

California State University, Fullerton
Department of Biological Science
Biology 481T: Sexual Selection, Behavior, and Mate Choice
Fall 2005

“Of the branches of biological science to which Charles Darwin’s life-work has given us the key, few, if any, are as attractive as the subject of sexual selection.”

Sir Ronald Fisher-1915

Meeting Place: SLC 268

Meeting Time: Thursdays from 17:00-19:50

Instructor: Sean Walker

Office: MH 389, Lab MH 342

Office Hours: T 10AM-12PM, W 9-10AM, F 9-11AM & by appointment

Phone: (Office) 278-3610, (Lab) 278-8204

Email: swalker@fullerton.edu

Web-Site: <http://biology.fullerton.edu/swalker>

Course Web Site: The course web-site will be on blackboard. You should be able to access it through <http://my.fullerton.edu> and follow the links to blackboard then to Biol 481T.

Course Description

In this course we will explore one of Darwin’s most brilliant and controversial ideas, Sexual Selection. Sexual selection is the mechanism that Darwin used to explain the origin of complex and conspicuous traits that could not be explained via natural selection. The study of sexual selection is concerned with the existence of such traits, explaining why they occur, the mechanisms that result in the evolution of such traits, and variation among individuals and organisms in such traits. In this course I will introduce the basic concepts associated with sexual selection (e.g., Sexual Selection Theory, Empirical Methods Used to Study Sexual Selection, Mating Systems, Parental Investment, and Sexual Selection, and Alternative Mating Tactics and Strategies) and we will discuss current ideas and literature in this area.

Prerequisites: If you are taking this course you should have completed the lower division biology core (Biol 171, 172, 273, 274) or its equivalent. In addition, it will be very helpful if you have taken Evolutionary Ecology (Biol 314).

Required Texts

Andersson, M. 1994. Sexual Selection. Princeton University Press 624 pp.

Course Requirements

Student Participation (15%)

Since this is a seminar class, participation is critical and will be 15% of your final grade. Several articles or book chapters will be required reading for each class meeting and students are expected to have read this material and be prepared to discuss it.

Questions (15%)

On the Tuesday prior to each class meeting every student except the presenters will send me 5 questions they have regarding the readings for that week. This list will be compiled by me and sent out to the class to aid in our discussion for that week.

Presentation (30%)

Each student is required to give an oral presentation and lead class discussion during one of the class meeting times. The subject of this talk should be a topic that you are interested in since you will spend a great deal of time researching the subject and will write a review paper on the topic. I have listed a number of topics below. Although you are not limited to these topics, choice of another topic will have to be approved by the instructor. **FOR YOUR PRESENTATION YOU WILL NEED TO PROVIDE TWO PAPERS FROM THE PRIMARY LITERATURE FOR THE CLASS TO READ. THEREFORE YOU *MUST* CHOOSE A TOPIC BY SEPTEMBER 22 AND PROVIDE ME WITH THE READINGS.**

Students will be responsible for running their assigned seminar. Students are expected to provide a basic review of the topic, summarize the required readings, and provide a critical and in depth analysis of the readings. Presenters should provide additional information on the topic by making use of the primary literature. You might want to start by examining the contents of journals such as: Animal Behaviour, Behavioral Ecology, Behavioral Ecology and Sociobiology, and Journal of Insect Behavior. In addition, you should also make use of the electronic databases found in the library (e.g., Web of Science or Biological and Agricultural Index). Students are encouraged to use visual aids (hand-outs, chalkboard, overheads, power-point presentations etc.) and following their presentation **will** maintain an active discussion. Presentations should be between 40-50 minutes in length.

Paper (Percentage of Grade:40% Outline 5% + Draft 10% + Peer Review 10%+Final Paper 15%)

