

Syllabus

Behavioral Ecology (Biol 315)

Spring 2011

Lecture/discussions: Tues & Thurs 11:00-12:15, Room A155

Laboratory: Wed 1:30-4:20 (some at night!), A142

Keith Tarvin, Instructor

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Office Hours:

Monday 10:30-11:30; Thursday 4:30-5:30
and by appointment.

Note: I tend to keep my office door closed when I'm inside but I'm happy to meet with you - don't hesitate to knock!

Biol 315 - Behavioral Ecology

4 NS, WR, QPh

Second Semester. Behavioral ecology is the study of how behavior (broadly defined) influences lifetime reproductive success of individuals. It is therefore deeply rooted in evolutionary theory, and considers the ways in which behavior may be adaptive. Topics will include life history strategies, optimal foraging and habitat selection, signaling and communication, sexual selection, and social organization and cooperation. Lectures, laboratories, and discussion sessions will primarily emphasize field studies and will illustrate observational, experimental, comparative, and modeling approaches. Laboratories occasionally meet at night. *Prerequisites: Biol 120/102 (or an AP score of 5) and either Biol 208, Biol 215, Biol 218 or Nsci 200/301. Consent of the instructor is required. Enrollment Limit: 14.*

Course Objectives

1. To understand evolutionary causes and consequences of animal behavior in an ecological context.
2. To become familiar with current theory and method in behavioral ecology
3. To learn techniques used to study behavioral ecology.
4. To become familiar with primary behavioral ecology literature.
5. To develop writing skills.
6. To develop quantitative skills used in the discipline.

Required Readings:

Required Book:

Searcy, W. A. and S. Nowicki. 2005. *The Evolution of Animal Communication: Reliability and Deception in Signaling Systems*. Princeton University Press. (available in paperback at the Oberlin Bookstore).

Other Readings:

In addition to the above book (which we will use during the middle of the course), I have selected various book chapters and primary articles to support lecture/discussion topics. I operate on the assumption that you have read the assigned material before class. You will be responsible for all the reading material on the exams, even if I don't cover it in class. The Reading List for the course is posted on Blackboard.

The texts I have chosen for the class comprise current reviews of major topics in behavioral ecology, and tend to be geared toward researchers, graduate students, and advanced undergraduates who

are familiar with the major issues in behavioral ecology. As such, they assume much knowledge on the part of the reader, and often are highly technical. My aim is to spend a good deal of class time discussing the texts and distilling the information therein. However, if you feel a bit lost as you read a particular article, you may wish to consult “Krebs, J. R. and N. B. Davies (1993) *An Introduction to Behavioural Ecology*, 3rd Ed. Blackwell Science,” which is on reserve in the library. Though a little outdated, this “introduction” is written in a traditional textbook format, is geared toward a traditional undergraduate readership, and does an excellent job of explaining basic issues. Of course you always can come by my office to discuss any aspect of the material you want. I certainly encourage you to do this!

Format of the Course

During lecture/discussions I will present material introducing each of the major topics of the course. I will lead us through material based on the readings and other material, but I expect you to bring up issues that you find interesting or confusing. Periodically, we will hold a “paper discussion,” during which we will discuss primary journal articles that I have chosen to supplement, expand upon, or extend treatment of topics presented in our basic readings or in class.

Grades for the lecture/discussion portion of the course will come from three exams. The first two exams will be worth 100 points each. The third (final) exam will be worth 150 points. It will cover the last third of the course, and also will have a comprehensive section. Exams will consist primarily of essay and short answer questions. Exam material will draw from lectures, readings, paper sessions, and anything that we discuss in class. One short homework assignment also will be required. It will be worth 30 points.

Laboratory Exercises:

Many of the laboratory exercises will be conducted in the field, so dress accordingly – wear shoes and pants that you don’t mind getting wet and muddy, and be prepared to be exposed to very cold weather for a few hours at a time. Snow, light rain and drizzle do not count as “bad” weather – so a cheap poncho might be a good investment.

