PLANTS

We have already studied that Plants produce their own food by the process of Photosynthesis.

1. . The leaves make their own food by a process called photosynthesis.

Carbon Dioxide + Water $\xrightarrow[\text{Sunlight}]{\text{chlorophyll}}$ Food + Oxygen (glucose)

Besides making their own food, a few plants also derive food from or feed on other plants or insects / animals to survive

Some plants feed on other plants: They are called :

PARASITIC PLANTS

Parasitic plants are the plants that cannot produce their own food and grow on other plants to obtain food and water. It leads to benefit for this plant but can also lead to harming or killing of the host plant.

- E.g. Dodder or Cuscuta or lady's lace is a parasitic plant.

Some plants feed on insects or animals:

INSECTIVOROUS / CARNIVOROUS PLANTS

- Such plants are called Insectivorous or Carnivorous plants.
- Such plants normally grow in soils which are Nitrogen – deficient. Hence, they eat insects to fulfill their need for Nitrogen.
- Such plants have special structures to trap insects.
- For e.g. Venus flytrap, Pitcher plant

Venus Flytrap –

- Venus flytrap is a insectivorous / carnivorous plant that traps ants, flies, beetles, slugs, spiders and even tiny frogs.
- They have a unique jaw like structure which closes to trap the prey.
- The edges of their leaves are lined with "teeth," and these leaves fit together like a clamshell. When the leaves snap shut, they form a trap.

- Flytraps lure insects by the reddish lining in the leaves and by secreting a fragrant nectar. When bugs land in the jaws of the flytrap, it doesn't clamp down right away.

Pitcher Plant – Pitfall traps

- Pitcher plant is an Insectivorous / Carnivorous plant that has leaves like a pitcher with a lid on it.
- The leaves have a deep cavity which is filled with a nectar- like secretion which attracts insects and flies into it.
- The sides of the pitcher are slippery and are grooved in such a way that the insects cannot climb out.
- Once the insect gets into the cavity, the lid gets closed and the insect gets trap in it.
- The insect then gets digested by the leaf.

Reproduction in Plants

While animals reproduce by laying eggs or giving birth to their young ones, plants reproduce either through:
A. their seeds or
B. from other parts of the plants. They could grow from their roots, stem, leaves and spores of the mother plant.

A. Reproduction through Seeds

- Seeds presents in the fruits can develop into new plants under favourable conditions. Some seeds are not fully grown when they get separated from their parent plant. Some are destroyed by strong wind or heavy rain or are eaten by insects or birds. Some do not get the right soil or enough air and water. Such seeds cannot into new plants. However, seeds which gets favourable conditions, which are air, water and warmth can grow into new plants.

A seed is made up of three parts:

1. **Seed coat :** It is the hard outer covering of the seed. It protects the seed.
2. **Cotyledons / seed leaves :** Cotyledons are special seed leaves. They store food for the growing embryo.
   Seeds having two cotyledons are **Dicots.** e.g. gram, pea , kidney bean seed, lima bean seed.
   Seeds that have only one cotyledon **Monocots** – e.g. maize, wheat , corn & rice seed etc..
   The food that is stored in these cotyledons is called endosperm (starchy material).
3. **Embryo :**It is the tiny part hidden at the base of the seed leaves. Seeding grows from the embryo.

GERMINATION

- Germination is the process by which a seed grows into a seedling and subsequently into a new plant.
- Upon getting the right amount of air, water and warmth, the process of germination takes place.

1. Water softens the seed coat and changes the food stored in the seed into a soluble form for the baby plant. Air and warmth make the cells of the seed active.
2. The seed grows in size and the seed coat bursts open. A tiny root called **radical** comes out and grows downwards. A tiny shoot called **plumule** grows upwards towards the sun. This plumule grows into stem and leaves.
3. During the early stages of germination, the seedling gets the good required for its growth from the cotyledons. After the food stored in the cotyledons has been used up, it gets its food from the soil.
4. The seedling absorbs water and nutrients from the soil with the help of its roots.
5. Air (which is required for germination) also reaches the seed through pores in the soil.
6. It develops leaves and grows into a plant. That is why soil is so important for plant growth.

SEED DISPERSAL – The process by which the seeds are scattered away or spread away from the mother plant is called seed dispersal.

1. Seed dispersal is mainly carried out by agents like wind, water and animals.
2. Some seeds are dispersed by explosion.

WIND DISPERSAL

- Seeds of some plants are light in weight and have wing like structures or hairs called tufts on them. This helps them to float in the air.
- The seeds then germinate into new plants in that place.
- Some examples are of
- Dandelion , Cotton, Drumstick and Maple seeds have wings, which help in dispersal.
- Sunflower plants have fruits which are hairy and are blown away to far off places.

WATER DISPERSAL

- Seeds dispersed by water have special structures that help them to stay afloat.
- Fruits like water lily and coconut palm float on water. They form a spongy or fibrous outer coat that helps them to float. Coconuts can travel to thousands of kilometers across seas and oceans. Lotus fruit also disperses seeds through water.

ANIMAL DISPERSAL

Animals and birds also help to disperse seeds.
At times while eating fruits, only the juicy part gets digested while the seeds are thrown away by mouth or are passed out through excretion. New plants grow from these seeds.

- This can happen far away from the parent plant. Since animals move from one place to another.
- For e.g. Seeds of Cherry and Apple are dispersed in this manner.
- Birds like parrots also disperse seeds to other areas through their droppings.
- Squirrels collect nuts and bury them as food for winter but they often forget where they have buried them. These seeds then grow into new plants.
- The Xanthium plant has spiny seeds with hooks. These get attached to the body of animals and are carried away from the parent plant.