Students are responsible for preparing a comprehensive review paper on the literature related to their topic. This paper will critically evaluate the literature related to your topic and should propose new ideas and future research in the area. To begin, you will prepare an outline and conduct a literature review on the topic. In this outline you will briefly summarize (1 page) the topic and will provide a list of relevant articles (at least 15 refereed journal articles) by **October 6, 2005**. In this course, like scientific community, your paper will be reviewed and evaluated by your peers. Thus a draft of your paper is due on **November 10, 2005**. **PLEASE NOTE THAT THIS IS NOT A FIRST DRAFT. THIS SHOULD BE CLOSE TO THE FINAL VERSION OF YOUR PAPER.** This draft should include a cover letter explaining that you are submitting this paper for evaluation and you should submit two copies of the paper (one for me and one for a reviewer). In addition the paper will be sent electronically to me with the subject line BIOL481T-DRAFT. **IF** I do not receive it electronically you will only receive half credit for your work. Papers will then be redistributed to the class and each person will critically evaluate the content and writing of another paper and add any other ideas they may have (There will be additional material given out on this). Reviews are due electronically to me on December 1 and the final paper including your response to reviewers is due as a hardcopy and sent electronically (SUBJECT LINE: BIOL 481T-FINAL) on **December 15 2005 by 5 pm. Start**

this early! It will require a great deal of time to **thoroughly** review the literature and to read the relevant papers.

This paper should be written in the format of a scientific journal. Specifically, follow the guidelines for formatting (i.e., line spacing, literature citations etc.) from the Instructions to Authors in Animal Behaviour. These guidelines are available in the printed journal and online (Go to <http://authors.elsevier.com> and find Animal Behaviour). All written assignments will be evaluated for content, grammar, originality and style. Please note that it is your responsibility to read and understand the definition of plagiarism and the penalties attached.

Grading Scale

Score	Letter Grade	Assigned G.P.A.
>95%	A+	4
≥ 90%	A	4
≥ 87%	A-	3.7
≥ 83%	B+	3.3
≥ 80%	B	3
≥ 77%	B-	2.7
≥ 73%	C+	2.3
≥ 70%	C	2
≥ 67%	C-	1.7
≥ 63%	D+	1.3
≥ 60%	D	1
≥ 57%	D-	0.7
< 57%	F	0

Course Policies

Attendance

Students are expected to attend and participate in lectures, laboratories and mandatory field trips. If you miss class **YOU ARE RESPONSIBLE** for obtaining the information from classmates **NOT** from the graduate assistant or instructor.

Exam, Lab and Assignment Make Up Policy

If you cannot take a test at the scheduled time, you should contact Sean (Dr. Walker) as soon as possible with appropriate documentation verifying the circumstances. **PLEASE NOTE** make ups will only be given in the case of documented emergencies or unavoidable conflicts (these must be approved by Sean in advance). Please note, it is **YOUR RESPONSIBILITY** to contact Sean regarding make up assignments, labs, or exams.

Late Assignments

Late work will have 10% of the maximum points for that assignment deducted per day that it is late (weekends count). If there are exceptional circumstances the assignment may be given full credit.

Academic Integrity

I take all issues regarding academic honesty very seriously. **ALL WORK HANDED IN SHOULD BE YOUR OWN.** Incidents of cheating, turning in work that is not your own or is

cited improperly (plagiarism) will result in a zero grade for the first incident and a zero grade for the course on the second incident. If plagiarism is suspected you may be asked to submit an electronic version of the assignment in question for checking with one of the available anti-plagiarism software packages. All incidences of academic dishonesty will be reported to the Associate Dean of Student Affairs.

Withdrawal from courses: CSUF policy regarding withdrawal from classes (UPS 300.016) will be followed. After the first two weeks of the semester, students may be granted withdrawal **ONLY** by presenting compelling evidence outlining a physical, medical, or emotional condition that prevents completion of the course. **POOR ACADEMIC PERFORMANCE IS NOT EVIDENCE OF A SERIOUS REASON FOR WITHDRAWAL.** Students unable to produce official documentation will be required to take the grade they have earned in the class. Please refer to the course schedule for information on the last day to withdraw with a W grade. Important dates concerning registration or drops are on the inside cover of the CSUF **Fall 2005** Class Schedule or at:
http://www.fullerton.edu/admissions/policy_and_deadline_information_.htm.

