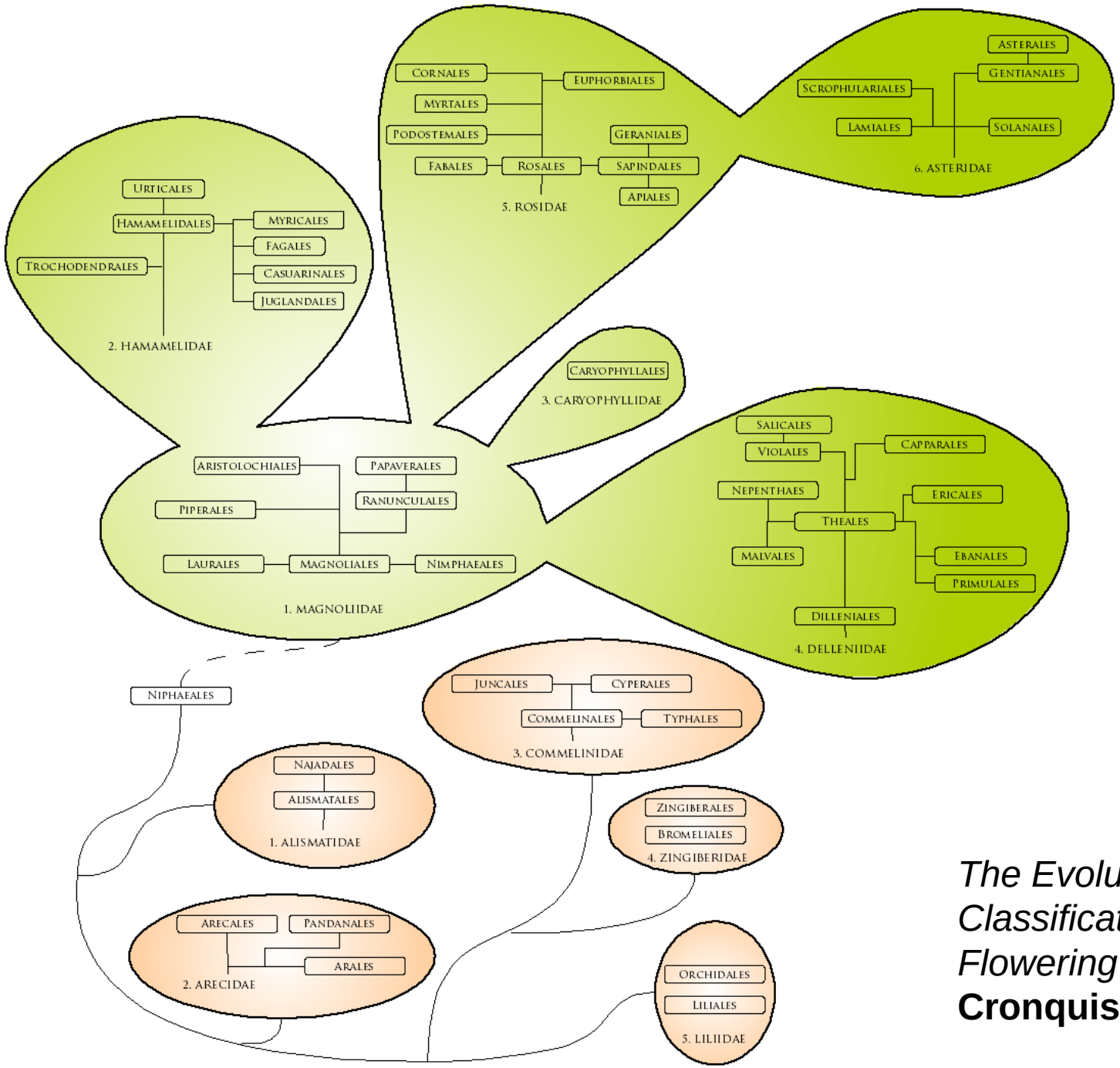
Angiosperms division. Overview of the main orders and families of angiosperms.

A subclass of Magnoliids.

