

Core Asterids

- two well supported lineages of the 'true' or core asterids
- 'lamiid' or Asterid I group
- 'campanulid' or Asterid II group
- appear to have the typical fused corolla derived independently and via two different floral developmental pathways

lamiid

campanulid

Core Asterids

- two well supported lineages of the 'true' or core asterids

= NOT fused corolla tube

- Asterids primitively NOT fused corolla at maturity
- 2 separate origins of fused petals in "core" Asterids (plus several times in Ericales)

Early vs. Late Sympetaly

euasterids II - campanulids

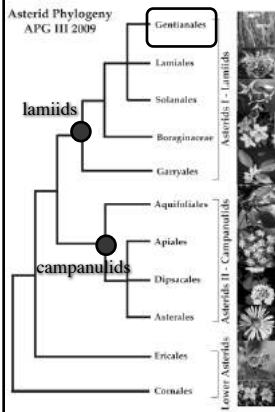
Calendula, Asteraceae early

euasterids I - lamiids

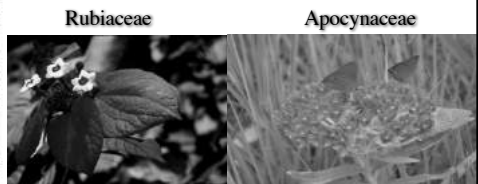
Anchusa, Boraginaceae late

also in Cornaceae of "basal asterids"

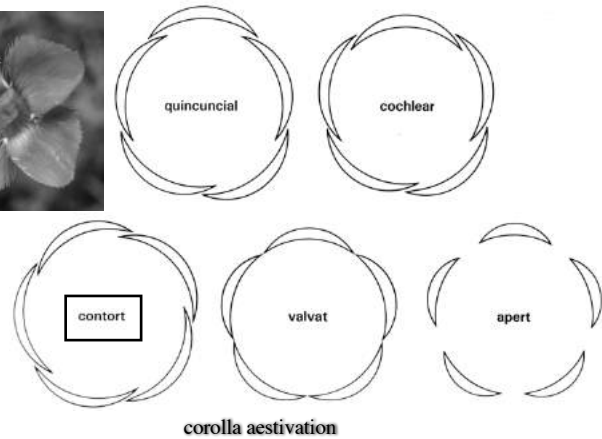
Gentianales



- order within 'lamiid' or Asterid I group
- 5 families and nearly 17,000 species dominated by Rubiaceae (coffee) and Apocynaceae (milkweed)
- iridoids, opposite leaves, contorted corolla

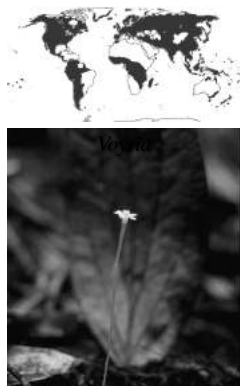


Gentianales



*Gentianaceae - gentians

Cosmopolitan family of 87 genera and nearly 1700 species. Herbs to small trees (in the tropics) or mycotrophs.



*Gentianaceae - gentians

- opposite leaves
- glabrous - no hairs!
- flowers right contorted



*Gentianaceae - gentians

CA (4-5) CO (4-5) A4-5 G(2)



- flowers 4 or 5 merous
- pistil superior of 2 carpels
- parietal placentation; fruit capsular

*Gentianaceae - gentians



Gentiana is 5 merous, with plaits between each petal lobe



*Gentianaceae - gentians



Gentianopsis is 4 merous, with fringed petals



*Gentianaceae - gentians



Gentianella is 4-5 merous, without fringe, and without plaits between petal lobes

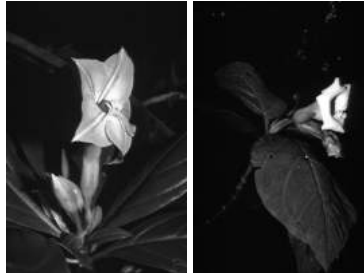


*Gentianaceae - gentians

- woody gentians common in cloud forests of the Neotropics
- hummingbird, bat, and bee pollinated radiations



Symbolanthus



Lisianthus



*Apocynaceae - milkweeds

Worldwide family of trees, vines, herbs with opposite leaves - 415 genera, 4600 species.



