

Insect Behavior - BSPM 507

Spring 2013

Instructor: Louis B. Bjostad
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Lecture: 11 MWF, Room E8 Plant Sciences – East Wing

Calendar:

23 Jan (Wednesday)	First class
25 Feb (Monday)	Exam One (30% of grade)
13 March (Wednesday)	Abstract of review article due (5% of grade)
16-24 March	No classes, Spring break
10 April (Wednesday)	Review article due (30% of grade)
10 May (Friday)	Last class
16 May (Thursday)	Exam Two (30% of grade), 4:10– 6:10 PM

Friday Discussions: Participation in Friday discussions = **5% of grade**

Optional Textbook: Animal Behavior, John Alcock
Sample Exams: Exam One and Exam Two

GRADING CRITERIA

A. 25 February, Monday. Written examination (30% of grade).

This exam will include all material from 23 January (Wed) through 22 February (Fri).

B. 13 March, Wednesday. Abstract of review article due (5% of grade).

Abstract should have 300 words, along with a preliminary reference list of 5 principal references in an appropriate format of your choice. Your abstract should summarize the topic that will be covered in your full-length review article that is due April 10 (Wed).

C. 10 April, Wednesday. Review article due (30% of grade).

Review article must be on a research topic of current interest in insect behavior in scientific format, including title, abstract (same one you turned in on 13 March), introduction, discussion (preferably in subsections), and references. You may insert photocopies of tables or figures from other publications, if you like. The paper should have 3000 words (this is usually about 10 double-spaced pages), and 10-20 references. Turn in one printed copy, and also email me a copy of your report (to louis.bjostad@colostate.edu) as a PDF document. Double-space all pages (so that I have room to write comments between the lines), number each page, and staple the pages together. Do not put your article in a binder (manuscripts submitted to journals never are). Include your email address at the top of your review article

D. 16 May, Thursday. 4:10– 6:10 PM. Final examination (30% of grade).

This exam will include only material from 27 Feb (Wed) through 10 May (Fri).

E. Class discussions (5% of grade).

Week 1 (Jan. 13 - Jan. 25) Introduction to Insect Behavior

Wednesday – Lecture:

Overview of major themes in insect behavior

Friday – Lecture:

Overview of major themes in insect behavior, continued

Week 2 (Jan. 28 – Feb. 1) Early Studies

Monday – Lecture (Chapter 1, Alcock)

Wednesday – Lecture:

Tinbergen N. 1958. The bee-hunters of Hulshorst. In *Curious Naturalists*, Doubleday, New York.

Friday - Class Discussion:

Tinbergen N. 1958. Back to the bee-hunters. In *Curious Naturalists*, Doubleday, New York.

Also of interest (not required):

Shettleworth SJ . Clever animals and killjoy explanations in comparative psychology . Trends In Cognitive Sciences Volume: 14 Pages: 477-481 Published: NOV 2010

Week 3 (Feb. 4– Feb. 8) Navigation

Monday – Lecture (Chapter 2, Alcock)

Wednesday - Lecture:

Wystrach, Antoine; Beugnon, Guy; Cheng, Ken. Ants might use different view-matching strategies on and off the route. *Journal of Experimental Biology* Volume: 215 Pages: 44-55 JAN 2012

Friday - Class Discussion:

Collett, Matthew. How navigational guidance systems are combined in a desert ant. *Current Biology* Volume: 22 Pages: 927-932 MAY 2012

Also of interest (not required):

Wystrach, Antoine; Graham, Paul. What can we learn from studies of insect navigation? *Animal Behaviour* Volume: 84 Pages: 13-20 JUL 2012

Week 4 (Feb. 11 - Feb. 15) Genes

Monday – Lecture (Chapter 3, Alcock)

Wednesday - Lecture:

Ament, Seth A.; Wang, Ying; Chen, Chieh-Chun; et al. The transcription factor Ultraspiracle influences honey bee social behavior and behavior-related gene expression. *PLOS Genetics* Volume: 8 Article Number: e1002596 MAR 2012

Friday - Class Discussion:

Gempe, Tanja; Stach, Silke; Bienefeld, Kaspar; et al. Mixing of honeybees with different genotypes affects individual worker behavior and transcription of genes in the neuronal substrate. *PLOS One* Volume: 7 Article Number: e31653 FEB 2012

Also of interest (not required):

Patalano, Solenn; Hore, Timothy A.; Reik, Wolf; et al.. Shifting behaviour: epigenetic reprogramming in eusocial insects. *Current Opinion in Cell Biology* Volume: 24 Pages: 367-373 JUN 2012

Week 5 (Feb. 18 - Feb. 22) Environment

Monday – Lecture (Chapter 4, Alcock)

Wednesday - Lecture:

Reppert SM, Gegeer RJ, Merlin C. Navigational mechanisms of migrating monarch butterflies . Trends In Neurosciences Volume: 33 Pages: 399-406 Published: SEP 2010

Merlin C, Gegeer RJ, Reppert SM. Antennal circadian clocks coordinate sun compass orientation in migratory monarch butterflies . Science Volume: 325 Pages: 1700-1704 Published: SEP 2009

Also of interest (not required):

Qin, Qiu-Hong; He, Xu-Jiang; Tian, Liu-Qing; et al. Comparison of learning and memory of *Apis cerana* and *Apis mellifera*. Journal of Comparative Physiology A-Neuroethology Sensory Neural and Behavioral Physiology Volume: 198 Pages: 777-786 OCT 2012

Week 6 (Feb. 25 - Mar. 1) Exam Week

Monday - FIRST EXAM

Wednesday – Insect Behavior Videos

Friday - Lecture (Discuss First Exam, Review Article and Library Research)

Week 7 (Mar. 4 - Mar. 8) Neural Mechanisms

Monday – Lecture (Chapter 5, Alcock)

Wednesday – Lecture:

Dupuy, Fabienne; Steinmann, Thomas; Pierre, Dominique; et al. Responses of cricket cercal interneurons to realistic naturalistic stimuli in the field. Journal of Experimental Biology Volume: 215 Pages: 2382-2389 JUL 2012

Friday - Class Discussion:

Card, Gwyneth M. Escape behaviors in insects. Current Opinion in Neurobiology Volume: 22 Pages: 180-186 APR 2012

Week 8 (Mar. 11 - Mar. 15) Development

Monday – Lecture (Chapter 6, Alcock)

Wednesday - Lecture:

Johnson, Brian R.; Frost, Elizabeth. Individual-level patterns of division of labor in honeybees highlight flexibility in colony-level developmental mechanisms. Behavioral Ecology and Sociobiology Volume: 66 Pages: 923-930 JUN 2012

MARCH 13 - ABSTRACT OF REVIEW ARTICLE IS DUE

Friday - Class Discussion:

Saveer, Ahmed M.; Kromann, Sophie H.; Birgersson, Goran; et al. Floral to green: mating switches moth olfactory coding and preference. Proceedings of the Royal Society B-Biological Sciences Volume: 279 Pages: 2314-2322 JUN 2012

Week 9 (Mar. 16 - Mar. 24) SPRING BREAK

Week 10 (Mar. 25 - Mar. 29) Defense

Monday – Lecture (Chapter 7, Alcock)

Wednesday - Lecture:

Kastberger, Gerald; Weihmann, Frank; Hoetzl, Thomas; et al. How to join a wave: decision-making processes in shimmering behavior of giant honeybees (*Apis dorsata*). PLOS One Volume: 7 Article Number: e36736 MAY 2012

Friday - Class Discussion:

Yager, David D.. Predator detection and evasion by flying insects. Current Opinion in Neurobiology Volume: 22 Pages: 201-207 APR 2012

Also of interest (not required):

Corcoran, Aaron J.; Conner, William E. Sonar jamming in the field: effectiveness and behavior of a unique prey defense. Journal of Experimental Biology Volume: 215 Pages: 4278-4287 DEC 2012

Week 11 (Apr. 1 - Apr. 5) Feeding Behavior and Host Selection

Monday – Lecture (Chapter 8, Alcock)

