Physiological ecology

- How individual organisms respond to the abiotic environment:
  - Temperature
  - Water
  - Light
  - Nutrients

Plants and water

- Plants perform best when their cells are fully hydrated—at maximum turgor
- What are they using the water for?

Water outline

- Plants and water
  - Regulation and uptake
  - Too little vs. too much water
- Animals and water
  - Regulation in dry places
  - Osmoregulation

Water regulation in plants

- Balancing gains & losses
Water uptake in plants

- Canadian grassland
- Wet or dry sites?

\[ n = 850 \text{ plants across 16 species} \quad \text{Fig. 6.11} \]

Responses to flooded soils (1)

- Too much water leads to low levels of...
- Some solutions:
  - __________________
  - __________________
  - __________________

Responses to flooded soils (2)

- Two more solutions

Animals and water

- Balancing gains and losses

Animals in the desert (1)

- Tenebrionid in the coastal Namib Desert

\[ \text{Animals in the desert (1)} \]

\[ \text{Tenebrionid in the coastal Namib Desert} \]
**Fog interlude**

Lima, Peru

**Animals in the desert (2)**

Merriam’s kangaroo rat

SW US in action

**Adaptation to water availability**

- Do different populations of the same species vary in their ability to conserve water?

**Osmoregulation in a ‘dry’ environment**

- Passive:
  - Water out
  - Salts in

Both are hypoosmotic to the saltwater.

- Range map: Merriam’s Kangaroo rat

- What about acclimation?

**Fig. 6.10**

**Fig. 6.17**

**Fig. 6.27**