

Asteraceae or Compositae – Aster F.

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- 1160 genera; 19,085 spp. (Zomlefer, 1994) – Dated
 - GA – USDA -113 genera and 451 spp– out of date but Maps useful.
 - 1528 genera; 22,750 spp. (acc. to Mabberley 2000, *The Plant Book*)
 - Flora North America – 23,000 spp. in 1500 genera (2413 in NA flora)
<http://beta.floranorthamerica.org/Asteraceae> **MOST UP TO DATE**
 - Weakley 2017 – 507 in GA or 12%; with 20,000-25,000 world wide
 - Distribution – Cosmopolitan (excl. Antarctica) – mostly Temperate latitudes

My primary reference: *Vascular Flora of the Southeastern United States* Vol 1. Asteraceae by Arthur Cronquist 1980. A UNC publication. But the above FNA link is more current.

At Least ½ of the species in this little golden guide book for the US are considered members of the Asteraceae.



Asteraceae (Compositae)

Family Diagnosis (more of a “nutshell” than the description - next slide)

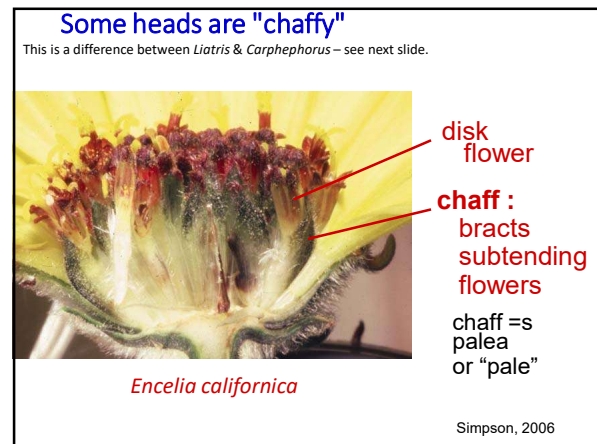
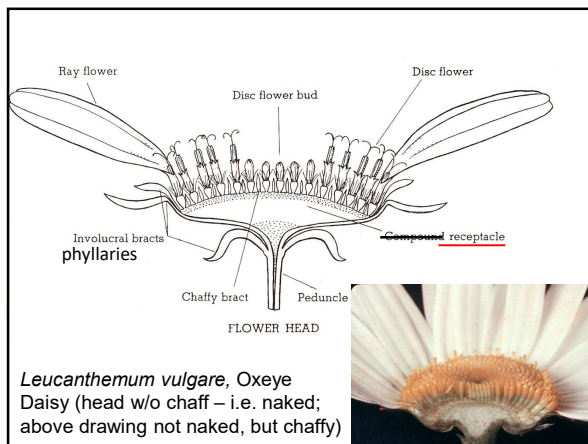
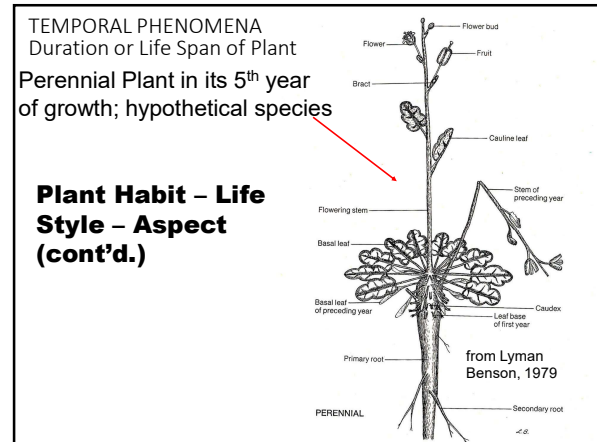
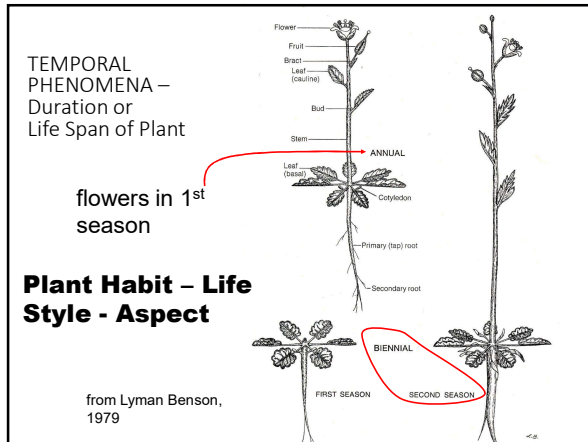
Herbs (shrubs); inflorescence a head; flowers with a reduced calyx called a pappus; anthers connate in a cylinder around the style; carpels 2; ovary inferior; fruit a cypselas (“achene”)

