Reading list for lectures by Deborah Charlesworth

In the notes below, B. & D. Charlesworth's book Elements of Evolutionary Genetics is called B&D book. Most of the material for these lectures is from Chapter 9 of that book.

The readings listed here are a selection of important theoretical papers. Further references, including papers with examples of biological cases of the systems modelled, are will be provided during the course.

Lecture 1: Population genetics of mating system evolution

1) Introduction to mating systems of animals and plants (B&D book p. 450, 453), including self-fertilisation and non-random mating

2) The "transmission advantage of selfing" (Fisher's single locus model, B&D book Box 9.2, and later refinements), genetically explicit and phenotypic models, fitness via reproductive functions

3) Biological factors selection for outcrossing, mixed mating systems

4) Population mean fitness, short- and long-term advantages

READINGS

Lloyd, D. G., 1979. Some reproductive factors affecting the selection of self-fertilization in plants. Am. Nat. 113**:** 67-79.

Nagylaki, T., 1976. A model for the evolution of self fertilization and vegetative reproduction. J. Theoret. Biol. 58**:** 55-58.

Porcher, E., and R. Lande, 2005. The evolution of self-fertilization and inbreeding depression under pollen discounting and pollen limitation. Journal of Evolutionary Biology 18**:** 497-508.

Lecture 2: Evolution of separate sexes and sex chromosomes

1) Introduction to gender in animals and plants

2) Allocation to male and female functions, trade-offs, ESS analysis, gender as a quantitative character

3) Invasion of populations by male and female sterility mutations (B&D Box 9.4), cytoplasmic and nuclear male sterility sexual polymorphism

4) Evolutionary origins of 2 sexes and of sex-determining systems (B&D book p. 467)

5) Evolution of suppressed recombination in sex chromosomes, SA selection

6) Degeneration of Y chromosomes

7) Breakdown of dioecy

READINGS

Charlesworth, B., and D. Charlesworth, 1978. A model for the evolution of dioecy and gynodioecy. Amer. Nat. 112**:** 975-997.

Jacobs, M. S., and M. J. Wade, 2003. A synthetic review of the theory of gynodioecy. Am.Nat. 161**:** 837-851.

Lloyd, D. G., 1980. The distributions of gender in four angiosperm species illustrating two evolutionary pathways to dioecy. Evol. 34**:** 123-134.

Lecture 3: Evolution of self-incompatibility **(B&D book p. 452)**

1) Introduction to self-incompatibility systems (SI) in plants and fungi, gametophytic systems including 2 loci

2) Balancing selection, frequency dependence, Wright's model in finite populations, long term balancing selection, functional allelic classes

3) Evolution of new S alleles

4) Breakdown of self-incompatibility

5) Evolution of dominance in sporophytic systems

READINGS

Schoen, D. J., and J. W. Busch, 2009. The evolution of dominance in sporophytic self-incompatibility systems. II. Mate availability and recombination. Evol. 63**:** 2099-2113.

Uyenoyama, M. K., Y. zhang and E. Newbigin, 2001. On the origin of self-incompatibility haplotypes: transition through self-compatible intermediates. Genetics 157**:** 1805-1817.

Vekemans, X., and M. Slatkin, 1994. Gene and allelic genealogies at a gametophytic self-incompatibility locus. Genetics 137**:** 1157-1165.

Wright, S., 1939. The distribution of self-sterility alleles in populations. Genetics 24**:** 538-552.