

Irrigation strategies for high density apple and sweet cherry.

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Irrigated agriculture

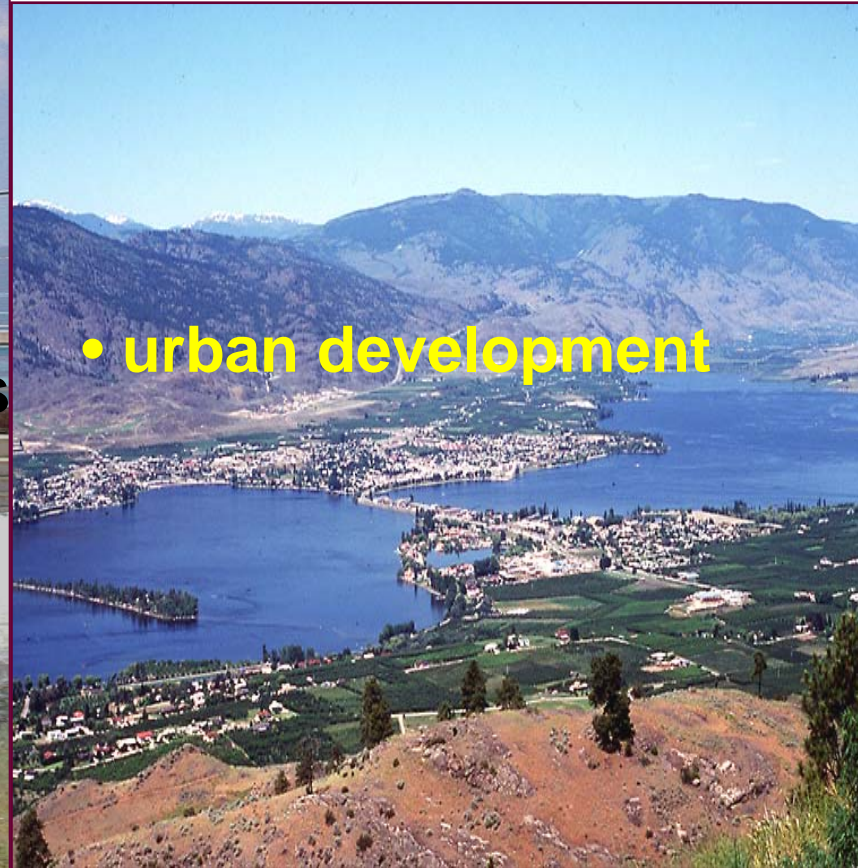
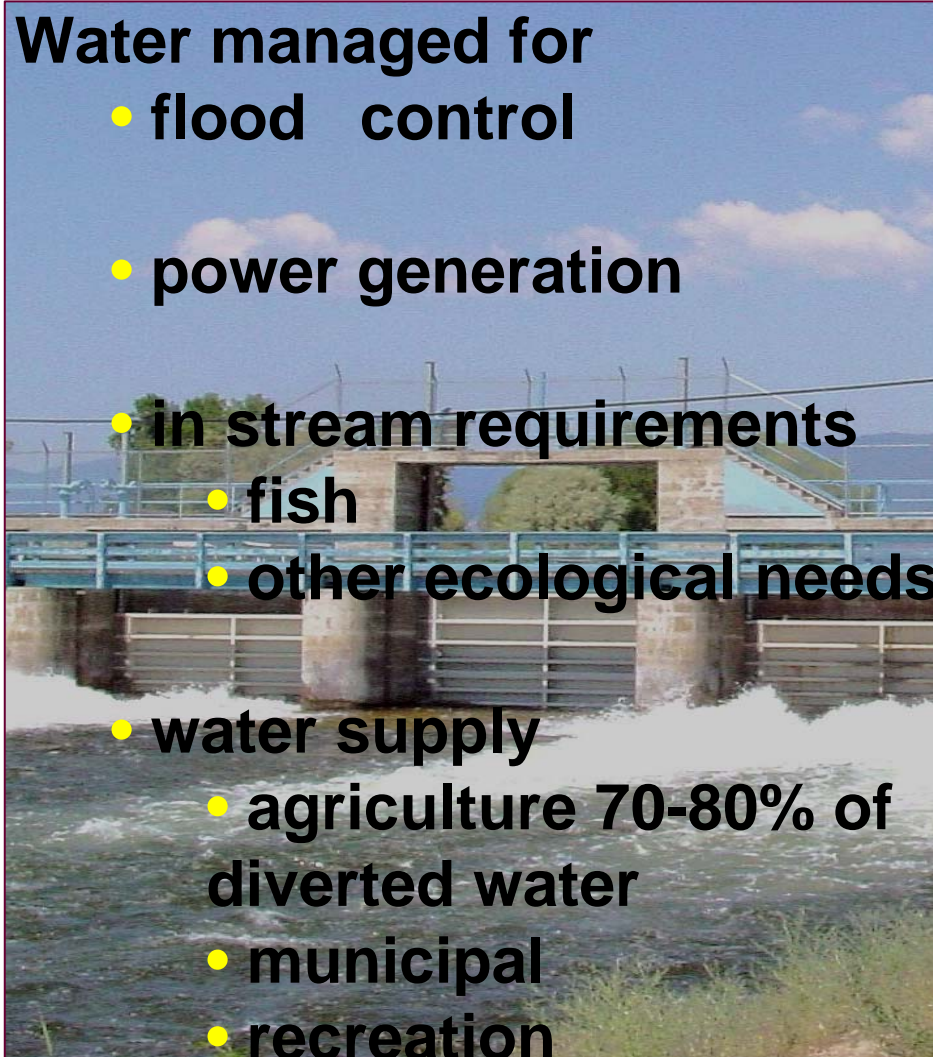
- Highly productive