Pachypodium



Periploca



*Apocynaceae - milkweeds

Worldwide family of trees, vines, herbs with opposite leaves - 415 genera, 4600 species.

Vinca minor - periwinkle
Introduced ground cover,
often spreading



Caralluma europea
cactus mimic



Asclepias syriaca
common milkweed

*Apocynaceae - milkweeds

Milky latex commonly poisonous and source of medicinal drugs.



Cathartus roseus
easy periwinkle



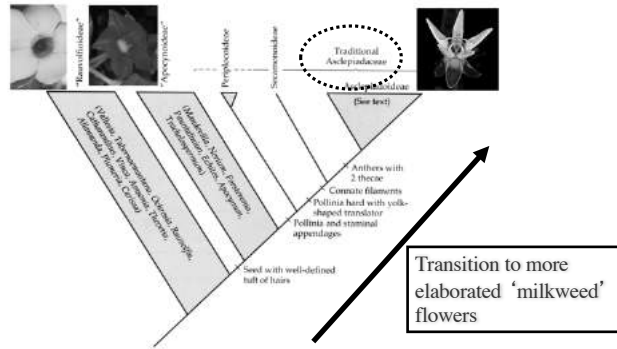
Asclepias & monardella
cardiac glycosides



Care vine - South America

*Apocynaceae - milkweeds

Family is broadly defined and includes distinctive milkweeds of old family Asclepiadaceae



*Apocynaceae - milkweeds

CA (5) CO (5) A5 G 2 primitive

- flowers 5 merous
- left contorted perianth
- 2 separate carpels - follicles



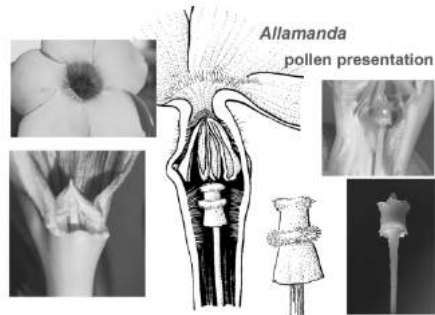
*Apocynaceae - milkweeds

CA (5) CO (5) A5 G 2 primitive

- 'pollen presentation' - style plunger or bottle brush to expose pollen (important! part of the suite of features in Asterid "heads" or pseudanthia)



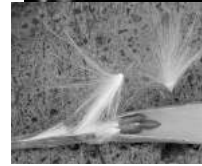
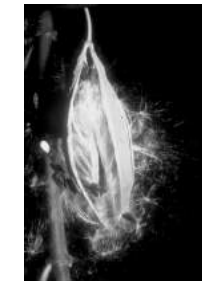
- 5 stamens begin to be connivent



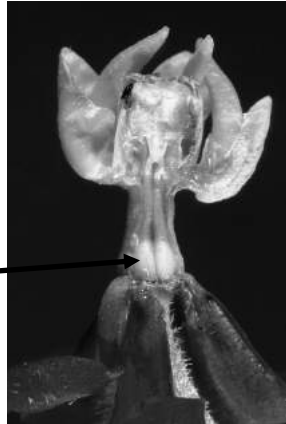
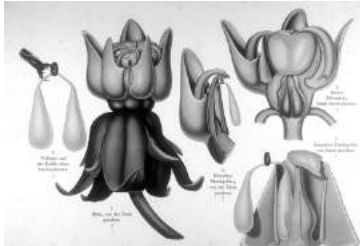
*Apocynaceae - milkweeds

CA (5) CO (5) A(5) G 2 derived

- stamens fuse to each other and to style region - gynostegium
- pollen forms pollinia
- more seeds with tufts of hairs

