EVOLUTION, VARIATION AND SYSTEMATICS
(PART 2): SYSTEMATICS & NOMENCLATURE




Niarsi Merry Hemelda, M.Si.

Reference Simpson, M.G. 2006. Plant systematics.
Chapter 16

Systematics

A science that includes and encompasses traditional taxonomy: the **description**, **identification**, **nomenclature**, and **classification** of organisms, and that has as its primary goal the **reconstruction of phylogeny**, or **evolutionary history**, of life.

2 major means of arriving at classification of life

Phenetic

based on overall similarities.

Similar objects are grouped together and dissimilar objects apart.

Phylogenetic

based on evolutionary history, or pattern of descent, which may or may not correspond to overall similarity

What is Nomenclature?

Assignment of plant names utilizing a formal system.

What is name of work providing the rules and recommendation for plant nomenclature?

International Code of Nomenclature for algae, fungi, and plants (ICN)
(formerly International Code of Botanical Nomenclature -- ICBN)

WHO FIRST CONSISTENTLY USED BINOMIALS?

Linnaeus

What is the correct form of binomials?

Binomial = "two names"

Quercus dumosa Nuttall

Quercus = genus name (capitalized)

dumosa = specific epithet (not capitalized)

Quercus dumosa = species name

Nuttall = author

THE REASONS THAT COMMON NAMES ARE DISADVANTAGEOUS (1):

1. Only scientific names are **universal**, used the same world-wide.

Apel (Indonesia)
Apple (English)
林檎 Ringo (Japanese)
苹果 Píngguǒ (Chinese)
사과 sagwa (Korean)
la pomme (French)
яблоко yabloko (Russian)
etc.

Malus domestica

THE REASONS THAT COMMON NAMES ARE DISADVANTAGEOUS (2):

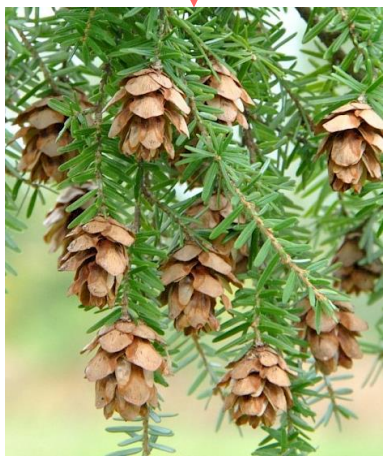
2. Common names are **not consistent**.

A taxon may have more than one common name	One common name may refer to more than one taxon

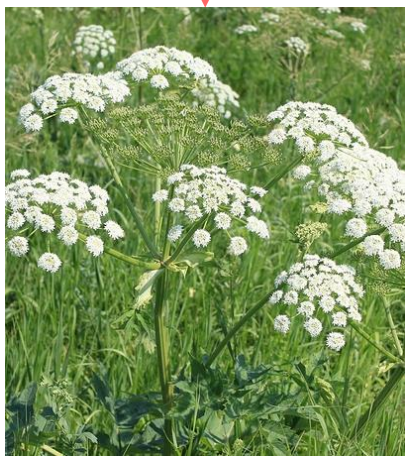
Known as:
- Chamise
- greasewood

Adenostoma fasciculatum

"Hemlock"



Tsuga spp.



Conium maculatum

THE REASONS THAT COMMON NAMES ARE DISADVANTAGEOUS (3):

3. Common names tell **nothing** about **rank and position**; scientific names do.

Rank is hierarchical classification in which a higher rank is inclusive of all lower ranks.

Position is placement as a member of a taxon of the next higher rank.

