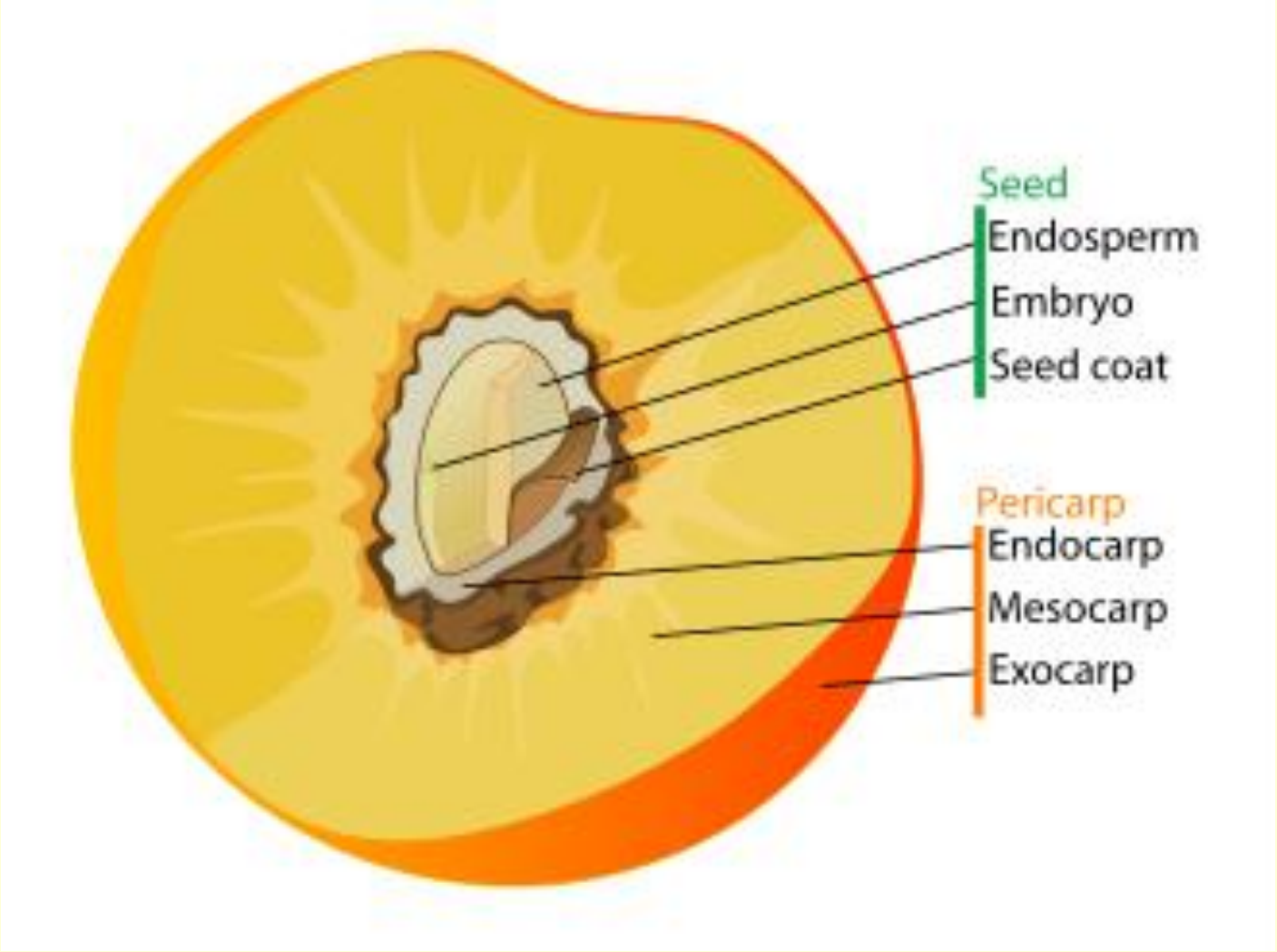
Fundamentals of the morphology of generative organs.

The structure and functions of the fruit.

The fruit is an organ of the angiosperms that contains seeds and develops from a single flower.

The function of the fruit is to form, protect, and propagate seeds.

Fruits are found only in angiosperms plants.

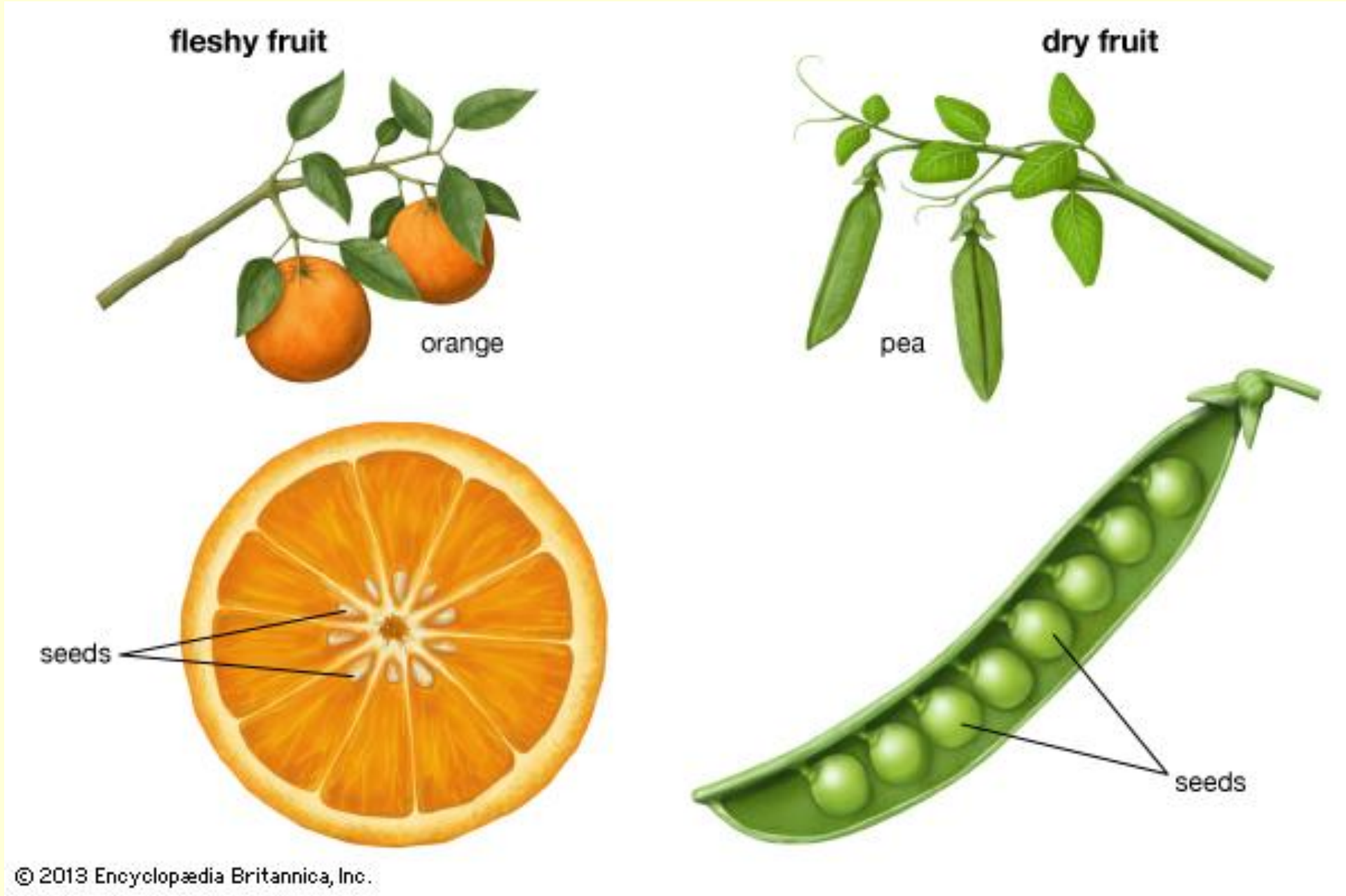

Seed
Endosperm
Embryo
Seed coat
Pericarp
Endocarp
Mesocarp
Exocarp

Fruits with one seed




Fruits with many seeds



Dry dehiscent fruits	Dry indehiscent fruits
1. These fruits open at the time of maturity to disperse their seeds.	1. These fruits do not open at the time of maturity to disperse their seeds.
2. These fruits split at the built-in line and release its contents along with the seeds.	2. These fruits do not split up; therefore, their seeds are dispersed by the predators or decomposers.
3. These fruits burst up when they become dry.	3. These fruits can only be opened by deterioration or when consumed by the animals.
4. Examples are silique, follicle, and legume.	4. Examples are nut, samara, and achene.

Capsules with different patterns of dehiscence

Fig. 122.—Capsule of *Iris* dehiscing along three dorsal sutures (*ds*); *vs* = ventral suture; *s* = seed.

Loculicidal dehiscence

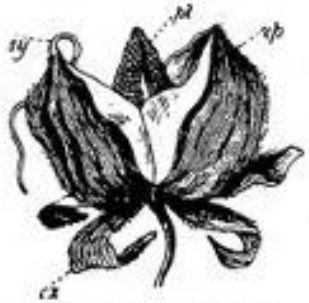


Fig. 123. — Capsule of Foxglove dehiscing along two ventral sutures, and leaving the seeds attached to the axile placenta (*pl*); *sty* = style; *cx* = calyx.

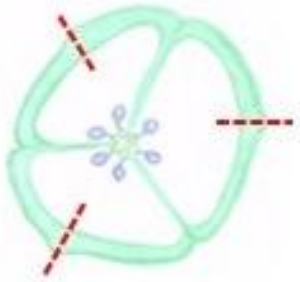
Septicidal dehiscence

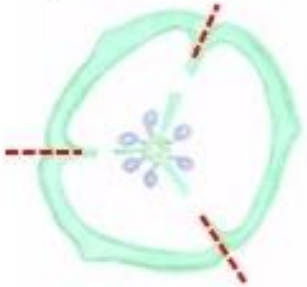
Fig. 125. — Capsule of *Anagallis* dehiscing transversely: *c* = calyx; *s* = seeds; *sg* = style.

Circumscissile dehiscence

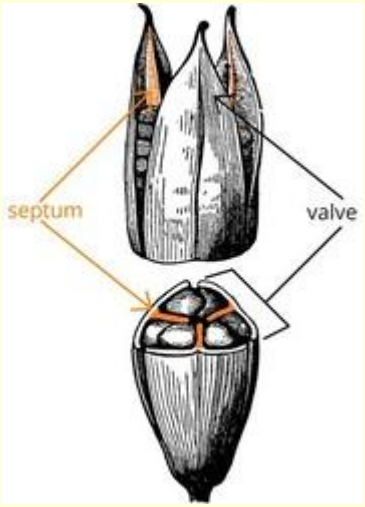
Fig. 126. — Capsule of Poppy dehiscing by

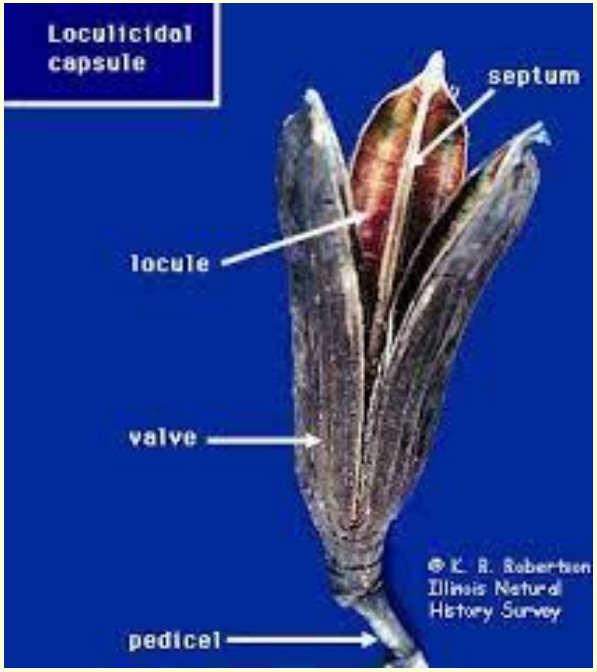
Poricidal dehiscence



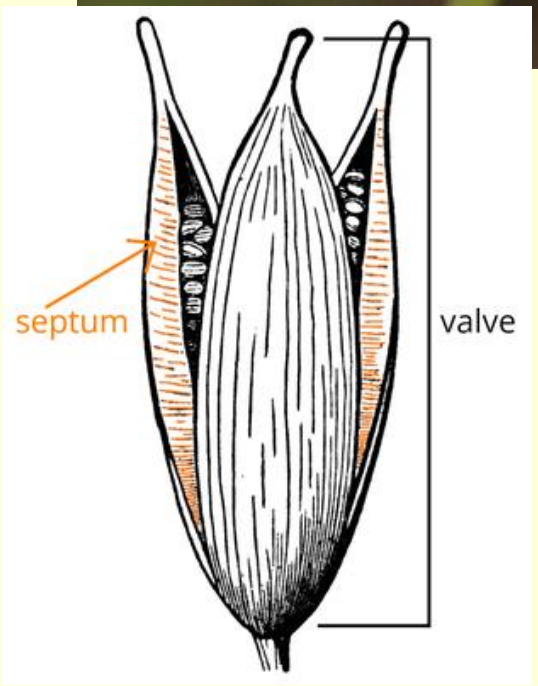


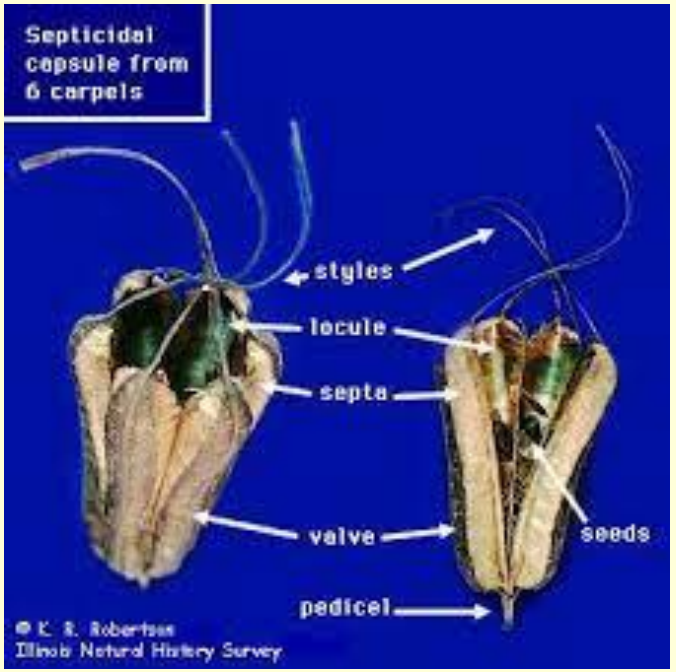
Hibiscus tiliaceus: Loculicidal capsule dehiscence and seed dispersal