Approximately 40% of the world's food comes from the 17% of the land that is irrigated (Postel, 2000).

Agricultural vulnerability: competition for water and land

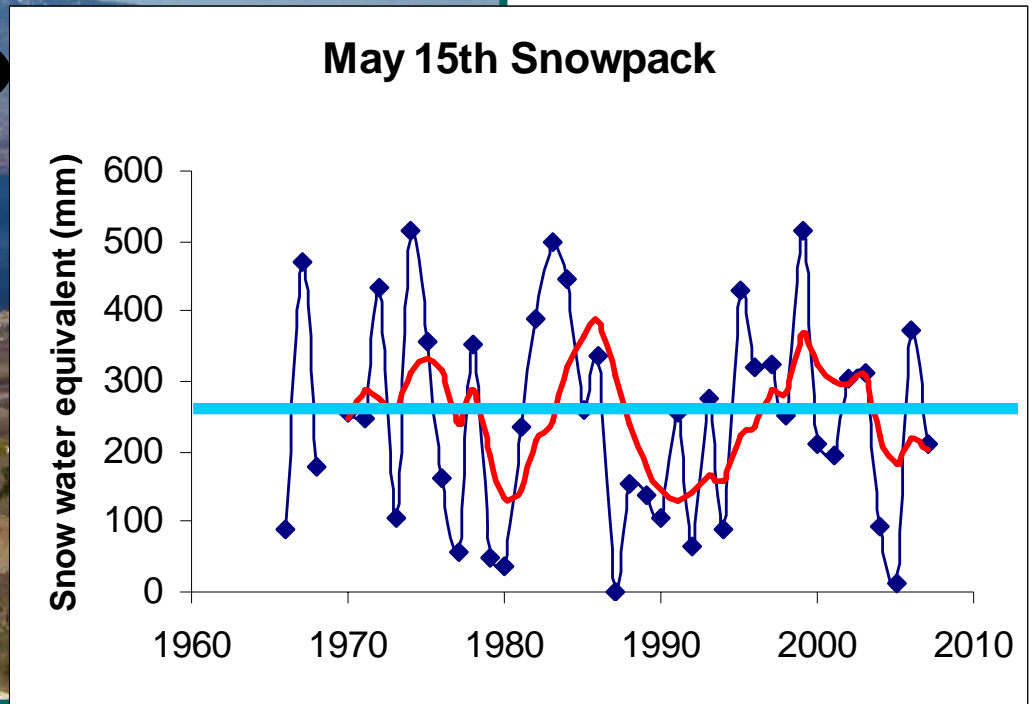
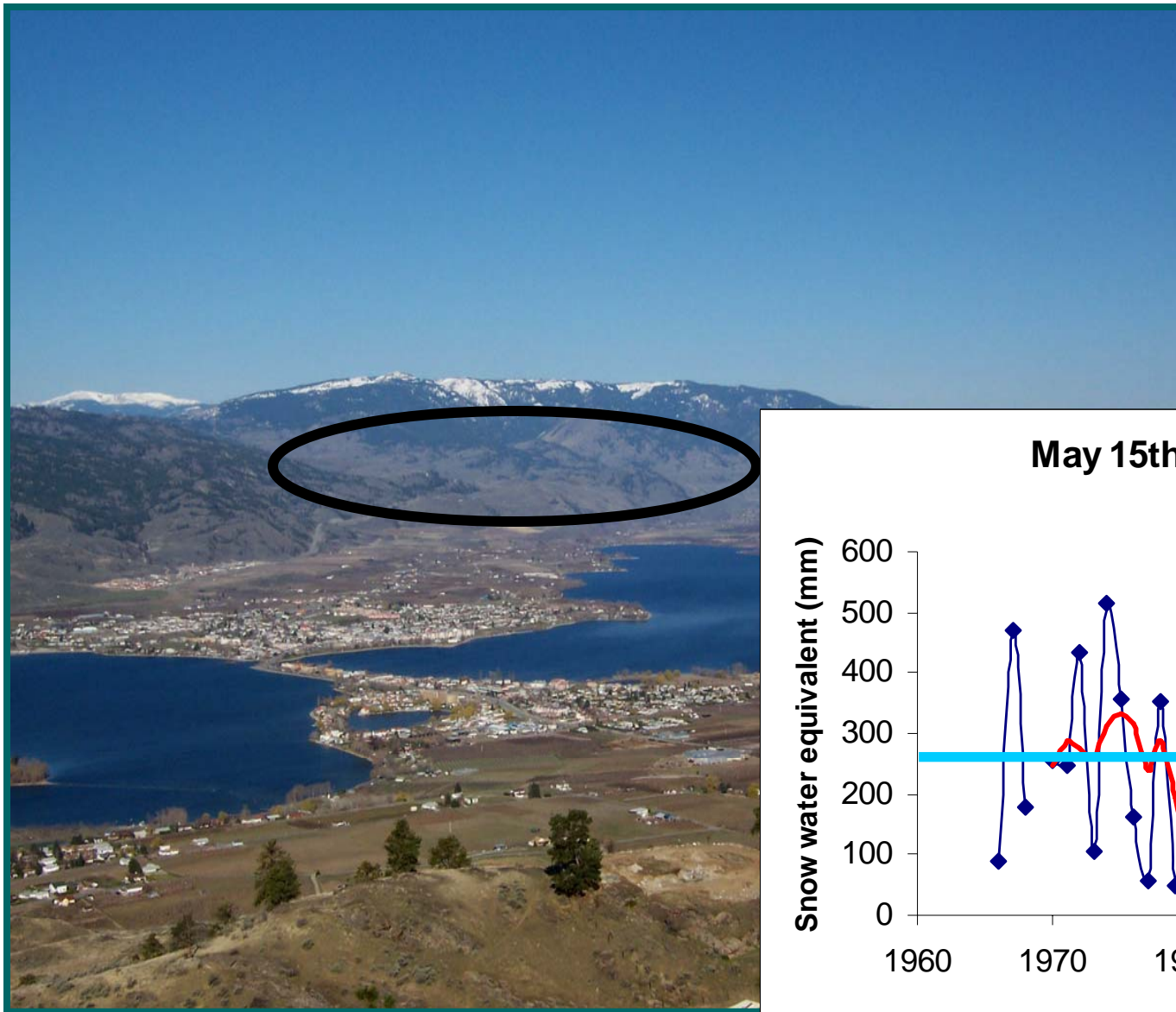
Water managed for