E.g., *Aster* & *Rosa* of same rank (genus) but different positions (Asteraceae & Rosaceae)

THE REASONS THAT COMMON NAMES ARE DISADVANTAGEOUS (4):

4. Many, if not most, organisms have no common name in any language.

Classification Ranks in Plant

Kingdom

Division

Subdivision

Class

Subclass

Superorder

Order

Suborder

Family

Subfamily

Tribe

Subtribe

Genus

Section

Species

Subspecies

Variety

Kingdom	(various)	Plantae
Phylum [Division]	-phyta	Magnoliophyta
Subphylum [Subdivision]	-phytina	Magnoliophytina
Class	-opsida	Magnoliopsida
Subclass	-idae	Asteridae
Superorder	-anae, [-iflorae]	Asteranae
Order	-ales	Asterales
Suborder	-ineae	Asterineae
Family	-aceae	Asteraceae
Subfamily	-oideae	Asteroideae
Tribe	-eae	Heliantheae
Subtribe	-inae	Helianthinae
Genus	(various)	*Helianthus*
Subgenus	(various)	*Helianthus*
Section	(various)	*Helianthus*
Species	(various)	*Helianthus annuus*
Subspecies	(various)	*Helianthus annuus* ssp. *annuus*
Variety	(various)	*Helianthus annuus* var. *annuus*

TRIBES

Family of Arecaceae

Subfamilies:

1. Arecoideae
2. Calamoideae
3. Ceroxyloideae
4. Coryphoideae
5. Nyphoideae

14 tribes