Most of the laboratory exercises comprise two parts: the first part will be dedicated to collecting data in the field or lab (this part may span more than one lab period), and the second to analyzing and interpreting those data. In addition, we may conduct a few other exercises inside as “alternates” when we encounter heavy rain, snow, or cold night temperatures. Descriptions of all laboratory exercises will be posted on Blackboard, and you should carefully read the relevant description before each lab.

Scheduling special laboratory exercises. One of the laboratory exercises involves recording frog mating calls. Consequently, we will conduct them at night, so mark your calendars accordingly! I’ve blocked two weeks in April for this exercise, but the exact dates of field work will depend on the weather. I will announce the actual dates in class as early as possible, but please reserve all of these nights on your calendar.

A few other labs will begin with an introduction as a large group, but thereafter you will collect data in small groups or by yourself on your own time. That is, we will need to collect some data outside of normal lab time.

Because Ohio spring weather can be unpredictable, you should be prepared to reschedule any of the labs described above as weather dictates. I will do my best to keep our lab schedule intact, but control of the weather lies with powers far greater than mine! Such is the nature of field ecology.

Laboratory assignments. During most of the laboratory exercises you will gather, analyze, and interpret quantitative data. The reports for several of the lab exercises will be rather informal, and will consist of your statistical analyses, graphs, tables, and written assessments and conclusions. Each of these reports will be worth 10 points. The write-up for the squirrel alarm call study will follow that of a formal scientific paper - that is, the reports should include an introduction with background literature,

hypotheses, and predictions, as well as methods, results (including tables and/or figures), and discussion sections. This paper will be worth 70 points, half of which will come from a rough draft, and half from the final version. Guidelines for all assignments will be posted on Blackboard.

If weather or other circumstances preclude our conducting all of the labs that are scheduled for grading, I will pro-rate the points for the completed labs so that the proportion of your total grade that comes from labs will remain constant. *Please understand that this means that I may need to increase the value of individual lab grades after the fact.*

Use of animals in laboratory exercises. The procedures using vertebrates in this course have been reviewed and approved by Oberlin's Institutional Animal Care and Use Committee (IACUC). Inquiries related to the use of animals at Oberlin College can be directed to me, Keith Tarvin, and/or to the Acting Chair of the IACUC, Joyce Babyak, Office of the Dean of Arts and Sciences; call 755-8410 or send an e-mail message to Joyce.Babyak@oberlin.edu.

Grading: You will be evaluated as follows:

Assignment	Points	Approximate percentage of total grade
Exam 1	100	20
Exam 2	100	20
Exam 3 (partially comprehensive)	150	30
Homework assignment	30	6
Short laboratory reports (up to 5 for a total of 50 pts)	50	10
Formal research paper on alarm call lab (35 pts for the draft + 35 pts for the final version)	70	14
Totals	500	100

Attendance Policy

Because this course involves class discussion and lectures on material that may not appear in readings, you should make every effort to attend all class meetings and laboratory exercises. Exam material may be drawn from class discussions (i.e., from information that is not in the readings!). If you expect to be absent for a class period, consult with me as soon as possible beforehand.

Honor Code

As members of the Oberlin College Community, each of us is expected to adhere to the Honor Code. Please familiarize yourself with this code. You can find it in the Student Policies section in Blackboard.

Course Materials

The syllabus, course calendar, assignments, and other course materials will be posted on the course Blackboard site. Updated versions of the calendar will be posted when appropriate.

