BioNB 221 - Introduction to Behavior

Summer 2001

COURSE AIMS AND ADMINISTRATION

TEACHING FACULTY

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OFFICE HOURS

I will be in our around my office every day from 1:00 pm to 3:00 pm. If you have questions concerning the course material, I urge you to come and discuss your questions with me during these hours. Also feel free to set up an appointment with me at any time outside of these hours.

COURSE SECRETARY

Lori Miller (W360 Mudd Hall; telephone: 254-4300; email: lmm8) is the administrative assistant who handles the record keeping and many of the other administrative details of this course. She will be available 8-12 and 1-4 Monday through Friday. Please contact Lori for questions concerning any administrative aspects of this course.

COURSE RATIONALE and OBJECTIVES

Introduction to Behavior (BioNB 221) is a one semester course that can be taken for either 3 credits or 4 credits (extra written assignments). Lectures will be held every day (Monday - Friday) from 4:00-5:15 PM in A409 Corson Hall (The Whittaker Room). The course is designed for undergraduate and graduate students who want to better understand the evolution, adaptive significance, and mechanisms of animal (including human) behavior.

4 CREDIT SECTIONS

Students will be able to take this course for 4 credits through completing a number of additional written assignments, and participating in class discussions. This additional credit is required for students majoring in Biology with a concentration in Neurobiology and Behavior (NB&B), and is optional for other students wishing to pursue the subject matter in greater depth than is afforded by the lectures alone.

TEXT BOOKS AND ASSIGNED READINGS

This course has 1 text, *Animal Behavior*, 6th edition (Alcock), which are sold at the Cornell Campus Book Store. A number of additional readings are required for specific lectures. All additional readings will either be handed out directly to you in class or they will be e-mailed to you as PDFs at least a week before the relevant lecture. The readings pertinent to each lecture are listed on the syllabus (see below).

SUPPLEMENTAL LECTURE MATERIALS

I will post my lecture notes for each lecture on the course website. They will be posted ASAP after each lecture. The basic idea for this is so that you can have access to a concise list of the material covered in each lecture, and to have copies of the various graphs and charts that I will be using. It is your responsibility to obtain lecture notes after the class, and to use them as supplementary studying material.

BIONB 221 HOMEPAGE

This is the place to find information about the course and PDFs of the lecture notes. It will be kept simple.
To get on the BioNB 221 homepage, open Netscape and type in the address:

http://www.nbb.cornell.edu/neurobio/bionb221/index.html

LABORATORY ON HONEY BEE BEHAVIOR

On Wednesday July 11, there will be a laboratory session to give students the opportunity to conduct observations on the social behavior of honey bees and to develop a full understanding of the levels of behavioral analysis. A problem sheet pertaining to the lab will be completed by each student and turned in by the end of class. This problem sheet will count for 10% of the 2nd prelim. The lab will take place in a room at Lidell (off campus) where two glass-walled observation hives will be set up. The laboratory will run during regular class hours; and I will give you more details abot how we will be getting there, closer to the date of the lab.

OTHER FIELD TRIPS

In addition to the honey-bee lab, we will also have a few other small "field" trips in order to see animals in action, these include:

1) observing a Naked Mole Rat colony in captivity.
2) watching resource-defense polygyny in Anthidium bees.
3) measuring ornamental coloration in birds: bill color in Zebra Finches

EXAMINATIONS

There will be two preliminary examinations and one final examination. The “prelims” will be approximately 50 minutes in duration and will be held during the regular class periods of **Monday July 9, and Monday July 23**. The date and time for the final examination has not yet been assigned but it will be either on the **6th or 7th of August** and it will be two hours long. Both preliminary exams will cover only material that has been presented since the previous exam. The final exam will cover both material since the second prelim and the contents of the entire course.

If you believe an exam question(s) was ambiguous, write down your interpretation and e-mail it to me by 9PM on the day of the exam. All such requests will be reviewed **before** the exams are graded.

