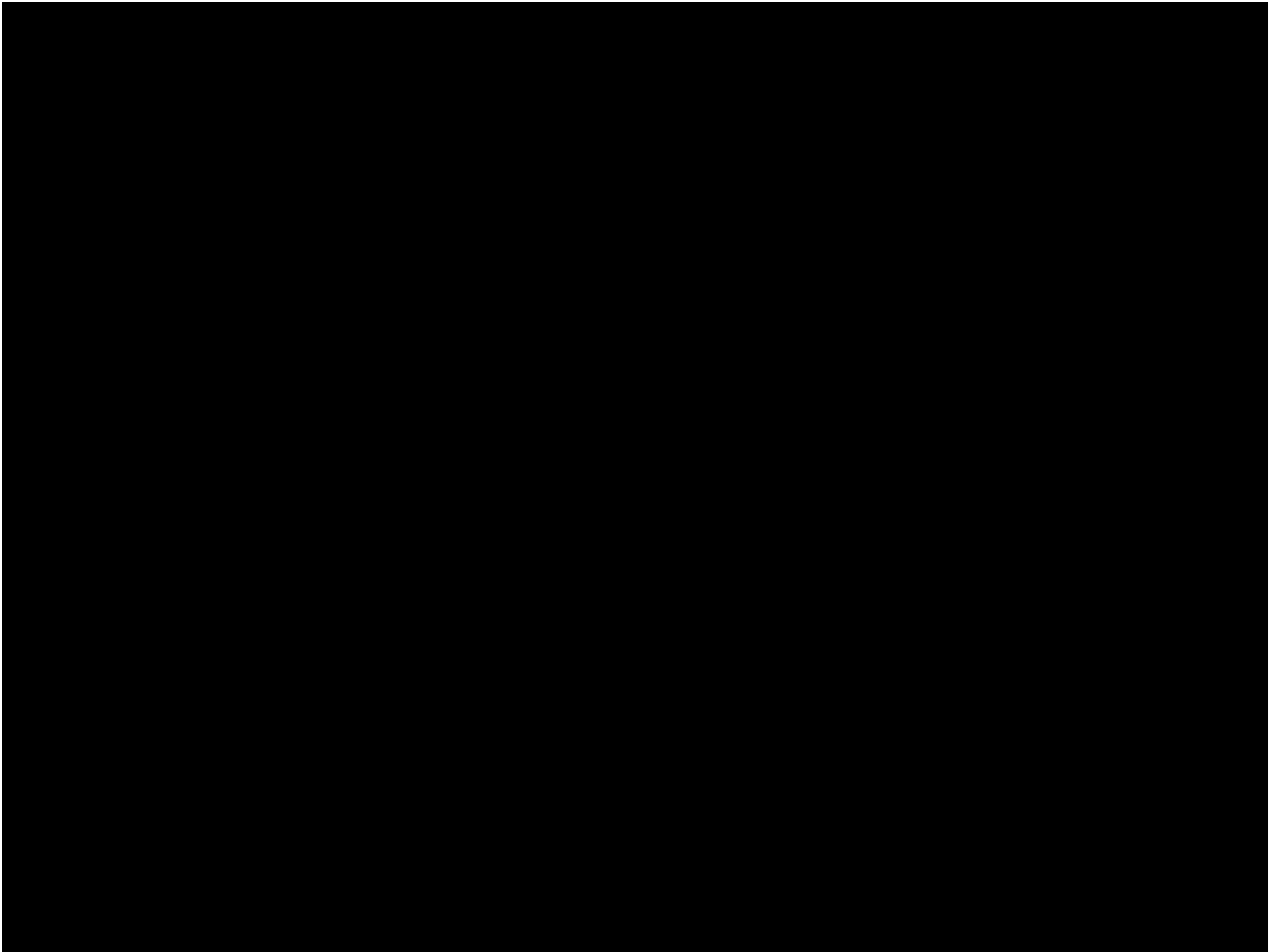
GC-MS total ion chromatograms of thermally desorbed components of *Illicium verum* and *I. anisatum* fruit pericarps



1 = limonene, 2 = 1,8-cineole, 3 = estragole, 4 = (*E*)-anethole, 5 = safrole, 6 = eugenol, 8 = (*E*)-caryophyllene, 9 = asaricin, 12 = methoxyeugenol, 13 = foeniculin, 14 = eugenol derivative, 15a = methoxyeugenol derivative.

