8. Fruits

Fruits are the mature ovaries or pistils of flowering plants with fertilized eggs (seeds) plus any associated accessory parts. **Accessory parts** are organs attached to a fruit but not derived directly from the ovary or ovaries, including the bracts, axes *Ficus*, receptacle *Malus domestica*, compound receptacle (in multiple fruits *Fragaria chiloensis* and *Ananas*, or perianth (calyx in *Punica*, and corolla in *Cucurbita moschata*. **Pericarp** is used for the fruit wall, derived from the mature ovary wall. The pericarp is sometimes divisible into layers: **endocarp**, **mesocarp**, and **exocarp** (figure 1.58).

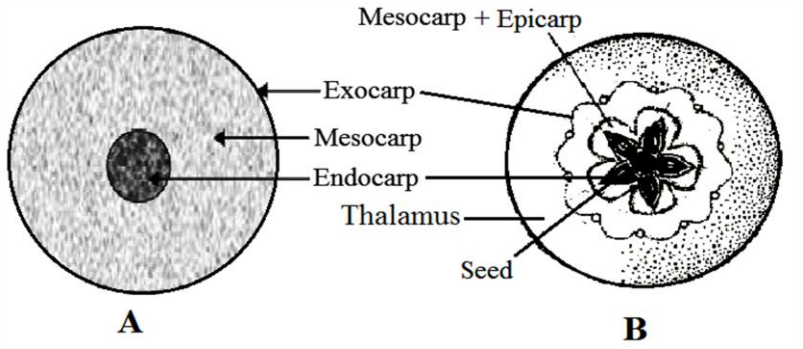

Figure 1.58: Diagram of fruit structures A- pericarp layers, B- fruit with accessory part (thalamus or fleshy receptacle)

8.1. Classification of Fruits

The major three fruit types are based on the development of the flower and ovary or ovaries number, which are; **simple fruits**, (derived from a single pistil of one flower), **aggregate fruits** (derived from multiple pistils of a single flower, thus having an apocarpous gynoecium) and **multiple fruits** (derived from many coalescent flowers). Aggregate or multiple fruits derived or composed of etaerio of single pistils each called a **unit fruit** (figures 1.59 and 1.60).

