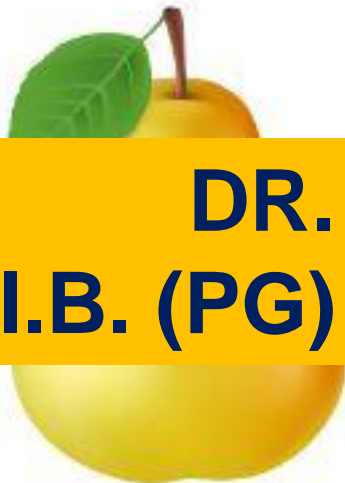
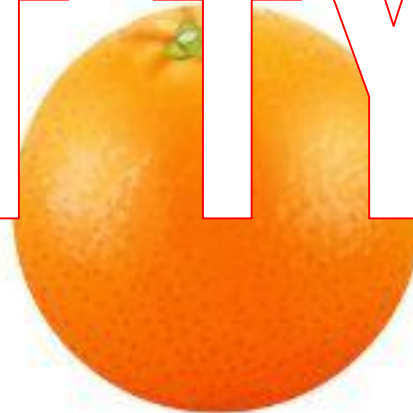




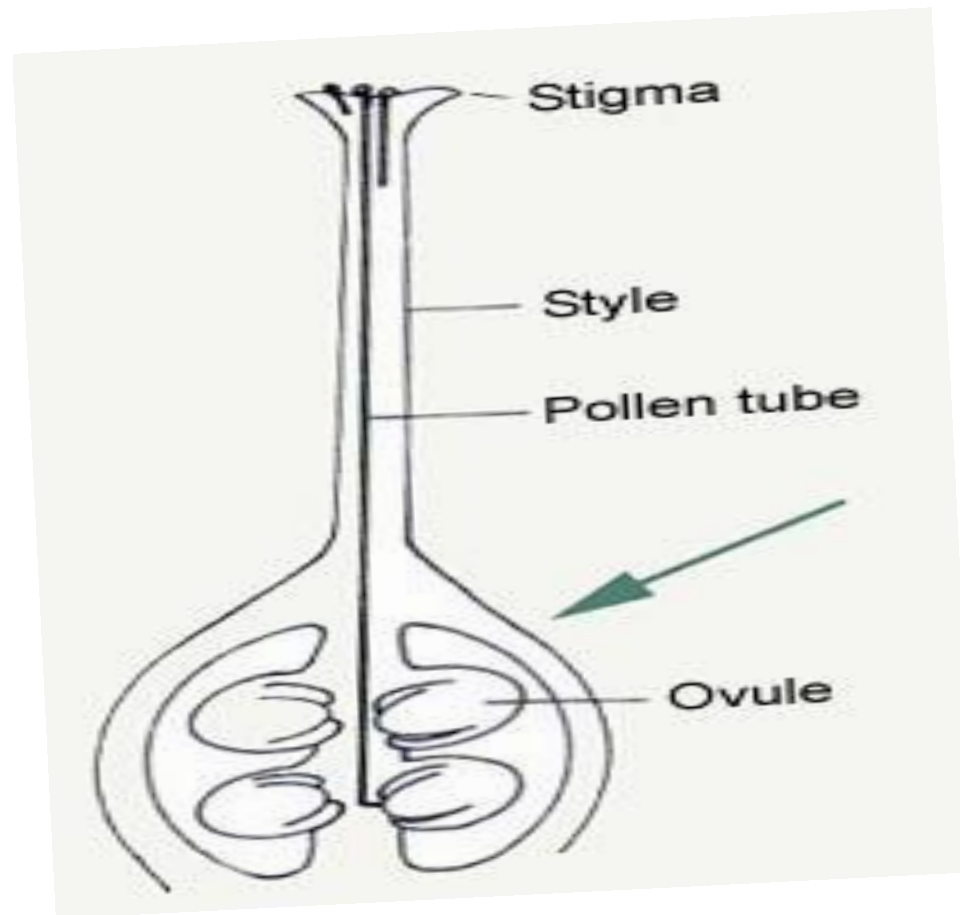
FRUIT TYPES



DR. NIDHAN SINGH
I.B. (PG) COLLEGE, PANIPAT

WHAT IS A FRUIT?

