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Conservation Assessment of the Recently Described John Cleese's Woolly Lemur, *Avahi cleesei* (Lemuriformes, Indridae)

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Abstract: John Cleese's woolly lemur (*Avahi cleesei*) was discovered in 1990 and officially defined and named in 2005. This nocturnal lemur is known to occur only in the Tsingy de Bemaraha Strict Nature Reserve, a UNESCO World Heritage Site in central western Madagascar. In this article we summarize available relevant information on morphology, distribution, habitat, and behavior including vocalizations to assess the conservation status and facilitate future investigations, surveys in particular. According to the IUCN Red List categories, *A. cleesei* is clearly in the category Endangered. Further studies might show, however, that the species should be classified as Critically Endangered, because of its very limited distribution and particularly specialized biological requirements.

Résumé: Découvert en 1990 et officiellement défini et nommé maki laineux de John Cleese (*Avahi cleesei*) en 2005, cette espèce de lémurien nocturne est seulement connue de la 'Réserve Naturelle Intégrale du Tsingy de Bemaraha' au centre-ouest de Madagascar, site classé du Patrimoine Mondial de l'UNESCO. Dans cet article nous résumons les informations disponibles sur la morphologie, la distribution, l'habitat et le comportement (y compris les vocalisations) pour définir le statut de conservation et faciliter des investigations futures, notamment sur la distribution. Selon les Catégories de l'UICN pour la Liste Rouge, *A. cleesei* doit être classé au moins dans la catégorie En Danger. Pourtant, des investigations futures pourraient démontrer qu'un classement Critiquement en Danger soit justifié, à cause de la distribution extrêmement limitée et des besoins biologiques très spécialisés.

Key Words: Cleese's woolly lemur, *Avahi cleesei*, conservation, Bemaraha, western Madagascar

Introduction

Although we first saw John Cleese's woolly lemur in 1990 (Mutschler and Thalmann 1990) and, as a result of our revision of the western woolly lemurs (Thalmann and Geissmann 2000), we had realized then that we had found a new taxon, we officially described and named the species only recently (*Avahi cleesei* Thalmann and Geissmann, 2005). In this article we summarize all available conservation-relevant information (published or unpublished), including information and recommendations that will facilitate future surveys for the species.

Species Description

The single individual of *Avahi cleesei* captured so far, an adult male (Fig. 1), had a body mass of 830 g. The facial fur is only slightly paler than that of the upper forehead and crown. The facial area above the nose extends upward toward the

forehead. This upward extension contrasts with the virtually opposite pattern created by the triangle of forehead pelage that invades the facial area in other western *Avahi* (for example, *A. occidentalis* and *A. unicolor*). The forehead fur immediately bordering the facial area is blackish and forms a dark chevron pattern above the facial area. The eyes are maroon, and the eyelids are black and hairless. The snout is also black and hairless. The fur surrounding the corners of mouth is whitish. The fur on the head and body has a brown-gray coloration and a woolly (slightly curled) flecked appearance. The tail is beige or brown-gray, and is slightly reddish only on the dorsal side of the root. The inner dorsal surface of the lower limbs is white. The fur of the chest, belly, and inner surface of the upper limbs is relatively thin, downy, and very light gray. *Avahi cleesei* is distinguished from *A. occidentalis* by its lack of a white facial mask and broad dark eye-rings, and from both *A. occidentalis* and *A. unicolor* by the presence of a dark chevron pattern on the forehead.