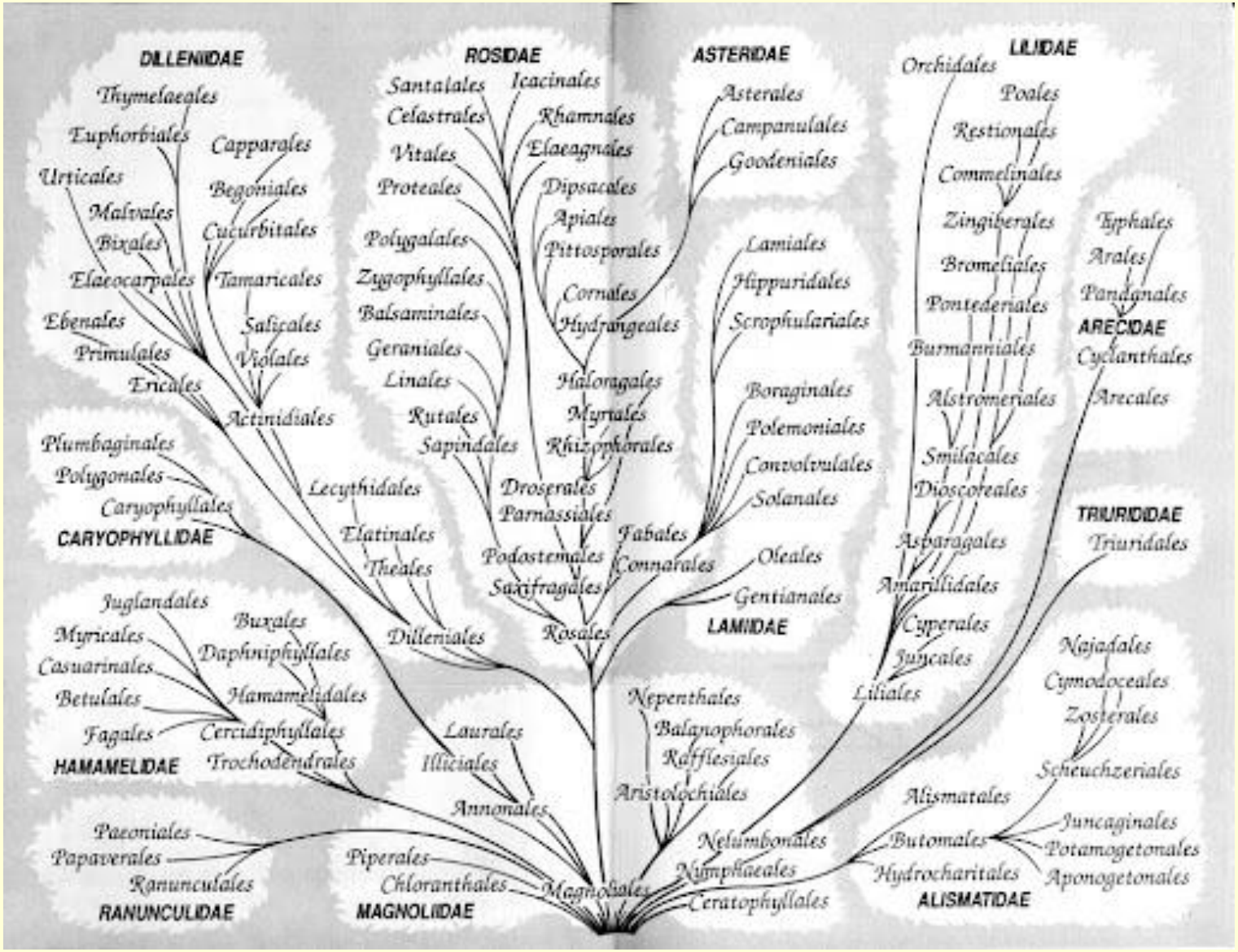
The Division of Angiosperms, or Flowering plants, includes 2 classes: dicotyledonous and monocotyledonous, 12 subclasses, about 533 families, 13000 genera and at least 2500000 species.

The monocotyledonous	The dicotyledonous
The monocotyledonous embryos have a single cotyledon	The dicotyledonous embryos have a pair of cotyledons
They have a fibrous root system	They have a tap root system
Leaves in monocots have parallel venation	Leaves in dicots have reticulate or net venation
In monocot flowers, the count of parts of the flower is a multiple of three or equal to three	The count of parts in a dicot flower is a multiple of four or five or equal to four or five
The roots and stems of monocotyledons do not possess a cambium and cannot increase in diameter	The roots and stems of dicotyledons possess a cambium and have the ability to increase in diameter
A few examples of monocotyledons are garlic, onions, wheat, corn and grass, etc.	A few examples of dicots are beans, cauliflower, apples and pear, etc.