FRUIT is a
mature ripened
OVARY that
contains the
SEEDS
(**OVULES**)



WHAT IS A FRUIT?

A fruit is a matured ovary along with fused accessory structures (hypanthium or perianth parts).

There is great diversity of size, form, texture, means of opening (dehiscence), and anatomy among fruits.

Many structures that a botanist considers to be fruits are neither sweet nor good to eat!

Seed dispersal is the primary function of fruits.

TRUE OR FALSE?

FALSE FRUITS or ACCESSORY FRUITS or SPURIOUS FRUITS or PSEUDOCARPS

- The bulk of fruit is derived not from the ovary but from adjacent tissue, outside the carpel. It may be receptacle as in strawberries, figs, apple, pineapple

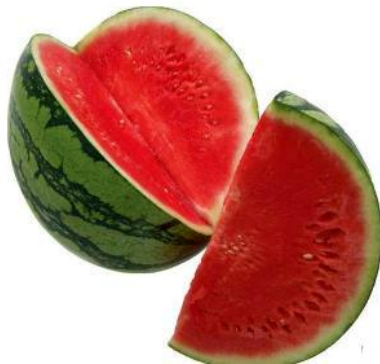


TRUE OR FALSE?

TRUE FRUITS

The fruits which develop completely from ovary only

Some true fruits are Mango, Orange, Kiwi, Watermelon, Tomato and we have many more..



CATEGORIZATION OF FRUITS

THREE CATEGORIES

SIMPLE FRUITS

Developing from single ovary of a single flower (Left)

AGGREGATE FRUITS

Develop from Multiple free Ovaries of a single flower (Middle)

COMPOSITE FRUITS

Whole inflorescence, i.e. multiple flowers are involved (Two in the Right)



LET'S KNOW MORE

SIMPLE FRUITS

Develop from Single flower, ovary monocarpellary, or if more than 1 carpels present, they are fused (syncarpous)

A. Dry

Pericarp (fruit wall) dry and not differentiated)

1. Indehiscent or Achenial-
Achene, Caryopsis, Cypsela,
Nut, Samara

2. Dehiscent:

(i) **Capsular**

(Legume, Follicle,

Siliqua, Silicula, Capsule)

(ii) **Schizocarpic (splitting)**

Cremocarp, Carcerulus,
Samara, Lomentum, Regma

B. Succulent

(Pericarp fleshy, differentiated into 3 layers)

Berry, Balausta, Pepo,
Amphisaraca,
Hesperidium, Drupe,
Pome

We will see them
with examples....

LET'S KNOW MORE

AGGREGATE FRUITS

(Develop from many free ovaries/carpels of a single flower, thus polycarpellary, apocarpous condition is seen)

1. Etaerio of Achenes
2. Etaerio of Berries
3. Etaerio of Drupes
4. Etaerio of Follicles

COMPOSITE FRUITS

(Whole inflorescence is turned into fruit- infructescence)

1. Sorosis
2. Syconus

SIMPLE DRY INDEHISCENT FRUITS

1. ACHENE (ACHENIUM OR ACHENOCARP)

Monocarpellate (formed from one carpel), indehiscent, single seeded, almost filling the pericarp, but not fused with it.

E.g. *Clematis* (Ranunculaceae), Grasses (Poaceae)



SIMPLE DRY INDEHISCENT FRUITS

2. CARYOPSIS

Formed from a single carpel, indehiscent. Actually a type of achene where pericarp is fused with the thin seed coat.

E.g. Wheat (*Triticum*), Maize (*Zea mays*), Paddy (*Oryza*) (Poaceae) etc.