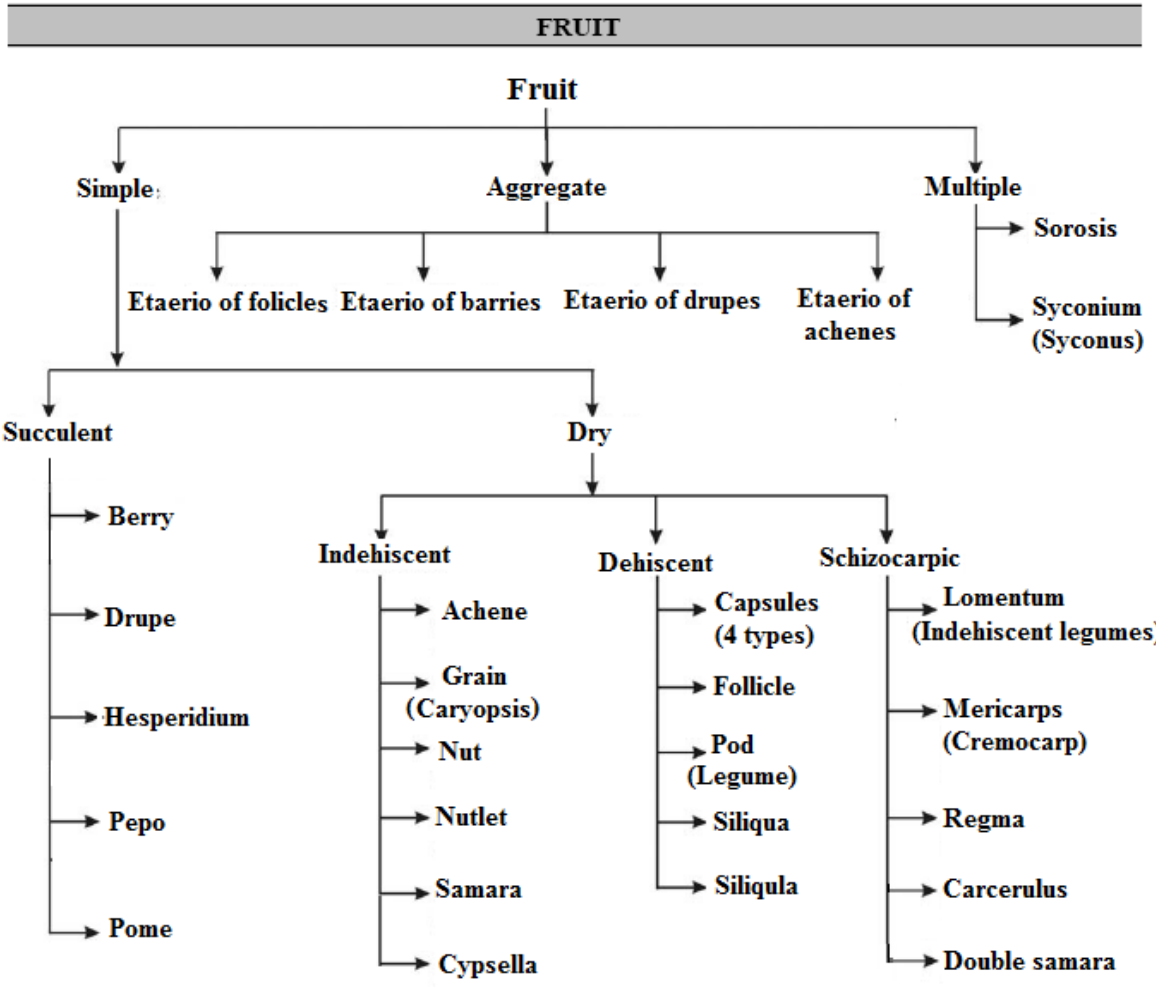

Figure 1.59: A Schematic diagram of the main classification of fruits based on specific structures

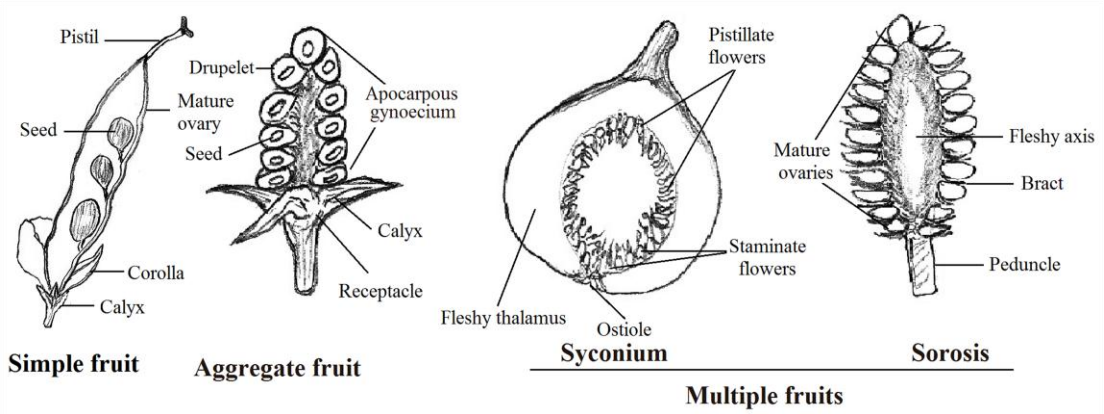

Figure 1.60: Major fruit structure and types

8.2. Simple fleshy (succulent) fruits (figure 1.61)

a) **Hesperidium,** is a septate fleshy fruit with a thick skinned, leathery outer pericarp wall and fleshy modified trichomes (juice sacs).
b) **Pepo,** is fleshy fruit with parietal placentation and a leathery exocarp, the fruit type of the Cucurbitaceae.
c) **Drupe,** is a fruit with a hard, stony endocarp and a fleshy mesocarp.
d) **Pome,** is a fleshy fruit with a cartilaginous endocarp derived from an inferior ovary, with the bulk of the fleshy tissue derived from the outer, adnate hypanthial tissue.
e) **Berry,** is a fruit with a succulent endocarp.