TABLE 1. *Classification of subfamily Arecoideae (Dransfield et al., 2005, 2008)*

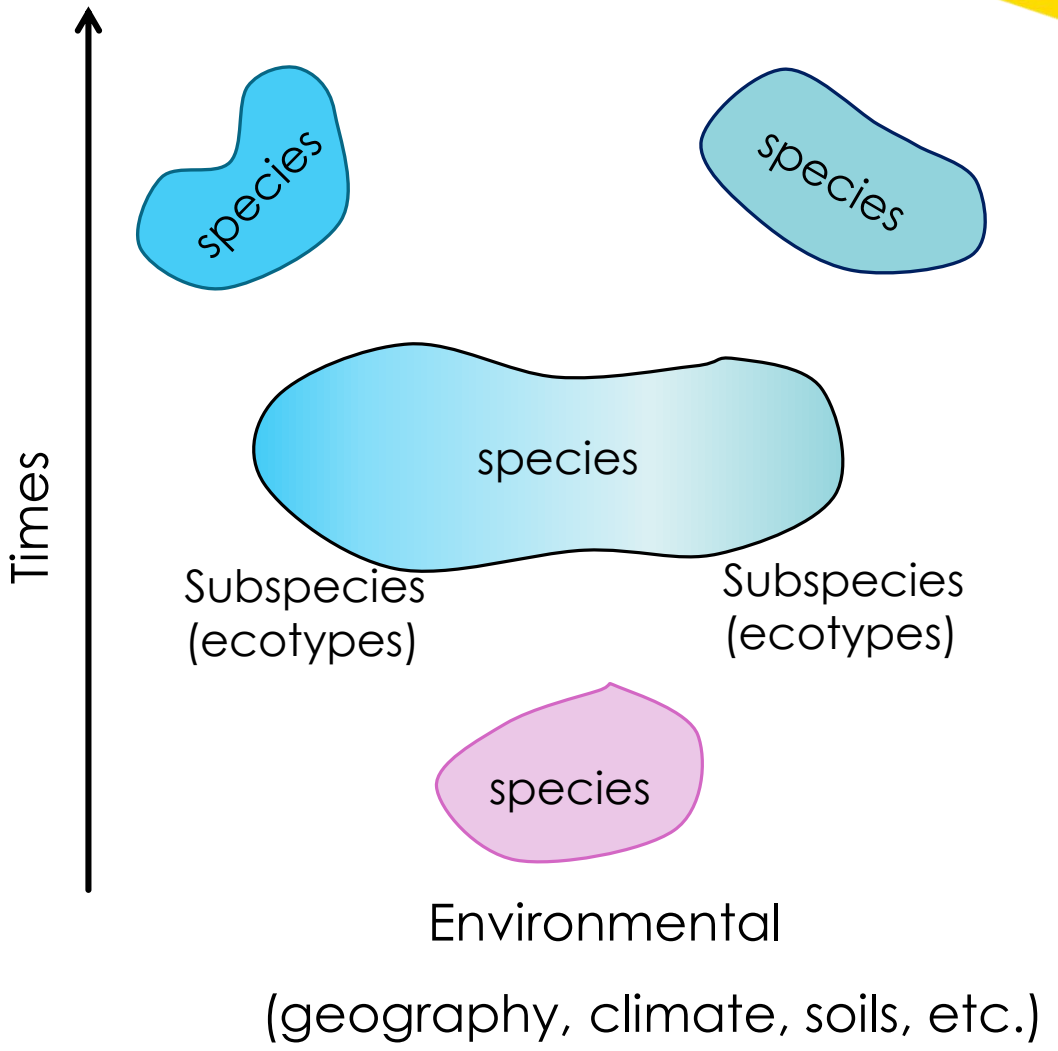
Tribe	Sub-tribe	Genus
Iriarteeae		*Dictyocaryum, Iriartea, Iriartella, Socratea, Wettinia*
Chamaedoreeae		*Chamaedorea, Gaussia, Hyophorbe, Synechanthus, Wendlandiella*
Podococceae		*Podococcus*
Oranieae		*Orania*
Sclerospermeae		*Sclerosperma*
Roystoneeae		*Roystonea*
Reinhardtieae		*Reinhardtia*
Cocoseae	Attaleinae	*Allagoptera, Attalea, Beccariophoenix, Butia, Cocos, Jubaea, Jubaeopsis, Lytocaryum, Parajubaea, Syagrus, Voanioala*
	Bactridinae	*Acrocomia, Astrocaryum, Aiphanes, Bactris, Desmoncus*
	Elaeidinae	*Barcella, Elaeis*
Manicarieae		*Manicaria*
Euterpeae		*Euterpe, Hyospathe, Neonicholsonia, Oenocarpus, Prestoea*
Geonomateae		*Asterogyne, Calyptrogyne, Calyptronoma, Geonoma, Pholidostachys, Welfia*
Leopoldinieae		*Leopoldinia*
Pelagodoxeae		*Pelagodoxa, Sommieria*
Areceae	Archontophoenicinae	*Actinokentia, Actinorhytis, Archontophoenix, Chambeyronia, Kentiopsis*
	Arecinae	*Areca, Nenga, Pinanga*
	Basseliniinae	*Basselinia, Burretiokentia, Cyphophoenix, Cyphosperma, Lepidorrhachis, Physokentia*
	Carpoxylinae	*Carpoxylon, Satakentia,*

