

**PLB 479 Plant Variation  
Fall Semester, 2009**

**Instructor:** Dr. Daniel Nickrent  
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**Office Hours:** I will meet with you individually following an appointment.

**Lectures:** Monday & Wednesday, 1 - 1:50, Rm. 430 LS II

**Discussions:** Friday 1 - 1:50, Rm. 430 LS II. The assigned reading or readings will be announced. You will be emailed a pdf file of all articles to read.

**Textbook:** Briggs, D. Walters, S. M. Plant variation and evolution. Cambridge University Press, Cambridge UK. 0-521-45295-3 (hardcover), 0-521-45918-4 (soft cover).

**Class Web Page:** <http://www.plantbiology.siu.edu/PLB479/index.html>

**Course Grading:** Your grade for this course will be based upon your performance on lecture exams, Discussion participation (see below), and the term paper. I grade on a straight percentage basis (e.g.  $\geq 90\%$  = A, etc.) with a possible curve based on student performance. The format for the lecture exams will be short answer and essay. The relative percentages for each are:

Exam 1	20%	Discussion participation	15%
Exam 2	20%	Term paper	<u>20%</u>
Final (comprehensive)	25%	Total	100%

**Lectures.** These were constructed from chapters in the textbook and then supplemented with additional new information taken from the literature. The lecture notes and all graphics are available on the class web page.

**Lecture exams.** These will consist mainly of short answer questions that test you knowledge of the main points covered in the lectures and discussion sessions. The the final exam will have two components (equal number of points): the material since exam 2 and a comprehensive part to test your understanding of concepts developed throughout the semester.

**Discussion Participation.** Lecture concepts will be reinforced by the weekly readings that will be taken from the primary literature. The journal article will be sent to you via email as a pdf file. Students are expected to read the weekly article and come prepared to discuss it during the Friday Discussion period. Coming prepared means not only reading the paper, but also taking notes about the important issues discussed in the paper, questions you have about any concepts that are unclear, etc. Your grade for Discussions will be determined by 1) whether you read the paper, 2) participation in discussing the paper, and 3) your degree of understanding following the discussion.

**Term Paper.** A list of potential topics for your term paper will be distributed early in the semester as well as instructions on format, length, style, etc. A first draft of you term paper (printed copy please) will be due on **November 6**. This will be promptly edited and returned to you with corrections and suggested changes. The final draft of the term paper will be due **November 30**. It will be graded and returned to you on the day of the final exam, **December 4**.

**PLB 479 Plant Variation  
Syllabus - Fall 2009**

Mon.	Aug. 24	Introduction. Chp. 1
Wed.	Aug. 26	From Ray to Darwin – History of plant systematics. Chp. 2
Fri.	Aug. 28	From Ray to Darwin – History of plant systematics. Chp. 2
Mon.	Aug. 31	Early work on biometry. Chp. 3
Wed.	Sept. 2	Phenetic classification (not in book)
Fri.	Sept. 4	Discuss Reading
Mon.	<b>Sept. 7</b>	<b><i>Labor Day – no classes</i></b>
Wed.	Sept. 9	Early work on the basis for individual variation Chps. 4 & 6
Fri.	Sept. 11	Early work on the basis for individual variation Chps. 4 & 6
Mon.	Sept. 14	Modern views on the basis of variation Chp. 6
Wed.	Sept. 16	Modern views on the basis of variation Chp. 6
Fri.	Sept. 18	Discuss Reading
Mon.	Sept. 21	Genetic variation and plant populations (not in book)
Wed.	Sept. 23	Genetic variation and plant populations (not in book)
Fri.	Sept. 25	Genetic variation and plant populations & Exam review
Mon.	Sept. 28	<b>EXAM 1</b>
Wed.	Sept. 30	Breeding systems & asexual reproduction Chp. 7
Fri.	Oct. 2	Discuss Reading
Mon.	Oct. 5	Breeding systems & asexual reproduction Chp. 7
Wed.	Oct. 7	Isolating mechanisms (not in book)
Fri.	Oct. 9	Discuss Reading
Mon.	Oct. 12	Intraspecific variation, ecotypes, & genecology. Chp. 8
Wed.	Oct. 14	Intraspecific variation, ecotypes, & genecology. Chp. 8
Fri.	Oct. 16	Discuss Reading
Mon.	Oct. 19	Recent advances in Genecology. Chp. 9
Wed.	Oct. 21	Recent advances in Genecology. Chp. 9
Fri.	Oct. 23	Discuss Reading
Mon.	Oct. 26	Gradual speciation and hybridization Chp. 11
Wed.	Oct. 28	Gradual speciation and hybridization Chp. 11
Fri.	Oct. 30	Discuss Reading
Mon.	Nov. 2	Review for exam
Wed.	Nov. 4	<b>EXAM 2</b>
Fri.	Nov. 6	Abrupt speciation and polyploidy Chp. 12. <i>First Draft of Term Paper Due.</i>
Mon.	Nov. 9	Abrupt speciation and polyploidy Chp. 12
Wed.	Nov. 11	Speciation – the process
Fri.	Nov. 13	Discuss Reading.
Mon.	Nov. 16	Species concepts –10 &13
Wed.	Nov. 18	Biogeography
Fri.	Nov. 20	Discuss Reading.
Mon.	Nov. 23	<b><i>Thanksgiving Vacation – no classes</i></b>
Mon.	Nov. 30	Phylogeography. <i>Final Draft of Term Paper Due.</i>
Wed.	Dec. 2	Conservation biology and genetics Chp. 15
Fri.	Dec. 4	<b>FINAL EXAM.</b>

