

Chapter 11

TRANSPORT IN PLANTS

Transpiration and photosynthesis a compromise transpiration is useful for

- Creates transpiration pull for absorption and transport of water.
- Supplies water for photosynthesis.
- Transport minerals from soil to all parts of the plants.
- Cools leaf surfaces, 10 to 15 degrees.
- Maintain shape and structure of the plants by keeping cells Turgid.

Photosynthesis requires continuous supply of water.

The humidity of rain forest is due to exchange of water between plants and atmosphere.

Evolution of C4 plant is strategy to more CO₂ and less water loss.

Uptake of mineral ions:

- Uptake of mineral is by both active and passive.
- Proteins of epidermis helps in uptake.
- Endodermal transport where the plant adjust quantity and types of solutes that reach xylem.

Translocation:

Occurs along with mass flow in xylem phloem also transports some minerals.

Phloem transport:

Flow from source to sink – Bidirectional flow:

Source – Where food is available.

Sink – Where food is needed.

Often source and sink can be reversed in plants.

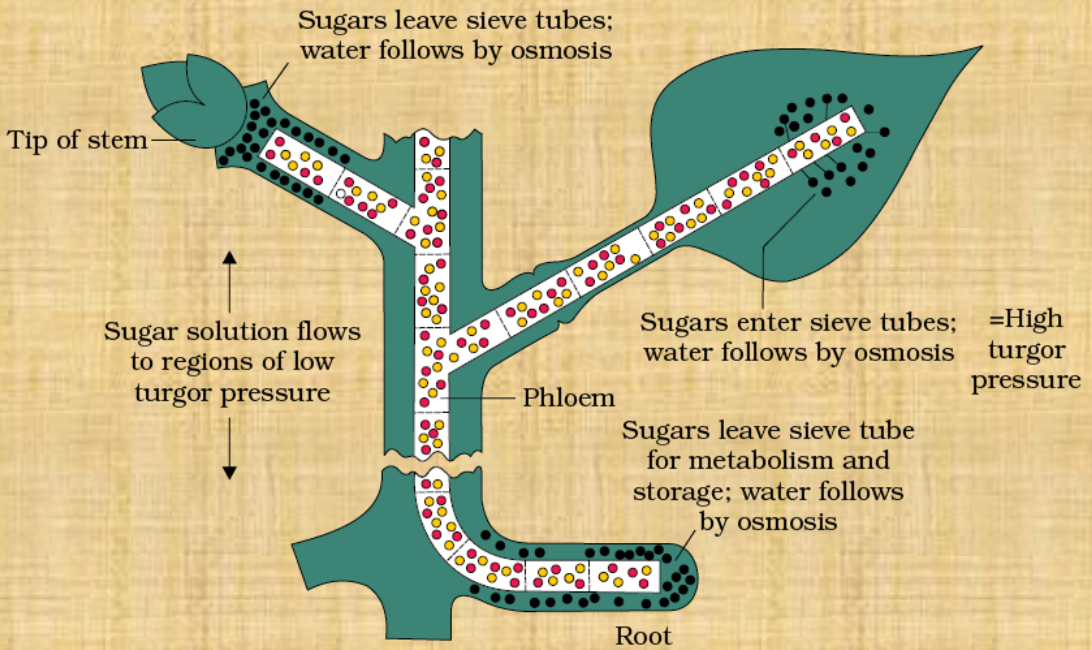


Fig. Diagrammatic presentation of mechanism of translocation

The pressure flow (or) mass flow hypothesis:

Loading – Glucose – Sucrose – by active transport enters into companion cells and sieve tubes. Because of entry of sucrose, the solution in sieve tube becomes hypertonic so water from surrounding xylem enters into sieve tubes the entry of water into sieve tubes creates pressure that act like driving force due to pressure the sugar solution move from high pressure to low pressure that is from source to sink.

Unloading – At sink, sucrose is actively absorbed cells so water moves surrounding xylem by diffusion.

Girdling experiment proves that phloem is responsible for transport of food and organics.