

Xylem vessels and tracheids

xylem



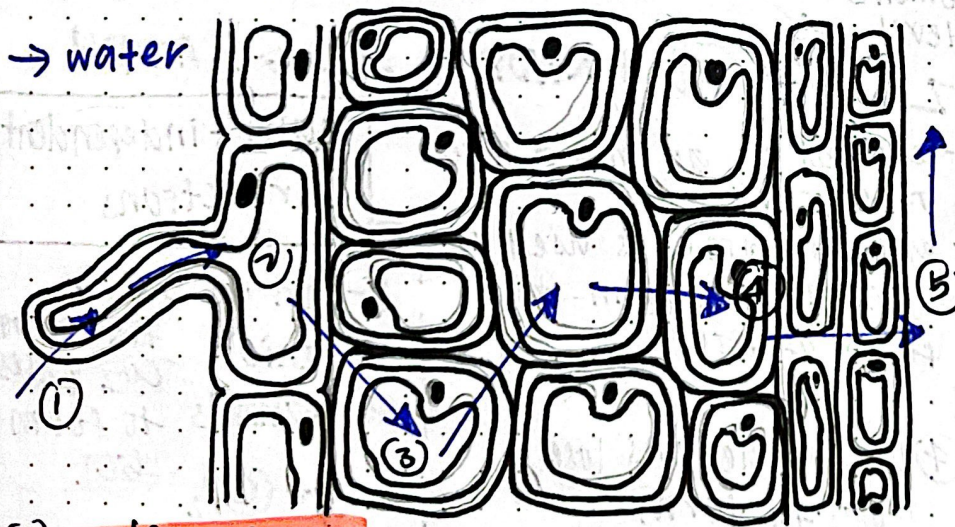
- consists of dead cells
- @ maturity
 - ↳ x cytoplasm
- arranged longitudinally from end to end
- ↳ form a cont. tube to allow water flow from roots to leaves
- walls have uneven lignin thickening
 - ↳ give strength to xylem vessel
 - ↳ prevent collapsing due to tension force + pressure change when H_2O moves thru
 - ↳ prevent plant from being bent

tracheid



- cell wall has lignin thickening
- have pits
 - ↳ allow water movt. to adjacent cells

Transport of water and mineral salts



- ① - water potential in root hair cells $<$ water in the soil
- mineral ions are actively pumped into the vacuole
 - ② H_2O from soil diffuses in2 the root hair cells + epidermal cell via osmosis
 - ③ $\uparrow H_2O$ potential in the root hair cells causes the H_2O to diffuse in2 the cortex via osmosis
 - ④ causes osmosis to continuously occur thruout the cortex, endodermis + pericycle layers
 - ⑤ causes root pressure to push water in2 the xylem vessels of the root, then in2 the xylem vessels
- **simplast pathway**
 ↳ H_2O moves thru cyto. + plasmodesmata
 - **apoplast pathway**
 ↳ moves thru spaces btw cellulose fibres @ cell wall

① Transpirational pull

- ↳ produced when H_2O that is evaporated from the stomata, pulls water from leaves

② capillary action

- ↳ produced from adhesion force + cohesion force of H_2O which moves H_2O upwards in the stem against gravity

③ root pressure

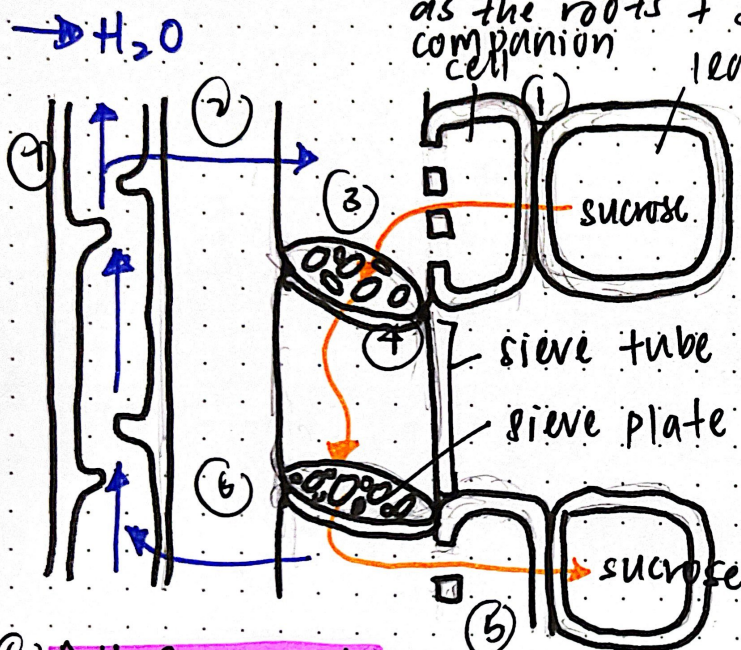
- ↳ moves H_2O from the soil in2 the xylem vessels of the root via osmosis

⑤ causes root pressure to push water in2 the xylem vessels of the root, then in2 the xylem vessels

- **simplast pathway**
↳ H_2O moves thru cyto. + plasmodesmata
- **apoplast pathway**
↳ moves thru spaces btw

Translocation

a process of transporting organic sub. such as sucrose, amino acids + hormones in the phloem from the leaves to other parts of plants such as the roots + stem



(1) sucrose is actively transported into the sieve tube

(2) transport of sucrose into the sieve tube thru companion cell from the leaf cells

↳ reduces H_2O potential in the sieve tube

↳ H_2O diffuses from the x. into sieve tube thru osmosis

(3) hydrostatic pressure +

(4) phloem sap is pushed along the sieve tube to other organs of the plant

(6) ↑ H_2O potential in phloem

↳ H_2O diffuses to return into the xylem via osmosis

(5) phloem sap (suc.) is transported from sieve tube to other parts e.g. shoots, stems, roots, fruits, tubers by act. transport.