

Demography, Life History, and Social Structure in *Propithecus diadema edwardsi* From 1986–2000 in Ranomafana National Park, Madagascar

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ABSTRACT Prosimian lemurs differ fundamentally from anthropoid primates in many traits related to social structure. By exploring the demography of Milne-Edwards' sifakas (*Propithecus diadema edwardsi*), and comparing it to other well-studied primates, we explore the effect of demographic and life-history factors on social structure. Specifically, we compare lemur survivorship and fertility patterns to two published composite models: one created for New World and another created for Old World monkeys. Using longitudinal data collected on individual *Propithecus diadema edwardsi* from four study groups from 1986–2000 in Ranomafana National Park, Madagascar, we quantify 1) group composition, 2) birth seasonality, 3) interbirth interval, 4) life-table values, and 5) population growth estimates. The mortality, survivorship, and life-expectancy schedules indicate high infant and juvenile mortality. Fertility remains high until death.

The intrinsic rate of increase and net reproductive rate indicate a shrinking population. We suggest that high mortality rather than low fertility causes the observed population decline. While sifaka survivorship closely resembles New World patterns, fertility resembles Old World patterns, i.e., like New World monkeys, few sifakas survive to reproductive age, and those that do, reproduce at a slow rate resembling the Old World pattern. This necessarily impacts social structure. An adult sifaka at the end of her lifespan will have one only daughter who survives to reproductive age, compared to 3.4 for New World or 2.7 for Old World monkeys. Demography limits the formation of large kin-based groups for sifakas, and survivorship and fertility patterns do not easily permit sifakas to form large same-sex family groups. *Am J Phys Anthropol* 125:61–72, 2004. © 2004 Wiley-Liss, Inc.

In many traits related to social structure, prosimians differ fundamentally from anthropoid primates. These differences caused Wright (1999) and Kappeler (2000) to label lemurs as “puzzling” and “idiosyncratic.” Puzzling lemur traits include: male based sex ratios, low maximum group size, high infant mortality rates, photo-period-dependent limited estrus, female dominance over males, female-female aggression, and monomorphism in polygynous social systems.

Specifically, in the Milne-Edwards' sifaka (*Propithecus diadema edwardsi*) social structure differs dramatically relative to anthropoid primates. Baboon migration patterns, for example, can be neatly summarized: Males disperse from their natal group as they reach adulthood (Rasmussen, 1981; Smuts, 1985; Altmann et al., 1996). However, patterns of dispersal in the Milne-Edwards' sifaka are less straightforward (unpublished data). Roughly 50% of males and females migrate, while the others remain in their natal group. Females tend to migrate prior to reproduction, while males move both as adolescents and after sexual maturity. Adults of both sexes, from adolescence onward, migrate as a result of targeted aggression (Wright, 1995, and unpublished data).

Migration patterns are not the only difficult-to-predict aspect of sifaka social structure. While papionines live in polygamous multi-male/multi-female social groups, the Milne-Edwards' sifaka cannot be so easily categorized. *Propithecus diadema edwardsi* demonstrate operational sex ratios consistent with harem, multi-male/multi-female, single-male/sin-

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