



1

Asterids

Eudicot Phylogeny
APG III 2009

- (1) fused petals
- (2) stamens = or less than number of petals
- (3) stamens fused to petals
- (4) pistil of 2 (rarely more) carpels

2

*Gentianaceae - gentian family

Cosmopolitan family of 80 genera and nearly 900 species. Herbs to small trees (in the tropics) with opposite leaves.

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

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

3

*Gentianaceae - gentian family

Gentiana is 5 merous, with plaits between each petal lobe

Gentiana andrewsii - Bottle gentian

Gentiana puberulenta - Prairie gentian

4

*Gentianaceae - gentian family



Gentianopsis is 4 merous with fringed petals



Gentianopsis virgata - fringed gentian

5

*Gentianaceae - gentian family



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

Gentianella quinquefolia - stiff gentian

6

**Apocynaceae - dogbane family



Mainly tropical family of trees and vines with opposite leaves. Milky latex commonly poisonous and source of medicinal drugs.



Vinca minor - periwinkle
Introduced ground cover, often spreading

7

**Apocynaceae - dogbane family

CA (5) CO (5) A5 G2

Flowers 5 merous, small, and with 2 separate carpels.



Apocynum androsaemifolium
Spreading dogbane *Apocynum sibiricum*
Hemp dogbane



8

**Apocynaceae - dogbane family

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

Fruits are follicles with cottony seeds for wind dispersal.



Apocynum androsaemifolium
Spreading dogbane
Apocynum sibiricum
Hemp dogbane



9

**Apocynaceae - dogbane family

Milkweeds different!
Flowers are highly modified for specialized insect pollination.

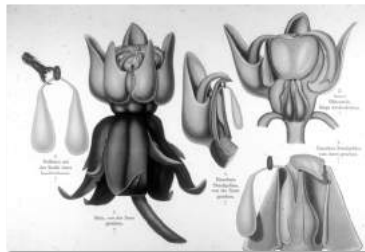


Asclepias - milkweeds



10

**Apocynaceae - dogbane family



Note 2 free carpels slightly fused at top

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

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



11

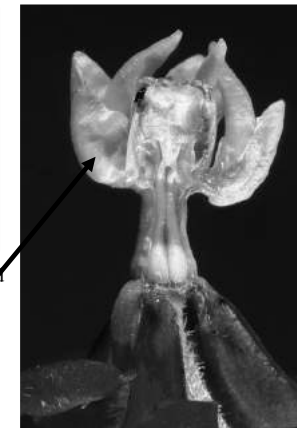
**Apocynaceae - dogbane family



Unusual corona structure for nectar reward

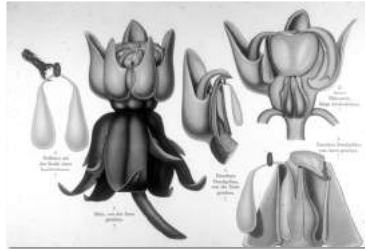
CA (5) CO (5) X 5 A 5 G 2

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



12

**Apocynaceae - dogbane family



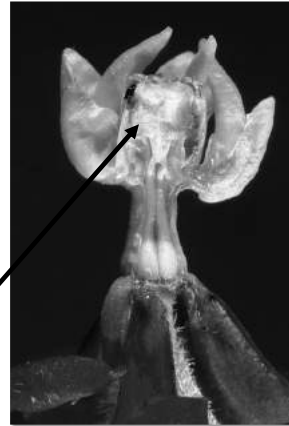
Fusion of 5 stamens and top of gynoecium

