Readings in Molecular Ecology of Herbivory  
Plant Sciences 7970/4970

Course Description:

This course is designed to provide graduate and advanced undergraduate students with skills to critically read and evaluate the primary scientific literature using the current primary literature in the field of molecular ecology of plant-herbivore interactions. The application of molecular biology tools to the rich history of chemical, physiological, population, and multi-trophic ecology studies on plant-herbivore interactions has produced an exciting, fast-paced interdisciplinary field at the forefront of ecology, ‘functional genomics’ and ‘systems biology’. This course is an ideal way to help students working in this field, or other areas of plant stress, to understand what is currently known, to experience the breadth of the techniques used, and to think critically about what’s published. Learning to evaluate the literature and prepare well-written critiques will help students to participate effectively in the important peer-review process of science.

The format of the course is a weekly discussion led by a student and monitored by two core faculty (Drs. Finke and Appel) and other faculty as interests in participation and/or need for specific expertise arise. To achieve full credit for the course, students participate in all discussions and lead one or two discussions. Participating requires having read the paper ahead of time and completed a review sheet, and actively joining the discussion. Leading a discussion requires selecting a recent publication in the field and sometimes a second paper that facilitates understanding or critique of that paper (e.g., a review, an opposing point of view, etc.) and leading the discussion.

Course Schedule:
Weekly for 1 hour at a time to be determined based on group availability.

Contact Info:
To enroll, please contact Christa Smith (1-31 Ag. Bldg; 882-3001; smithchrista@missouri.edu)
For questions regarding the course content please contact Debbie Finke finked@missouri.edu or Heidi Appel appelh@missouri.edu

Required Texts and Materials:
Current primary literature

Course Policies:
Prerequisite: Graduate Standing and/or Instructor Consent
Assignment and Grading Procedures: Grading Scale S/U
Class Session: Determined by selected literature
Absences: Grade is based on attendance and participation; notify instructors by email of necessary absences.
Late Work: Review sheets from all participants are due weekly at the end of class. Please discuss extenuating circumstances with instructors.
Policy on Cell Phones:
As a courtesy to fellow students and the instructor, all cell phones must be switched off during class time. Exception: if you are a primary care giver for a minor or ill relative, you may have your cell phone on to receive emergency calls. In this case, if your phone rings, you must leave the room without disturbing others and conduct your personal business outside the classroom.

Academic Inquiry, Course Discussion and Privacy Policy:
University of Missouri System Executive Order No. 38 lays out principles regarding the sanctity of classroom discussions at the university. The policy is described fully in Section 200.015 of the Collected Rules and Regulations. In this class, students may make audio or video recordings of course activity unless specifically prohibited by the faculty member. However, the redistribution of audio or video recordings of statements or comments from the course to individuals who are not students in the course is prohibited without the express permission of the faculty member and of any students who are recorded. Students found to have violated this policy are subject to discipline in accordance with provisions of Section 200.020 of the Collected Rules and Regulations of the University of Missouri pertaining to student conduct matters.

University of Missouri Policy on Academic Dishonesty:
Academic honesty is fundamental to the activities and principles of a university. All members of the academic community must be confident that each person's work has been responsibly and honorably required, developed, and presented. Any effort to gain an advantage not given to all students is dishonest whether or not the effort is successful. The academic community regards academic dishonesty as an extremely serious matter, with serious consequences that range from probation to expulsion. When in doubt about plagiarism, paraphrasing, quoting, or collaboration, consult the course instructor.

The University has specific academic dishonesty administrative procedures. Although policy states that cases of academic dishonesty must be reported to the Office of the Provost for possible action, the instructor may assign a failing grade for the assignment or a failing grade for the course, or may adjust the grade as deemed appropriate. The instructor also may require the student to repeat the assignment or to perform additional assignments.

Assisting Students with Special Needs:
If you need accommodations because of a disability, if you have emergency medical information, or if you need special arrangements in case the building must be evacuated, please inform an instructor immediately.

To request academic accommodations (for example, a notetaker or extended time on exams), students must also register with the Office of Disability Services, (http://disabilityservices.missouri.edu), S5 Memorial Union, 882-4696. It is the campus office responsible for reviewing documentation provided by students requesting academic accommodations, and for accommodations planning in cooperation with students and instructors, as needed and consistent with course requirements. For other MU resources for students with disabilities, click on "Disability Resources" on the MU homepage.
Review Form
(modified from Technical Note - How to Review a Technical Paper, Alan Meier, Berkeley Lab,

1. Title and author(s) of paper.

2. **Scientific summary of paper in your own words** (limit to 200 words).
   (Demonstrates that you understand the paper and can summarize it more concisely than the author in their abstract)

3. **Lay summary of paper for the general public** (limit to 50 words).
   (Written so that an educated reader without expertise in the field can understand the main results and why the results are important or relevant to society)

4. **Good things about the paper.**
   (Strongly recommended if the review is critical as good psychology if you want the author to drastically revise the paper.)

5. **Major comments.**
   (Discuss assumptions, approach, analysis, results, conclusions, reference, etc. Be constructive by suggesting improvements.)

