

What's in a Name?

Plant Taxonomy for Cut Flower Growers



CAROLI LINNÆI
S:Æ R:IGIÆ MITIS SVECIÆ ARCHIATRI; MEDIC. & BOTAN.
PROFESS. UPSAL; EQUITIS AUR. DE STELLA POLARI;
HCC NON ACAD. IMPER. MONSPÆL. BEROL. TOLOS.
UPSAL. STÖCKH. SOC. & PARIS. CORESP.

SPECIES PLANTARUM,

EXHIBENTES
PLANTAS RITE COGNITAS,

AD
GENERA RELATAS,
CUM

DIFFERENTIIS SPECIFICIS,
NOMINIBUS TRIVIALIBUS,
SYNONYMIS SELECTIS,
LOCIS NATALIBUS,

SECUNDUM
SYSTEMA SEXUALE
DIGESTAS.

TOMUS I.

Cum Privilegio S. R. Mitis Sueciæ & S. R. Mitis Poloniæ ac Electoris Saxon.

HOLMIÆ,
IMPENSIS LAURENTII SALVII.
1753.

C. Appelgren

I am a plant systematist



What is systematics?



Systematics is the study of the evolutionary diversity of life

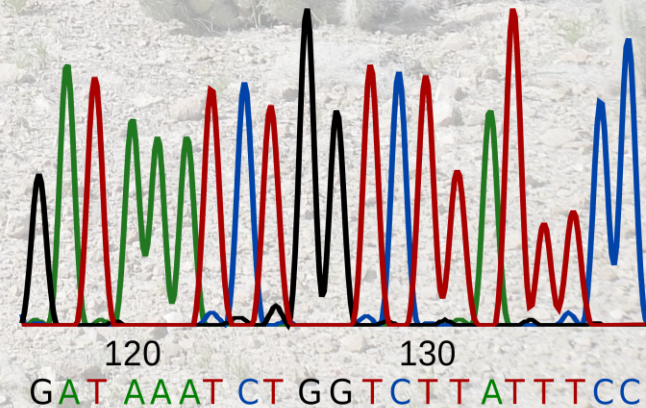
Systematics intersects with just about every part of biology

What is systematics?



3 parts to systematics:

- 1) taxonomy**
- 2) phylogenetics**
- 3) evolution**

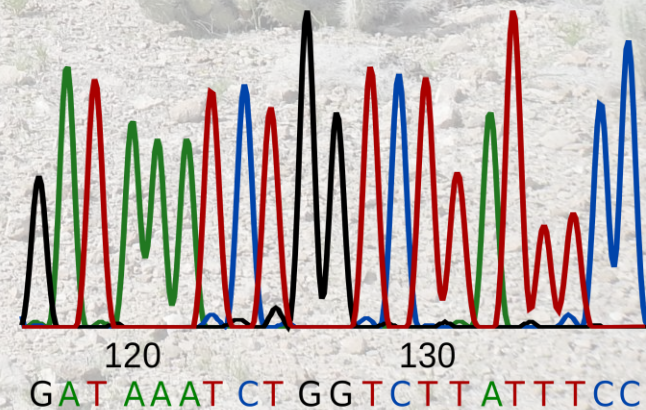


What is systematics?



3 parts to systematics:

- 1) taxonomy**
- 2) phylogenetics
- 3) evolution



Goals for today



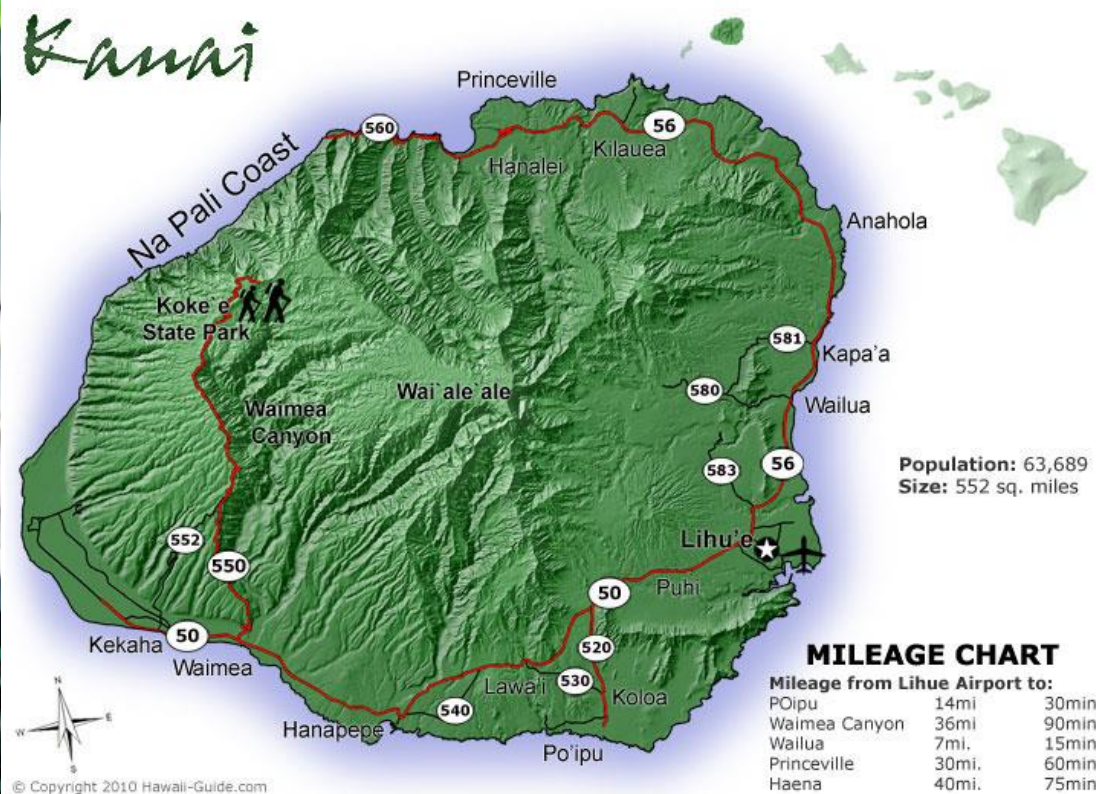
- I will attempt to demystify plant taxonomy:**
- 1) How do plants get their scientific names?**
 - 2) Why do these names change?**

How plants get their names—example 1

Describing a “new” species



Are you surprised we would discover a new tree in Hawaii?



Kauai, the most biodiverse Hawaiian island



← Kawaikini Summit

©Mark A. Johnson
markjohnson.com

The summit area was first explored botanically in 2012, by Ken Wood (NTBG)



Ken Wood

The summit area was first explored botanically in 2012, by Ken Wood (NTBG)

The author also encountered a previously undescribed plant community located within the extremely steep, windy, boulder strewn stream banks just below the Kawaikini summit. Here one finds the *Dubautia-Sadleria* shrubland/fernland plant community, which is named after the two endemic genera that dominate this habitat. It is a low statured community (1-2 m tall) associated with a broad array of other endemics, and where few, if any, weeds occur and no invasive animals have been observed. It was in this community that the thought-to-be extinct species *Lysimachia venosa* (Primulaceae) was rediscovered and a potentially new species of *Coprosma* (Rubiaceae) has been documented (see Summary of Rare Plant Taxa & Appendix). This particular habitat can be further characterized by its cold, dark, narrow basalt canyon walls seeping with springs and is considered by the author to be the remotest of Kaua`i's eco-regions.



***Dubautia-
Sadleria***
community



There is still so much to be discovered!

We still need explorers!



Describing a new species

Who picks the name?

Novon

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VOLUME 14 NUMBER 4

2004

Pritchardia flynnii (Arecaceae), a New Endemic Species from Kaua'i, Hawaiian Islands

David H. Lorence

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Chrissen E. C. Gemmill

Pacific Biosystematics Research Centre, Department of Biological Sciences, University of Waikato, Private Bag 3105, Hamilton, New Zealand 2001. gemmill@waikato.ac.nz

ABSTRACT. *Pritchardia flynnii* Lorence & Gemmill is described and illustrated from Kaua'i, Hawai'i, U.S.A. This new species most closely resembles the Kaua'i endemic species *Pritchardia hardyi*, from which it differs by its shorter, more slender trunk 0.7–7(11) m tall and 10–20(30) cm DBH, erect to arcuate inflorescences equaling or slightly exceeding the petioles with lanate-tomentose, eventually glabrescent rachillae, and smaller fruits 25–35 × 18–23 mm when dry.

Key words: Arecaceae, Hawaiian Islands, Kaua'i, *Pritchardia*.

Pritchardia Seemann & Wendland (Arecaceae: Coryphoideae) comprises 28 currently recognized species restricted to the Hawaiian Islands, Tuamotu Archipelago, Cook Islands, Tonga, and Fiji (Gemmill, 1998). All but 5 of these species are restricted to the Hawaiian Islands (Uhl & Dransfield, 1987, 1999). All Hawaiian species are single-island endemics, many with highly restricted distributions, and many are listed as federally endangered or threatened. The genus was monographed by Becari and Rock (1921), who recognized 32 species, 25 of these Hawaiian. Subsequently, Read and

***Pritchardia flynnii* Lorence & Gemmill, sp. nov.**
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Arbor usque ad 7(11) m; foliis 10–26, petiolis (31)35–61 cm longis lepidotis tomentosus basin versus, laminae 57–107 cm longis planis vel leviter undulatis (32)42–46(50)-segmentis, pagina abaxiali cum lepidibus densis ellipticis vel subcircularibus 0.4–0.8 mm longis; inflorescentia 58–88 cm longa; drupis ellipsoideis vel ovoideo-ellipsoideis, 22–25 × 15–16 mm in sicco.