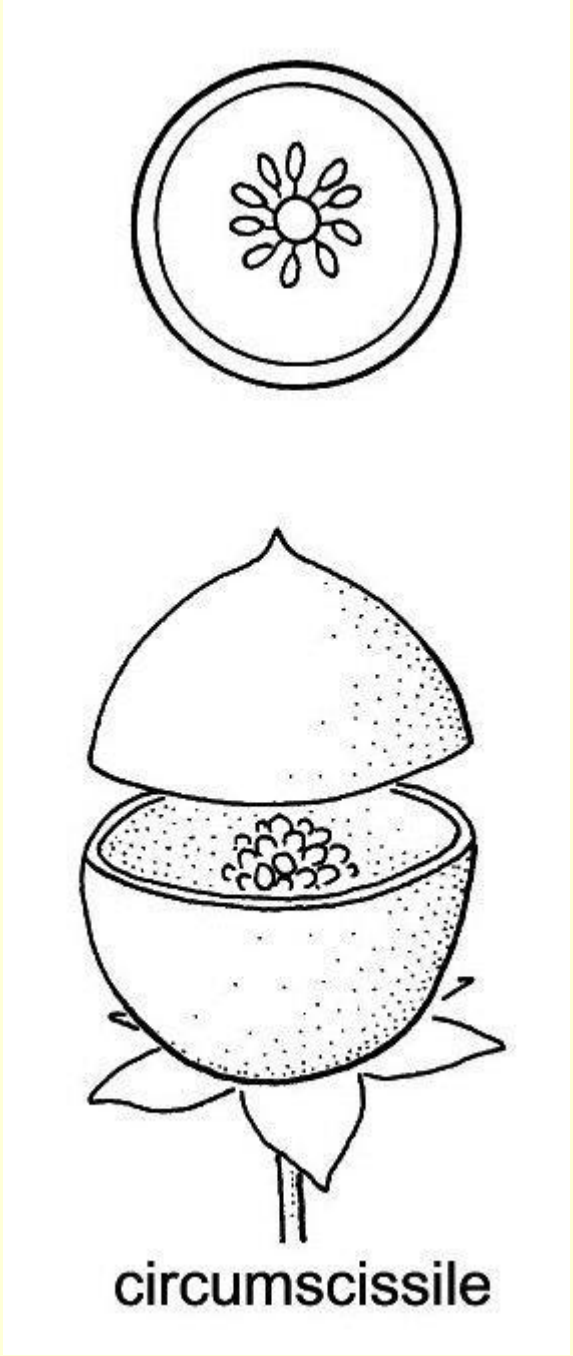


Septicidal dehiscence fruit





Circumscissile dehiscence fruit



Poricidal dehiscence fruit

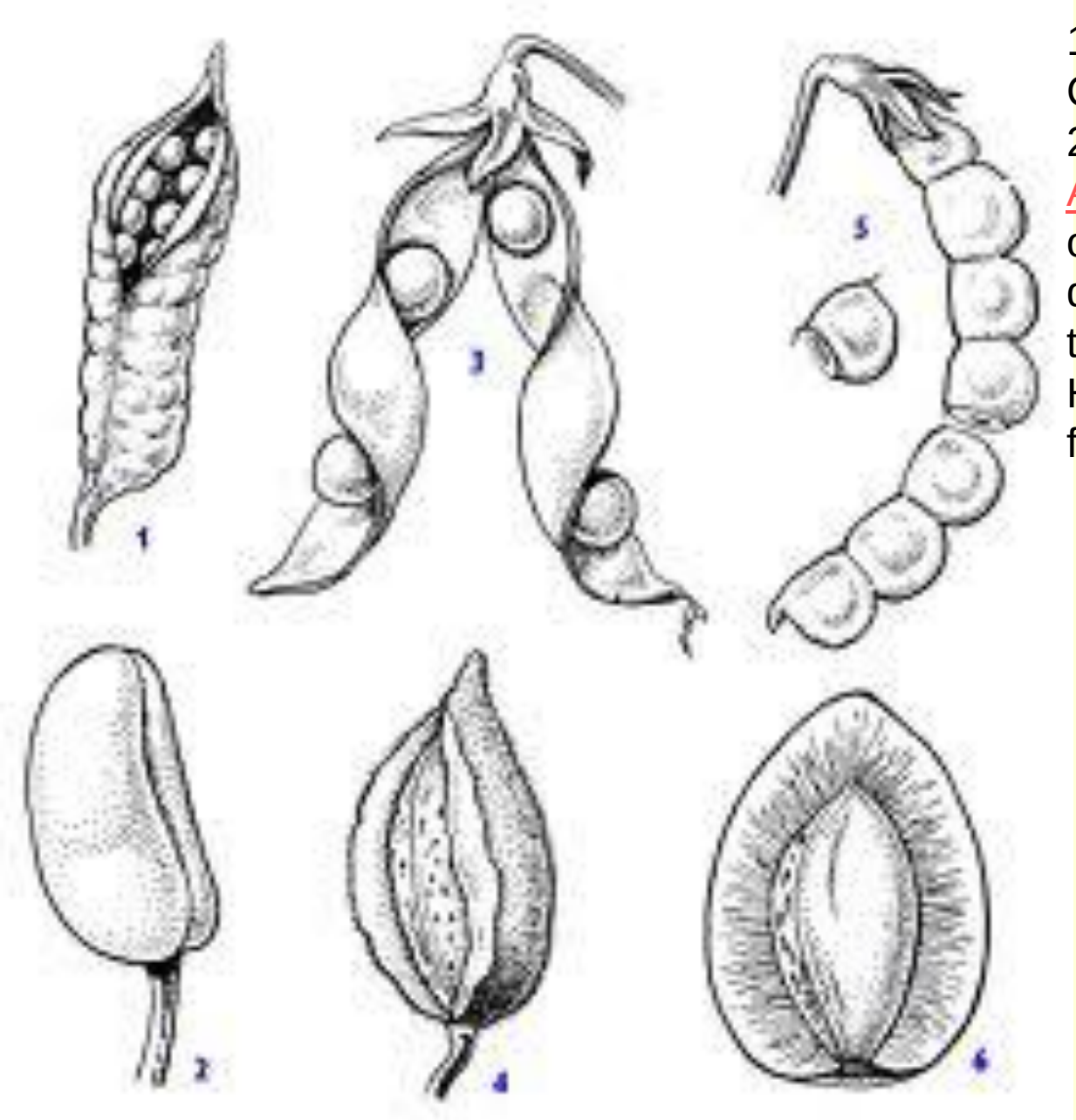
The modern classification of fruits is based on the structure of the gynaecium of the flower, so four types of fruits are distinguished:

1. Monocarpous.

2. Apocarpous or apocarpia.

3. Syncarpous or syncarpia.

4. Pseudomonocarpous or pseudomonocarpia.

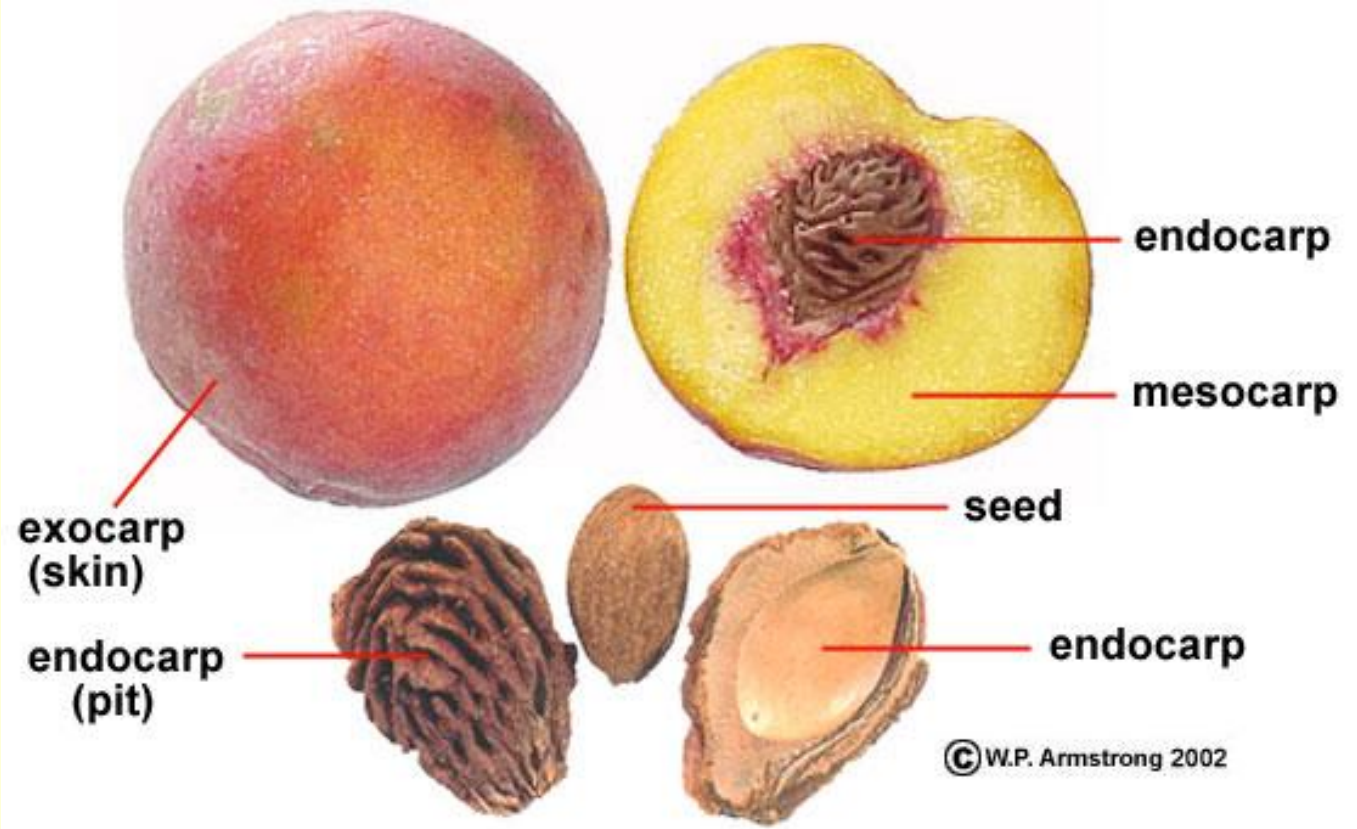


1 - The dry follicle of Consolida,
2 - The fleshy follicle of Actaea , 3 - The legume of Vicea , 4 – the dry drupe of Amygdalus , 5 – the legume of Hedysarum , 6 – the fleshy drupe of Prunus

The follicle of larkspur (*Consolida regalis*)

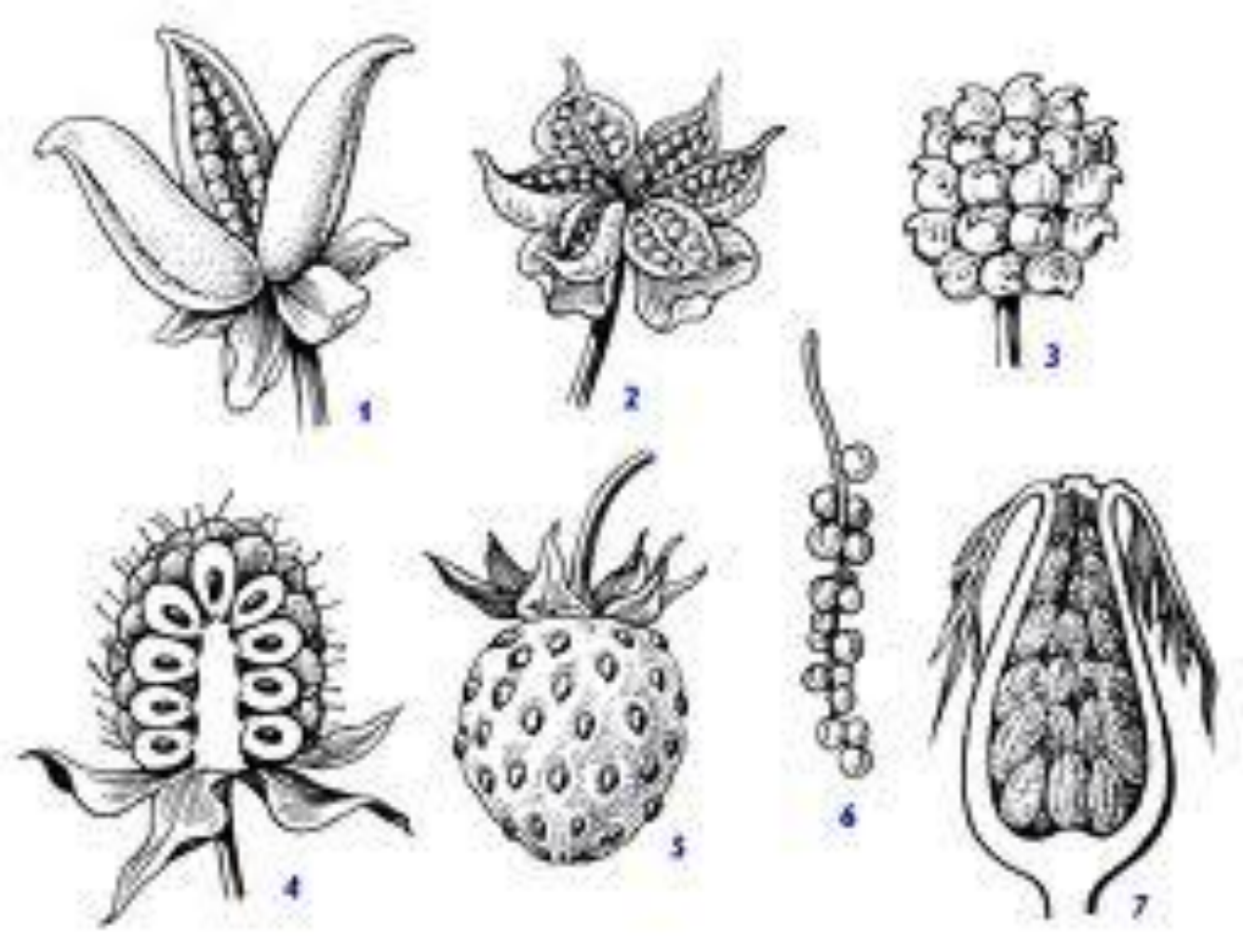
The follicle can be juicy (*Actaea simplex*).

