NORTH POINT SR. SEC. BOARDING SCHOOL,
ARJUNPUR
Class –XII Subject: Biology

CHAPTER

SEXUAL REPRODUCTION IN FLOWERING PLANT

radical and root cap enclosed in an undifferentiated sheath called **coleorrhiza.** The portion of the embryonal axis above the level of attachment of scutellum is the epicotyl. Epicotyl has a shoot apex and a few leaf primordia enclosed in a hollow foliar structure, the **coleoptile.**

Soak a few seeds in water (say of wheat, maize, peas, chickpeas, ground nut) overnight. Then split the seeds and observe the various parts of the embryo and the seed.

2.4.3 Seed

In angiosperms, the seed is the final product of sexual reproduction. It is often described as a fertilised ovule. Seeds are formed inside fruits. A seed typically consists of seed coat(s), cotyledon(s) and an embryo axis. The cotyledons (Figure 2.15a) of the embryo are simple structures, generally thick and swollen due to storage of food reserves (as in legumes). Mature seeds may be **non-albuminous** or **ex-albuminous**. Non-albuminous seeds have no residual endosperm as it is completely consumed during embryo development (e.g., pea, groundnut). Albuminous seeds retain a part of endosperm as it is not completely used up during embryo development (e.g., wheat, maize, barley, castor). Occasionally, in some seeds such as black pepper and beet, remnants of nucellus are also persistent. This residual, persistent nucellus is the **perisperm.**

Integuments of ovules harden as tough protective seed coats (Figure 2.15a). The micropyle remains as a small pore in the seed coat. This facilitates entry of oxygen and water into the seed during germination. As the seed matures, its water content is reduced and seeds become relatively dry (10-15 per cent moisture by mass). The general metabolic activity of the embryo slows down. The embryo may enter a state of inactivity called **dormancy,** or if favourable conditions are available (adequate moisture, oxygen and suitable temperature), they germinate.

As ovules mature into seeds, the ovary develops into a fruit, i.e., the transformation of ovules into seeds and ovary into fruit proceeds simultaneously. The wall of the ovary develops into the wall of fruit called **pericarp**. The fruits may be fleshy as in guava, orange, mango, etc., or may be dry, as in groundnut, and mustard, etc. Many fruits have evolved mechanisms for dispersal of seeds. Recall the classification of fruits and their dispersal mechanisms that you have studied in an earlier class. *Is there any relationship between number of ovules in an ovary and the number of seeds present in a fruit?*

In most plants, by the time the fruit develops from the ovary, other floral parts degenerate and fall off. However, in a few species such as apple, strawberry, cashew, etc., the thalamus also contributes to fruit formation. Such fruits are called **false fruits** (Figure 2.15b). Most fruits however develop only from the ovary and are called **true fruits**. Although in most of the species, fruits are the results of fertilisation, there are a few species