Correct answers to the exams will be posted on the web page, and outside my office on the following day. I will attempt to return your graded examinations 1 week after the exam date. If an error in the calculation of your exam score has occurred, or if after careful study of the answer key you are still puzzled about the score that you received on a particular question, you may submit a written request within 2 days for reconsideration. Please do not waste yours and my time with futile attempts to get additional points.

GRADING

For students taking the 3-credit option, grades will be assigned as follows:

Exam 1: 25%
Exam 2: 25%
Final Exam: 50%

For students taking the 4-credit option, 75% of your grade will be assigned based on the total of their scores for the three exams as above and the remaining 25% of the course will be based on class participation and written assignments as listed below .

Participation: 7.5%
Problem sets: 7.5%
Paper 1: scientific paper: 10%
Paper 2: scientific paper rewrite: 5%

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INTRODUCTION TO BEHAVIOR Summer 2001

Lecture	Date	Topic	Reading Assignment
1	Mon., Jun. 25	Introduction to Behavior	No readings
2	Tues., Jun. 26	Natural Selection & Behavior	Alcock, Chapter 1
3	Wed., Jun. 27	Levels of Analysis	Alcock, Chaper 1; Holekamp and Sherman 1997
4	Thurs., Jun. 28	Genes & Behavior	Alcock Chapter 3
5	Fri., June 29	Sex	Ridley, M. (1993)
6	Mon., Jul. 2	Sexual selection & Male Male Competition	Alcock, Chapter 12: 429-444
7	Tues., Jul. 3	Female Choice	Alcock Chapter 12: 456-477
8	Wed., Jul. 4	NO CLASS	
9	Thurs., Jul.5	Mating Systems and Parental investment	Alcock Chapter 13
10	Fri., Jul. 6	Alternative Reproductive Strategies & Sperm Competition	Alcock, Chapter 12: 444-456
11	Mon., Jul. 9	**TEST 1** covering lectures & assigned readings for 1-10	
12	Tues., Jul. 10	Levels of selection; Intro to Bee Dance	Dawkins 1982; Seeley 1998
13	Wed., Jul. 11	Honey Bee Lab	Seeley 1995
14	Thurs., Jul. 12	Principles of communication	Alcock, Chapter 8
15	Fri., Jul. 13	Hypothesis Testing; Class Project on Human Mating Preferences	Whitfield 1990; Platt 1964
16	Mon., Jul. 16	Group Living	Alcock, Chapter 9: 315-322 Alcock, Chapter 15: 555-561
17	Tues., Jul. 17	Kinship and Reciprocity	Alcock Chapter 15: 561-569
18	Wed., Jul. 18	Cooperative Breeding and Family Dynamics	Alcock Chapter 15: 569-582
19	Thurs., Jul. 19	Cooperation and Conflict.	Reeve and Nonacs 1992
20	Fri., Jul. 20	Recognition Behavior	Pfennig & Sherman 1995
21	Mon., Jul. 23	**TEST 2** covering lectures & assigned readings for 12-20	
22	Tues., Jul. 24	Game Theory and Modelling	Krebs and Davies 1993
23	Wed., Jul. 25	Eusociality	Honeycutt 1997; Alcock Chapter 15: 583-599
24	Thurs., Jul. 26	Eusociality, social insects & Reproductive Skew	Keller & Reeve 1994
25	Fri., Jul. 27	Orientation and Navigation **Guest Lecture (Charlie Walcott)**	Chapter 5; 156-164 Chapter 11 394-406 Emlen 1975
26	Mon., Jul. 30	Animal Defenses & Chemical Basis of Defense in a Moth **Guest Lecture (Vikram Iyengar)**	Alcock, Chapter 9: 300-312 Iyengar & Eisner 1999
27	Tues., Jul. 31	Reproductive skew (continued) Hormones and Behavior	Alcock, Chapter 4 87-95 Alcock, Chapter 6, 203-209
28	Wed., Aug. 1	Social Behaviour in Microorganisms; Darwinian Medicine	Crespi 2001 Neese & Williams 1998
29	Thurs., Aug. 2	Alternative Reproductive Strategies Sex Ratios	Trivers and Willard 1973 Komdeur et al. 1997
30	Fri., Aug. 3	Human Behavior & The Meaning of Life	Chapter 16; 603-610 Wright 1995 Dawkins 1995
	Tues Aug 7	Final Exam (4:00)	

