Historical background

I. Artificial systems: Classify organisms according to one or a few characters, primarily for identification purposes.

II. Natural systems: Reflect the situation, as it is believed to exist in nature and utilize all information available at one time.

III. Phylogenetic systems: Classify organisms according to their evolutionary sequence. It reflects genetic relationships between the different groups.

Period I. From 300 B.C. - 1700 A, D.

This system based on the habit of the plant.
A. Theophrastus (370 –285 B.C.), student of Plato and **Aristotle**, known as "father of botany", he classified the plants known to him (500 species) as following

1. Differences between organs (external) and tissues (internal).

2. Distinction of different types of tissues.

3. Classification of plants into **trees**, **shrubs**, **subshrubs** and **herbs**.

4. Distinction of flowering plants and non flowering plants.

5. Recognition of various types of sexual and nonsexual reproduction.

6. Basic understanding of gross anatomy (**CA and CO** are) **modified leaves**
7. Recognition of fruit in its modern technical sense (pericarp)

B. John Ray (1628-1705)

- He proposed a system which is partially natural and partially artificial. He classified the flowering plants into:

  1. Arborae: trees and shrubs plants

  2. Herbae: Herbaceous plants, those have been classified into:

  a. **Imperfectae**, including herbaceous plants with indistinct or no flowers.

  b. **Perfectae**, including herbaceous flowering plants.

- Ray was able to recognize **Monocotyledons** and **Dicotyledonous** characters in the groups of his classification

Period II. From 1700-1775 (Linnaean Period)

- ✓ This period was characterized by artificial systems of classification, based on floral characters.
- ✓ **Carl Linnaeus (1707-1778),** created modern referable system of nomenclature "**Father of Plant Taxonomy**", he was the first botanist who draw the attention to the roll of **carpels** and **stamens** in the reproduction of the flowering plants.
- ✓ Linnaeus assumed reproductive features were more important than other characteristics. The system was based on numbers of parts, which does not give a "natural" classification but the major contribution was that it was usable by anyone trained in Botany.
- ✓ An important facet was the use of **binomial nomenclature** with a genus name and specific epithet.
- ✓ This system is still in use.
- ✓ Linnaeus main work was "**Species Plantarum**", published in **1753** in **2** volumes.

Period III. From 1775-1875

This period was characterized by an enormous increase in the knowledge of the worlds flora. In another direction knowledge from other branches of science e.g. Anatomy, Physiology, Morphology, etc..... was accumulated.

1. de Jussieau (1789), "**Genera Plantarum**" was the first major "natural" work, based on placement of like plants together

2. de Condolle (1825), Swiss, "**Prodromus**" – flora of the world, obviously incomplete, but remains only systematic treatment available for some plant groups.

3. George Bentham and Joseph Hooker, "**Genera Plantarum**" (1862-1883), collection of generic descriptions taken from original observation, included in their system **97000 species** belonging to **200 families** arranged in two groups: Dicotyledons and Monocotyledons.

Period IV. From 1875-1960

This period is characterized by the apperance of the Evolution theory by:

- **Charles Darwin (1859)** "**Origin of Species**" The publication of "Origin of Species" encouraged botanists to incorporate evolutionary concepts into classifications.

- **Hofmeister (1857)** on the reproduction of the plants and the devolopment of the theory of **alternation of generation.**

- **Mendel's laws** of genetics were puplished by the begining of the 20 th century. The systems of this period are mainly phylogenetical **(phylo= evolution, genetic= relatioships)** in other words based on evolution and relationships between the different groups.

- **Adolf Engler and Karl Prantl "Die Naturlichen Pflanzen" (1887-1915)** started with the most primitive plants and progressed to most structurally complex. Most floras follow this progression.

- **Charles Edwin Bessey (1845-1915)** The goal was to organize flowering plants in a scheme that reflected **evolutionary relationships**. Most modern systems of classifications, including Cronquist's are modifications of Bessey's "intuitive approach".

Wettstein (1862-1935)

Proposed a phylogenatic system of classification. He published in 1901 *handbuch der systematischen Botanik* (Manual of systematic botany). The system proposed by him is primarily based on the dicta of Engler, but his system is more phylogenatic . He considered that :

1- Functionless reproductive parts or organs as evidence of reduction .
2- Survival by possession of adaptive modification to indicate advancment .
3- Woody plants to be more primitive than herbaceous ones .
4- Many flowered inflorescence to be more primitive than the few or solitary flowered types.
5- Spiral arrangment of parts to be primitive than cyclic type.

Based on above dicta Wettstein divided the angiosperms into two classes Dicotyledons and Monocotyledons.

Takhtajan (1959) with the result of more true **phylogenetical systems** based on primitive and advanced characters.

John Hutchinson (1948-1968), he proposed a system of classification which is considered as the most recent and appreciable system for the classification of higher plants. His system was based on those of **Bentham** and **Hooker** and **Bessey**, he presented the system of his work in two volumes, **the Families of Flowering Plants.**

Cronquist (1968), he developed a comprehensive system of classification of angiosperms, he presented new concepts of classification in the **Evolution** and classification of Flowering Plants.

Definitions

I. Species is generally considered to be the **basic unit of taxonomy** but there is debate on the definition of species and species concepts vary.

II. Infra specific categories are used to describe populations that show some degree of differentiation. Those categories that are most often used are **subspecies** and **variety**.

III. A genus is a group of species that have more in common with each other than with other species. Generic concepts also vary in different groups.

IV. The family is a grouping of similar genera. This is the highest category in which most are considered to be monophyletic groupings.

V. Order includes one or more related families. It becomes very difficult to insure that a monophyletic group has been circumscribed at this and higher levels.

VI. The Subclass is the category that serves as the backbone of Cronquist's classification. Boundaries become very difficult to draw at this level.

Comparison of Monocots and Dicots

Monocotyledons	Dicotyledons
Embryo with 1 cotyledon, usually developing under ground	Embryo with 2 cotyledons, usually developing above ground
Roots usually fibrous	A primary root usually present
Growth is mostly herbaceous	Growth either herbaceous or woody
Vascular bundles scattered	Vascular bundles usually forming a ring
Leaves usually parallel-veined	Leaves usually net-veined
Flower parts usually in multiples of 3	Flower parts usually 4 or 5