Geographic Range

So far, *Avahi cleesei* is known to occur in only a single location, the Tsingy de Bemaraha National Park in central western Madagascar (Fig. 2), a UNESCO World Heritage Site. Within the reserve it has been sighted in two localities, in the forest of Ankindrodro (19°08'S, 44°49'E; n = 5 weaned individuals in two groups) and the type locality (18°59'S, 44°45'E), a forest 3–4 km east-northeast of the village of Ambalarano at the base of the western Tsingy precipice (n = 4 weaned individuals in two groups). The species was outside the reserve's boundaries in 1994, in the heavily disturbed forest in the surroundings of the village of Ankinajao (19°03'S, 44°47'E; n = 10 weaned animals in five groups: Thalmann and Geissmann 2000). The forest was completely destroyed since we made the sightings at Ankinajao, and no woolly lemurs have been found there since 2003 (U. Thalmann pers. obs.). It appears that the species was last detected on 1 October, 2003 by one of us (UT), approximately 2 km to the south of the type locality. Surveys in the vicinity and wider surroundings of the Bemaraha region (different forests and forest types including the southern bank of the Manambolo River to the south and reaching as far north as the National Park of Namoroka, the Mahavavy du Sud River, and the Betsibioka River) did not reveal any evidence for the presence of the species (Rakotoarison *et al.* 1993; Thalmann and Rakotoarison 1994; Curtis 1997; Ausilio and Raveloanrino 1998; Hawkins *et al.* 1998; Sterling 1998; Thalmann *et al.* 1999; U. Thalmann unpubl. data). Based on these findings, it has to be concluded at present that the species occurs only in the Reserve Tsingy de Bemaraha to the north of the River Manambolo, and in certain forest types within the closer surroundings of the Tsingy de Bemaraha region (see 'Habitat'). The northern distribution beyond the type locality is completely unknown, but is evident, under any circumstances, that the species has an extremely restricted geographic range. Moreover, its ecological range may also be very narrow (see below).

Habitat

Avahi cleesei definitely occurs in subhumid, dry deciduous forests close to the western Tsingy precipices (Ankindrodro, type locality close to Ambalarano, Figs. 3, 4), in the larger Tsingy crevasses or gorges, and forests along small seasonal rivulets and seasonal swamps close to the Bemaraha massif (forest 2 km south of type locality, Ankinajao). To date, *A. cleesei* has not been detected in any of the region's typical dry deciduous forests of western-type, similar to the Kirindy (Ganzhorn and Sorg 1996) or Marosalaza forests (Hladik 1980). Based on a comparison of a 400 m² forest sample (Fig. 4) from the type locality of *A. cleesei* with the forest of Marosalaza (Hladik 1980), the subhumid dry deciduous forest has more green-leaved trees during the dry season, a higher floristic diversity, and the trees are larger in diameter at breast height and in canopy height (Thalmann *et al.* 1994; Thalmann unpubl.).



Figure 1. Photograph of adult male *Avahi cleesei* (type) after capture on 3 October 1991.

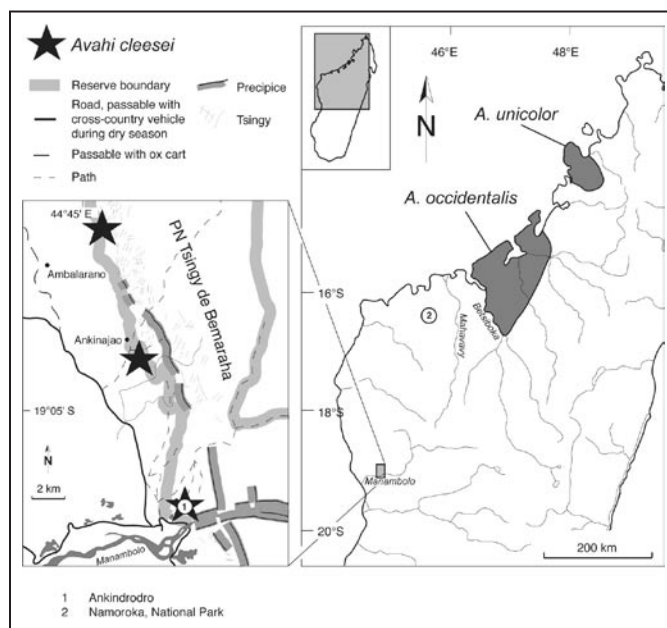


Figure 2. Distribution map of western taxa of woolly lemurs, *Avahi*.