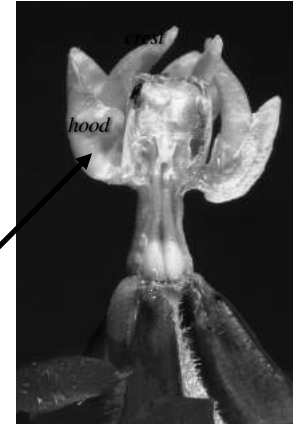
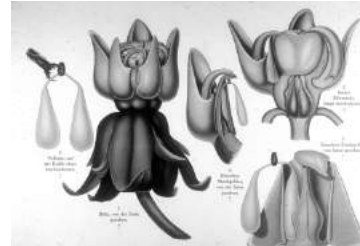


***Apocynaceae - milkweeds**



Note 2 free carpels slightly fused at top

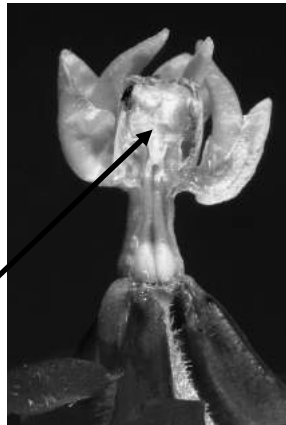
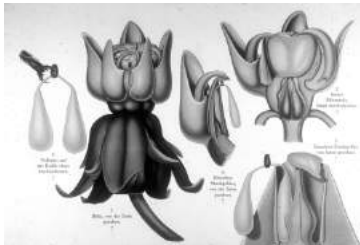
***Apocynaceae - milkweeds**



Corona for nectar reward

Corona = hood + crest

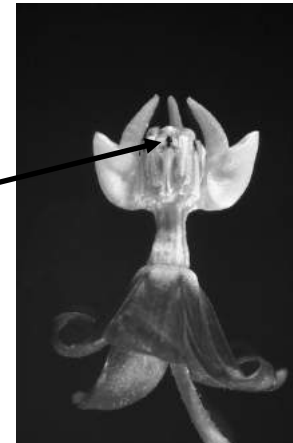
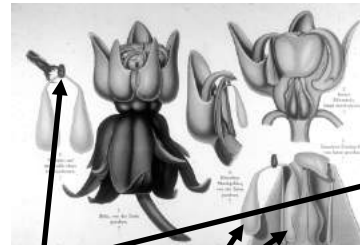
***Apocynaceae - milkweeds**



Fusion of 5 stamens and top of gynoecium

Corona = hood + crest
Gynostegium = A + G

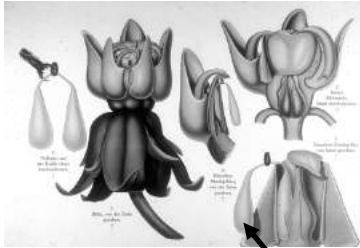
***Apocynaceae - milkweeds**



Gland is attached to 2 pollinia

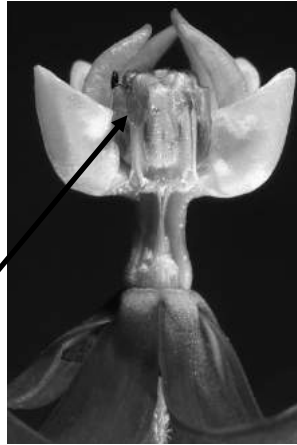
Corona = hood + crest
Gynostegium = A + G
Pollinia = pollen mass

*Apocynaceae - milkweeds

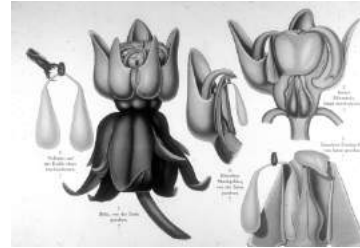


Gland is attached to 2 pollinia

Corona = hood + crest
Gynostegium = A + G
Pollinia = pollen mass



*Apocynaceae - milkweeds



Bee removing pollinia or inserting pollinia into stigmatic cleft



*Apocynaceae - milkweeds



Asclepias amplexicaulis - Clasping milkweed

"Las Vegas" strategy of pollination; but when occurs, all ∞ ovules are fertilized. Typically few follicles are produced per plant. Note seeds with coma attached for wind dispersal.