DISPERSAL BY EXPLOSION

- Some plants have pods that explode when ripe / when they dry up and scatter their seeds.
- This is observed plants like balsam, castor, pea and beans.

B. Besides seeds plants also reproduce through their other parts:

They could grow from their roots, stem, leaves and spores of the mother plant.
VEGETATIVE PROPAGATION
The reproduction of a plant from the parts of the mother plant like roots, stems, leaves, buds and spores is called vegetative propagation.
For e.g. Plants like Cacti, Strawberry, Onions etc. reproduce by vegetative reproduction.

Vegetative propagation through Stem:-

Vegetative propagation (or reproduction) can take place through stems. This is seen in various different types of plants. For example -

1. Runner – Grasses produce underground stems. These underground stems grow through the soil and they produce new roots and side shoots at definite intervals above the ground. This leads to the entire land getting green. Another example of a runner is a Strawberry plant.

2. Tuber – Potatoes are underground stems called tubers. They are swollen because they store food in them. Just as normal stems have buds, they too have buds called ‘eyes’ found in depressions on its surface. These depressions are called ‘eyes’ or ‘notches’.. New potato plants sprout from these eyes or notches. Hence, when a potato is cut into parts and planted in the soil, each part with an ‘eye’ develops into a new potato plant.

3. **Cutting –**

Many plants such as Rose, Coleus, Sugarcane and Bougainvellia are propagated by stem cuttings.

Cutting is a artificial way of producing plants. It allows many new plants to be produced from a single plant without waiting for flowers and seeds.

In this method a young healthy stem from the node of a plant is cut off and is planted in a suitable rooting medium that includes moist sand, a mixture of compost and soil.

These buds then give out roots and a new plant grows out of the cutting with new roots and stem.

Vegetative propagation through Roots:

Roots help by absorbing water from soil, by providing support to the plant by anchoring it to the soil and besides this some roots also store food. Roots of some plants can also give rise to new plants. In such plants buds develop at the base of the stem. These buds then grow into new plants by taking nutrition from these swollen, modified roots. For e.g. Sweet potato.

It is cut with its buds on its top and sown in the soil . from there, the plant develops new roots that grow into fresh shoots upwards while a new sweet potato swollen root grows underground.

Vegetative propagation through Leaf:

New plants can also be obtained from leaves. In Plants like Bryophyllum, the margins of the leaves contain buds. Small plants called plantlets arise from these buds. These plantlets fall off and develop into mature plants.

SPORES

Some plants like ferns and mosses and organisms like mushroom do not bear flowers or fruits. They do not produce seeds. Instead, they have spores. Spores are tiny bodies present on the inner surface of the leaves.

When weather conditions are ideal, some ferns, algae, moss and even fungi, release spores into the air, often carried by the wind, by insects or birds until they land. Spores contain both male and female reproductive organs, which allows these plants to replicate themselves in a form of cloning.

CROP PRODUCTION

The practice of growing plants on a large scale for food or other purposes is called Agriculture.

Plant that are grown in large quantities in a particular area or region during a particular season are called Crops.

Cultivation of crops involves a number of stages:

A. Preparation of soil

- The soil is first loosened or turned using ploughs or tractors. This is called **tilling** or **ploughing**.
- Ploughing / tilling helps by:
    a. Allowing roots to penetrate deeply
    b. To restore nutrient rich soil on the top layer
    c. It helps in growth of Earthworms and Microbes

B. Adding manure or fertilizers

- Manures and fertilizers are added so as to replenish the soil with important nutrients also protect them from pests.

C. Sowing of seeds

- Seeds which are healthy / good quality are sown at a distance to prevent over crowding
- HYV (High Yielding Variety), of seeds develop by scientist are being preferred now a days. Though they require more water, they yield good quality crops

D. Irrigation

- Germination of seeds also requires water besides air and warmth, Thus crops are supplied water by artificial means at regular intervals and this is called irrigation.
- Irrigation can be done by various sources like wells, tube-wells, ponds, rivers, lakes, dams and canals.
- Various methods of irrigation like drip irrigation, sprinkler irrigation can be used.

Drip irrigation systems distribute **water** through a network of valves, pipes, tubing, and emitters.The other name of this irrigation system is trickle irrigation. Water is made to drip a very low

If you apply pumping system in which you make use of pipes to distribute water with the help of spray heads which moisten your whole soil surface, then this system is known as **Spray or Sprinkler Irrigation system.**

E. Harvesting

The process of cutting and gathering crops after they mature is called Harvesting. The crops are pulled out or cut close to the ground. This is done manually using sickles or by using machines.

F. Threshing & Winnowing

-**Threshing** is the process of loosening the edible part of grain (or other crop) from the husks and straw to which it is attached. It is the step in grain preparation after reaping and before winnowing, which separates the grain from the chaff.

-It can be done manually or by using machines.

-**Winnowing** is an agricultural method developed by ancient cultures for separating grain from chaff. It is also used to remove weevils or other pests from stored grain. The threshed crops are tossed in the air to separate the lighter particles of chaff, dirt and even pests from them . It is done using a winnowing fan.

G. Storage

Crop Storage is an essential and unavoidable part of the **crop** production process

-The harvested crops need to be kept safe from moisture , insects and rats. Hence they need to be stored properly.

For this:

-The grains are dried in the sun to reduce the moisture in them.

- The grains are stored in jute bags or metallic bins.

- The large scale storage of grains is done in Silos and granaries to protect them from pests like rats and insects.