Announcements:

**Monday:** Ch. 9 The population implications physiological ecology – patterns of distribution and abundance.

**Next Friday:** Discussion of paper from the primary literature – paper and reading guide available on the website.

Today – Problem Discussion Session

1. In what kinds of environments would you expect to find predominantly C3, C4, or CAM plants? How can you explain the co-occurrence of two, or even all three of these types of plants in the same area? Discuss a means of testing your explanation.

2. Data in figure 6.16 suggest that prey size may favor a particular body size among pumas, with larger prey favoring larger cats. However, larger pumas also tend to occur at higher latitudes, and this variation in body size has been interpreted as a thermoregulatory adaptation (reduced heat loss via a reduction in surface area: volume ratio). Is predator size determined by climate, predator-prey interactions, or both? How might you design an experiment to test your hypothesis?

3. What advantage does aposematic coloration give to noxious prey? What are the costs and benefits of Batesian mimicry to the model and to the mimic? Recently, some ecologists have hypothesized that autumval leaf coloration is aposematic, with bright coloration being an indicator of strong defenses to ward off insect herbivores and parasites that deposit offspring on trees in the fall. Discuss the merits of this hypothesis and how you might test it.

4. What does it mean when Molles says that predators and prey are engaged in a ‘co-evolutionary race?’ Give some examples between plants and herbivores as well as between carnivores and their prey. How might predator-prey co-evolution interact with the water and temperature relations of organisms described in chapters 4 & 5? Would similar co-evolution occur between detritivores and plants? Why or why not?

5. How is plant allocation to the growth of roots vs. shoots analogous to the foraging behavior of animals? Consider plant foraging strategies in response to limitation by water vs. light vs. nutrients. How would you expect allocation to roots vs. shoots to change under these differing constraints? How might plants with very different allocation strategies coexist in the same area?
6. In general, consider the multiple physiological challenges faced by organisms. Using optimal foraging theory as an example, think more generally about organisms “optimizing” their way of life in response to the multiple, and constantly changing challenges of existence. Perhaps the fundamental question of ecology is “Why are there so many species?” If the challenges of life were fewer and more constant, would there be fewer or more species? Why?