PLANT ~ PART 4

TRANSPIRATION

TRANSPIRATION-COHESION-TENSION MECHANISM

- Water is pulled upward by _____ pressure in the xylem

_____

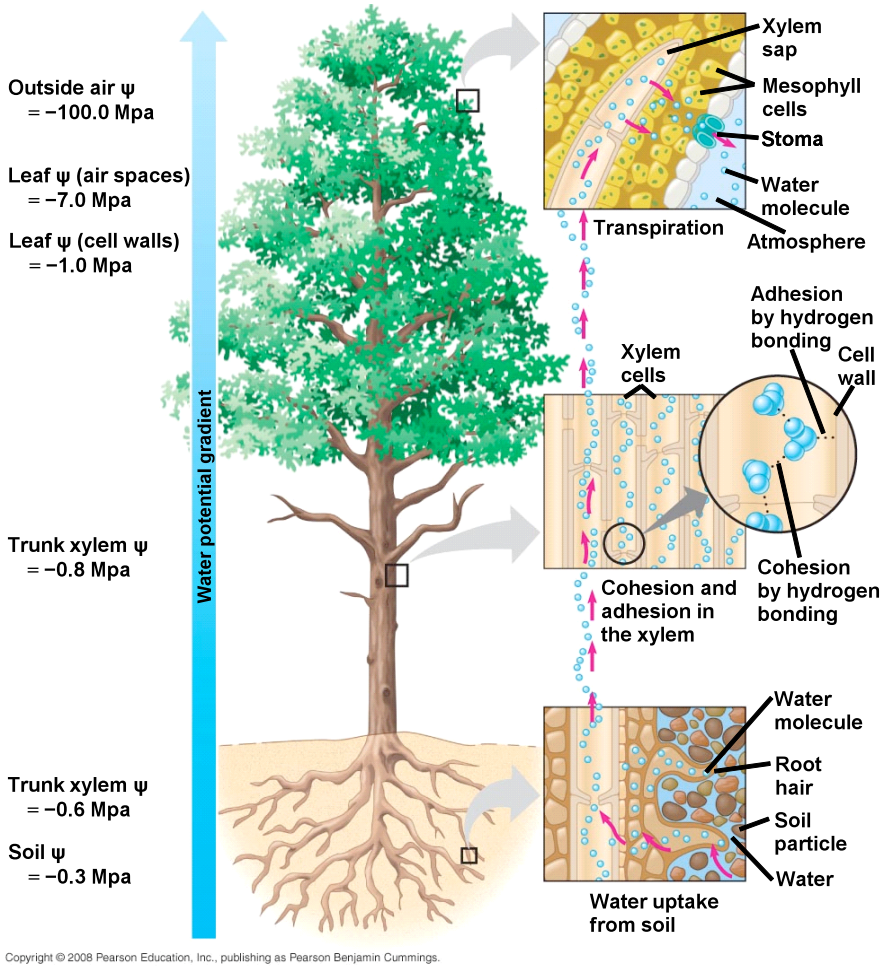
- Water vapor in the airspaces of a leaf diffuses _____ its water potential gradient and exits the leaf via _____
- Transpiration produces _____ pressure (tension) in the leaf, which exerts a pulling force on water in the xylem, pulling water into the leaf

_____

- The _____on xylem sap is transmitted all the way from the leaves to the root tips and even into the soil solution
- Transpirational pull is facilitated by _____of water molecules to each other and _____ of water molecules to cell walls

