

Molecular Ecology — General Info

Fall 1995

333 Science II

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Office Hours: by appt.!!

Course Content: This course will focus on reading and discussing seminal issues and the current literature in molecular ecology. We will typically read a section of Avise (1994) “Molecular Markers, Natural History and Evolution” along with one or more specific papers on a particular topic in molecular ecology.

Expectations: Attendance, preparation, and participation is mandatory. Also, we expect everyone to read the paper(s) critically so that we can have good discussions. Each student will serve as a primary discussion leader once during the semester. The primary discussion leader will be selected randomly on the day of class. Each student will also serve as a secondary discussion leader one or more times during the semester.

Tentative Schedule and Topics

<u>WEEK</u>	<u>TOPIC [readings from Avise (1994)]</u>
1	Organizational meeting
2	Introduction/History [Chapters 1 & 2]
3	Molecular Tools [Chapter 3; microsatellites] Bruford and Wayne. 1993. Microsatellites and their application to population genetic studies. <i>Curr. Op. Genet. Devel.</i> 3:939-943.
4	Interpretive Tools [Chapter 4]
5	Inbreeding [pp. 190-204] Reeve et al. 1990. DNA “fingerprinting” reveals high levels of inbreeding in colonies of the eusocial naked mole-rat. <i>Proc. Natl. Acad. Sci. USA</i> 87:2496-2500. Templeton and Read. 1994. Inbreeding: one word, several meanings, much confusion. pp. 91-105 in V. Loeschcke et al. (eds.), “Conservation Genetics”.
6	Breeding Systems [Chapter 5, pp. 204-213] Broyles and Wyatt. 1990. Paternity analysis in a natural population of <i>Asclepias exaltata</i> : multiple paternity, functional gender, and the “pollen-donation hypothesis”. <i>Evolution</i> 44:1454-1468.
7	Genetic Variation--Introductions Kreitman and Wayne. 1994. Organization of genetic variation at the molecular level: lessons from <i>Drosophila</i> . pp. 157-183 in B. Schierwater et al. (eds.), “Molecular Ecology and Evolution: Approaches and Applications”. Leberg. 1993. Strategies for population reintroduction: effects of genetic variability on population growth and size. <i>Conserv. Biol.</i> 7:194-199. Liu and Furnier. 1993. Comparison of allozyme, RFLP, and RAPD markers for revealing genetic variation within and between trembling aspen and bigtooth aspen. <i>Theor. Appl. Genet.</i> 87:97-105.
8	No class
9	Dispersal [pp. 213-233] Buroker. 1983. Population genetics of the American oyster <i>Crassostrea virginica</i> along the Atlantic coast and the Gulf of Mexico. <i>Mar. Biol.</i> 75:99-112.
10	Biogeography [pp. 233-250, 321-331] Reeb and Avise. 1990. A genetic discontinuity in a continuously distributed species: mitochondrial DNA in the American oyster, <i>Crassostrea virginica</i> . <i>Genetics</i> 124:397-406.

- 11 **Natural Selection--Pesticide Resistance** [Chapters 7 & 8 of Golding (1994)]
Raymond et al. 1991. Worldwide migration of amplified insecticide resistance genes
 in mosquitoes. *Nature* 350:151-153.
- 12 **Speciation/Hybrid Zones** [Chapter 7]
- 13 **Phylogeny** [pp. 306-320, 332-359]
Telford and Thomas. 1995. Demise of the Atelocerata? *Nature* 376:123-124.
Boore et al. 1995. Deducing the pattern of arthropod phylogeny from mitochondrial
 DNA rearrangements. *Nature* 376:163-165.
Friedrich and Tautz. 1995. Ribosomal DNA phylogeny of the major extant arthropod
 classes and the evolution of myriapods. *Nature* 376:165-167.
- 14 Thanksgiving week
- 15 **Conservation Biology/Genetics I** [Chapter 9]
- 16 **Conservation Biology/Genetics II**
Hedrick. 1995. Gene flow and genetic restoration: the Florida panther as a case study.
 Conserv. Biol. 9:996-1007.
Maehr and Caddick. 1995. Demographics and genetic introgression in the Florida
 panther. *Conserv. Biol.* 9:1295-1298.
Maehr and Cox. 1995. Landscape features and panthers in Florida. *Conserv. Biol.*
 9:1008-1019.