Tentative Schedule (all reading material for student presentations is TBA)

- 1) August 25 – Introduction to Class/ How to Give a Presentation
- 2) September 1– History of Sexual Selection /Overview of Sexual Selection (Readings: Darwin, C. 1871. Chapter VIII from *The Descent of Man and Selection in Relation to Sex*; Sexual Selection Chapter 1 pp. 3-31)
- 3) September 8 – Genetics and Sexual Selection-Fisher’s Runaway Model and Indicator Traits (Chapters 2 & 3 pp 32 -78)
- 4) September 15–Empirical Methods and Case Studies (Chapters 4, 5 & 6 pp. 80-131)
- 5) September 22- Sexual Selection, Mating Systems, and Parental Roles (Chapter 7 pp. 143-182; Trivers, R. L. 1972. Parental investment and sexual selection. In B. Campbell, ed. *Sexual Selection and the Descent of Man, 1871-1971, 136-179. Heinemann, London.*)
Topic Choice and Readings are DUE TO SEAN at the Beginning of class.
- 6) September 29- Alternative Mating Tactics (Chapter 16, Brockmann, H. J. 2001. The Evolution of Alternative Strategies and Tactics. *Advances in the Study of Behavior* 30:1-51.)
- 7) October 6 Outline and Literature Survey Due, Student Presentation #1
- 8) October 13- Student Presentation #2
- 9) October 20 Student Presentation #3
- 10) October 27- Student Presentation #4
- 11) November 3 Student Presentation #5
- 12) November 10 Student Presentation #6 ** First Draft of Paper Due (two copies in class & electronically to Sean) **
- 13) November 17- Student Presentation #7
- 14) November 24 _ NO CLASS Thanksgiving Day
- 15) December 1-Student Presentation #8 **Paper Reviews Due in Class
- 16) December 8 Student Presentation #9
- 17) December 15 by 5 pm- Final Paper & Response to Reviewers Due (Hardcopy & an electronic copy to Sean)**

Potential Student Presentation Topics

1. Alternative Strategies in Dawson's Burrowing Bees

Simmons, L.W., J. L. Tomkins, and J. Alcock. 2000. Can minor males of Dawson's burrowing bee, *Amegilla dawsoni* (Hymenoptera : Anthophorini) compensate for reduced access to virgin females through sperm competition? *Behavioral Ecology* 11(3):319-325.

Alcock, J. 1996. Provisional rejection of three alternative hypotheses on the maintenance of a size dichotomy in males of Dawson's burrowing bee, *Amegilla dawsoni* (Apidae, Apinae, Anthophorini). *Behavioral Ecology and Sociobiology* 39(3):181-188.

2. Evolution of Polyandry

Sakuluk, S. K., J. M. Schaus, A-K. Eggert, W. A. Snedden, and P. L. Brady. 2002. Polyandry and fitness of offspring reared under varying nutritional stress in decorated crickets. *Evolution* 56(10):1999-2007.

Tregenza, T, and N. Wedell. 2002. Polyandrous females avoid costs of inbreeding. *Nature* 415:71-73.

3. Copulatory Courtship and Cryptic Female Choice

Tallamy, D. W., B. E. Powell, and J. A. McClafferty. 2002. Male traits under cryptic female choice in the spotted cucumber beetle (Coleoptera: Chrysomelidae) *Behavioral Ecology* 13(4): 511-518.

Edvardsson, M. and G. Arnqvist. 2000. Copulatory courtship and cryptic female choice in red flour beetles, *Tribolium castaneum*. *Proceedings of the Royal Society of London, Series B.* 267:559-563.

4. Sexual Cannibalism in Sagebrush Crickets

Johnson, J. C., T. M. Ivy, and S. K. Sakaluk. Female remating propensity contingent on sexual cannibalism in sagebrush crickets, *Cyphoderris strepitans*: a mechanism of cryptic female choice. *Behavioral Ecology* 10(5)227-233

Sakaluk, S. K. and T. M. Ivy. 1999. Virgin-male mating advantage in sagebrush crickets: differential male competitiveness or non-independent female mate choice. *Behaviour* 136:1335-1346.

5. *Fighting or Sneaking in Dung Beetles*

Moczek, A. P. and D. J. Emlen. 2000. Male horn dimorphism in the scarab beetle, *Onthophagus taurus*: do alternative reproductive tactics favor alternative phenotypes. *Animal Behaviour* 59: 459-466.

Emlen, D. J. 1997. Alternative reproductive tactics and male-dimorphism in the horned beetle *Onthophagus acuminatus* (Coleoptera: Scarabaeidae). *Behavioral Ecology and Sociobiology* 41:335-341.