## Useful References

### Plant Biosystematics and Evolution

- Bakker, Freek T. 2005. *Plant Species-level Systematics: New Perspectives on Pattern & Process*. Lubrecht & Cramer Ltd. ISBN: 3906166392
- Briggs, D. & S. M. Walters. 1997. *Plant Variation and Evolution*, 3rd. edition. Cambridge University Press, Cambridge, UK.
- Davis, P. H., and Heywood, V. H. 1963. *Principles of Angiosperm Taxonomy*. Oliver and Boyd, New York.
- Grant, V. 1971. *Plant Speciation*. Columbia University Press. New York, NY.
- Grant, V. 1985. *The Evolutionary Process: A critical Review of Evolutionary Theory*. Columbia Univ. Press, New York, NY.
- Grant, W. F. 1984. *Plant Biosystematics*. Academic Press, New York, NY.
- Niklaus, K. J. 1997. *The evolutionary biology of plants*. University of Chicago Press, Chicago, Illinois. 449 pp.
- Soltis, D. E. and P. S. Soltis (eds.). 1989. *Isozymes in plant biology*. Dioscorides Press, Portland, Oregon. 268 pp.
- Stuessy, T. F. 1990. *Plant Taxonomy: The Systematic Evaluation of Comparative Data*. Columbia Univ. Press, New York. 514 pp.

### Plant Taxonomy and Systematics

- Cronquist, A. 1988. *The Evolution and Classification of Flowering Plants*, 2nd. Ed. New York Botanical Garden. 555 pp.
- Cronquist, A. 1981. *An Integrated System of Classification of Flowering Plants*. Columbia Univ. Press, N.Y.
- Judd, W. S., C. S. Campbell, E. A. Kellogg, and P. F. Stevens. 2002. *Plant Systematics: A Phylogenetic Approach*, Second Edition. Sinauer Associates, Inc., Sunderland, MA. 576 pp. + CD. Used here at SIUC for PLB 304.
- Mabberley, D. J. 1997. *The Plant Book. A Portable Dictionary of the Higher Plants*. Second Edition. Cambridge Univ. Press, Cambridge. 858 pp.
- Radford, A. E. 1986. *Fundamentals of Plant Systematics*. Harper & Row, New York, NY.
- Radford, A. E., W. C. Dickison, J. R. Massey & C. R. Bell. 1981. *Vascular Plant Systematics*. Harper and Row, New York. 891 pp.
- Simpson, M. G. 2006. *Plant Systematics*. Elsevier Acad. Press. New York, NY.
- Singh, G. 1999. *Plant Systematics*. Science Publishers. 258 pages.
- Sivarajan, V. V. 1991. *Introduction to the principles of plant taxonomy*. Cambridge University Press, New York.
- Stace, C. A. 1980. *Plant Taxonomy and Biosystematics*. Edward Arnold Publ., London. 279 pp.
- Takhtajan, A. 1997. *Diversity and classification of flowering plants*. Columbia University Press, New York.
- Walters, D. R. and D. J. Keil. 1996. *Vascular Plant Taxonomy*, 4th. Ed. Kendall/Hunt Publ. Co., Dubuque, Iowa. 608+ pp.
- Woodland, D. W. 1997. *Contemporary Plant Systematics*, Second Edition. Andrews University Press. 619 pp + CD.
- Zomlefer, W. B. 1994. *Guide to Flowering Plant Families*. University of North Carolina Press, Chapel Hill. 430 pp.