6. **Minor comments.**
   (This section contains comments on style, figures, grammar, etc. If any of these are especially poor and detract from the overall presentation, they may escalate to the ‘major comments’ section.)

7. **Recommendation to the journal editor.**
   Circle one:  
   1) Publish as is
   2) Publish after corrections have been made
   3) Reject
What makes a good paper?

Good papers contain something of merit. You, an expert in the subject, should be able to find it (if it exists). However, the item of merit may be poorly presented, which can undermine the paper's value. A logical structure is the first element of a good presentation.

A standard structure for technical papers has evolved as follows:

1. Abstract
2. Introduction
3. Body of the Paper (technique, results, discussion)
4. Conclusions
5. References
6. Tables
7. Figures (and captions)

Naturally there are minor variations in these sections depending on the topic and the journal's requirements, but the concept is always the same. If the author did not follow it, then it should be quickly obvious to a reader why a different structure was necessary.

Even if the paper was written in the standard structure, major problems may exist. (The standard structure simplifies identification of the defects.) Here are some common errors encountered in each of the above sections.

Read the Abstract before and after the whole paper. Does it actually summarize the paper? Does it include the conclusions as well as the statement of the original problem? Is there information not presented elsewhere in the paper? Keep in mind that abstracts are often written in haste, sometimes not by the principal author, and occasionally with knowledge of information not discussed in the paper.

The Introduction should explain why the topic is important. The audience for the paper will determine the scope of the Introduction. If the paper is about a new chemical reaction to be published in the Journal of the American Chemical Society, then it is probably not necessary to explain to the reader why organic chemistry is important in everyday life. Many technical papers suffer from excessively broad introductions; usually the first few paragraphs can be excised. Does the author cite only his own papers for examples of past work?

The Body of the Paper is the part most requiring the referee's expertise. Here you are on your own. As you read it, decide if the approach and analysis are clearly described. Has the author integrated discussions of errors and uncertainties in his analysis at suitable points? Authors also have difficulty identifying what parts of their papers are central and which are either irrelevant or of lesser importance. (Sometimes the author has not carefully considered his audience.) Therefore, look for material that could be deleted. Is the level of detail reasonable? Are too much data presented? Many journal articles are condensations of much longer and detailed internal reports. It is perfectly acceptable to refer to the internal reports for details, especially when only a few readers will be interested. (If they want the details, they can write the author for the report.) When the paper has a page limit, the author may fail to insert enough detail. As a referee, you need to identify these cases and suggest areas where offsetting deletions could be made so as to remain within the limits.

While reading the Body of the Paper, consider the topic as a whole. Is this the right amount of work for a paper? Is the paper premature? Alternatively, should the paper be divided into two papers? Few referees seriously consider these issues.
The Conclusions should follow directly from the Body of the Paper. There should be no surprises and, most important, no new material introduced. Some authors try to broaden their conclusions by "reaching" for results produced elsewhere. This is unacceptable.

The References provide many clues to the author's approach. The paper is immediately suspect (but not necessarily wrong or obsolete) if all of the references are old. A reference list containing papers only by the author deserves special, and skeptical, scrutiny. Beyond this, however, the referee should be able to spot omissions. Has the author forgotten important references? Help the author if possible by supplying the citations.

Tables, Graphs, and Figures are vital components to a paper but only when thoughtfully used. Tables are particularly abused. Is every table and graph necessary? (Perhaps a citation to an internal report would suffice.) Do the tables contain more digits than are actually significant? This is a common problem when computers calculate values and the programmers fail to suppress insignificant digits. Worse, these nonsense numbers clutter up a table, thus making it more difficult for the reader to extract the significant numbers. Zero suppression also removes table clutter. For example: 1.3732145 -> 1.4 and 0.00045 km -> 45 cm

Substitution of graphs for tables avoids both of these problems.

Table? <- DATA => graph?

Can the table data be presented better in a graph? With the advent of computer plotting programs, graphs are wonderfully easy to create. There are now several guides to the preparation of effective displays of quantitative information. Unfortunately, some treat a graph as a piece of art and refuse to acknowledge that most graphs will be computer generated. You must recognize that a compromise may be required.

Check that all figures and tables are appropriately captioned and are referred to in the text. Journals differ in their policies regarding captions, but it is good practice to have one sentence in the caption summarizing the results.

When to decline

Most editors ask the referee to finish a review within a specified time. Unfortunately, a good review takes many hours to prepare and it must compete with other obligations. Therefore, you can (and should) decline to review a paper if you cannot devote the necessary time before the deadline. But tell the editor immediately so that he can find a substitute referee.

Upon inspection of the paper you may realize that you are not competent to review the paper. This is nothing to be ashamed about because editors cannot perfectly match papers and referees. Once again, you should notify the editor immediately.

When you decline to review a paper, the editor will be particularly gratified if you suggest an alternate referee, with the relevant address, and telephone number. Some editors will encourage you to pass on the paper directly, while others want full control of the review process.

Good editors keep lists of referees. One goal is to avoid asking people to review papers too frequently, but the lists often include information about the quality of the reviews and how often one declines. It is sometimes believed that a good referee gets preferential treatment when he submits his own paper. This belief may have some justification.