

EVOLUTIONARY ECOLOGY
BIO 480.531 BIO 531.501 ENVR 511.501
DR. SUSAN S. KILHAM WINTER TERM 99-2

The purpose of this course is to introduce graduate students to the major concepts that are central to understanding how organisms function in the environment, namely natural selection, population genetics, ecology. Human impacts on the environment and applications of evolutionary and ecological concepts to applied problems are emphasized.

1/5	1	Introduction, Types of Selection Natural Selection, Fitness, Adaptation	
1/12	2	The species concept (Dr. Rick McCourt)	
1/19	3	Genetic Basis of Change, Population Genetics	REPORT 1
1/26	4	Coevolution, Generalists/Specialists Populations: Distribution & Abundance	REPORT 2
2/9	5	Competition/Predation/Mutualism	
	6	EXAM Feb. 9	
2/16	7	Why are there so many species? Communities; Diversity	REPORT 3
2/23	8	Food Webs, Trophic Structure Element cycling	REPORT 4
3/1	9	Human impacts	
3/8	10	Applied evolutionary ecology; management, Genetic diversity, genetic engineering	

FINAL EXAM: March 15

REPORTS: There will be four required reports of papers from the **primary research literature** published within the last year.

TEXT: The text is: M. Begon, J.L. Harper & C.R. Townsend. Ecology, 3rd Edition. 1996. ISBN 0-932-03801. I will refer to particular sections of this text and will use illustrations from it. However, any general ecology text could be used as a reference for more in depth information on the topics discussed.

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Grading:	Mid term exam:	100 points
	Final exam:	100 points
	Reports:	100 points (25 pts each)

Each of you will read and report on 4 **primary research papers** published in **1999-2000** from the broad field of evolutionary ecology. This means that they are reports of direct research and not review type articles. You may choose any topics you wish, as long as they are **within the subject area of this course** (which is very broad!!) The journals to use are: *Science* (articles or reports), *Nature* (articles or letters), *Ecology*, *Evolution*, *American Naturalist*, *Journal of Ecology*, *Paleobiology*, *Genetics*, *Journal of Molecular Evolution*, *Conservation Biology*, *Ecological Applications*. It is possible, **with my permission**, to use a paper from another journal if you can justify it based on your particular interests (e.g. applications of principles of ecology or evolution to remediation). You will prepare a report (**2-3 p**; reports longer than 3 p. will not be accepted), consisting of the **major points** of the paper, the **approach used**, the **topics** of evolution and ecology that are addressed (e.g.: mating systems, competition, complex life cycles, risk aversion, coevolution, etc.), and your opinion of the **merit** of the paper. It is highly likely that more than one such topic applies to the interpretation of the experiments in a particular paper.

The reports must be **typed**. A copy of the research paper you used (which I may keep) must accompany each report. You may refer to figures or other illustrative material in the attached paper. [Copying from the paper, e.g., the abstract, introduction or conclusions, is a bad idea! It is, in fact, plagiarism, and grounds for dismissal]

I realize that the Drexel Library does not take some of these journals, but you have access to some journals via Drexel web-based sources, to the Penn Library with your Drexel ID and there is also the Academy of Natural Sciences library (19th and The Parkway). The Drexel Library does take *Science*, *Nature*, *Ecology*, *American Naturalist*, *Journal of Ecology*, *Genetics*.. I personally take several of these journals, but they can only be borrowed for the short time it takes to copy them.

Every student must read at least chapters 3 and 4 of *On the Origin of Species* by Charles Darwin. There will be a question on the final exam about this. You should pay particular attention to the examples of various ecological principles as you are reading (eg., keystone predators, herbivory increasing species diversity, competition for pollinators, etc). Of course, you should read the entire book, but the question will be taken from examples in the two chapters.