- flood control
- power generation
- in stream requirements
 - fish
 - other ecological needs
- water supply
 - agriculture 70-80% of diverted water
 - municipal
 - recreation

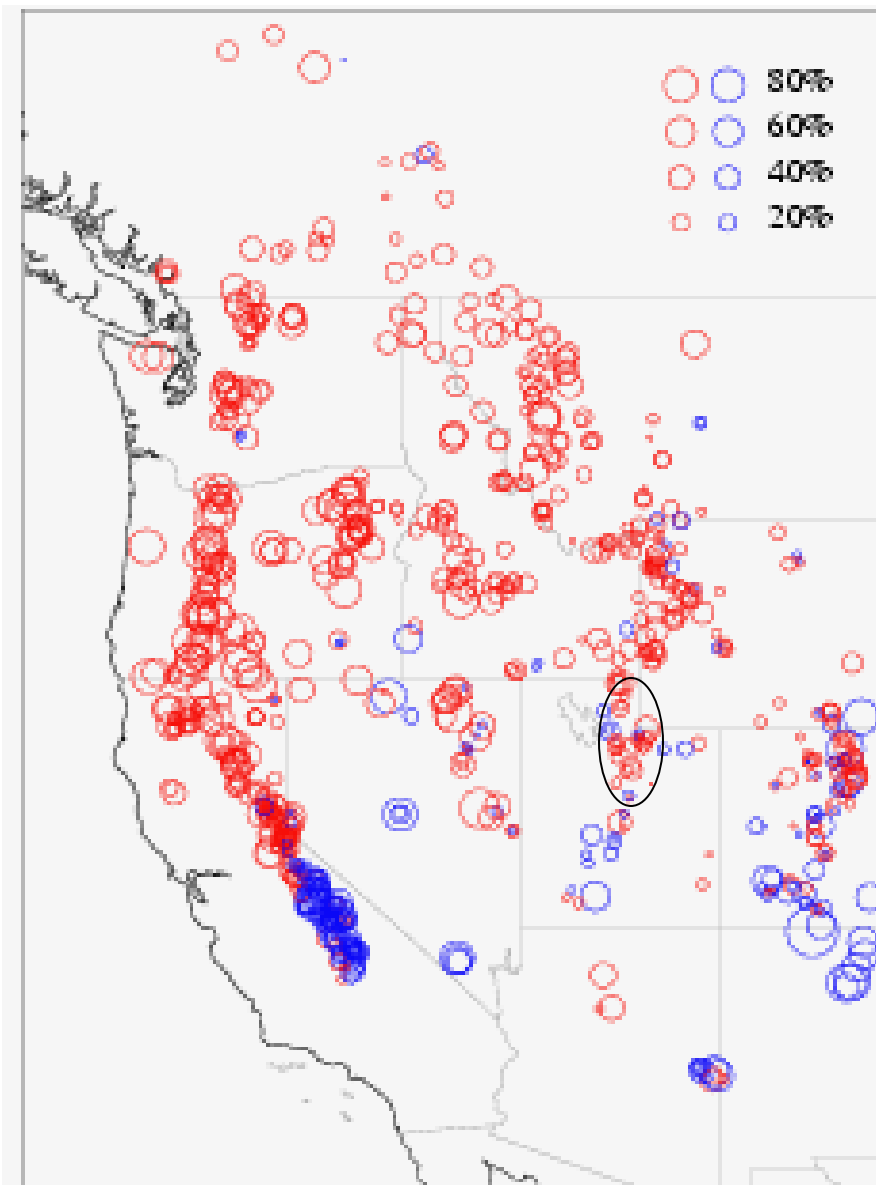


- urban development

Snowpack reliability



Trends in Snow pack



Throughout the Pacific Northwest

- Higher winter and springtime temperatures
- Reduction in snow fraction: % of precipitation that falls as snow
- Earlier snow melt and runoff

Mote P.W., Hamlet A.F., Clark M.P., Lettenmaier D.P., 2005, Declining mountain snowpack in western North America, BAMS, 86 (1): 39-49