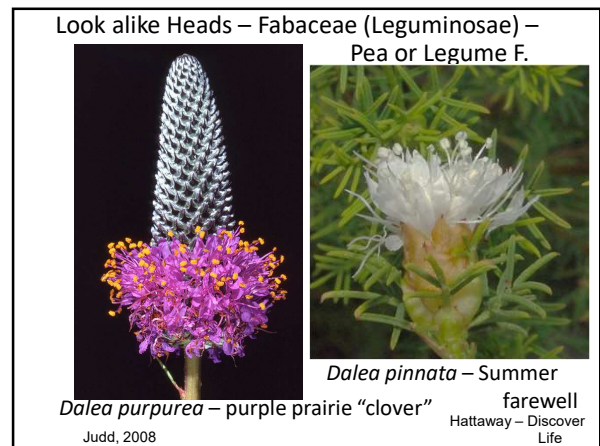
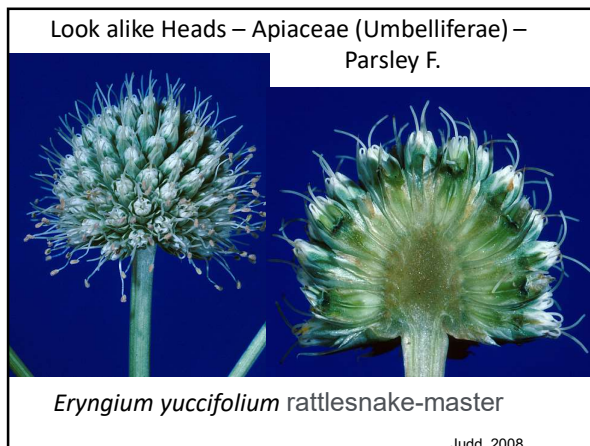
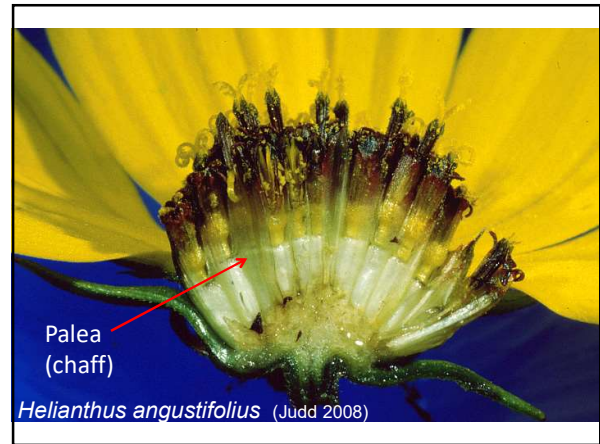
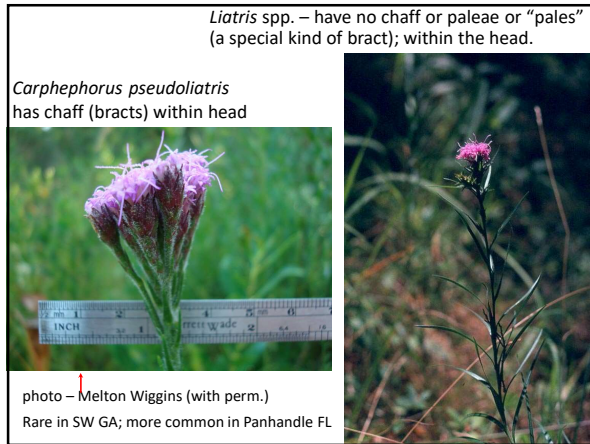
Asteraceae (Compositae)

Family Description

Vegetatively variable (e.g. lvs. alt., opp. whorled or basal)

The Asteraceae are distinctive in being herbs, shrubs, vines or trees, the inflorescence a head (capitulum) subtended by an involucre of bracts known as phyllaries, flowers either disk or ray/ligulate (rarely bi-labiate, i.e. 2 lipped) with heads of many taxa a mix of central disk and peripheral ray flws. Calyx modified into a pappus of scales, awns, or capillary bristles (or absent); androecium syngenesious [anthers united (connate) & filaments distinct]; ovary inferior with a single basal ovule; fruit a multiple of achenes (cypselas).





