TOPIC: MORPHOLOGY OF FLOWERING PLANTS- TYPES OF FLOWER,FRUIT AND SEED

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Types of flower

1. **Reproductive organs –**
   - **Unisexual –** when either only stamens or only carpels is present.
   - **Bisexual –** When both androecium and gynoecium are present.
2. **Symmetry –**
   - **Actinomorphic (radial symmetry)** – When a flower can be divided into two equal radial halves in any radial plane passing through the centre. e.g., mustard, datura, chilli.
   - **zygomorphic (bilateral symmetry)** – When a flower can be divided into two similar halves only in one particular vertical plane. e.g., pea, gulmohur, bean, Cassia.
   - **asymmetric (irregular)** – if a flower cannot be divided into two similar halves by any vertical plane passing through the centre. e.g., canna.

3. A flower may be trimerous, tetramerous or pentamerous when the floral appendages are in multiple of 3, 4 or 5, respectively.
4. **Bracts** –
   - **Bracteate** – Flowers with bracts (reduced leaf found at the base of the pedicel) are called bracteates.
   - **Ebracteate** – Flowers without bracts are called ebracteate.
5. Based on the position of calyx, corolla and androecium in respect of the ovary on thalamus –
   - **Hypogynous** – the gynoecium occupies the highest position while the other parts are situated below it. The ovary in such flowers is said to be superior. e.g., mustard, china rose and brinjal.
   - **Perigynous** – If gynoecium is situated in the centre and other parts of the flower are located on the rim of the thalamus almost at the same level, it is called perigynous. The ovary here is said to be half inferior. e.g., plum, rose, peach.
   - **Epigynous** – the margin of thalamus grows upward enclosing the ovary completely and getting fused with it, the other parts of flower arise above the ovary. Hence, the ovary is said to be inferior. e.g., guava and cucumber, and the ray florets of sunflower.

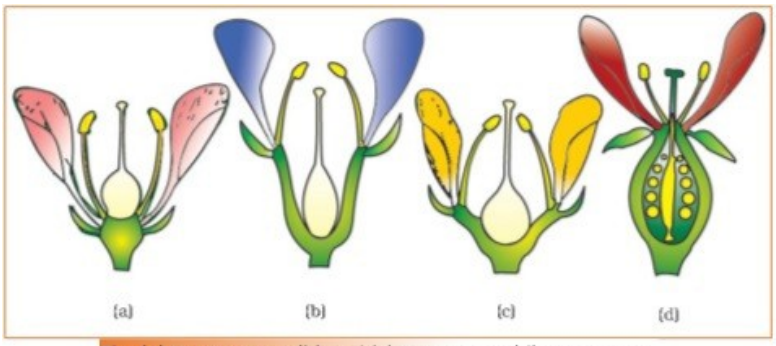

Fig: (a) Hypogynous (b) and (c) Perigynous (d) Epigynous

THE FRUIT

- The fruit is a characteristic feature of the flowering(Angiospermic) plants.
- It is a mature or ripened ovary, developed after fertilisation.
- If a fruit is formed without fertilisation of the ovary, it is called a **parthenocarpic fruit**.
- Generally, the fruit consists of a wall or pericarp and seeds.
- The pericarp may be dry or fleshy.
- When pericarp is thick and fleshy, it is differentiated into the outer epicarp, the middle mesocarp and the inner endocarp.
- **Drupe Fruit –** In mango and coconut.

  They develop from monocarpellary superior ovaries and are one seeded.In mango the pericarp is well differentiated into an outer thin epicarp, a middle fleshy edible mesocarp and an inner stony hard endocarp.

  In coconut the mesocarp is fibrous.