The legume



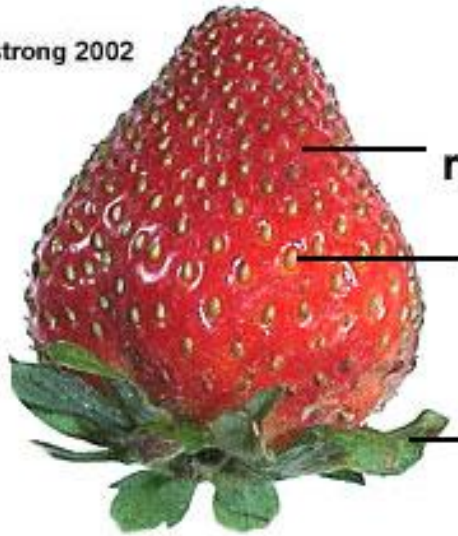
Drupe (fleshy fruit with a stony endocarp)

the dry drupe of Amygdalus



1 – A dry etaerio follicles of Paeonia , 2 - A dry etaerio follicles of Caltha , 3 - An etaerio of achenes of Anemone and Ranunculus, 4 - An etaerio of drupelets of Rubus ,5 - Utricle of Fragaria ,6 - A flashy etaerio follicles of Schisandra ,
7 - cynarrhodium of Rosa .

Strawberry Flower

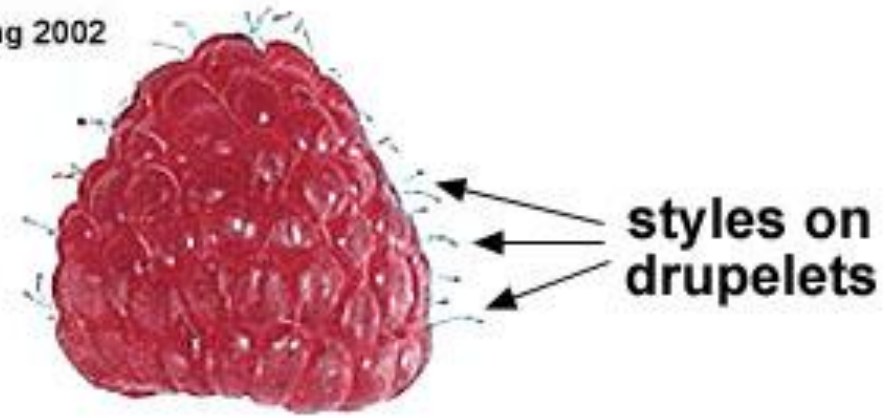


Aggregate Fruit

Many one-seeded achenes produced by a single flower.

Hybrid Strawberry (*Fragaria ananassa*)

Thimbleberry Flower



Aggregate Fruit

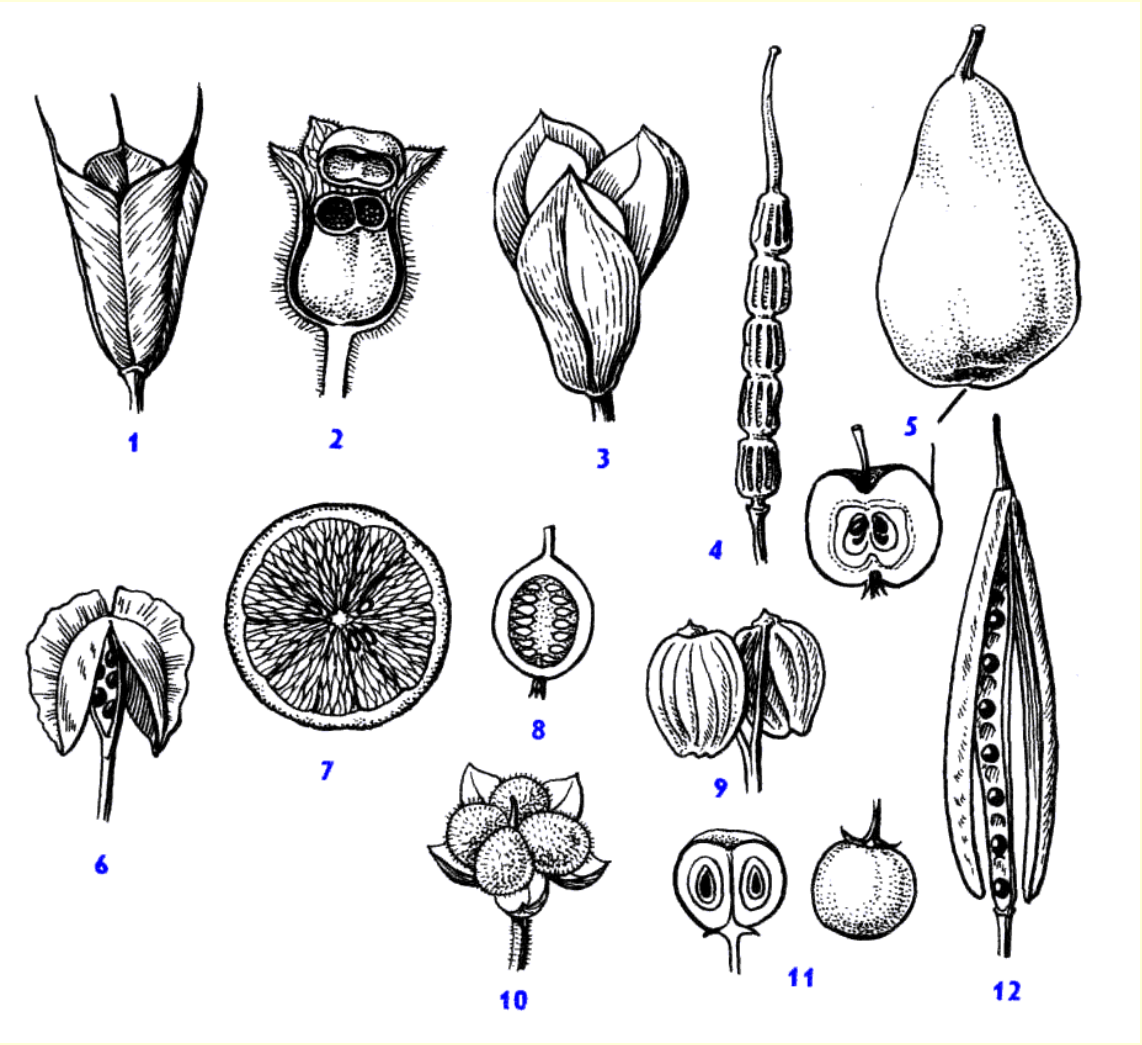
Many one-seeded drupelets
produced by a single flower.

Thimbleberry (*Rubus parviflorus*)