Monocots

One cotyledon

Veins usually parallel

Vascular bundles usually complexly arranged

Fibrous root system

Floral parts usually in multiples of three

Embryos	Leaf venation	Stems	Roots	Flowers

Dicots

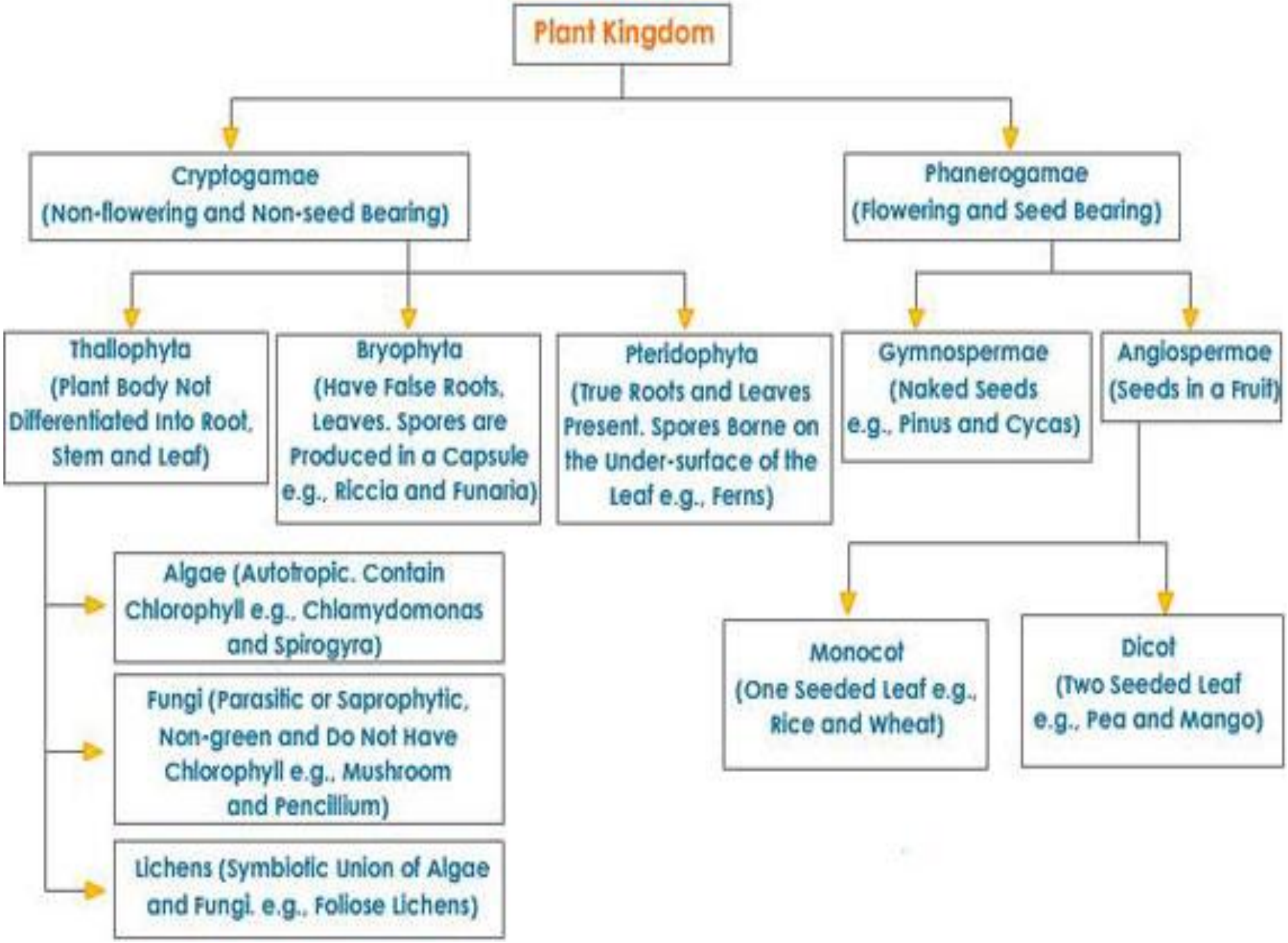
Two cotyledons

Veins usually netlike

Vascular bundles usually arranged in ring

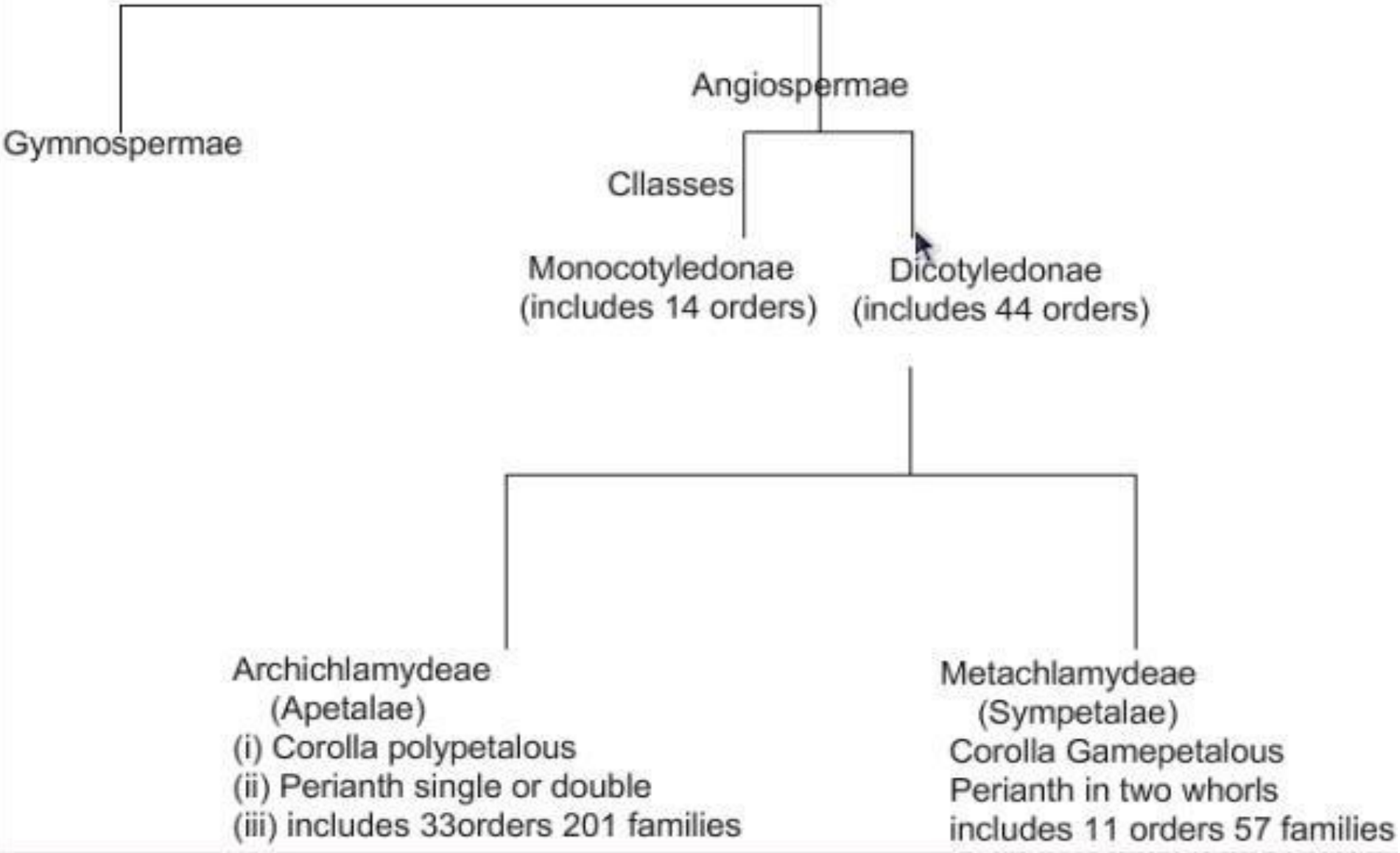
Taproot usually present

Floral parts usually in multiples of four or five


Plant Kingdom
Cryptogamae
(Non-flowering and Non-seed Bearing)
Phanerogamae
(Flowering and Seed Bearing)
Thallophyta
(Plant Body Not Differentiated into Root, Stem and Leaf)
Bryophyta
(Have False Roots, Leaves. Spores are Produced in a Capsule e.g., Riccia and Funaria)
Pteridophyta
(True Roots and Leaves Present. Spores Borne on the Under-surface of the Leaf e.g., Ferns)
Gymnospermae
(Naked Seeds e.g., Pinus and Cycas)
Angiospermae
(Seeds in a Fruit)
Algae (Autotropic. Contain Chlorophyll e.g., Chlamydomonas and Spirogyra)
Fungi (Parasitic or Saprophytic, Non-green and Do Not Have Chlorophyll e.g., Mushroom and Pencillium)
Lichens (Symbiotic Union of Algae and Fungi. e.g., Foliose Lichens)
Monocot
(One Seeded Leaf e.g., Rice and Wheat)
Dicot
(Two Seeded Leaf e.g., Pea and Mango)

Engler and karl A.E. prantl. system of classification:

Division: Embryophyta (Siphonogama)



ıe of Life: 24th September 2018

indexing the world's known species

ITIS SPECIES 2000

Spanish | Chinese | Russian | Portuguese | Dutch | German | Polish | Lithuanian | Thai | Vietnamese

Browse taxonomic tree

☑ Show statistics ☐ Show providers ☑ Show extinct taxa (†)

- Animalia • 1,216,001 of 1,525,728 est. living spp (80%); 58,864 †spp
- Archaea • 377 of 502 est. living spp (75%)
- Bacteria • 9,982 of 10,358 est. living spp (96%)
- Chromista • 23,437 of 25,000 est. living spp (94%); 2,366 †spp
- Fungi • 135,110 of 140,000 est. living spp (97%)
- Plantae • 364,099 of 382,000 est. living spp (95%); 349 †spp
- Protozoa • 2,686 of 8,118 est. living spp (33%)
- Viruses • 3,186 of 3,186 est. living spp (100%)

Dicotyledoneae

General characteristic features

1. Embryo with typically 2 cotyledons.
2. Stem with arranged vascular bundles.
3. Leaves usually with netted venation of the palmate or pinnate type.
4. Flower basically with parts numerous or in multiples or of 4 or 5 (Tetramerous or pentamerous),

✓ **Subclass1: Dialypetalae**

Perianth differentiated into calyx and corolla

✓ **Order: Rhoedales** Placentation basically parietal (no hypanthium)

1. Family: Brassicaceae (Cruciferae) - The Mustard Family

✓ **Diversity:** A large family with over 3,000 species in about 350 genera

Distribution: Throughout temperate parts of the World with maximum diversity in the Mediterranean.