Presentation structure

- Plant water requirements
- Water management of tree fruits
 - Issues with high density plantings
 - Strategies for managing water well
 - Conservative systems
 - Irrigation scheduling
 - Amendments



Plant water requirements



Water in plants

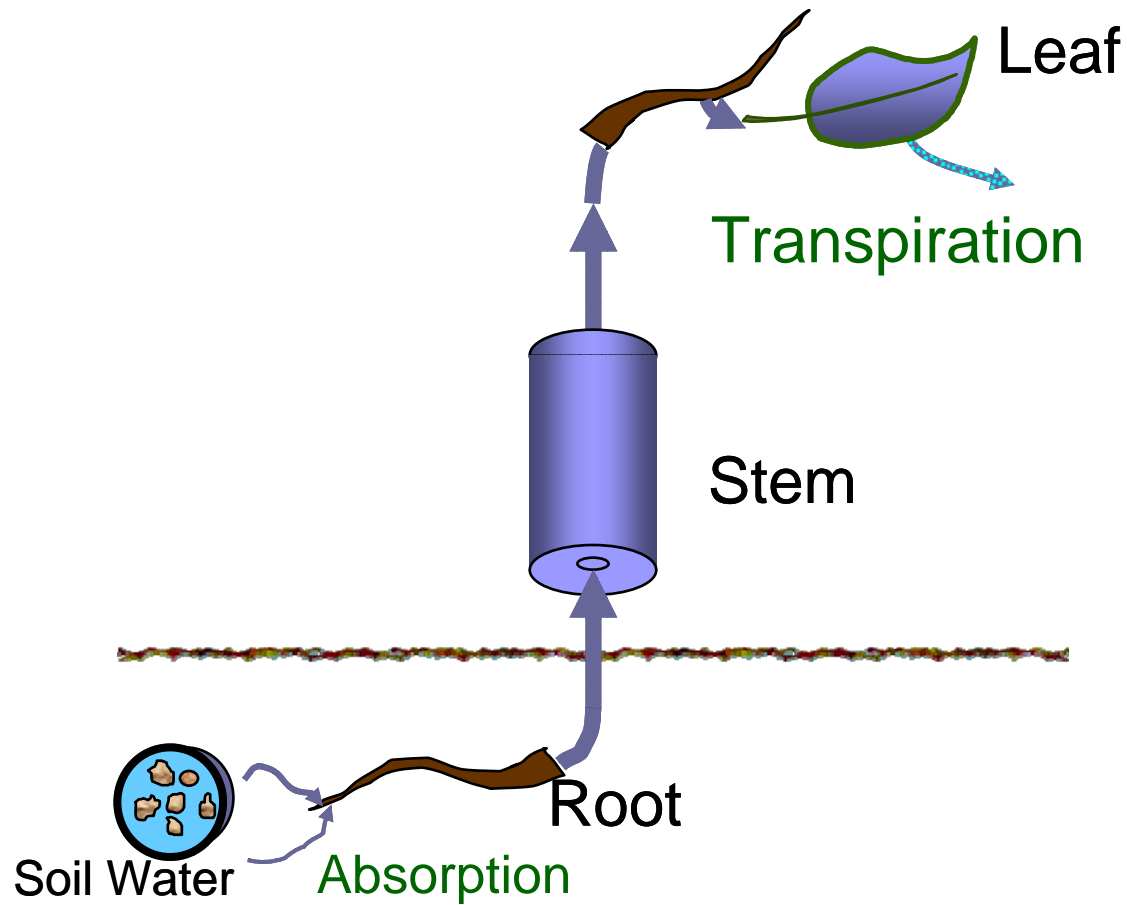
- **Plant constituent (e.g. apple fruit ~ 80% water)**
- **Solvent and transporter of nutrients etc.**
- **Chemical reactant**
- **Maintains cell turgidity (important for growth and cell function)**
- **Modifies tree micro-climate (cools through evaporation, increases humidity)**