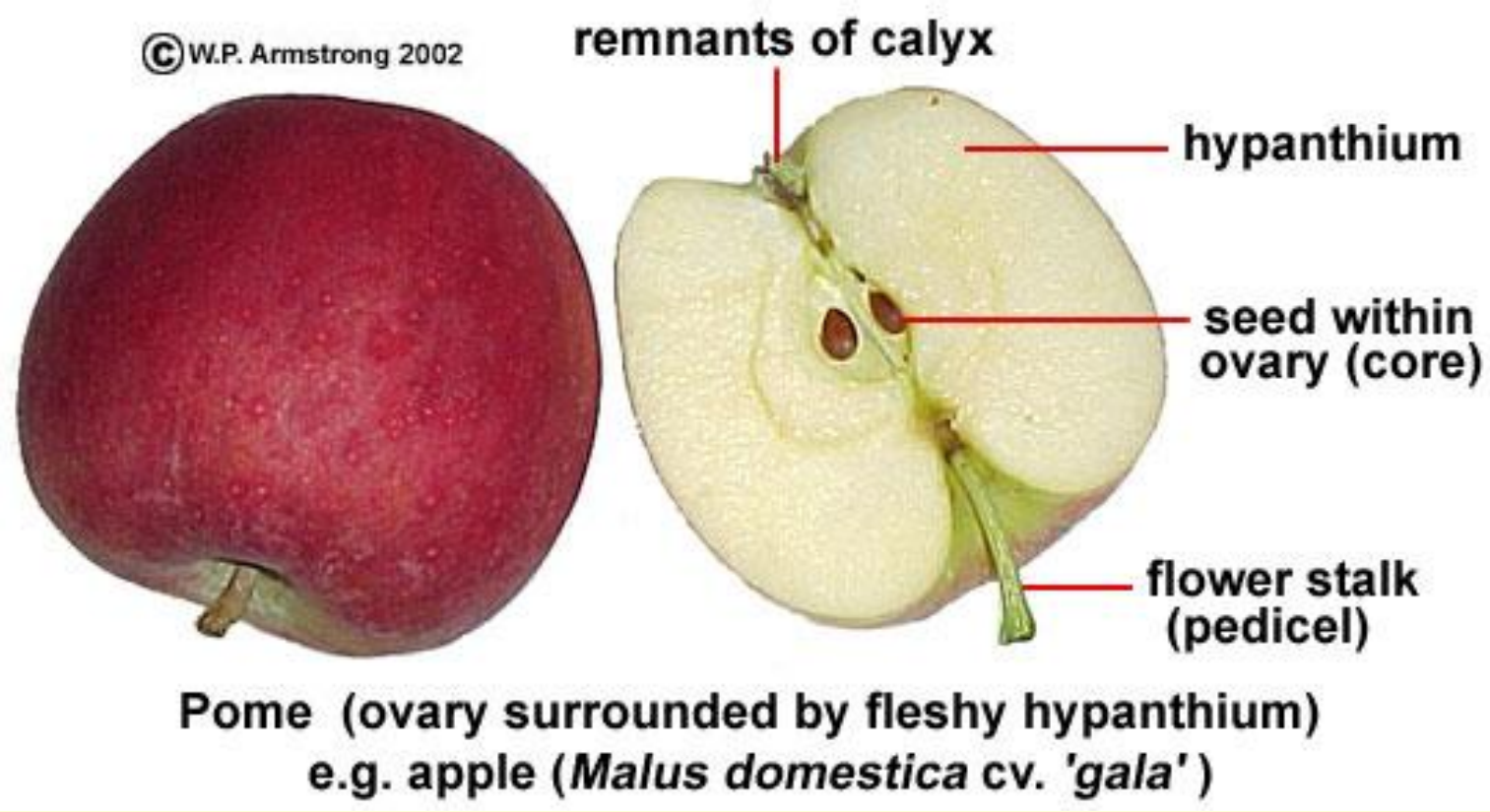
A dry etaerio follicle of Aquilegia

A flechy etaerio follicle
of Scisandra chinensis

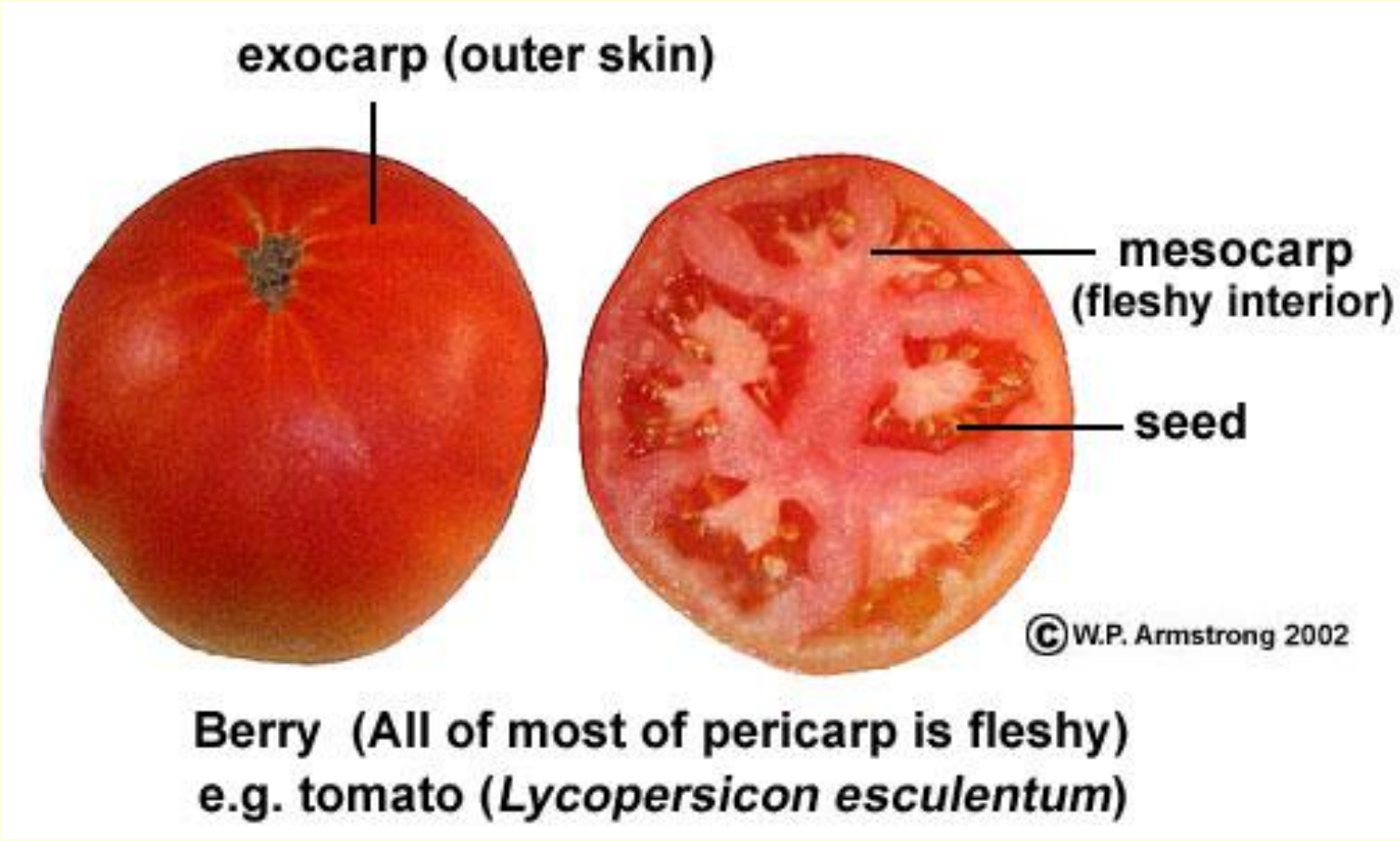
A dry etaerio follicle of Illicium



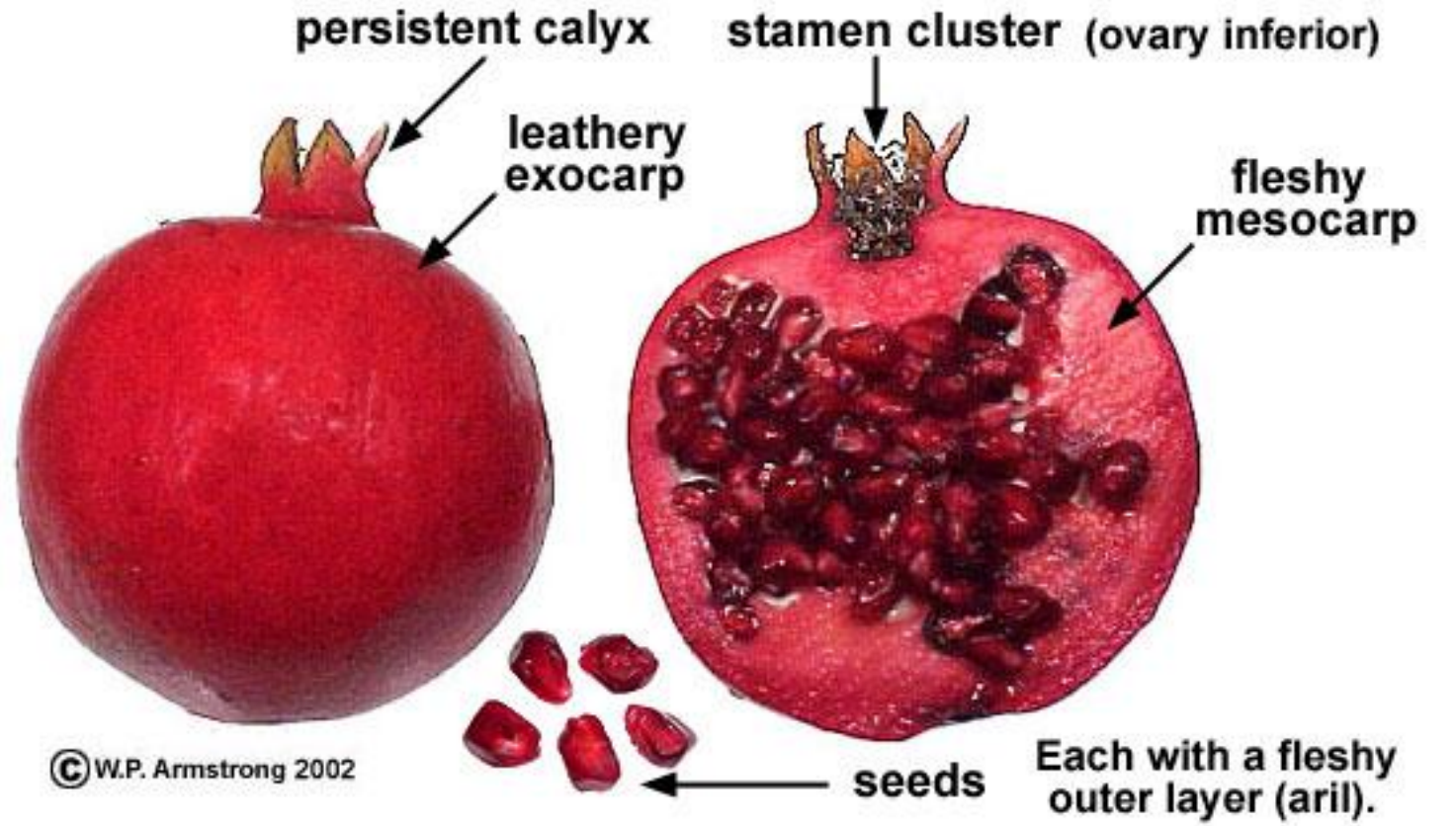
1. An etaerio follicles of Aquifegia ; 2 - loculicidal capsule of Hyoscyamus ; 3 - The septicidal capsule of Tulipa; 4 - lomentaceous silique (pod) of Raphanus ; 5 - pome; 6 - silicle ; 7 - Hesperidium of citrus ; 8 - berry, 9 – Schizocarp of Apiaceae 10 - Coenobium, 11 – berry of Arctostaphylos ; 12 - silique (pod) of Brassicaceae.



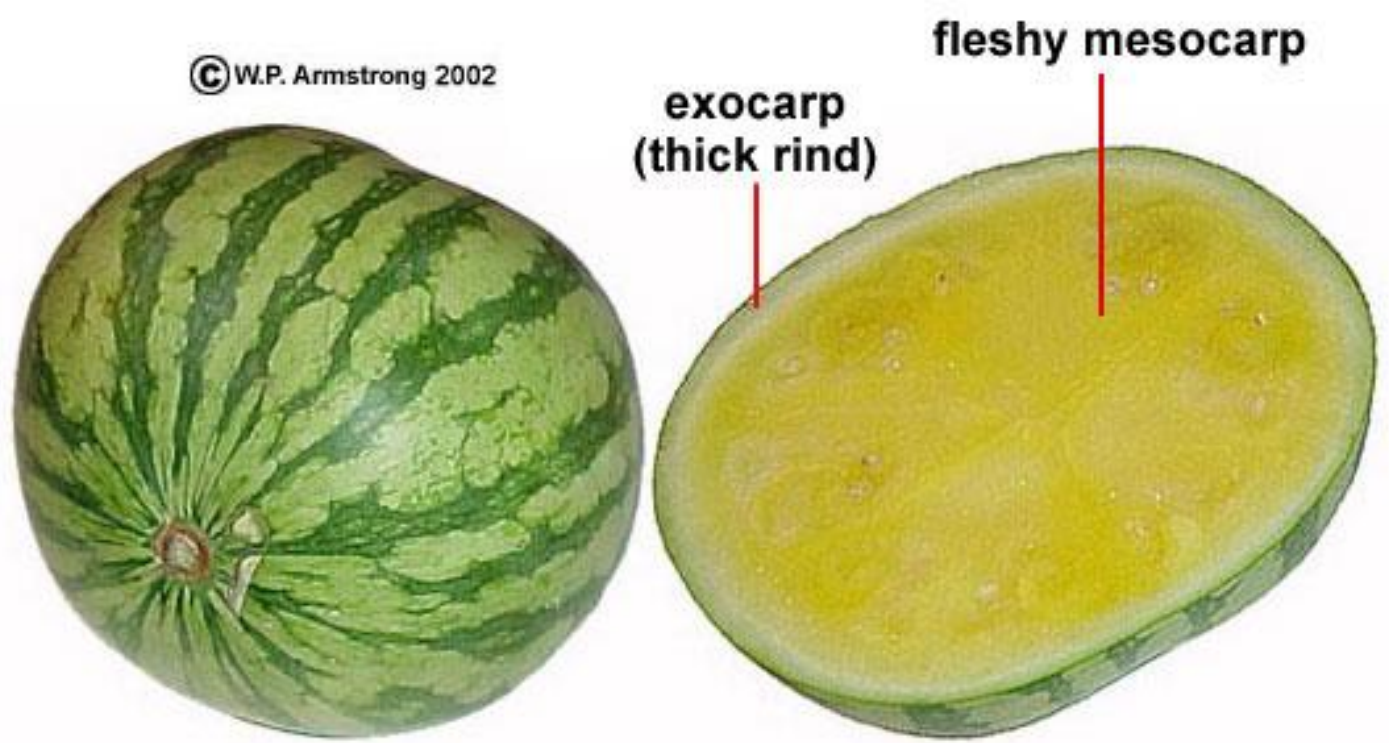
Pome (ovary surrounded by fleshy hypanthium)
e.g. apple (*Malus domestica* cv. *'gala'*)



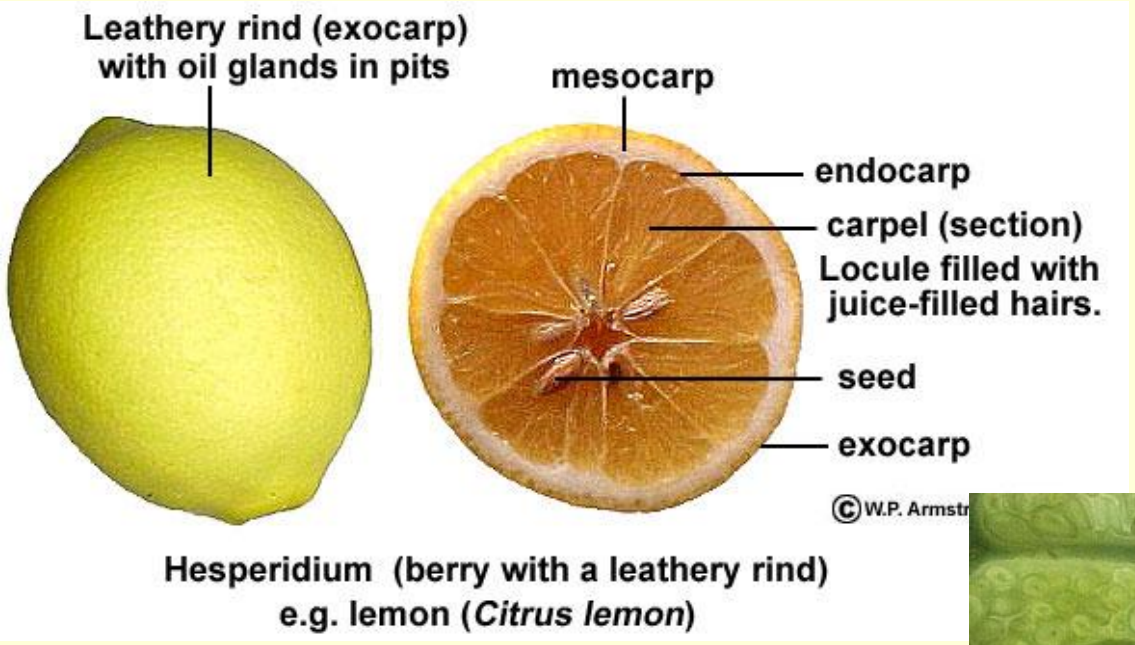
Berry (All of most of pericarp is fleshy)
e.g. tomato (*Lycopersicon esculentum*)



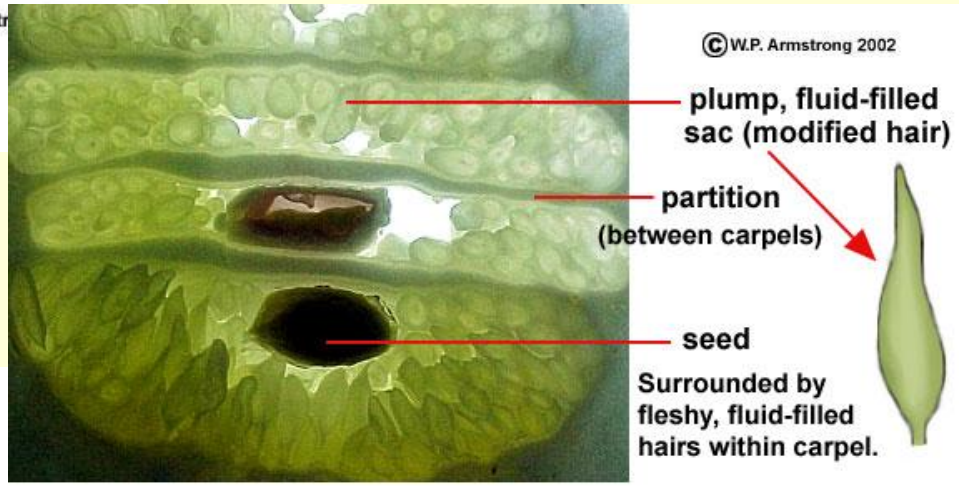
Pomegranate (*Punica granatum*): A many-seeded berry.