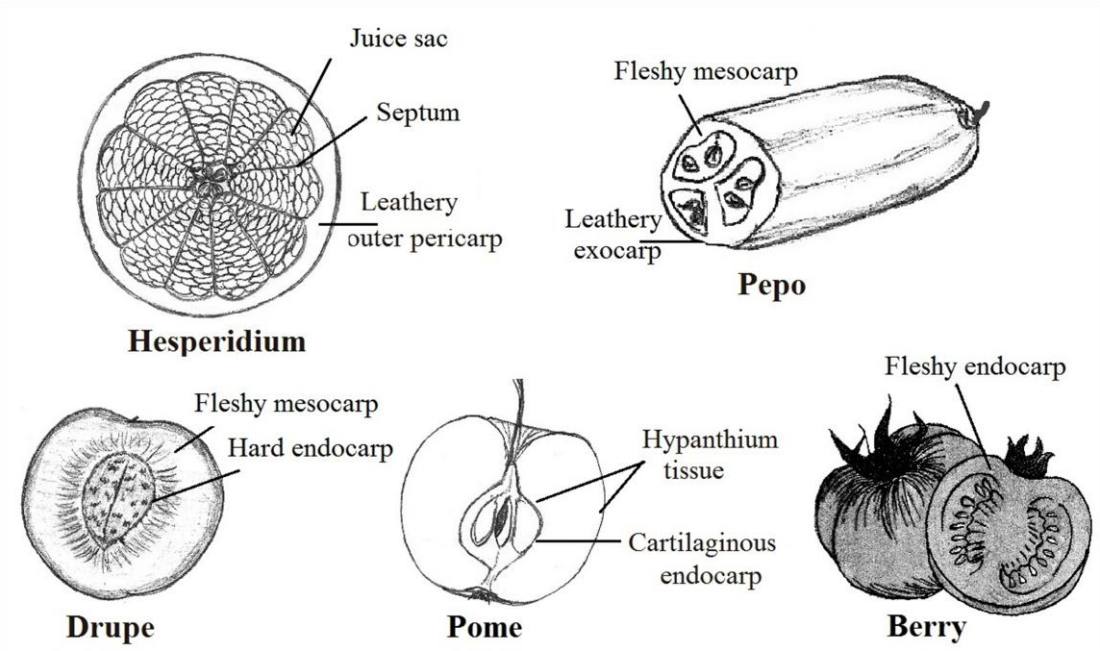

Figure1.61: Simple fleshy or succulent structure and types

8.3. Indehiscent simple dry fruits (not splitting open at maturity) (figure 1.62)

A. **Achene,** is a one-seeded, dry, indehiscent fruit with seed attached to the pericarp at one point only.
B. **Grain** or **caryopsis,** is a one-seeded, dry, indehiscent fruit with the seed coat adnate to pericarp wall.
C. **Nut,** is a one-seeded, dry indehiscent fruit with a hard pericarp, usually derived from a one-loculed ovary.
D. **Nutlet,** is a small nutlike fruit.
E. **Samara,** is a winged, dry, usually indehiscent fruit.

F. Cypsella, is the unilocular fruit and single-seeded with persistent hairy calyx (pappus). the fruit develops from a bicarpellary, syncarpous, inferior ovary with basal placentation.

G. Urticle, is a small, bladder-like, thin-walled, one-seeded fruit.

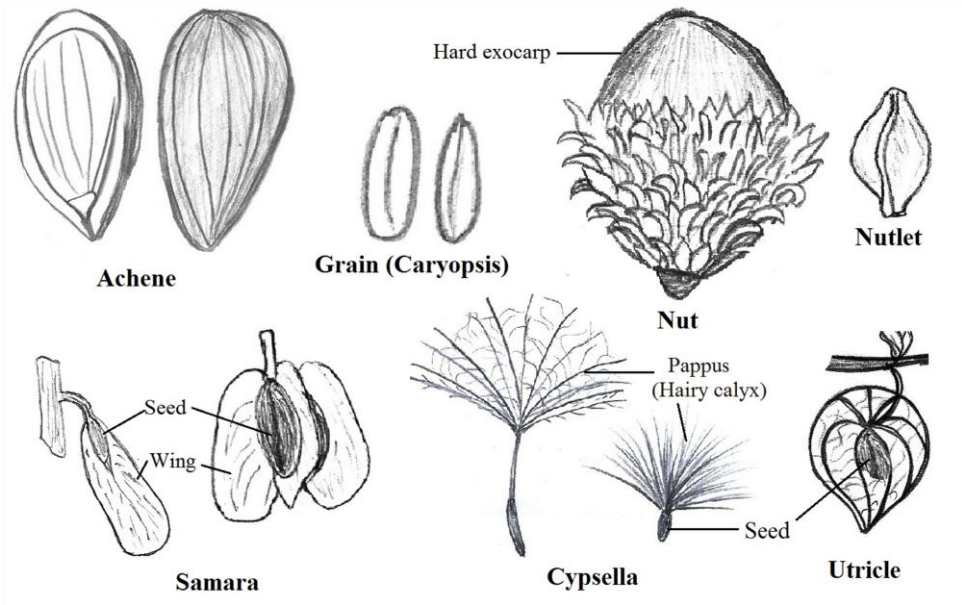

Figure 1.62: Different types of indehiscent simple dry fruits

8.4. Dehiscent simple dry fruits (splitting open at maturity) (figure 1.63)

A. Capsules, are fruits derived from multicarpellary ovaries. Four types can be determined based on the type and dehiscence location.

