Primate Behavior, Ecology and Conservation

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The objective of this lecture is briefly to outline: (a) the history primates, their rich phylogeny and diversity, with a special focus on the primates of Sri Lanka; (b) the ecological niche separation among four species of sympatric primates, for example, as manifest at Polonnaruwa; (c) the evolution of social organization and behavior as reflected by these species; and (d) issues of conservation.

The anatomical, behavioral, and ecological history of primates, like that other placental mammals, can be traced back to the end of the age of reptiles. Several evolutionary trends are typical of primates, including adaptations for arboreal life, such as grasping hands, opposable thumbs, binocular depth perception and visual acuity. These developments were accompanied by a reduction of the sense of smell and numbers of teeth, and the expansion of the cerebral cortex.

The Order Primates first was represented worldwide in the tropical and subtropical continents (except Australia) by only the Suborder Prosimii or "pre-monkeys" (e.g., lemurs, tarsiers, lorises). These ancestral types gave rise to and were largely replaced by more efficient progeny species classified in the Suborder Anthropoidea, or the "true monkeys and apes." These species are now represented in the New World by the ceboids (e.g., marmosets, spider, cebus, and howler monkeys), and in the Old World by the cercopithecoids (e.g., baboons, guenons, macaques, colobus, langurs) and hominoids (apes and man). The prosimian stock flourished in their ancient ways, however, on the island of Madagascar where they were insulated from replacement by modern anthropoids. Primates living today are represented by a diversity of body forms and life-styles among about 234 different species.

The island of Sri Lanka, a biodiversity "hotspot," boasts 4 or 5 species of non-human primates incorporating 13 different subspecies. As is true for most mammals of Sri Lanka, the primate subspecies diversification reflects differences in phenotypic adaptations to contrasts in climate, vegetation and geography. The species include a generalist - the Toque macaque, two leaf-eating monkeys - the Gray or Hanuman langur and the Purple-faced langur, and a prosimian - the Slender loris (possibly two species). The four species are found sharing the same semi-evergreen forest habitat at Polonnaruwa, where these primates have been studied more or less continuously for nearly four decades. Taken together, these four species manifest a microcosm of socio-ecological relationships that is typical for much of the primate fauna, particularly that of the Old World.

Different anatomical, ecological and behavioral niche adaptations of the four primate species contribute to their peaceful co-existence at Polonnaruwa. For example, the macaque eats mainly fruits, leaf shoots, flowers and insects but cannot digest mature leaves. The two leaf-eating monkeys, on the other hand, have special gut adaptations with symbiotic bacteria in the foregut, that allow these langurs the digest mature leaves (cellulose) and resist chemical plant defenses. The two langur species, in turn, differ in the details of their diet. The loris is nocturnal and feeds on insects, small prey and fruit. Niche diversification and sympatry among these four species is a two-way effect.

The social organization of the four species also differs markedly and falls along a gradient of increasing complexity where each species' social life reflects a distinct step in the evolution of primate society – recapitulating phylogeny. Competition for limiting food resources, within and among species, had been a driving force underlying the selection for increased cooperation among primate individuals of the same species, and so the sophistication of social communication and behavioral strategies.

Scientific knowledge is a prerequisite to conservation success and it clearly points to the necessity for the protection of natural forest habitats that are suitable to sustain primate populations. This means lush and fairly diverse forests with the availability of year-round free water. Unfortunately, in Sri Lanka, most protected areas are in arid zones where primates are either few or absent altogether. The political and economic challenges to conservation action for primates are steep, and building public appreciation and support are necessary first steps.