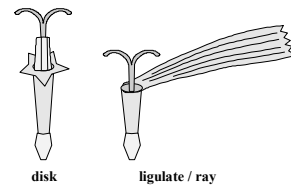


Asteraceae: floral variation

3 structural types of flowers/florets: (more if consider sex):

- 1) **Disk (tube)**: corolla radial symmetry, 5 (4) teeth-like lobes
- 2) **Ray (ligulate)**: bilateral symmetry with basal tube with an open/flat extension with 3-5 apical teeth.
- 3) Bilabiate: corolla bilateral symmetry (2 lips) in central florets – not illus. here (rare in our flora, e.g. *Chaptalia* – sunbonnets)

Disk (tube) & Ray Flowers



Mod. From Simpson, 2006

Ray Flower



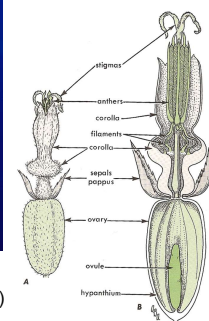
Taraxacum officinale (Dandelion) - from Judd 2008

Disk Flowers



Helianthus angustifolius (Judd 2008)

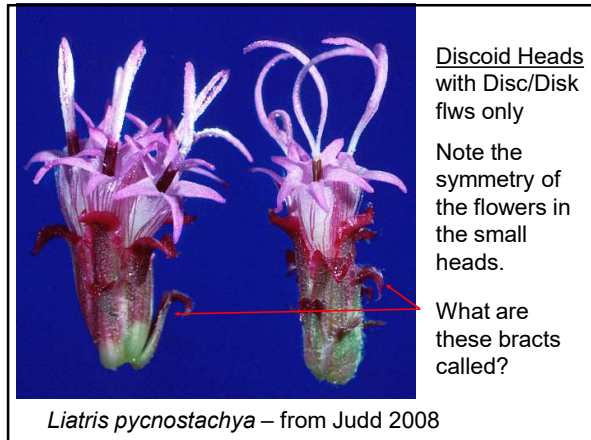
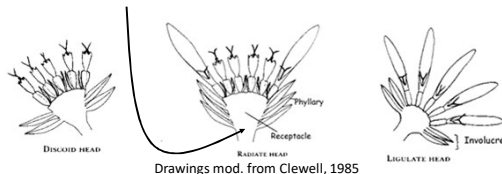
note the pappus (modified calyx) consists of 2 awns



Three (main*) types of heads (in our flora):

- 1) **discoid**, with only disk flowers;
- 2) **radiate**, with central (bisexual or male) disk flowers and peripheral (female or sterile) ray flowers;
- 3) **ligulate**, with all ray flowers (typically with 5-toothed corolla apices);

Note the Receptacle.



Baccharis halimifolia – Groundsel; Saltbush – Disk only flws; note the white is due to the **pappus**. Plants are dioecious.