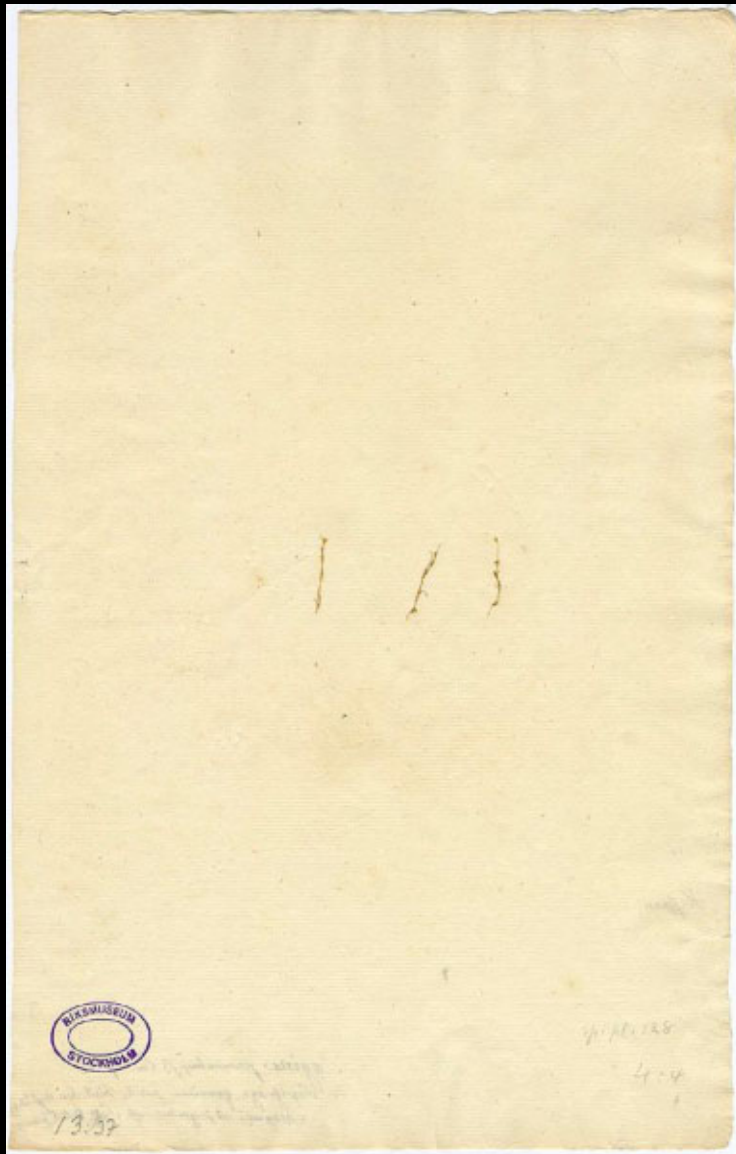
Taxonomy

- Getting the correct name on a plant is essential for
 - understanding relationships
 - biological inventory
 - conservation
 - medicine and forensic science



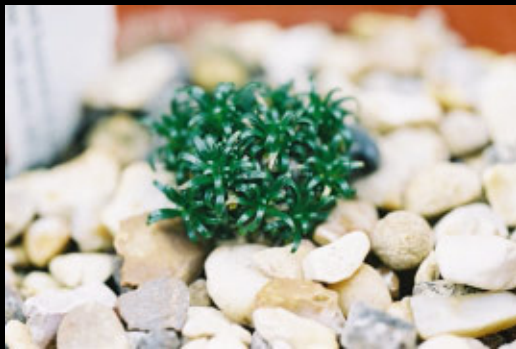
Sagina in the British Isles

- Eight native spp. plus two hybrids in BI (Stace, 1997)



Sagina in the British Isles

Eight native species plus two hybrids in BI (Stace, 1997)



- Only seven in New Atlas (2002) as *S. boydii*, a presumed native, is of uncertain origin...