Solitary palms, often with exposed roots at cylindrical base; trunk 0.7–7(11) m tall, 10–20(30) cm DBH, gray-brown, ringed with low leaf scars, longitudinally fissured. Crown symmetrical, with 10 to 26 leaves, leaf bases fibrous; petioles (31)35–61 cm long, about 1/2–3/4 as long as leaf blade, 2.4–3 cm wide distally, 3.5–5 cm wide and densely woolly basally, the indument pale brown or tan in color, densely lepidote throughout length and eventually abaxially on rachis, rachilla, and petiole.

What's in a name?

Under the ICN, a plant species name consists of **3 parts**:

- genus
- specific epithet
- author(s) of the name

Pritchardia flynnii Lorence & Gemmill

Pritchardia flynnii (Arecaceae), a New Endemic Species from Kaua'i, Hawaiian Islands

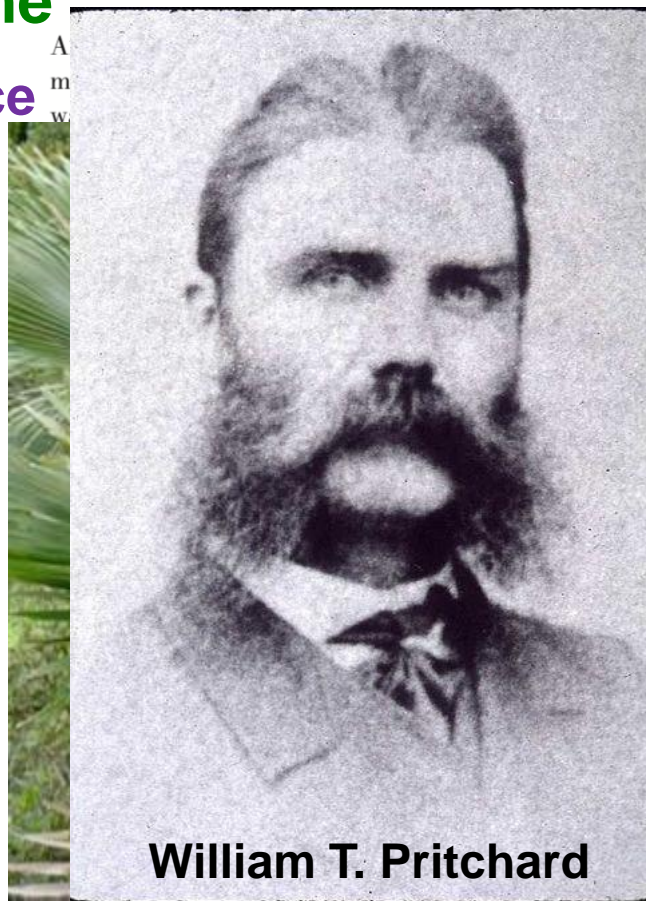
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William T. Pritchard



Tim Flynn, NTBG

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What about cultivar names?

Cultivar: a cultivated variety

Can be in any language!

Must use “cv.” OR single quotes; never italicized

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What about cultivar names?

Cultivar: a cultivated variety

Examples:

***Phaseolus vulgaris*
cv. Bountiful**

***Phaseolus vulgaris*
'Bountiful'**

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Describing a new species

Follow the rules of the ICN

–in scientific publication

–name must be in Latin or Latinized

–must write formal description

–must illustrate the species

–etc.

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Important question: How do we know this is a new species?

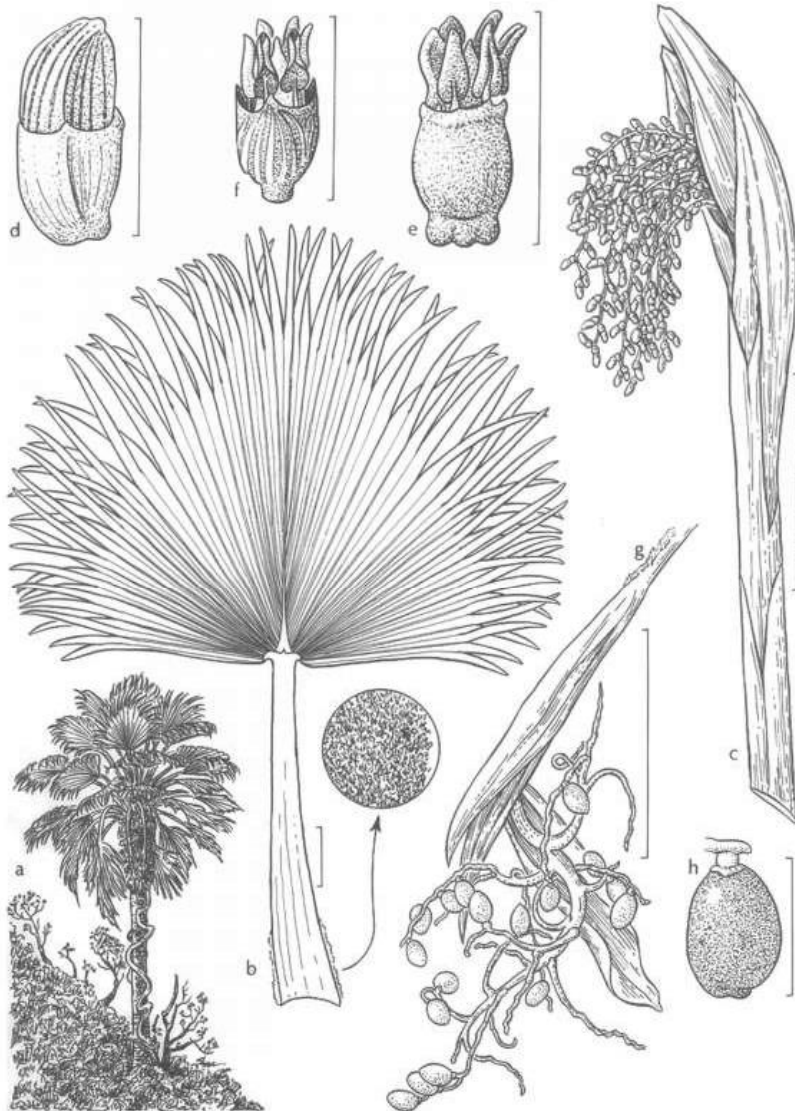


Figure 1. *Pritchardia flynnii* Lorence & Gemmill. —a. Habit. —b. Leaf, adaxial surface, with inset showing dense woolly indument at base of petiole. —c. Inflorescence in bud showing prophyll and peduncular bracts. —d. Dried flower in bud with connate petals. —e. Fresh flower. —f. Dried flower. Both e and f with petals fallen. —g. Infructescence. —h. Mature fruit. a, drawn from unvouchered individual growing along Wabiawa Stream; b, g, h from Lorence & Stone 8380; c–f, from Lorence & Stone 8385. Scale bar 10 cm in b, c; 7 mm in d, e; 6 mm in f; 7.5 cm in g; 2.5 cm in h.



Remember that possibly undescribed *Coprosma*?

PhytoKeys 60: 21–32 (2016)
doi: 10.3897/phytokeys.60.6406
<http://phytokeys.pensoft.net>

RESEARCH ARTICLE

A peer-reviewed open-access journal
PhytoKeys
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***Coprosma kawaikiniensis* (Rubiaceae) a new species from the *Dubautia-Sadleria* shrubland-fernland community on Kaua‘i, Hawaiian Islands**