6. *Sexual Conflict and the Evolution of Female Colour Morphs in Damselflies*

Andres, J. A., R. A. Sanchez-Guilluen and A. C. Rivera. 2002. Evolution of female colour polymorphism in damselflies: testing the hypotheses. *Animal Behaviour* 63(4):677-685.

Van Gossum, H. R. Stoks, and L. De Bruyn. 2001. Frequency-dependent male mate harassment and intra-specific variation in its avoidance by females of the damselfly *Ischnura elegans*. *Behavioral Ecology and Sociobiology* 51(1):69-75.

7. *Lekking Behaviour and Sandflies*

Jones, T. M., and R. J. Quinnell. 2002. Testing predictions for the evolution of lekking in the sandfly, *Lutzomyia longipalpis*. *Animal Behaviour* 63:605-612

Jones, T. M., R. J. Quinnell, and A. Balmford. 1998. Fisherian flies: benefits of female choice in a lekking sandfly. *Proceedings of the Royal Society, Series B.* 265:1651-1657

8. *Male mating tactics in scorpionflies*

Engqvist, L. and K. P. Sauer. 2002. A life-history perspective on strategic mating effort in male scorpionflies. *Behavioral Ecology* 13(5):632-636.

Bockwinkel, G. and K. P. Sauer. 1994. Resource dependence of male mating tactics in the scorpionfly, *Panorpa vulgaris* (Mecoptera, Panorpidae). *Animal Behaviour* 47(1):203-209.

9. *Sexually transmitted diseases and Sexual Selection*

Webberley, K. M., G. D. D. Hurst, J. Buszko, M. E. N. Majerus. 2002. Lack of parasite-mediated sexual selection in a ladybird/sexually transmitted disease system. *Animal Behaviour* 2002 63:131-141.

Abbot, P. and Dill, L. M. 2001. Sexually transmitted parasites and sexual selection in the milkweed leaf beetle, *Labidomera clivicollis*. *Oikos* 92:91-100.

10. *Sensory Exploitation*

Endler, J. A. and Basolo, A. 1998. Sensory ecology, receiver biases and sexual selection. *Trends in Ecology and Evolution* 13:415-420.

Sakaluk, S. K. 2000. Sensory exploitation as an evolutionary origin to nuptial food gifts in insects. *Proceedings of the Royal Society of London, Series B* 267:339-343.

Aguilar, A. Córdoba. 2002. Sensory trap as the mechanism of sexual selection in a damselfly genitalic trait (Insecta: Calopterygidae). *American Naturalist* 160: 594-601.

CLASSROOM SAFETY BRIEFING

- In the event of an emergency such as earthquake or fire:
 - Take all your personal belongings and leave the classroom (or lab). Use the stairways located at the east, west, or center of the building.
 - Do not use the elevator. They may not be working once the alarm sounds.
 - Go to the lawn area towards Nutwood Avenue. Stay with class members for further instruction.
 - For additional information on exits, fire alarms and telephones, **Building Evacuation Maps** are located near each elevator.
 - Anyone who may have difficulty evacuating the building, please see me after class.
- Dial 911 on any campus phone, pay phone, or blue emergency phones to connect directly to University Police. Dialing 911 on your cell phone will connect with the Highway Patrol. Tell CHP dispatcher that CSUF Police are the responding agency. Stay on the line until asked to hang up.
- If you want to bring visitors to the classroom, you must obtain permission from the instructor in advance and must sign a volunteer form.
- Visitors to the lab must obtain permission from the Chair and must sign a volunteer form.
- There is no smoking within 20 feet of every campus building. This includes the MH balcony.
- **FOR LAB CLASSES:** Specific hazards or risks in the lab will be discussed prior to each experiment. If you have any questions about the safety of an experiment, please contact me or the lab instructor.
 - If there is a spill of a hazardous chemical, notify your TA immediately.
 - Report all injuries to me or the TA immediately.
 - All students must read and sign the departmental, “Laboratory safety procedures” form at the beginning of each semester.
- **FOR CLASSES WITH FIELD TRIPS:**
 - Make sure you submit an Academic Field Trip Waiver and sign the Participant List for each field trip.
 - Students must comply with all State laws regarding possession, sale and use of alcohol or controlled substances while participating in CSUF related activities.