Habit and leaf form
Herbs, or shrubs , or lianas . Annual, biennial, and perennial. climbing. When shrubby, often pachycaul*. Hydrophytic, helophytic, mesophytic, and xerophytic.

Leaves : alternate, simple to lobed, exstipulate (lacking stipules), often a **basal rosette**.

Lamina: dissected to entire; when simple-dissected, pinnatifid, or runcinate منشارية; one-veined , or pinnately veined; cross-venulate. Leaves exstipulate. Lamina margins **entire**, or **serrate**, or **dentate**.

Inflorescence, floral: raceme, indeterminate growth
Flower: Tetramerous.

Pachycaul (From greek Pachy=Large and Latin Cauli = Trunk)
****Pachycauls are trees, with particularly thick-stemmed trunks, often bottle-shaped**

Perianth: with distinct calyx and corolla,

Calyx (sepals): 4 separate

Corolla (petals): 4 separate, often clawed, cruciform

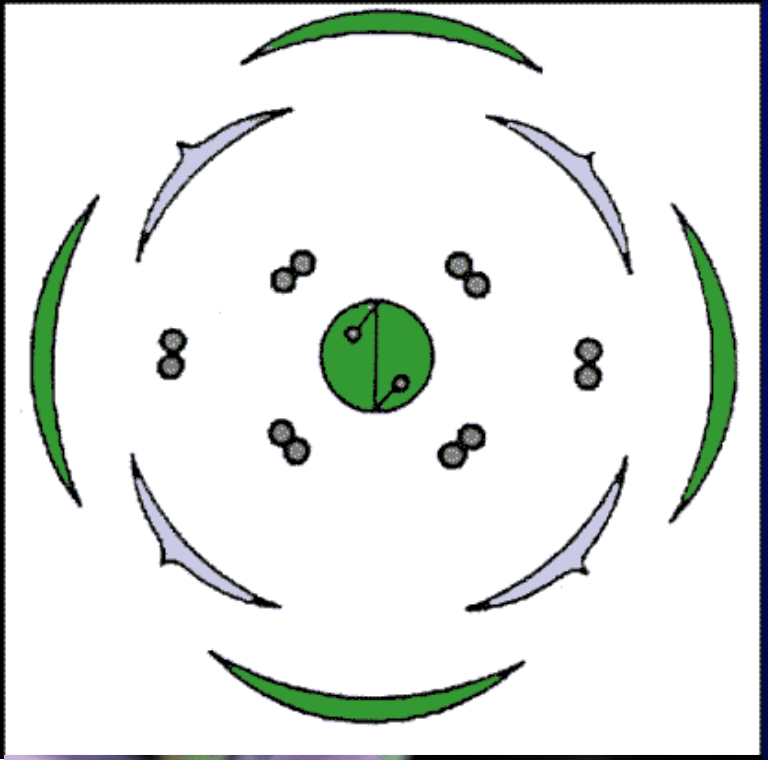
Androecium: 6, tetradynamous (4 tall, 2 short)

Gynoecium: 2 united carpels, superior ovary (= hypogynous flower); ovules have parietal placentation.

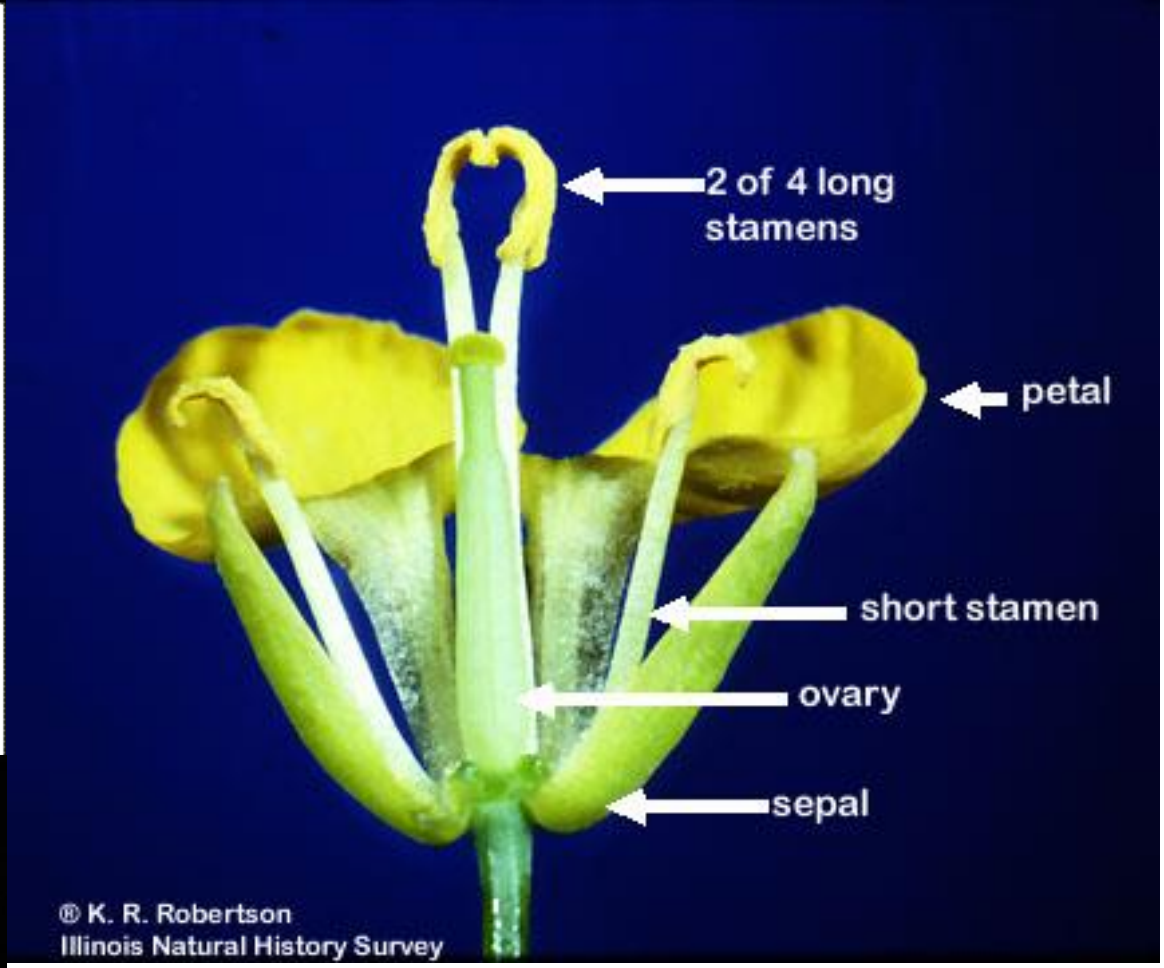
Fruit: dry, dehiscent. silicle (short, squat), silique (longer than wide by 3X)

Geography, cytology. Frigid zone to tropical. Cosmopolitan, concentrated in the North temperate and Mediterranean. *X* = 5–12(+).

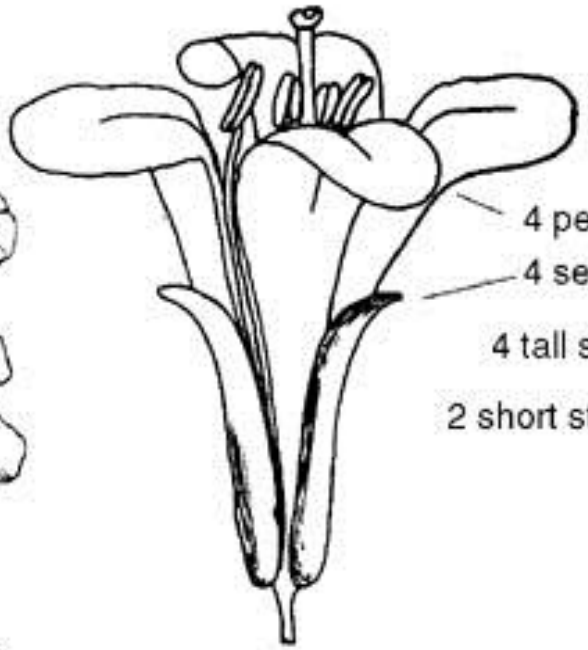
$$K^4\ Co^4\ S^{2+4}\ P\ \underline{(2)}$$