FINAL EXAMINATION

- First half: covers lecture meetings and assigned readings for 22-30
- Second half: covers all materials in the lecture meetings and all assigned readings

REFERENCES:

TEXTS:

Alcock, J. 2001. *Animal Behavior: An Evolutionary Approach*, 7th edition. Sinauer Associates, Inc., Southerland, MA.

NON-TEXT READINGS:

Crespi. B.J. 2001. The evolution of social behavior in microorganisms. Trends in Ecology and Evolution 16: 178-183.

Dawkins, R. 1982. Replicators and vehicles. In: *Current Problems in Sociobiology*, (Kings College Sociobiology Group, ed.), pp. 45-64. Cambridge University Press.

Dawkins, R. 1995. God's utility function. Scientific American (Nov 95)

Emlen, S. T. 1975. The stellar-orientation system of a migratory bird. *Scientific American*, 233: 102-111.

Holekamp, K. & Sherman, P. 1998. Why male ground squirrels disperse. In: Exploring Animal Behavior: Readings from American Scientist, 2nd Edition (eds.: P. Sherman & J. Alcock), Sinauer.

Iyengar, V.K. & Eisner, T. 1999. Female choice increases offspring fitness in an arctiid moth (*Utetheisa ornatrix*). Proceedings of the National Academy of Sciences 96: 15013-15016.

Keller, L. & Reeve, H.K. 1994. Partitioning of reproduction in animal societies. *Trends in Ecology and Evolution*, 9(3): 98-102.

Komdeur, J. et al. 1997. Extreme adaptive modification in sex ratio of the Seychelle's warbler's eggs. Nature 385, 522-525.

Krebs, J.R. & Davies, N.B. 1993. *An Introduction to Behavioural Ecology*, 3rd edition. Blackwell Scientific Publications, Oxford.

Nesse, R.M. & Williams, G.C. (1998). Evolution and the origins of disease. *Scientific American*, 275: 86-93.

Pfennig, D.W. & Sherman, P.W. 1995. Kin recognition. *Scientific American*, 272 (June): 67-73.

Platt, J.R. 1964. Strong inference. Science 146: 347-353.

Reeve, K. & Nonacs, P. 1992. Social contracts in wasp societies. Nature 359: 823-825.

Ridley, M. 1993. The enigma. In: *The Red Queen*. Macmillan, New York.

Seeley, T. 1995. The honeybee colony. In: *The Wisdom of the Hive*. Harvard University Press. Cambridge.

Seeley, T. 1998. The honey bee colony as a superorganism. In: Exploring Animal Behavior: Readings from American Scientist, 2nd Edition (eds.: P. Sherman & J. Alcock), Sinauer.

Trivers, R. & Willard. 1973. Natural selection and parental ability to vary the sex-rato of offspring. Science 179: 90-92.

Wingfield, J. et. al. 1998. Testosterone and aggression in birds. In: Exploring Animal Behavior: Readings from American Scientist, 2nd Edition (eds.: P. Sherman & J. Alcock), Sinauer.

Whitfield, D. 1990. Male choice and sperm competition as constraints on polyandry in the red-necked phalarope *Phalaropus lobatus.* Behavioral Ecology and Sociobiology 27: 247-254.

Wright, R. 1995. The evolution of despair. Time (Aug. 28): 50-57.