Types of Fruits

Fruit

- The structure known as a "fruit" is found only in the members of the Angiosperms.
- A fruit developed solely from the ovary and its contents is known as a true fruit.
- A fruit developed from the ovary and its contents plus additional parts of the flower such as the receptacle, petals, and sepals is known as an accessory fruit (e.g. pineapple)

- The following is a common classification of fruit types:

I. Simple Fruits

II. Aggregate Fruit - A fruit formed by the development of a number of pistils from the same flower. The individual units may be berries or other specific types.

III. Multiple Fruit - A fruit formed by the development of a number of pistils often with accessory parts, the pistils being from a number of flowers. (mulberry).

Simple Fruits

- develops from a single ovary containing one or more carpels
- Fruits formed from 1 pistil.
- They may be either true or accessory fruits
- a simple fruit is either

1. **fleshy** fruits
2. **dry fruits**

1. Fleshy Fruits

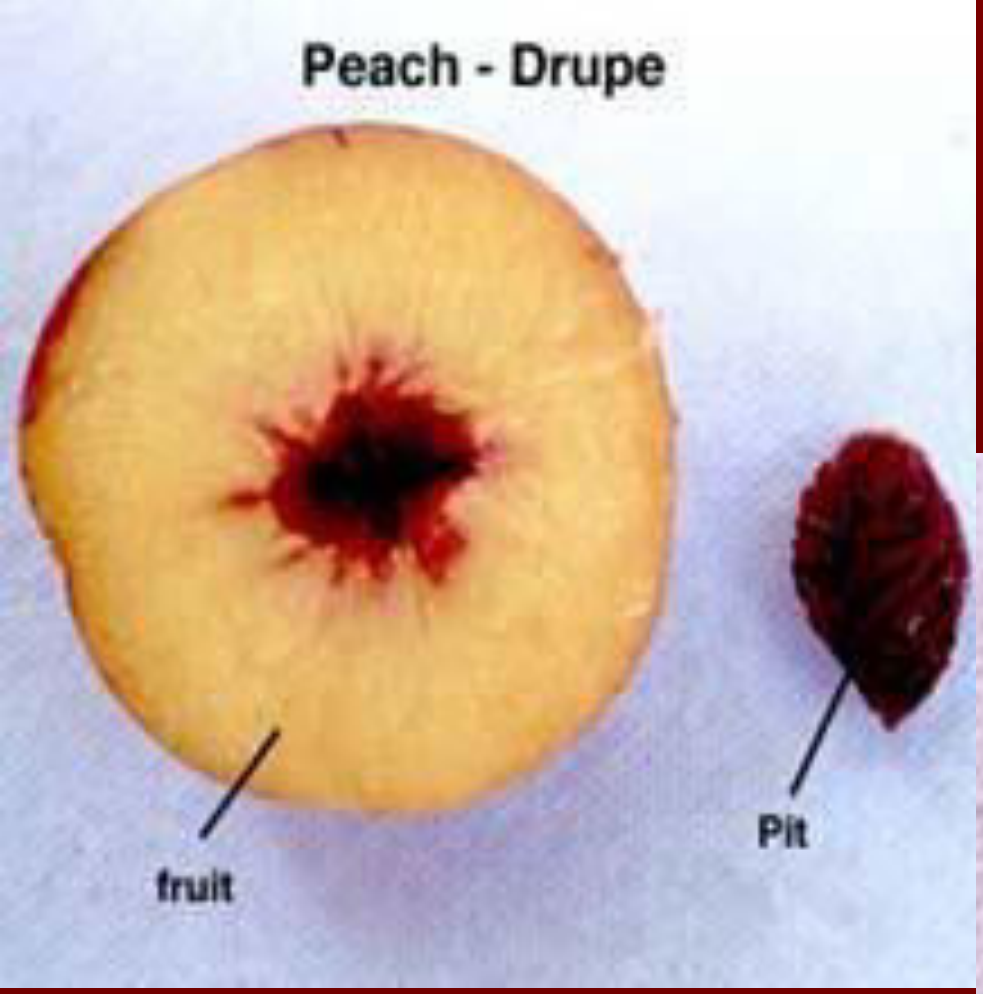
- A fruit in which the wall becomes soft and fleshy as it matures.

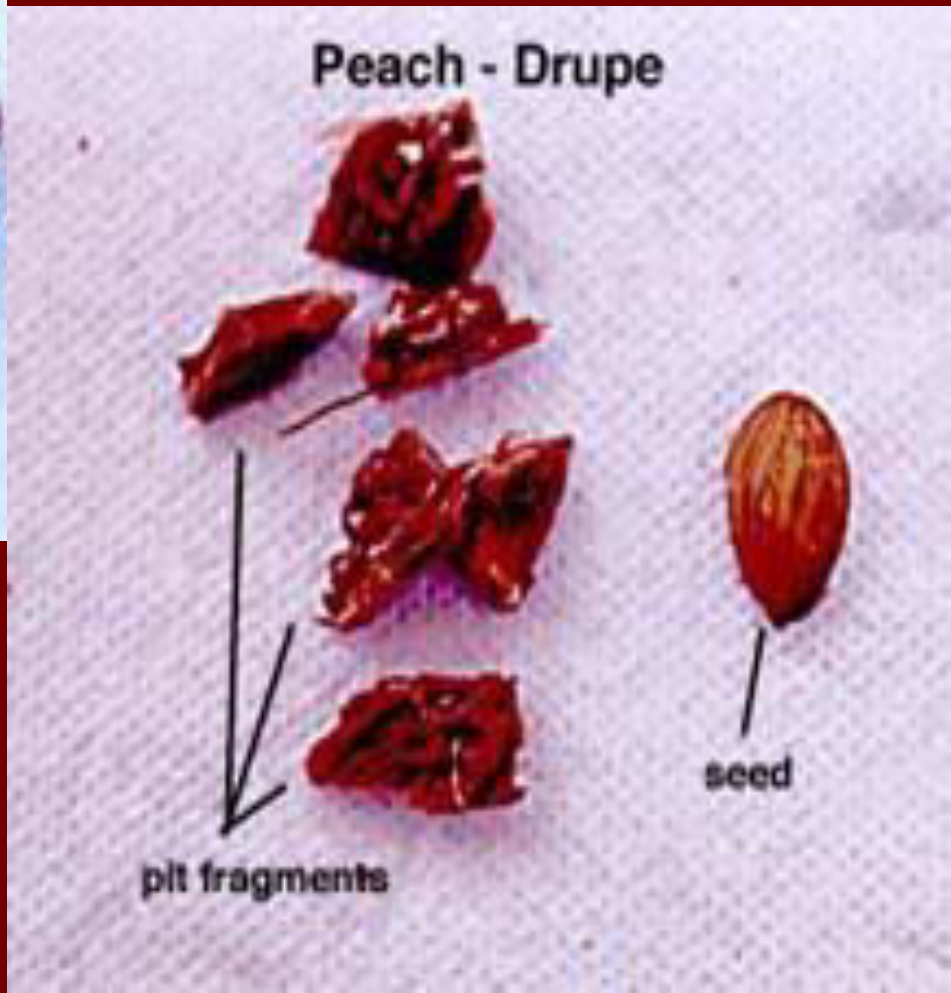
Types of Fleshy Fruits

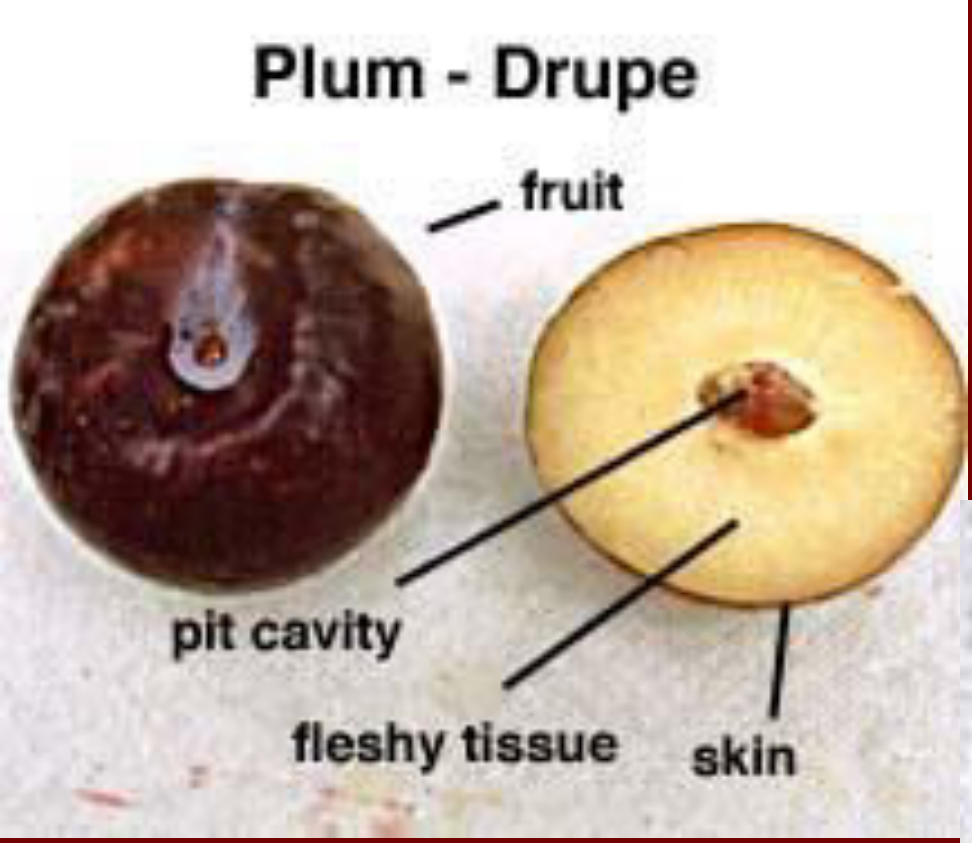
A. Drupe
B. Berry
C. Pome

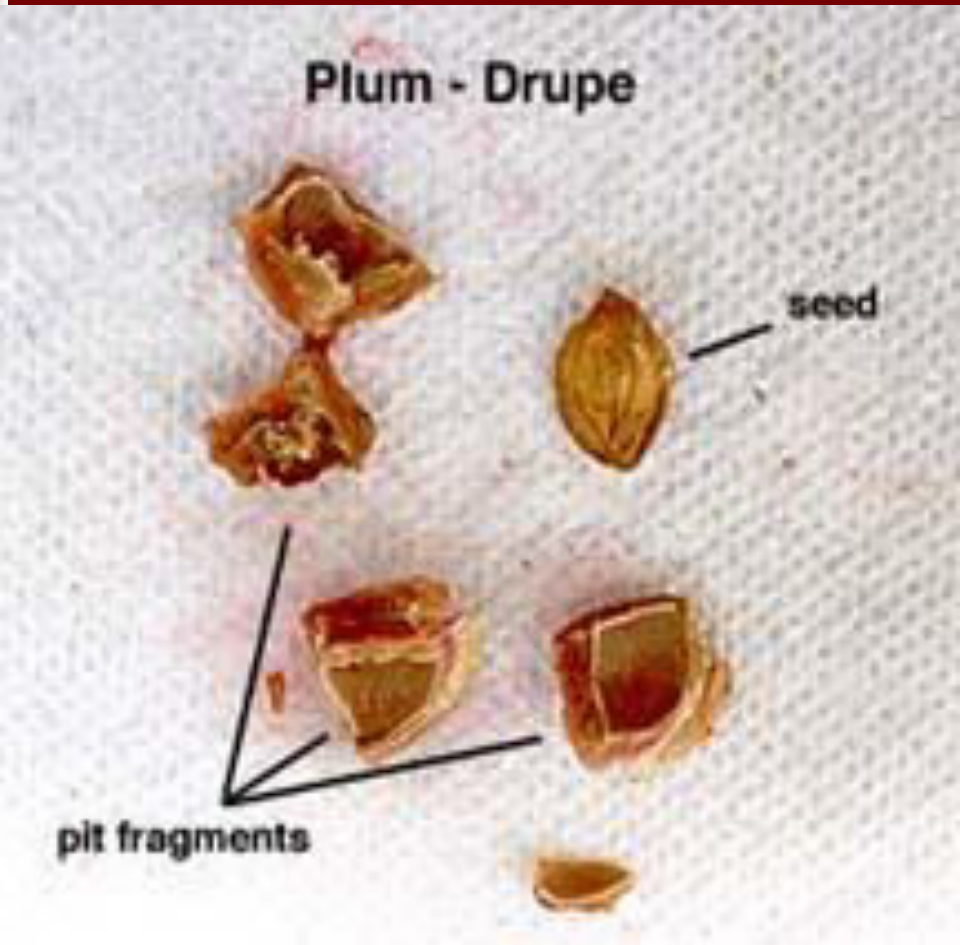
A. Drupe

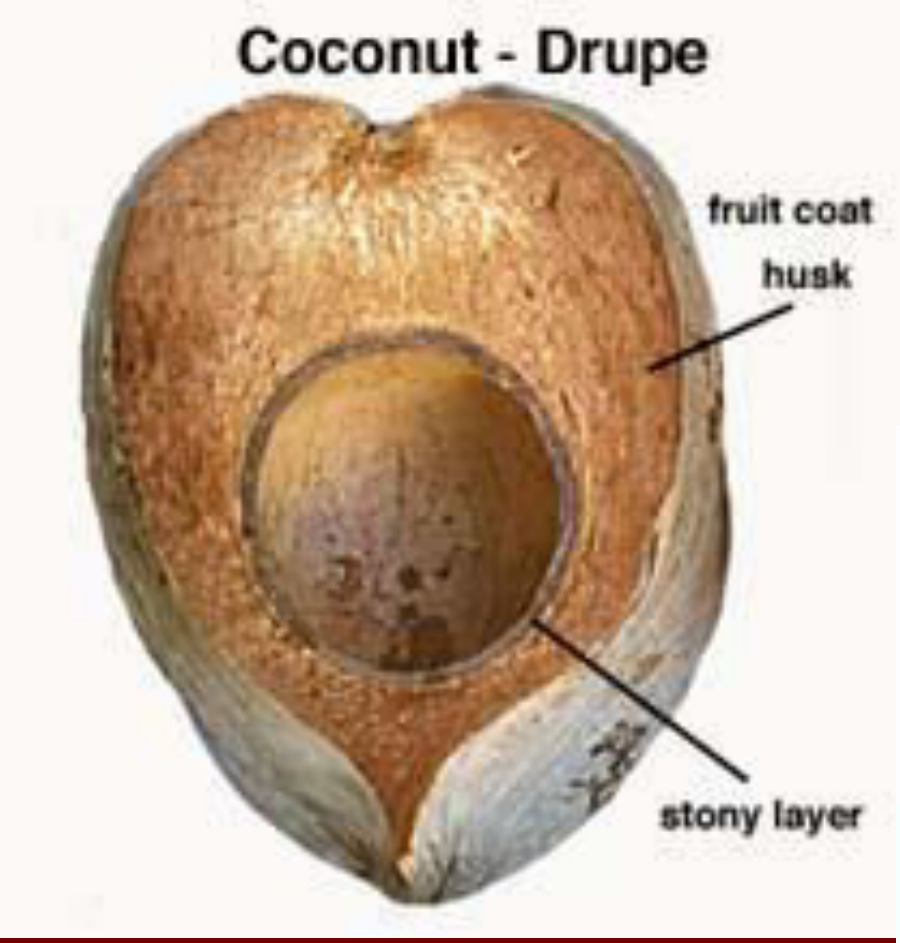
- A one-seeded simple fruit developed from a superior ovary
- the innermost portion of the wall (endocarp) becomes hard and stony,
- the outermost part (exocarp) becomes a relatively thin skin,
- the middle portion between the skin and the stone (mesocarp) becomes either fleshy or fibrous. (cherry)


Peach - Drupe
fruit
Pit


Peach - Drupe
pit fragments
seed


Plum - Drupe
fruit
pit cavity
fleshy tissue
skin


Plum - Drupe
seed
pit fragments


Coconut - Drupe
fruit coat
husk
stony layer

Coconut - Drupe
stony layer
liquid endosperm
solid endosperm

- If a fruit is fleshy and it has a hard stony pit containing a seed it is classified as a **drupe**.
- Drupes are covered by a thin skin derived from the outer tissue layer of the ovary.
- The soft fleshy tissue below the skin is derived from the middle layer of the ovary and the hard stony pit is derived from the inner tissue layer of the ovary.
- Cracking the pit open reveals a single seed formed from an ovule contained within the ovary of the flower.
- Coconuts have fibrous walls instead of the fleshy walls found in most drupes.

