Zoology 524/Cons 501: Topics in Conservation Genetics
2008 Mon Wed 1:30 – 3 pm FSC 1617

Instructors

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Introduction

There is growing interest in the field of conservation genetics among life sciences graduate students at UBC. Some of these students are focussing their programs and research directly in this area, while others are pursuing research in the related fields of conservation biology, ecology, evolutionary biology or plant breeding. Graduate-level classes in evolutionary biology and population genetics cover much of the background theory relating to conservation genetics, but do not focus on specific issues in conservation genetics. This course is offered to 1) meet the need of students working specifically in conservation genetics; and 2) to provide a genetic perspective to students working in other areas of conservation biology.

Course Objectives

1. Review aspects of population genetics as they apply to conservation biology.
2. Discuss the relative importance of genetics, in terms of maintenance of evolutionary potential and avoidance of inbreeding, in biodiversity conservation.
3. Compare and contrast methodologies for characterizing genetic structure and diversity in species at risk of extinction.
4. Evaluate the role of genetic information in conservation strategies for threatened and endangered species.

Target Audience

Graduate students in the Faculties of Science, Forestry and Agriculture in the areas of ecology, evolution, biodiversity, conservation biology and gene resources management. There are no formal prerequisites for the course, but students will need at least an introductory genetics class (preferably population genetics) at the undergraduate level to participate fully in this course.

Course format

Most weeks a 1.5 hour lecture will be given introducing a topic during the first meeting of the week. The second 1.5 hour meeting of the week will focus on a student-led summary of one or more papers relating to the topic, and a directed discussion of the issues at stake. Each student will be expected to lead at least one discussion and play an active support role in a second discussion.

Grading

Oral presentation of assigned papers and discussion 30%
Term paper 70%

A term paper outline will need to be submitted and approved by both course instructors. A percentage grade will be assigned for the course.

Topics

Jan. 9	Scope of conservation genetics (Rick)
Jan. 14	The genetics of small and declining populations (Rick)
Jan. 21	Effective population size (Sally)
Jan. 28	Inbreeding depression, heterozygosity and fitness (Sally)
Feb. 4	Quantitative genetics and local adaptation (Sally)
Feb. 11	Climate change and rate of adaptation (Sally)
Feb. 18	READING BREAK
Feb. 25	Population structure and gene flow (Rick)
Mar. 3	Mutation and conservation (Rick)
Mar. 10	Phylogeography and units of conservation (Rick)
Mar. 17	Hybridization and introgression (Sally)
Mar. 24	EASTER MONDAY
Mar. 31	Statistical issues in conservation genetics (Rick)
April 7	Conservation strategies (Sally)

Reference materials

Books

There will be no course textbook. Selected readings from the following books will provide background information for the lecture portion of the course. We find the two texts in bold font particularly useful:

Allendorf, F.W. and G. Luikhart. 2007. Conservation and the Genetics of Populations. Blackwell Publishing. 642 p.

Avise, J.C. and J.L. Hamrick, eds 1996. Conservation Genetics: Case Histories from Nature. Chapman & Hall, New York.

Falk and Holsinger 1991. Genetics and Conservation of Rare Plants. Oxford University Press.

Frankham, R. et al. 2001. Introduction to Conservation Genetics. Cambridge Press.

Landweber, L.F. and A.P. Dobson, Eds. 1999. Genetics and the extinction of species. Princeton University Press, Princeton, NJ.189 p.

Smith, T.B., and R.K. Wayne (Eds). 1996. Molecular genetic approaches in conservation. Oxford University Press, New York. 483 p.

Papers

Paper relevant to topics covered in the lecture portion of the course will be drawn from peer-reviewed scientific journals, including but not limited to the following:

Conservation Biology

Conservation Genetics

Evolution

Trends in Ecology and Evolution

Molecular Ecology

Calendar Description

Cons 501/Zool 523 (3) Topics in conservation genetics. Lectures and directed discussions will address topics including the genetics of small populations, inbreeding, extinction risks due to genetic versus demography factors, adaptation and climate change, and methods for assessing genetic diversity for conservation planning.