

Camp Evolution 2016 – February 21-25
Summaries of Lectures & Readings
Spencer C.H. Barrett, University of Toronto

4) *Heterostyly as a model system in ecological and evolutionary genetics*

In this lecture, I review recent progress on the evolutionary history, functional ecology, genetics and molecular biology of heterostyly using a variety of taxa to illustrate advances in understanding. Distyly and tristily represent remarkable examples of convergent evolution and are represented in at least 28 animal-pollinated, flowering plant families. The floral polymorphisms promote disassortative mating and are maintained in populations by negative frequency-dependent selection. Comparative analyses using phylogenies and character reconstructions demonstrate multiple independent origins of heterostyly and the pathways of evolution in several groups. Field studies of pollen dispersal and stigma capture support the Darwinian hypothesis that the reciprocal style–stamen polymorphism functions to increase the proficiency of animal-mediated cross-pollination and reduce pollen wastage. Although the patterns of Mendelian inheritance of the style morphs are well established in diverse taxa, the identity, number and organization of genes controlling the heterostylous syndrome are unknown, despite recent progress. In future, it will be particularly important to establish the contribution of ‘supergenes’ vs. regulatory loci that cause morph-limited expression of genes.

Barrett, S.C.H. (1992). *Evolution and Function of Heterostyly*. Springer-Verlag, Berlin.

Barrett, S.C.H. (1993). The evolutionary biology of tristily. In: *Oxford Surveys in Evolutionary Biology*. Eds. D. Futuyma and J. Antonovics. Oxford University Press, Oxford 9: 283-326.

Barrett, S.C.H. & J.S. Shore (2008). New insights on heterostyly: Comparative biology, ecology and genetics. In *Self-incompatibility in Flowering Plants: Evolution, Diversity and Mechanisms*. (Ed. V. Franklin-Tong). Springer-Verlag, Berlin, pp 3-32.