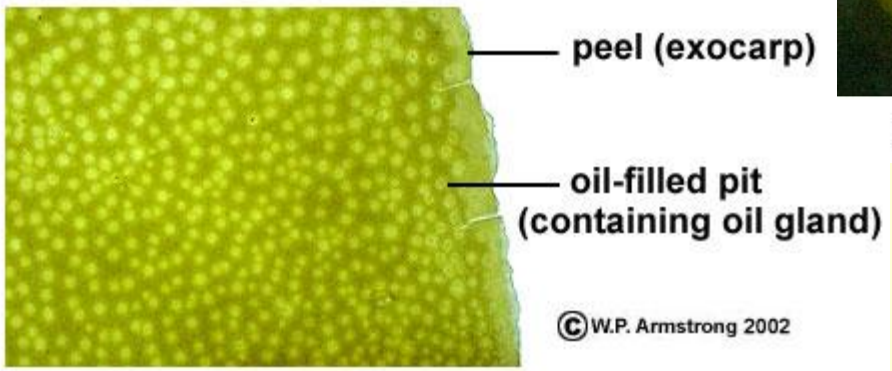
Pepo (a berry with a hard, thick rind)
e.g. watermelon (*Citrullus lanatus* var. *lanatus*)



Hesperidium (berry with a leathery rind)
e.g. lemon (*Citrus lemon*)



Magnified View Of The Sections (Carpels) Of An Orange

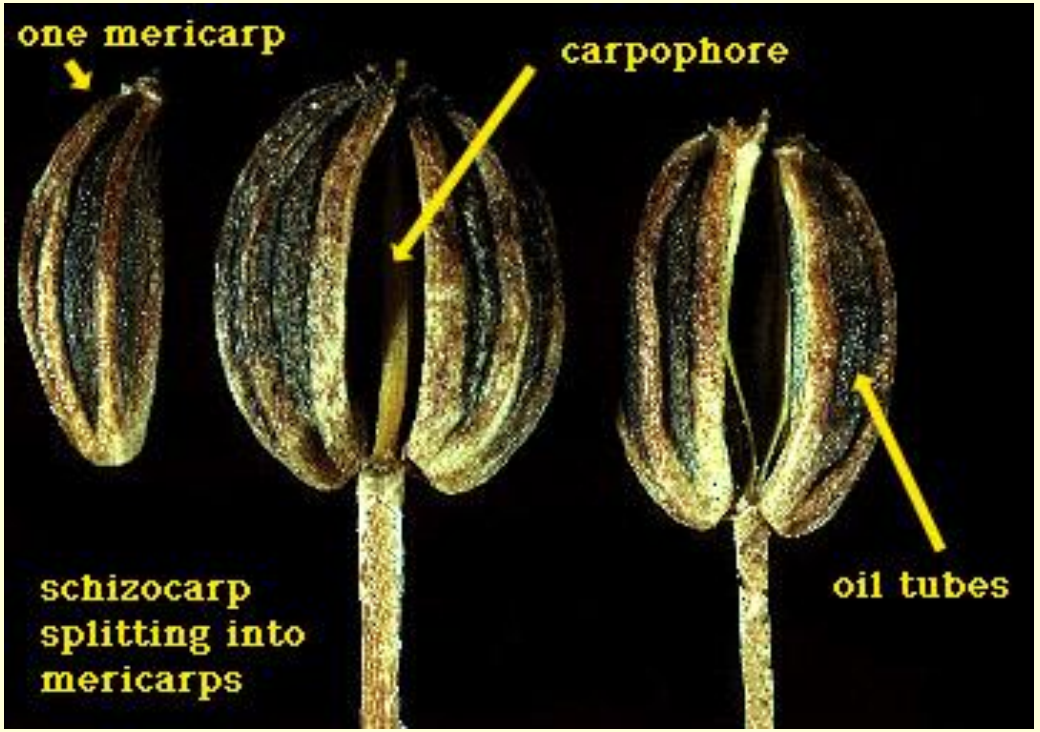


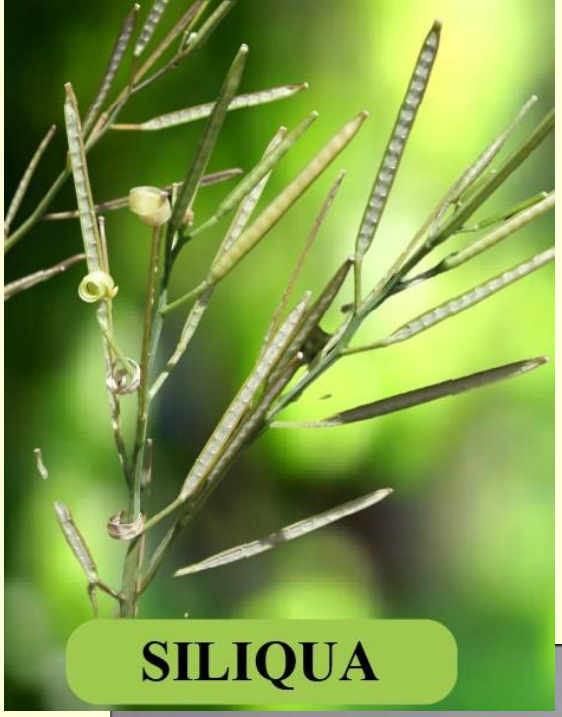
Magnified View Of The Surface Of A Lemon Peel

Coenobium of Cynoglossum

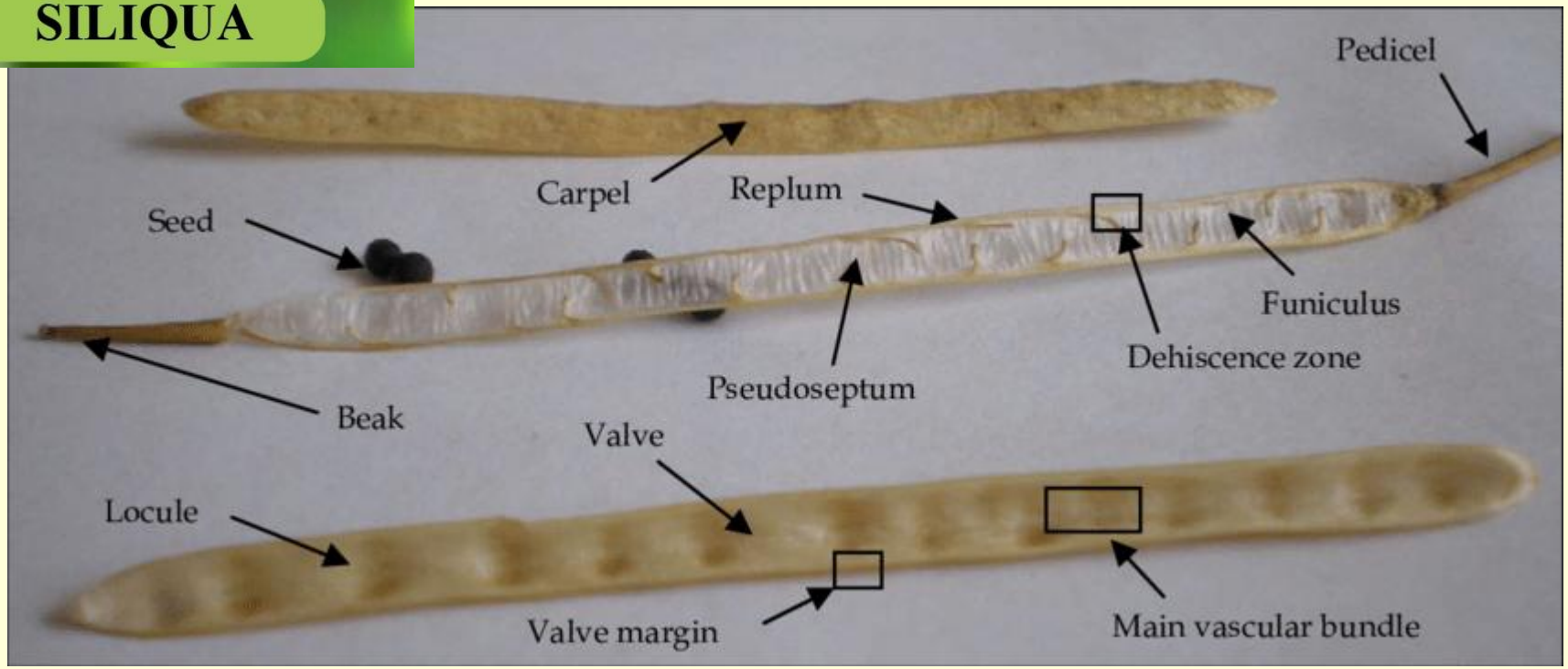
Schizocarp of Malvaceae

Schizocarp of Apiaceae

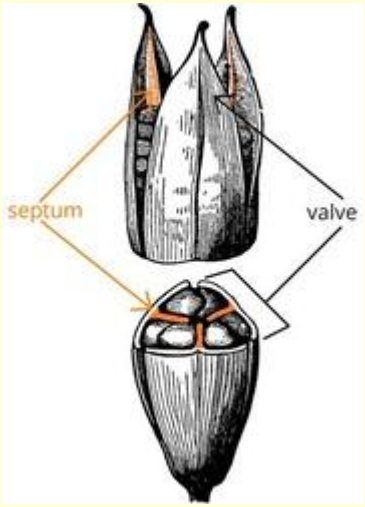


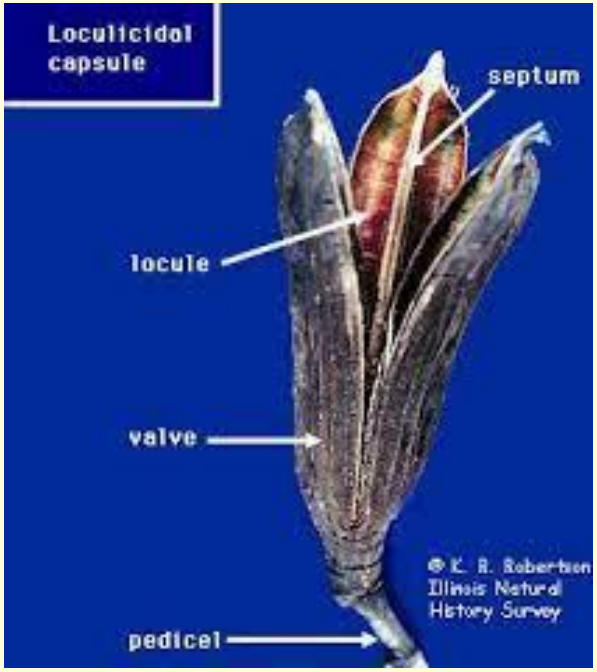

SILIQUA

Silicula

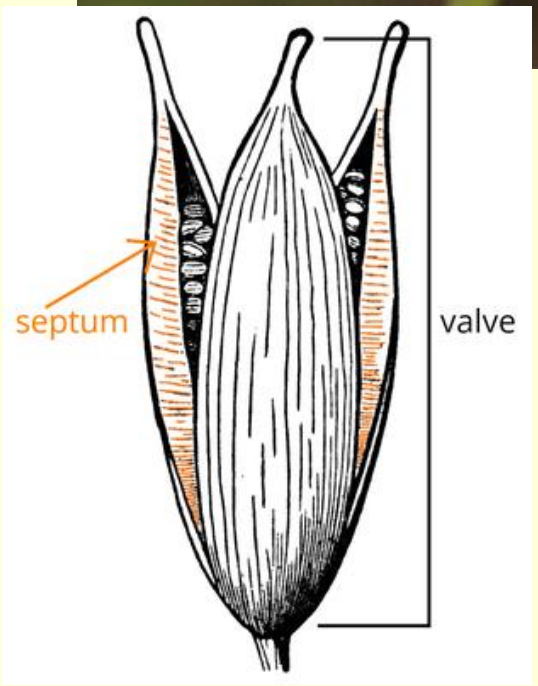

Pedicel
Carpel
Replum
Seed
Funiculus
Dehiscence zone
Pseudoseptum
Beak
Valve
Locule
Valve margin
Main vascular bundle

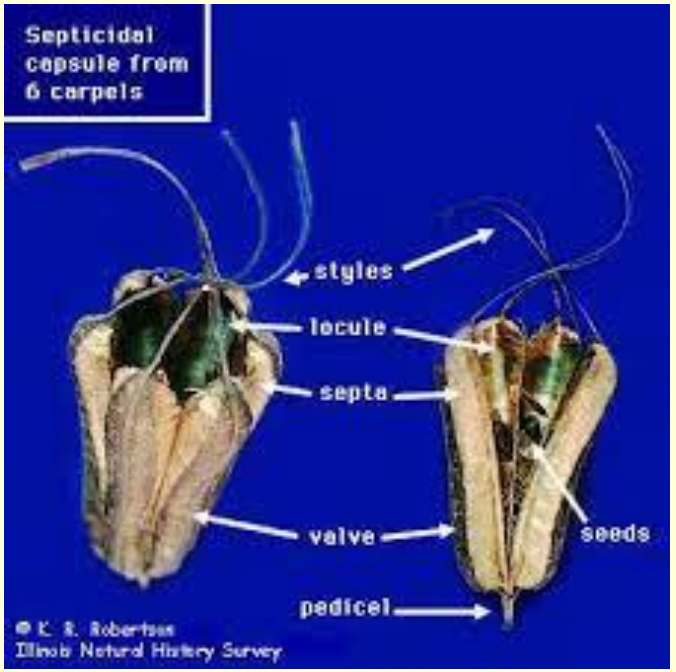
Hibiscus tiliaceus: Loculicidal capsule dehiscence and seed dispersal