Behavior and Ecology

A short-term field study of *A. cleesei* using telemetry was conducted 4–14 October 1991 (Figs. 5 and 6). During this time, the group (which included the type specimen) was



Figure 3. Subhumid, dry deciduous forest at the base of the tsingy precipice (type locality).

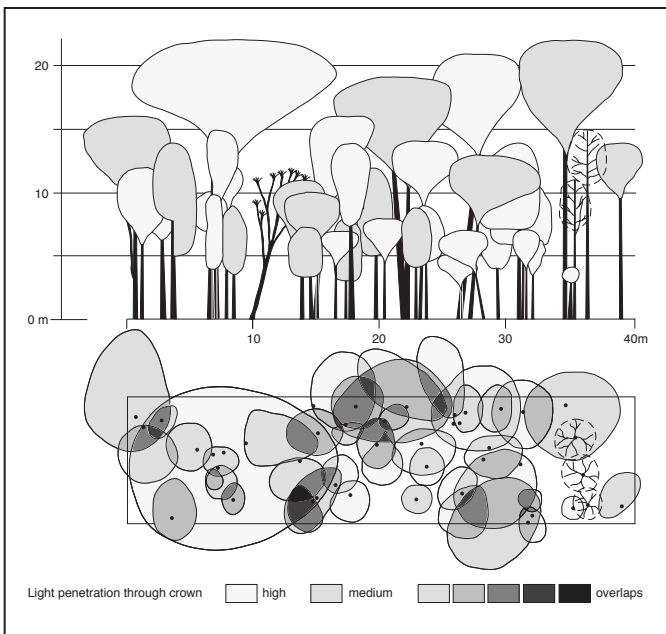


Figure 4. Schematic drawing of the subhumid dry deciduous forest (10 × 40 m). Note that most trees have mature leaves even toward the end of the dry season (October).

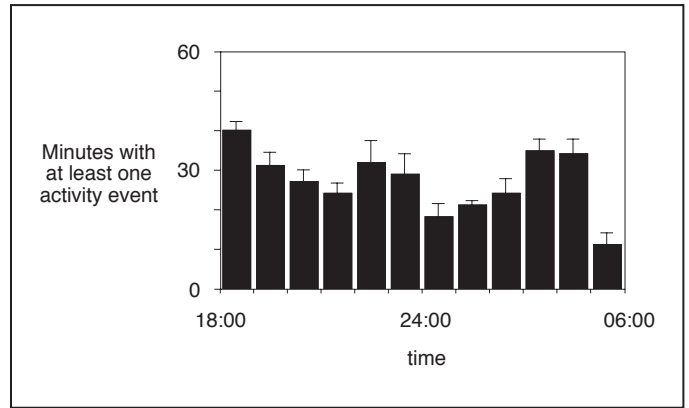


Figure 5. Nocturnal activity (18:00–06:00) of the study group in the nights from 5/6 to 13/14 October 1991 (total observation time 92 hours and 40 minutes). Error bars indicate standard error.