CA (5) CO (5) $\overline{X} 5$ A 5 G 2

Corona = hood + crest

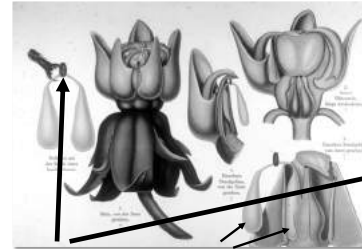
Gynoestegium = A + G

Pollinia = pollen mass



13

**Apocynaceae - dogbane family



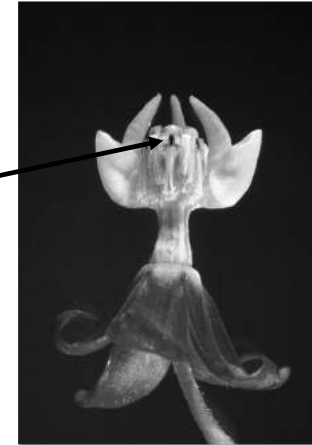
Gland is attached to two **pollinia**

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

Corona = hood + crest

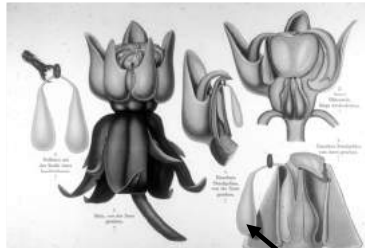
Gynoestegium = A + G

Pollinia = pollen mass



14

**Apocynaceae - dogbane family

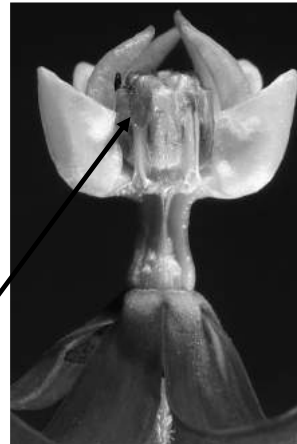


CA (5) CO (5) $\overline{X} 5$ A 5 G 2

Corona = hood + crest

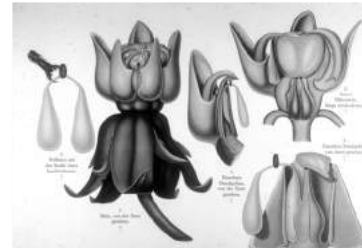
Gynoestegium = A + G

Pollinia = pollen mass



15

**Apocynaceae - dogbane family



Bee removing pollinia or inserting pollinia into stigmatic cleft

CA (5) CO (5) $\overline{X} 5$ A 5 G 2

Corona = hood + crest

Gynoestegium = A + G

Pollinia = pollen mass

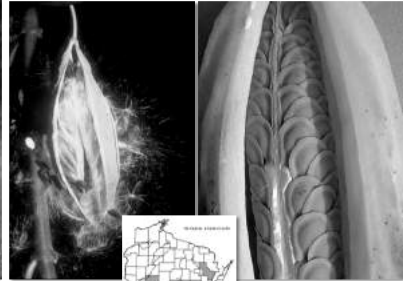


16

**Apocynaceae - dogbane family



"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.



Asclepias amplexicaulis - Clasp milkweed

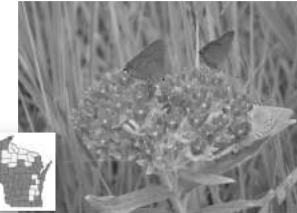


17

**Apocynaceae - dogbane family



Asclepias syriaca - Common milkweed



Asclepias tuberosa - Butterfly weed

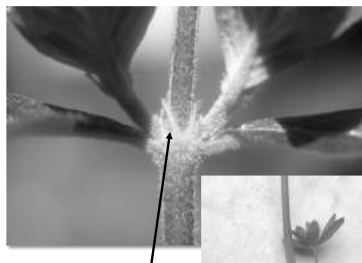


Asclepias incarnata - Swamp milkweed



18

**Rubiaceae - coffee family



Opposite or whorled leaves
Inter-petiole stipules

All species in Wisconsin are 4 and in the tropics are 5-merous



Galium - Bedstraw

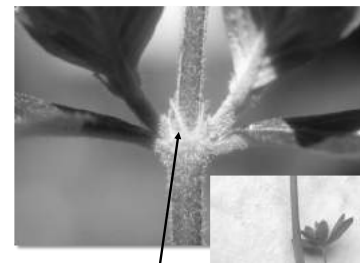
Important & large family of trees/shrubs in the pantropics



Coffea arabica - coffee

19

**Rubiaceae - coffee family



Opposite or whorled leaves
Inter-petiole stipules

All species in Wisconsin are 4 and in the tropics are 5-merous



Galium - Bedstraw

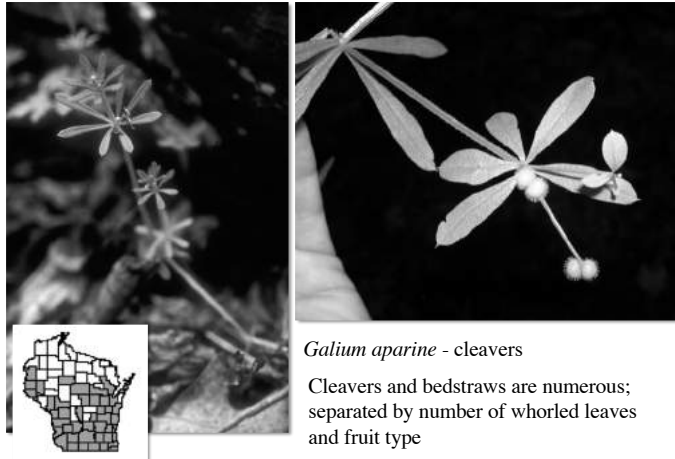


CA (4) CO (4) A 4 T (2)