Plant water requirements

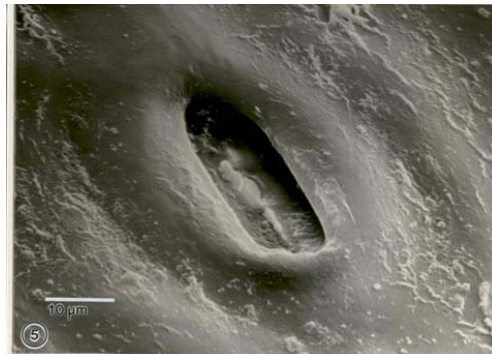
- **adequate supply for crops**
 - **prevent stress**
 - **maximise yield**
 - **improve fruit quality**

Plant water movement

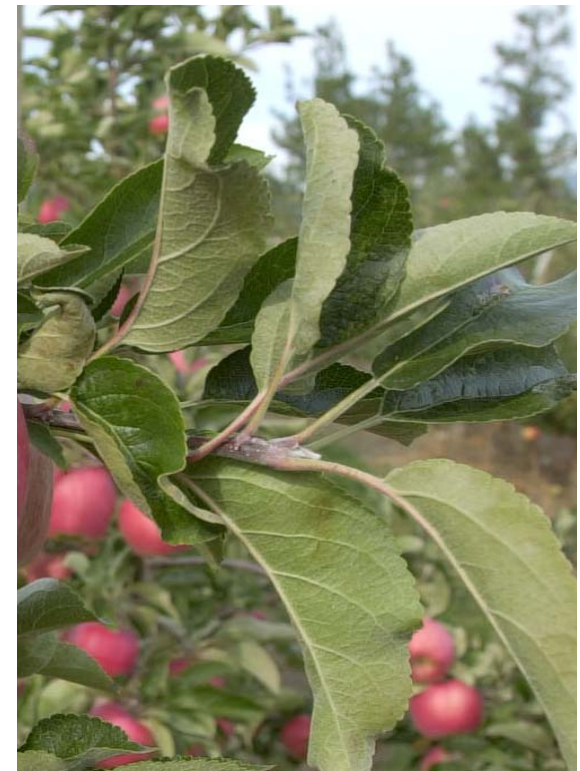


***Soil-Plant-
Air
Continuum
of
Water***

Water movement through the plant – stomates



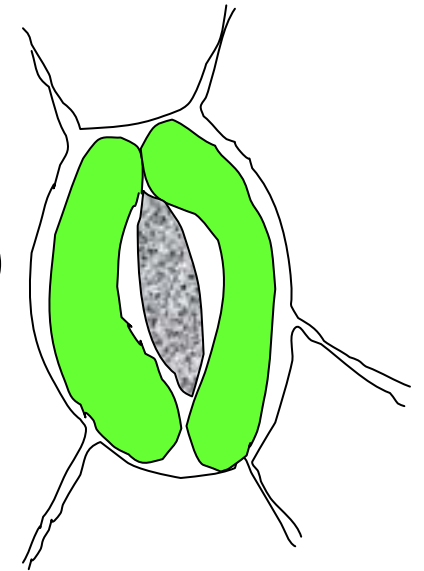
(100k - 350K/sq in)



Water movement through the plant – stomates

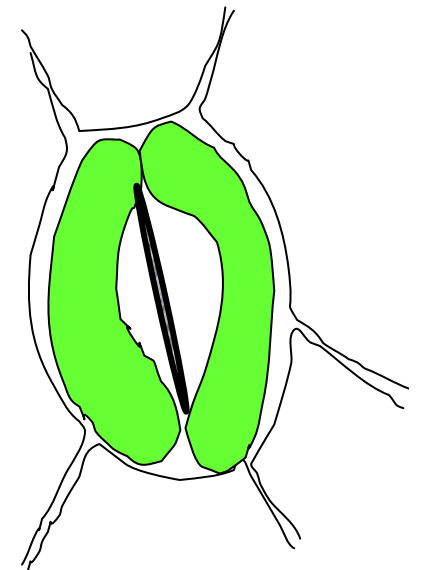
Open when

- Guard cells are turgid (filled with water)
- Plant requires CO_2 for growth and function
- Sufficient light for photosynthesis



Closed when

- Guard cells are water stressed
- Plant does not require CO_2
- Low light



Daily Fruit Growth