B. **The Berry**

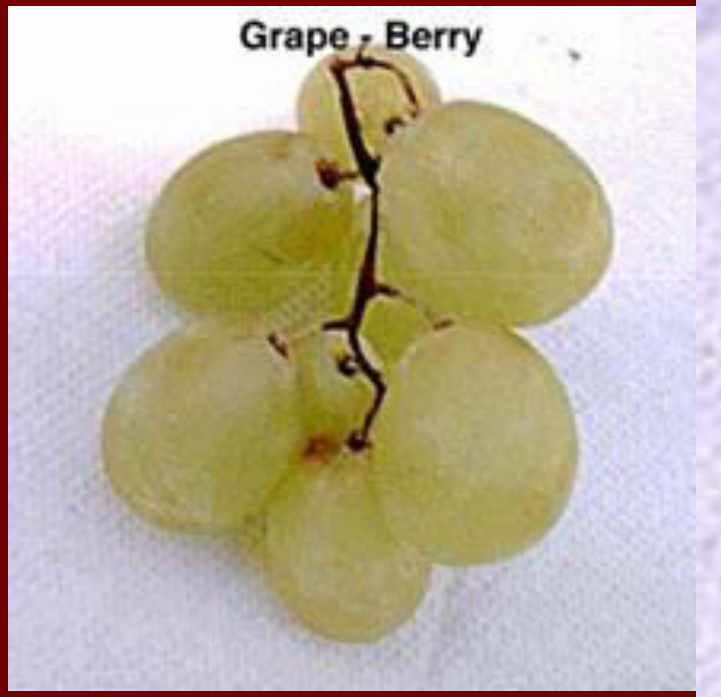
- A simple fruit in which the ovary wall or at least its inner portions become enlarged and usually juicy. (grape, banana, gooseberry).Two special types of berry-like fruits may be singled out for special consideration.

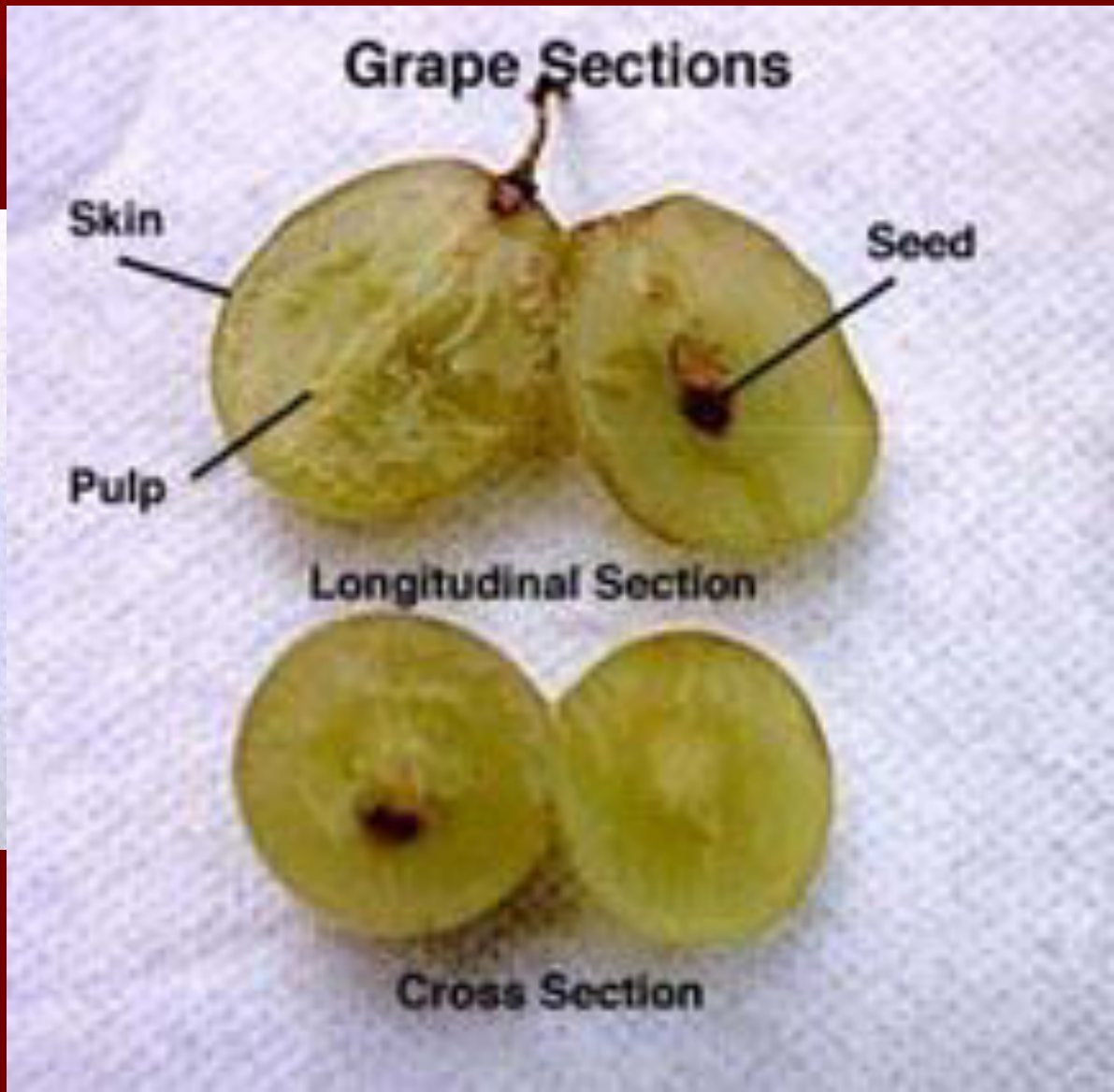
  Two special types of berries:

  b.1. hesperidium

  b.2. pepo

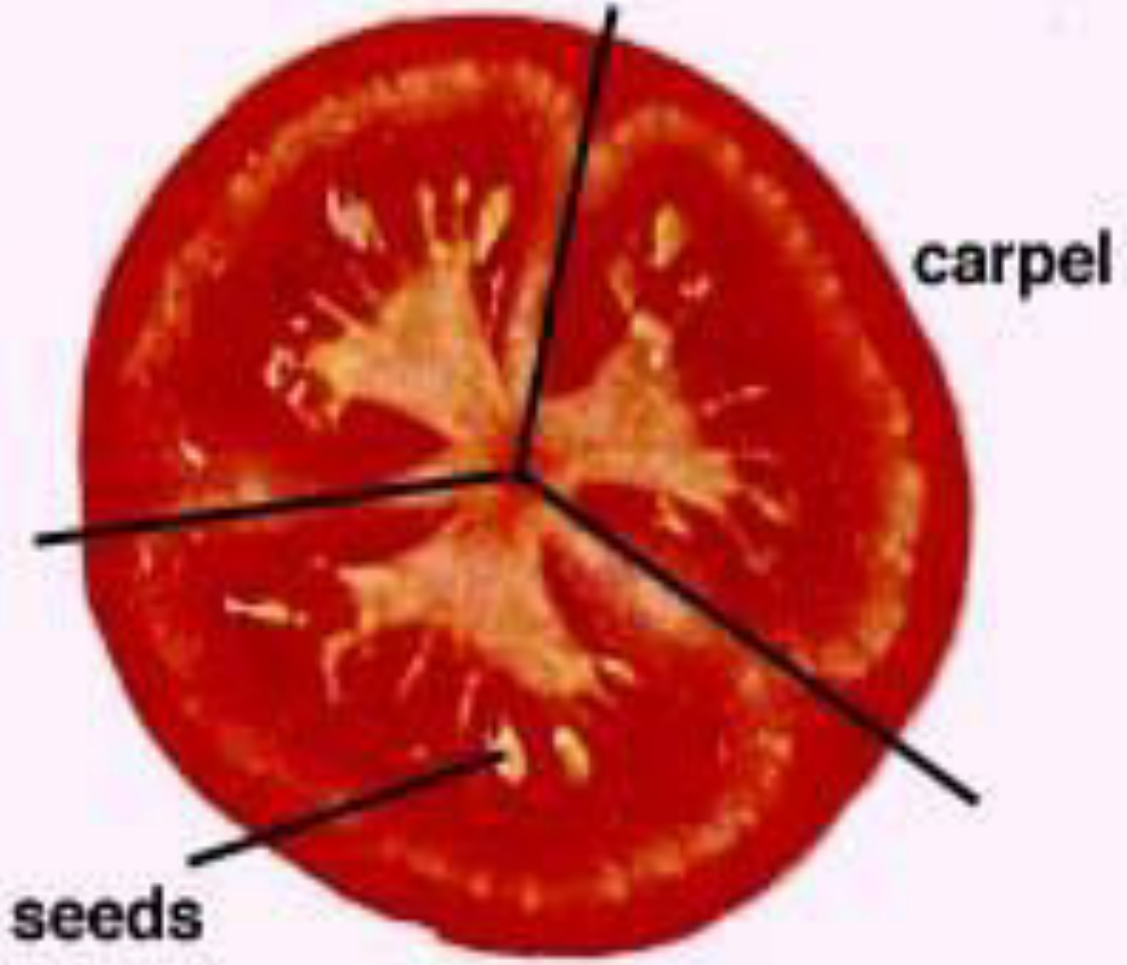
Common berries





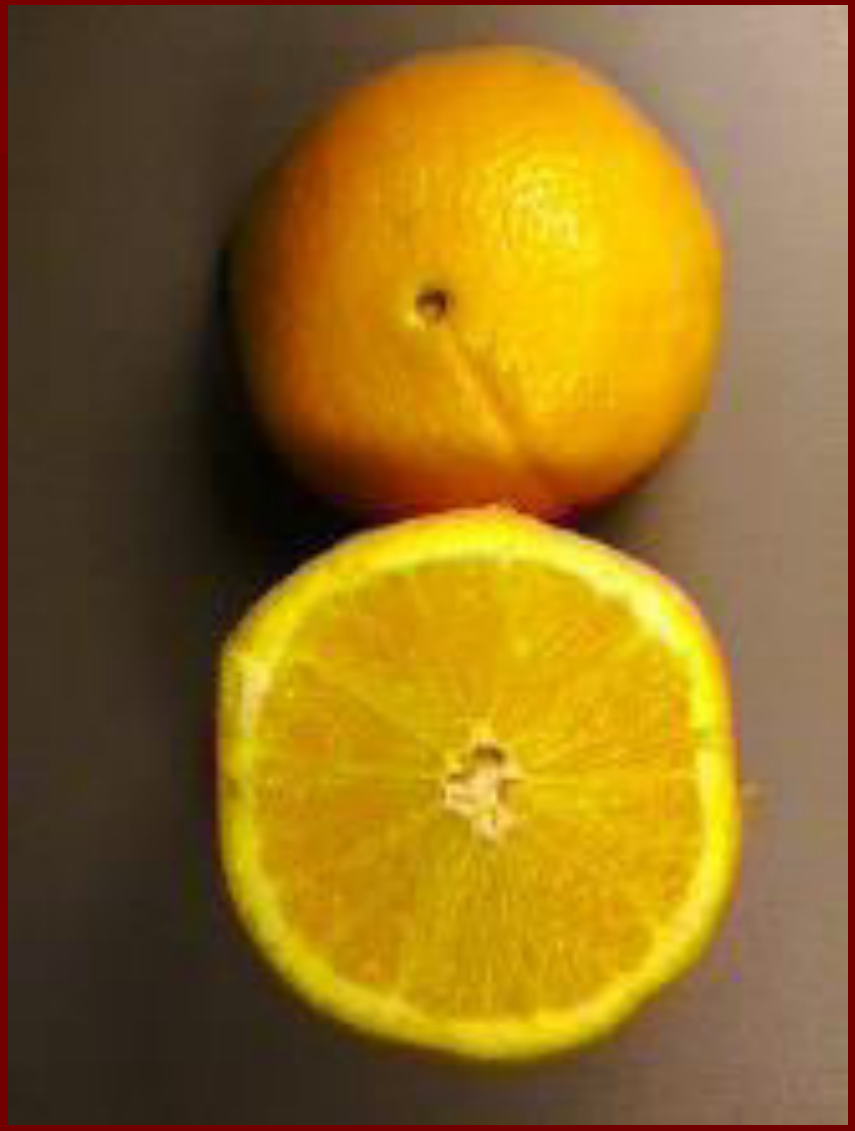
Tomato - Berry

Cross Section

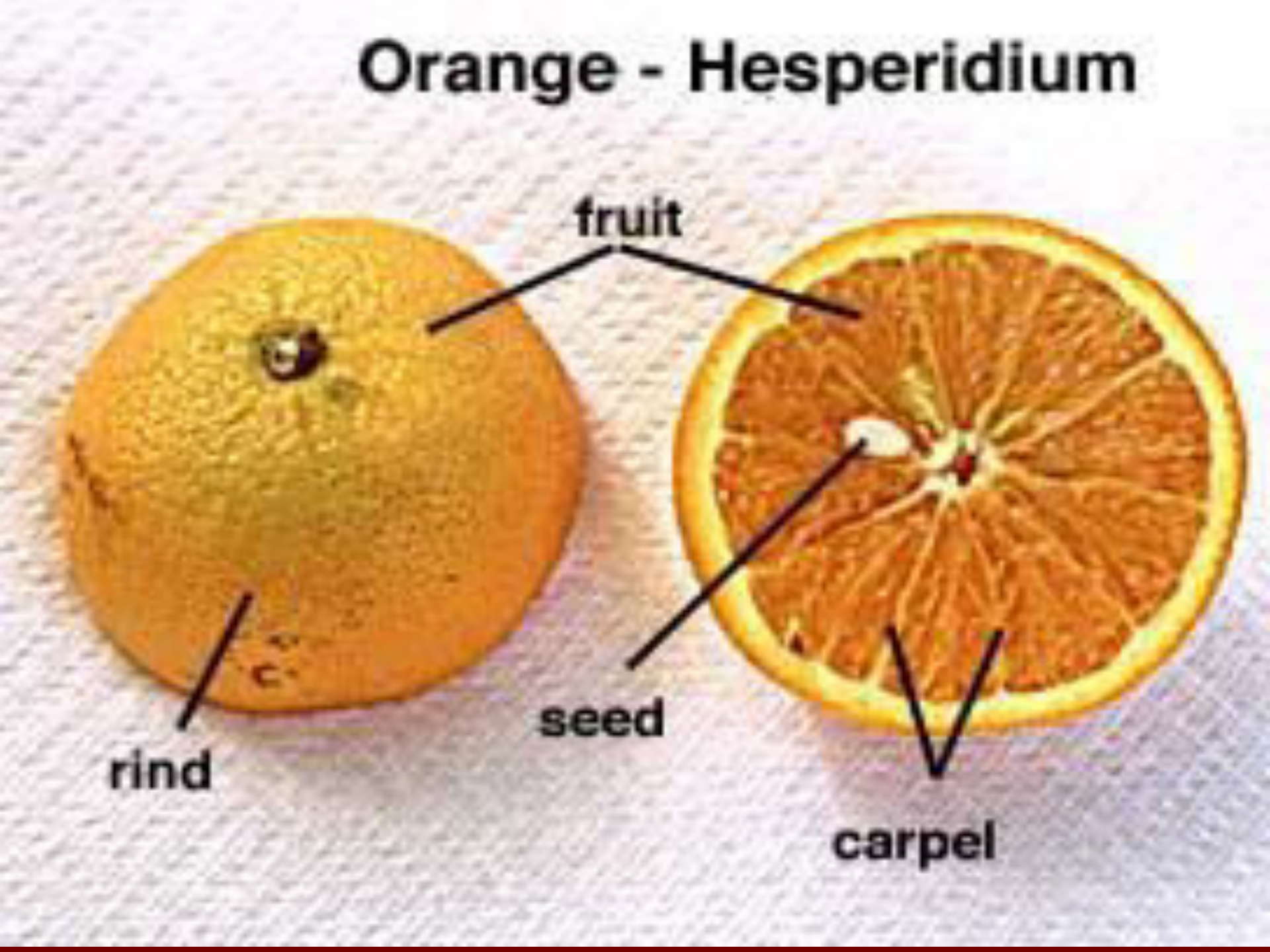


Hesperidium

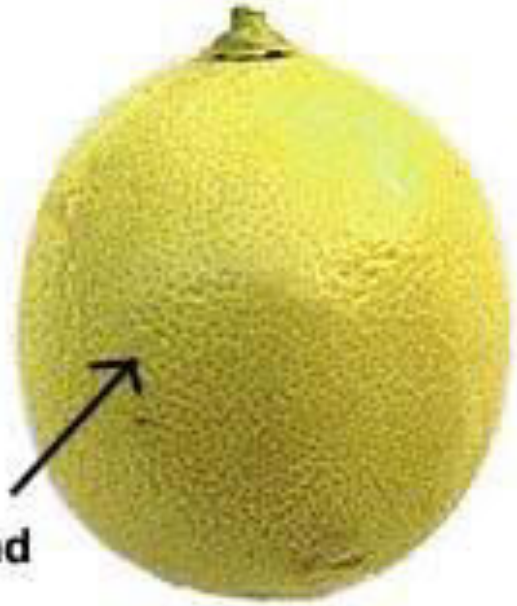
- This is a special type of berry in which a leathery rind forms
- the interior of the fruit divided by septa, indicating the number of carpels.



