

Silky Sifaka

Propithecus candidus Grandidier, 1871

Madagascar

(2000, 2002, 2004, 2006, 2008)

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Propithecus candidus is a large white sifaka from northeastern Madagascar. Silky sifakas have recently been raised to full species (Mayor *et al.* 2002, 2004; Mittermeier *et al.* 2006), though some still consider this taxon to be a subspecies of *Propithecus diadema* (see Groves 2001; reviewed in Tattersall 2007). It has a head-body length of 48–54 cm, a tail length of 45–51 cm, a total length of 93–105 cm, and a weight of 5–6.5 kg (Lehman *et al.* 2005). The pelage is long, silky and white, which gives this species its common English name. In some individuals, silver-gray or black tints may appear on the crown, back and limbs, and the pygal region (at the base of the tail) is sometimes yellow. The muzzle and face are bare, the skin a mix of pink and black, with some individuals having all pink or all black faces. The tips of the naked black ears protrude just beyond the white fur of the head and cheeks. This species does not occur with any other sifakas and cannot be confused with any lemurs within its range.

Unlike *Propithecus perrieri* and *P. edwardsi*, where adult males and females are difficult to distinguish, adult male and female *P. candidus* can be readily distinguished from one another by the pelage coloration of the upper chest. Adult males possess a large brown “chest patch” that results from chest scent marking with the sternal gular gland. As rates of male chest scent marking increase during the mating season, male chest patches become larger and can cover the entire front torso to the abdomen (Patel 2006a).

The most recent IUCN Red List assessment (2008) lists *P. candidus* as Critically Endangered. This is one of the rarest and most critically endangered lemurs. Global population size is estimated between 100 and 1,000. Silky sifakas are hunted throughout their range as there is no local taboo, or *fady*, against eating them. Habitat disturbance, such as slash-and-burn agriculture (*tavy*), logging of precious woods (for example, rosewood) and fuel wood, also occurs in and adjacent to the protected areas where they are found (Patel *et al.* 2005b; Patel 2007b; Nielson and Patel 2008).

The silky sifaka has a very restricted range in northeastern Madagascar that includes the humid forest belt extending from Maroantsetra to the Andapa Basin and the Marojejy Massif. Marojejy National Park



marks the northern limit of its current distribution, although at one time it occurred as far north as Bemarivo River near Sambava. The Androranga River may represent the northwestern range limit within the Tsaratanana Corridor. The Antainambalana River, within the Makira Conservation Site, is believed to be the southern limit. Silky sifakas may occur in northeastern Makira (Amparihibe, Bezavona), although they have not yet been observed there (Milne-Edwards and Grandidier 1875; Tattersall 1982; Wilme and Callmander 2006; Patel and Rasolofoson *et al.* 2007; Andrianandrasana 2008). Recent unconfirmed reports have identified several groups of silky sifakas just outside of north-eastern Makira in the unprotected Maherivaratra forest (Mosesy, Marojejy National Park Guide Association Chief pers. comm., February 2009) which would represent a slight enlargement of their known geographic range. In Maherivaratra and Andaparaty, silky sifakas may actually be sympatric with *Varecia*, which had never been suggested before 2008.

Surveys have documented the presence of silky sifakas in Marojejy National Park (Humbert 1955; Guillaumet *et al.* 1975; Benson *et al.* 1976, 1977; Duckworth *et al.* 1988; Nicol and Langrand 1989; Sterling and McFadden 2000; Goodman *et al.* 2003), Anjanaharibe-Sud Special Reserve (Nicol and Langrand 1989; Schmid and Smolker 1998; Goodman

et al. 2003), the Makira Conservation Site (Rasolofoson *et al.* 2007; Ratelolahy and Raivoarisoa 2007; Patel and Andrianandrasana 2008), the Betaolana Corridor (Goodman *et al.* 2003), and the Tsaratanana Corridor (WWF Andapa Projet Simpona pers. comm.).

The majority of the remaining population of *P. candidus* is found in just two protected areas managed by Madagascar National Parks (Andapa): Marojejy National Park and Anjanaharibe-Sud Special Reserve. A few groups have recently been found in the Makira Forest Protected Area (managed by the Wildlife Conservation Society) at two sites: Andaparaty (central-east Makira) and Manandriana, 44 km to the north-west, adjacent to the Anjanaharibe-Sud Special Reserve). Silky sifakas are also found in the Betaolana Corridor that connects Anjanaharibe-Sud and Marojejy, as well as the unprotected Tsaratanana Corridor to the northwest. Further surveys are needed in Makira and in the western part of Anjanaharibe-Sud, which has recently been extended. Approximately 16 groups were found during a recent survey in western Marojejy near Antsahaberoaka (December 2008, pers. obs.).