Wednesday - Lecture:

Powell, Thomas H. Q.; Cha, Dong H.; Linn, Charles E., Jr.; et al. On the scent of standing variation for speciation: behavioral evidence for native sympatric host races of *Rhagoletis pomonella* (Diptera: Tephritidae) in the southern United States. EVOLUTION Volume: 66 Pages: 2739-2756 SEP 2012

Friday - Class Discussion:

Soler, Roxina; Pineda, Ana; Li, Yehua; et al. Neonates know better than their mothers when selecting a host plant. Oikos Volume: 121 Pages: 1923-1934 DEC 2012

Week 12 (Apr. 8 - Apr. 12) Choosing Where to Live

Monday – Lecture (Chapter 9, Alcock)

Wednesday - Lecture:

Seeley TD, Visscher PK, Passino KM. Group decision making in honey bee swarms. American Scientist 94 (3): 220-229 MAY-JUN 2006.

REVIEW ARTICLE IS DUE

Friday - Class Discussion:

Seeley, Thomas D.; Visscher, P. Kirk; Schlegel, Thomas; et al. Stop signals provide cross inhibition in collective decision-making by honeybee swarms. Science Volume: 335 Pages: 108-111 JAN 2012

Week 13 (Apr. 15 - Apr. 19) Communication

Monday – Lecture (Chapter 10, Alcock)

Wednesday - Lecture:

Okada, Ryuichi; Akamatsu, Tadaaki; Iwata, Kanako; et al.. Waggle dance effect: dancing in autumn reduces the mass loss of a honeybee colony. JOURNAL OF EXPERIMENTAL BIOLOGY Volume: 215 Issue: 10 Pages: 1633-1641 DOI: 10.1242/jeb.068650 Published: MAY 2012

Friday - Class Discussion:

Rodriguez, Rafael L.; Haen, Christina; Cocroft, Reginald B.; et al. Males adjust signaling effort based on female mate-preference cues. Behavioral Ecology Volume: 23 Pages: 1218-1225 NOV-DEC 2012

Week 14 (Apr. 22 - Apr. 26) Reproductive Behavior

Monday – Lecture (Chapters 11 and 12, Alcock)

Wednesday - Lecture:

Fabre, Caroline C. G.; Hedwig, Berthold; Conduit, Graham; et al. Substrate-borne vibratory communication during courtship in *Drosophila melanogaster*. *Current Biology* Volume: 22 Pages: 2180-2185 NOV 2012

Friday - Class Discussion:

Izzo, Amanda S.; Tibbetts, Elizabeth A. Spotting the top male: sexually selected signals in male *Polistes dominulus* wasps. *Animal Behaviour* Volume: 83 Pages: 839-845 MAR 2012

Week 15 (Apr. 29 – May 3) Social Behavior

Monday – Lecture (Chapter 13, Alcock)

Wednesday - Lecture:

Muscudere, Mario L.; Traniello, James F. A. Division of labor in the hyperdiverse ant genus *Pheidole* is associated with distinct subcaste- and age-related patterns of worker brain organization. *PLOS One* Volume: 7 Article Number: e31618 FEB 2012

Friday - Class Discussion:

Fabre JH. 1879. The Burying Beetles and Experiments with Burying Beetles. From *The Insect World of J. Henri Fabre*, by Edwin Way Teale, Harper and Row, 1949.

Week 16 (May 6 - May 10) Social Behavior

Monday – Lecture (Chapter 14, Alcock)

Wednesday - Lecture:

Pinter-Wollman, Noa; Hubler, Julia; Holley, Jo-Anne; et al. How is activity distributed among and within tasks in *Temnothorax* ants? *Behavioral Ecology and Sociobiology* Volume: 66 Pages: 1407-1420 OCT 2012

Friday - Class Discussion:

Konrad, Matthias; Pamminer, Tobias; Foitzik, Susanne. Two pathways ensuring social harmony. *Naturwissenschaften* Volume: 99 Pages: 627-636 AUG 2012