The family has inferior ovary.

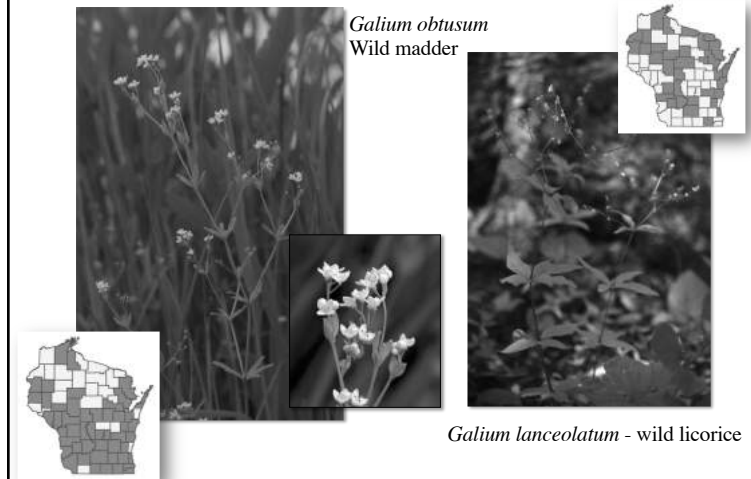
20

**Rubiaceae - coffee family



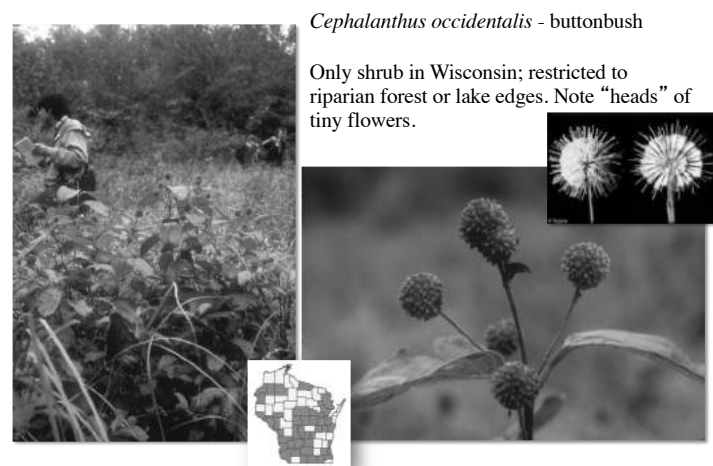
21

**Rubiaceae - coffee family



22

**Rubiaceae - coffee family



23

**Rubiaceae - coffee family



24

**Rubiaceae - coffee family



Mitchella repens
Partridge berry, twin-berry



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



25

*Solanaceae - nightshade family

- Large cosmopolitan family of alternate-leaved herbs, vines, or shrubs with cyme inflorescences
- Important family for nasty compounds (and drugs)
- Important for source of foods (potato, tomato, pepper)

Solanum dulcamara
Bittersweet



26

*Solanaceae - nightshade family



edible fruits include . . .

Capsicum - pepper

Solanum - tomato & eggplant



27

*Solanaceae - nightshade family

drug plants include . . .