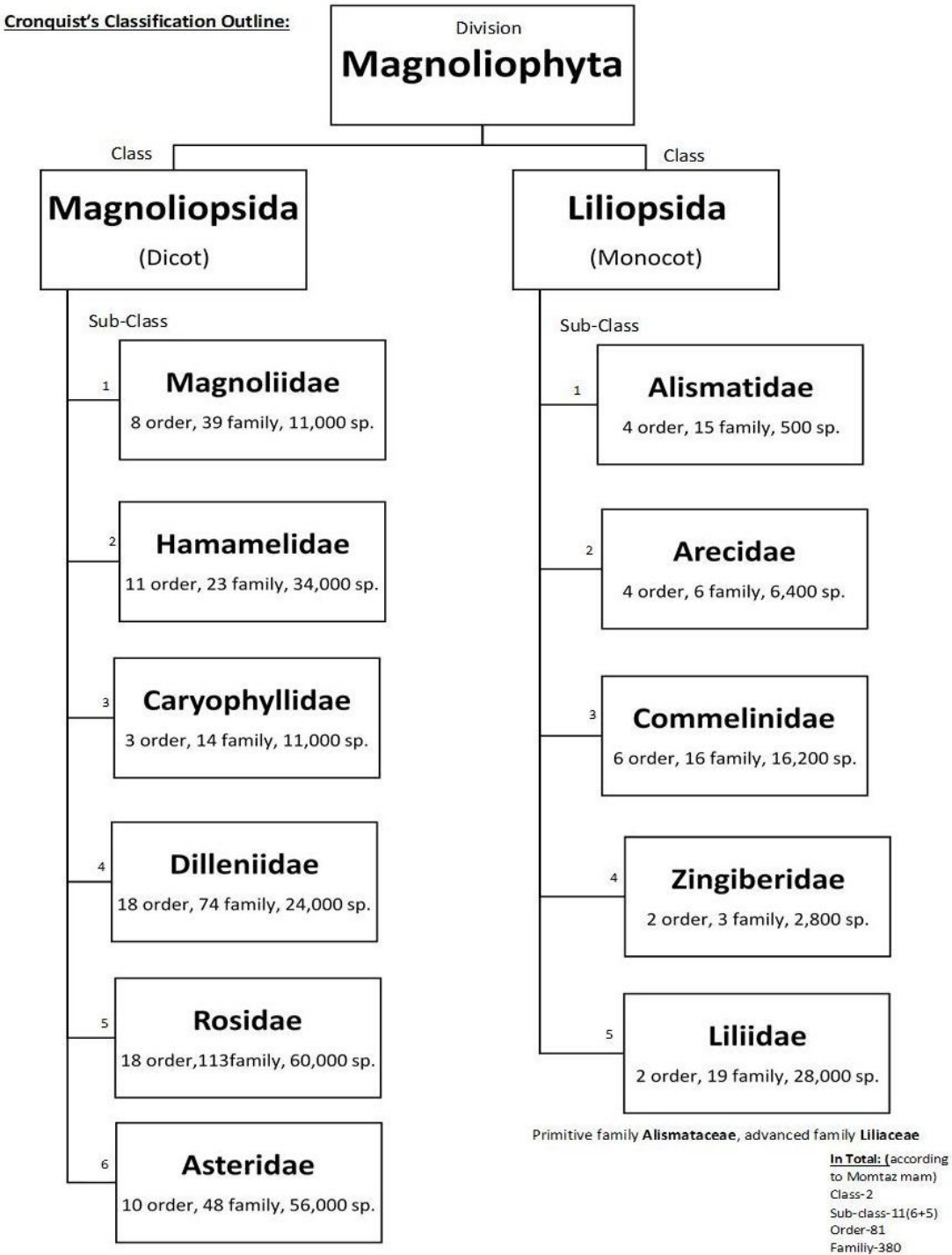


The Evolution and Classification of Flowering Plant
Cronquist system

Takhtajyan system



Cronquist's Classification Outline:



Primitive family **Alismataceae**, advanced family **Liliaceae**

In Total: (according to Momtaz mam)
Class-2
Sub-class-11(6+5)
Order-81
Familiy-380

Primitive sign:

- receptacle convex, elongated
- large number of perianth members
- spiral arrangement of members flower
- actinomorphic flower
- large solitary flowers
- polypetalous and polysepalous flower

Progressive sign:

- receptacle shortened, flat, even concave
- reduced number of perianth members
- circular arrangement of members flower
- zygomorphic flowers
- small brightly ornamented, aggregated in inflorescences
- gamopetalous and gamosepalous flower

Class – Magnoliopsida or Dicotyledones

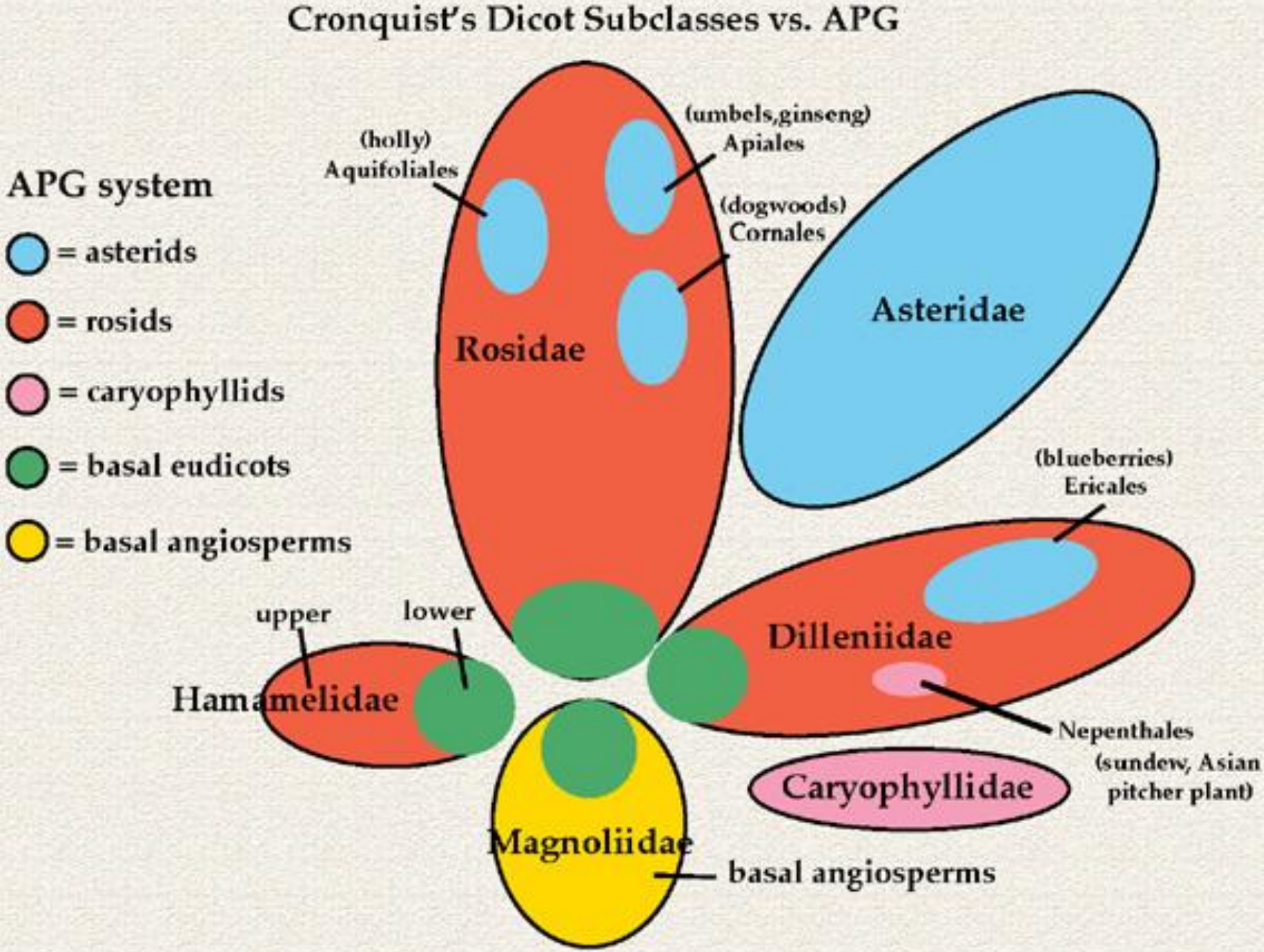
includes 8 subclasses, 429 families, about 200,000 species.