SIMPLE DRY INDEHISCENT FRUITS

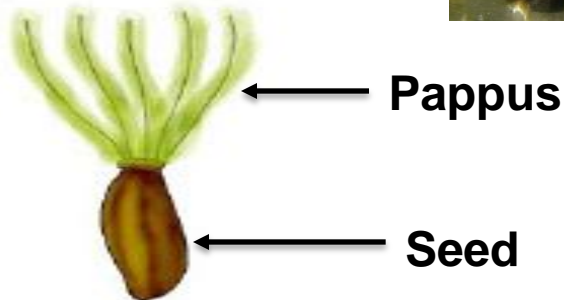
3. CYPSELA

Dry, indehiscent 1-seeded achene, with closely adhering calyx, bicarpellary, syncarpous, inferior, unilocular ovary. Calyx often forms **Pappus**, which may be hairy or scaly. **E.g. Family Asteraceae**

With Pappus



Without Pappus



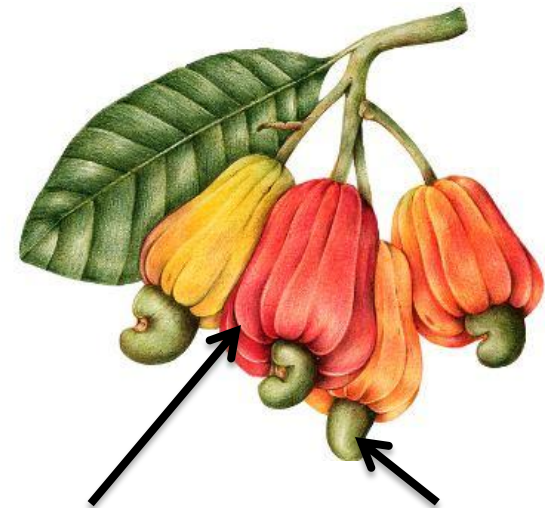
SIMPLE DRY INDEHISCENT FRUITS

4. NUT

Dry, indehiscent fruit with 1 seed (rarely 2), pericarp becomes very hard (stony or woody) at maturity, seed remains attached or fused with the ovary wall.

E.g. Walnut (Juglandaceae)

Quercus (Oak)-Fagaceae, Cashewnut- Anacardiaceae



Receptacle

Nut

SIMPLE DRY INDEHISCENT FRUITS

5. SAMARA

Dry, indehiscent, winged achene. Pericarp grows out to form wings. Seeds are carried away by wind with the help of wings.

E.g. *Ulmus* (*Ulmaceae*), *Acer* (*Aceraceae*)

In *Shorea robusta*, wings are outgrowths of sepals.



Ulmus



Acer



Shorea

SIMPLE DRY DEHISCENT FRUITS

1. LEGUME/POD

Simple dry, dehiscent fruit, from a simple carpel and dehiscent on two sides.

E.g. Peas (*Pisum*), Groundnut (*Arachis*), Gram (*Cicer*)-
Leguminosae Family



SIMPLE DRY DEHISCENT FRUITS

2. FOLLICLE

Dry, unilocular, many-seeded fruit, dehiscent by one opening only, mostly ventral suture, sometimes also by dorsal suture.

E.g. *Calotropis* (Asclepiadaceae),
Delphinium (Ranunculaceae)



SIMPLE DRY DEHISCENT FRUITS

3. SILIQUA AND SILICULA

Dry dehiscent fruit from bicarpellary, syncarpous, superior ovary, which becomes bi-chambered due to a false septum (replum), dehiscence along both sutures, seeds remaining attached to replum.

E.g. Mustard, Radish (Brassicaceae)

Silicula is similar to siliqua but is short, broad and flattened.

E.g. *Capsella*, *Iberis* (Brassicaceae)



