

Chapter 57

Evolutionary Aside 57.2--The Evolutionary Species–Area Relationship

MacArthur and Wilson's theory is based on an equilibrium occurring between two ecological processes: colonization and extinction. Yet, many islands are famous for their adaptive radiations, in which an ancestral species gives rise to many descendant species, each adapted to a different ecological niche (see chapter 22). How does speciation fit into the equilibrium theory?

This topic has become a subject of great interest in recent years. It turns out that island area not only affects extinction rates (species going extinct less often as island size increases), but also the rate of speciation—larger islands have more speciation. Why this occurs is not clear, but probably is affected by two factors. First, the larger an island, the greater the chance for a population to become split in two by a river or some other barrier, promoting allopatric speciation (chapter 22). Second, larger islands tend to be more ecologically varied, providing more niches and thus more opportunities for species to evolve differences permitting coexistence (for instance, character displacement).

Evolutionary diversification also tends to be more important on isolated islands, again for two reasons. First, on islands near a mainland, repeated colonization from the mainland leads to gene flow, which tends to inhibit speciation. Second, more isolated islands simply have fewer colonists, thus providing more available niches that can be occupied by newly arisen species.

Evolutionary biologists continue to work to refine understanding of the relative importance of ecological and evolutionary factors, and how they interact, to determine species richness on different islands.