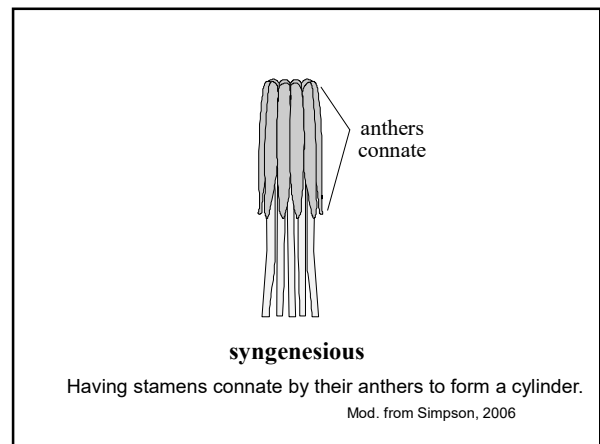
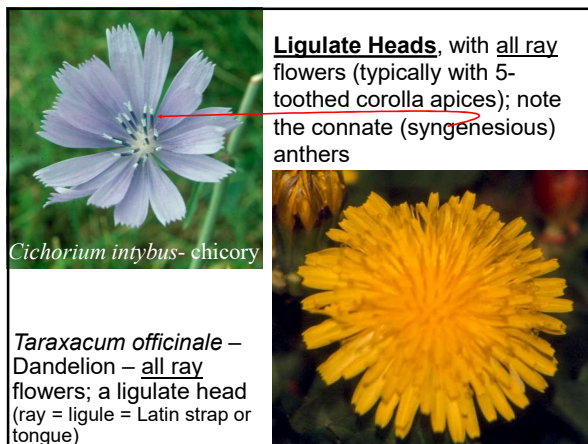
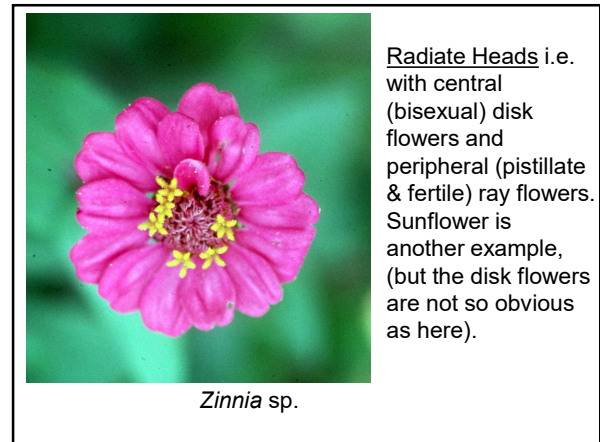


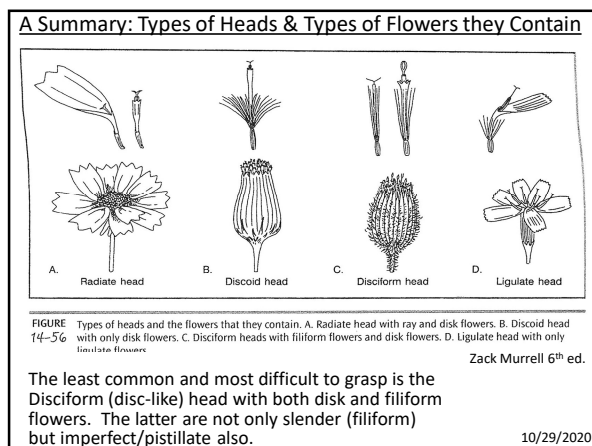
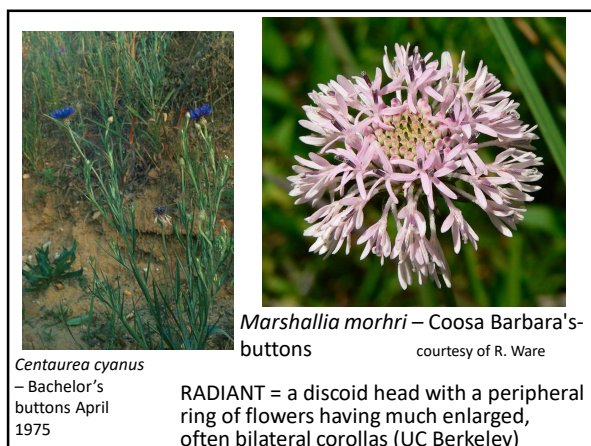
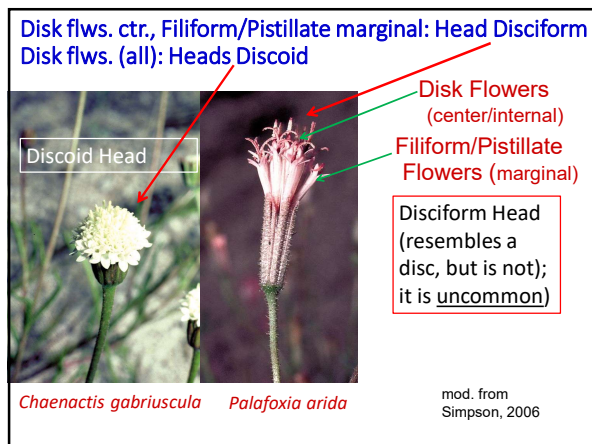
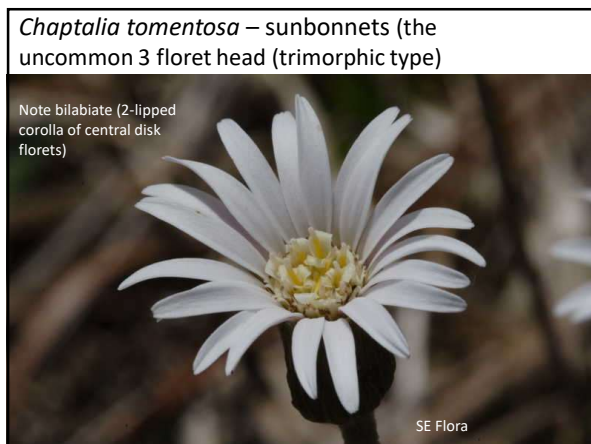
Articum minus – Burdock – less obvious here but all discoid heads [note the involucre bracts (phyllaries)]