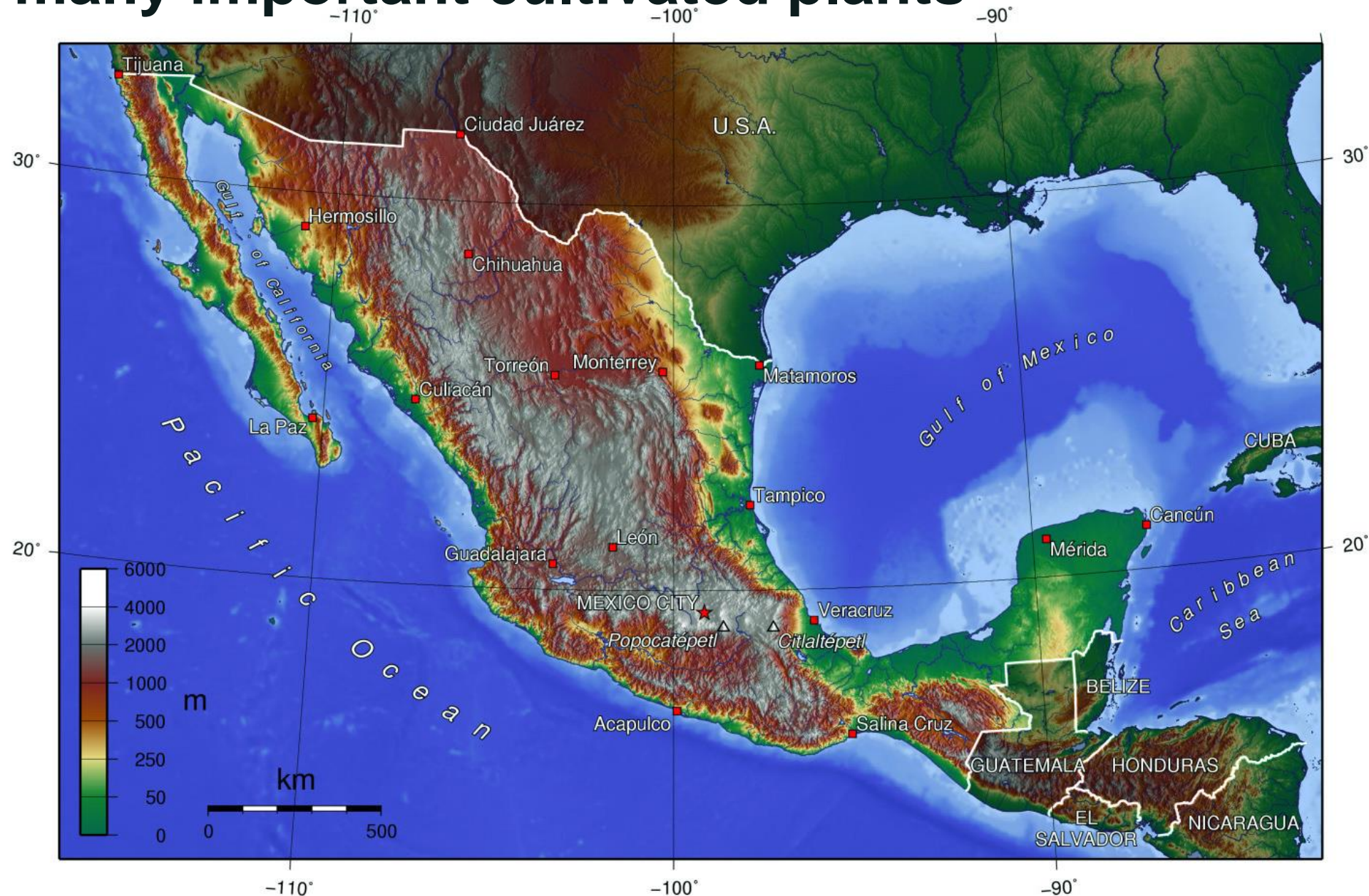
Kenneth R. Wood¹, David H. Lorence¹, Michael Kiehn^{1,2}

1 National Tropical Botanical Garden, 3530 Papalina Road, Kalaheo, HI 96741, USA **2** Department of Botany and Biodiversity Research and Core Facility Botanical Garden, University of Vienna, Rennweg 14, 1030 Vienna, Austria

These examples illustrate taxonomy at its
best: a nice, orderly process...

Much of my work involves Mexico

Mexico is highly biodiverse & the origin of many important cultivated plants





***Mirabilis
jalapa* L.**

How did this species get its name? *Mirabilis jalapa* L.



L. = Linnaeus



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**SPECIES
 PLANTARUM,**

MIRABILIS.

1. MIRABILIS. *Hort. cliff.* 53. *Hort. ups.* 43. *Fl. zeyl.* Jalapa.
 85. *Mat. med.* 76.
Nyctage. *Roy. lugdb.* 417. *Cold. noveb.* 29.
Jalapæ species omnes. *Tournef. inst.* 130.
Solanum mexiocanum, flore parvo. *Bauh. pin.* 168.
prodr. 91.
 β. *Solanum mexiocanum, flore magno.* *Bauh. pin.* 168.
Admirabilis peruviana. *Clus. hist.* 2. p. 87.
Habitat in India utraque. 4

IMPENSIS LAURENTII SALVII.
1753.

C. Appelgren

Why so many names??

The species had already been in Europe for 200 years!



**Fortunately for
taxonomy, only one
species of *Mirabilis*
had been introduced**



Dahlia

Multiple species of *Dahlia* had already been hybridized in Europe by the 1800's, creating a taxonomic nightmare

Dahlia coccinea Cav.



Important point: Taxonomists knew very little about the wild diversity of these economically valuable plants

Mirabilis longiflora L.



Norm Douglas

**Taxonomic concepts
change over time as
more is learned**

Norm Douglas



Mirabilis melanotricha
(Standl.) Spellenb.

**Why the parentheses?
Allionia melanotricha Standl.**



Hipólito
Ruíz
López

José
Antonio
Pavón
Jiménez

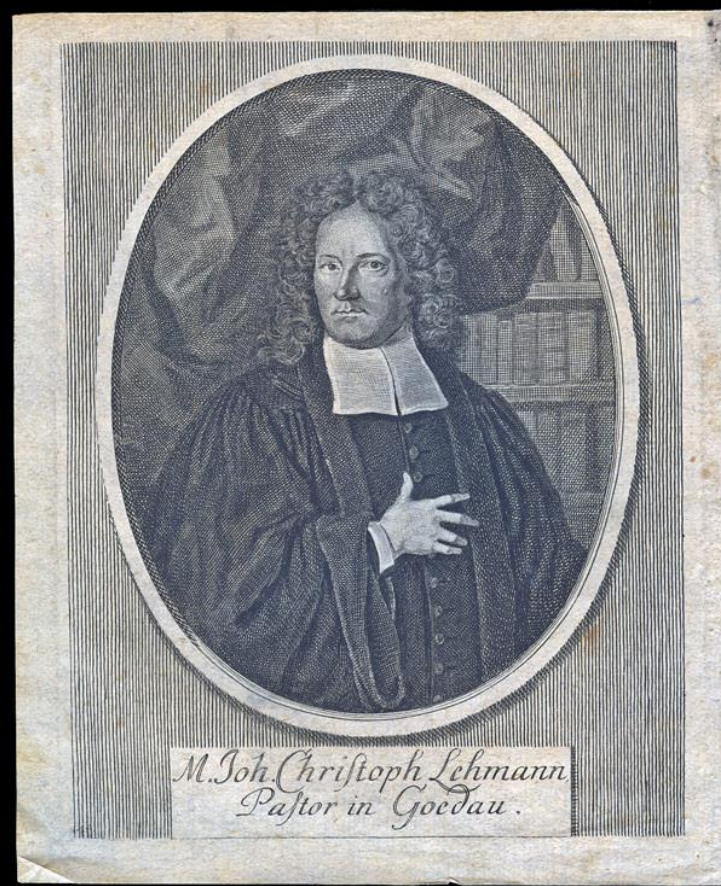


A typical
nomenclatural
adventure: *Tiquilia*
All of the species I
will show you are
currently
considered *Tiquilia*

Lithospermum dichotomum
Ruiz & Pavón [1799]
Tiquilia dichotoma
(Ruiz & Pavón) Pers. [1805]

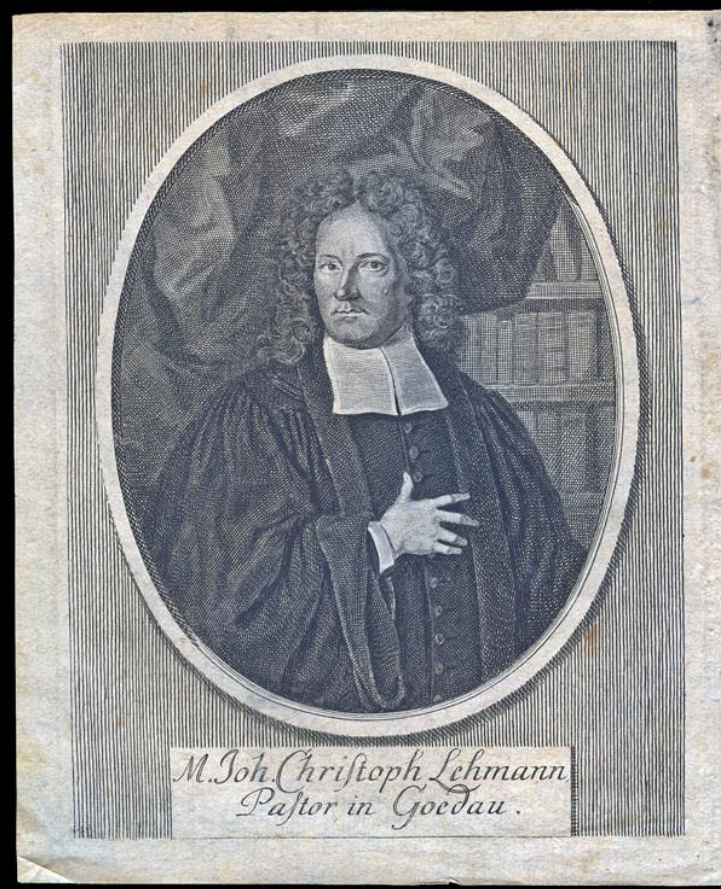


Christian
Persoon



*M. Joh. Christoph Lehmann
Pastor in Goedau.*

***Coldenia procumbens* L. [1753]**



Lithospermum dichotomum
Ruiz & Pavón [1799]
Tiquilia dichotoma
(Ruiz & Pavón) Pers. [1805]
Coldenia dichotoma (Ruiz &
Pavón) Lehm. [1830's]