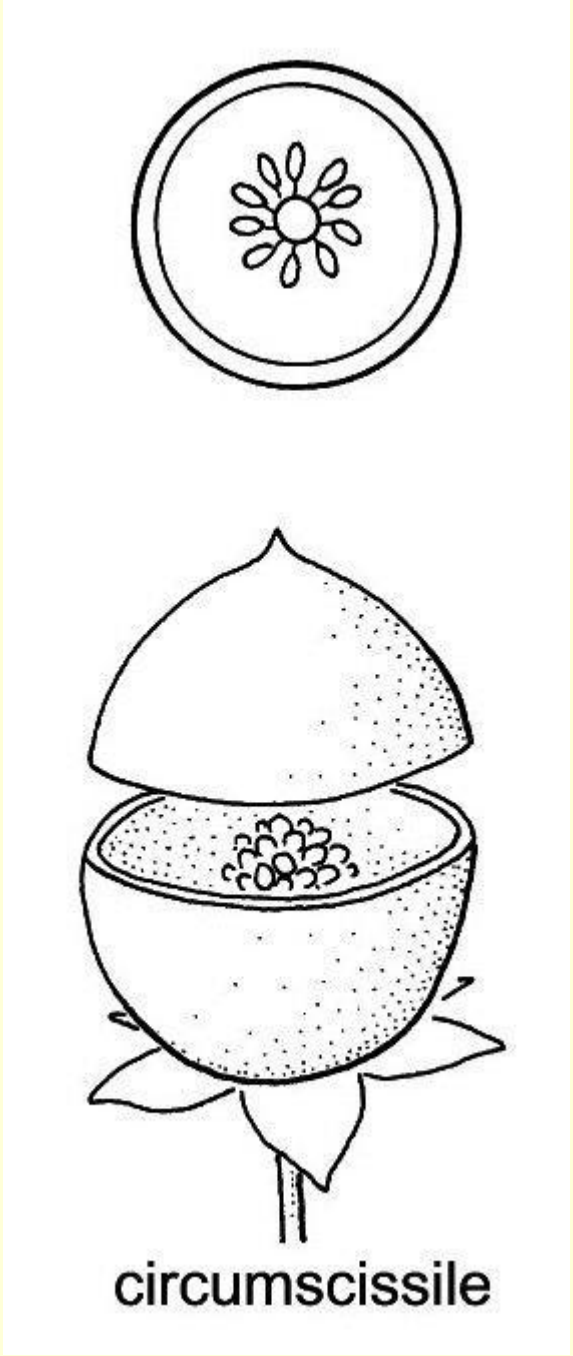


Septicidal dehiscence fruit

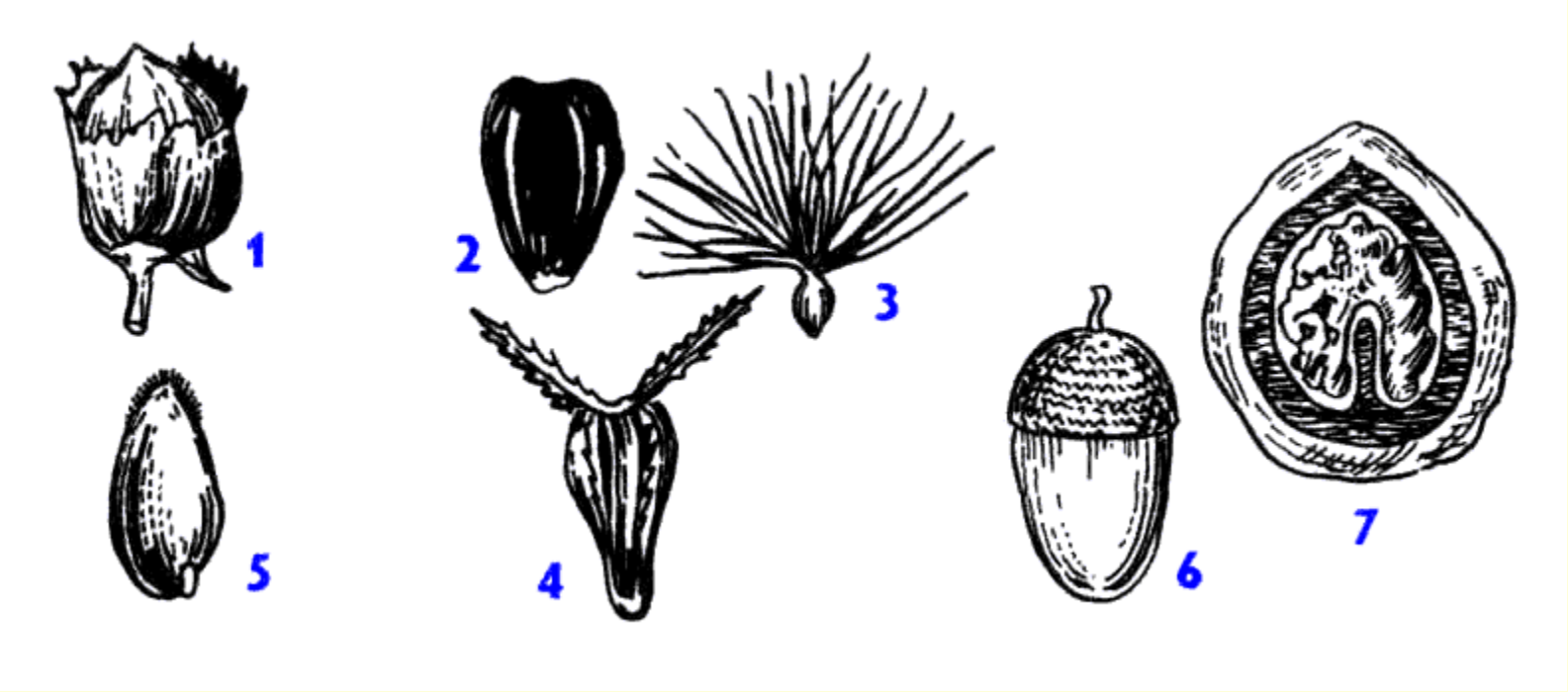




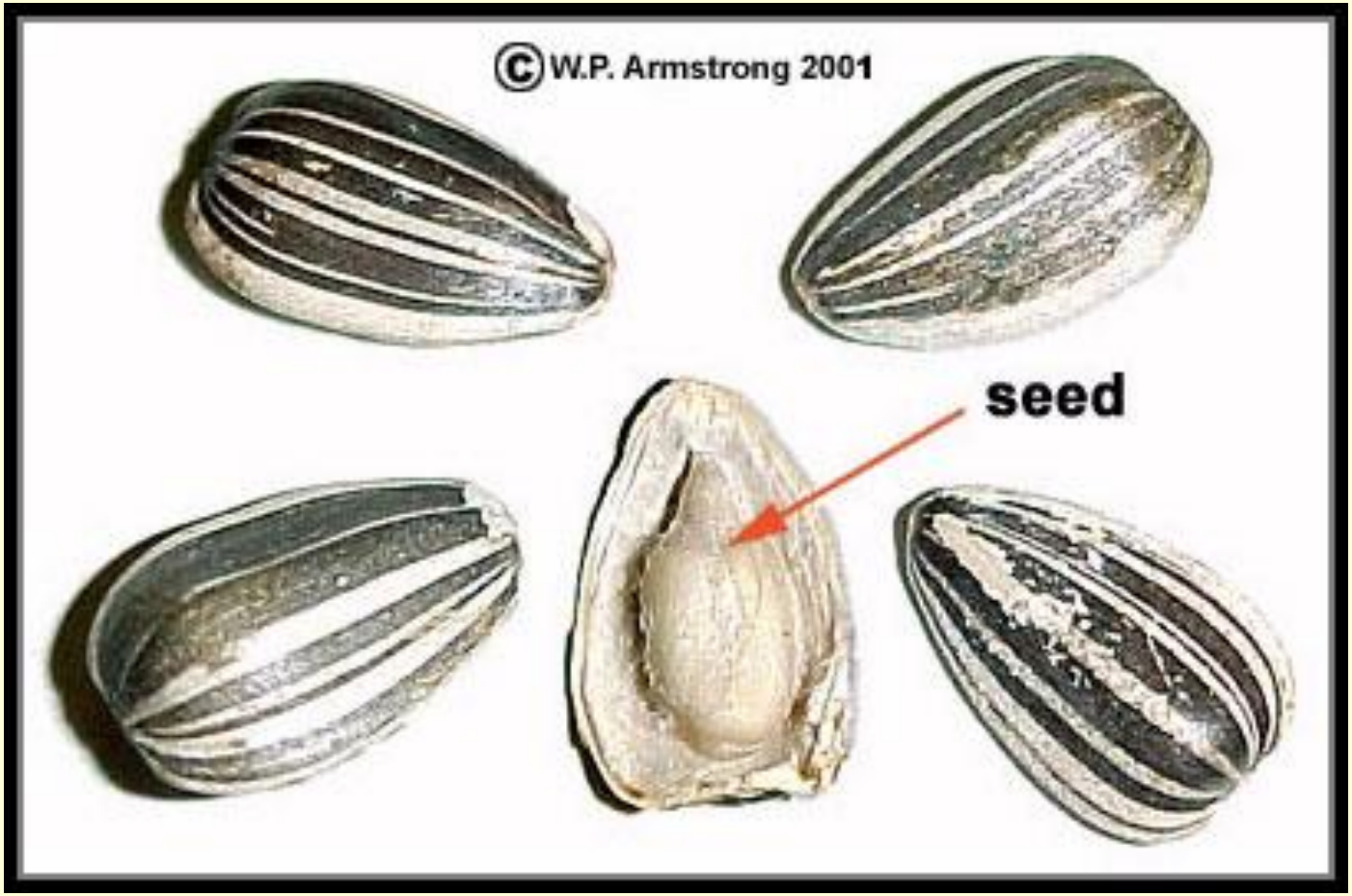
Circumscissile dehiscence fruit



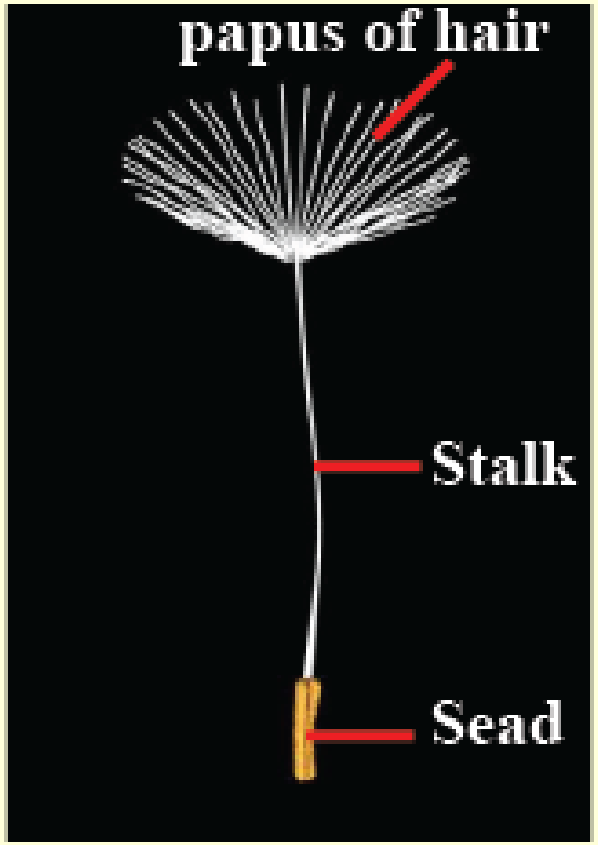
Poricidal dehiscence fruit



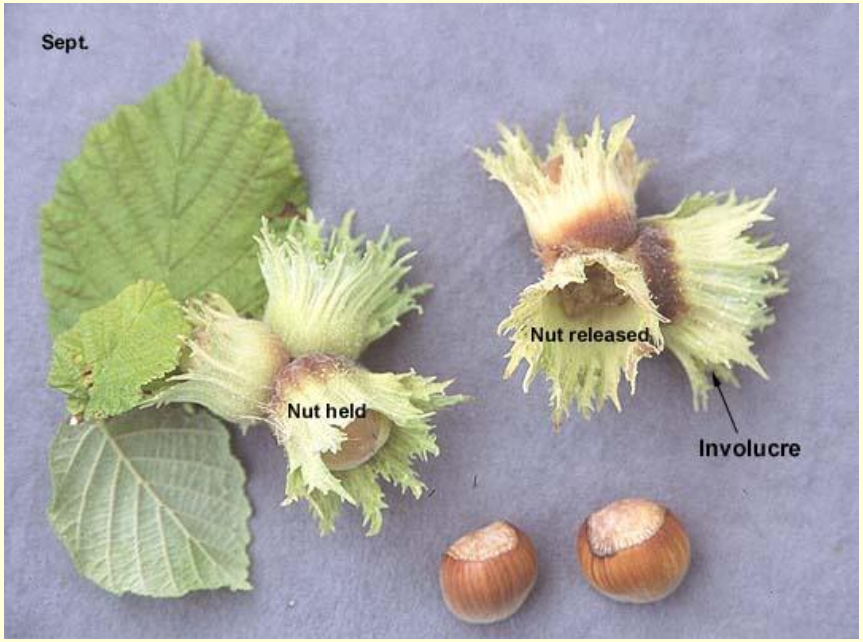
Pseudomonocarpic fruits (Original). 1 – nut, 5 – grain, 2, 3, 4 – cypsela (achenes), 6 – acorn, 7 - pseudodrupe (or drupe-like nut).