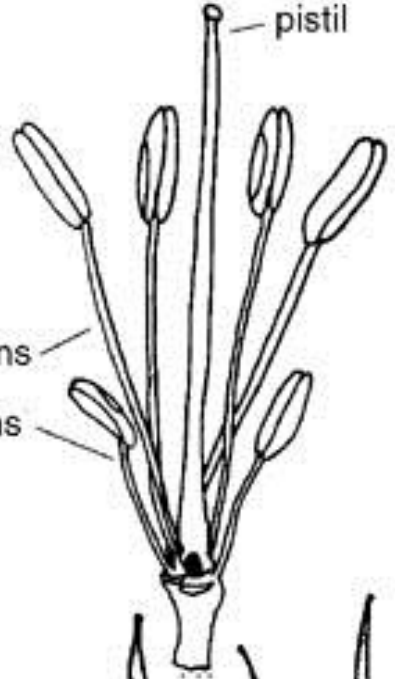



Raphanus sativus
Brassicaceae
© G. D. Carr


2 of 4 long stamens
petal
short stamen
ovary
sepal
® K. R. Robertson
Illinois Natural History Survey

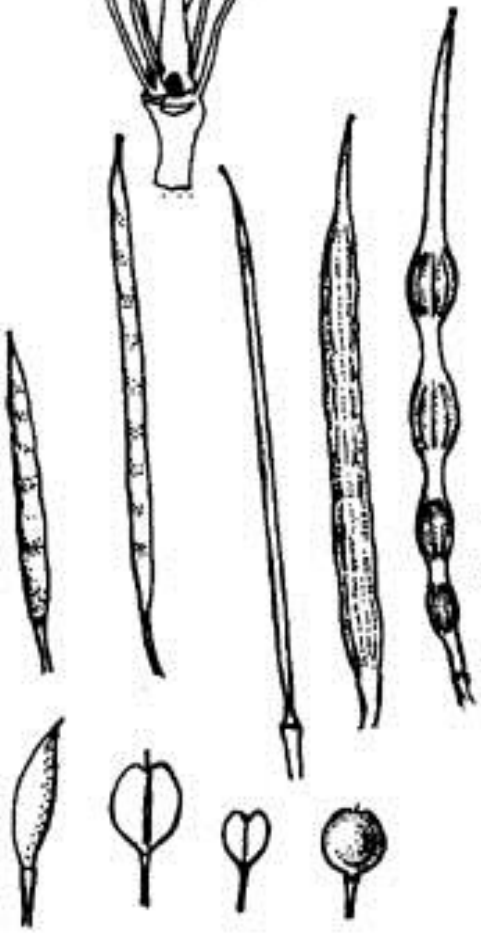
Wall Flower



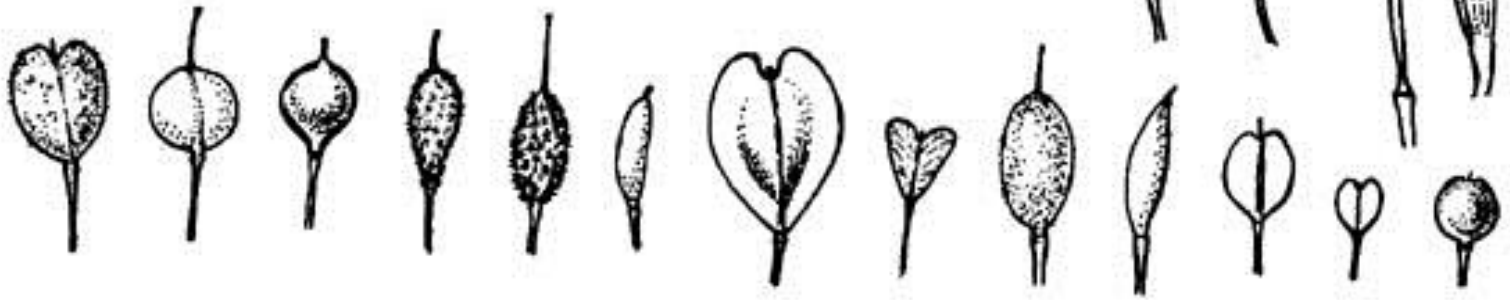


Patterns of the Mustard Family

Mustard seed pods come in many shapes and sizes, but always occur on the plant in the same radial pattern around the stalk, a "raceme".



The seed pods split open from both sides to expose a clear membrane in the middle.



Pachycaul stems

Common Plants

- ✓ *Brassica oleracea* var. *capitata* (cabbage) الكرنب
- ✓ *Brassica oleracea* var. *botrytis* (cauliflower). قرنبيط
- ✓ *Brassica oleracea* var. *gemmifera* (Brussels sprouts). الكرنب الملفوف
- ✓ *Brassica nigra* (Black mustard) الخردل الأسود
- ✓ *Eruca sativa* الجرجير
- ✓ *Raphanus sativus* (radish) الفجل
- ✓ *Brassica rapa* (turnip, fleshy roots) اللفت
- ✓ *Rorippa indica* (watercress)
- ✓ *Sinabis alba* condiments (mustard) خردل
- ✓ *Arabis alpina* ornamentals
- ✓ *Erysimum repandum* (Cheiranthus)
- ✓ *Matthiola incana* (Stocks)

Order: Columniferae (Malvales)

Stamens usually **numerous**, Ovary **superior**, Placentation usually **axile**, sepals usually **valvate**

1. Family: Malvaceae - The Mallow Family

✓ **Diversity:** A family of 75 genera and over 1,000 species .

✓**Distribution:** World wide, but most diverse in the tropics.

✓**Habit and leaf form:** Herbs, shrubs, or trees. Mesophytic or xerophytic.

✓**Leaves:** alternate; spiral; petiolate; non-sheathing; simple.

✓**Lamina:** dissected or entire: when dissected, palmatifid; palmately veined; cross-venulate. Leaves usually stipulate.

✓**Inflorescence. floral and fruit.** Flowers **solitary**. or aggregated in 'inflorescences'; in cymes. The terminal inflorescence unit cymose. Inflorescences compound cymose, composed of cincinni. **Flowers**: small to large; regular to somewhat irregular.

Family: Malvaceae

Diversity: A family of 75 genera and over 1,000 species .

Vegetative characters:

1. **Leaves:** alternate, often palmately lobed and palmately veined, stipulate, usu. stellate hairs (=star-shaped) with reticulate multicostate venation.
2. **Life form:** annual to perennial,
3. Habit: herbs, shrubs, small trees.
4. Presence of mucilage.
5. **Distribution**: cosmopolitan, diversity centered in the American tropics

Floral characters:

Inflorescence: cyme or solitary

3. **Flower**: Pentamerous, bisexual, actinomorphic
4. **Perianth**: differentiated into calyx and corolla.
5. **Corolla**: polypetalous, contorted (clockwise/anticlockwise) .
6. **Androecium**: numerous stamens, united forming complete monadelphous staminal tube.
7. **Gynoecium**: superior ovary, 5-10 carpels, 5-10 locules, axile placentation.
8. **Fruit:** capsule or schizocarp
9. $\mathbf{K^{3\text{-}5}\ Co^{5}\ S\ P\ (\underline{5\text{-}8})}$ $X = 6–17(+), 20(+).$
10. **Epicalyx = whorl of bracts below the calyx showy flowers with nectar, seeds often covered in fine hair**

Common Plants:

- ✓ *Gossypium barbadense* (Cotton) important for oil and fibers
- ✓ *Hibiscus cannabinus* (Flax التيل) yields fibres of low quality used for rope manufacture
- ✓ *Hibiscus esculentus* (okra البامية) capsules a popular vegetable
- ✓ *Hibiscus sabdariffa,* الكركدية dried petals and capsules are boiled for preparing a refreshing drink.
- ✓ *Malva parviflora,* الخبيزة Mallow, leaves used as a vegetable.
- ✓ *Althaea rosea,* الخطمية popular ornamental plant
- ✓ *Hibiscus rosa-sinensis* الورد الصينى popular ornamental plant

Order: Geraniales

Ovules pendulous with a ventral raphe and micropyle up or erect with a dorsal raphe and the micropyle down.

1. Family: Geraniaceae

Diversity: over 700-750 species in about 11 genera.

Distribution: .Widespread in the subtropics and temperate regions of both hemispheres and reaching to the arctic and Antarctic regions.

Habit and life form. Herbs or shrubs. Mesophytic or xerophytic.

- ✓ **Leaves:** alternate or opposite; petiolate; simple, or compound; Leaves usually stipulate. Stipules scaly, or leafy, or spiny.
- ✓ **Inflorescence:** Flowers solitary, or aggregated in 'inflorescences' (usually); in cymes, or in umbels.
- ✓ **Flowers:** bracteolate; small. Flowers usually 5 merous; cyclic; tetracyclic to polycyclic.
- ✓ **Perianth:** with distinct calyx and corolla
- ✓ **Calyx:** 5; 1 whorled; polysepalous, or gamosepalous, regular, or unequal but not bilabiate; impricate.
- ✓ **Corolla:** 5; 1 whorled; polypetalous; imbricate, or contorted (rarely); unequal but not bilabiate, or regular; deciduous. **Petals clawed** ذات مخالب.