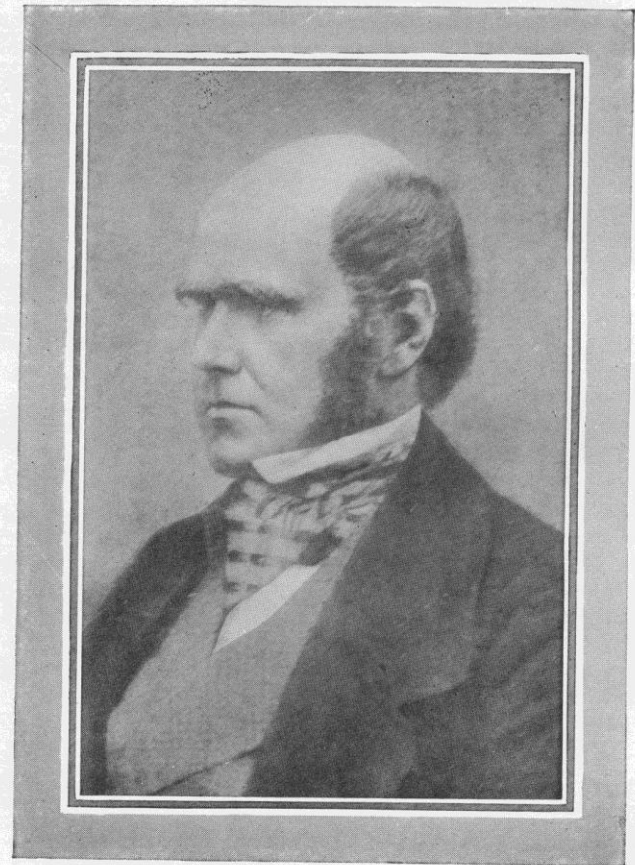


Coldenia procumbens L. [1753]

Galápagos Islands

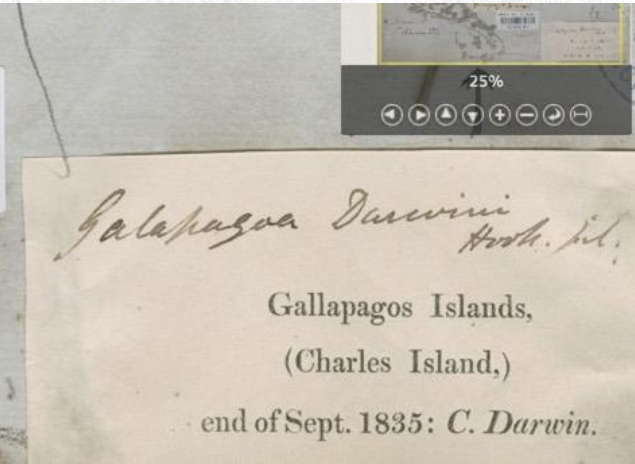
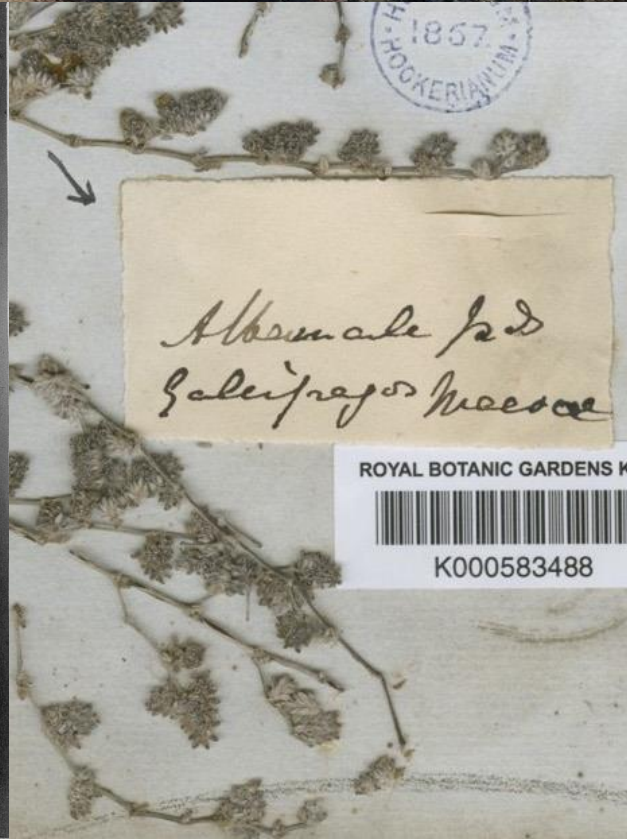
Galapagoa darwinii Hook.f. [1830's]

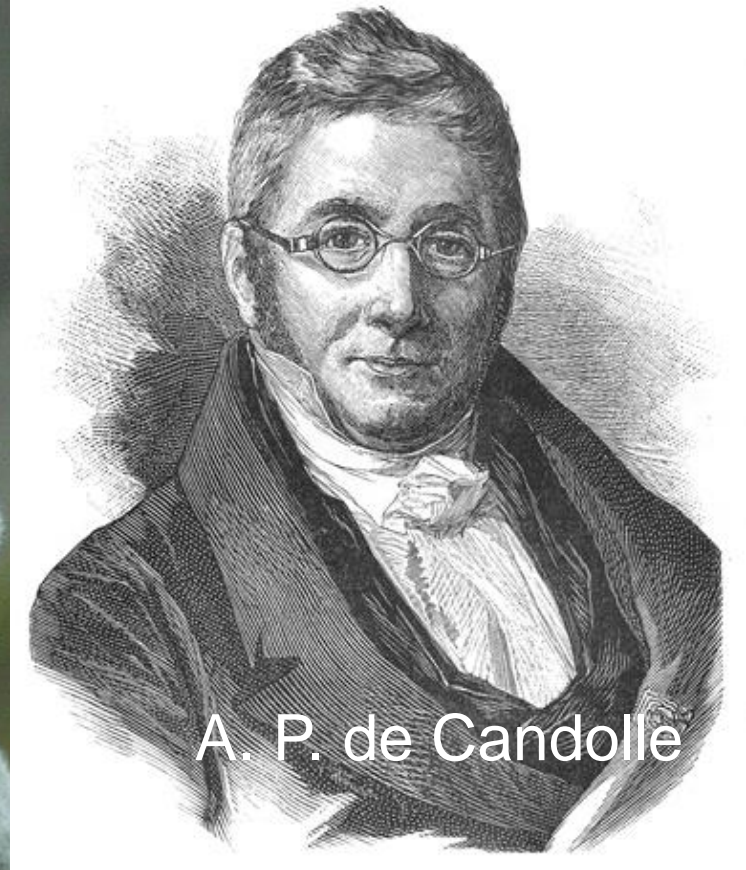
Herbarium specimens are exceptionally important for taxonomy



Charles Darwin

J. D. Hooker





***Coldenia canescens* DC. [1840's]**

Ptilocalyx greggii
Torr. & A.Gray



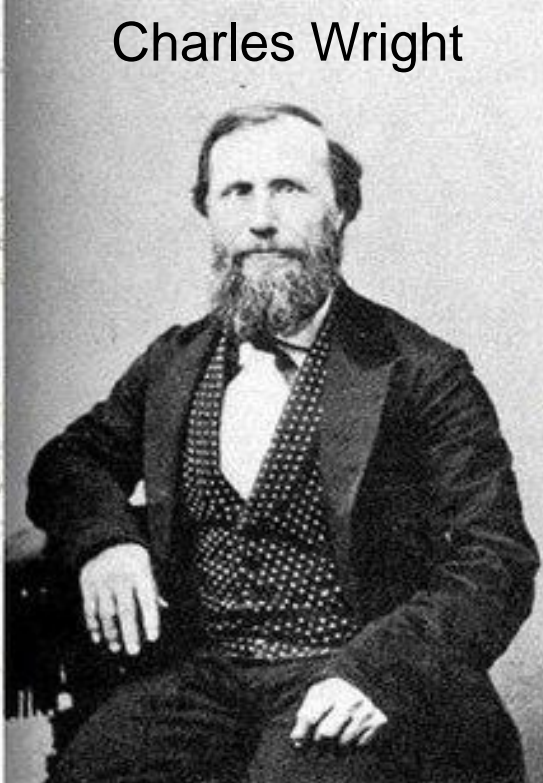
Eddya hispidissima
Torr. & A.Gray



Asa Gray



Charles Wright



John Torrey





Coldenia canescens DC.