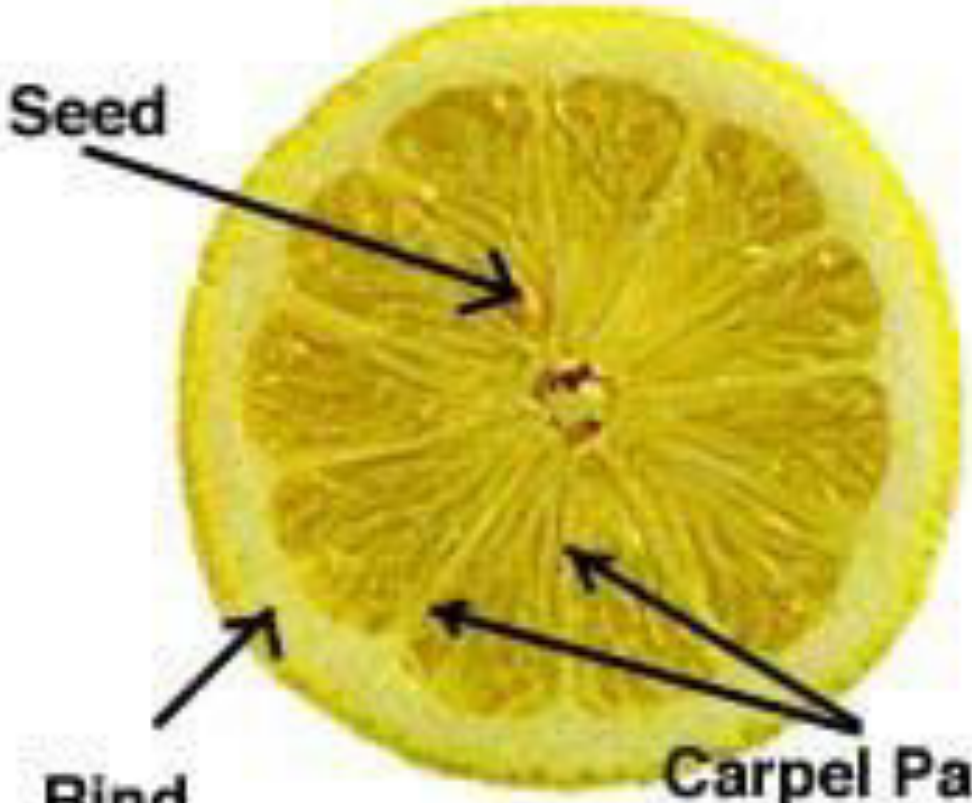
Orange - Hesperidium



Lemon - Hesperidium

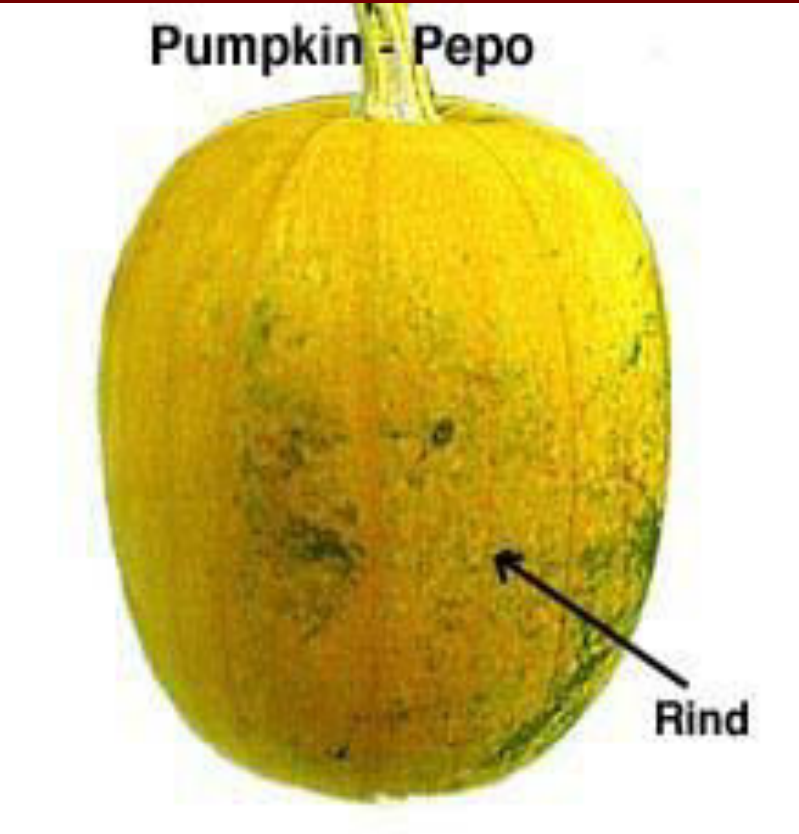


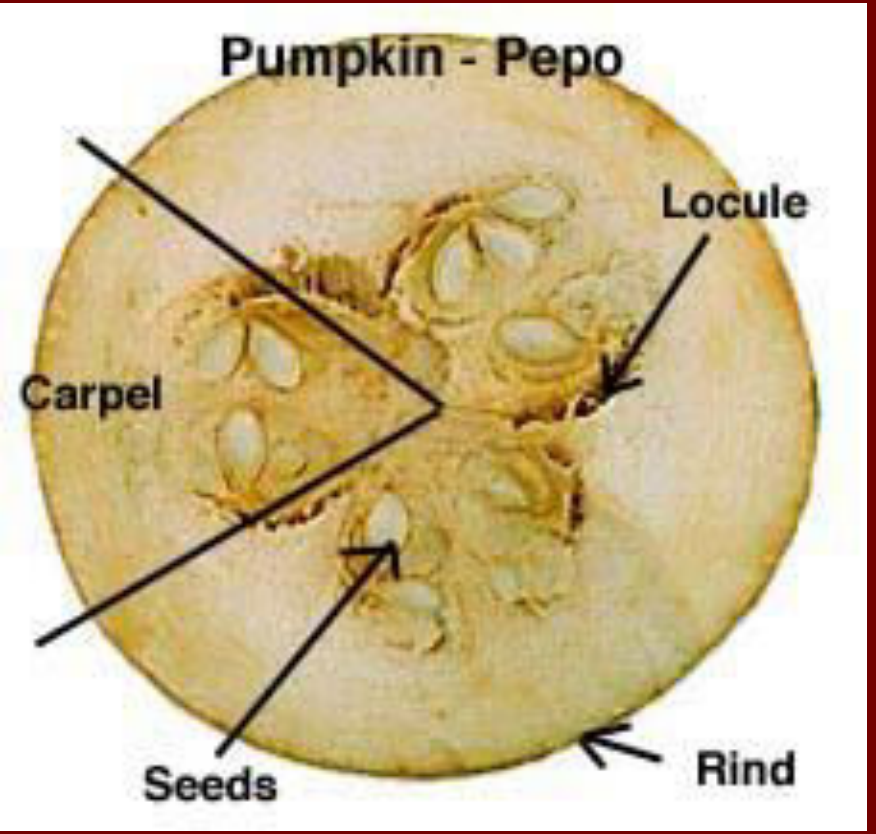
Lemon - Hesperidium

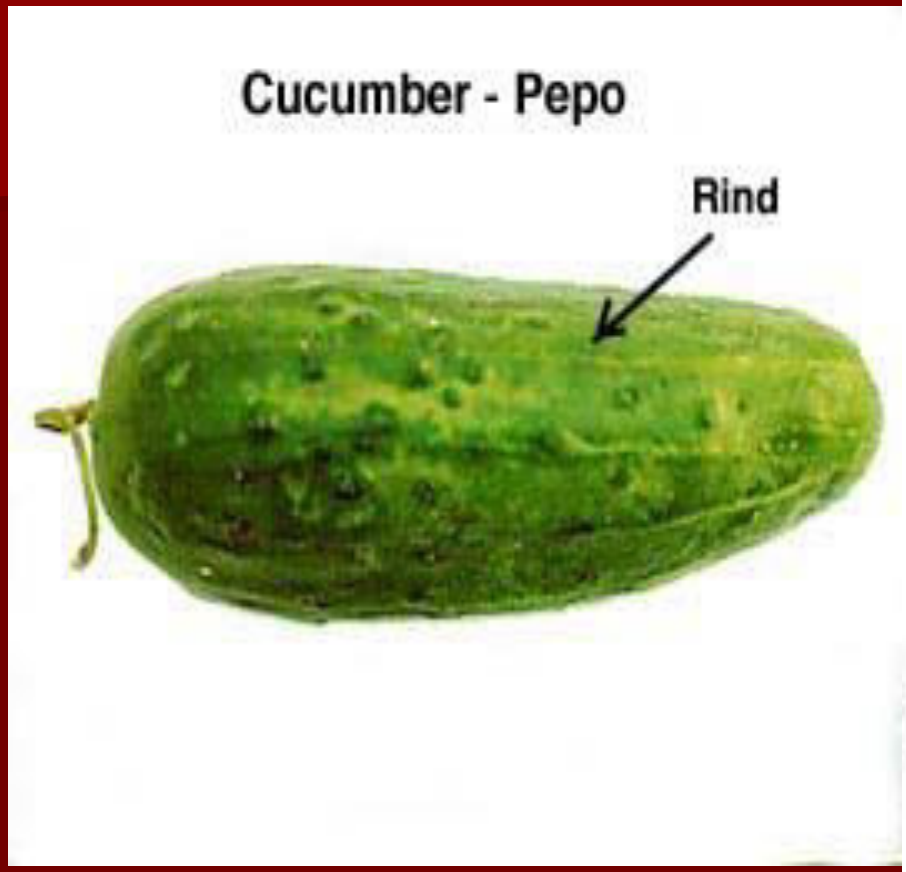


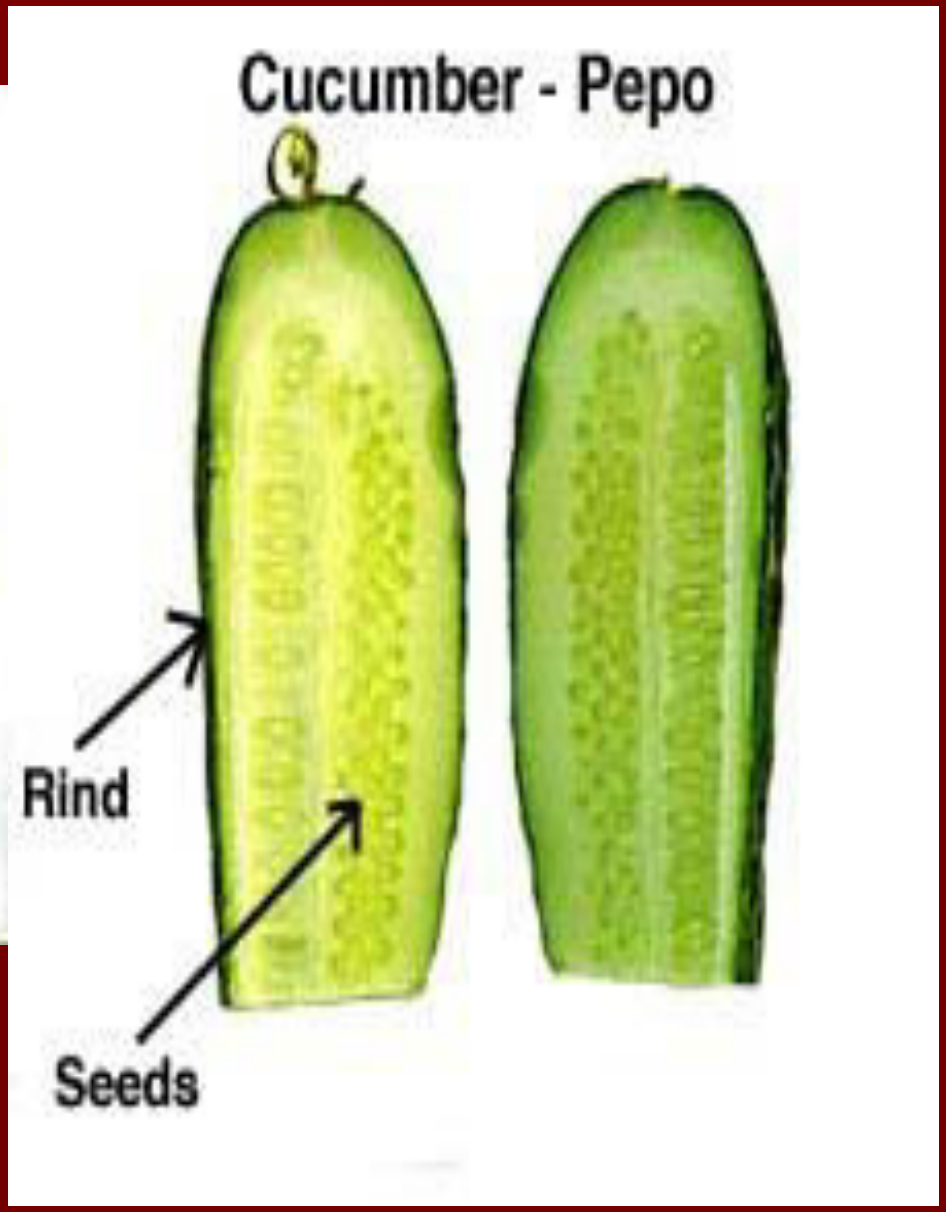
Pepo

- Berry with a relatively hard rind (watermelon, gourds, squash).