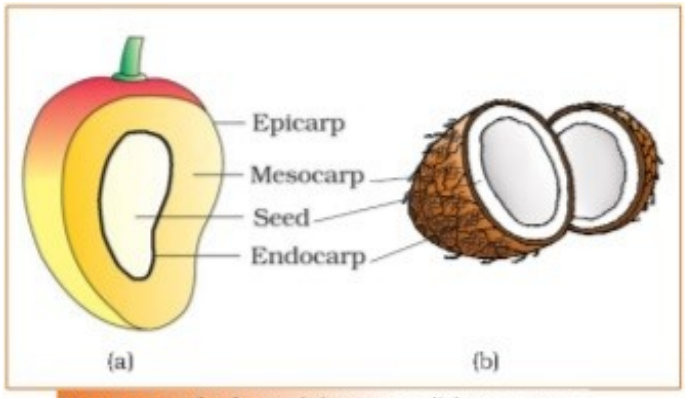

Fig: Parts of a fruit: (a) Mango (b) Coconut

THE SEED

- The ovules after fertilisation, develop into seeds.
- A seed is made up of a seed coat and an embryo.
- The embryo is made up of a radicle, an embryonal axis and one (wheat, maize) or two cotyledons (gram and pea).

Structure of a Dicotyledonous Seed

- **Seed coat –** The outermost covering of a seed.

  The seed coat has two layers, the outer **testa** and the inner **tegmen**.

- **Hilum –** The hilum is a scar on the seed coat through which the developing seeds were attached to the fruit.
- **Micropyle –** it is a small pore present above the hilum.
- **Embryo –** it consists of an embryonal axis and two cotyledons.
- **Cotyledons –** These are often fleshy and full of reserve food materials.

- **Radicle and plumule –** they are present at the two ends of the embryonal axis.
- **Endosperm –** In some seeds such as **castor** the endosperm formed as a result of **double fertilisation,** is a food storing tissue. In plants such as bean, gram and pea, the endosperm is not present in mature seeds and such seeds are called nonendospermous.

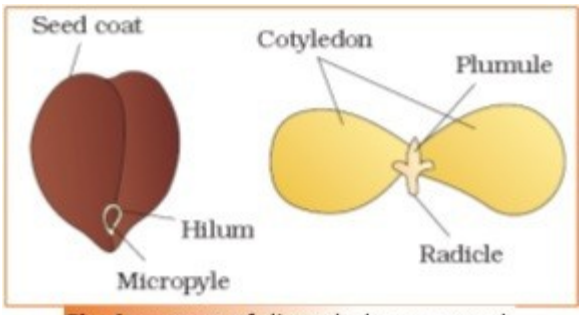

Fig: Structure of dicotyledonous seed

Structure of Monocotyledonous Seed

- **Seed Coat –** In the seeds of cereals such as maize the seed coat is membranous and generally fused with the fruit wall, called Hull.
- **Endosperm –** The endosperm is bulky and stores food. Generally, monocotyledonous seeds are endospermic but some as in orchids are non-endospermic.
- **Aleuron layer –** The outer covering of endosperm separates the embryo by a **proteinous** layer called aleurone layer.
- **Embryo –** The embryo is small and situated in a groove at one end of the endosperm.

- **Scutellum –** one large and shield shaped cotyledon known as scutellum
- **Embryonal axis –** ends are known as plumule and radicle.
- **Coleoptile and coleorhiza –** The plumule and radicle are enclosed in sheaths which are called coleoptile and coleorhiza respectively.

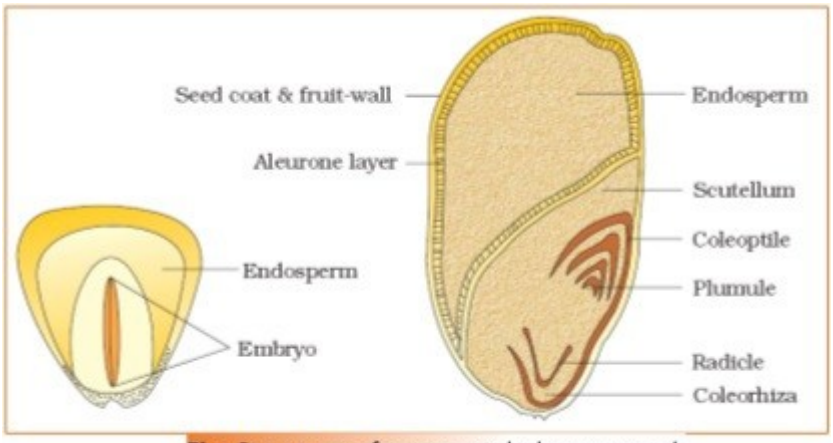

Fig: Structure of monocotyledonous seed