**College of Science Al-Mustanseiriyah University Dep.: Biology**

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**Lecture: 6**

**\*\*\*Fruits:**

Fruits are the mature ovaries or pistils of flowering plants plus any associated accessory parts.

\*\*Accessory parts: are organs attached to a fruit but not derived directly from the ovary, including the bracts, axes, receptacle.

\*\*Pericarp: is the fruit wall, derived from the mature ovary, sometimes pericarp divided into layers: **1-** endocarp

 **2-** mesocarp

 **3-** exocarp

**\*\*\*\*Fruit types:** are based first on fruit developed :

1. Simple fruit: derived from a single pistil of one flower.
2. Aggregate fruit: derived from multiple pistil of a single flowers, thus having an apocarpous gynoecium.
3. Multiple fruit: derived from many coalescent flowers.

**\*\*\*Simple fruits:**

1. **Achene:** is a one-seeded, dry, indehiscent fruit with seed attached to the pericarp at one point only as in sunflower.
2. **Grain (or caryopsis):** is a one-seeded, dry, indehiscent fruit with the seed coat adnate to pericarp wall as in poaceae family.(like wheat).
3. **Nut:** is a one seeded, dry, indehiscent fruit with a hard pericarp.
4. **Samara:** is a winged, dry, usually indehiscent fruit as in *Acer*.
5. **Urticle:** is a small, bladdery or inflated, one-seeded, dry fruit, utricles are essentially achenes in which the pericarp is significantly larger than the mature seed as in *Atriplex* (salt bush).
6. **Capsules:** are generally dry, dehiscent fruits derived from compound ovaries, several types of capsule can be recognized based on the type or location of dehiscence:-

**A/** Loculicidal capsules: have longitudinal lines of dehiscence radially aligned with the locules or between the placenta if septa are absent it splits into valves.

**B/** Septicidal capsules: have longitudinal lines of dehiscence radially aligned with the ovary septa( or with placenta if septa are absent). Its splits into valves.

 **\*\*Valves:** apportion of the pericarp wall that splits off, but does not enclose the seed, valves may remain attached to the fruit or may fall off.

**C/** Circumscissile capsules: (also called a pyxis) has a transvers (as opposed to longitudinal) line of dehiscence, typically forming a terminal lid as in *Plantago*.

**D/** Septifragal or valvular capsules: is one in which the valves break off from the septa, as in *Lpomoea (*morning glory).

**E/** Poricidal capsules: have dehiscence occurring by means of pores as in *Papaver*.

1. **Follicle:** is a dry, dehiscent fruit derived from one carpel that splits along one suture, such as in unit fruit of *Magnolia*.
2. **Legume:** is a dry, dehiscent fruit derived from one carpel that splits along two longitudinal sutures as in fabaceae.

**11- Silicles and siliques:** are dry, dehiscent fruits derived from a two carpeled ovary that dehisces along two sutures but that has an outer rim.

**12-** **Scizocarp:** is a dry, dehiscent fruit type derived from a two or more loculed compound ovary in which the locules separate at maturity.

**13-** **Berry:** is the unspecialized term for a fruit with asucculent pericarp as in *Vitis* (grape).

**14-** **Drupe :** is a fruit with a hard, stony endocarp and a fleshy mesocarp, as in *Prunus*.

**15-** **Hesperidium:** is a septate fleshy fruit with a thick – skinned, leathery outer pericarp wall and fleshy modified trichomes (juice sacs)arising from the inner walls, as in *Citrus*(orange, lemon, etc.).

**16- Pepo:** is a non –septate fleshy fruit with parietal placentation and leathery exocarp derived from an inferior ovary, as in cucurbtaceae.



**\*\*\*Aggregate fruits:** is one derived from two or more pistils (ovaries) of one flower:-

**A/ Achenecetum:** is an aggregate fruit of achenes. A common example is Fragaria( strawberry), in which the achenes are on the surface of accessory tissue, an enlarged, fleshy receptacle.

**B/ Drupecetum:** is an aggregate fruit is an aggregate fruit of follicles as in *Magnolia*.

**C/ Syncarp:** is an aggregate fruit, typically of berries , in which the fruits fuse together , as in Annona (note that syncarps may form at the floral stage or later during fruit development , if the latter , the fruit is sometimes called a **pseudosyncarp**.

**\*\*\*\*\*Multiple fruits:** is one derived from two or more flowers that coalesce. Types of multiple fruits:-

1. Sorosis: is a multiple fruit in which the unit fruits are fleshy berries and are laterally fused along a central axis as in *Ananas*( pineapple).
2. Syconium : is a multiple fruit in which the unit fruits are small achenes covering the surface of a fleshy , inverted composed receptacle (derived from a hypanthodium) as in *Ficus*.



**\*\*\*\*Seeds:**

Aspects of seed morphology can be important systematic characters used in plant classification and identification. Parts of ssed is:

1. **Seed coat:** the outer protective covering of seed derived from the integument. Seed coat consist of two fused layers: **a/** testa

 **b/** tegmen

 **\*\*\*sarcotesta:** a seed coat that is fleshy at maturity .

1. **Hilum :** the scar of attachment of the funiculus on the seed coat.
2. **Raphe:** a ridge on the seed coat formed from an adnate funiculus.

**\*\*Embryo:** is the immature sporophyte, it consist of:

**A/ Epicotyl :** the immature shoot.

**B/ Radical:** the immature root.

**C/ Hypocotyl:** the transition region between the root and epicotyl.

**D/ Cotyledon:** the first leaf/leaves of the embryo, often functioning in storage of food reserves.