### Molecular Evolution and Systematics

- Avise, J. C. 2000. *Molecular markers, natural history and evolution*, 4<sup>th</sup>. edition. Kluwer Academic Publishers. 511 pp.
- Bell, G. 1997. *Selection: The mechanism of evolution*. Chapman and Hall, New York.
- Crawford, D. J. 1990. *Plant Molecular Systematics*. John Wiley & Sons, New York. 388 pp.

- Gillespie, J. H. 1991. *The Causes of Molecular Evolution*. Oxford University Press, New York, N.Y. 352 pp.
- Givnish, T. J. and K. J. Sytsma (eds.). 1997. *Molecular evolution and adaptive radiation*. Cambridge University Press, Cambridge, United Kingdom. 621 pp.
- Graur, D., and W.-H. Li. 2000. *Fundamentals of Molecular Evolution*. Sinauer Associates, Inc., Sunderland, MA.
- Hillis, D. M., C. Moritz, B. K. Mable. 1996. *Molecular Systematics*, 2nd. Edition. Sinauer Assoc., Sunderland, Mass.
- Hollingsworth, P. M., R. M. Bateman, and R. J. Gornall. 1999. *Molecular Systematics and Plant Evolution*. Taylor and Francis, New York.
- Langridge, J. 1991. *Molecular genetics and comparative evolution*. John Wiley & Sons, Inc., New York, New York. 216 pp.
- Lewontin, R. C. 1974. *The Genetic Basis of Evolutionary Change*. Columbia University Press, New York.
- Li, W.-H. 1997. *Molecular Evolution*. Sinauer Assoc., Sunderland, Mass.
- Miyamoto, M. and J. Cracraft (eds). 1991. *Phylogenetic Analysis of DNA Sequences*. Oxford Univ. Press, N.Y. 358 pp.
- Page, R. D. M., and E. C. Holmes. 1998. *Molecular Evolution - A Phylogenetic Approach*. Blackwell Science, Oxford, UK. 346 pp.
- Soltis, D., P. Soltis, and J. Doyle. 1998. *Molecular Systematics of Plants II: DNA Sequencing*. Kluwer Academic Publishers, Boston, MA. 574 pp.
- Soltis, P. S., D. E. Soltis & J. J. Doyle, eds. 1992. *Molecular Systematics of Plants*. Chapman and Hall, New York. 434 pp.
- Soltis, D. E., P. S Soltis, P. K. Endress, & M. W. Chase. 2005. *Phylogeny and Evolution of Angiosperms*. Sinauer Associates, Inc. Sunderland, MA. 370 pp.
- Suzuki, D. T., A. J. F. Griffiths, J. H. Miller, and R. C. Lewontin. 1989. *An introduction to genetic analysis*, 4th ed. W. H. Freeman and Company, New York, New York. 768 pp.

### **Biogeography and Phylogeography**

- Avice, J. C. 2000. *Phylogeography: The history and formation of species*. Harvard University Press, Cambridge, MA. 447 pp.
- Brown, J. H. and A. C. Gibson. 1983. *Biogeography*. C. V. Mosby Company, St. Louis, Missouri. 643 pp.
- Carlquist, S. 1974. *Island biology*. Columbia University Press, New York, New York. 660 pp.
- Cox, C. B. and P. D. Moore. 1993. *Biogeography: an ecological and evolutionary approach*, 5th ed. Blackwell Scientific Publications, Oxford, United Kingdom. 326 pp.

### **Evolutionary Biology - General**

- Eldredge, N. 1989. *Macro-evolutionary dynamics: Species, niches, and adaptive peaks*. McGraw-Hill Publishing Company, New York, New York. 226 pp.
- Futuyma, D. J. 1979. *Evolutionary biology*. Sinauer Associates, Inc., Sunderland, Massachusetts. 565 pp.
- Grant, V. 1991. *The evolutionary process*, 2nd ed. Columbia University Press, New York, New York. 487 pp.
- Harvey, P. H. and M. D. Pagel. 1991. *The Comparative Method in Evolutionary Biology*. Oxford University Press, New York, N.Y. 248 pp.
- Kardong, K. V. 2007. *An Introduction to Biological Evolution*. McGraw-Hill Science/Engineering/Math; 2 edition. 368 pp.
- Lincoln, R. J., G. A. Boxshall and P. F. Clark. 1982. *A dictionary of ecology, evolution and systematics*. Cambridge University Press, New York. 298 pp.
- Mayr, E. 2001. *What Evolution Is*. Basic Book, New York, NY.
- White, M. J. D. 1978. *Modes of speciation*. W. H. Freeman and Company, San Francisco, California. 455 pp.
- Zimmer, C. 2001. *Evolution: The Triumph of an Idea*. Harper Collins, New York, NY. 528 pp.