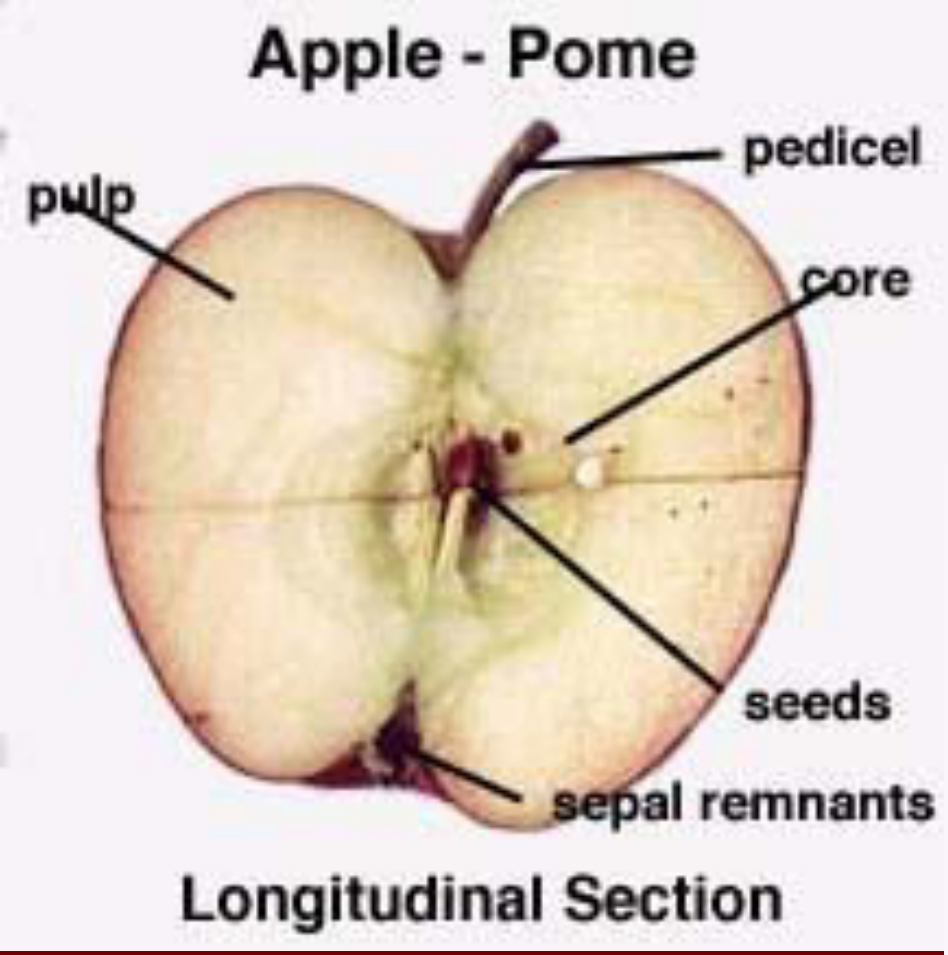


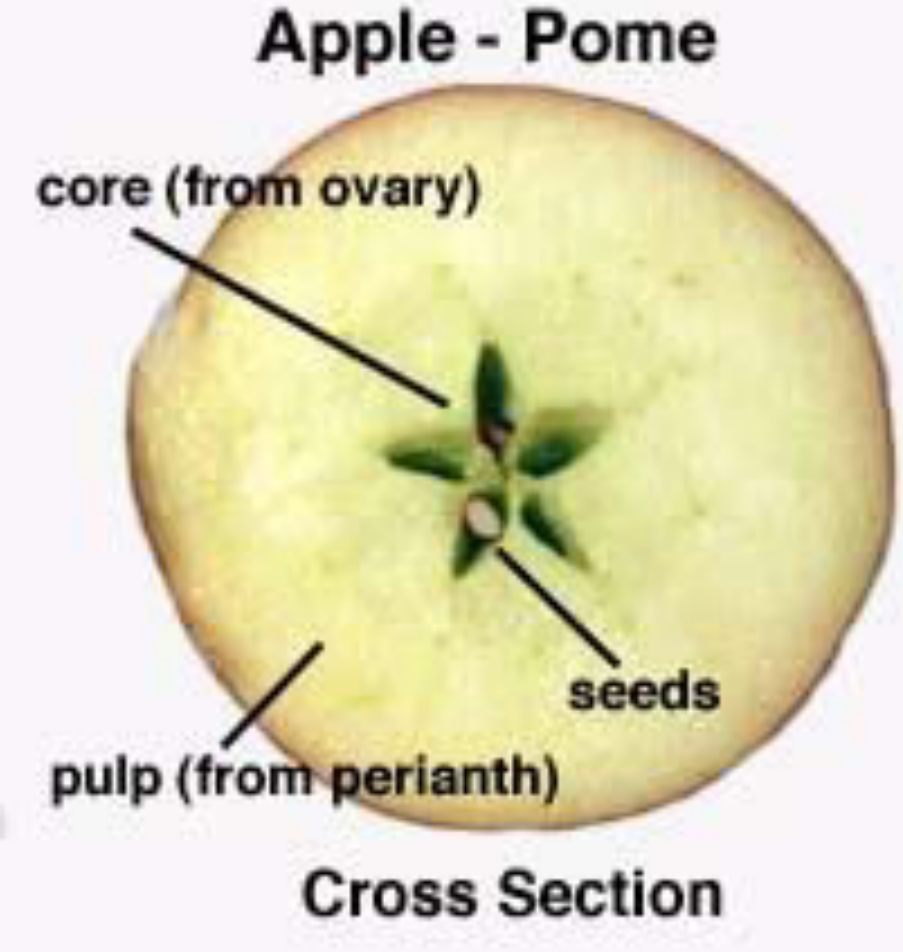

Cucumber - Pepo
Rind


Cucumber - Pepo
Rind
Seeds

C. Pome

- a **pome** (after the French name for an apple: *pomme*)
- An accessory fleshy fruit formed by a group of carpels more or less firmly united with each other and surrounded by and united to the floral tube or receptacle. (apple, pear, mountain ash).
- consists of tissue derived from the ovary and from the perianth.
- For this reason it is often called an accessory fruit
- A pome is an accessory fruit composed of five or more carpels in which the exocarp forms an inconspicuous layer.


Apple - Pome
pedicel
pulp
core
seeds
sepal remnants
Longitudinal Section


Apple - Pome
core (from ovary)
seeds
pulp (from perianth)
Cross Section

2. Dry Fruits

- Fruits in which the coat becomes dry at maturity.

Two Major types of Dry Fruits:

A. **Dehiscent Fruits** - Dry fruits which at maturity open by definite natural beans to shed the contained seeds.

B. **Indehiscent fruits** - Dry fruits which do not open when mature to shed their seeds. Many of this group are one seeded fruits.

A. Dehiscent

Types of Dehiscent Fruits

i. Legume- A dry dehiscent fruit developed from 1 carpel and at maturity splitting along both the dorsal and ventral sutures. (beans,peas).

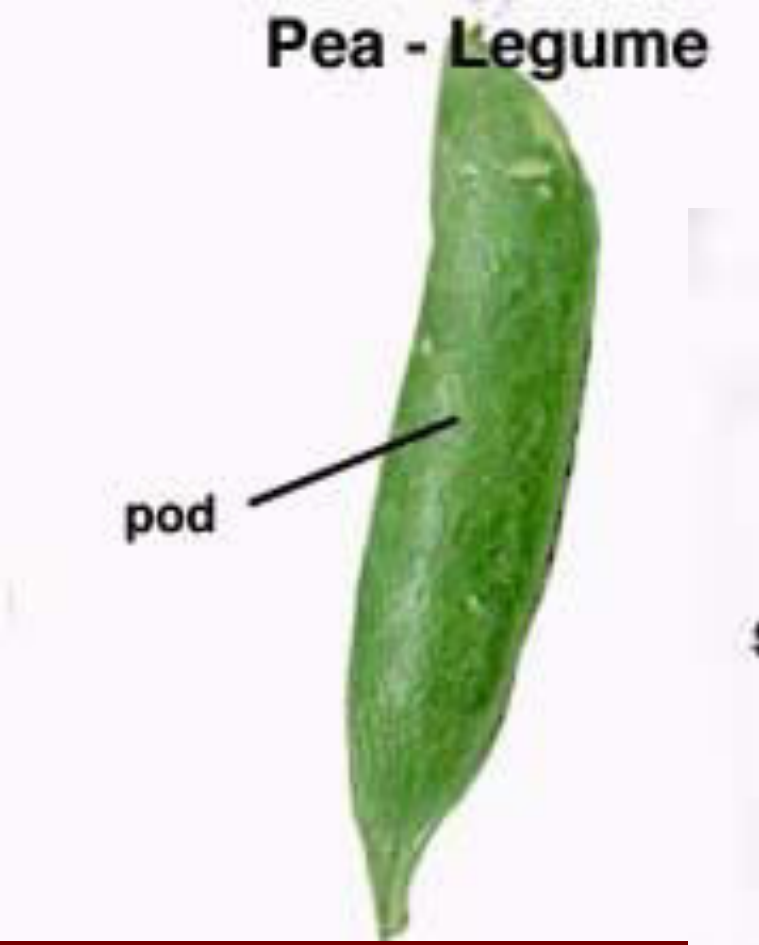
ii. Follicle- A dry dehiscent fruit developed from 1 carpel and at maturity splitting along only one suture. (larkspur, columbine)

iii. Capsule- A dry dehiscent fruit developed from several carpels.

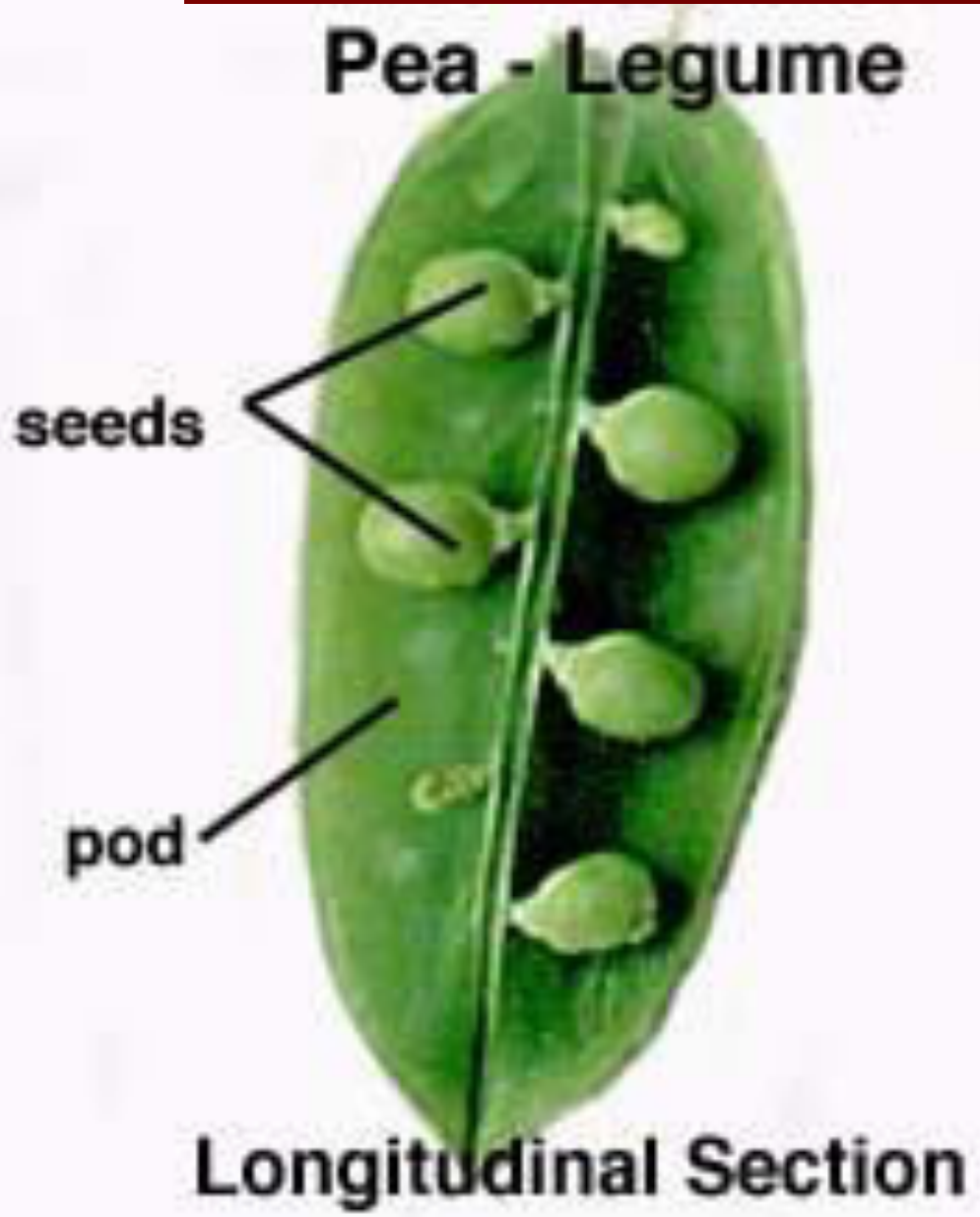
i. Legume

- The legume splits along two lines of dehiscence following maturation and drying.
- The legume type fruit is derived from a simple ovary (one carpel) with two rows of ovules.
- This type of fruit structure is characteristic of peas, beans and peanuts.
- The peanut is one of the few legumes that does not split open when ripe. This is probably because the fruit of the peanut develops in the soil rather than in the air.

Pea - Legume

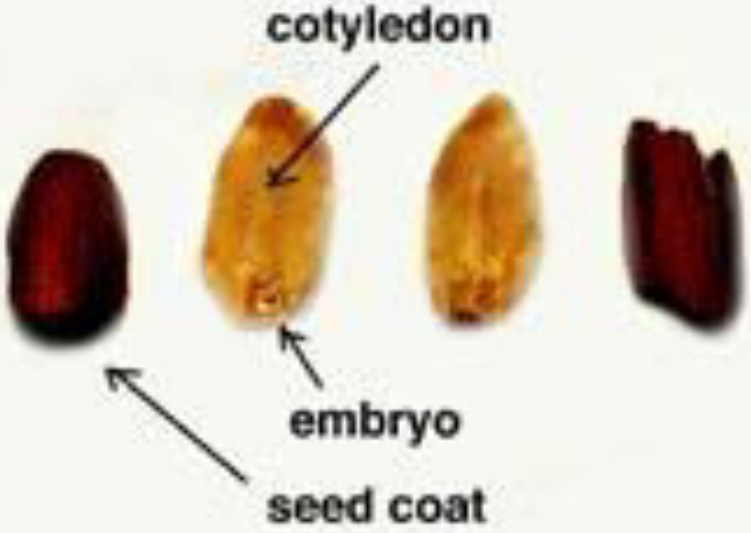


Pea - Legume



Longitudinal Section

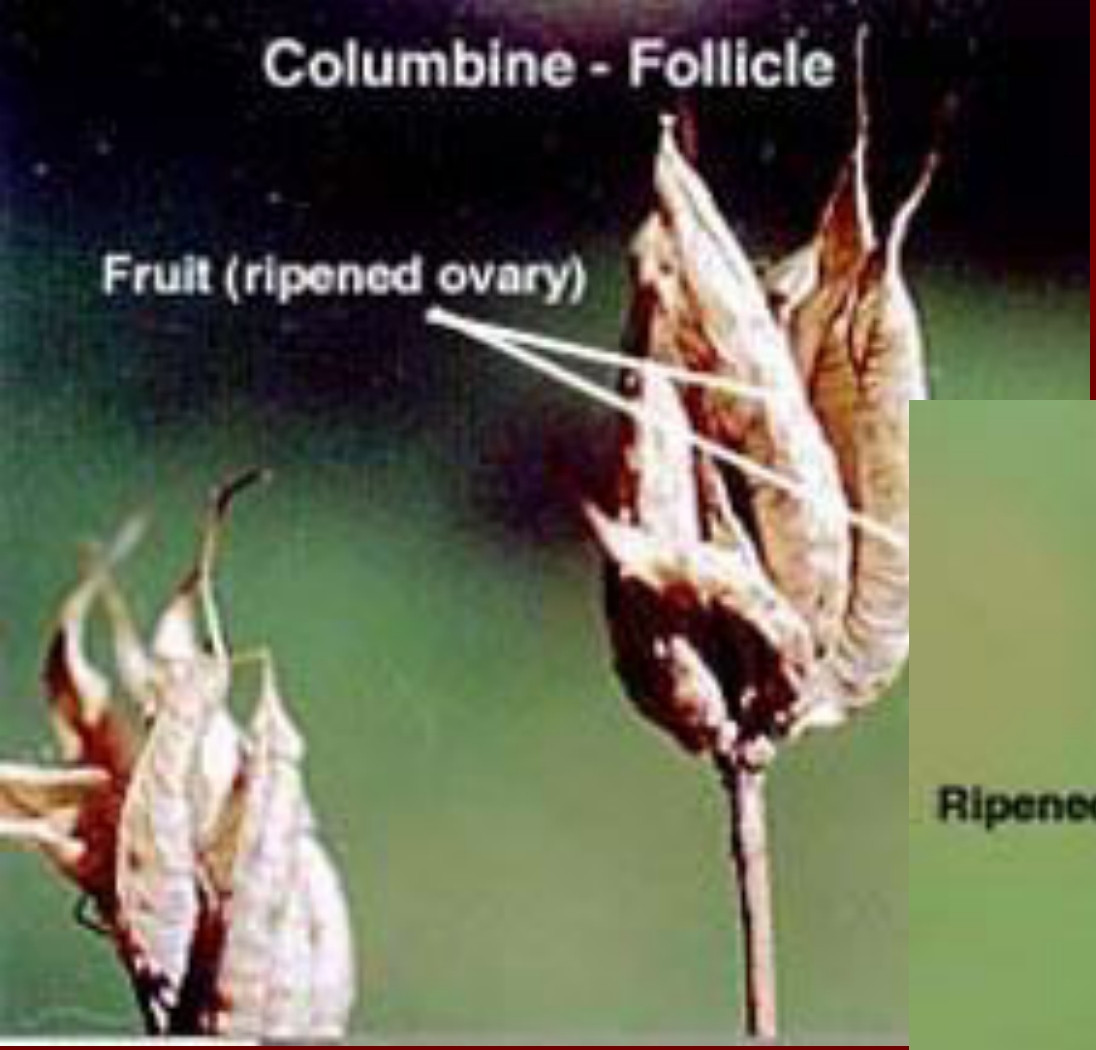
Peanut - Legume



Peanut - Legume

ii. Follicle

- A dry dehiscent fruit developed from 1 carpel and at maturity splitting along only one suture. (larkspur, columbine)
- Columbine and milkweed plants produce fruit that is known as a follicle.
- Fruit of the Follicle type develop from a single ripened ovary and split once to release their seeds.
- The split is always lengthwise, along one edge of the carpel. Legumes you remember split along two edges of the carpel.