*Apocynaceae - milkweeds



Apocynum androsaemifolium
Spreading dogbane



Apocynum cannabinum
Hemp dogbane

*Apocynaceae - milkweeds



Apocynum androsaemifolium
Spreading dogbane



Apocynum cannabinum
Hemp dogbane

*Apocynaceae - milkweeds



Asclepias syriaca - Common
milkweed



Asclepias tuberosa - Butterfly weed



Asclepias incarnata -
Swamp milkweed

*Rubiaceae - coffee

Cosmopolitan family, most diverse in tropics, of 550 genera and over 10,000 species

- trees, shrubs, lianas, and herbs
- important drug family

Psychotria nervosa



Houstonia carolina
azure bluets



Cinchona
quina

*Rubiaceae - coffee

Cosmopolitan family, most diverse in tropics, of 550 genera and over 10,000 species

- opposite (whorled) leaves with inter-petiolar stipules



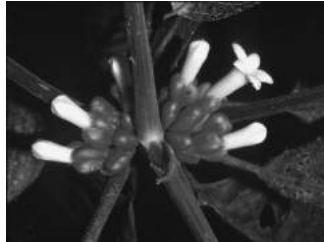
Galium (bedstraw) -
are these stipules?



*Rubiaceae - coffee

CA (4-5) CO (4-5) A 4-5 T(2)

- 4 merous in temperate regions, 5 merous in tropics - tendency to cluster (pseudanthia!)
- only epigynous family in Gentianales
- fruit usually a 2-seeded drupe



Pentagonia
Panama



Galium - bedstraw
Wisconsin

*Rubiaceae - coffee



Galium aparine - cleavers

Cleavers and bedstraws are numerous; separated by number of whorled leaves and fruit type

*Rubiaceae - coffee



Houstonia caerulea- azure bluets

*Rubiaceae - coffee



Mitchella repens
Partridge berry, twin-berry



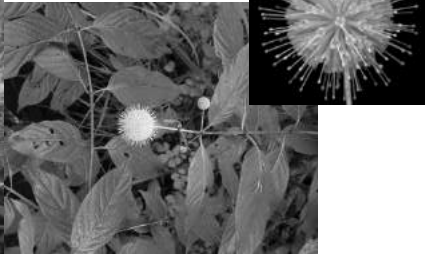
Note: paired flowers above with connate pistils; "twin" berry to right

*Rubiaceae - coffee



Cephalanthus occidentalis - buttonbush

Only shrub in Wisconsin; note "heads" of tiny 4 merous flowers "pseudanthia"



*Rubiaceae - coffee



Isertia



Coffea arabica - coffee

*Rubiaceae - coffee



Psychotria nervosa



Cephaelis tomentosa
hotlips

• the giant genus *Psychotria* is paraphyletic and includes more specialized genera (e.g., condensed, bracted inflorescences) "pseudanthia"!

*Rubiaceae - coffee



Psychotria nervosa



Sally Kellerman
Hot Lips Hoolihan

• the giant genus *Psychotria* is paraphyletic and includes more specialized genera (e.g., condensed, bracted inflorescences)

*Rubiaceae - coffee

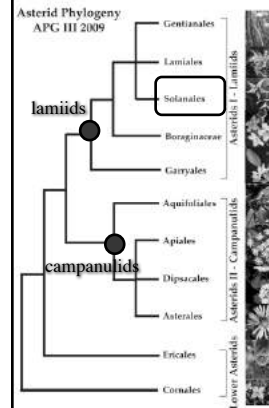


Hydnophytum formicarum
(in greenhouse #4)



The genus *Hydnophytum* - ant plants and epiphytes - along with the whole subtribe Hydnophytinae - are now shown to be derived out of the genus *Psychotria*!

