

"PRINCIPLES OF PHYLOGENETICS: ECOLOGY AND EVOLUTION"

*Integrative Biology 200B*  
University of California, Berkeley

Spring 2007  
D.D. Ackerly

March 13, 2007. **Adaptive radiation**

Reading:

Losos, J., T. Jackman, A. Larson, K. de Queiroz, and L. Rodriguez-Schettino. 1998. Contingency and determinism in replicated adaptive radiations of island lizards. *Science* 279:2115-2118.

Harmon, L. J., J. A. Schulte, II, A. Larson, and J. B. Losos. 2003. Tempo and mode of evolutionary radiation in Iguanian lizards. *Science* 301:961-964.

1. Key innovation and diversification (continued)  
The case of nectar spurs in *Aquilegia* (S. Hodges)
2. Environmental change, ecological opportunity and diversification  
*Inga* and *Phyllica* (Richardson)  
*Bursera* (Becerra)
3. Adaptive radiation: evolution of disparity and diversification  
*Anolis* lizards:  
Ecomorphs and phylogeny (Losos)  
Macrohabitat radiations within ecomorphs (Glor)  
Disparity vs speciation (Harmon)
4. Radiation of  $\alpha$  vs.  $\beta$  traits: evolutionary sequences in speciation vs. radiation  
*Ceanothus* in California (Ackerly et al.)

**Reading list:**

Ackerly, D. D., D. W. Schwilk, and C. O. Webb. 2006. Niche evolution and adaptive radiation: testing the order of trait divergence. *Ecology* 87:S50-S61.

Becerra, J. X. 2005. Timing the origin and expansion of the Mexican tropical dry forest. *Proceedings of the National Academy of Sciences of the United States of America* 102:10919-10923.

Glor, R. E., J. J. Kolbe, R. Powell, A. Larson, and J. B. Losos. 2003. Phylogenetic analysis of ecological and morphological diversification in Hispaniolan trunk-ground anoles (anolis cybotes group). *Evolution* 57:2383-2397.

Harmon, L. J., J. A. Schulte, II, A. Larson, and J. B. Losos. 2003. Tempo and mode of evolutionary radiation in Iguanian lizards. *Science* 301:961-964.

Harvey, P. H., and A. Rambaut. 2000. Comparative analyses for adaptive radiations. *PhilTransRoySocLondSerB* 355:1599-1605.

Hodges, S. 1995. Spurring plant diversification: Are floral nectar spurs a key innovation? *Proc. Roy. Soc. London Ser. B* 262:343-348.

Hodges, S. 1997. Floral nectar spurs and diversification. *Int. J. Plant Sci.* 158:S81-S88.

Losos, J. 1992. The evolution of convergent structure in Caribbean *Anolis* communities. *SystBiol.*

- 41:403-420.
- Losos, J. B., and D. B. Miles. 2002. Testing the hypothesis that a clade has adaptively radiated: iguanid lizard clades as a case study. *Amer. Nat.* 160:147-157.
- Losos, J. B., M. Leal, R. E. Glor, K. de Queiroz, P. E. Hertz, L. R. Schettino, A. C. Lara, T. R. Jackman, and A. Larson. 2003. Niche lability in the evolution of a Caribbean lizard community. *Nature* 424:542-545.
- Losos, J., T. Jackman, A. Larson, K. de Queiroz, and L. Rodriguez-Schettino. 1998. Contingency and determinism in replicated adaptive radiations of island lizards. *Science* 279:2115-2118.
- Marks, C. O., and M. J. Lechowicz. 2006. Alternative designs and the evolution of functional diversity. *American Naturalist* 167:55-66.
- Richardson, J. E., R. T. Pennington, T. D. Pennington, and P. M. Hollingsworth. 2001. Rapid diversification of a species-rich genus of Neotropical rain forest trees. *Science* 293:2242-2245.
- Richardson, J., F. Weitz, M. Fay, Q. Cronk, H. Linder, G. Reeves, and M. Chase. 2001. Rapid and recent origin of species richness in the Cape flora of South Africa. *Nature* 412:181-183.
- Sanderson, M. 1998. Reappraising adaptive radiation. *AmerJBot.* 85:1650-1655.
- Sanderson, M., and M. Donoghue. 1994. Shifts in diversification rate with the origin of angiosperms. *Science* 264:1590-1593.
- Sanderson, M. J., and M. J. Donoghue. 1996. Reconstructing shifts in diversification rates on phylogenetic trees. *TREE* 11:15-20.
- Schluter, D. 2000. *The ecology of adaptive radiations*. Oxford University Press, Oxford.
- SILVERTOWN, J., J. FRANCISCO-ORTEGA, and M. CARINE. 2005. The monophyly of island radiations: an evaluation of niche pre-emption and some alternative explanations. *Journal of Ecology* 93:653-657.