Stegnocarpus canescens (DC.) Torr. & A.Gray [1850's]

Asa Gray



John Torrey



Ptilocalyx greggii
Torr. & A.Gray
Coldenia greggii
(Torr. & A.Gray)
A.Gray



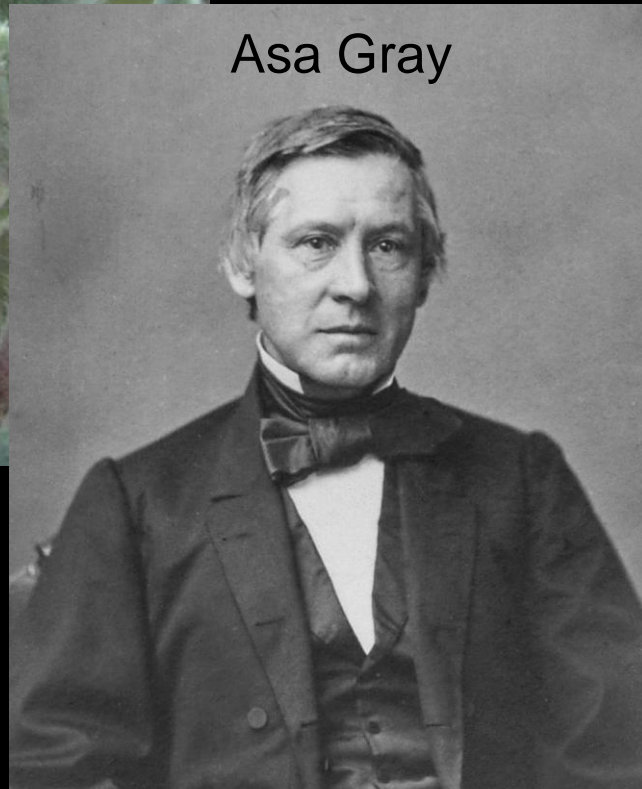
Eddya hispidissima Torr. & A.Gray
Coldenia hispidissima (Torr. & A.Gray)
A.Gray



Asa Gray



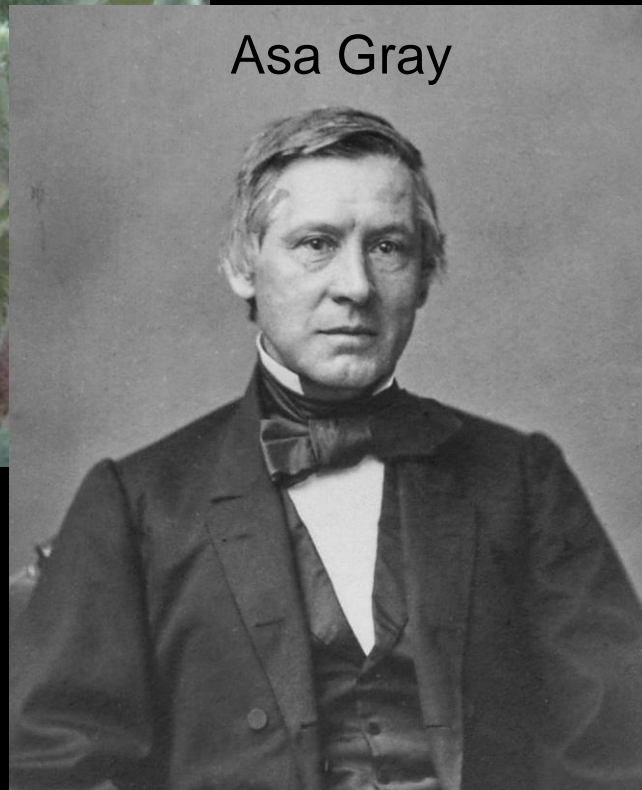
A few years later, Asa Gray reviewed all available specimens of this group, and had second thoughts...



Asa Gray

***Coldenia canescens* DC.**

***Stegnocarpus canescens* (DC.) Torr. & A.Gray**

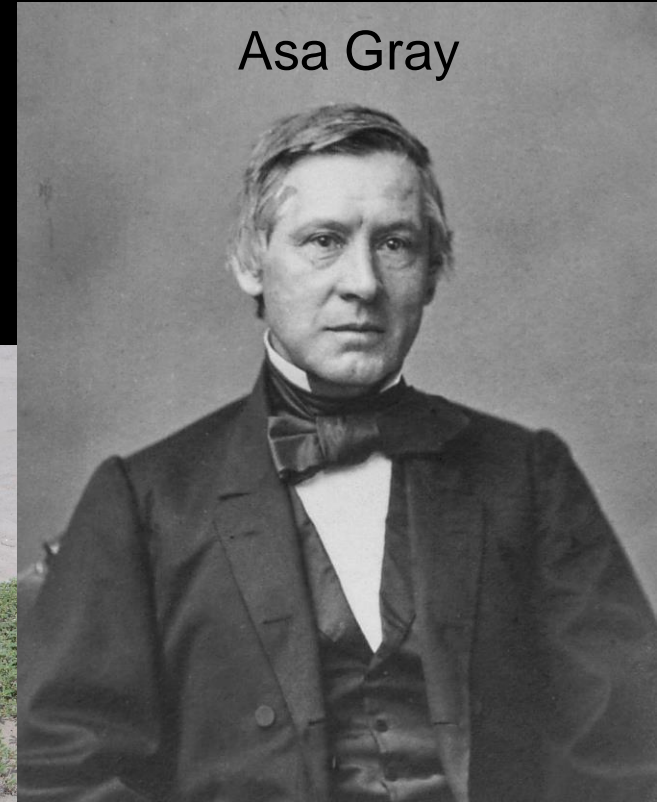


Asa Gray

***Coldenia canescens* DC.**
***Stegnocarpus canescens* (DC.) Torr. & A.Gray**

At the same time, he reaffirmed Lehmann's decision to transfer *Tiquilia* to *Coldenia*...

Asa Gray



Lithospermum dichotomum
Ruiz & Pavón [1799]
Tiquilia dichotoma
(Ruiz & Pavón) Pers. [1805]
Coldenia dichotoma (Ruiz & Pavón) Lehm. [1830's]



...and he decided that *Galapagoa* should be merged with *Coldenia* too!

And taxonomically,
things stood the way
Gray left them for over
a century...

Galapagoa darwinii Hook.f.
Coldenia darwinii (Hook.f.) A.Gray [1860's]

Asa Gray



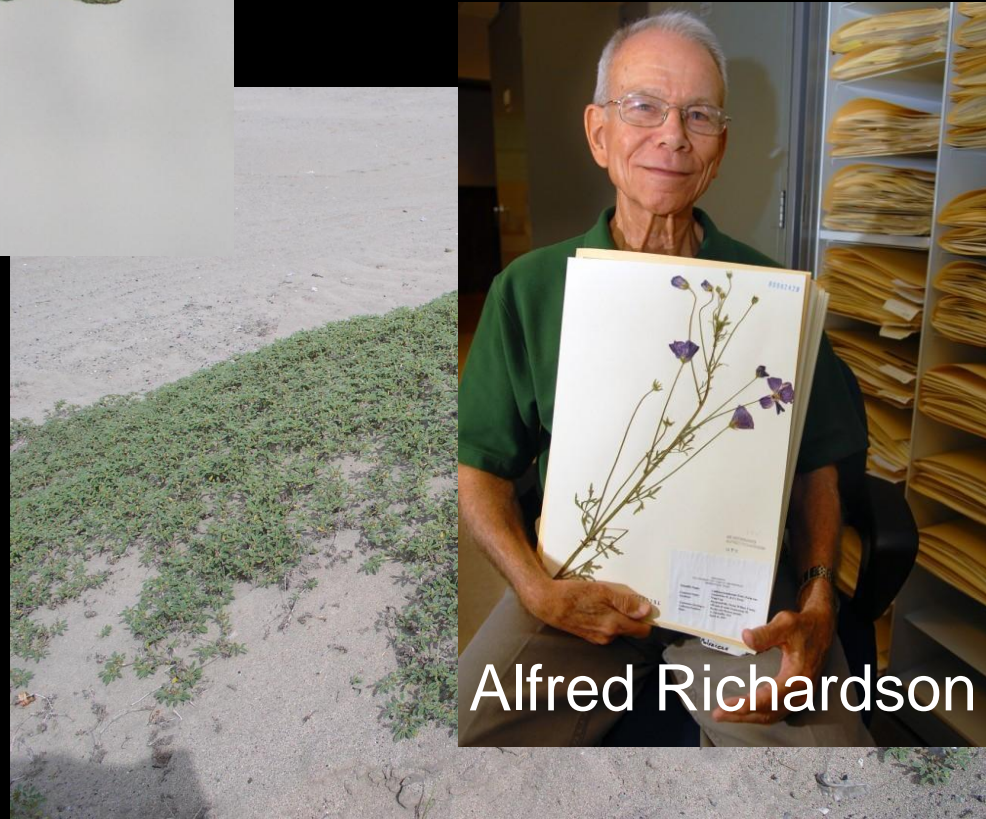
He concluded that all of the New World taxa belonged to single genus, separate from *Coldenia*.



Lithospermum dichotomum
Ruiz & Pavón [1799]
Tiquilia dichotoma
(Ruiz & Pavón) Pers. [1805]
Coldenia dichotoma (Ruiz & Pavón) Lehm. [1830's]

...until a graduate student at the Univ. of Texas, Alfred Richardson, decided to **monograph** the genus in the 1970's.

He realized that all of the New World taxa were only superficially similar to the Old World *Coldenia*.