- **Loculicidal capsules** have longitudinal lines of dehiscence radially aligned with the locules.
- **Septicidal capsules** have longitudinal lines of dehiscence radially aligned with the ovary septa.
- **Circumscissile capsules** (also called a **pyxis** or **pyxide**) has a transverse (as opposed to longitudinal) line of dehiscence.
- **Poricidal capsules** have dehiscence occurring by means of pores.

B. Follicle, is a fruit derived from one carpel that splits along one suture.

C. Pod or **Legume,** is a dry, dehiscent fruit derived from one carpel that splits along two longitudinal sutures; legumes are the diagnostic fruit type of the Fabaceae,

D. Silicles and **siliques,** are dry, bilocular, multi-seeded fruit that develops from a bicarpellary pistil having parietal placentation and a false septum (replum).

- **Siliqua,** is about as broad or broader than long.
- **Siliqula,** is longer than broad.

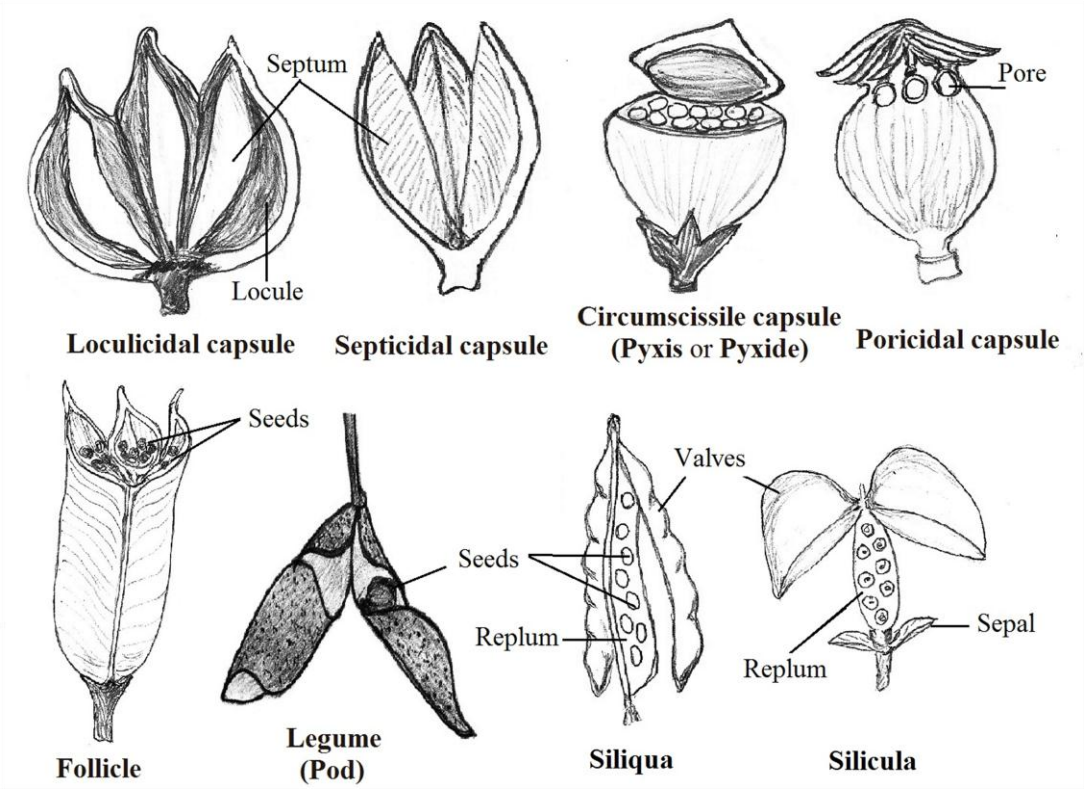

Figure 1.63: Different types of dehiscent simple dry fruits

8.5. Simple schizocarp fruits (figure 1.64)

Schizocarp fruits (splitting fruits) are dry fruits that upon maturing divide into single-seeded indehiscent cremocarp or mericarps.

