TYPES OF FRUITS

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FRUIT

- ✓ Fruit is a product of fertilization in angiosperms
- ✓ Consists ripened ovary of flower including seed
- ✓ Important constituent of a balanced diet, rich source of carbohydrates, minerals and vitamins
- ✓ Study of fruit and fruit bearing plants is called pomology

CLASSIFICATION OF FRUITS

Three main types of fruits

I. **SIMPLE FRUITS**

II. **AGGREGATE FRUITS (ETAERIO)**

III. **COMPOSITE FRUITS (MULTIPLE)**

SIMPLE FRUITS

Develop from monocarpellary ovary or multicarpellary syncarpous ovary

Dry Fruits

Pericarp remains dry and undifferentiated into three layers

- Dehiscent or Capsular
- Indehiscent or Achenial
- Schizocarpic or Splitting

Succulent Fruits

Pericarp is fleshy or fibrous and remains distinguishable into three layers. These are indehiscent

- Drupe
- Berry
- Pepo
- Hesperidium
- Balausta
- Amphisarca
- Pome

DRY FRUITS

Dehiscent Fruits (Capsular Fruits)

- **Legume or Pod:**
  - Fruit develops from monocarpellary superior ovary with marginal placentation.
  - Ovary is unilocular with many ovules.
  - The fruits dehisces by both sutures.
  - Examples – Pea, gram, red gram

- **Follicle:**
  - Fruit develops from superior and unilocular ovary.
  - Usually found in pairs or groups
  - Fruits dehisces by one suture
  - Examples – Larkspur, *Calotropis, Michelia, Vinca*

- **Siliqua:**
  - Fruit develops from bicarpellary, syncarpous, superior ovary with parietal placentation.
  - Ovary remains unilocular in the beginning but becomes bilocular due to formation of false septum, called replum.
  - Each locule has many seeds.
  - On maturity fruit dehisces from below to upwards.
  - Characteristic of family Cruciferae (mustard, raidsh, turnip etc.)

- **Silicula:**
  - Similar to siliqua but its width and length are equal.
  - It is wide and flat
  - Examples- Candytuft (*Iberis amara*) and shephard's purse (*Capsella bursa-pastoris*)

- **Capsule**
  - Develops from multicarpellary, syncarpous, superior ovary with several locules and axile placentation.
  - According to mode of dehiscence, these fruits are further classified as follows-
    - Porous dehiscence- Poppy (*Papaver*)
    - Loculicidal dehiscence- Cotton (*Gossypium*) and Okra (*Hibiscus esculentus*)
    - Septicidal dehiscence – *Aristolochia*
    - Septifragal dehiscence - *Datura*
    - Transverse dehiscence - *Celosia*

Indehiscent or Achenial Fruits

Pericarp does not rupture and seeds remains enclosed within it

- **Achene**
  - Fruit develops from monocarpellary superior ovary.
  - Unilocular and single seeded.
  - The pericarp does not fuse with seed coat
  - Examples - *Clematis* and *Naravelia*

- **Caryopsis**
  - Fruit develops from monocarpellary, superior ovary and it remains unilocular and single seeded.
  - The pericarp remains fused with testa.
  - Characteristic to family Poaceae (Wheat, rice, maize)

- **Cypsella**
  - Fruits develops from bicarpellary, syncarpous, inferior ovary with basal placentation.
  - Fruits are unilocular and single seeded.
  - Persistent hairy calyx (pappus) are found at the apex of fruit.
  - Characteristic to family Compositae (*Taraxacum* and *Cosmos)*

- **Nut**
  - Fruits develops from unilocular, syncarpous, multicarpellary, superior ovary.
  - Single seeded fruit.
  - Pericarp becomes hard and stoney
  - Examples - Cashew nut (*Anacardium*). Litchi, water chestnut (*Trapa*)

- **Samara**
  - The fruits develops from bicarpellary, syncarpous, superior ovary.
  - It is single seeded.
  - The pericarp becomes flat like wings.
  - Example - Chilbil (*Holoptelea*)

Schizocarpic or Splitting Fruits

Fruits are dry and multiseeded, and after ripening are divided into one seeded segments or mericarps. Mericarps do not rupture further

- **Lomentum**
  - Fruits develops from monocarpellary, unilocular, superior ovary.
  - It is a modification of legume.
  - Bisutural fruits which are divided into one seeded mericarps.
  - Examples - Groundnut, *Mimosa*, *Tamarindus*

- **Cremocarp**
  - Fruits develops from bicarpellary, syncarpous, inferior ovary.
  - On maturation, these divide along with carpophore into two mericarps, each single seeded.
  - Characteristic to family Umbelliferae (Coriander, carrot, fennel etc.)

- **Regma**
  - Fruits develops from tricarpellary (Multicarpellary), syncarpous, multilocular, superior ovary.
  - On maturation, after splitting, these divide into as many parts as the number of carpels.
  - Each part is known as coccus and has one seed.
  - Example - castor (*Ricinus*) and *Geranium*.