A 14-month study (Patel 2006a; Patel *et al.* 2006) and two short studies (Kelley and Mayor 2002; Queslin and Patel 2008) have examined the behavioral biology, communication, and feeding ecology of silky sifakas in Marojejy National Park. Silky sifakas show the greatest elevational range of any of the sifakas; as low as 300 m in the Makira (Andaparaty) and as high as 1,875 m in Marojejy. Thus, they inhabit several types of elevation-specific habitats including primary montane rainforest, sclerophyllous forest, and even low ericoid bush at their highest elevations. Their social structure is variable; they can be found in male-female pairs, one-male groups, and multi-male/multi-female groups. Groups range in size from two to nine. Home ranges (95% Kernel) vary by site from 34 to 47 ha (Patel 2006b; Patel and Andrianandrasana 2008).

Approximately 25% of the day is spent feeding, 44% resting, and the remainder is devoted to social behavior (16.8%), traveling, and sleeping. Long bouts of terrestrial play involving adults are not uncommon. Rates of aggression are low, and occur mainly during feeding. Females have feeding priority over males. As in other eastern sifakas, *P. candidus* is a folivorous seed predator eating fruits, seeds and leaves from a very large number of plant species. A recent two-month study documented feeding from 76 species across 42 families (mainly trees, but many lianas as well). During this short study, the most important plant families in their diet were Moraceae (20.3%), Fabaceae (12.9%), Myrtaceae (12.6%), Clusiaceae (10.1%) and Apocynaceae (9.5%). The four most preferred foods accounted for 37.1% of total feeding time: fruit from *Pachytrope dimepate* (16.1%), seeds from *Senna* sp.

(8.4%), young leaves from *Plectaneia thouarsii* (6.5%), and fruit from *Eugenia* sp. (6.0%). Fifty-two percent of feeding time was spent eating leaves, 34% fruit, and 11% seeds. Flowers and soil were eaten rarely (Patel 2006b; Queslin and Patel 2008).

Mating is believed to occur on a single day each year in December or January. Infants are born in June or July. Females generally give birth to a single offspring every two years, although they have been seen to give birth in consecutive years (Patel 2006b). Infants initially grasp the fur on their mother's belly, and only about four weeks later begin to ride "jockey style" on their mother's back. As is typical of *Propithecus*, all group members interact affiliatively with infants. Grooming is the most frequent form of non-maternal infant care, followed by playing, occasional carrying, as well as nursing in a few remarkable instances (Patel *et al.* 2003a; Patel 2007a). Dispersal has been observed only once, when a young adult male immigrated in 2007, aggressively forcing the older resident male out of the group he had been a member of for at least seven years. Although eastern sifakas generally exhibit male and female group transfer, female transfer in *P. candidus* has yet to be observed.

Other than humans, only the fossa (*Cryptoprocta ferox*) has been documented as a predator of the silky sifaka (Patel 2005). No aerial predation attempts by raptors have ever been observed, although these sifakas sometimes stare skyward and emit loud "aerial disturbance" roars in the presence of the large Madagascar buzzard (*Buteo brachypterus*), which does not, however, eat lemurs, only small birds. Loud sneeze-like "zzuss!" vocalizations are their second type of alarm call, and are emitted in response to terrestrial disturbances and to lost calls by other group members, as well as after receiving aggression. Acoustic analyses have revealed sex and individual differences in the acoustic structure of the silky sifaka "zzuss" vocalization (Patel *et al.* 2003b; Patel *et al.* 2006).

As in all prosimians, olfactory communication is well developed. Eastern sifakas have several specialized scent-marking glands that include a sebaceous chest gland only found in males, and mixed apocrine-sebaceous genital glands in both sexes (Schilling 1979). Sifakas do not allomark, as in *Eulemur*, by directly scent-marking conspecifics. Females scent-mark trees by rubbing their genital glands in a rhythmic vertical motion. Males scent-mark trees in a number of ways, by rubbing them with their chest gland, genital glands, or a combination of the two. Males routinely gouge trees with their toothcombs just prior to chest-marking, which leaves long-lasting visible marks. Silky sifakas do not eat bark or gum, so such non-nutritive male tree-gouging is likely communicative in function (Patel and Girard-

Buttoz 2008). Both sexes often urinate while scent-marking. Although males scent-mark two or three times as often as females, female scent-marks are responded to far more often and more quickly than male marks. A one-year study found that only 17% of male *P. candidus* marks are responded to by other group members, but 71% of female marks received a response, on average within 61 seconds (Patel 2006a). In both *P. edwardsi* and *P. candidus*, male overmarking of a female's mark is the most common response, followed by males overmarking the scent-marks of other males. Male eastern sifakas preferentially use one type of scent-marking, combined chest-ano-genital marking, when depositing an overmark (Andrianandrasana *et al.* 2007). The high rates of overmarking practiced by male eastern sifakas lead to totem-tree marking, in which certain trees are covered with male scent-marks and gouge marks. Extensive scent-marking of the home range border has not been observed in *P. candidus* (Patel 2006a; Ritchie and Patel 2006; Patel and Girard-Buttoz 2008).

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