i. **Lomentum** or **indehiscent legumes,** the fruit develops from monocarpellary, unilocular. These are bisutural legume fruits which are constricted or divided into one seeded mericarps, as in some Fabaceae (*Hedysarum* sp.).

ii. **Double samara,** the fruit develops from bicarpellary, syncarpous, pericarp develops into two wings, as in *Acer macrophyllum*.

iii. **Regma,** the fruit develops from tricarpellary or multicarpellary syncarpous. The fruit is multilocular, on maturation, after splitting, these divided into as many parts as the number of carpels, and has one seed, as in *Ricinus*, *Erodium* and *Geranium*.

iv. **Cremocarp fruits** are formed from the two one-seeded carpels. These may remain separate and are attached to the central strand of support for the time before dispersal of the seeds. These come under the family Apiaceae.

v. **Carcerulus,** the fruit develops from bi or polycarpellary, syncarpous, and is multilocular, number of locules may increase due to false septation, on maturation, single seeded mericarp splits away, as in *Althea, Ocimum* and *Malva*.

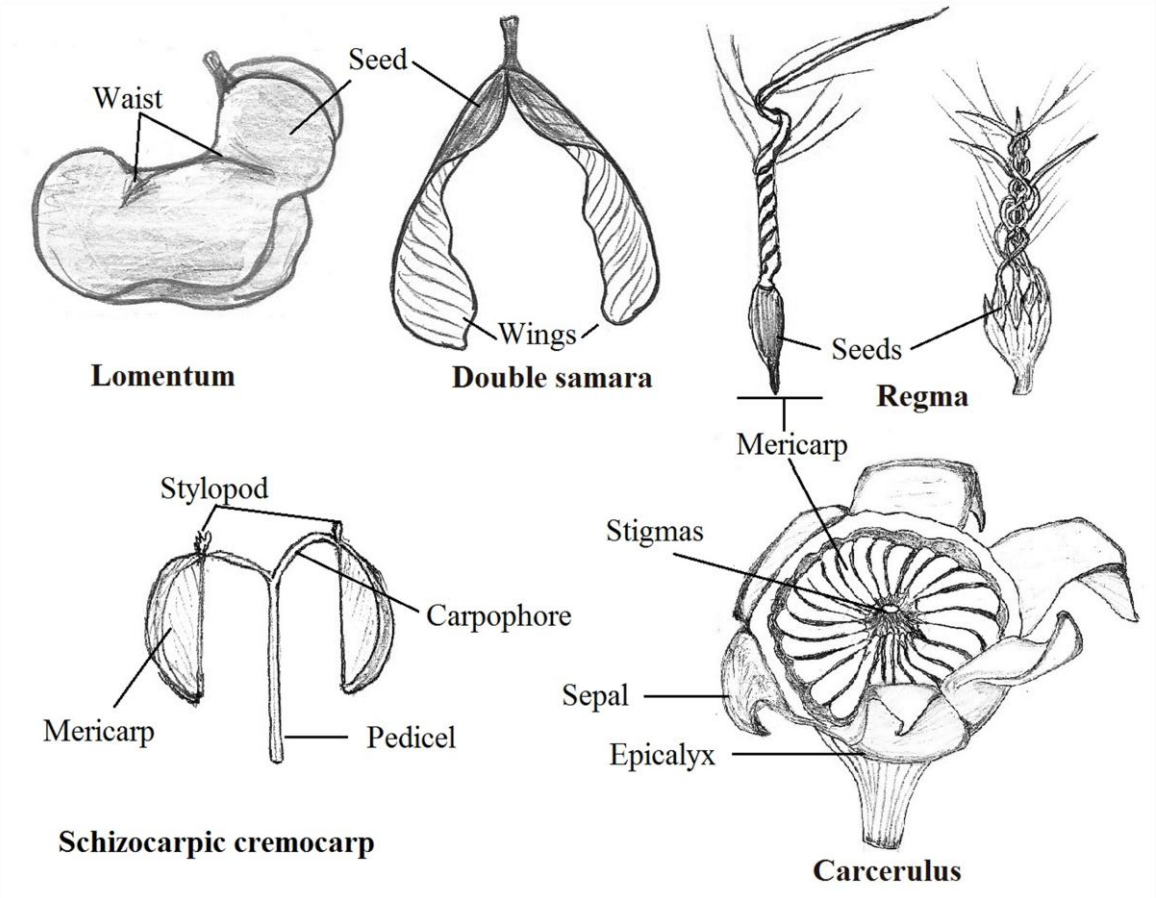

Figure 1.64: Different structure and types of schizocarp fruits