- **Carcerulus**
  - Fruits develops from bi- or multicarpellary, syncarpous, multilocular superior ovary.
  - Number of locules may increase due to false septation.
  - On maturity, single seeded mericarp splits away'
  - Example - *Althaea, Ocimum* and *Malva*.

- **Double Samara**
  - Fruits develops from bicarpellary, syncarpous, superior ovary.
  - Pericarp develops into two wings.
  - On maturation it is divided into two one seeded parts.
  - Example: *Acer* (maple)

SUCCULENT OR FLESHY FRUITS

In these fruits, the pericarp is distinguished into three layers – epicarp, mesocarp and endocarp. Mesocarp is fleshy or fibrous. These are of following types:

- **Drupe**
  - Fruits develops from mono or multicarpellary, syncarpous, superior ovary.
  - Fruits are single seeded, rarely more number of seeds.
  - Pericarp comprises three layers. The epicarp forms the skin of the fruit. Mesocarp is fleshy or fibrous and endocarp is hard and stoney.
  - Example - Mango, Coconut, peach, walnut, cherry, Almod etc.

- **Berry**
  - Fruits develops from mono or multicarpellary, syncarpous, superior or inferior ovary with axile or parietal placentation.
  - Epicarp forms the rind of the fruit, mesocarp becomes fleshy and endocarp remains thin or membranous.
  - Examples- Tomato, brinjal, guava, date, papaya, chiku, areca nut etc.

- **Pepo**
  - Fruits develops from tricarpellary, syncarpous, unilocular, inferior ovary with parietal placentation.
  - Fruits are full of swollen placenta and have many seeds.
  - Epicarp makes the hard rind, mesocarp and endocarp are fleshy.
  - Characteristic of family Cucurbitaceae as in bottle gourd, cucumber, muskmelon etc.

- **Hesperidium**
  - Fruits develops from multicarpellary, syncarpous, multilocular, superior ovary with axile placentation.
  - Epicarp is firm, leathery and has several oil glands. Mesocarp is in the form of white, fibrous part fused with epicarp. Membranous endocarp projects inwards forming distinct chambers.
  - Many juicy unicellular hairs are found on the inner side of endocarp, as in lemon and orange.

- **Balausta**
  - Fruits develops from multicarpellary, syncarpous, multilocular, superior ovary. It has many seeds.
  - The epicarp is rough and leathery, mesocarp is papery and thin and endocarp is hard and it forms chambers to enclose seeds irregularly.
  - The fruit has persistent calyx. Testa is red and fleshy whereas tegmen becomes hard
  - Example - Pomegranate

- **Amphisarca**
  - The fruit develops from multicarpellary, syncarpous, multichambered superior ovary.
  - Epicarp is hard, mesocarp and endocarp are fleshy on which scattered numerous seeds are found.
  - Example - wood apple (*Aegle marmelos*)

- **Pome**
  - The fruit develops from bi or polycarpellary, syncarpous, inferior ovary.
  - The thalamus becomes fleshy and swollen and surrounds the fruit. So it is a false fruit.
  - The pericarp is thin and papery. Fleshy swollen thalamus forms the edible part of the fruit.
  - Example - Apple and pear

AGGREGATE FRUITS

Groups of fruitlets developed from multicarpellary, apocarpous ovary of a single flower.

This type of aggregate fruits is called etaerio, i.e. aggregate of fruitlets

Types of Aggregate Fruits: 04

- **Etaerio of follicles:**
  - Each free carpel develops into a fruitlet which is known as follicle.
  - Many follicles of a flower make it etaerio, i.e. etaerio of follicle.
  - Examples - *Calotropis* and *Catharanthus* (aggregate of two follicles) and *Michelia* (aggregate of several follicles)

- **Etaerio of achenes:**
  - It is an aggregate of achene fruitlets developed from a single flower
  - Example - Rose, strawberry, *Clematis* and *Naravelia*.

- **Etaerio of berries:**
  - It is an aggregate fruitlets of berries developed from a single flower
  - Example - Custard apple (*Annona*)

- **Etaerio of drupes**
  - It is an aggregate of drupes fruitlets developed from apocarpous ovaries of a single flower.
  - Example - Raspberry

COMPOSITE OR MULTIPLE FRUITS

These fruits develop from the complete inflorescence, and are known as **infructescence**

Types of Composite fruits

- **Syconus**
  - Fruits are develops from hypanthodium inflorescence.
  - The receptacle becomes fleshy and hollow cup-shaped with a narrow apical opening.
  - Unisexual flowers are found on its inner surface, male flowers towards upper side and female flower towards lower side.
  - The fruit is achene type.
  - Fleshy receptacles form the edible part.
  - Example - Fig (*Ficus*)

- **Sorosis:**
  - This type of fruit develops from spike, spadix or catkin inflorescence, as in jackfruit, mulberry and pineapple.
  - The fruits are so compactly set that entire inflorescence appears as one fruit.
  - In jackfruit, stigma fuse with each other to make rough and spiny rind. Bracts, perianth and seeds become edible in jackfruits.
  - In mulberry, perianth present around the dry achenes is edible part.

Thank You