Alfred Richardson

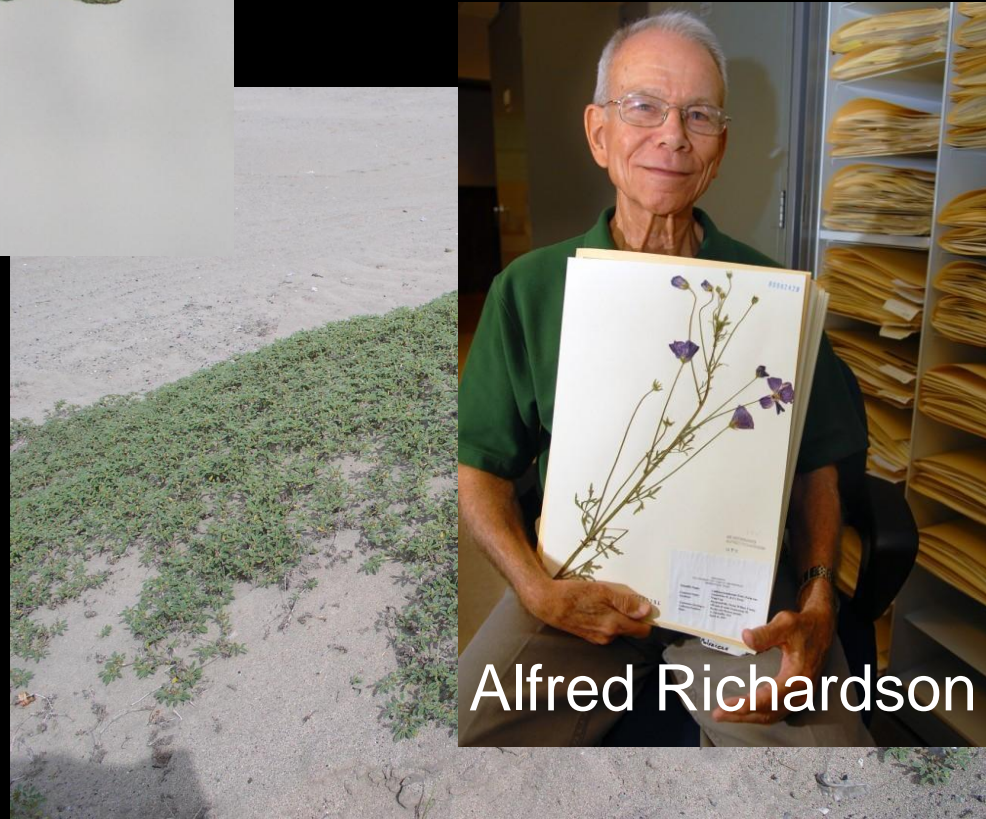
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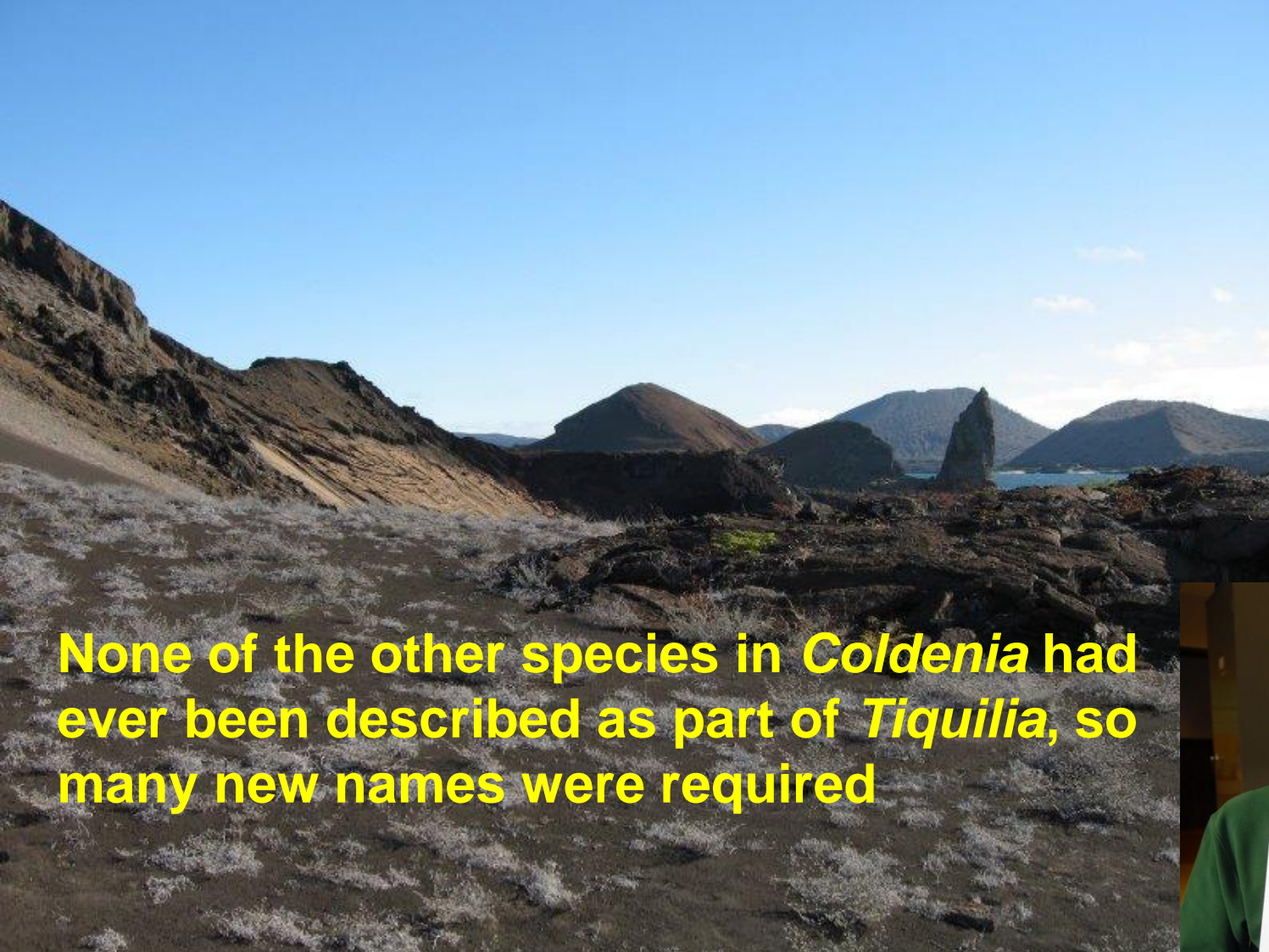
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Alfred Richardson



None of the other species in *Coldenia* had ever been described as part of *Tiquilia*, so many new names were required



Galapagoa darwinii Hook.f. [1830's]
Coldenia darwinii (Hook.f.) A.Gray [1860's]
Tiquilia darwinii (Hook.f.) A.T.Richardson [1970's]

Alfred Richardson



***Coldenia canescens* DC.**
***Stegnocarpus canescens* (DC.) Torr. & A.Gray**
***Coldenia canescens* DC.**
***Tiquilia canescens* (DC.) A.T.Richardson**



Alfred Richardson

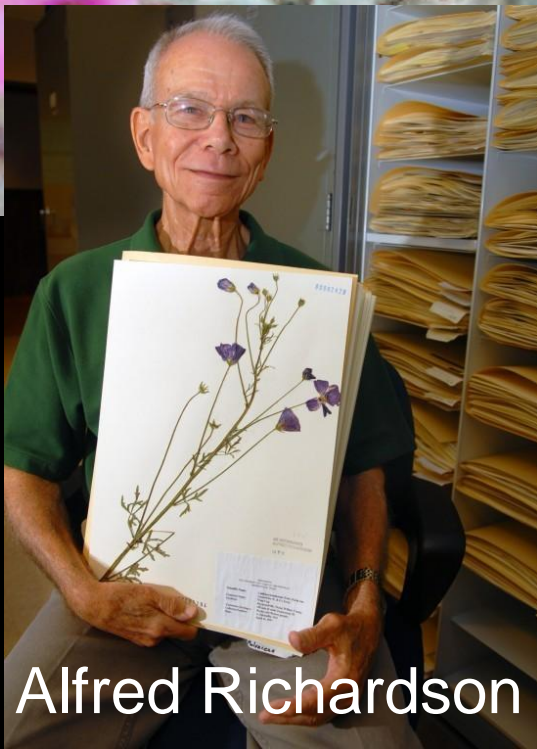
Ptilocalyx greggii
Torr. & A.Gray
Coldenia greggii
(Torr. & A.Gray)
A.Gray
Tiquilia greggii
(Torr. & A.Gray)
A.T.Richardson



Eddya hispidissima Torr. & A.Gray
Coldenia hispidissima (Torr. & A.Gray)
A.Gray



Tiquilia hispidissima (Torr. & A.Gray)