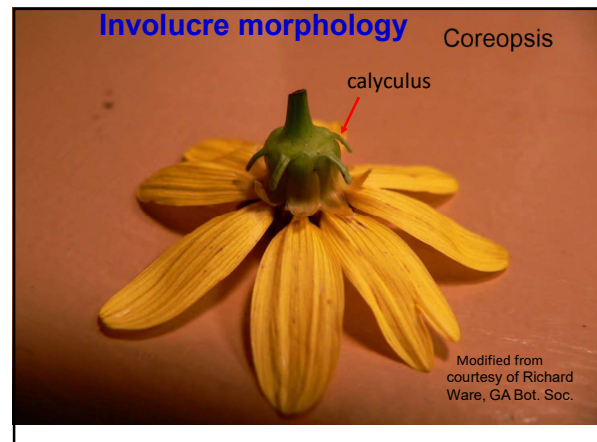
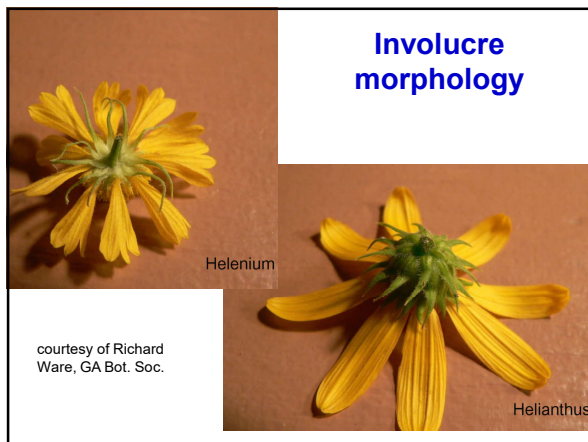
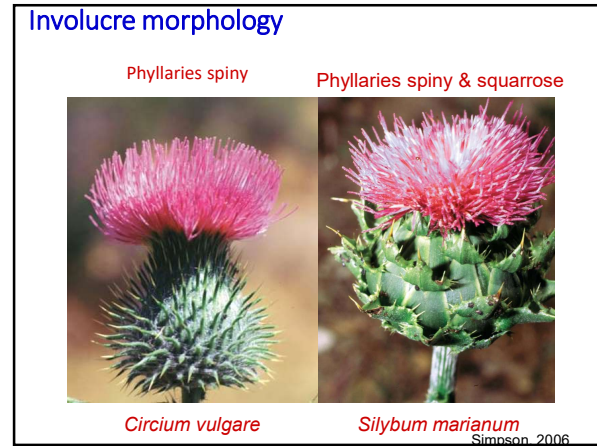
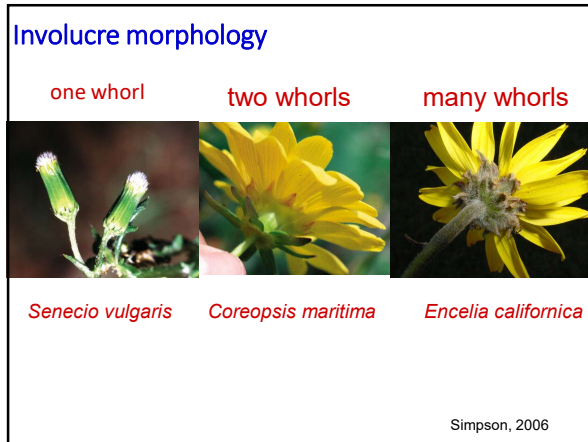
Conoclinium coelestinum Mistflower, Ageratum (relative of *Eupatorium*)