WEEKLY SCHEDULE FOR BEHAVIORAL ECOLOGY, SPRING 2011

Week	Topic	Readings (see bottom of page for codes)	Laboratory
1 8-10 Feb	Introduction and Course Mechanics	DGC Chap 2	*Using the Library Effectively
	Epistemology and Methods of Behavioral Ecology: History, assumptions and modes of inquiry; hypotheses and predictions <i>Assignment: Identify hypotheses and predictions in the introductions of selected papers (TBA in class)</i>	DGC Chap 1 (<i>skim</i>); DGC Chap 3	
2 15-17 Feb	<u>Paper discussion</u> and hypothesis workshop <i>Homework: Hypotheses & predictions (due 24 Feb)</i>	Gould and Lewontin (1979) Proc R. Soc Lond B 205: 581; Alcock (1998) Evol and Human Behav 19:321; Hypothesis papers (TBA)	The Ghost of Behavior Past: Tradeoffs associated with goldenrod gall fly host selection I: Gall collection
	Optimality Theory: Optimality	DGC Chap 7	
3 22-24 Feb	Continue Optimality	(continue DGC Chap 7)	*The Ghost of Behavior Past: Tradeoffs associated with goldenrod gall fly host selection II: Survival analysis
	Life History Strategies: Fitness; Growth vs reproduction	Daan and Tinbergen (Chap 13, BKD – <i>skip section 13.4</i>)	
4 1-3 Mar	Costs of reproduction; <u>discuss</u> Penn and Smith	Penn and Smith (2006) PNAS 104: 553	Optimal foraging by tree squirrels I
	Timing of breeding; Parental investment	(continue Daan and Tinbergen)	
5 8-10 Mar	EXAM I		Optimal foraging by tree squirrels II
	Communication and Signaling: Introduction to signaling	S&N Chap 1	
6 15-17 Mar	When interests overlap	S&N Chap 2	*Optimal foraging by tree squirrels III
	Continue: When interests overlap	S&N Chap 2	
7 22-24 Mar	When interests diverge	S&N Chap 3	Alarm calls in squirrels I
	Continue When interests diverge; <u>Paper discussion</u>	Getty, T. (2006) Trends in Ecol & Evol 21: 83.	
8 29-31 Mar	<i>Spring Break</i>		<i>No lab</i>

9 5-7 Apr	Sexual Selection, Mating, and Parental Care: Sexual Selection – Overview; The Fisher-Lande process	DGC Chap 11, pp 363-395	Alarm calls in squirrels II
	Indicator models; Interesting theoretical issues	DGC Chap 11, pp 395-426	
10 12-14 Apr	More interesting theoretical issues	(see DGC Chap 11)	**Alarm calls in squirrels III
	<u>Paper discussion</u>	Prum (1997) Am. Nat. 149: 668.	
11 19-21 Apr	EXAM II		Spring peeper signaling and correlates of mating success I: Data collection -NIGHT LAB-
	Mating Systems and Parental Care	DGC Chap 12	
12 26-28 Apr	Social Organization and Cooperation: Living in groups	K&R Chap 4	Spring peeper signaling and correlates of mating success II: Data collection -NIGHT LAB-
	Cooperation in insect societies	Bourke (Chap 9, BKD)	
13 3-5 May	Competition and cooperation	Pusey and Packer (Chap 11, BKD)	*Spring peeper signaling and correlates of mating success III: Data analysis
	Cooperation and altruism in humans	Fowler (2005) PNAS 102: 7047.	
14 10-12 May	Cooperative breeding in vertebrates	Emlen (Chap 10, BKD)	*Interpretive lab: Generating hypotheses and predictions at Sandy Ridge Metro Park
	<u>Paper discussion - Group selection</u>	Diggle et al. 2007. Nature 450: 411; Wilson, E. O. and B. Hölldolber (2005) PNAS 102: 13367.	
Wed 18 May	EXAM III (Comprehensive Final) (7:00 pm)		

* Short laboratory report to be submitted for a grade (10 points each).

** Laboratory write-up in formal scientific paper format to be submitted for a grade (70 points each).

Codes to sources of literature (all but DGC are on closed reserve in the library, and all but S&N are also posted on Blackboard):

DGC - Danchin, É., L.-A. Giraldeau, and F. Cézilly (2008). *Behavioural Ecology*, Oxford University Press.

BKD (“big Krebs and Davies”) - Krebs, J. R. and N. B. Davies, eds. (1997). *Behavioural Ecology: An Evolutionary Approach*, 4th Ed. Blackwell Science.

S&N - Searcy, W. A. and S. Nowicki. 2005. *The Evolution of Animal Communication: Reliability and Deception in Signaling Systems*. Princeton University Press.

K&R - Krause, J. and G. D. Ruxton (2002). *Living in Groups*. Oxford University Press.

TBA - Paper to be announced later in the semester.

Other readings listed here are journal articles. Short (but sufficient) citations are provided here, and full citations are provided in the Reading List so that you can find these articles on your own.