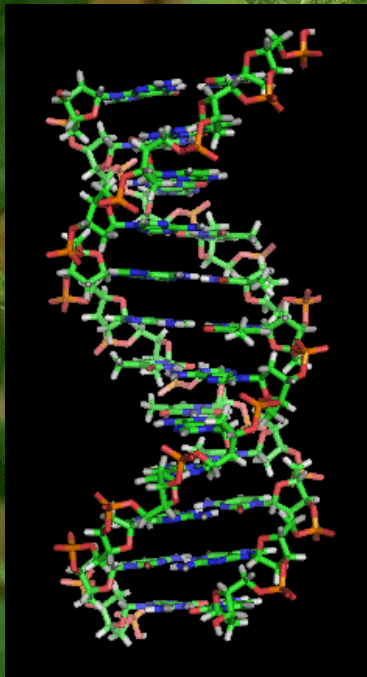


Alfred Richardson

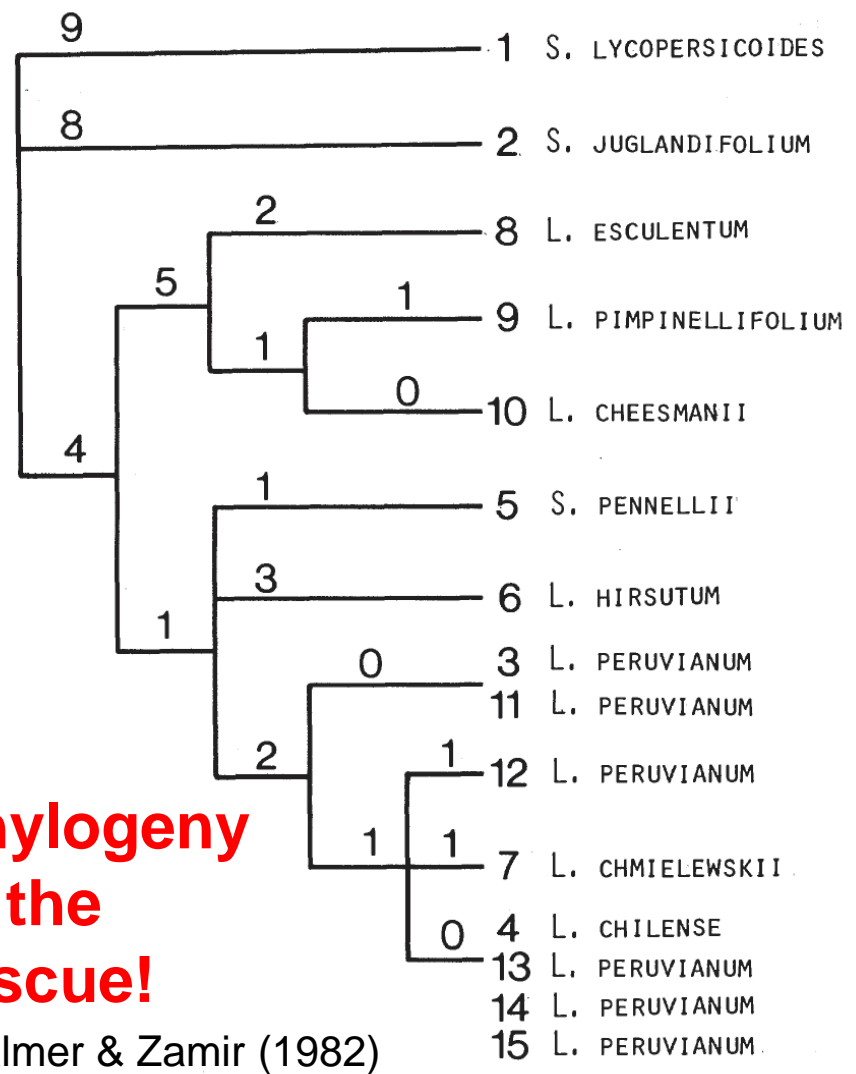
By the way, Richardson was right!

Why has there been so much instability in these names?
**Fundamentally, because taxonomists did not have a complete view of the biodiversity of the groups they worked on...
 ...and they sometimes disagreed!**

Is there any hope of nomenclatural stability??

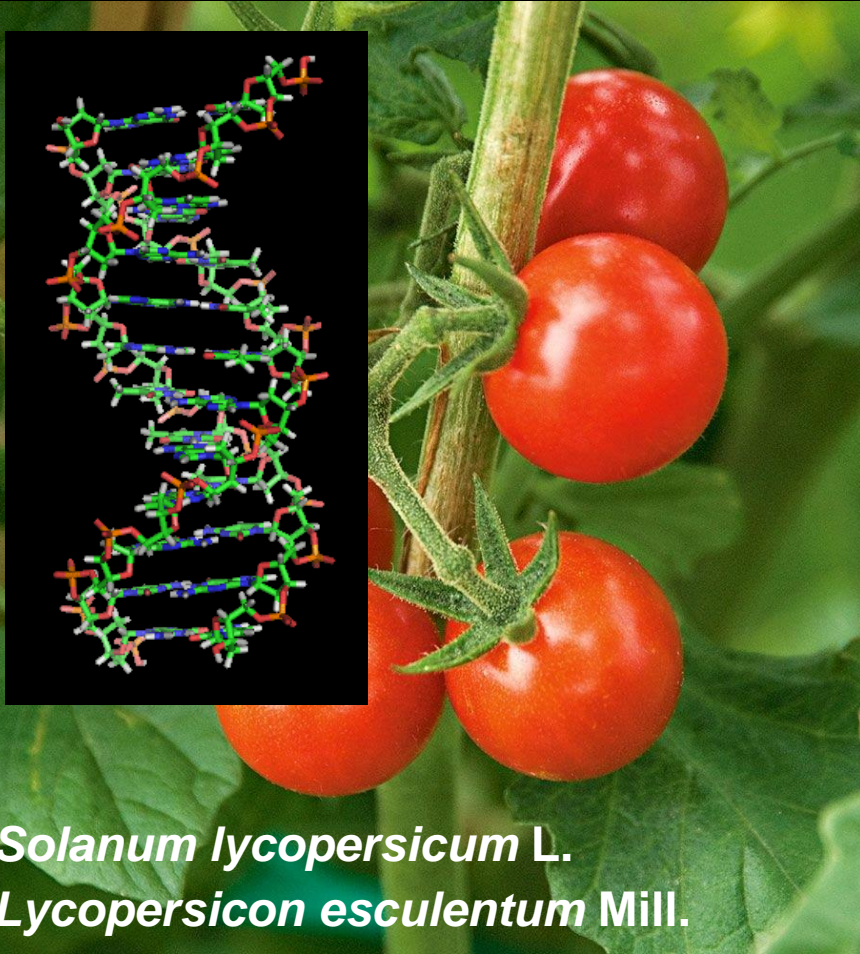


Solanum lycopersicum L.
Lycopersicon esculentum Mill.