Solanales



- order within 'lamiids' or Asterid I group
- 5 families and nearly 5,000 species dominated by Solanaceae (nightshade) and Convolvulaceae (morning glory)
- no iridoids, alternate leaves, plicate corolla, calyx persistent in fruit



*Solanaceae - nightshades

Large cosmopolitan family of herbs, shrubs, or trees with nasty compounds. Important for source of foods (potato, tomato, pepper) and drugs.

- Alternate leaved
- Cyme or dichasium inflorescence



*Solanaceae - nightshades

CA (5) CO (5) A5 G (2)

- 5- merous flowers
- axile placentation
- berry fruited



*Solanaceae - nightshades

CA (5) CO (5) A5 G (2)

- stamens often terminal pored for buzz pollination by bees (remember Ericaceae?)



*Solanaceae - nightshades

CA (5) CO (5) A5 G (2)

- often calyx persistent in fruit



Physalis alkekengi - Japanese lantern

*Solanaceae - nightshades



Solanum dulcamara - bitterweet

*Solanaceae - nightshades



Solanum carolinense - Horse nettle

*Solanaceae - nightshades



Physalis virginiana
Ground cherry
Note: calyx surrounding berry



*Solanaceae - nightshades



edible fruits include . . .

Capsicum - pepper

Solanum - tomato & eggplant



*Solanaceae - nightshades

drug plants include . . .

Atropa belladonna



*Solanaceae - nightshades

drug plants include . . .



Nicotiana tabacum

Atropa belladonna

Brugmansia

Datura stramonium



*Solanaceae - nightshades



Introduced,
hallucinogenic roadside
weed

Datura stramonium
Jimson-weed

. . . also called
thorn-apple

*Solanaceae - nightshades



Introduced,
hallucinogenic roadside
weed

Datura stramonium
Jimson-weed

. . . also called
thorn-apple

CASE REPORT

Jimson Weed Intoxication in Five Adolescents

Steven N. Semral, DO; Neil P. Cosser, MD

INTRODUCTION
Datura stramonium (Jimson weed) is a poisonous shrub that grows widely throughout the United States with a high potential for abuse. The plant possesses potent anticholinergic properties, and its ingestion can cause serious illness or death. Intentional ingestions may result in unintended poisoning for people who attempt to replicate the psychotherapeutic and delirium that typically ensues after ingesting the leaves, stem, seeds, or tea brewed from the leaves. We report 5 cases of *D. stramonium* intoxication seen within a 3-day span as well as recent data regarding anticholinergic plant exposures.

Wisconsin Medical Journal 2005

*Solanaceae - nightshades



Introduced,
hallucinogenic roadside
weed

Datura stramonium
Jimson-weed

. . . also called
thorn-apple

Case 3

A 16-year-old male presented with slurred, unintelligible speech and severe restlessness. Blood pressure was 130/67, and pulse was 85 beats per minute. Activated charcoal was administered. Shortly after admission to the PICU, he became aggressive, combative, and even attempted to stand on a bedside table and fly to escape from the room. Subsequently, he was sedated with intravenous lorazepam. Discharge occurred after 24 hours with normal vital signs and mental status.

Case 4

A 15-year-old male was brought to the ED by the police after he had been found crawling down a busy street into an intersection. He was picking at objects on his body that were not present. His only comprehensible words were obscenities. Blood pressure was 119/44, and pulse was 154 beats per minute. Skin was dry and flushed. Urine toxicology screen was negative. Activated charcoal was administered. Blood pressure and temperature remained stable. Pulse ranged from 40 to 109 beats per minute with sinus rhythm. He was sedated as necessary and discharged 40 hours later with normal vital signs and mental status.

Wisconsin Medical Journal 2005