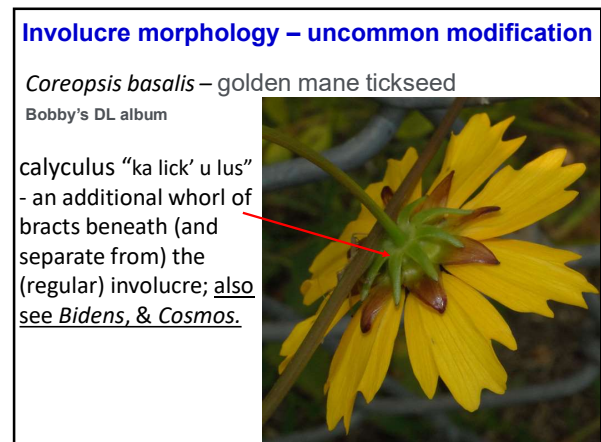
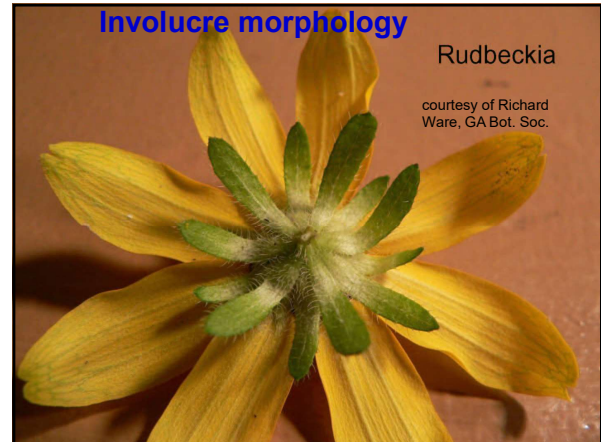
Note heads at bottom are older and in the fruiting stage with the **pappus** showing on a lot of the heads.











Involucre of *Chaptalia tomentosa* – sunbonnets
(the trimorphic head type pointed out earlier)



Imbricate involucre
(overlapping phyllaries)

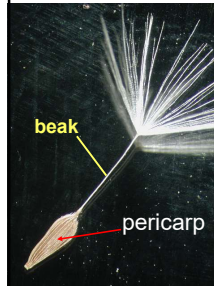
Note also white tomentose
underside of leaves.



Alabama
plants

**Pappus: modified
calyx & Cypsela**

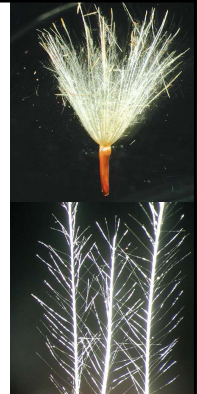
Mod. From Simpson, 2006



capillary bristles,
borne atop "beak"

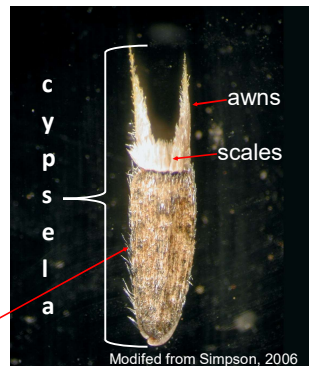
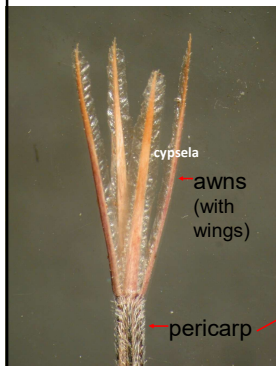


capillary bristles:
barbellate



capillary bristles:
plumose

Pappus: modified calyx & Cypsela (achene w. pappus)