The following features are characteristic of representatives of this subclass:

1. Two cotyledons in the embryo of. Every a cotyledon with three vascular bundles.
2. Reticulated or fingered venation of leaves.
3. The leaves are simple and compound more or less divided into a petiole and a plate.
4. Predominantly (but not always) a taproot system.
5. The presence of secondary growth due to cambium
6. Stems have open vascular bundles arranged in a circle, or stems have annular non-bundled structure.
7. Flowers are mainly 5- rarely 3- 4-membered.

The dicotyledonous class includes 8 subclasses:

- Magnoliids - Magnoliidae
- Ranunculids - Ranunculidae
- Caryophyllids - Caryophyllidae
- Hamamelids -Hamamelidae
- Dilleniidae- Dilleniidae
- Rosids - Rosidae
- Lamiids - Lamiidae
- Asterids - Asteridae


Cronquist's Dicot Subclasses vs. APG
APG system
= asterids
= rosids
= caryophyllids
= basal eudicots
= basal angiosperms
(holly)
Aquifoliales
(umbels,ginseng)
Apiales
(dogwoods)
Cornales
Rosidae
Asteridae
(blueberries)
Ericales
upper
lower
Hamamelidae
Dilleniidae
Nepenthales
(sundew, Asian
pitcher plant)
Caryophyllidae
Magnoliidae
basal angiosperms