- ✓ **Androecium** 5, or 10, or 15 (1, 2 or 3 times C). 1 adelphous, or 5 adelphous.(sometimes 7f. + 3s.)
- ✓ **Gynoecium** 5 carpelled. Syncarpous, **superior,** Ovary 5 locular. **Styles** 1. Apical. **Stigmas** 5; dry type; papillate.
- ✓ **Placentation:** Axile. Ovules 1or 2 per locule.
- ✓ **Fruit:** non-fleshy; a schizocarp. Mericarps 5.
- ✓ **Geography, cytology:** Frigid zone to tropical. Cosmopolitan. $X = 7–14$.

Common Plants

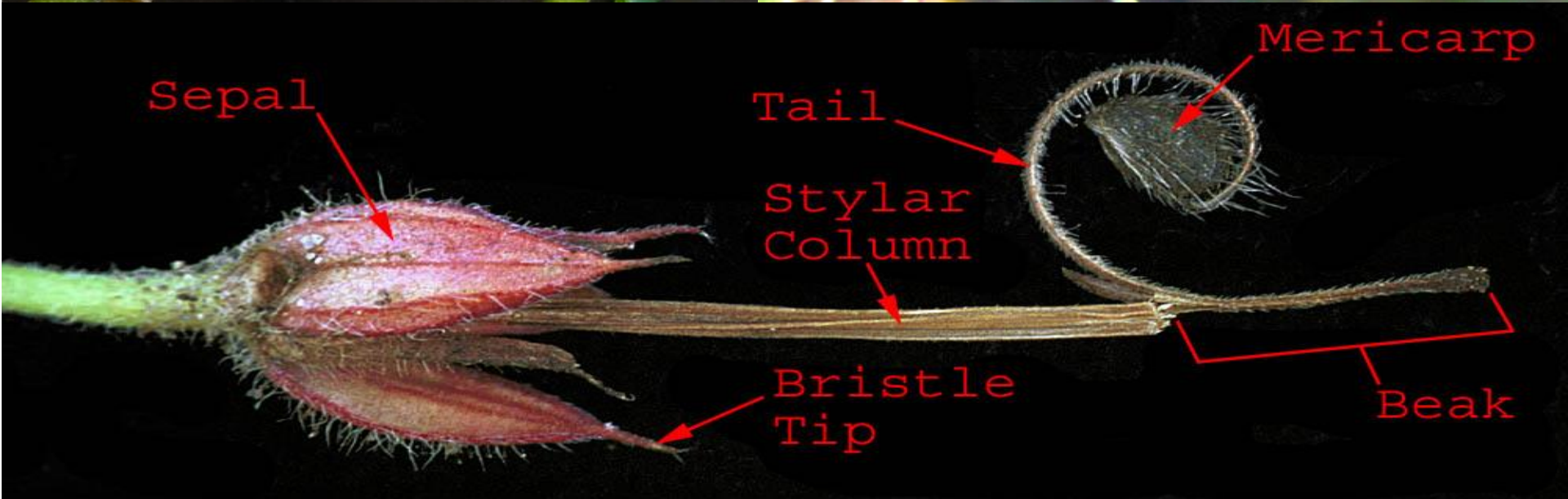
Pelargonium zonale

Pelargonium graveolens

Erodium sp ***% ♀ K5 C5 A(7f+3s) G5***

Geranium molle

Pelargonium graveolens


Sepal
Tail
Mericarp
Stylar
Column
Bristle
Tip
Beak


mericarp beak
mericarp body

2. Family: Euphorbiaceae

Diversity: One of the largest dicot. familes (ca. 300 genera with over 7,500 species)

Distribution: Worldwide with centers of diversity in both temperate and tropical areas.

Habit and life form: Trees, or shrubs, or herbs, or lianas. Plants succulent, or non-succulent. Self supporting, or climbing. Mesophytic, or xerophytic.
Leaves: minute to large; usually alternate, petiolate to sessile.
Lamina: entire; pinnately veined, or palmately veined. Leaves stipulate

- ✓ **Inflorescence:** The terminal inflorescence unit nearly always cymose (**Cyathium**)
- ✓ **Perianth:** sepaline, or vestigial (اثرى، بدون وظيفة), or absent, or petaline (occasionally); when present, 5; 1 whorled (usually), or 2 whorled (sometimes); when two-whorled, isomerous.

- ✓ **Calyx:** 5; polysepalous, or gamosepalous; regular.
- ✓ **Corolla:** when present, 5; polypetalous; regular.
- ✓ **Androecium:** 1–1000 stamens (i.e. to 'many'). Androecial members branched (e.g. *Ricinus*), or unbranched
- ✓ **Anthers:** dehiscing via longitudinal slits, or dehiscing via pores (rarely with apical pores)
- ✓ **Gynoecium: Usually** 3 carpelled, or 4–30 carpelled (rarely); superior, **syncarpous**

Styles: **3 (usually), or 6(–12) (or more)**; free, or partially joined (to almost completely joined, apical.

Stigmas: **3 (usually), or 6(–12) (or more)**; dry type; papillate, or non-papillate

Placentation: **axile**, or apical. Ovules 1or 2 per locule.

Fruit: Non-fleshy, (usually), a schizocarp. Mericarps when schizocarpic (usually) 3, fruit when non-schizocarpic, a capsule, or a drupe

Geography, cytology: Temperate, sub-tropical, and tropical. Cosmopolitan, except Arctic. X = 6–14 (or more).

Common Plants

Ricinus communis
Euphorbia pulcherrima
Euphorbia peplus
Euphorbia ammak

Male flower: ⊕ ♂ P_5 A_5 G_0

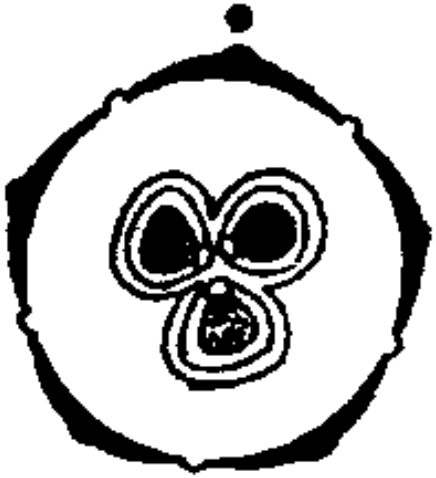


Fig: Female flower

Female flower: ⊕ ♀ P_5 A_0 $G_{(3)}$

Male flower

formula and floral diagram

Euphorbia pulcherrima

Ricinus communis

Euphorbia peplus

Euphorbia ammak

Order: Leguminosae (Fabales)

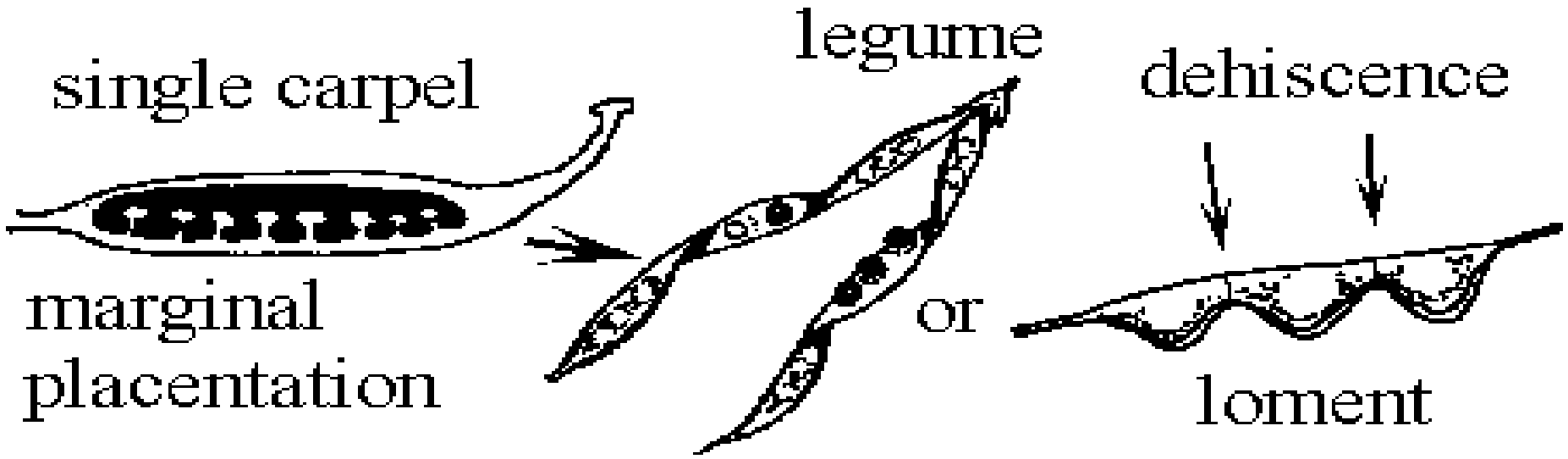
Key to the families of the Leguminosae:

1. Flowers actinomorphic ..... Mimosoideae

1a. Flowers zygomorphic 2

2. Perianth showing some connation, the uppermost petal (standard) enclosing the lateral petals (wings) Papillionoideae

2a. Perianth with separate parts, the standard enclosed by the wings..... Caesalpinioideae

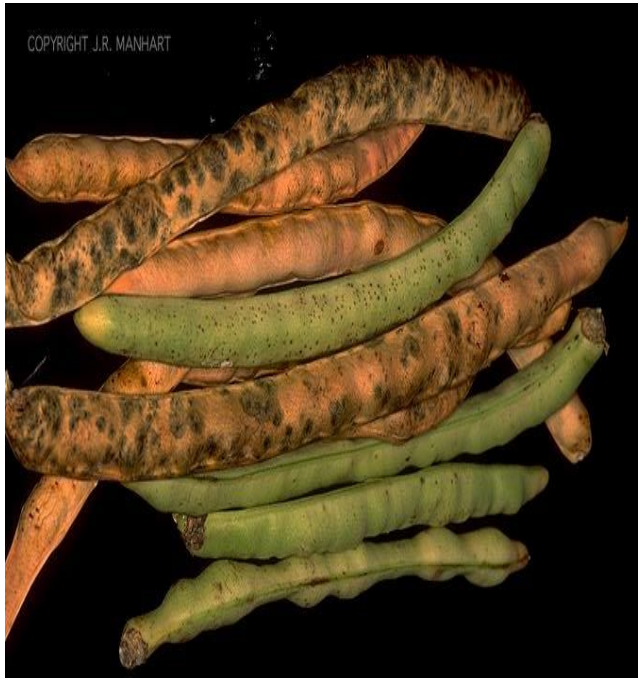


1. Family: Mimosaceae - the Mimosa Family

Diversity: The Mimosaceae includes about 40 genera with ca. 2,000 species.

Distribution: Worldwide, but mostly tropical and subtropical .

Habit and life form: Trees and shrubs, or herbs. The herbs annual, or biennial, or perennial. Helophytic, or mesophytic, or xerophytic.



Family: Leguminosae, subfamily: Mimosoideae

Vegetative characters:

1.Leaves: compound with reticulate venation.

Floral characters:

2.Inflorescence: Head-like.

3.Flower: Pentamerous.

4.Perianth: differentiated into calyx and corolla.

5.Calyx: 5; 1 whorled; gamosepalous, or polysepalous

6.Corolla: poly- or gamopetalous.

7.Androecium: 5-∞ free stamens.

8.Placentation: marginal .

9.Gynoecium: superior ovary, 1 carpel, 1 locule,

10.Fruit: legume, a loment. Fruit elastically dehiscent, or passively dehiscent.

Common Plants

Acacia nilotica
Acacia farensiana
Albizzia lebbek

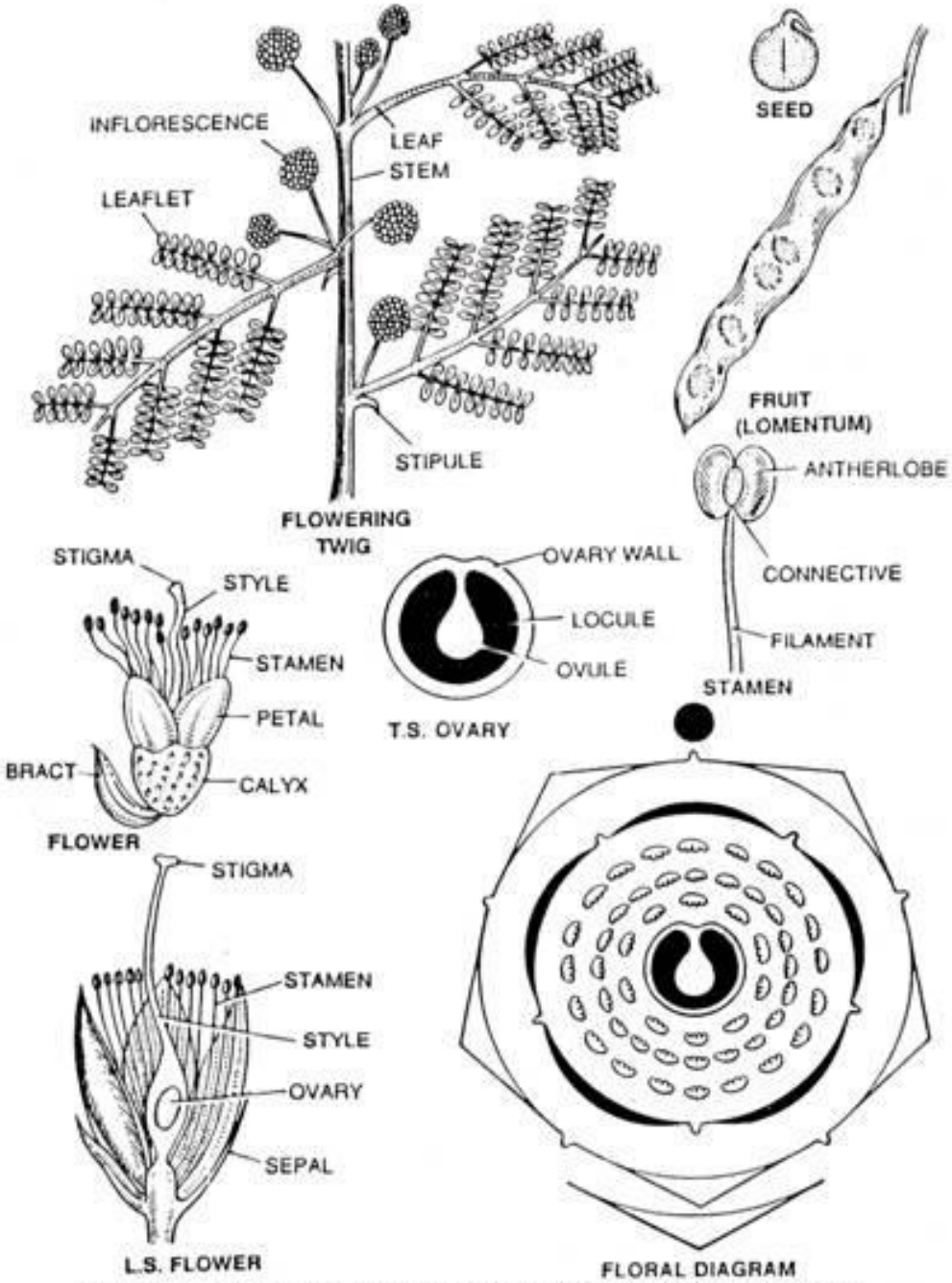


Fig. 15.5. Mimosaceae (Leguminosae), *Acacia nilotica* (Linn) Del.

Fabaceae

MIMOSOIDEAE
(Mimosa Subfamily)

♀ Ca(5) Co(5) A(5-∞) G^1

Family: Leguminosae, subfamily: Papilionoideae

Vegetative characters:

1.Diversity: This large, diverse and important family includes over 400 genera and 10,000 species.

2.Distribution: Worldwide, but most diverse in warm, temperate areas.

3.Habit and leaf form. Trees, or shrubs, or herbs, or lianas.

4.Leaves: compound with reticulate venation.

Floral characters:

5.Inflorescence: solitary; in panicles, in racemes, in spikes, and in heads.

6.Flower: Pentamerous, zygomorphic, hermaphrodite.

7.Perianth: differentiated into calyx and corolla.

