

Survey of the Critically Endangered Perrier's sifaka (*Propithecus perrieri*) across most of its distribution range

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Abstract

Propithecus perrieri (Perrier's sifaka) is one of the most endangered lemur species due to its small and fragmented distribution range. Despite a Critically Endangered (CR) conservation and flagship species status, there are still many uncertainties regarding its actual distribution and its presence in some forests of its putative distribution range. We report the results of diurnal and nocturnal surveys carried out in 2012 across most forest fragments of its putative distribution range, namely the Ankarana National Park, the Analamerana Special Reserve and Andrafiarena-Andavaokoera Protected Area. During our surveys the species was only observed in Andrafiarena and Analamerana protected areas.

Introduction

In the last couple of decades there has been a significant increase in our knowledge of the distribution and number of lemur species across Madagascar (Mittermeier *et al.*, 2008). However, there are still many regions and species for which very little basic data is available. This is true of recently discovered species, as expected, but this is also true for species that have been known for decades but have limited distribution or live in little studied regions. Historically, Perrier's sifaka (*Propithecus perrieri*) was reported to

inhabit a small area in the north of Madagascar. The species range was thought to cover most of the forest fragments comprised between the Analamerana Special Reserve and the Ankarana National Park (Meyers and Ratsirarson, 1989; Hawkins *et al.*, 1990; Tab. 1). Some studies suggested that the distribution range might also extend southward toward the Andavaokoera forest (Schwitzer *et al.*, 2006). However, reports of the species presence across the putative range have been limited. Two studies by Banks *et al.* (2007) and Rasoloharjaona *et al.* (2005) failed to find Perrier's sifakas in the Ankarana National Park in 2003/2004 (Tab. 1), and Zaonarivelo *et al.* (2007) also failed to observe it in the Andavaokoera forest in 2006. On the other hand Ranaivoarisoa *et al.* (2006) confirmed its presence in the Andrafiarena forest in 2005 and Banks *et al.* (2007) also found individuals in a forest corridor between the Analamerana Special Reserve and the Andrafiarena forest (Tab. 1, Fig. 1). Since then, no survey has been published yet, leaving Perrier's sifaka distribution range partially unresolved and controversial. The rapid fragmentation of the forest habitat across Madagascar suggested that an update of the species status was necessary and urgently needed.

Methods

All forests presented in Fig. 1 were surveyed by multiple independent teams, over different periods of the day from May to September 2012. Diurnal surveys were performed