Modified from Simpson, 2006

Symphyotrichum – former "Aster" vs. false "Aster" - *Boltonia*

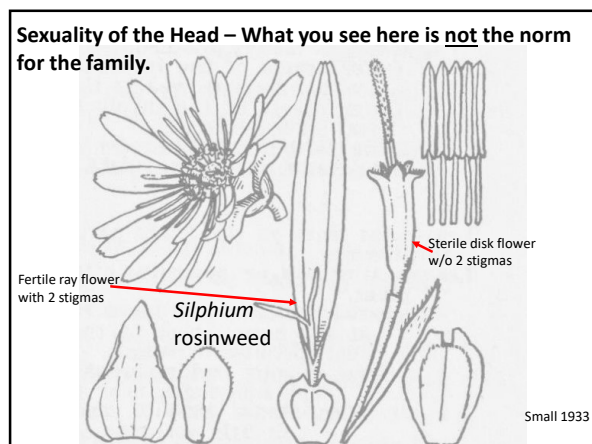
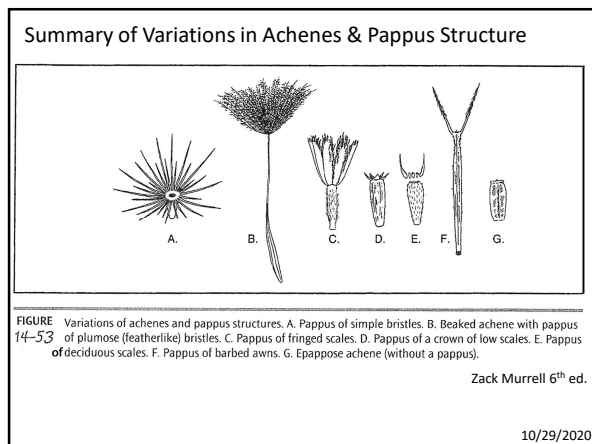
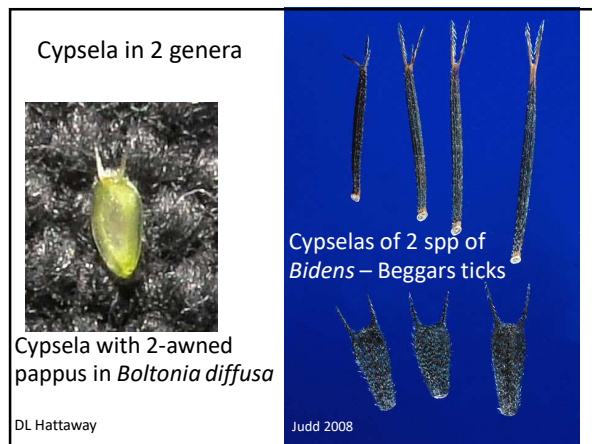
Note the
difference in the
involucre between
the genera.

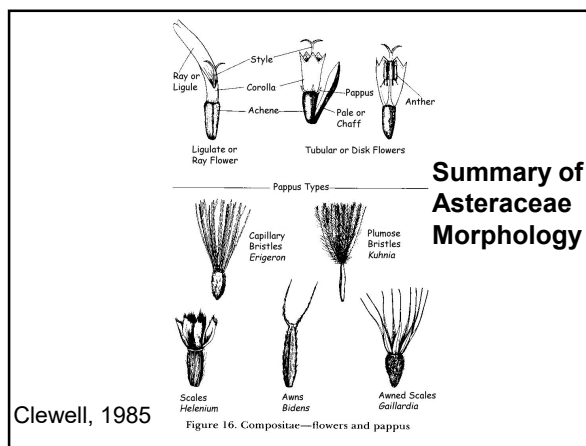
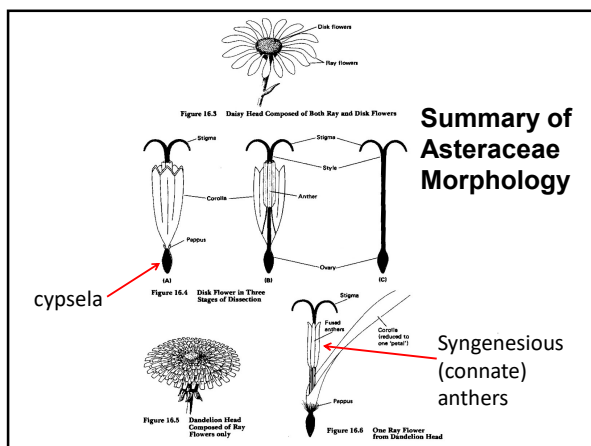
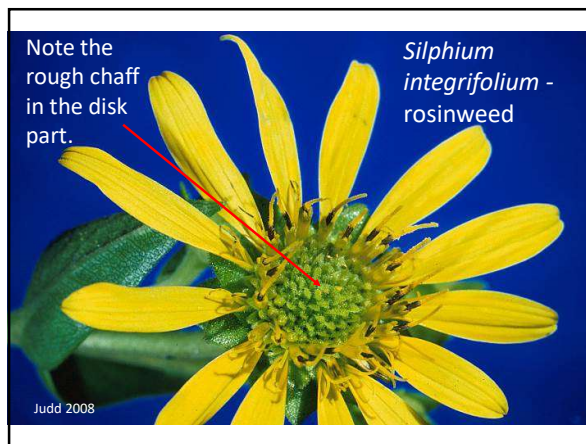
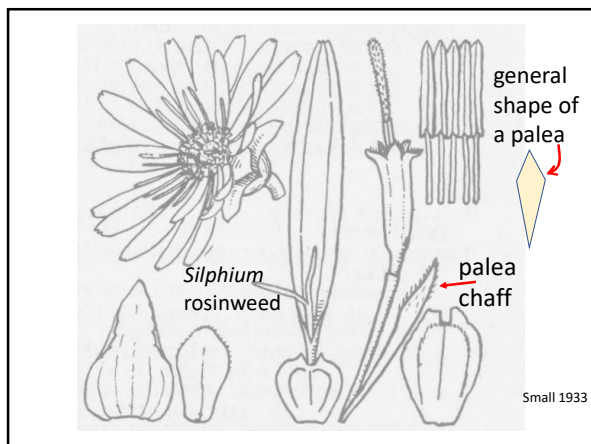
S. tenuifolium