SUBCLASS MAGNOLIIDS - MAGNOLIIDAE

Order Magnoliales

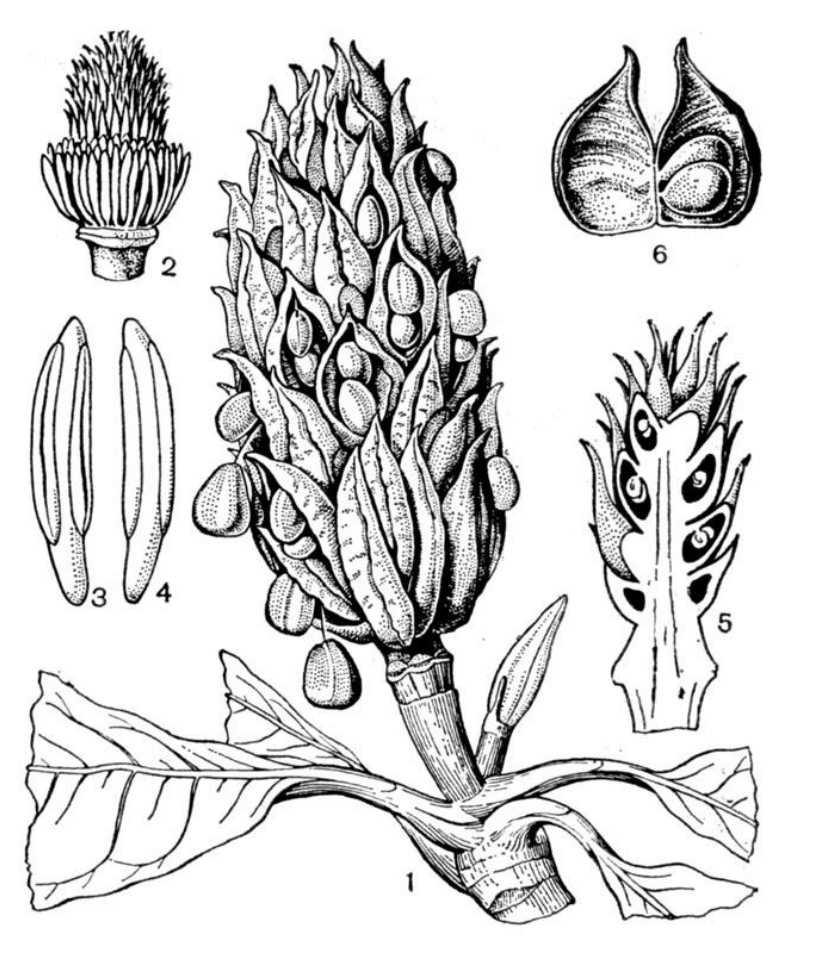
Family Magnoliaceae

Magnolia obovate

$$*P_9A_\infty G_{\underline{\infty}}$$

Magnólia grandiflóra

Magnólia grandiflóra


2
6
3
4
5
1

Order Illiciales

The family Schisandraceae

Schisandra chinensis

Schisandra chinensis:
1 - branch with leaves and follicles; 2 - part of the shoot with leaves and flowers; 3 - stamen; 4 - ovary with lateral stigma; 5 - pistillate flower