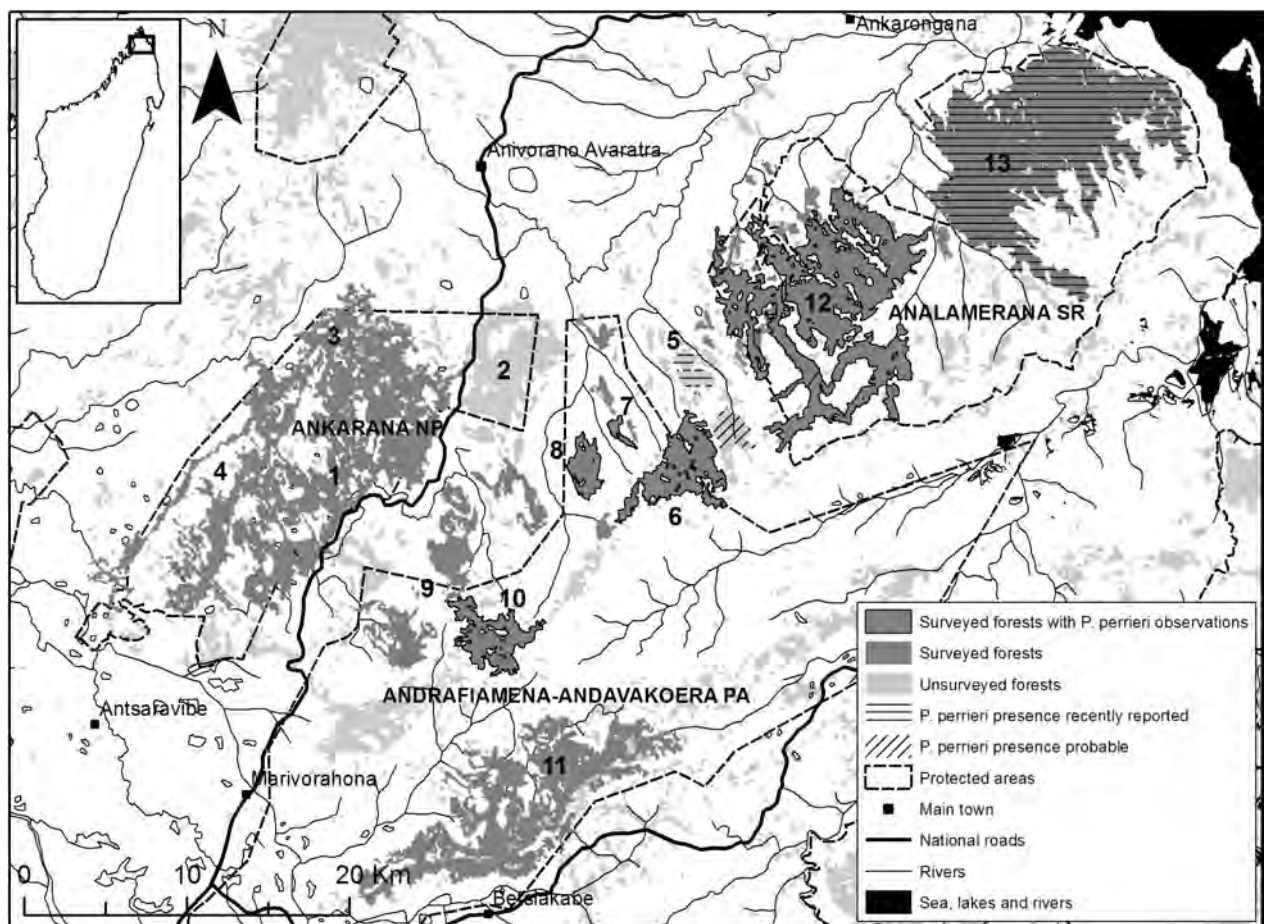


Fig. 1: Map of the surveyed area and Perrier's sifaka presence/absence. This map represents the surveyed forests, the locations of bibliographic data report of *P. perrieri* recent presence and the putative distribution area of the species. Numbers refer to study sites or forests and correspond to the locations numbered (Tab. 1). The locations are as follows, 1: Second river, 2: North-eastern degraded forest, 3: North-western forest, 4: rest of the reserve, 5: Ambery, 6: Andrafiarena, 7: Madorimasina, 8: Antsahabe, 9: Antserasera, 10: Mahanoro, 11: Andavaokoera, 12: Antsohy, 13: Analamerana. SP: Special Reserve, PA: Protected Area, NP: National Park. The forest polygon data are from Moat and Smith (2007).

Tab. 1: Bibliographic review of *P.perrieri* surveys.

Notes: PA: Protected Area; CP: Conservation Plan; ER: extremely rare, R: Rare; N.O: Not Observed; P: Present; TBC: to be confirmed. *Perrier’s sifaka presence in Ankarana was reported by Meyers and Ratsirarson (1989) with no distinction by site.

Reference	Year	Ankarana				Out of PA (5)	Andrafiamaena-Andavakoera						Analamerana	
		Second river (1)	North-eastern degraded forest (2)	North-western forest (3)	Rest of the reserve (4)		An-drafiamaena (6)	Mador-imasina (7)	Ant-sahabe (8)	Ant-serasera (9)	Maha-noro (10)	An-dava-koera (11)	Ant-sohy (12)	Anal-ame-rana (13)
Meyers & Ratsirarson, 1989	1988	ER*	ER*	ER*	ER*		R					N.O	P	P
Hawkins et al., 1990	1988	P	P		N.O									P
Mayor & Lehman, 1999	1998													P
Rasolaharijaona et al., 2005	2003				N.O								P	P
Schwitzer et al., 2006	CP											P	P	P
Ranaivoarisoa et al., 2006	2005						P						P	P
Zaonarivelo et al., 2007	2006											N.O		
Banks et al., 2007	2003-2004	N.O	N.O		N.O	P							P	P
This study	2012			N.O	N.O		P	P	P	N.O	P	N.O	P	
Consensus		TBC	TBC	N.O	N.O	P	P	P	P	N.O	P	N.O	P	P

on and/or out of existing trails looking and listening for lemur presence. Nocturnal surveys were performed using acoustic and visual Distance Sampling techniques on existing trails and/or transects. All Perrier’s sifaka observations were recorded using a global positioning system.

Results

During our surveys, we observed Perrier’s sifakas in Andrafiamaena, and in Antsohy, the eastern forest of the Analamerana Special Reserve (Tab. 1, Fig 1). For both protected areas most groups (42 out of 49) were observed diurnally (Fig 2). Two groups were also observed in two small fragments east of the Andrafiamaena forest, namely Antsahabe and Madiromasina.

However, no *P. perrieri* individuals could be observed or detected in the Ankarana National Park, in Andavakoera, in the eastern forests fragments of the Andrafiamaena-Andavakoera protected area, and in the eastern forest of Analamerana Special Reserve frequently called Analamerana (Tab. 1, Fig 1).