Columbine - Follicle
Fruit (ripened ovary)

Columbine - Follicle
Ripened Ovary (empty)
Seeds

bay magnolia,

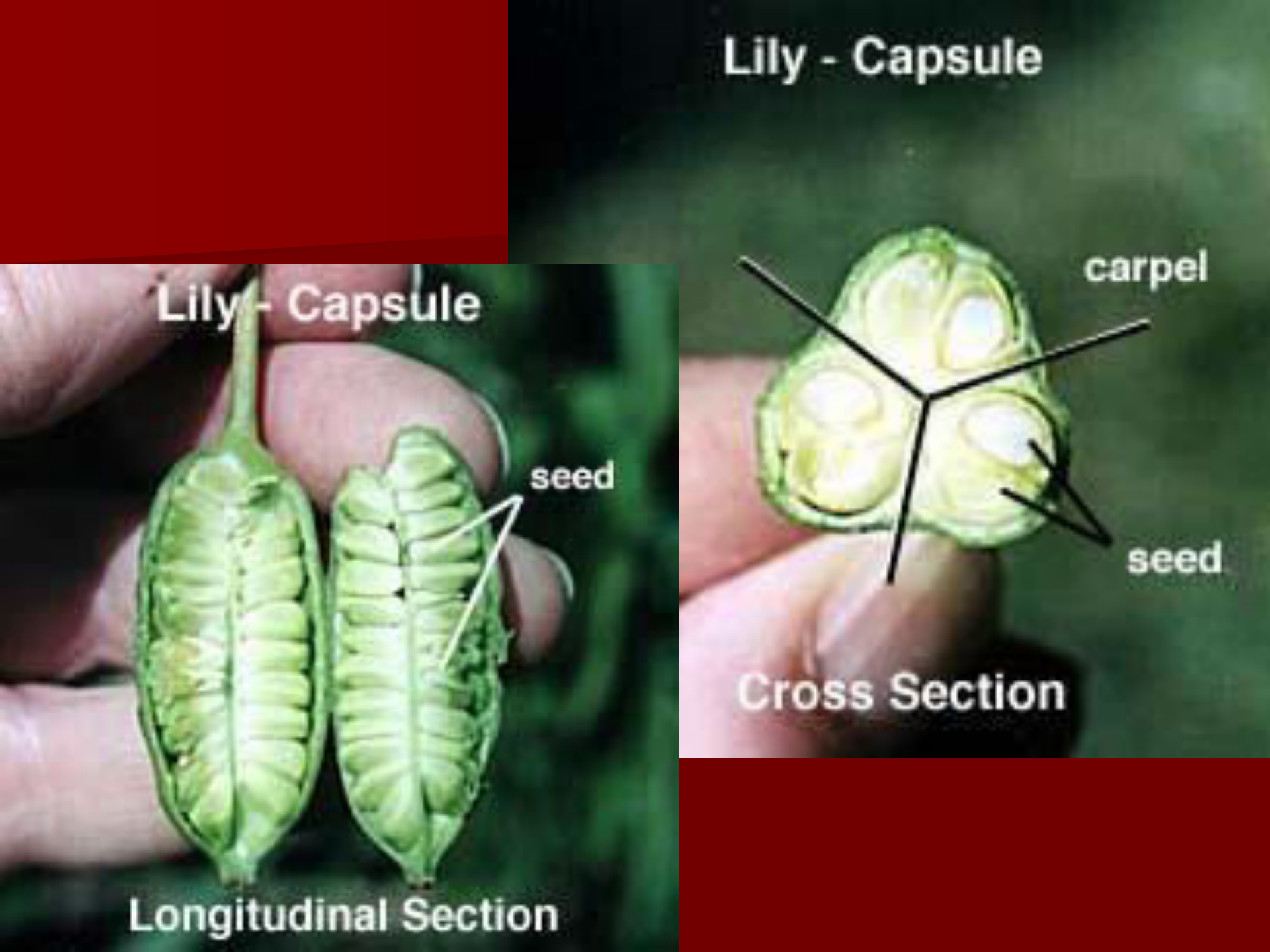
Magnolia virginiana

Milkweed - Follicle

Milkweed - Follicle
Seeds
Longitudinal Section

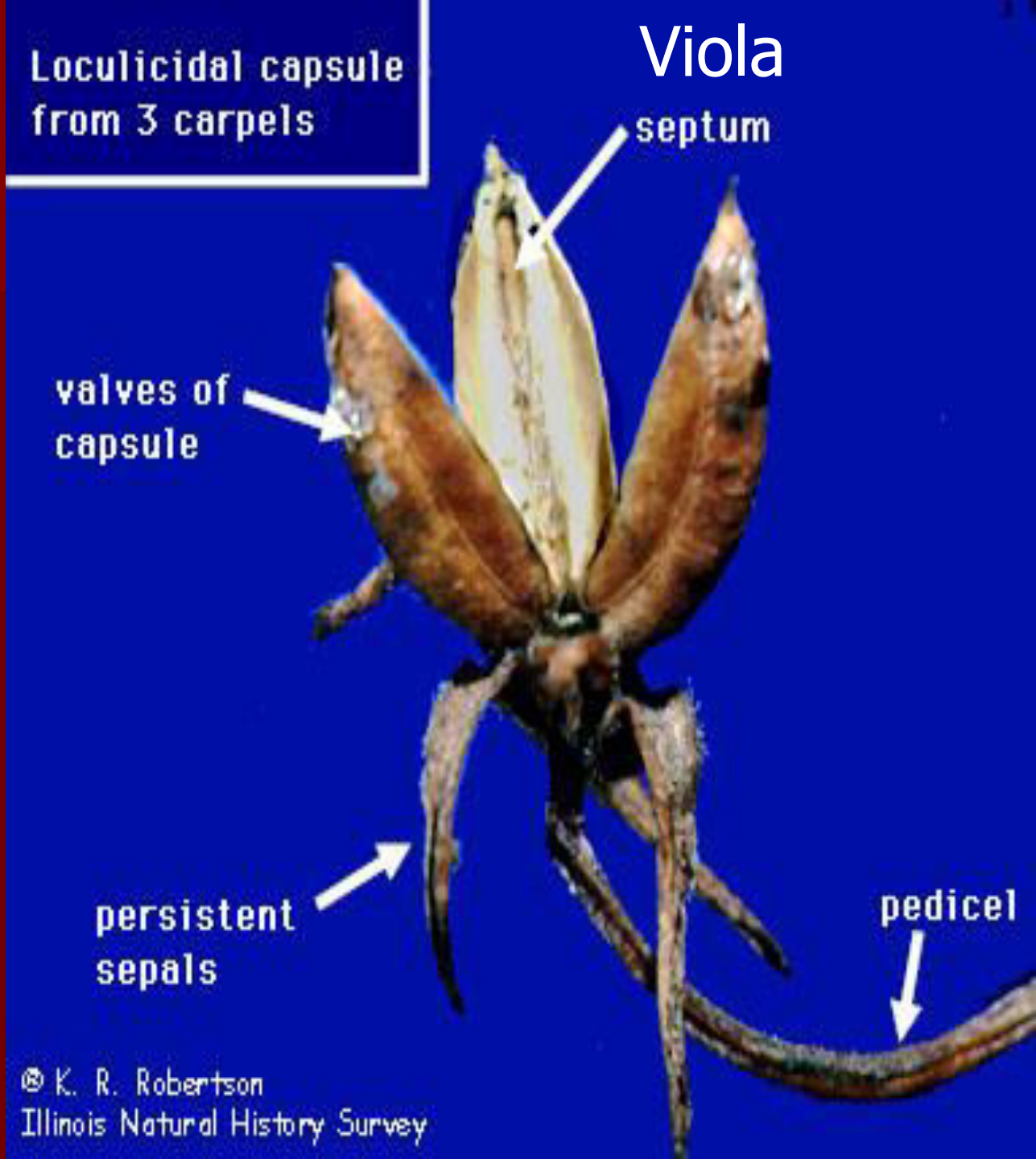
ii. Capsule

- A dry dehiscent fruit developed from several carpels.
- Unlike the legume, the capsule is composed of more than one carpel.
- Fruits like the lily split length-wise into sections corresponding to the number of carpels.

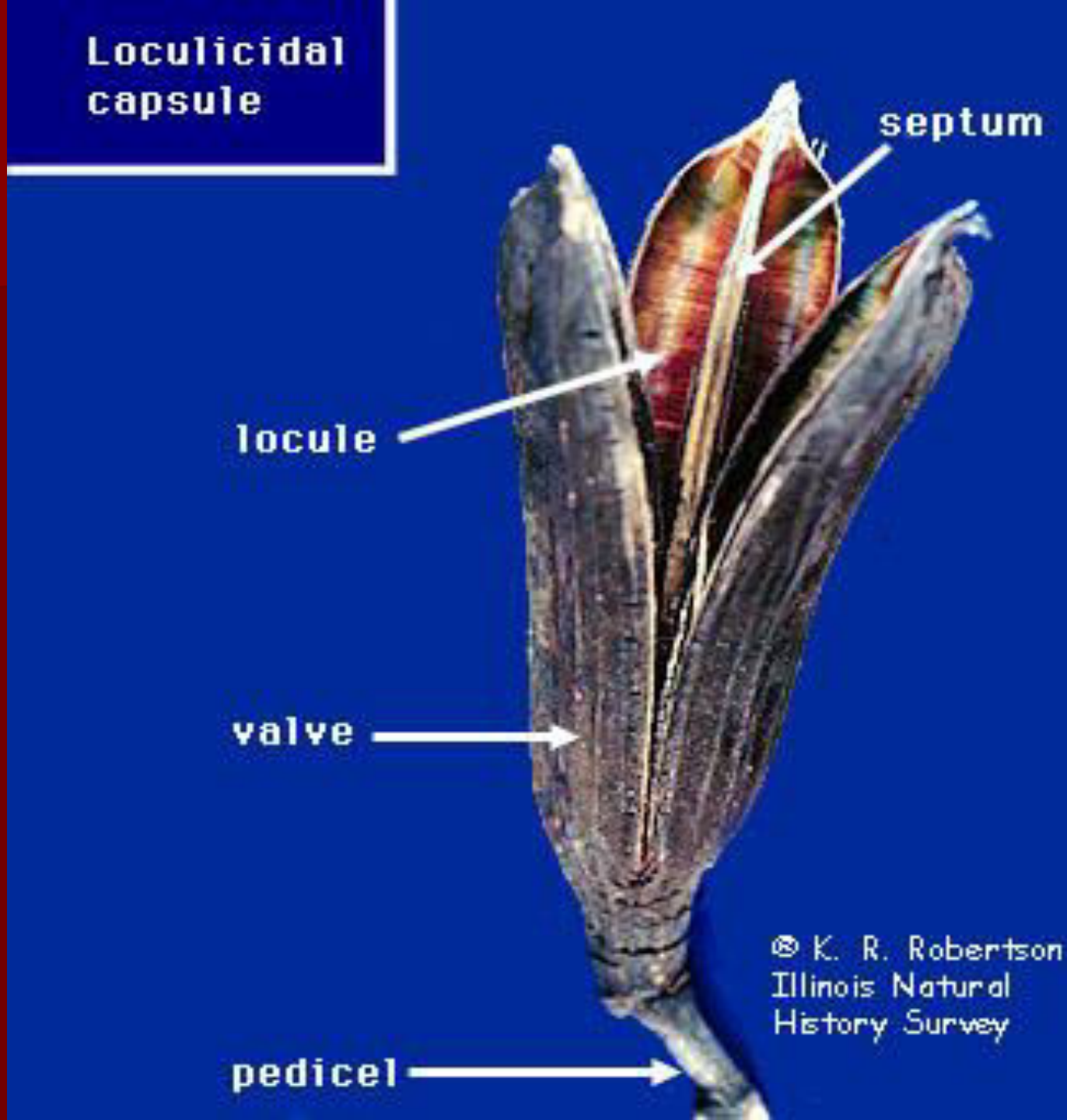

Lily - Capsule
carpel
seed
Cross Section
Lily - Capsule
seed
Longitudinal Section

Types of capsules

A. Loculicidal - one which splits along the outer median line. (lilies).



Yucca fruit.


