ECOLOGY 8000

CRITICALLY READING THE LITERATURE

GENERAL APPROACH
1. Read the abstract, look over the figures, get a feel for the paper. See where it's going.
2. Read the entire paper for general content, message, approach.
3. Slow down. Read it again. With the message in mind, go over each step and critically evaluate the paper.
4. Make notes in the margins (or annotate with Acrobat). Figure things out. Disagree. Play devil's advocate. Come up with alternatives. Extract the data; replot the data; reanalyze the data. Reach new conclusions. Design a follow-up study. Go to the literature and get other information (background papers; theoretical papers that motivated this paper; etc.)

MORE DETAIL:
1. Introduction: What is the paper about?
   a. What is the context for this work?
   b. What's the big-picture?
   c. What specific aspect of the big-picture question did the authors address?
   d. Is this an important question? Why?
   e. What organism/system was studied? Why?
2. Methods and results: design and approach.
   a. What did the authors actually do?
   b. Are their methods appropriate for the question being address (is the study designed well)? c. Are there problems with the design (artifacts/confounding effects/pseudoreplication/etc.)?
      d. Do the authors actually test what they think they are testing?
   c. If the paper involved hypothesis tests, what were the hypotheses?
   d. Were the hypotheses tested appropriate to the big question? To the more specific question?
   e. Were alternative hypotheses specified?
   f. Can the design distinguish among competing hypotheses?
   g. How were the data analyzed? Were the data analyzed appropriately (in the context of the design, hypotheses, questions)?
   h. How do the data analyses and data presentations relate back to the questions and hypotheses? Are the authors' interpretations of the statistical analyses appropriate?
3. Figures and tables: presentation of results.
   a. Graphs: What are the axes? What do the points and error bars (e.g., st. dev, st. error, 95%CI) represent? How did the data collected give rise to these figures (do you know how the response parameter was derived; do you know what it means?). Could you recreate these graphs with the raw data (how)? What do the graphs show, if anything?
   b. Tables: Similar as above. What results are presented in the table?
   c. What other information would you like to have seen presented? Why?
   d. Are all the figures and tables necessary?
4. Discussion: conclusions and caveats and putting it back into the big picture..
   a. What question do the authors address? Is it the same question they set us up to expect in the introduction? Why or why not? How do the conclusions relate to the introduction?
   b. How is the discussion connected to the introduction, methods, results?
   c. How are these results connected back to the literature?
   d. Given the hypotheses and the results, were the conclusions appropriate? Does the authors' interpretation of the results tie together in a logical and consistent way? Are there alternative explanations for the results? What are they? How would you distinguish them from the others (can you do this with the existing data)?