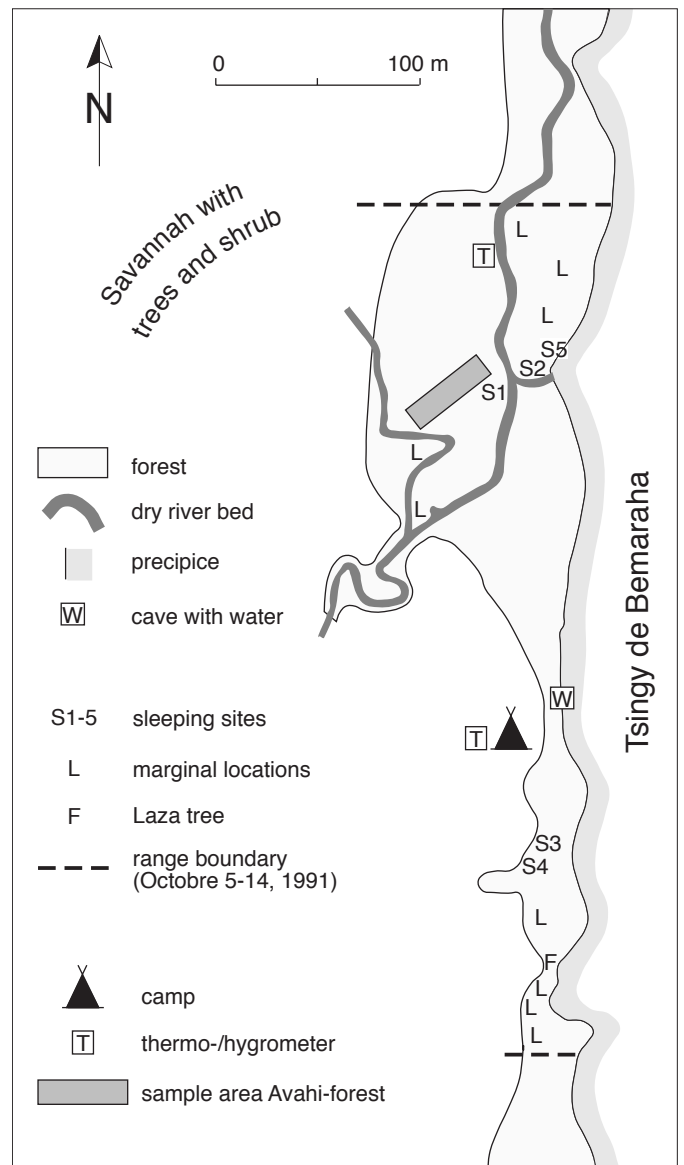


Figure 6. Map of the study site (type locality) near Ambalarano, Bemaraha.

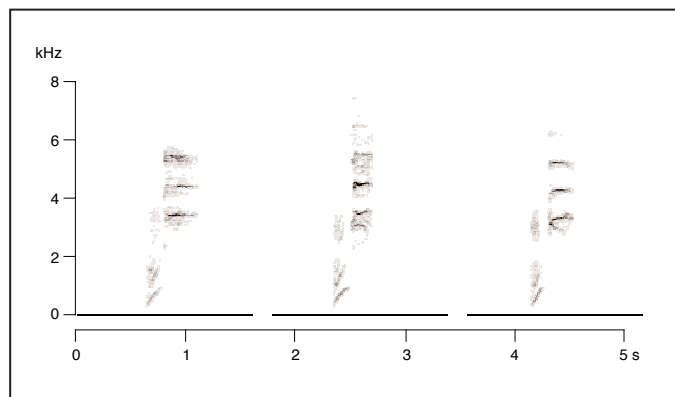


Figure 7. Sonograms of typical *Avahi cleesei* ‘vou-hy’ calls (a) and whistle calls (b) at Ambalarano, Bemaraha, 9 October 1991, 19:40–20:14. Calls can be heard at http://www.gibbons.de/main/non-gibbon/2006avahi_cleesei.html.

only active at night; used a home range of approximately 2 ha and five different sleeping sites; and fed on buds, sprouting buds, and young leaves. According to the signals of the activity transmitter, Cleese’s woolly lemur shows three distinct nocturnal activity peaks: the first between 18:00 and 20:00, a second more variable between 22:00 and 24:00, and the third between 03:00 and 05:00. Although detailed observations on feeding behavior have not been made, it is probable that Cleese’s woolly lemur exhibits a comparable feeding behavior as its northerly congener *A. occidentalis*. The latter is a specialized folivore, feeding on selected relatively rare tree species that, in addition, are relatively large in size (Thalmann 2001, in press). Such a narrow niche may explain why members of the genus *Avahi* may occur locally in high densities but may be absent in other localities due to the lack of preferred tree species.