S. cordifolium









More on Tools & Steps for Plant ID

1. books/pamphlets with keys and preferably descriptions & illustrations;
2. 10X lens (make sure you know how to use it);
3. measuring device;
4. knife or clippers
5. HIPDAD (see *Tipularia*, 2016);
6. computer or actual access to herbaria – e.g. UGA, FSU, USF; SERNEC (233 herbaria), BONAP.
7. internet tools like USDA Plants database (currently out of date but still useful).

10/24/2020

3 or 4 Steps in Plant ID

1. Make sure you have an avg. or typical specimen.
2. Do PLANT ANALYSIS 1st - see Plant Analysis handout. This is what Elpel (author of *Botany in a Day*) calls "Profiling Your Plant" on pg. 24 of the 6th ed.
3. Key the plant.
4. Then – "do" Post Keying Procedures (HIPDAD)

Before you Key – "Do" PA – Plant Analysis

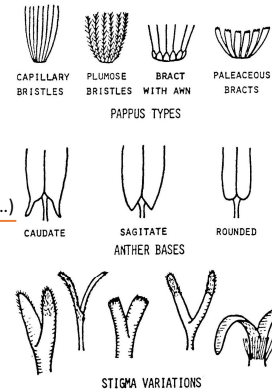
- Humans cannot multitask.
- Relates to team work bullet on previous slide – one member of 2-person team looks at plant while other reads the 2 leads to the key couplet. A third person – if available, could be the "glossary person."
- Plant Analysis Handout (strictly for Asteraceae – see next slides)

What does Plant Analysis look like for the Asteraceae/Compositae?

1. Habit (annual, biennial or perennial (if last – herbaceous or woody)
2. Leaf arrangement (opposite etc.); focus on lower nodes
3. Involucre – imbricate or not; how many series?
4. Head type (which of 3 types)
5. Head/receptacle naked or chaffy (w. “pales”)
6. Head flat or conical – (latter like coneflower & black-eyed susans)
7. Pappus type (including no pappus – minority)
8. Sexuality of ray & disk florets – norm is perfect (or functionally staminate) disk florets with either pistillate or sterile ray florets (rarely perfect in SEUS flora).

Plant Analysis for Comps. (cont’d.)

“Esoteric” Stuff for Asteraceae Plant Analysis (requires good magnification) (+/- already dealt with top row; note barbellate not showing but...)



Adapted from handout Richard & Teresa Ware used ca. 2012.

After Keying Out –“Do” Post Keying Procedures (HIPDAD)

HIPDAD – What Does It Mean?

- H – Habitat (not to be confused with plant habit)
- I - Illustrations (Photos and/or Drawings)
- P – Phenology (including flowering time)
- D - Distribution (or Range)
- A - Abundance (e.g. Common, Occasional, Rare)
- D - Description (or a Diagnosis)

10/24/2020

Short Practical Exercise – See *Eurybia* in Weakley for GA – of 10 spp., how many are common in GA?