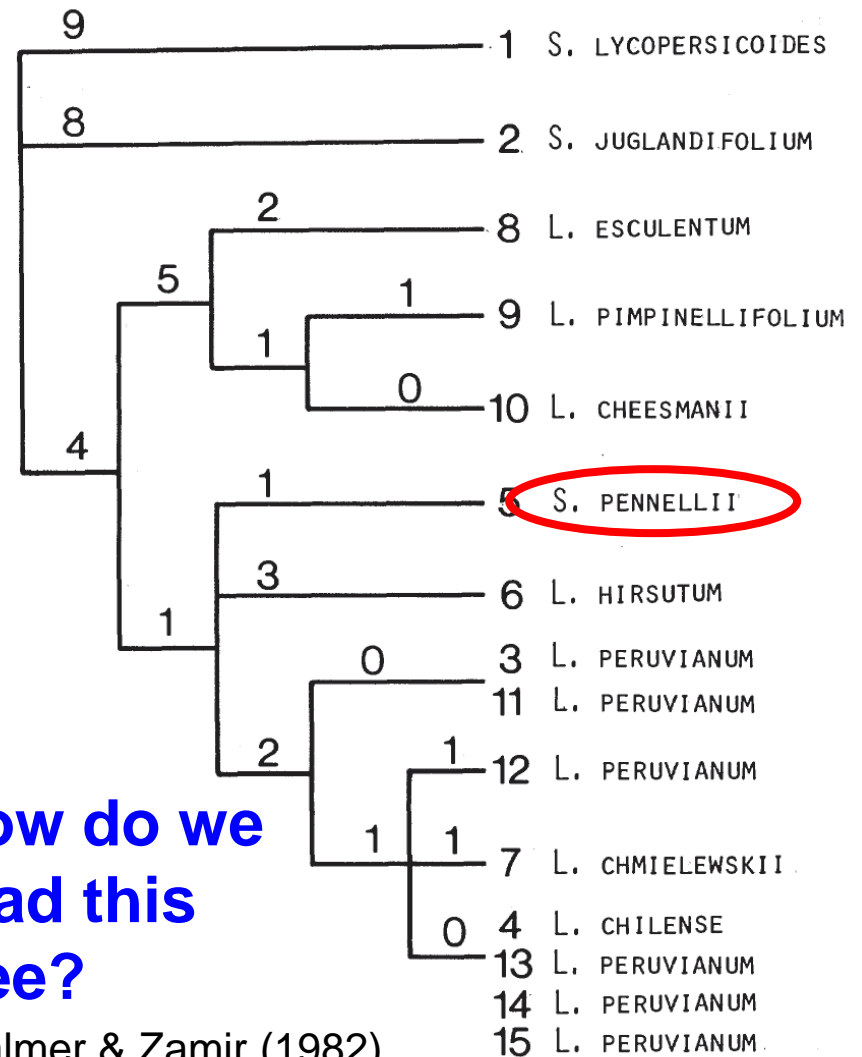


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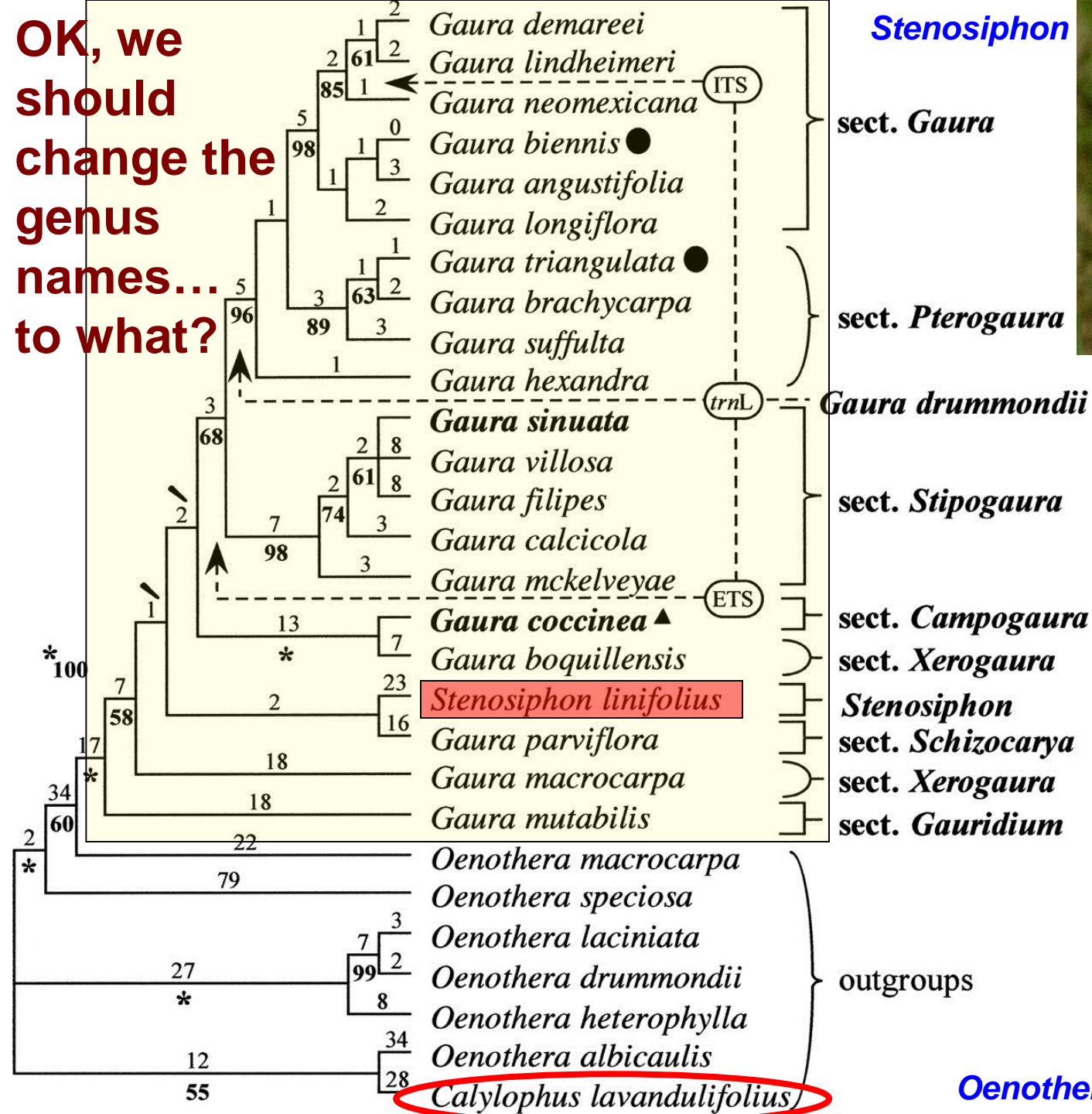


Solanum lycopersicum L.
Lycopersicon esculentum Mill.



How do we read this tree?

OK, we should change the genus names... to what?



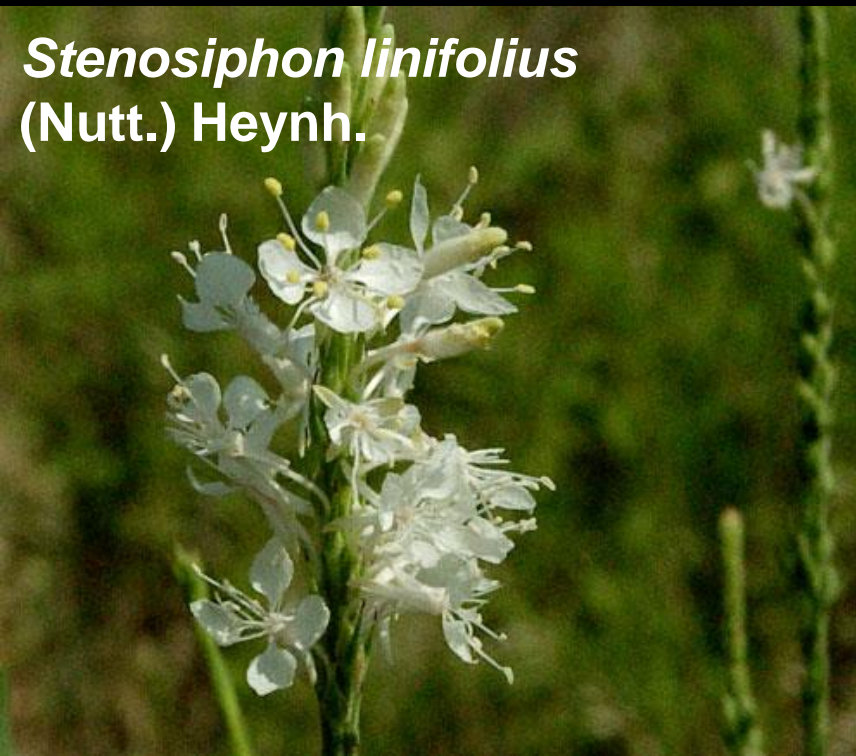
Gaura



Oenothera

But what happens if there is **ALREADY** a species in the genus with that name?

We need to come up with a new name



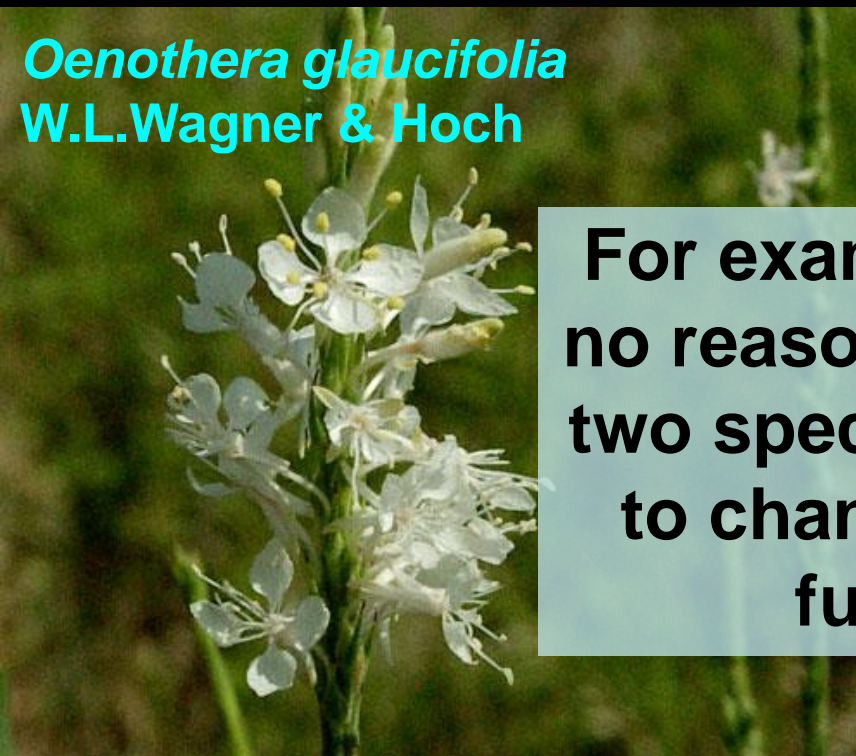
Stenosiphon linifolius
(Nutt.) Heynh.



Oenothera linifolia Nutt.

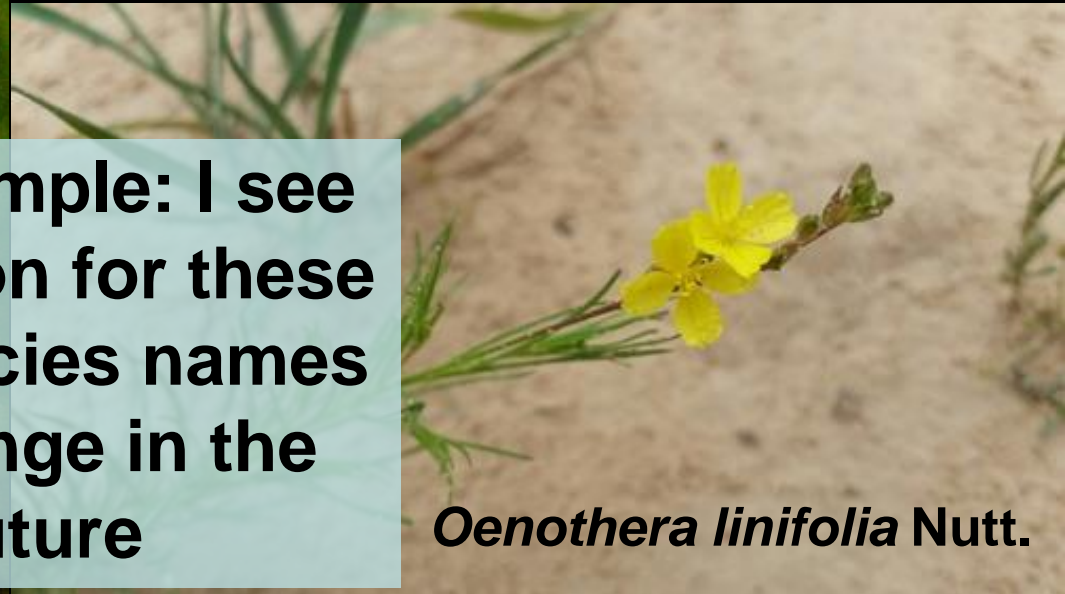
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Oenothera glaucifolia
W.L.Wagner & Hoch

For example: I see no reason for these two species names to change in the future



Oenothera linifolia Nutt.

So...name changes will continue

Still lots to learn about the world's plants!

Great news: future names will be stable

Linne'



**On behalf of all
plant
systematists...**

**Thank you for
your patience!**

