

PLANT EVOLUTION
BOTANY 462
FALL 2005, MWF 10:30-11:20

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Office Hours: Drop By or By Appointment

The purpose of this course is to discuss the processes of evolution with particular reference given to the plant kingdom. In so doing, examples will be largely drawn from botanical studies although many zoological examples may also be used. This course is not to be confused with plant systematics or taxonomy which is the naming and identification of plant species. Although the subject matter may overlap to some degree, this class will be dealing with the principles affecting speciation and the evolution of vascular plant groups, and not the theory involved in the establishment of a classification system.

Text

Strickberger, M. W., 1996. Evolution. (Third Edition) Jones and Bartlett Pub., Sudbury, Massachusetts. *Although no book I have found discusses all of the issues in plant evolution to fulfill all the needs of this course, this book comes pretty close. A thorough text with good discussions of issues.*

Other materials.

Avers, C. J. 1989. Process and patterns in evolution. Oxford University Press, New York.

Briggs, D. and S. M. Walters. 1984. Plant variation and evolution. 2nd edition. Cambridge University Press, Cambridge. *(Easy reading with many examples. A more recent edition has come out but I have not seen it yet.)*

Dobzhansky, T, Ayala, F.J., Stebbins, G.L., Valentine, J. W. 1977. Evolution. W. H. Freeman and Company, San Francisco. *(A good general book that covers many of the important principles of evolutionary biology. Many examples used to illustrate concepts. Well written.)*

Grant, V. 1981. Plant Speciation. 2nd edition. Columbia University Press, New York. *(A good reference book on speciation. Grant's views have changed on some topics)*

Grant, V. 1991. The evolutionary process, a critical study of evolutionary theory. 2nd edition. Columbia University Press, New York. *(A detailed up-to-date book in most areas of evolutionary biology.)*

Graur, D. and W.-H. Li. 2000. Fundamentals of Molecular Evolution. Sinauer Associates, Inc. *(A thorough and comprehensive book detailing many aspects of molecular evolution.)*

- Pearson, L. 1995. The diversity and evolution of plants. CRC Press. *(A relatively good book for finding out how various plant groups are related and how the plant kingdom has evolved. Some of the more recent issues relating to specific groups are out of date.)*
- Stebbins, G. L. 1950. Variation and evolution in plants. Columbia University Press, New York. *(A timeless classic. Very insightful and always worth looking through!)*
- White, M. J. D. 1978. Modes of speciation. W. H. Freeman and Company. *(A good general book on speciation events, primarily at the chromosome level. Most examples are animal related although many topics are relevant to plant systems.)*

Grading

Grades will be determined from the cumulative scores of midterm and final exams, a term paper, and several short assignments. Final grades will be based on a curve of the entire undergraduate class; graduate student grades will be applied based on that curve. The term paper is to be a library research assignment on any topic of your choosing (pending approval) relative to evolution. A study sheet with pertinent topics for exams will be handed out one week prior to the exam to help in preparation. An approximate schedule of when assignments are due (excluding short assignments) is as follows:

Topic for term paper	Oct. 14
Midterms	Oct. 7, Nov. 11
Outline for term paper	Nov. 4
Term Papers due	Dec. 2
Final Exam	Monday, Dec. 12, 9:45-11:45 a.m.

Video Nights

An excellent series on Evolution was put out by PBS a few years ago. Some of it touches on things we will be discussing in our course. An “optional” evening meeting will be scheduled to watch these throughout the semester, probably in room 011. These are intended to be fun evenings...I'll provide popcorn and soda's (you can provide other libations, etc)

Approximate Weekly Schedule

<u>Schedule of Lectures</u>	<u>Topic</u>	<u>Chapter Readings*</u>
Week 1 (Aug 22-26)	Historical Context: John Ray to Darwin	1
Week 2 (Aug 29-Sep 2)	Historical Context: Darwin to Mendel	2,3,10
Week 3 (Sep 7-9)	Principles of Natural Selection	20,21
Week 4 (Sep 12-16)	Hardy Weinberg Law	20
Week 5 (Sep 19-23)	Hardy Weinberg and variability factors	*
Week 6 (Sep 26-30)	Natural Selection	*
Week 7 (Oct 3-7)	Natural Selection and Genetic Drift (MIDTERM)	*
Week 8 (Oct 10-14)	Costs of Selection - the genetic load (Topics)	22
Week 9 (Oct 17-21)	Speciation	23
Week 10 (Oct 24-28)	Isolation factors in speciation	23
Week 11 (Oct 31-Nov 4)	Gradual vs. Quantum speciation (Outline)	23
Week 12 (Nov 7-11)	Chromosomal aberrations and speciation (MIDTERM)	10
Week 13 (Nov 14-18)	Sympatric Speciation	23
Week 14 (Nov 21-23)	Origin of Life; Plant Evolution	5-9,12
Week 15 (Nov 28-Dec 2)	Plant Evolution: bacteria to lower vascular plants (Papers)	13
Week 16 (Dec 5-7)	Plant Evolution: ferns, gymnosperms, angiosperms	13

***Other reading materials may be used to supplement text.**

FINAL Dec 14 9:45 – 11:45