

- I. RESOURCES: > *HANDOUT* – featuring gas exchange diagrams, charts given in lecture
> See Lecture Slides for #21 in S:\drive “Lecture Slides”
> Smith and Smith Text – plant response to Light (p. 88-93); Water p. 104-09
> Journal Article: N.R. Adams, et al. – Article #02 in “PIP Starters” (S:drive)

II. DISCUSSION

- A. Based upon your lab experience, list factors that influence net radiation (Q) and vaporization, and consequently, net assimilation rate (NAR) and transpiration (E):

1. ENVIRONMENTAL FACTORS:

2. LEAF MORPHOLOGY (phenotypic factors):

- B. INTERPRETATION OF DATA AND VISUAL MODELS – Use “RESOURCES” listed above

1. Effect of varying relative humidity (See Handout, p. 1 and p. 2, Fig 4-4) upon:

a. TRANSPIRATION –

b. LEAF WATER POTENTIAL –

c. STOMATAL APERTURE –

2. Explain the CAUSE and EFFECT for each above based on your knowledge of gas exchange processes. See Smith & Smith Text, p. pages 104-109 and charts on the HANDOUT. Where possible, relate to your “IRGA laboratory” data. Use additional paper for necessary space for your notes.

3. Water Use Efficiency (WUE) – application of physiology to ecology and agriculture
 - a. What is WUE and how is it expressed? [See Smith, p 108 and HANDOUT, Table 8]
 - b. How could you compute WUE for the soybean leaf we used in laboratory?
 - c. How do CAM (Crassulacean Acid Metabolism) and C_4 metabolism affect WUE? (See HANDOUT, Figure 4.12 and Table 4.2; and Smith and Smith, pp. 88-90)
 - d. Take 10-15 min to scan the article by N.R. Adams, et al. (see RESOURCES above).
 - i. On a separate notes page, write out their purpose, note experimental variables, apparatus and instrumentation, and summarize their results.
 - ii. What was the significance of their findings (see their Discussion)?
 - e. Why should agriculturists and foresters be concerned about WUE?
4. What is the correlation between geographic distribution of plant species and their photosynthetic metabolism? See Figures 42 and 43 of the HANDOUT.