S. procumbens



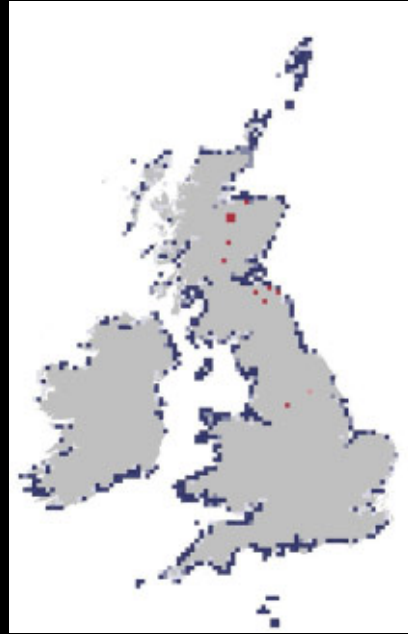
S. maritima



S. nivalis



S. procumbens



S. maritima



S. nivalis



S. boydii

'Supposed to have been found in Braemar in 1878 by Mr W. B. Boyd. He does not remember gathering it.... He had received about that time living plants from Switzerland for his garden, and there is the chance that it may be of foreign origin'

[Druce, 1920]

Sagina boydii (Boyd's pearlwort)

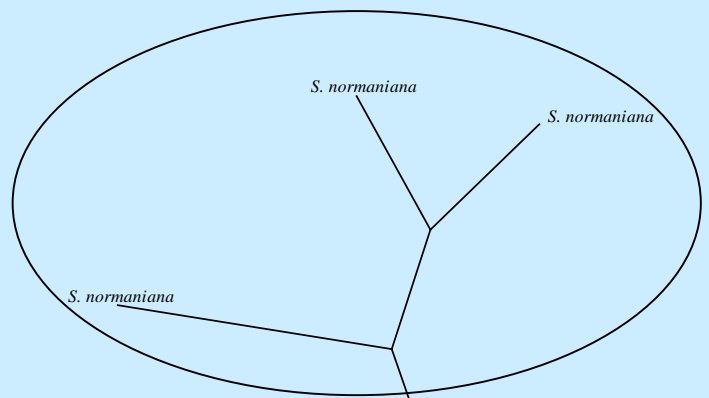


Is this a distinct species?

If so, is it a Scottish endemic?

Preliminary studies showed close relationship to *S. procumbens*, *S. saginoides* and their hybrid, *S. x normaniana*

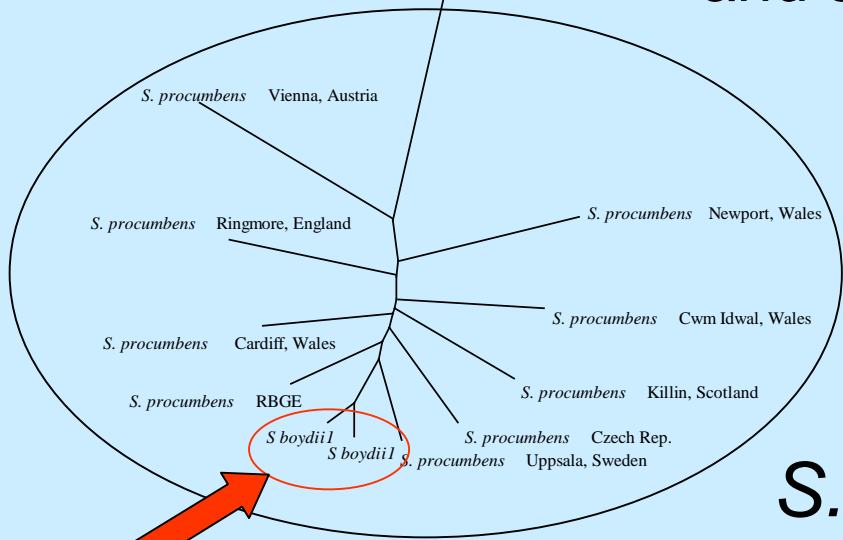
More detailed study.....



