BIOL V23: Plant Biology - Roots (Ch 5)

I. Structure

A. types of roots

1. seedling

2. tap root systems

a. tap roots

b. branch roots

3. fibrous root systems

4. adventitious roots

5. woody roots

B. root tip

1. root cap

2. root apical meristem (RAM)

quiescent center

3. region of elongation

4. region of maturation

root hair zone

5. primary meristems

a. protoderm

b. procambium

c. ground meristem

C. young root cross-section (dicot)

1. epidermis

2. cortex

3. unique root tissues

a. endodermis

Casparian strip

b. pericycle

4. vascular tissue

a. primary xylem

arrangement

b. primary phloem

D. young root cross-section (monocot)

1. epidermis
2. cortex
3. unique root tissues
   a. endodermis
      Casparian strip
   b. pericycle
4. vascular tissue
   a. primary xylem
   b. primary phloem
5. pith

E. branch roots = lateral roots

II. Root functions

A. general

1.

2.

3.

4.

B. special

1. food storage

2. water storage

3. aerial
    a. climbing

    b. photosynthetic

4. prop

5. buttress

6. asexual reproduction

7. contractile

8. pneumatophores (mangroves)

C. symbioses
1. parasitic

    haustoria

2. mutualistic
    a. mycorrhiza(e)

        ectomycorrhiza(e)

        endomycorrhiza(e)

    b. nitrogen (N_2) fixation

        root nodules

        cyanobacteria

III. Soils
A. Overall
1. soil horizons
    a. topsoil

        humus

    b. subsoil,

    c. parent material

B. soil particle sizes

clay

silt

sand

gravel

types of soils

a. “light” soils

b. “heavy” soil

C. How does rock become soil?

1. weathering

2. biological effects

D. water in soil

1. hygroscopic

2. gravitational

3. capillary

E. pH affects plants & soil

1 example: cation exchange & available minerals