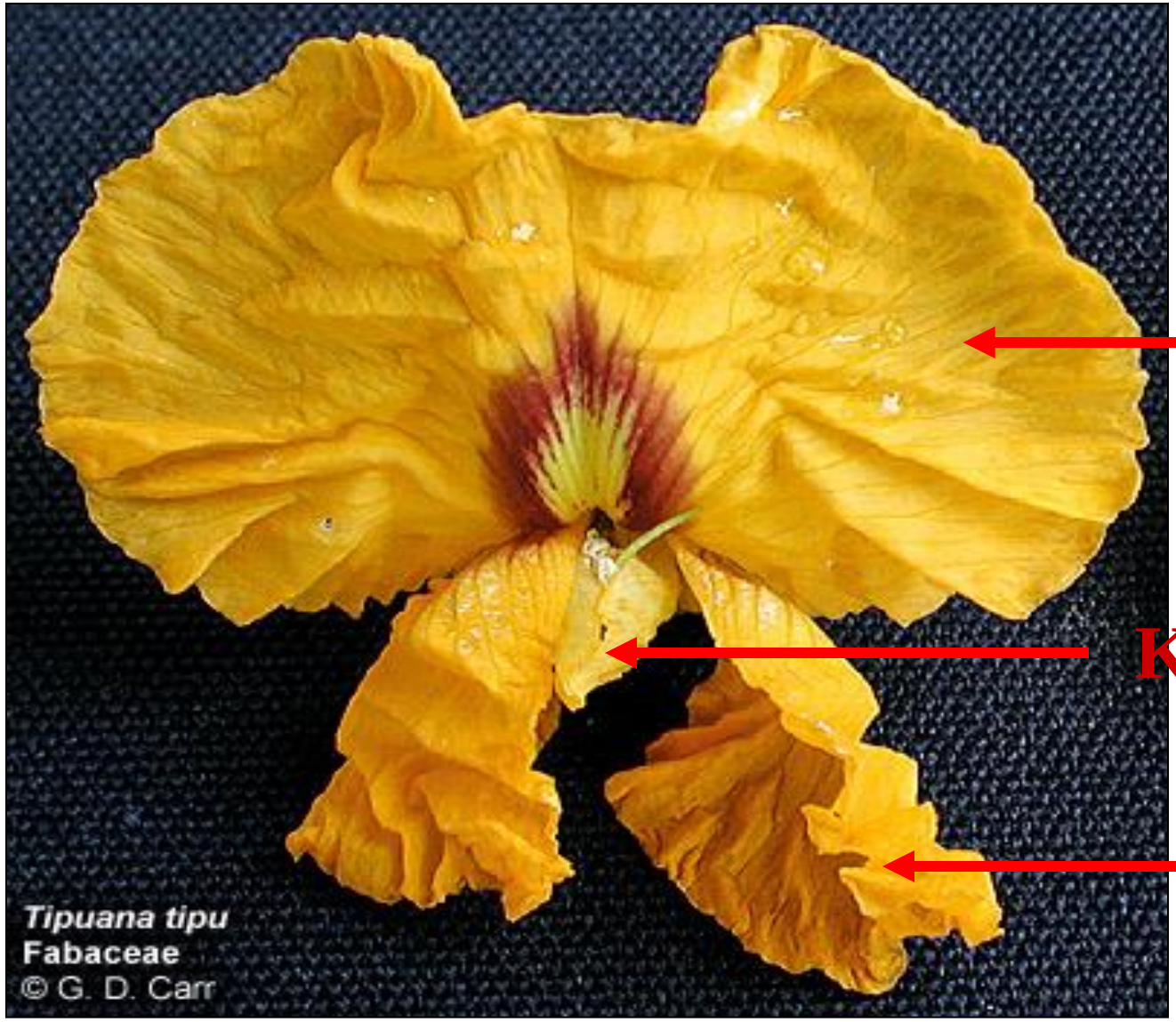
8.Corolla: polypetalous, imbericate descending, papilionaceous corolla (standard,wings, keel).

9.Androecium: 10 stamens, united diadelphous 1,(9).

10.Gynoecium: superior ovary, 1 carpel, 1 locule, marginal placentation.

11.Fruit: A legume (usually), or a follicle, or an achene, or samaroid, or a loment, or drupaceous.

Sesbania sesban

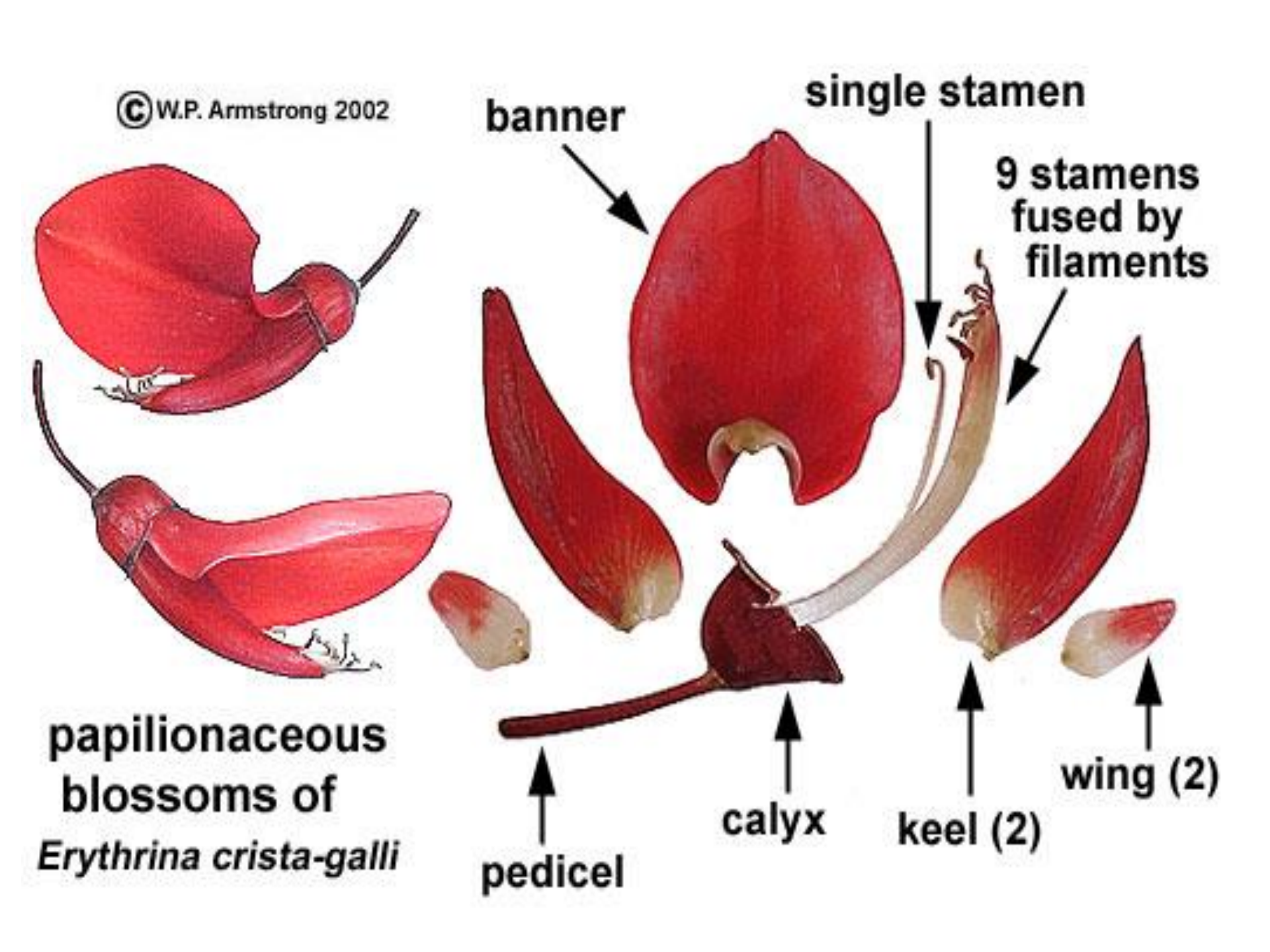


Standard or Banner

Keel

Wing

⊹ ♀ K(5), C 1+2+ (2), A(9)+1, G1.


©W.P. Armstrong 2002
banner
single stamen
9 stamens
fused by
filaments
papilionaceous
blossoms of
Erythrina crista-galli
pedicel
calyx
keel (2)
wing (2)

Number of Stamens:

1. Isostemonous : when number of stamens in consistent with the number of petals.

2. Diplostemonous: when stamens are twice as many as petals.

3. Haplostemonous: having stamens arranged in a single whorl or may be reduced with the extinction of the outer or inner whorl.

