

Biology 118
Dr. George S. Ellmore
Office: Barnum 205
(Tuesdays 2-4)

Spring 2012
Tufts University

Plant Physiology

- Jan 19 Course goals: plants' uniquely productive role
24 Architecture of higher plants
26 Water relations: physical components of Ψ
31 Biotic components of Ψ in plants; aquaporins
- Feb 2 Water relations in the field; Osmotic *vs* other adjusters; case studies
7 Paradox of pores; diffusions shells; hydraulic redistribution
9 Mechanism of stomatal action; soil ions
14 Symplast/apoplast; guttation and tension
16 Mangroves and Maples
****21** EXAM: 100 points**
28 Mechanism of movement within phloem
- March 1 Phloem transport
6 Ion uptake; the Nernst equation
8 Respiration, and cyanide resistance
13 Herbicides and energy capture in Φ
15 Carbon fixation in Φ
27 Alternative modes of carbon fixation: C-4 and CAM
29 Environmental influence on Φ
- April 3 Nitrogen metabolism
5 Biofuels: C *vs* N incorporation
****10** EXAM: 100 points**
12 Signaling and integration: auxin and GA
17 Biosynthesis and elicitors: ethylene and ABA
19 Environmental physiology; trees
24 Plant security: defense against pathogens
26 Higher-order physiology

FINAL EXAM (F+ TR Block) : Friday May 4 at Noon (150 points)

Text: **Taiz, L., and E. Zeiger. 2010.** Plant Physiology. Sinauer. Sunderland, MA.

LEARNING OBJECTIVES, 2012

Biology 118: Plant Physiology at Tufts University

Students successfully completing this course are able to:

- 1) Demonstrate ways to measure environmental services accomplished by plants.
- 2) Propose ways of using plants to preserve and improve urban, agricultural, rural, and wilderness environments.
- 3) Explain and provide examples of how plants interact with light, water, soil and other organisms, and how humans alter those interactions.
- 4) Evaluate the idea that plants such as wheat, corn, and tomato have exploited humans to become widely successful far beyond their native ranges.
- 5) Demonstrate and explain research equipment and measures (data) used to document and compare plant function.
- 6) Recommend (as consultants) how to increase food autonomy through productive food gardens in countries ranging from USA, Vietnam, and Namibia (temperate, tropical, and arid zones).
- 7) Position themselves to join a research group investigating plant function.