Cypsela of sunflower

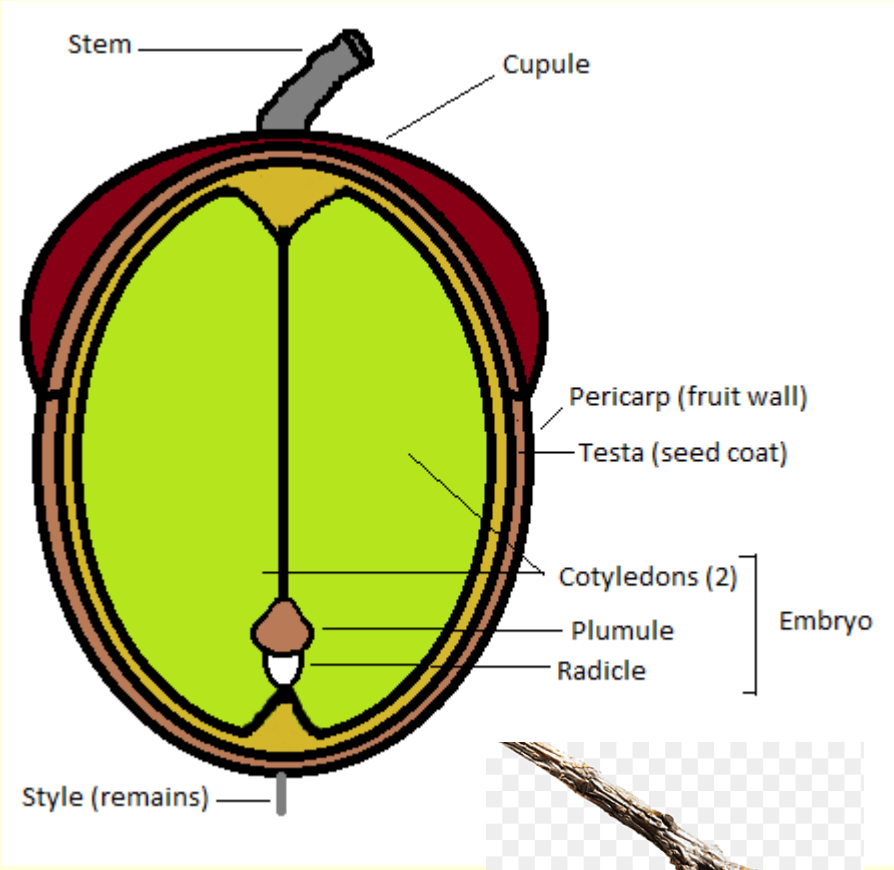


Cypsela (achenes) of dandelion

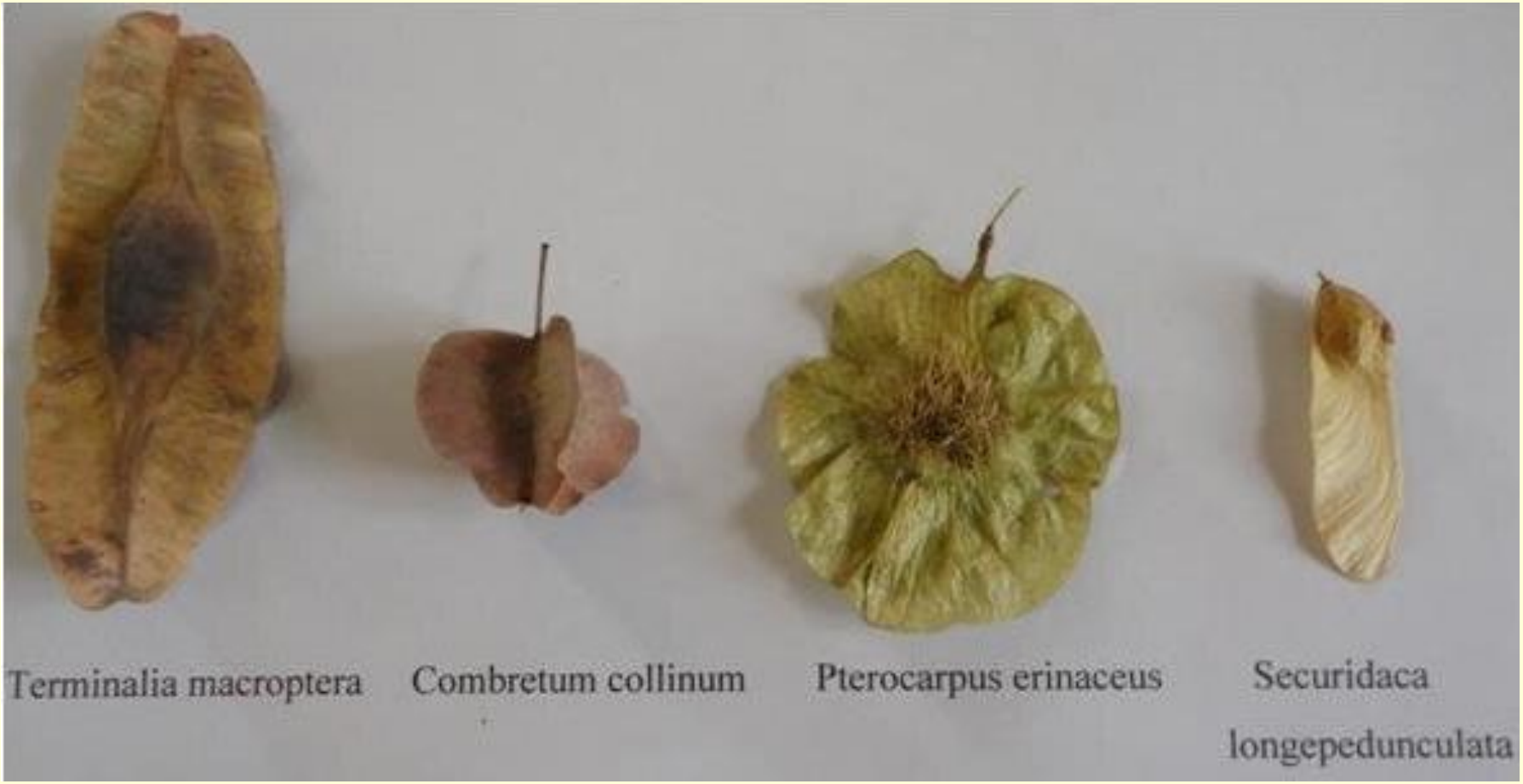


Nut of Corylus avenala

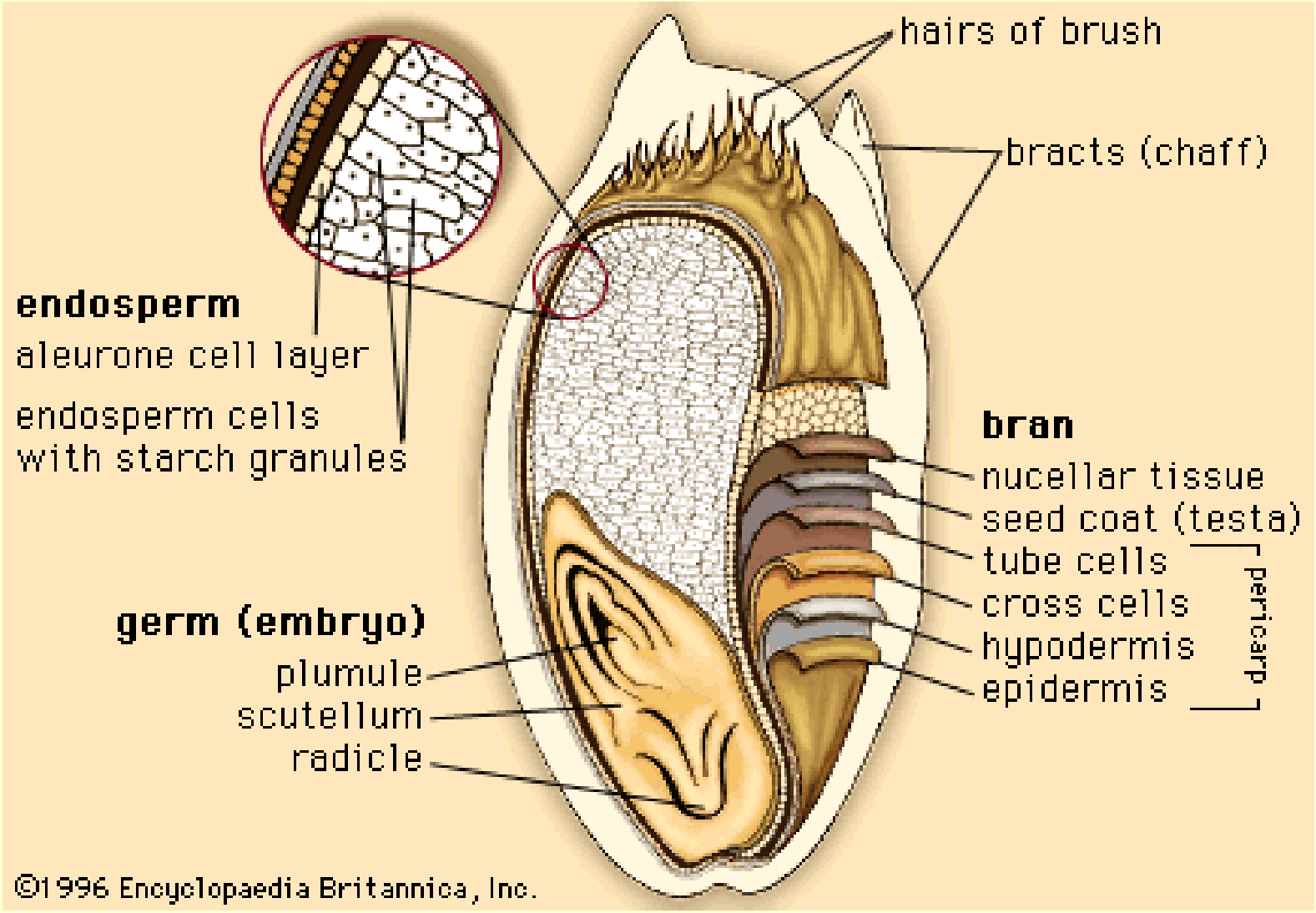
Structure of acorn



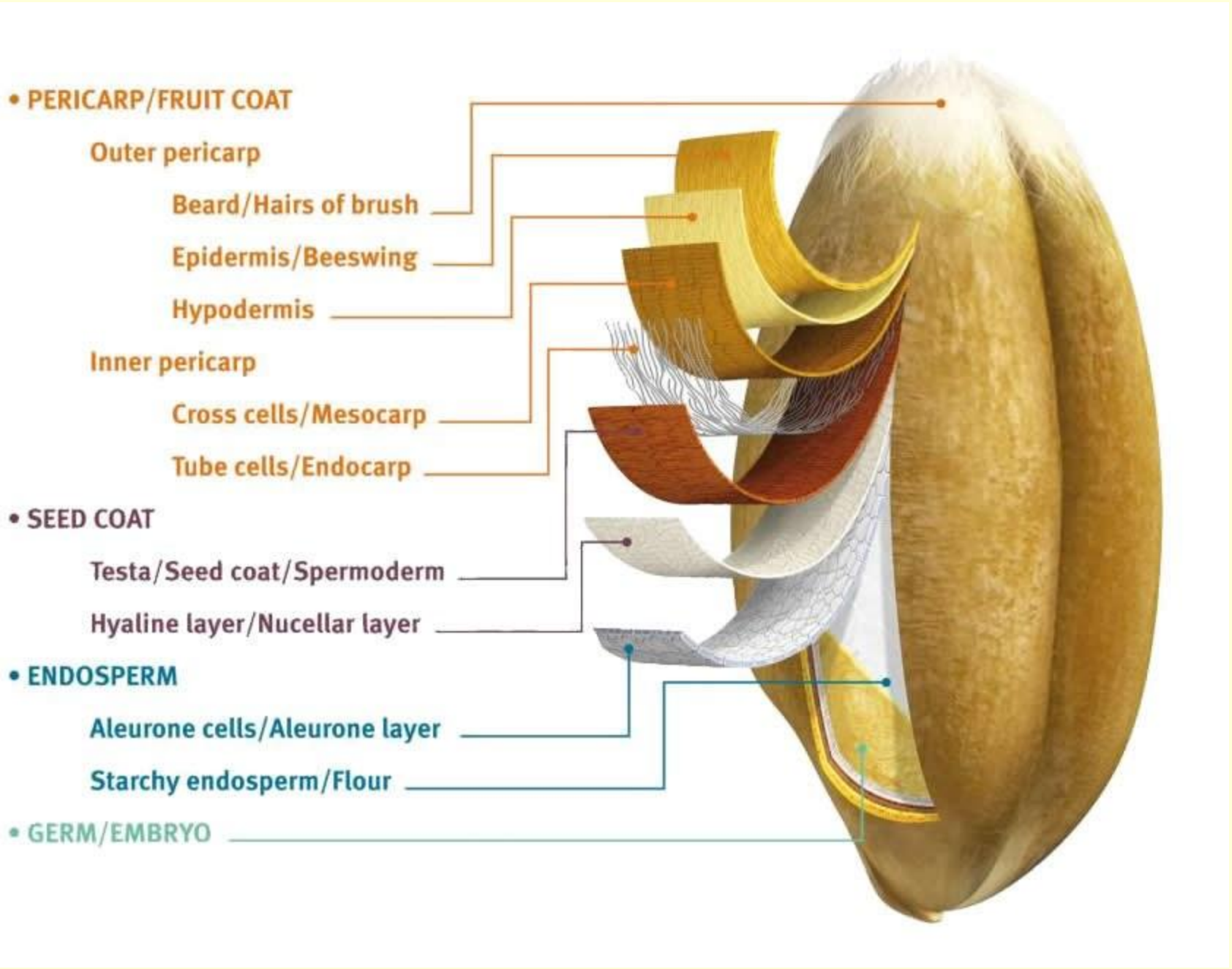
Pseudodrupe (or drupe-like nut) of Juglands

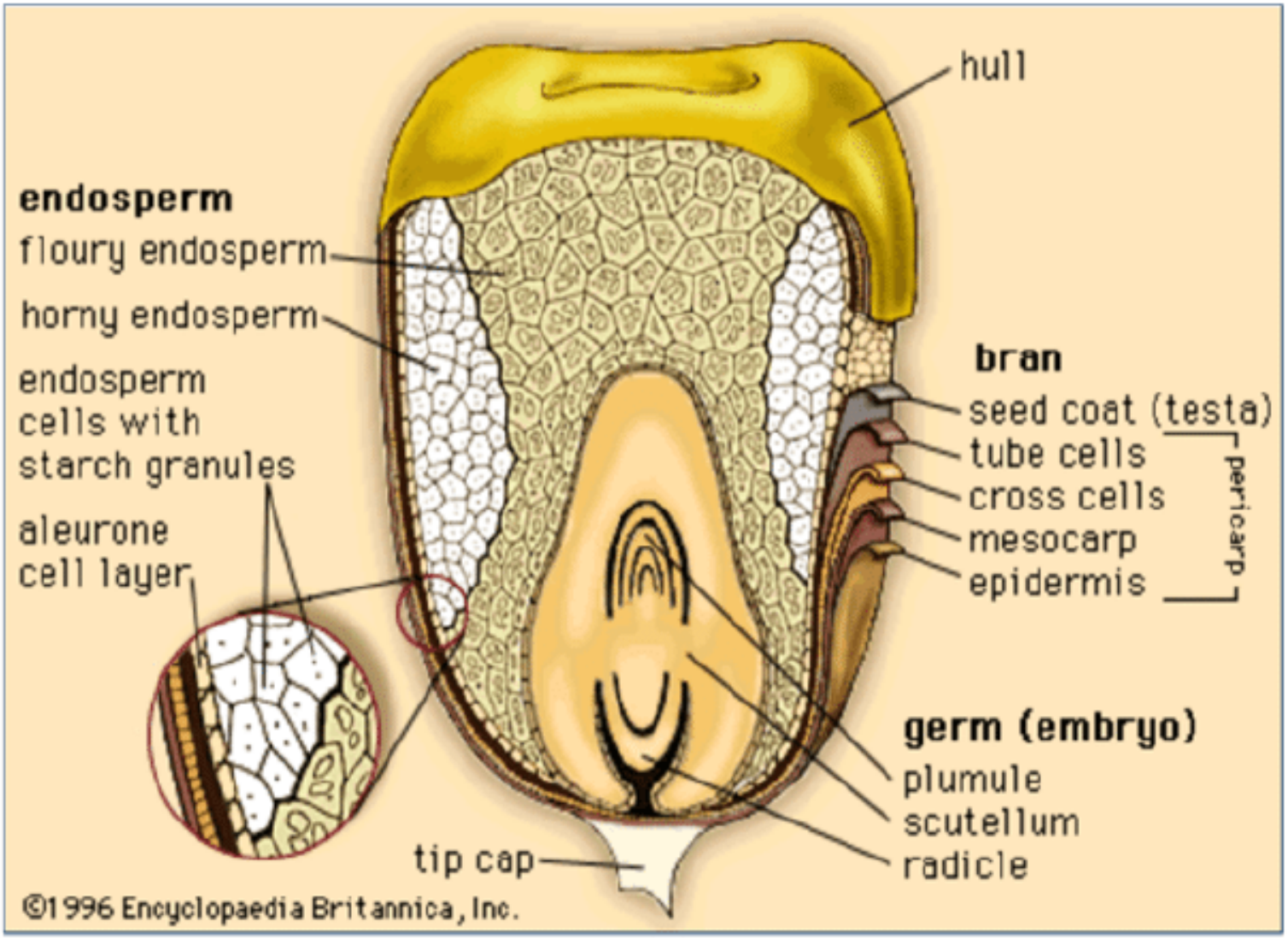

Terminalia macroptera
Combretum collinum
Pterocarpus erinaceus
Securidaca longepedunculata