Loculicidal capsule
septum
locule
valve
pedicel
© K. R. Robertson
Illinois Natural History Survey

Loculicidal capsule
pedicel
© K. R. Robertson
Illinois Natural History Survey

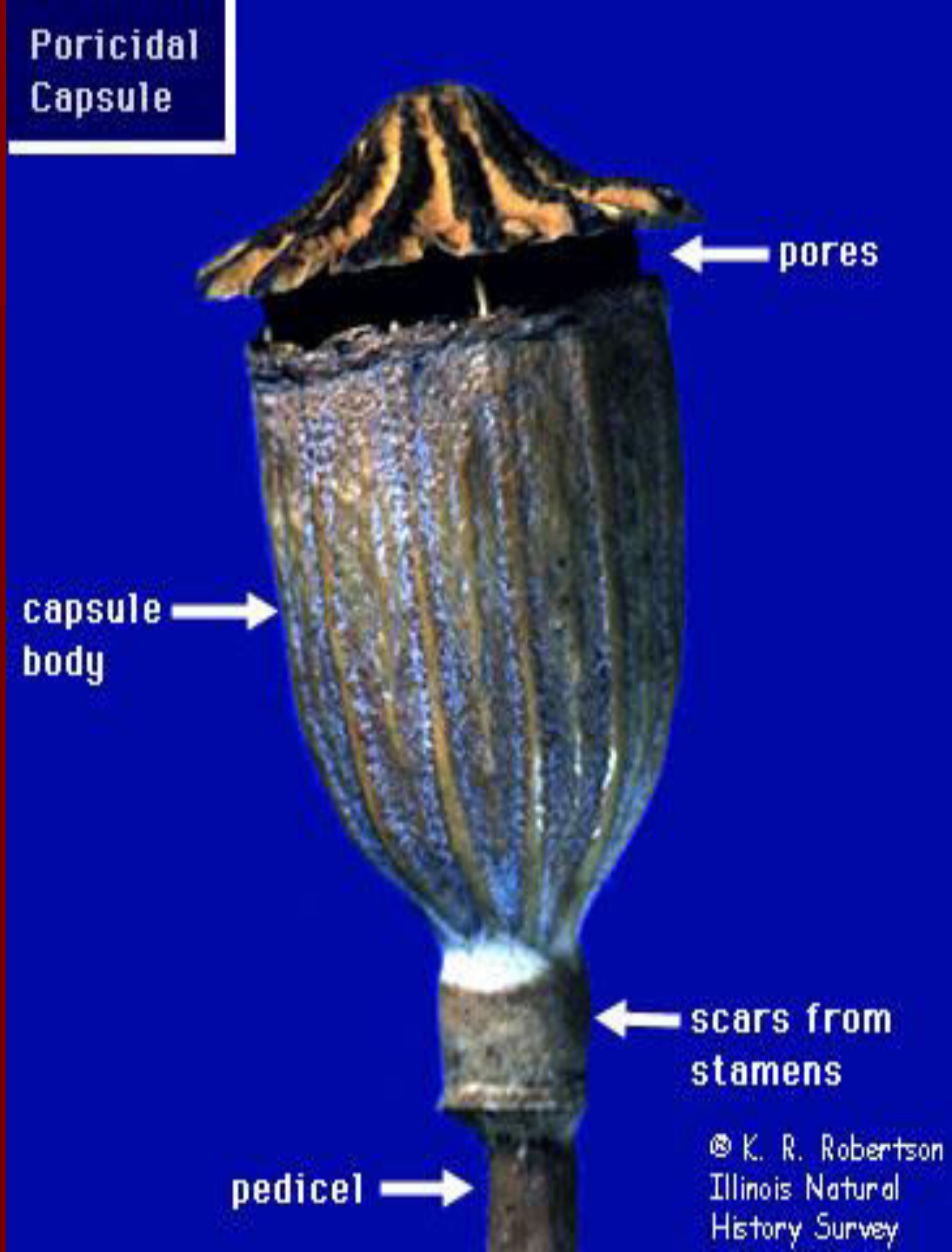
Datura

B. Poricidal capsule

- one which opens with round holes.

(poppies)

Papaver



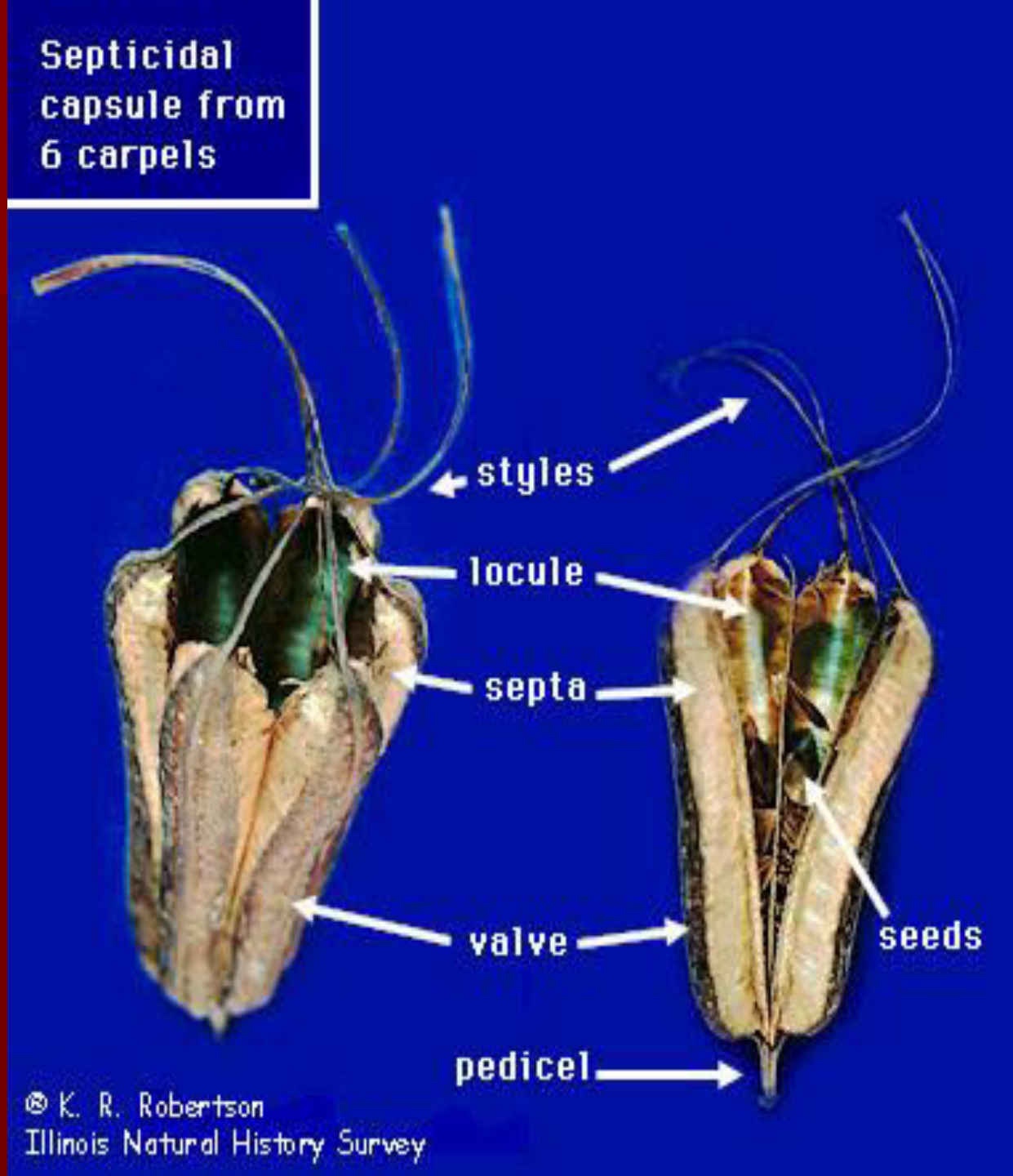
C. Denticidal capsule

- In a denticidal capsule, small teeth at the top of the fruit split open to release the seeds, as in this corn cockle (*Agrostemma githago*).

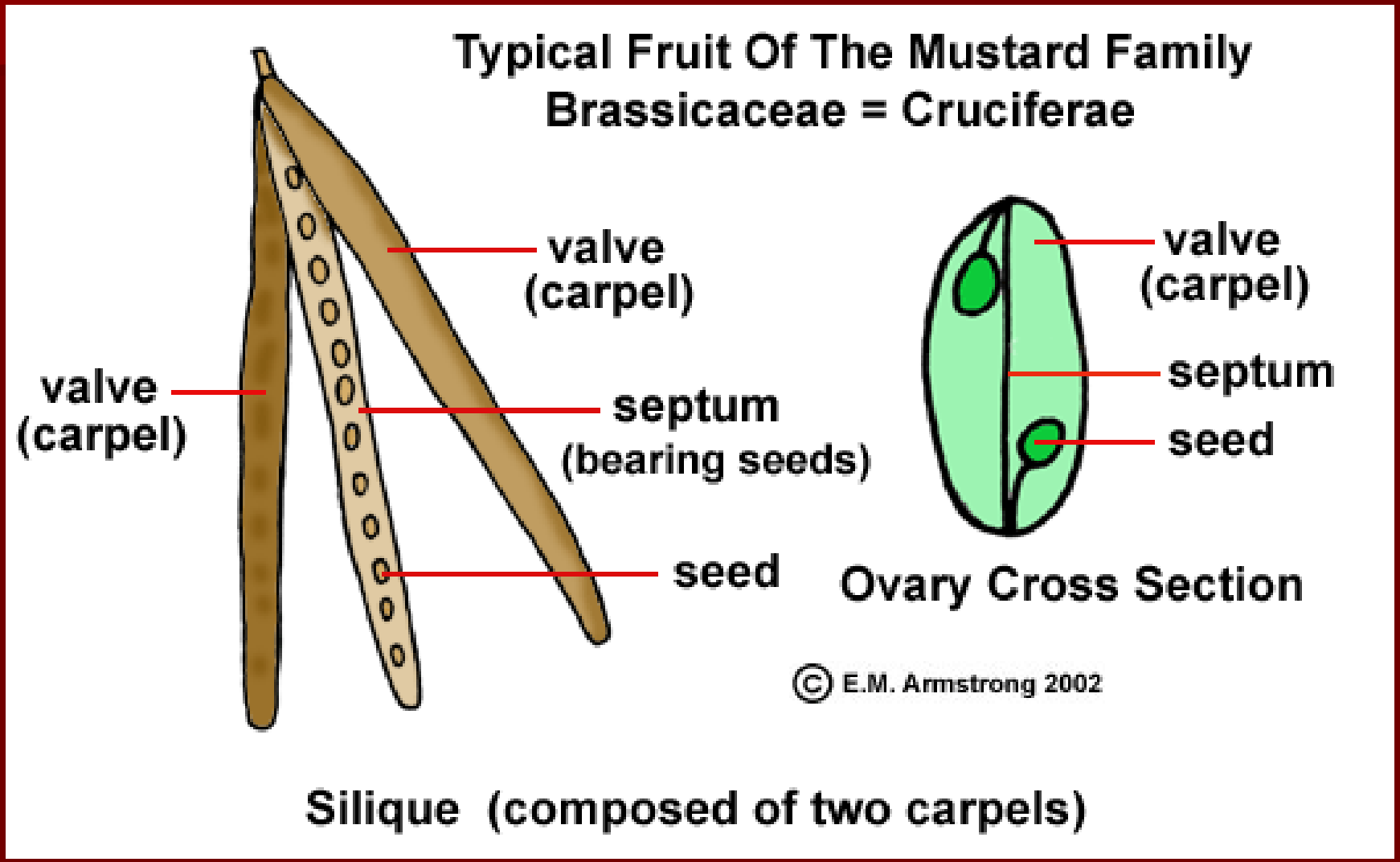
D. Septicidal capsule

- one which splits along the septa and opens at top

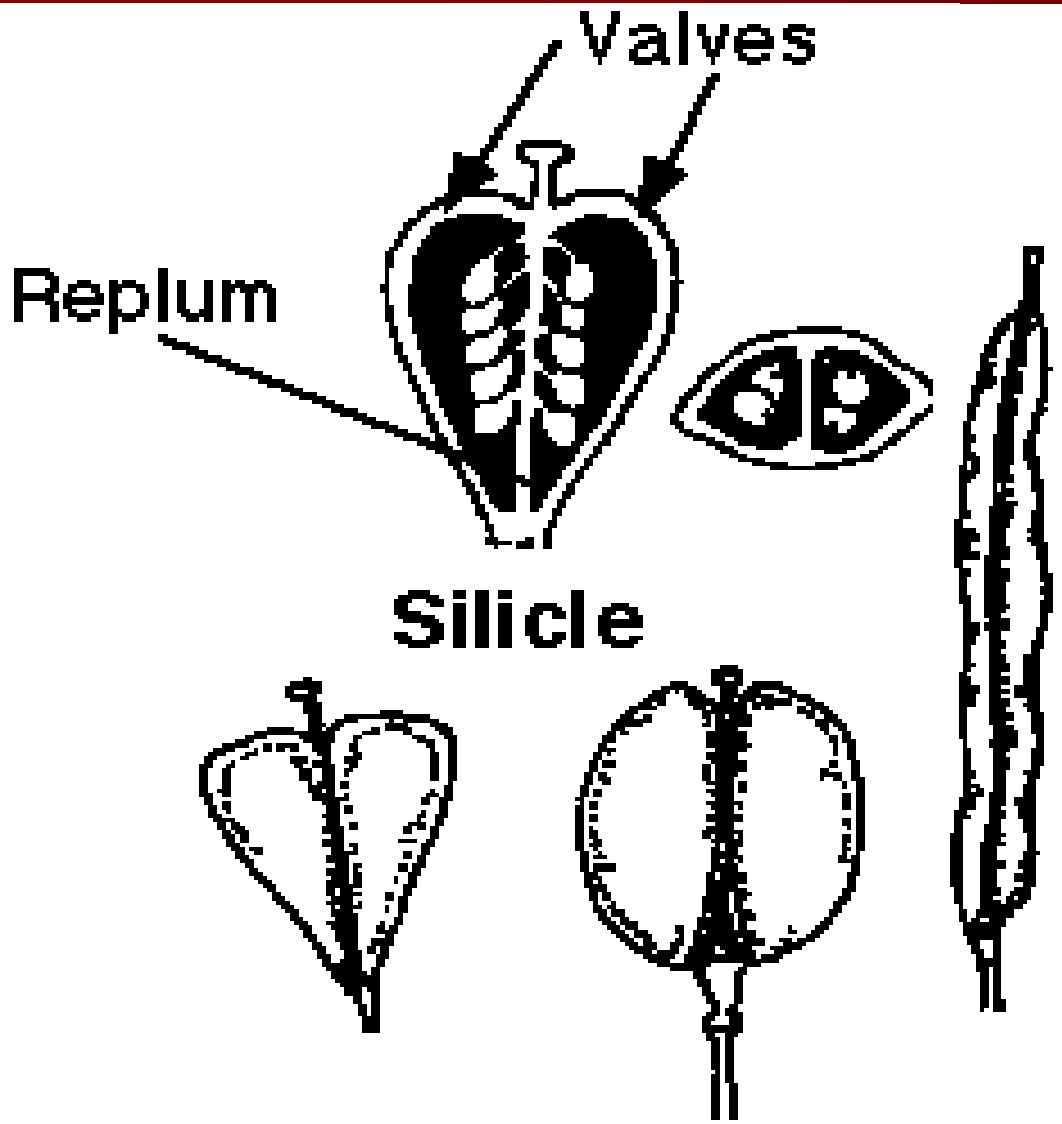
Dutchman's pipe (*Aristolochia*),

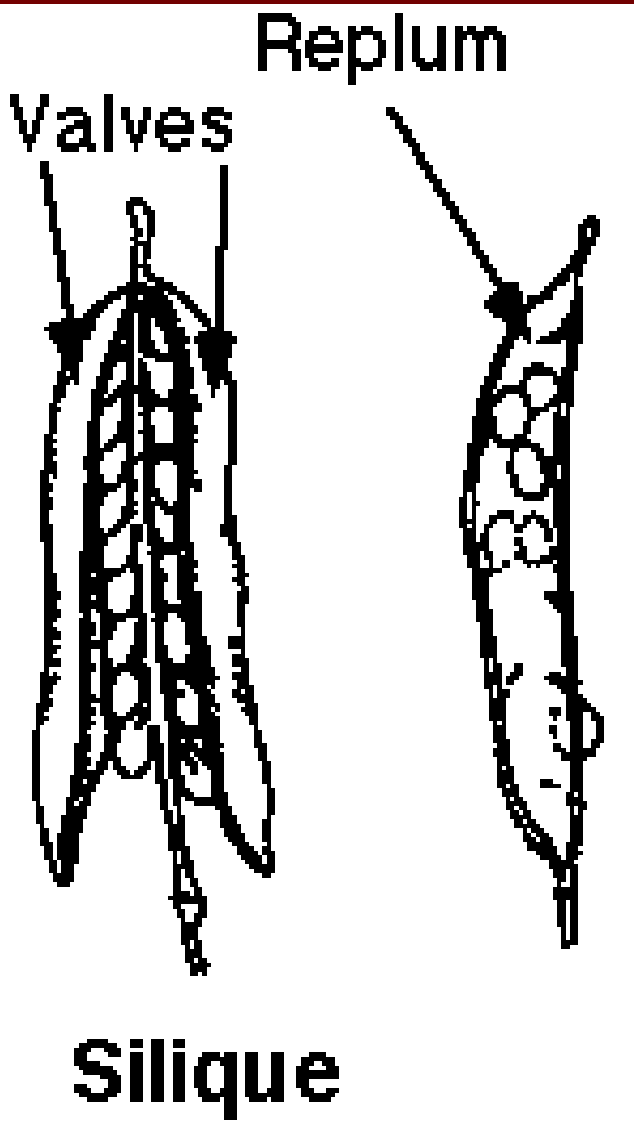


E. Silique - a special long slender capsule of 2 carpels.



F. Silicle - a special short broad capsule of 2 carpels.





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G. Pyxis = a capsule which has circumscissle dehiscence. (plantain)

Indehiscent fruits

- Dry fruits which do not open when mature to shed their seeds.
- Many of this group are one seeded fruits.