Common Plants

Cicer arietinum	الحمص
Pisum sativum	البسلة
Arachis hypogaea	الفول السودانى
Lupinus termis	الترمس
Lathyrus odoratus	بسلة الزهور
Trifolium alexandrinum	البرسيم
Dalbergia sissoo	السرسوع
Vicia faba	الفول
Phaseolus vulgaris	الفاصوليا
Lens esculenta	العدس
Glycine hispida	فول الصويا
Medicago sativa	البرسيم حجازى
Melilotus indica	الحندقوق

Family: Leguminosae, subfamily: Caesalpinioideae

Vegetative characters:

1.Diversity: It has 152 genera and 2300 species.

2. life form: Trees, or shrubs, or herbs, or lianas.

3. Leaves: compound with reticulate venation.

Floral characters:

4.Inflorescences: Flowers aggregated (usually), or solitary; when aggregated, in panicles, or in fascicles, or in racemes, or in spikes, or in heads, terminal, or axillary.

5.Flower: Pentamerous.

6.Perianth: differentiated into calyx and corolla.

7.Corolla: polypetalous, imbericate ascending.

8.Calyx: 5, 1 whorled; polysepalous, or gamosepalous.

9.Androecium: 5-10 stamens.

10.Gynoecium: superior ovary, 1 carpel, 1 locule, marginal placentation.

11.Fruit: Legume

Geography, cytology. **Frigid zone, temperate, sub-tropical, and tropical. Cosmopolitan.**

Economic uses: **Economically very important for food, fodder, fibres, dyes, gums, resins, oils.**

Common Plants

Cassia nodosa	الكاسيا
Cassia obovata	الكاسيا
Tamarindus indicus	التمر الهندى
Poinciana regia	البوانسيانا
Bauhinia variegata	خف الجمل
Ceratonia siliqua	الخروب

Delonix regia

Bauhinia variegata

Delonix regia
cv. Horace Clay
Fabaceae - Caesalpinioideae

$$\overset{5}{\frown}\quad 2+(2)+1\quad 10 \text{ or } (9)+1 \text{ or } (10)\quad 1$$

$$CA\ CO\ Z\ A\ \ G$$

Subclass Rosidae

Order: Apiales (Umbelliflorae)

Family: Apiaceae (Umbelliferae)

Habit and life form. Aromatic herbs (mostly), or shrubs (some), or trees (few), with **sheathing leaves**, **hollow stem**, biennial or perennial about 446 genera and 3,540 species.

Leaves: alternate, (usually). compound (often dissected), sheathing leaf-base, exstipulate

Inflorescence, compound or simple umbel .

Flowers, bisexual, actinomorphic, 5-merous.

Perianth: with distinct calyx and corolla 4-10, one or two whorld.

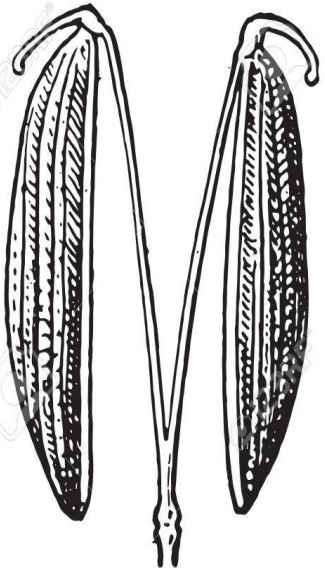
Calyx, 5, separate and very small. 1 whorld

Corolla, 5, separate, often **yellow or white**. 1 whorld

Androecium: 5 separate stamens, 1 whorld, isomerous

- ✓ **Gynoecium:** **bicarpelate, united, inferior ovary (=epigynous), two styles that are fused at their base forming a nectar secreting disc (=stylopodium).**
- ✓ **Stigmas** wet type; **non-papillate**;
- ✓ **Placentation** **axile, or apical. Ovules 1 or 2 per locule (usually two)**
- ✓ **Fruit:** **schizocarp, 2 mericarps , one seeded.**
- ✓ **Geography, cytology.** **Frigid zone to tropical. Cosmopolitan, but mainly North temperate. *X* = (4-)8–11(-12).**
- ✓ **Floral formula:** **K^5 Co^5 S^5 G2**

Flower and fruit



Inflorescence an umbel, compound umbel, or head

ovary inferior

placentation
apical-axile

stylopodium

Fruit a schizocarp of mericarps

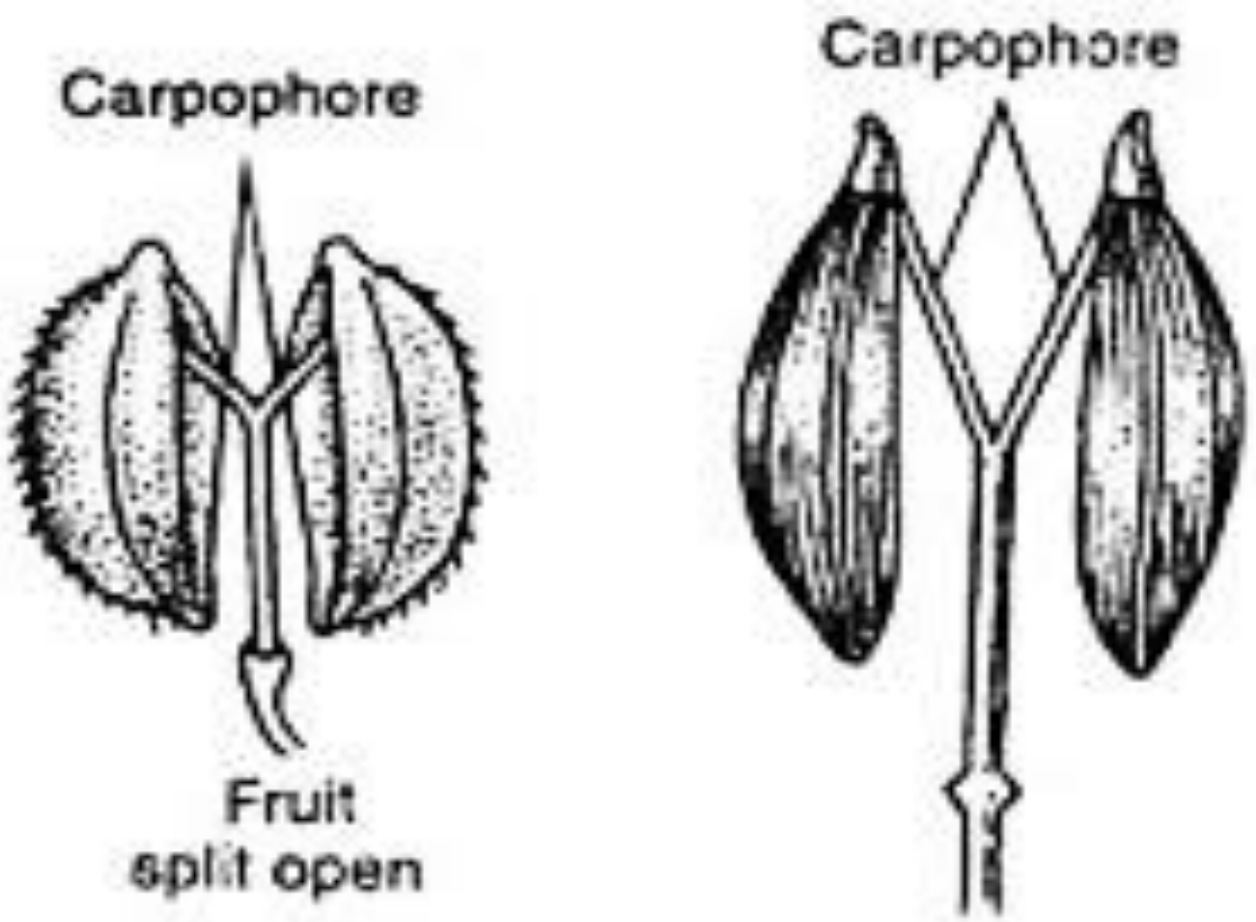


Fig. 2.110 : Carpophores in different fruits : A. in *Coriandrum sativum* and B. in *Foeniculum vulgare*

•Common Plants

•Economically important members include a number of food, herb, and spice plants, such as

- ***Daucus carrota*** الجزر الاصفر
- ***Daucus boissieri*** الجزر الاحمر
- ***Petroselinum sativum*** البقدونس
- ***Anethum graveolens*** الشبت
- ***Carum carvi*** الكراوية
- ***Cuminum cyminum*** الكمون
- ***Ammi visnaga*** الخلة البلدية
- ***Ammi majus*** *الخلة* الشيطانى
- ***Pimpinella anisum*** اليانسون
- ***Coriandrum sativum*** الكسبرة
- ***Foeniculum vulgare*** الشمر