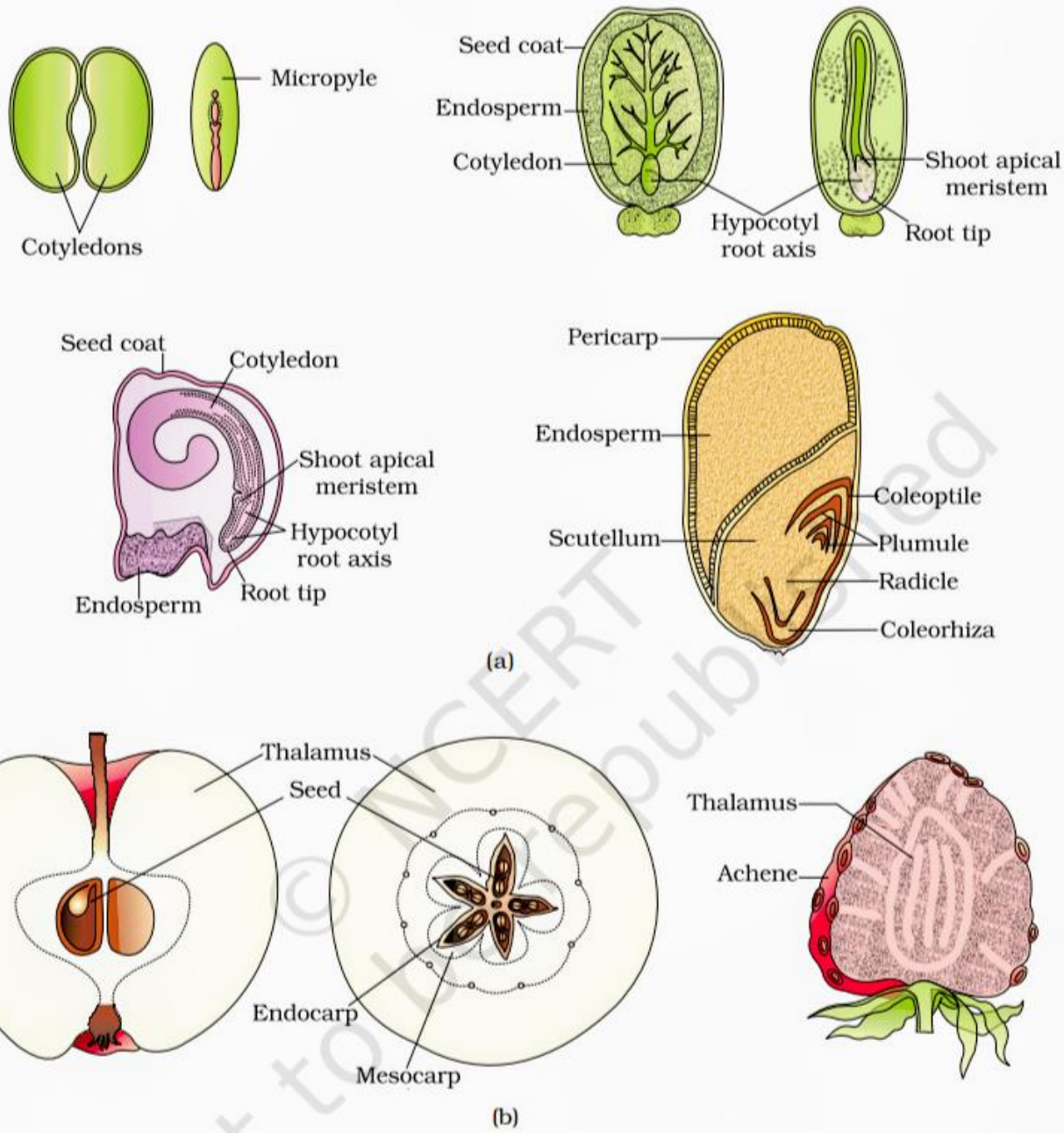

Figure 2.15 (a) Structure of some seeds. (b) False fruits of apple and strawberry

in which fruits develop without fertilisation. Such fruits are called **parthenocarpic fruits.** Banana is one such example. Parthenocarpy can be induced through the application of growth hormones and such fruits are seedless.

Seeds offer several advantages to angiosperms. Firstly, since reproductive processes such as pollination and fertilisation are independent of water, seed formation is more dependable. Also seeds have better adaptive strategies for dispersal to new habitats and help the species

Albuminous seeds:-

These seeds have residule endosperm.

Endosperm is not completely used by the developing embryo, so a portion of it remain in the seed.

Examples--coconut,castor,maize,etc.

Non-albuminous seeds:-

These seeds do not have residule endosperm as it is consumed by the growing embryo.

Endosperm is completely used by the developing embryo before the maturation of seed , so there is no endosperm left in the seed .

Examples--pea,bean,mustard etc.

Perisperm:

- It is unused nucellus in the seed.
- It is a part of seed.
- It is often nonfunctional for seed.
- Perisperm is present in only a few seeds.

Pericarp:

- It is the covering of fruit that develops from ovary wall.
- It is a part of fruit.
- It is protective covering of fruit.
- It is found in all fruits.

The following are the differences between true fruit and false fruit:

1. The true fruit is produced from the fertilized ovary of the perennial and ovules get converted into seeds. Whereas, the false fruits are produced without fertilization.

2. The pericarp and the seed are the two most important components in the production of true fruit. Whereas, the production of false fruits grows from other parts of the flower except for the ovary.

3. While true fruits include aggregate, multiple and simple fruits, the false fruit includes seedless fruits such as banana, pineapple, apple.

ASSIGNMENT 6

1. WRITE ABOUNT TYPES OF ENDOSPERM FORMATION IN ANGIOSPERM.
2. WITH A WELL LABELLED DIAGRAM EXPLAIN THE PROCESS OF EMBRYO FORMATION IN DICOT PLANT.
3. STATE THE DIFFERENCES BETWEEN

- MONOCOT AND DICOT EMBRYO.
- PERISPERM AND PERICARP
- ALBUMINOUS AND NON ALBUMINOUS SEED
- TRUE FRUIT AND FALSE FRUIT