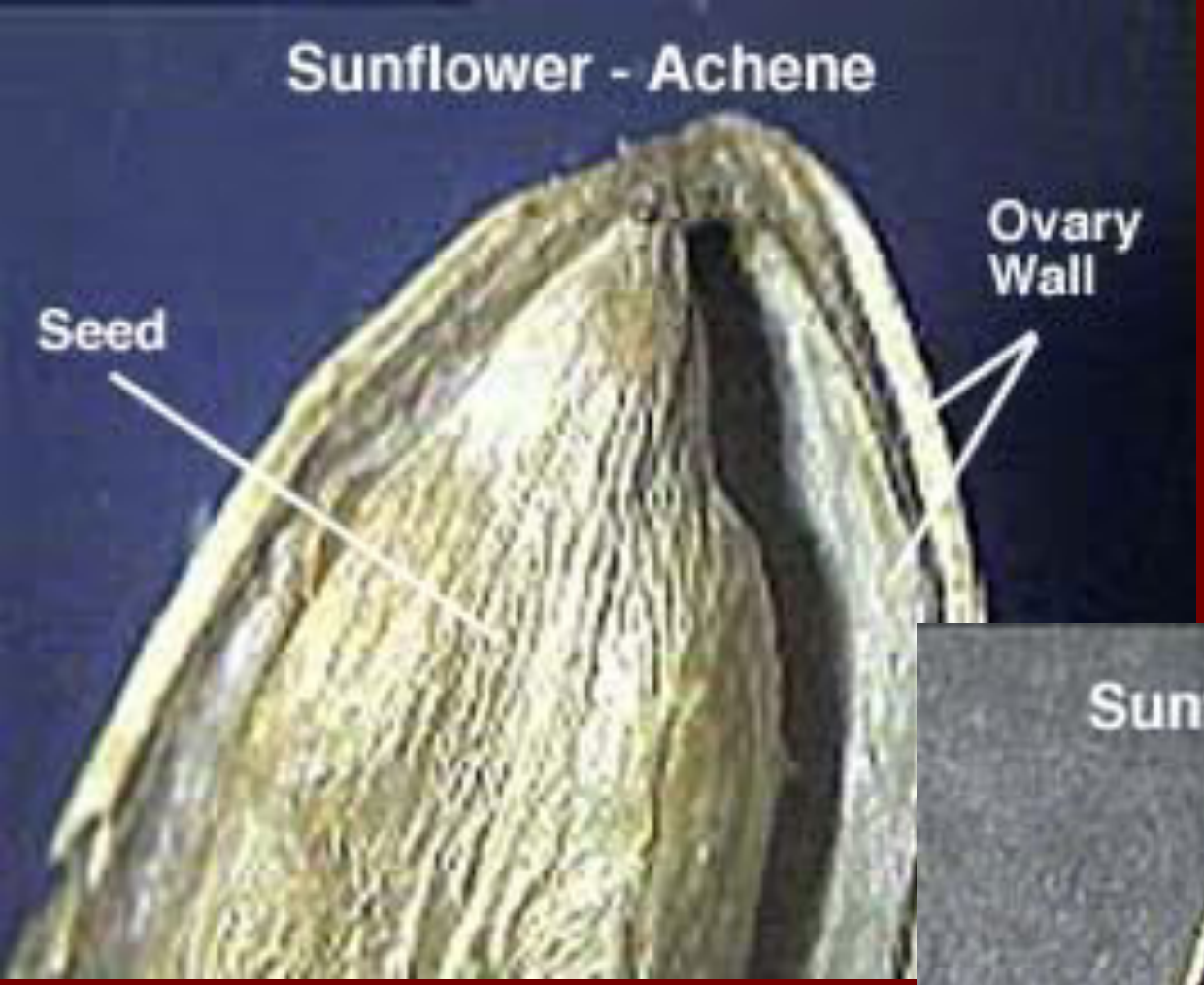
Types of Indehiscent Fruits:

a. Achene
b. Nut
c. Samara
d. grain
e. Schizocarp

A. Achene

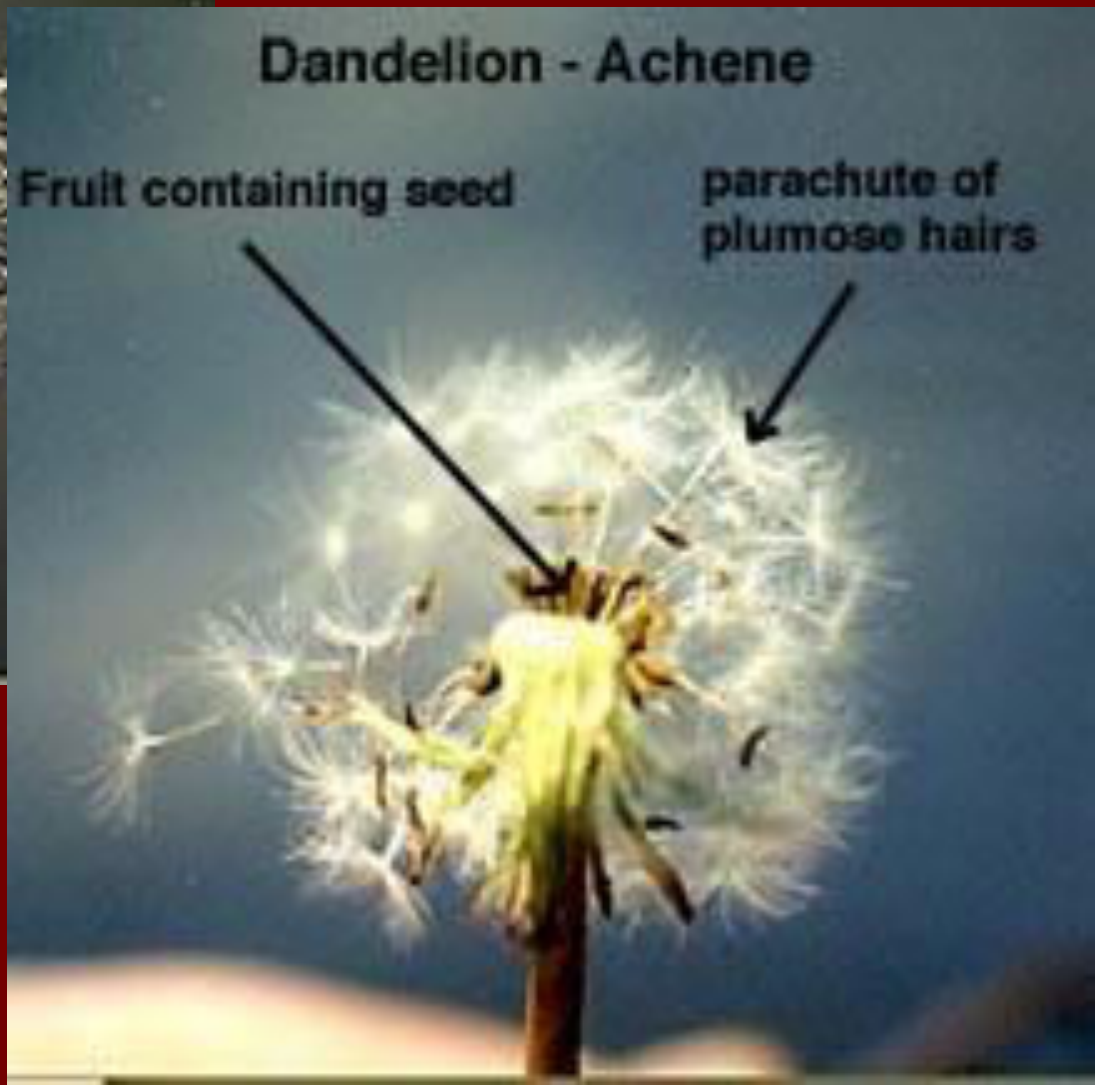
- A one-seeded, dry, indehiscent fruit;
- the one seed is attached to the fruit wall at a single point.
- (buttercups, dandelion, sunflower).
- one seed which is free of the pericarp (fruit wall)