S. x normaniana

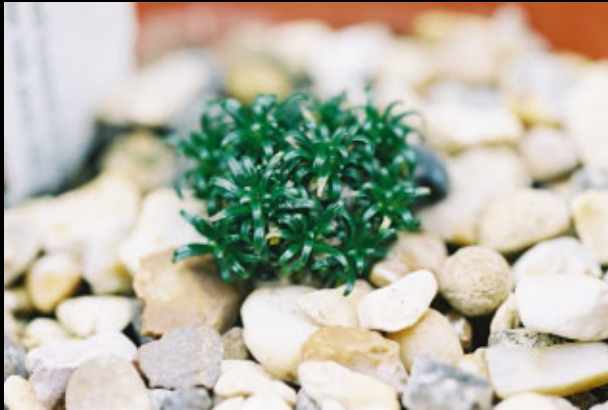
S. saginoides

S. boydii is embedded in *S. procumbens*
and should be included in that species



S. procumbens

Sagina boydii (Boyd's pearlwort) R.I.P.



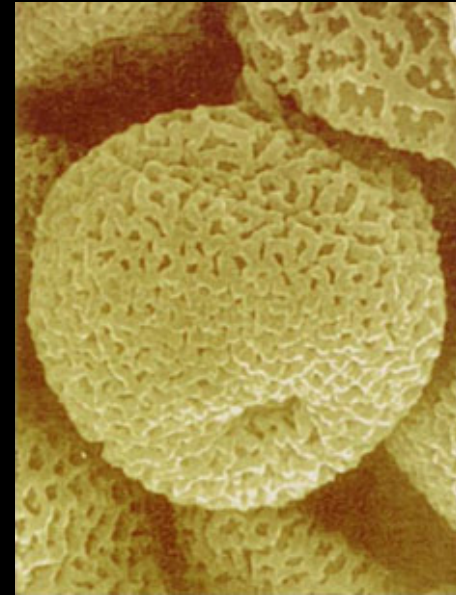
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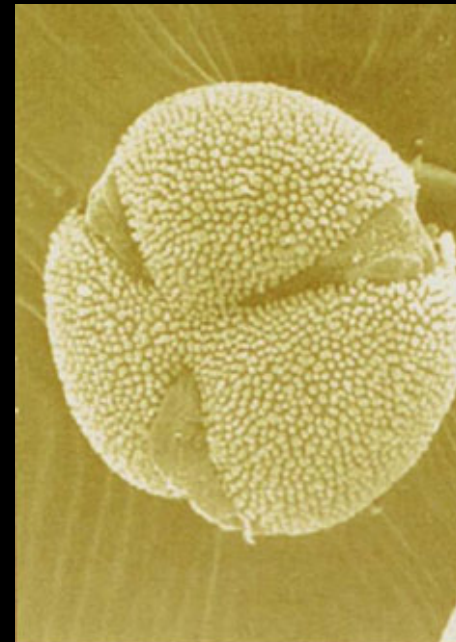
Is this a distinct species? **NO**

If so, is it a Scottish endemic? **n/a**

monocots plus “primitive dicots”



eudicots (tricolpates)



Nelumbo
Lotus



triaperturate pollen

Nymphaea
waterlily



Protea
Proteaceae



triaperturate
pollen



Platanus
Platanaceae

Differentiating frequently confused species 'Mu Tong' group



Akebia quinata
Lardizabalaceae



Clematis montana
Ranunculaceae



Aristolochia manshuriensis
Aristolochiaceae



Differentiating frequently confused species

'Mu Tong' group



Akebia quinata
Lardizabalaceae



Clematis montana
Ranunculaceae



Aristolochia manshuriensis
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