The samara


hairs of brush
bracts (chaff)
endosperm
aleurone cell layer
endosperm cells
with starch granules
bran
nucellar tissue
seed coat (testa)
tube cells
cross cells
hypodermis
epidermis
pericarp
germ (embryo)
plumule
scutellum
radicle
©1996 Encyclopaedia Britannica, Inc.

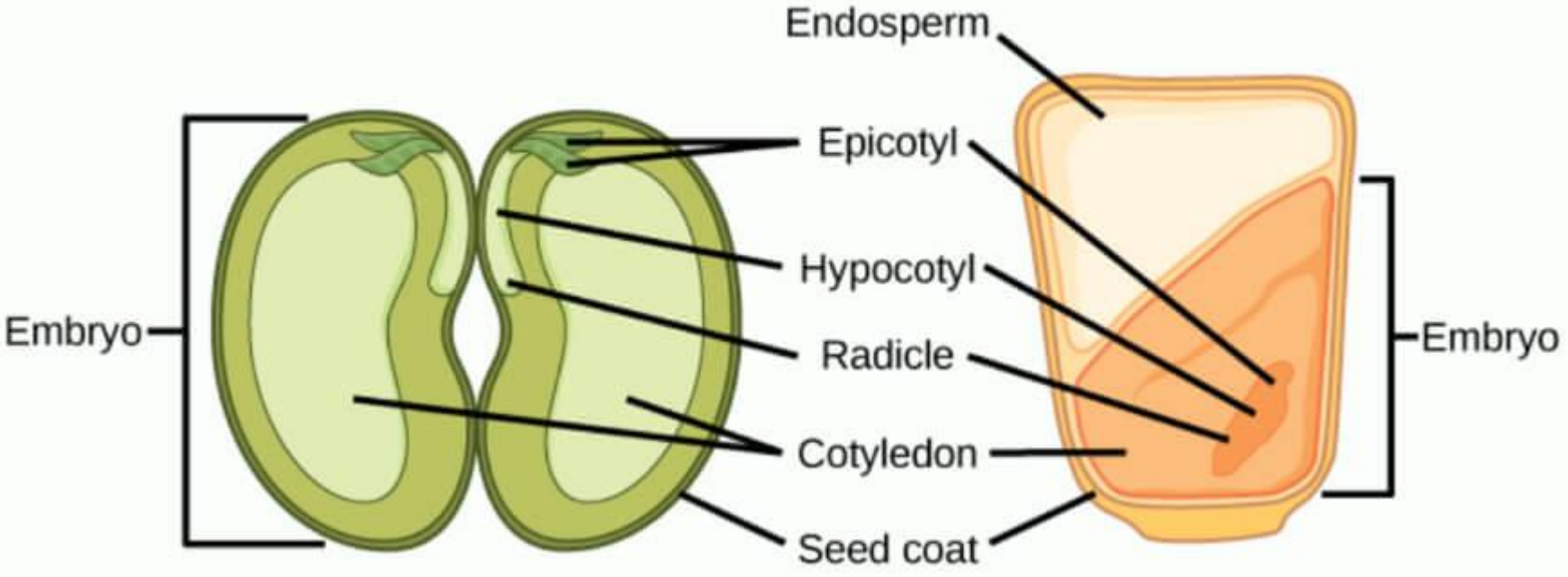
Grain


• PERICARP/FRUIT COAT
Outer pericarp
Beard/Hairs of brush
Epidermis/Beeswing
Hypodermis
Inner pericarp
Cross cells/Mesocarp
Tube cells/Endocarp
• SEED COAT
Testa/Seed coat/Spermoderm
Hyaline layer/Nucellar layer
• ENDOSPERM
Aleurone cells/Aleurone layer
Starchy endosperm/Flour
• GERM/EMBRYO

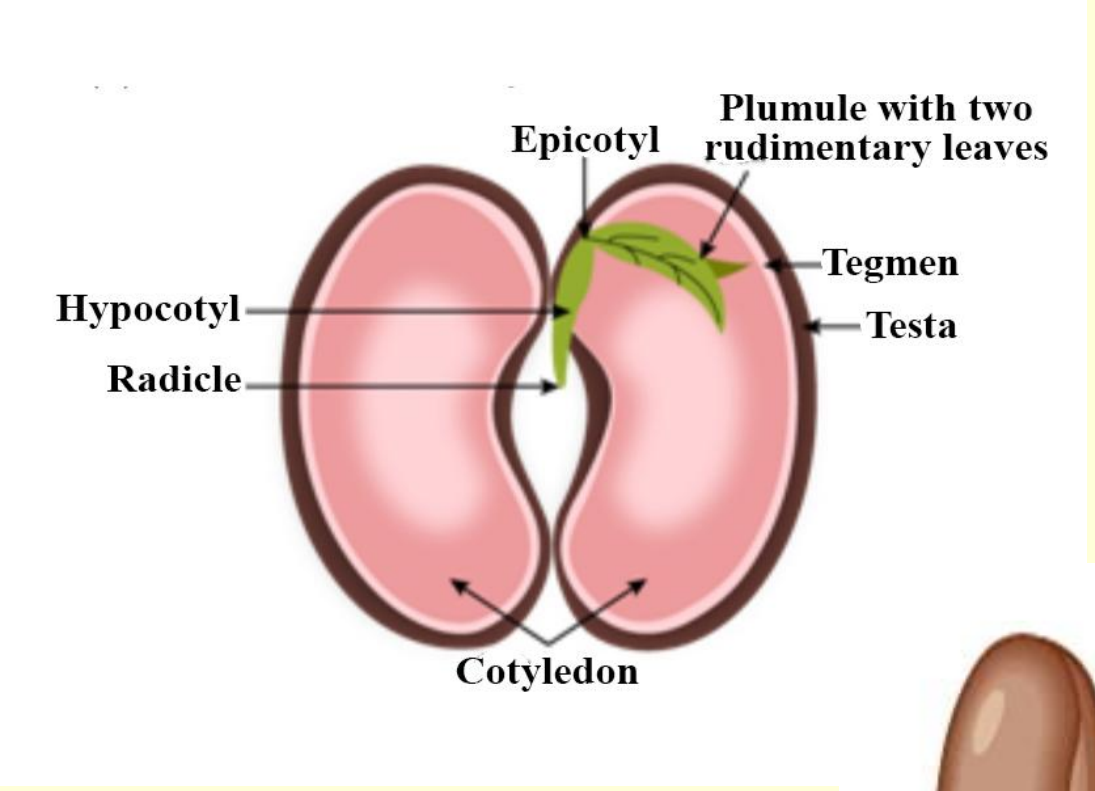

hull
endosperm
floury endosperm
horny endosperm
endosperm cells with starch granules
aleurone cell layer
bran
seed coat (testa)
tube cells
cross cells
mesocarp
epidermis
pericarp
germ (embryo)
plumule
scutellum
radicle
tip cap
©1996 Encyclopaedia Britannica, Inc.

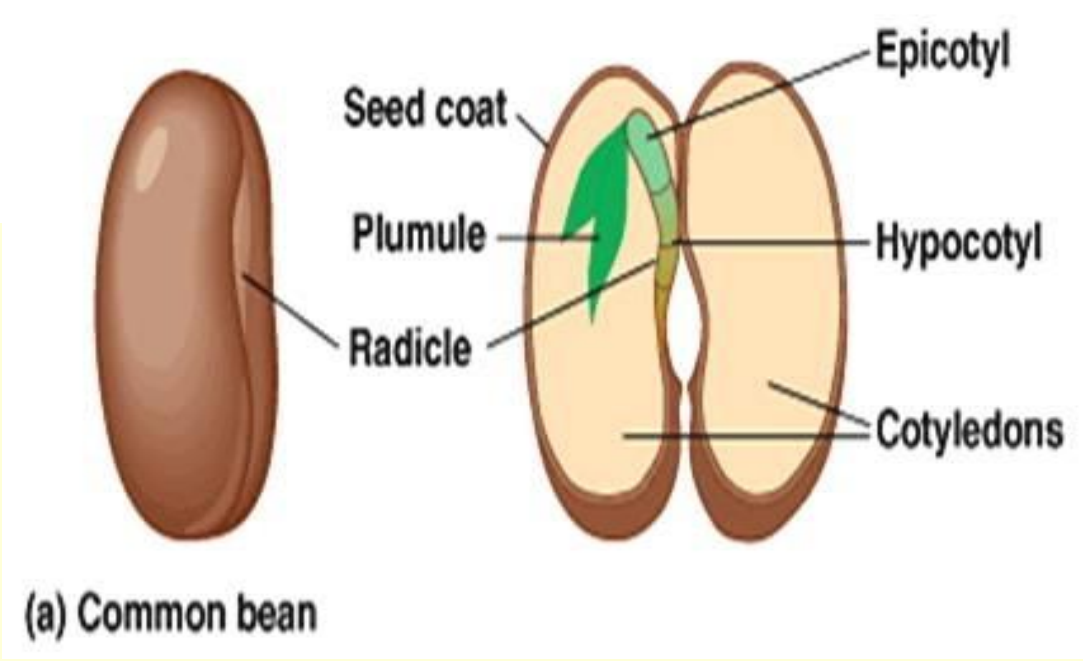
Monocot and Dicot Seed

Definition, Structure, 10 Differences, Examples

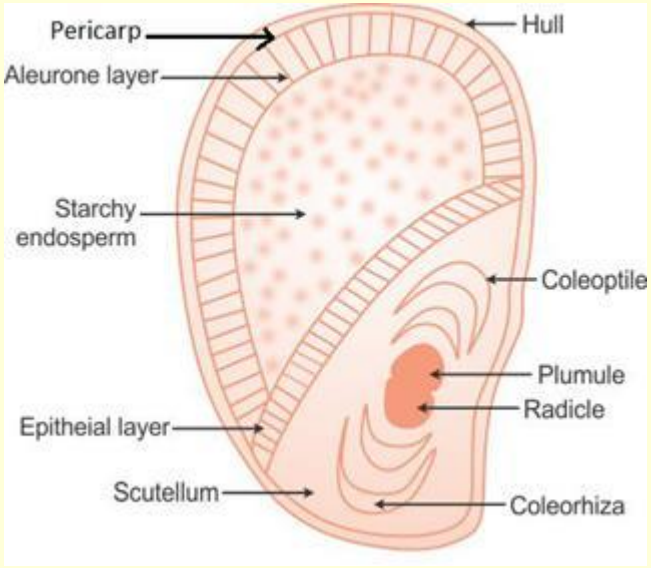


Task 2. Morphology of seeds of dicotyledonous plants.





Task 3: Morphology of the grain of a cereal.



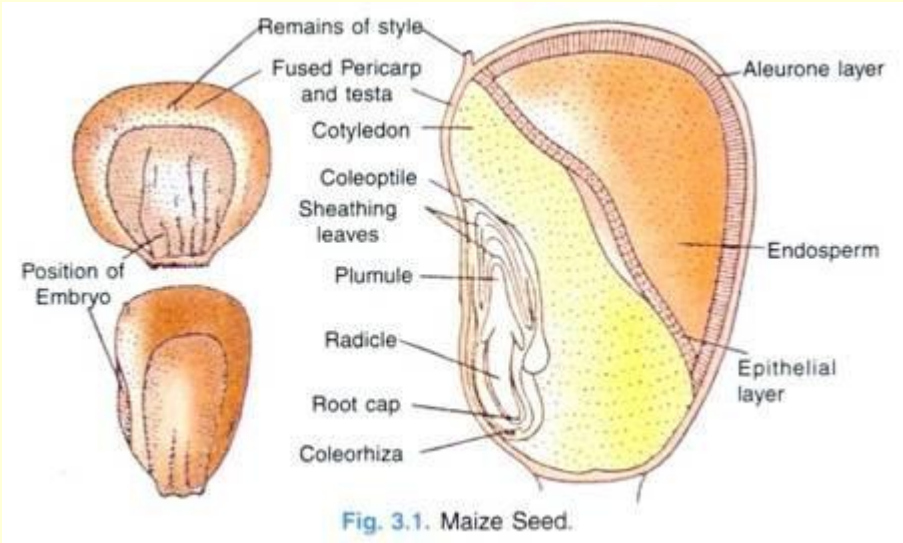


Fig. 3.1. Maize Seed.