Nicotiana tabacum

Atropa belladonna

Brugmansia

Datura innoxia

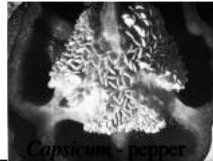


28

*Solanaceae - nightshade family

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

- 5- merous flowers
- axile placentation
- berry fruited



Capsicum - pepper



Solanum carolinense - Horse nettle



29

*Solanaceae - nightshade family

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

- stamens often terminal pored for buzz pollination by bees



Solanum carolinense - Horse nettle



30

*Solanaceae - nightshade family

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

- berry fruited - often with persistent calyx



Physalis alkekengi - Japanese lantern



31

*Solanaceae - nightshade family



Solanum dulcamara - bitterweet



32

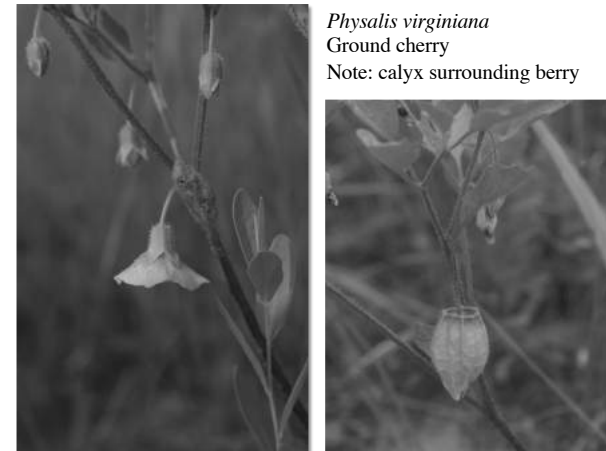
*Solanaceae - nightshade family



Solanum carolinense - Horse nettle

33

*Solanaceae - nightshade family



Physalis virginiana
Ground cherry
Note: calyx surrounding berry

34

*Solanaceae - nightshade family



Datura stramonium
Jimson-weed (Jamestown weed)

Introduced, hallucinogenic
roadside weed
. . . also called thorn-
apple

35

*Solanaceae - nightshade family



Datura stramonium
Jimson-weed (Jamestown weed)

Introduced, hallucinogenic
roadside weed
. . . also called thorn-
apple

CASE REPORT

**Jimson Weed Intoxication
in Five Adolescents**

Steven N. Isomail, DO; Neil P. Cooney, 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 ingestion can cause serious illness or death. Intentional ingestions may result in unintended poisoning for people who attempt to experience the anticholinergic-induced delirium that typically manifests after ingesting the leaves, stems, seeds, or tea brewed from the berries. We report a case of 23 adolescent intoxication seen within a 3-day span as well as review data regarding anticholinergic plant exposures.

Wisconsin Medical Journal 2005

36

*Solanaceae - nightshade family



Datura stramonium
Jimson-weed (Jamestown weed)

Introduced, hallucinogenic
roadside 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

37

*Solanaceae - nightshade family



also called "moonflower"

38

**Convolvulaceae - morning-glory family



Convolvulus - bindweed

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

Flowers strongly funnelliform with plicate corolla tube (with fold lines). Fruit usually capsular.

Largely tropical family of 55 genera and nearly 2000 spp. Twining herbs with alternate leaves.



Ipomoea purpurea
Morning-glory: cultivated

39

**Convolvulaceae - morning-glory family



Calystegia sepium
Hedge bindweed
Note: 2 large bracts below calyx



Convolvulus arvensis
Field bindweed
Note: no floral bracts



40

*Convolvulaceae - morning-glory family

Cuscuta (Cuscutaceae) is actually part of the Convolvulaceae!

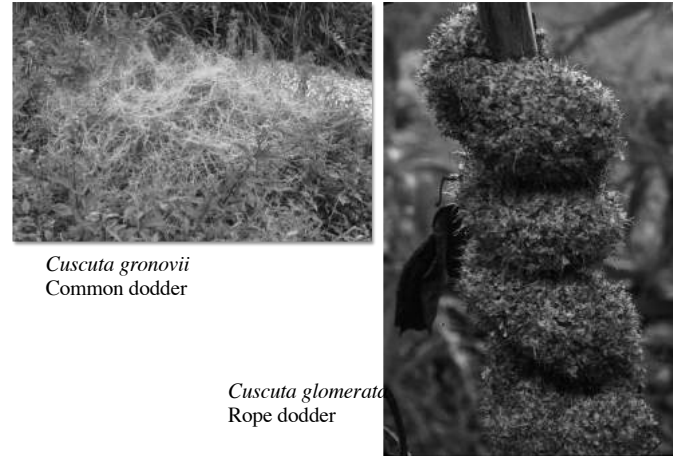


- Twining habit (for support) has gone parasitic (support + food + water; no chlorophyll)

Cuscuta spp. - dodder

41

*Cuscutaceae - dodder family



Cuscuta gronovii
Common dodder

Cuscuta glomerata
Rope dodder

42