Infraspecific Taxa (1)

- the result of **incipient speciation**, the early and incomplete divergence of one lineage into two (or more)
- the terminal entities of those lineages are not fully separated from one another

3 infraspecific categories:

subspecies | variety | Form/forma



Infraspecific Taxa (2)

Subspecies and variety

- Characterized as separate groups of populations within species.
- Present slight or often intergrading morphological differences as well as some geographic, ecological ,a and/or phylogenetic distinctions

Form

- distinct phenotypes of no persistent populational significance.
- A forma does not have any degree of geographic, ecologic, and/or phylogenetic integrity as usually required of subspecies and varieties.

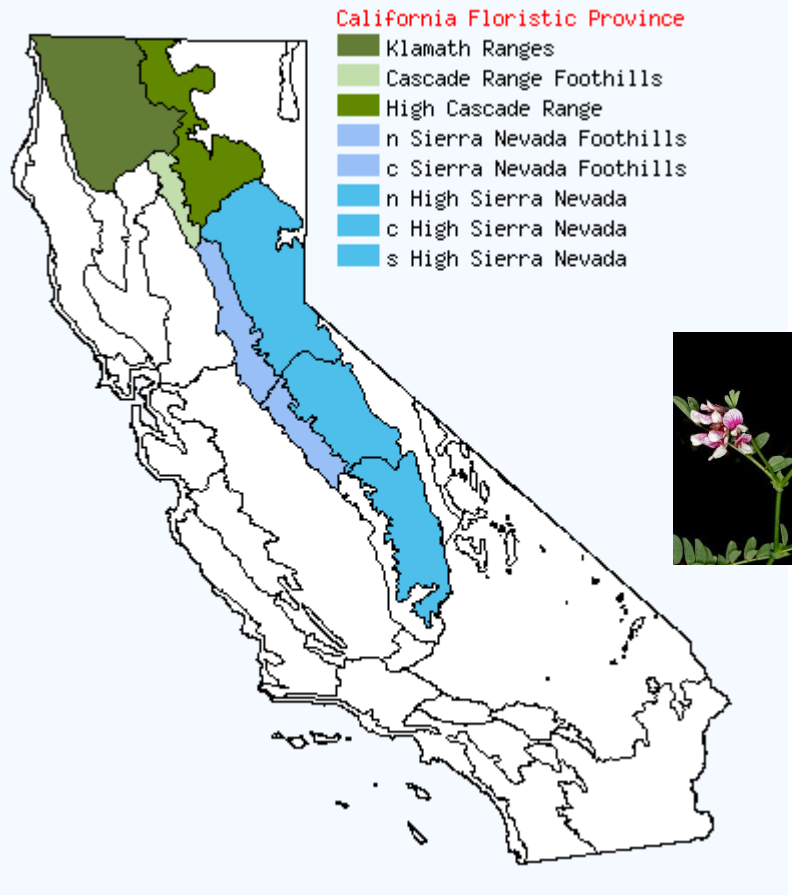
Hosackia stipularis var. *ottleyi*

Stem: wiry. **Leaf:** stipules wide, clasping stem.

Hosackia stipularis var. *stipularis*

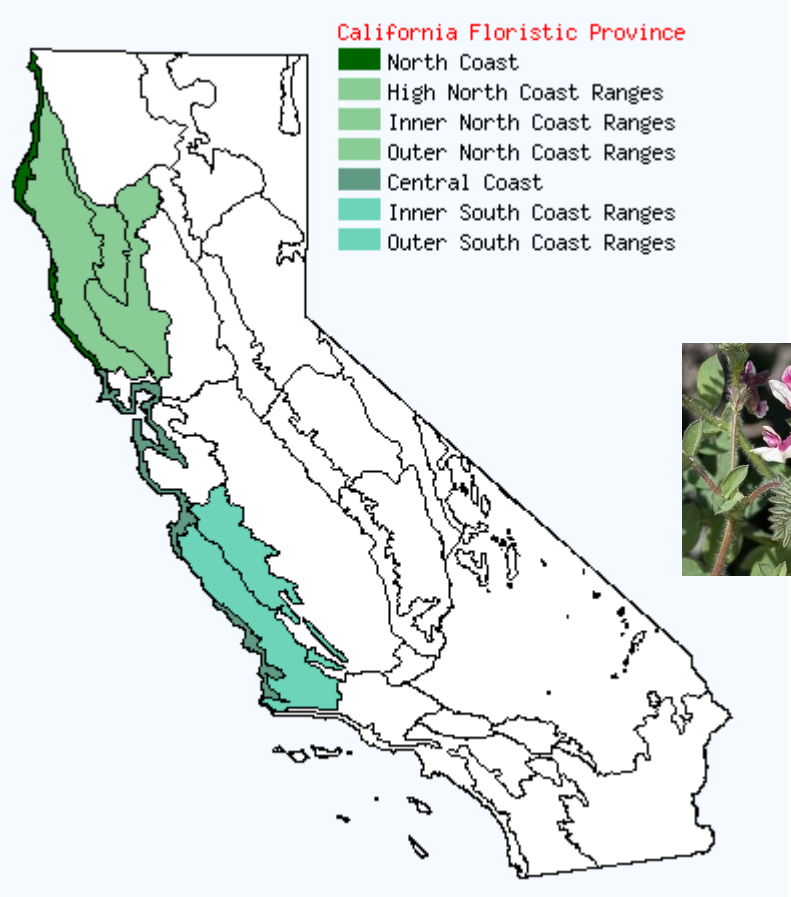
Stem: often fleshy.
Leaf: stipules narrow or wide, not or +- clasping stem.

H. stipularis var. *ottleyi*



Ecology: Open pine forest, streambeds; **Elevation:** 600--1200 m.

H. stipularis var. *stipularis*



Ecology: Thickets, chaparral, logged areas; **Elevation:** 200--1000 m.

UNIVERSITAS INDONESIA
Veritas, Probitas, Iustitia

Thank you