* $P_{\infty}A_0G_{\underline{\infty}}$ *$P_{\infty}A_{3\text{-}7}G_0$

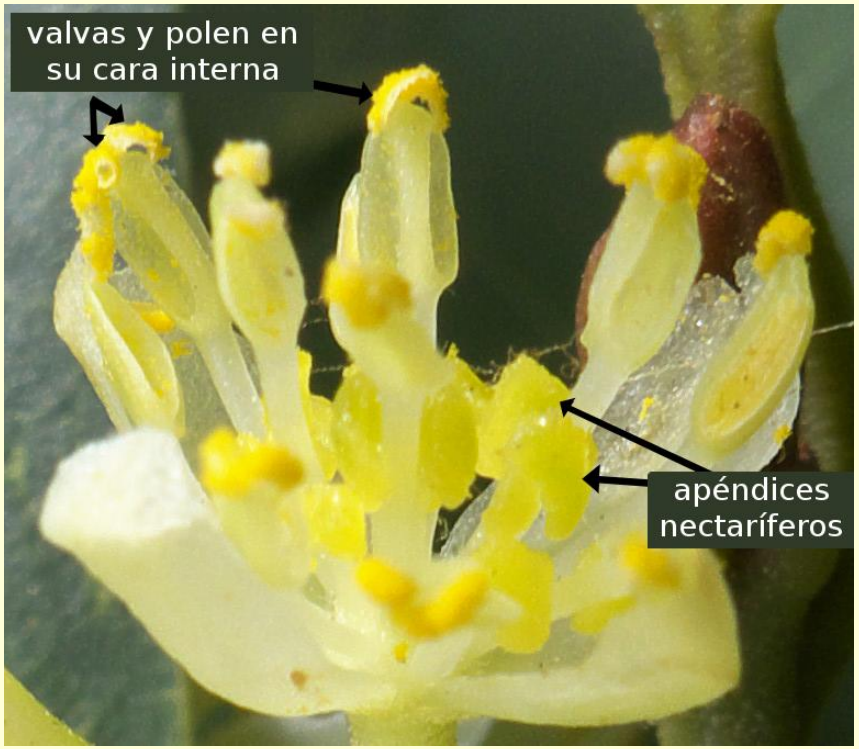
The family Iliiciaceae

Illicium verum

* $P_{\infty}A_{\infty}\underline{G_{\infty}}$

Order Laurales

The family Lauraceae



Laurus nobilis

* $P_4A_{0staminodes}G_{\underline{1}}$
*$P_4A_{\infty}G_0$

Cinnamomum verum

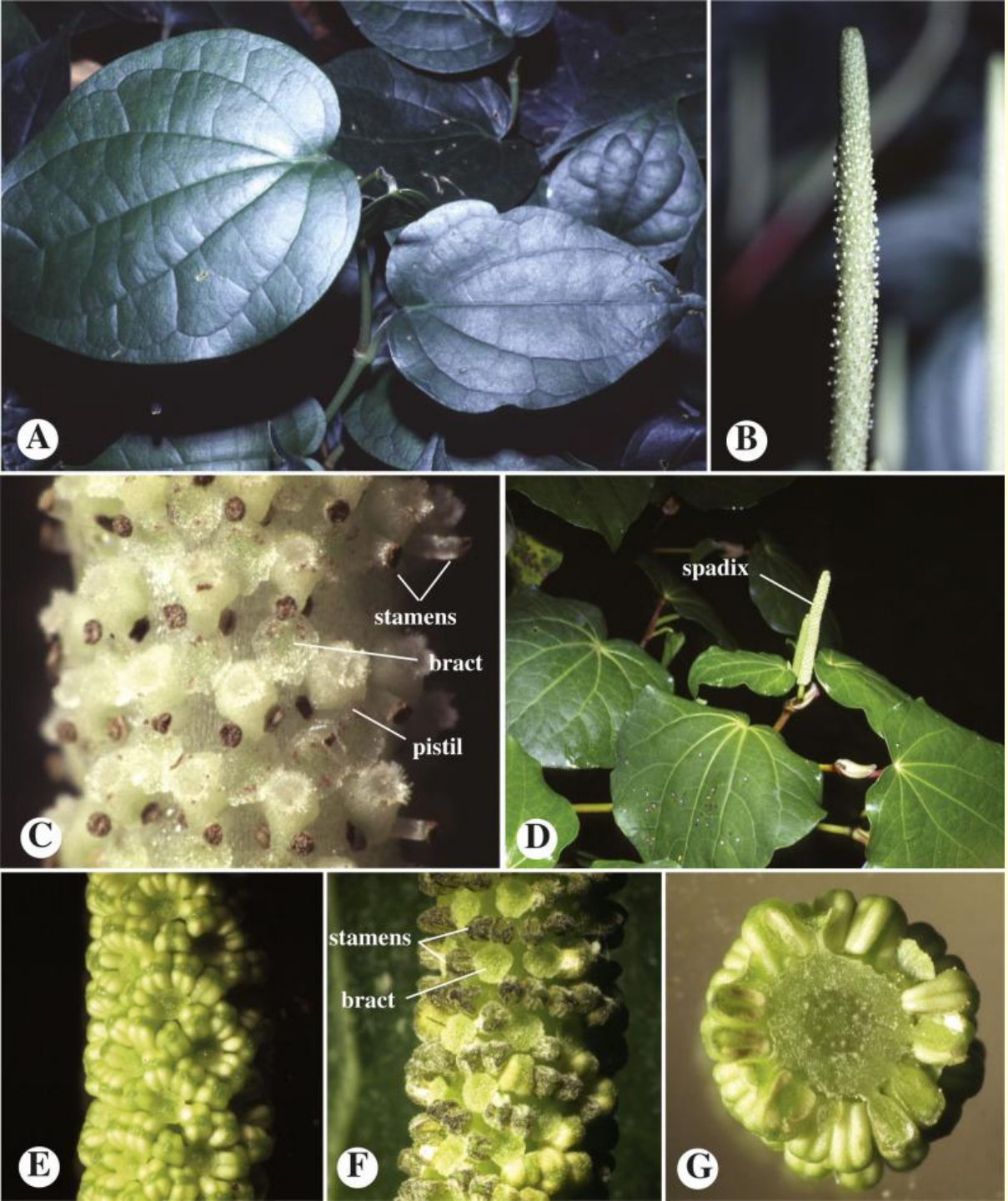
The order Piperales.

The pepper family Piperaceae

Peperomia obtusifolia

Piper nigrum

Piperaceae. **A**. *Piper nigrum*, pepper. Vegetative morphology. **B**. *Peperomia argyreia*, watermelon peperomia. Spadix inflorescence. **C**. *Peperomia* sp. Close-up of inflorescence, showing numerous small, bracteate flowers. Note absence of perianth. **D–G**. *Macropiper excelsum*. **D**. Whole plant with spadix. **E**. Immature male flowers. **F**. Mature male flowers, anthers dehiscing. **G**. Inflorescence cross-section, showing thick, fleshy axis.