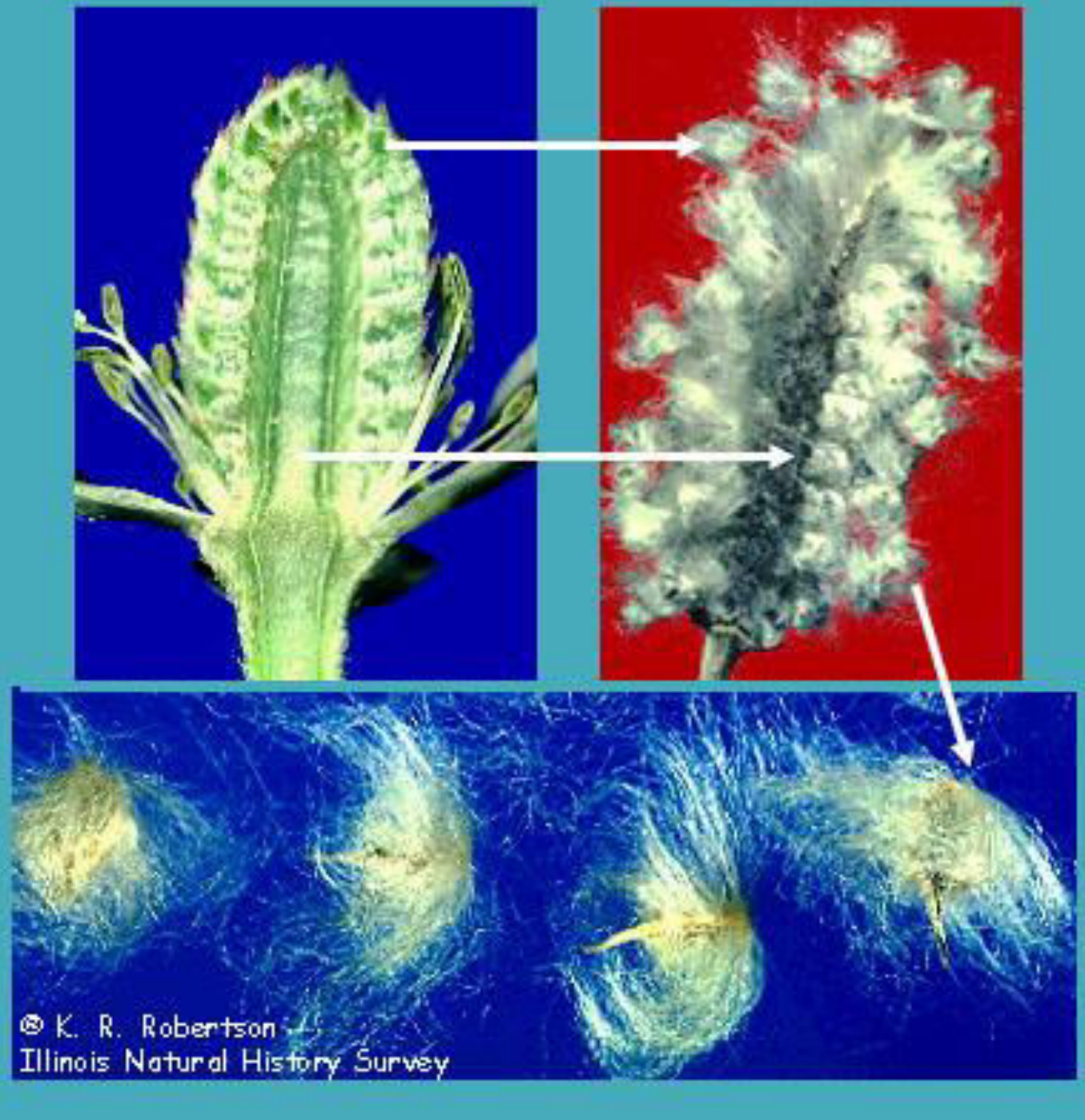
Hepatica


Sunflower - Achene
Ovary
Wall
Seed

Sunflower - Achene
Ovary
Wall
Seed

Dandelion - Achene
Achene Cluster


Dandelion - Achene
Fruit containing seed
parachute of plumose hairs

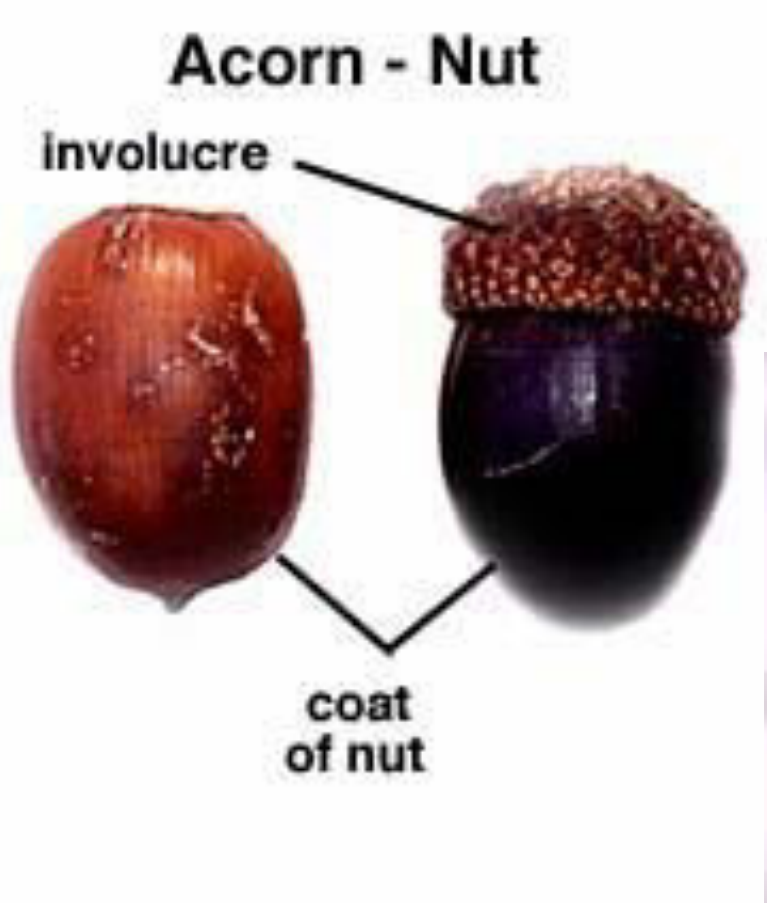


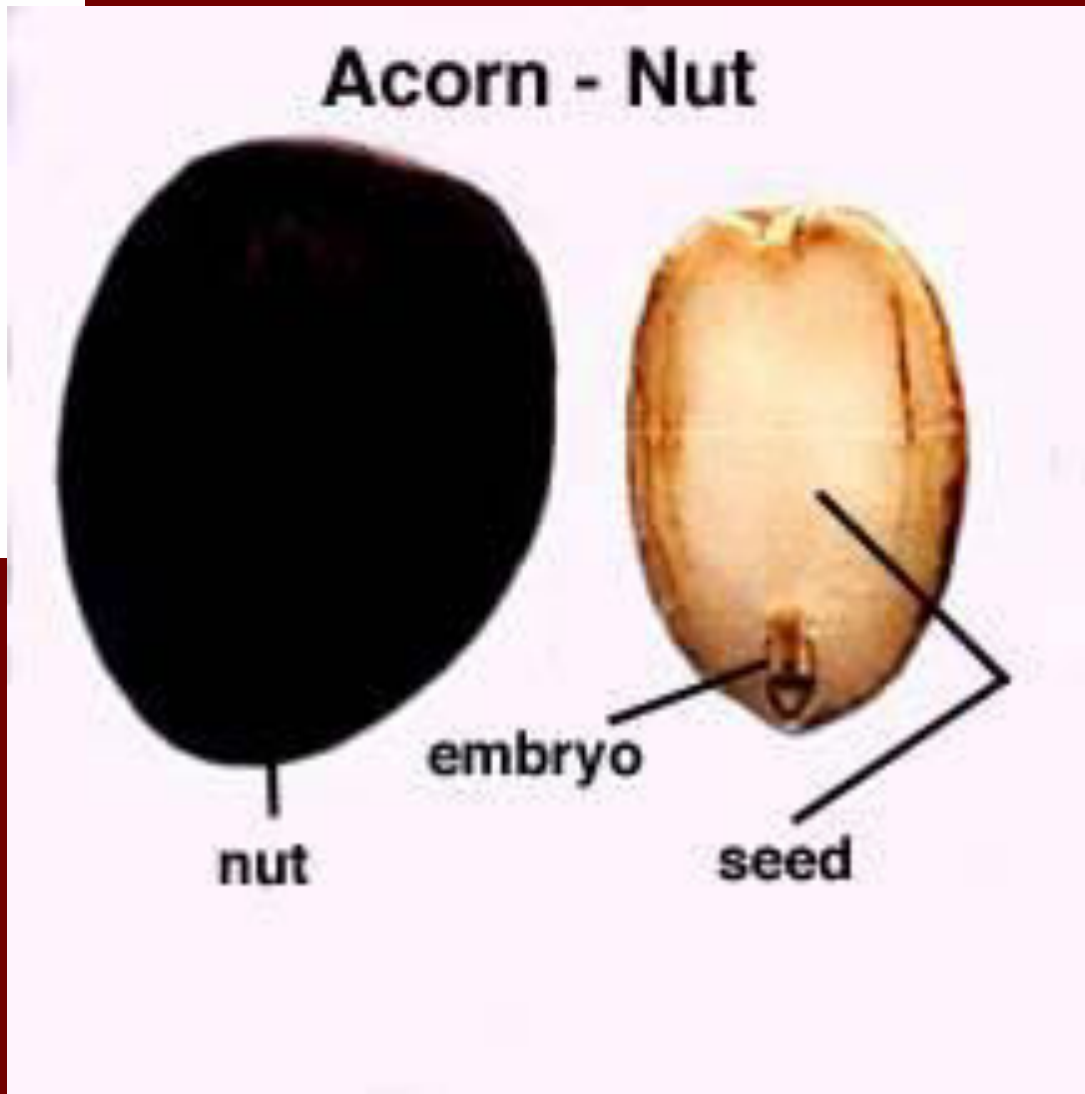
Anemone

B. Nut

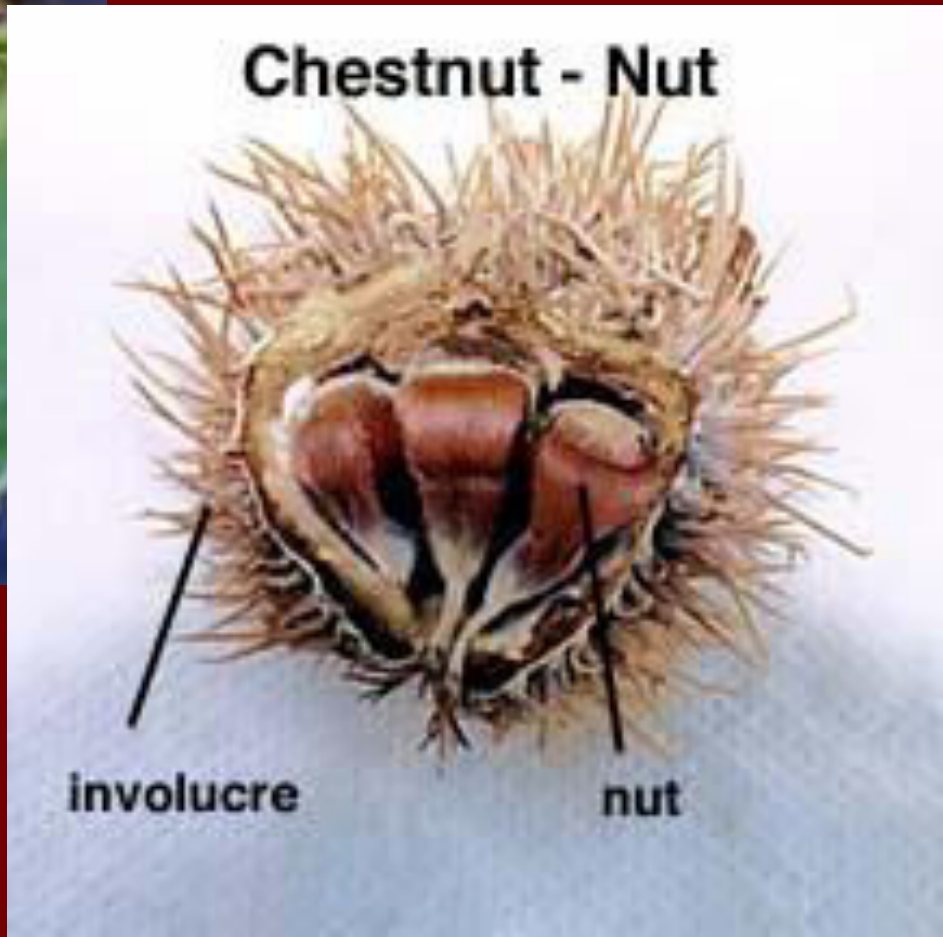
- A dry, indehiscent, one seeded fruit similar to an achene but with the wall greatly thickened and hardened.
- (beech, chestnut, oak, hazel; walnut and hickory - note: because of extrafloral bracts, or "husk", the latter two fruits are sometimes called "drupes").

bur oak (Quercus macrocarpa).


Acorn - Nut
involucre
coat
of nut


Acorn - Nut
embryo
nut
seed

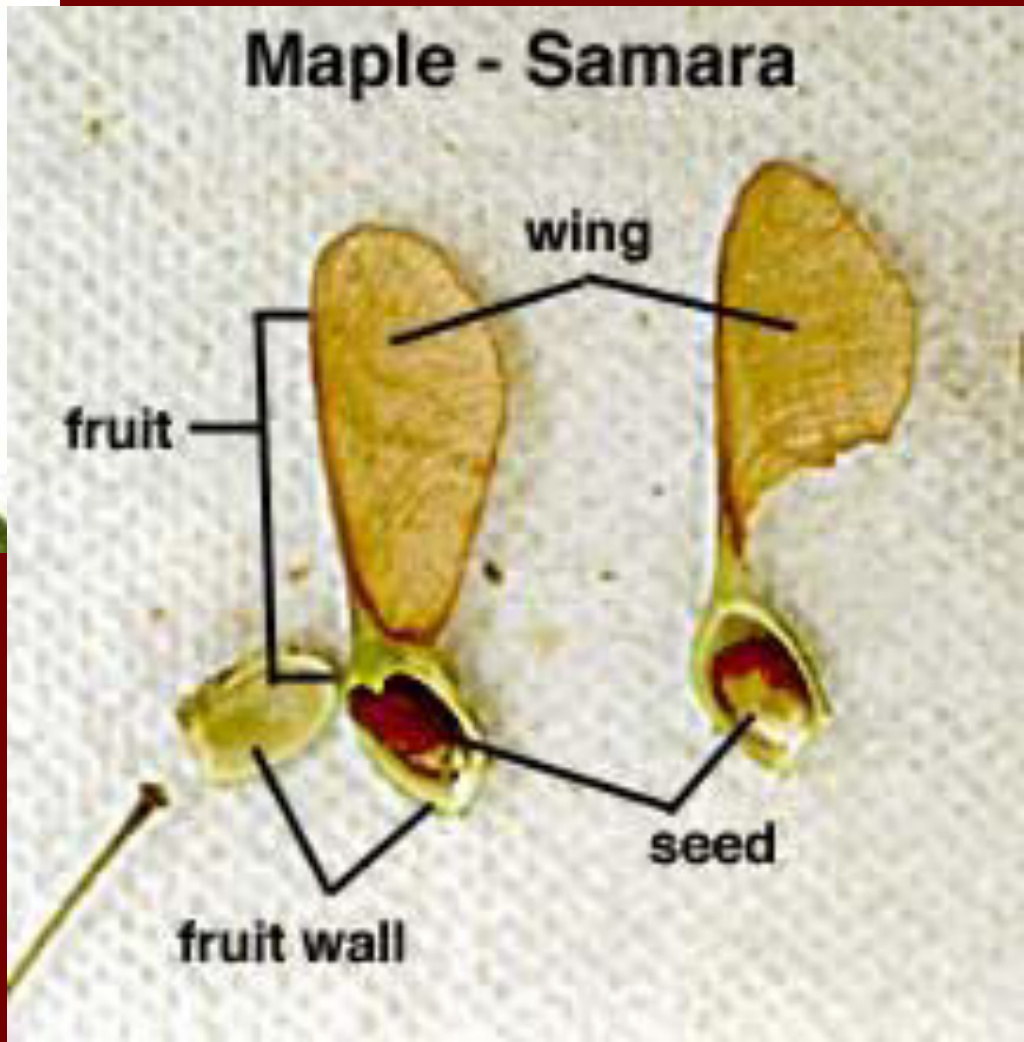
Chestnut - Nut
involucre

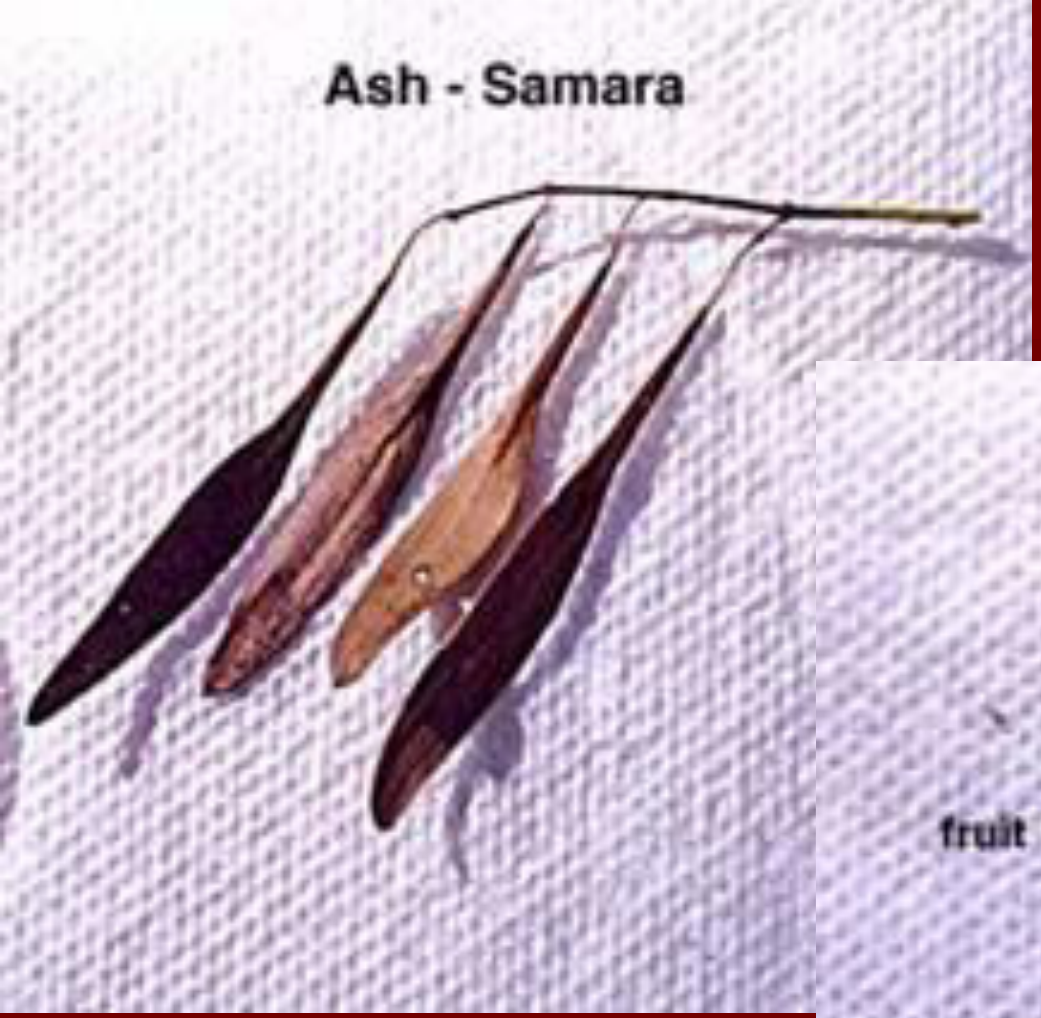

Chestnut - Nut
involucre
nut

C. Samara

- A one- or two-seeded dry, indehiscent fruit in which part of the fruit wall grows out into a wing. (elm, maple, ash).
- an achene with a wing for wind dispersal

Maple - Samara



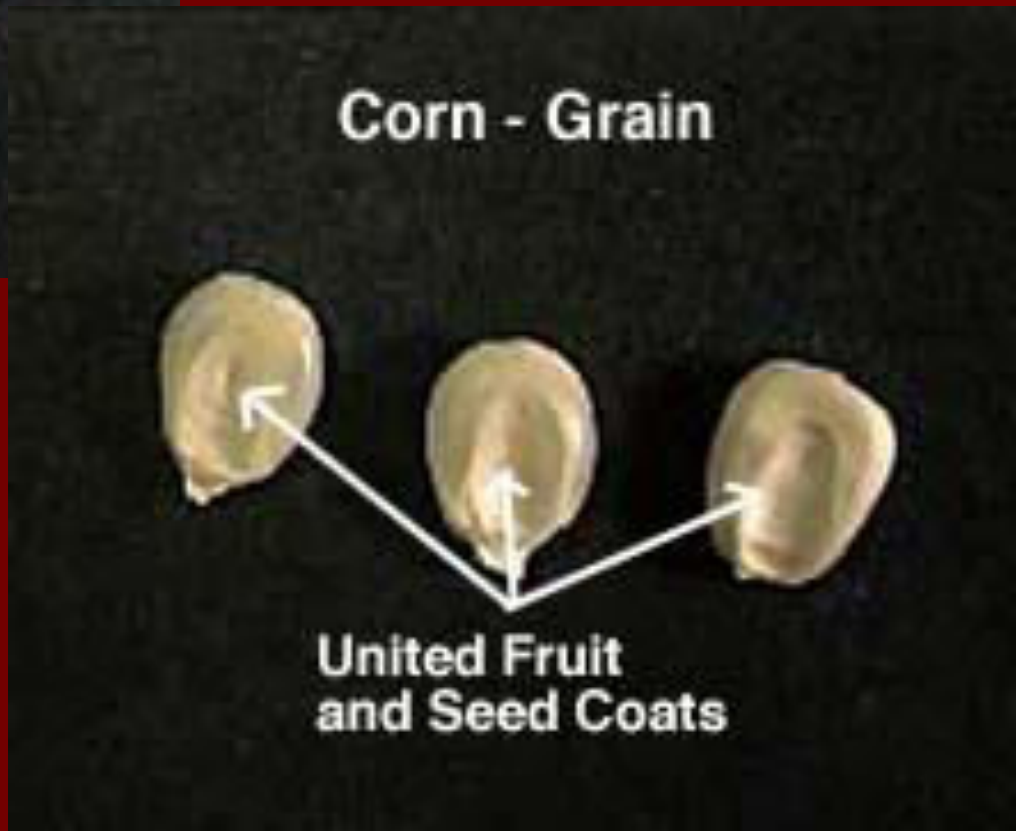

Ash - Samara

Ash - Samara
wing
fruit
seed
fruit wall

D. Grain or Caryopsis

- one seed which has the seed coat fused to the pericarp

Wheat - Grain


Corn - Grain
United Fruit
and Seed Coats

E. Schizocarp = from a compound pistil, splits into **mericarps** (pieces) which enclose one or more seeds and resemble fruits themselves.