Class-X

Life process Structure of Stomata, Heterotrophic

Heterotrophic :(Hetero = different ; trophic = food)

It is a mode of nutrition in which organisms derive their food for some other animals or plants. They cannot prepare their own food e.g. human being.

Heterotrophs are further categorized depending on the nature of food they consume:

(i) Herbivores : Animals which eat only plants, e.g. Cow, goat etc.

(ii) Carnivores : They feed on flesh of other animals, e.g. Lion, vulture etc.

(iii) Omnivores : They feed on plants and animals both e.g. Dog, human etc.

(iv) Detritivores : Feed on detritus or dead organic remains, e.g. Earthworm etc.

(v) Sanguivorous : Feed on blood e.g. Leech, female mosquito etc.

(vi) Frugivorous : Feed on fruits, e.g. Parrot etc.

(vii) Insectivores : Feed on insects, e.g. Bats etc.

On the Basis of Mode of Feeding Organisms are Categorized As :

(i) Holozoic : They ingest mostly solid but sometimes liquid food. e.g., Amoeba, human etc.

(ii) **Saprotrophic :** They absorb organic matter from dead and decaying organisms with the help of their enzymes. e.g., Bacteria, fungi etc.

(iii) **Parasitic :** They derive their nutrition from other living plants or animals e.g. Plasmodium round worms etc.

- Stomata :
- Carbon dioxide: Terrestrial plants obtain carbon dioxide from the atmosphere through the small openings present on leaves called as stomata. 'Stomata' are the small pores present on the surface of leaves. They help in exchange of gases and transpiration. Stomatal opening is guarded by the presence of guard cells (kidney shaped).
- Aquatic plants obtain CO₂ dissolved in water through their general body surface so they perform more photosynthesis than terrestrial plants.



Opening and Closing of stomata

(i) Water : Plants absorb water from the soil by the process of osmosis. This water is transported to leaves by a special type of tissue called as xylem. Plants utilize carbon dioxide during photosynthesis, the intensity of light at which amount of CO₂ used during photosynthesis becomes equal to the amount of CO₂ released during respiration by plants in called as Compensation point. Compensation point occurs at low light intensity that is during morning and during evening hours.

✤ Dark reaction :

- It involves three basic steps :
- Carboxylation : In this step CO₂ is assimilated by acceptors like RUBP (in C₃ Plants), PEP (in C₄ Plants) with the help of enzymes i.e. RuBisCO (Ribulose-1,5-bisphosphate carboxylase oxygenase) & PEPCo (Phosphoenol pyruvate carboxylase) respectively.
- 2. Synthesis of glucose : In this phase captured CO₂ is assimilated into glucose.
- 3. Regeneration of RUBP

Overall Reaction of Dark Phase :

12RUBP + 6CO₂ + 12NADPH + 18ATP + 12H⁺ → 12RUBP + C₆H₁₂O₆ + 18ADP + 18ip + 12NADP

Desert plants are exception. They open stomata in night to absorb $\rm CO_2$ and form intermediate compound

i.e. malate. Which is stored in vacuole and during day it is converted into sugar.

FACTORS AFFECTING PHOTOSYNTHESIS :

(a) Carbon dioxide :

It is the raw material for the formation of glucose. Land plants obtain CO_2 from the atmosphere through the stomata. The aquatic plants get their CO_2 as bicarbonates through their general surface. CO_2 used by the green plants during photosynthesis is released due to respiration in green plants and other organisms. Hence, we say that photosynthesis and respiration are antagonistic to each

other. It has been proved experimentally that an increases in CO_2 concentration up to 0.5 percent may cause increase in photosynthesis but only for a limited time period provided other conditionsremain constant.

(b) Oxygen :

 O_2 acts as competitive inhibitor of CO_2 . Over concentration of O_2 stops photosynthesis.

Stomach

Internal lining of stomach contains numerous **gastric glands**. They secrete gastric juice that helps in the digestion of food. The muscular wall of stomach helps in **churning** of food. The stomach also helps in storage of food for sufficient time.

Functions of Stomach: -

(1) Temporary storage of food.

- (2) Partial digestion of food by gastric juice.
- (3) Churning of food.
- (4) The stomach regulates the flow of partially digested food into the small intestine.

In stomach:-

Food is mixed with gastric juice which contains mucus, hydrochloric acid, pepsin, rennin and a weak lipase enzyme.

Pepsinogen \xrightarrow{HCl} Pepsin Prorennin \xrightarrow{HCl} Renin Proteins \xrightarrow{pepsin} Peptides and peptones Casein (milk protein) \xrightarrow{rennin} Paracasein

Mucus, lubricates the food and protects the inner lining of the stomach from the action of acids.