Vocalizations

We recorded three different classes of vocalizations for Cleese’s woolly lemur in Bemaraha: ‘vou-hy’ calls (Fig. 7), whistles, and growls. Only the ‘vou-hy’ call is loud and conspicuous, whereas the other vocalizations are difficult to hear and locate. The ‘vou-hy’ calls did not occur every night and did not appear to be uttered at any regular times during the active period. They seem, however, to be linked with the activity peaks. During 85 hours and 10 minutes of indirect observations we noted 105 such calls. ‘Vou-hy’ or whistle calls by one individual were often answered by a corresponding call by another individual. Examples of typical ‘vou-hy’ and whistle calls can be heard on the Internet as soundfiles (WAV-format) at http://www.gibbons.de/main/non-gibbon/2006avahi_cleesei.html.

Survey Recommendations

Given the extremely small known range of Cleese’s woolly lemur, surveys are obviously urgently needed to find additional populations. Interviews with local inhabitants may be one source of information, it became evident to us

that Cleese’s woolly lemur is one of the least known species, along with the aye-aye (*Daubentonia madagascarensis*), and is considered very rare. The local name is *Dadintsifaky*. Some people call it *Bekola be*—the big *Bekola*—*Bekola* being the local name for *Haplemur occidentalis* (Rakotoarison *et al.* 1993; Thalmann unpubl. data). Field surveys in potential habitat are necessary as a second source of information. During daytime surveys, the immobile and cryptically colored Cleese’s woolly lemurs are virtually impossible to find. Therefore, surveys at night with head lamps are necessary, using the reflecting eye shine to find them. Given the comparable size and eye shine of the sportive lemurs (*Lepilemur ruficaudatus*) and *A. cleesei*, four main characteristics besides knowledge of their general appearance (such as body proportions) may be used to distinguish between *Lepilemur* and *Avahi* at night: (1) *Avahi* are often encountered in groups, thus several animals may be spotted sitting or feeding closely together, although this may also sometimes apply for *Lepilemur*. (2) In *Lepilemur*, the ears are clearly protruding, whereas *A. cleesei* has much smaller ears. (3) When resting, woolly lemurs usually hide their tail between their body and the substrate, whereas in sportive lemurs the tail hangs down. (4) Sportive lemurs often move their heads sideways, probably to have a better look at the observer. Woolly lemurs seem to be less curious, and look at the observer without moving the head in the same way as do the sportive lemurs.

Conservation Assessment

According to the IUCN Red List categories and criteria, *A. cleesei* clearly falls into the category Endangered under the criteria B1ac(i, ii, iii, v) (IUCN 2001): The extent of occurrence is estimated to be less than 5,000 km² (B1), the species is known from just one location (B1a), and the known population is declining (B1c) in extent of occurrence (i); area of occupancy (ii); area, extent and/or quality of habitat (iii); and in number of mature individuals (v).

More detailed analyses and surveys may reveal, however, that this avahi should even be moved to the Critically Endangered category. For example, the disturbed forest close to the village of Ankinajao, which supported a substantial number of individuals in 1994 (Thalmann and Geissmann 2000) had been cut completely by 2003 (Thalmann unpubl. data). The subhumid forest occurring at the base of the escarpment of the Tsingy de Bemaraha is under continuous pressure from annual bushfires. In some places, the forest has been reduced to only a few meters in width (Fig. 6). Such subhumid forests are the only habitat where *A. cleesei* is known to occur. In addition, migrating individuals are forced to travel through stretched ranges (Fig. 6) that are possibly much easier to control and defend by the range holders because part of the borders are made up of savanna and the rocky tsingy precipice (Fig. 6). This may make it extremely difficult for migrating animals (for example, young animals leaving the family group) to cross established territories in order to find a mate and its own range.

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