IBIO 490, Behavioral Ecology of African Mammals (BEAM)
May 12 – June 1 2018, Kenya

Course Description

This intensive 3-week field course will focus on the behavioral ecology of African mammals in their natural habitat. The course curriculum is designed to take advantage of the extraordinary richness, diversity, and observability of the mammalian fauna inhabiting Meru National Park, Lake Nakuru National Park, and the Maasai Mara National Reserve in southwest Kenya and will be held from May 12th through June 1st of 2018. Situated in the northern portion of the Serengeti ecosystem, the Mara contains savannas, acacia woodlands, and riverine forests, which are occupied by different groups of mammals. In each habitat type, we will use our bush vehicles as classrooms and mobile "blinds" from which to observe the behavior of resident herbivores and carnivores. Although most of our work in this course will be observational in nature, students will also receive instruction regarding how to capture and handle particular African mammals. Finally, this course will offer students a unique opportunity to learn about the culture of the indigenous Africans who inhabit the areas surrounding the Mara, the Maasai people. Many aspects of Maasai culture have changed little in thousands of years.

The best times of day for observing the behavior of African mammals are around dawn and dusk, so we will spend two or three hours each morning and evening in our vehicles, observing and quantifying the behavior of various mammals and testing hypotheses about why these animals behave as they do. During the warmer hours around midday, course instructors will lecture students on selected topics germane to understanding the Serengeti-Mara ecosystem and the behavior of its animals. During the evening hours, students will participate in literature-based discussions, as well as discussions around Kenyan culture.

After developing an understanding of the behavioral biology of African mammals and the methods available for its study, students will be expected to conduct independent projects answering specific questions about the behavior of one species, comparing the behavior of two different species, or testing an explanatory hypothesis in relation to behavior.

Course Objectives

- Recognize and identify all resident species of mammal and describe their social systems
- Focus on ecological variables shaping the behavior of resident species
- Learn and practice basic techniques used for animal observation
- Learn to formulate and test hypotheses
- Examine effects of humans on resident mammal populations and discuss conservation of East Africa's fauna
- Gain appreciation for Kenyan culture and that of the local people, the Maasai

Course Readings

Required Textbook
The Behavior Guide to African Mammals (1991, 2012) by Richard D. Estes

Required Readings
For lecture:

Davies NB, Krebs JR, West SA. 2012. An Introduction to Behavioural Ecology. 4th edition. Wiley-Blackwell. Excerpts from chapters 1, 3, 5.
Martin P, Bateson P. 2007. Measuring Behavior: An Introductory Guide. 3rd edition. Cambridge University Press. Excerpts from chapters 2, 3, 5
Shorrocks B, Bates W. 2015. The Biology of African Savannahs. 2nd edition. Oxford University Press. Excerpts from chapters 1, 2, 3.

For student-led discussions:

Balme GA, Hunter LTB. 2013. Why leopards commit infanticide. Animal Behavior 86:791-799.
Bishop AL, Bishop RP. 2013. Resistance of wild African ungulates to foraging by red-billed oxpeckers (*Buphagus erythrorhynchus*): Evidence that this behaviour modulates a potentially parasitic interaction. African Journal of Ecology 52:103-110.
Bro-Jørgensen J, Pangle WM. 2010. Male topi antelopes alarm snort deceptively to retain females for mating. The American Naturalist 176:E33-E39.
Caro T, Izzo A, Reiner RC Jr, Walker H, Stankowich T. 2014. The function of zebra stripes. Nature Communications 5:3535.
McComb K, Shannon G, Durant SM, Sayialel K, Slotow R, Poole J, Moss C. 2011. Leadership in elephants: The adaptive value of age. Proceedings of the Royal Society B: Biological Sciences 278:3270-3276.
Muller CA, Manser MB. 2007. 'Nasty neighbours' rather than 'dear enemies' in a social carnivore. Proceedings of the Royal Society B: Biological Sciences 274:959-965.
Van der Meer E, Fritz H, Blinston P, Rasmussen GSA. 2013. Ecological trap in the buffer zone of a protected area: Effects of indirect anthropogenic mortality on the African wild dog *Lycaon pictus*. Oryx 48:285-293.
Watts HE, Tanner JB, Lundrigan BL, Holekamp KE. 2009. Post-weaning maternal effects and the evolution of female dominance in the spotted hyena. Proceedings of the Royal Society B: Biological Sciences 276:2291-2298.
White AM, Swaisgood RR, Czekala N. 2007. Differential investment in sons and daughters: Do white rhinoceros mothers favor sons? Journal of Mammalogy 88:632-638.

Course Lectures

Pre-Departure: Scientific Skills
- How to Read a Scientific Paper
- How to Write a Scientific Paper
- Introduction to Applied Statistics
- How to Use Vassar Stats
- How to Present and Lead a Group Discussion

Scientific Methods
- Introduction to Behavioral Ecology
- Hypotheses and Study Design
- Collecting Behavioral Data
- Ecological Techniques

Ecology
- Savanah Ecology
- Basics of Mammalian Biology
- Rift Valley Geology
- Vegetation and its Interactions with Herbivores and Humans
- The Mara-Serengeti Ecosystem

What You See: Behavioral Biology in Action
- Reproductive Behavior
- Species Interactions
- Cognitive Ecology

Guest Lectures
- Conservation in East Africa (Dr. Bilal Butt, University of Michigan)
- Evolution of Behavior in Ungulates (Dr. Jakob Bro-Jorgensen, University of Liverpool)
- Kenya Wildlife Service (Timothy Ikime, MSc, Kenya Wildlife Service)
- Livestock BOMAs: A Novel Ecological Tool (Abraham Njenga, Ol Pejeta Conservancy)
- Wildlife Management (Brian Heath, Director of Mara Conservancy)

Assignments and Grading

Below is the breakdown of the assignments and how many points each is worth. Note that these assignments and weighted values are subject to change prior to the start of the course.

Pre-Departure – 100 pts
- Paper summary #1 – 20 pts
- Scientific writing – 20 pts
- Plagiarism – 20 pts
- Statistics – 20 pts
- Paper summary #2 – 20 pts

Science Communication – 10 pts
Lecture Quizzes (~12, 10 points each) – ~120 pts
In the Field – 150 pts
- Field journal (individual) – 30 pts
- Hypothesis testing (individual) – 30 pts
- Ethogram (individual) – 30 pts
- Observation techniques (pairs) – 30 pts
- Ecological techniques (pairs) – 30 pts

Student-Led Discussions – 80 pts
- Kenyan topic (individual) – 40 pts
- Scientific paper (pairs) – 40 pts

First Project – 120 pts
- Proposal (group) – 25 pts
- Abstract (group) – 20 pts
- Presentation (group) – 75 pts

Second Project – 200 pts
- Proposal (group) – 50 pts
- Paper (individual) – 150 pts

Participation – 40 pts
- Project 1 (peer evaluation) – 10 pts
- Project 2 (peer evaluation) – 10 pts
- General (instructor evaluation) – 20 pts

TOTAL: ~820 pts

Final Grade
Your course grade will be based on successful completion of the assignments listed here, and your final grade in the course will be determined by the total number of points you score on these assignments. The final grades will be determined according to the following system:

4.0: 90-100%	3.5: 85-89%
3.0: 80-84%	2.5: 75-79%
2.0: 70-74%	1.5: 65-69%
1.0: 50-64%	0.0: 0-50%