Transpiration-Cohesion-Tension Mechanism

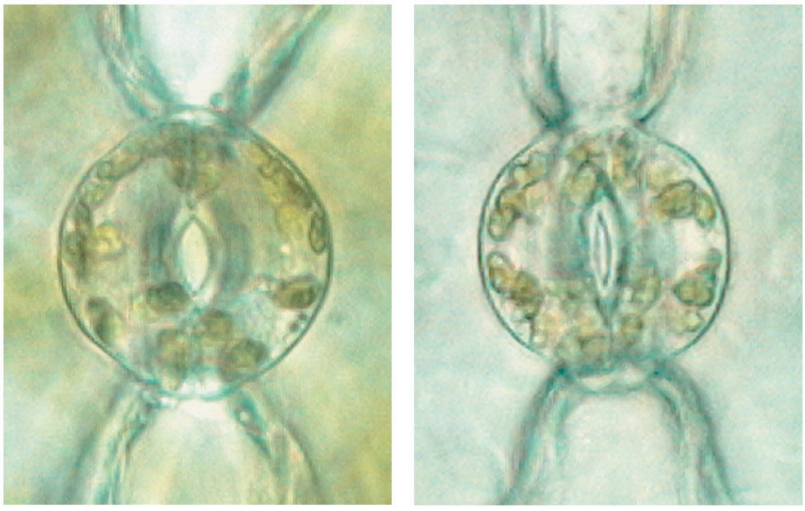
Fig. 36-15



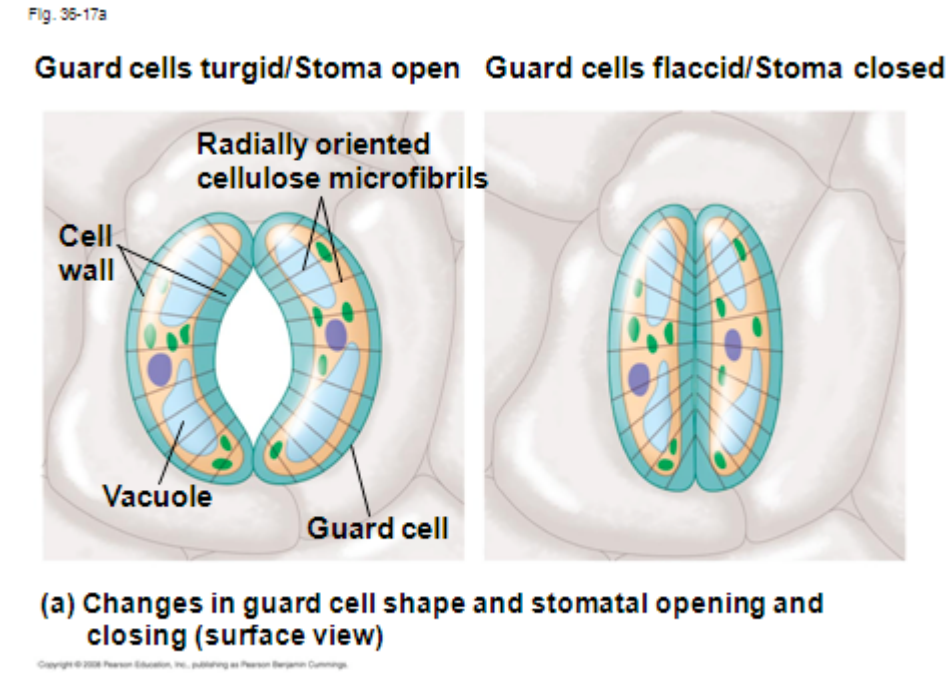
- The movement of xylem sap against gravity is maintained by the transpiration-cohesion-tension mechanism
- Transpiration _____water potential in leaves, and this generates negative pressure (tension) that _____water up through the _____
- There is no energy cost to bulk flow of xylem sap

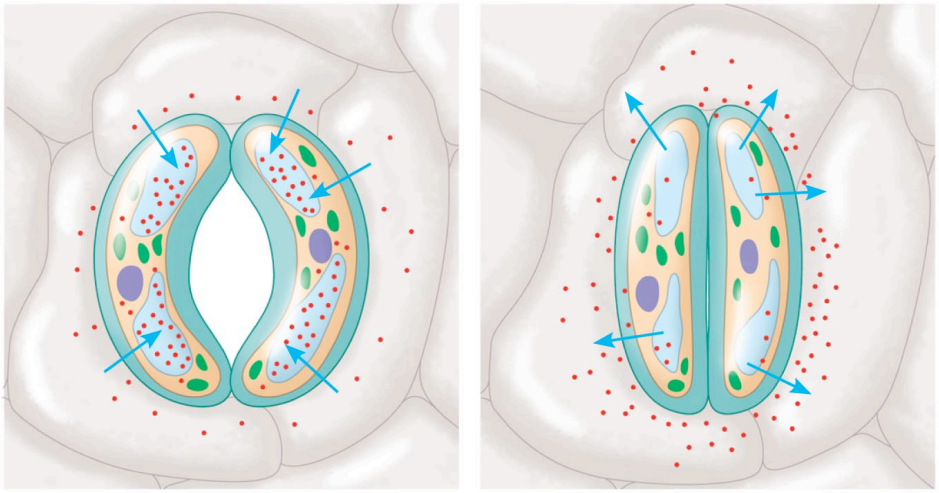
- At night, when transpiration is very low, root cells continue pumping mineral ions into the xylem of the vascular cylinder, lowering the water potential
- Water flows in from the root cortex, generating **root pressure**
- Results in guttation→

What helps to regulate transpiration?



Mechanisms of stomatal opening and closing





Role of potassium in stomatal opening and closing

Stimuli for opening and closing stomata:

- Generally, stomata open during the _____ and close at _____to minimize water loss
- Stomatal opening at dawn is triggered by_____, _____ , and an internal "clock" in guard cells
- All eukaryotic organisms have internal clocks; _____**rhythms** are 24-hour cycles