1-3 SILIQUA



4-5 SILICULA

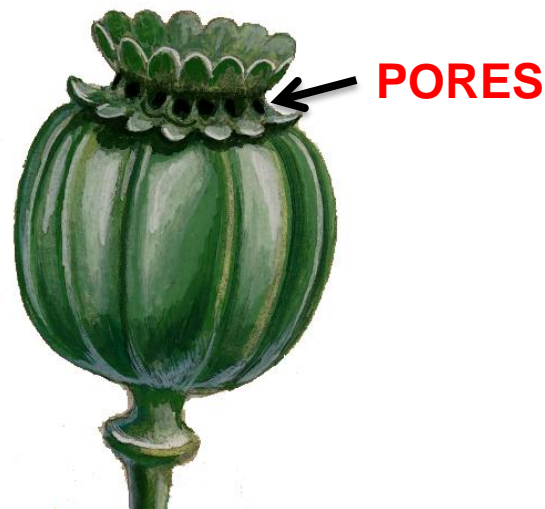
SIMPLE DRY DEHISCENT FRUITS

4. CAPSULE

Commonest fruit type, dry, many-seeded, derived from polycarpellary ovary, it may open by means of valves, pores, or a lid, or by irregular fracturing to release the seeds.

It can be Poricidal when it opens with pores or holes around the top.

E.g. Poppy (*Papaver somniferum*), Dog Flower (*Antirrhinum majus*)



SIMPLE DRY DEHISCENT FRUITS

4. CAPSULE

The capsule is Loculicidal when it splits along the locule (midrib of each ovary).

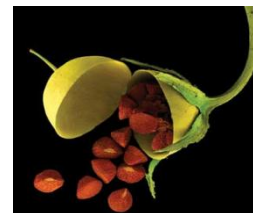
E.g. Cotton, Lady's Finger

Circumscissile capsule opens by splitting through the centre of the fruit, so that the top of the capsule lifts off like a lid.

E.g. *Anagallis* (Primulaceae)



LOCULICIDAL CAPSULE
COTTON, OKRA



CIRCUMSCISSILE
ANAGALLIS

SIMPLE DRY DEHISCENT FRUITS-SCHIZOCARPIC

1. CREMOCARP

Schizocarpic fruits split open on maturity. Cremocarp develops from bicarpellary, syncarpous, inferior ovary and splits in two 1-seeded, indehiscent mericarps.
E.g. Coriander, Fennel, Carrot etc. (Apiaceae)



SIMPLE DRY DEHISCENT FRUITS-SCHIZOCARPIC

2. CARCERULUS

Produced from bi- to polycarpellary, superior, multilocular ovary. False septa may appear at maturity so that each loculus contains 1 seed.

Mature fruit opens into one-seeded indehiscent mericarps.
E.g. *Tropaeolum*, *Malva*, *Althaea*



SIMPLE DRY DEHISCENT FRUITS-SCHIZOCARPIC

3. LOMENTUM

Constricted pod, schizocarpic in dehiscence, breaks into one-seeded mericarps on maturity.

E.g. *Acacia*, *Sophora*, *Senna* etc.



SIMPLE DRY DEHISCENT FRUITS-SCHIZOCARPIC

4. REGMA

Schizocarpic fruit splitting into cocci or single seeded parts on maturity.

Some times it produces a noise when splitting.

E.g. Castor, *Geranium* etc.



SIMPLE FLESHY FRUITS

1. BERRY

Simple fleshy fruit without a stone, usually containing many seeds.

Examples: Kiwi, Coffee, Chillies, Tomato etc.



SIMPLE FLESHY FRUITS

2. BALAUSTA

A false berry, epicarp hard forming rind, fusing with thalamus, mesocarp forms infoldings, also fuses with epicarp. Endocarp thin, membranous, surrounding the seeds in which edible part is juicy testa.

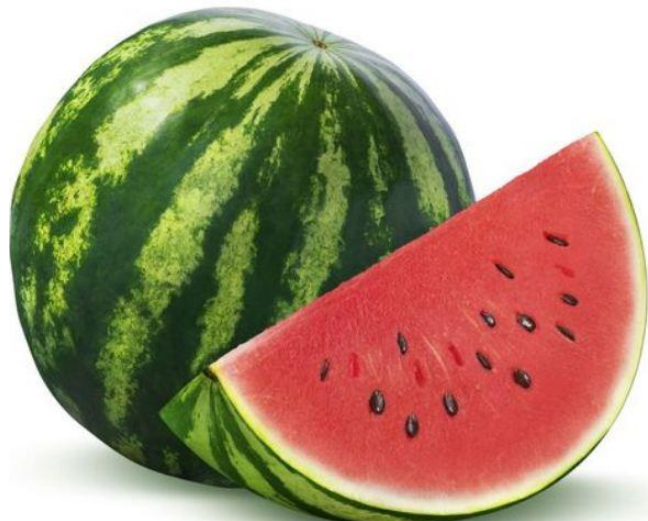
Example is Pomegranate



SIMPLE FLESHY FRUITS

3. PEPO

Fleshy fruit, with leathery skin, formed from an inferior ovary.
Characteristic of Family Cucurbitaceae
E.g. Cucumber, Water Melon, Pumpkin etc.