The order **Aristolochiales**

Family Aristolochiaceae

Aristolochia gigantea

Aristolochia clematitis

Asarum europaeum

*P(3)A6+6G(6)-

Order Rafflesiales

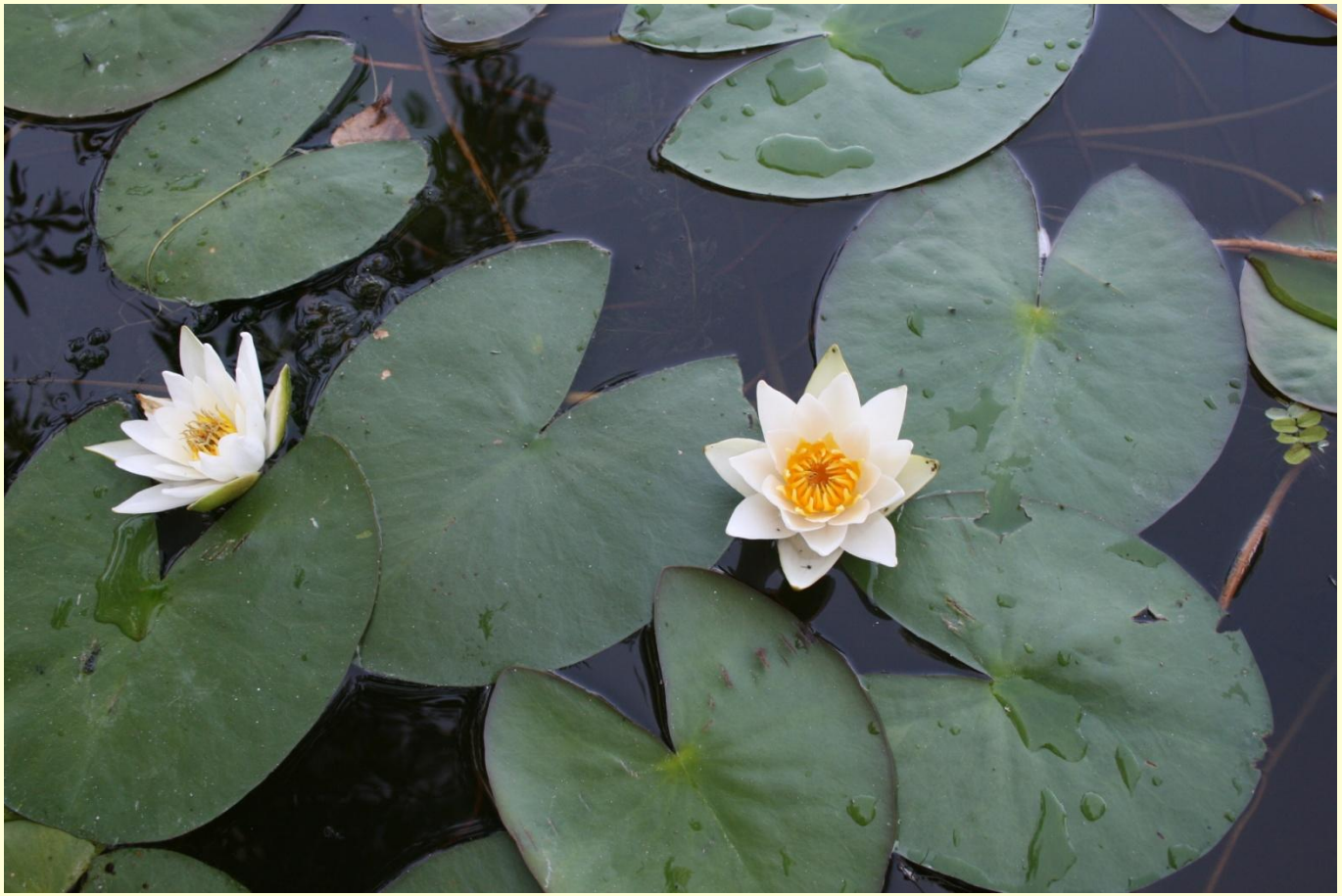
Family Rafflesiaceae

Rafflesia arnoldii

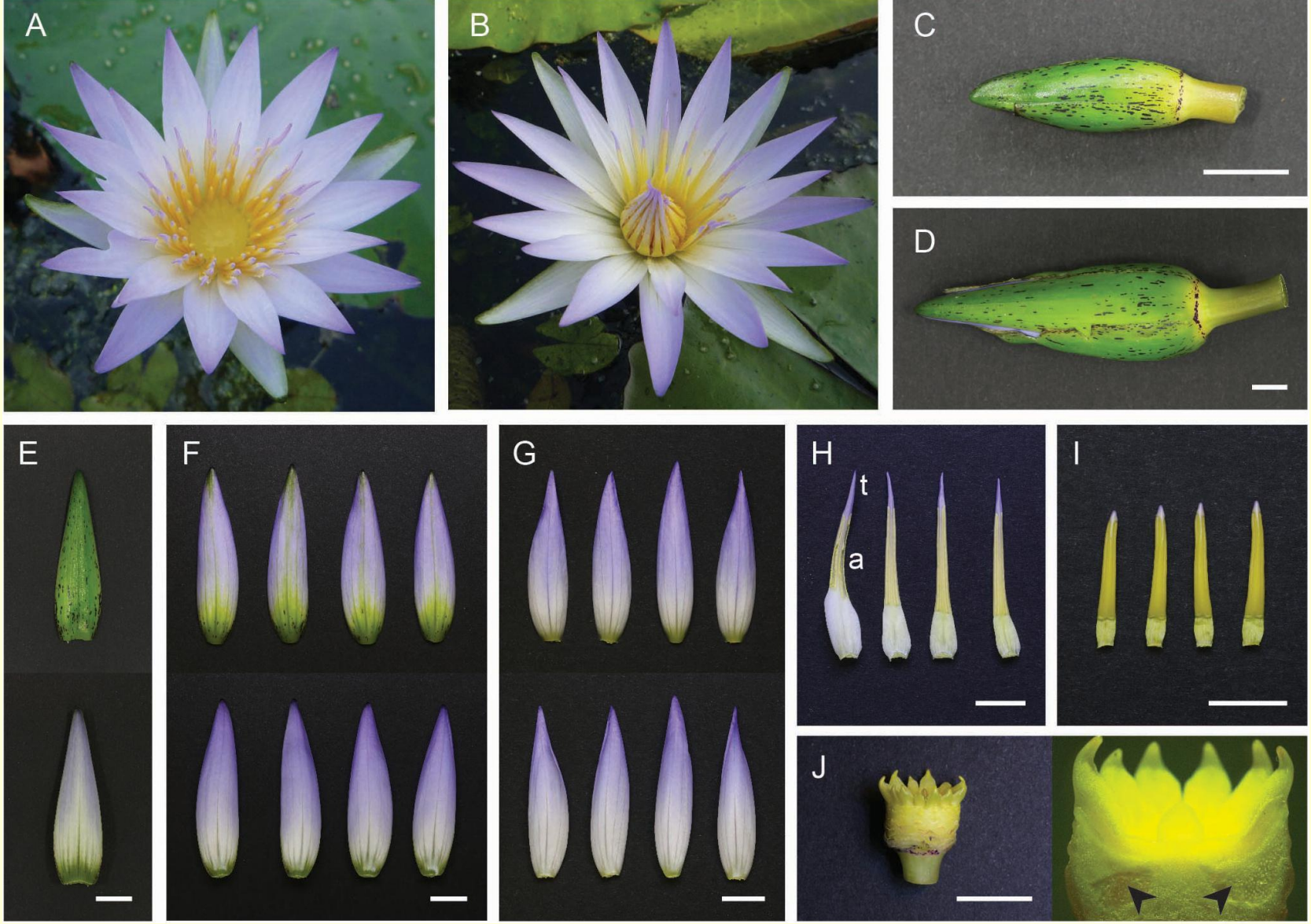

© Dashuki Mohd

Order Nymphaeales

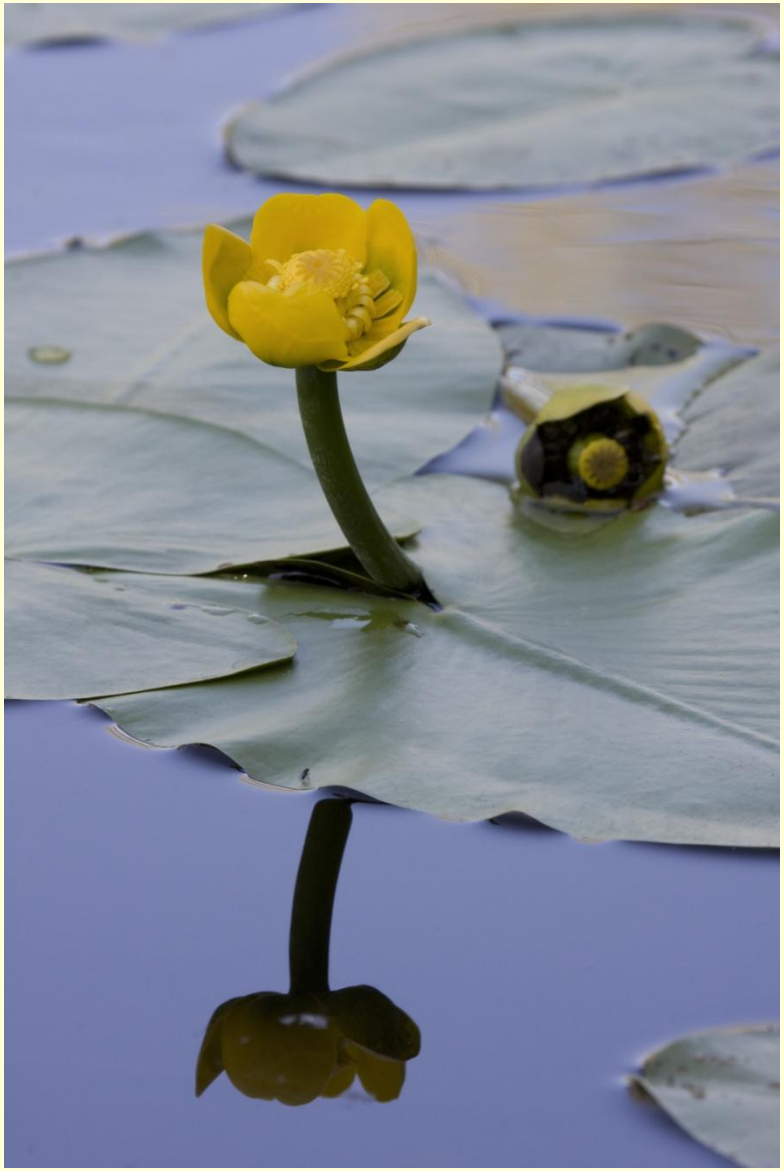
Family Nymphaeceae



Nympaea alba



Nymphaea caerulea floral components. **(A)** Flower at first day of anthesis; **(B)** flower at second day of anthesis. **(C)** A total of 2.5 cm long floral bud; **(D)** 5.5 cm long floral bud. **(E)** Green abaxial surface (top) and whitish adaxial surface (bottom) of a sepal. **(F)** Abaxial surface (top) and adaxial surface (bottom) of outer petals. **(G)** Abaxial surface (top) and adaxial surface (bottom) of inner petals. **(H)** Petaloid stamens, “t” indicates the cerulean tip and “a” indicates the anther portion. **(I)** Inner stamens. **(J)** Pluricarpellate pistil. Arrowheads indicate ovules within carpels. Scale bar, 1 cm.



Nuphar lutea *$Ca_4Co\ _{\infty}A_{\infty}G_{(\infty)}$-

Nymphaea rubra

Nymphaea *caerulea*

The order Lotus (Nelumbonales)
Lotus family (Nelumbonaceae)

Nelumbo nucifera

Nelumbo nucifera

Nelumbo lutea