Discussion

Altogether, our results confirm the presence of *P. perrieri* in Andrafiamaena and Antsohy forests. Meyers and Ratsirason (1989, Tab. 1) had found it difficult to observe *P. perrieri* in Andrafiamaena and had therefore considered the species to be “rare”. Our results suggest that this may not be the case. Indeed, more than one third of the groups (37 %, n = 17) were spotted in the Andrafiamaena forest during a 19 days survey effort, compared to the remaining 63 % (n = 31) who were spotted during a 29 days survey effort in Antsohy. This suggests that the density of *P. perrieri* in the Andrafiamaena forest could be as high as in Antsohy, and not “rare”. Beyond these two forests we also report for the first time its presence in Antsahabe and Madiromasina, two forest fragments located close to the Andrafiamaena forest.

Despite an eight-day survey effort in the Analamerana forest (east fragment of the Special Reserve), we did not sight any Perrier’s sifaka. Indeed, the species was recently reported to occur in this forest, but at lower densities than in the Antsohy forest (2.2 ind/km² against 5.2 ind/km² respectively; Banks et al., 2007). Unfortunately our limited ef-

fort in the Analamerana forest did not allow us to survey its eastern side and to perform a complete survey of the forest fragment.

One of the main objectives of this survey was also to confirm Perrier’s sifaka presence/absence in the forests of Andavakoera and Ankarana. Indeed, Meyers and Ratsirarson (1989) mentioned that “Andavakoera contained no or few *Propithecus*”. Similarly, Zaonarivelo et al. (2007) did not spot any Perrier’s sifaka in 2006 while surveying the forest with one team during a period of 10 days starting from the southern town Betsiaka. In the present study we surveyed the Andavakoera forest during 17 days with three teams, starting from three different camps located in the north of the forest. Our results therefore confirm the probable absence

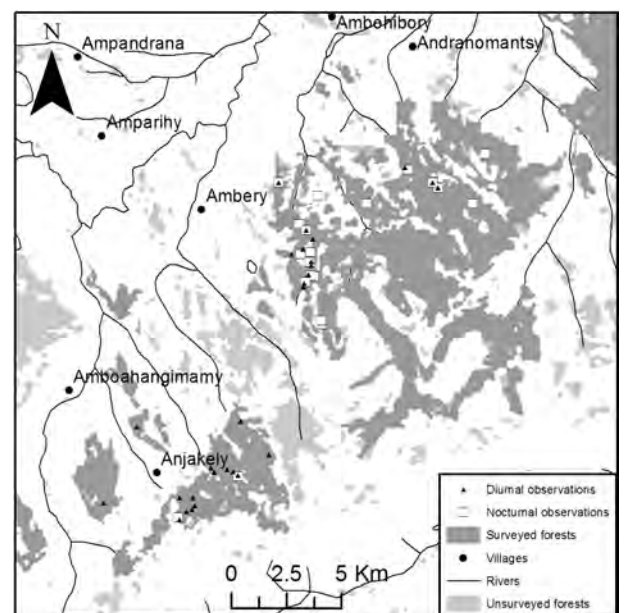


Fig. 2: *P. perrieri* observations. This map represents the Anjahankely and Antsohy forests visited during our survey (between May and September 2012) with details regarding diurnal and nocturnal observation of Perrier’s sifaka; Forest polygon data from Moat and Smith (2007).

of Perrier's sifaka from this forest. Regarding the Ankarana forest, Perrier's sifaka was mentioned as extremely rare in 1998 (Meyers and Ratsirarson, 1989) and its presence in 1989 was reported only in two sites, "Second river" and "Northern degraded forest" (Hawkins *et al.*, 1990; Tab. 1). Later, in 2003-2004, Banks *et al.*, (2007) did survey both sites again using distance sampling but reported no observation of *P. perrieri*. Given that distance sampling might not be the best method to detect the presence of a species at very low densities, we aimed to verify its absence in Ankarana. Despite 32 days of survey in Ankarana, we did not spot any sifaka but must add that we did not have enough time to visit the two crucial areas where the species had been observed by Hawkins *et al.* (1990).

We consequently propose a consensus distribution of Perrier's sifaka based on the review of the literature and on the results of our survey (Tab. 1; Fig. 1). We suggest that the small non surveyed forest fragment located between Andrafiama and Antsohy forest might contain Perrier's sifaka, due to its geographic location and the type of vegetation it harbours.

Conclusion

In conclusion we were able to confirm the presence of Perrier's sifaka in the Andrafiama and Antsohy forests, with both sites exhibiting similar densities. We also report the presence of Perrier's sifaka in two small forest fragments neighbouring the Andrafiama forest, Anstahabe and Madiromasina. We confirm the very likely absence of *P. perrieri* from the Andavakoera forest in the south of the Andrafiama-Andavakoera protected area and also from Antserasera forest fragments in the east of the same protected area. Finally, we confirm the absence of the species from the south and the west of the Ankarana National Park and leave unresolved the question of its presence in the north-east of the park.

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