SIMPLE FLESHY FRUITS

4. AMPHISARACA

Many-seeded special berry, epicarp, mesocarp and endocarp form woody covering. Placentae form edible pulp, enclosing seeds.

Example is *Aegle marmelos* (Bael)- Rutaceae



SIMPLE FLESHY FRUITS

5. HESPERIDIUM

Multi-chambered, special kind of berry, epicarp glandular oily, forming rind (outer peel). Mesocarp white, fibrous, endocarp membranous, lining each locule of ovary. Seeds 1-many perlocule, with edible, juicy placental hairs arising from inner side of endocarp.

E.g. Citrus genus (Rutaceae) Orange, Lemon etc.



SIMPLE FLESHY FRUITS

6. DRUPE

Fleshy fruit with a hard stony endocarp around the single seed.

E.g. Cherry, Coconut, Mango, Peach etc.



SIMPLE FLESHY FRUITS

7. POME

Fleshy, many-seeded, false fruit, developing from a polycarpellary, syncarpous, inferior ovary with a thin skin. The seeds are contained in inner part of the pericarp which is tough and cartilaginous.

E.g. Apple, Pear, Loquat etc.



AGGREGATE FRUITS

1. ETAERIO OF ACHENES

Aggregate fruits develop from many ovaries of a single flower, i.e. from polycarpellary apocarpous condition, each ovary forming a fruitlet. Here the individual fruitlets are achenes.

E.g. Lotus, Buttercup, Strawberry etc.



L.S. of Fruit



AGGREGATE FRUITS

2. ETAERIO OF BERRIES

Individual fruitlets are berries.

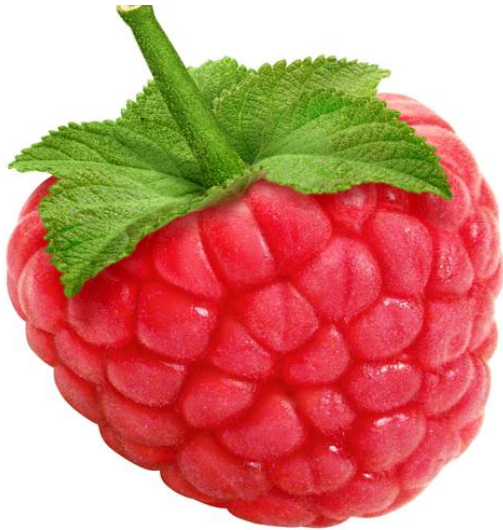
Example is Sharifa or Custard Apple, the edible part is juicy mesocarp.



AGGREGATE FRUITS

3. ETAERIO OF DRUPES

Individual fruitlets are known as drupelets.
E.g. Raspberry, Blackberry, wild berry etc.



AGGREGATE FRUITS

4. ETAERIO OF FOLLICLES

The fruit consists of 2-many follicles.

E.g. *Calotropis* (two follicles); *Aconitum* (3 follicles)

Magnolia (Many follicles)



COMPOSITE FRUITS

1. SOROSIS

Composite fruits develop from the whole inflorescence. All flowers of inflorescence ripen into fruitlets which are compactly packed along the peduncle to form a single fruit. Sorosis from spike-Pineapple, from female catkin- Mulberry, Jackfruit etc.



HAVING SEEN ALL THESE, WE HAVE GONE THROUGH MAJOR CATEGORIES OF FRUITS, BUT THIS IS NOT THE END, ENORMOUS OTHER VARIETIES EXIST IN NATURE...



Thanks