

HAIRY-EARED DWARF LEMUR (*ALLOCEBUS TRICHOTIS*) DISCOVERED IN A HIGHLAND RAIN FOREST OF EASTERN MADAGASCAR

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ABSTRACT.- Original data is presented on the discovery of an almost extinct lemur species, *Allocebus trichotis*, from a previously unknown distribution range in a highland rain forest of Eastern Madagascar. The biogeographic and conservational consequences and interests are also discussed.

KEY WORDS.- Distribution, Cheirogaleidae, *Allocebus*, Vocalization, Conservation, Evolution

RESUME.- Des données originelles sont présentées concernant la découverte d'une espèce de Lémurien pratiquement éteinte, *Allocebus trichotis*, dans une région de répartition préalablement inconnue dans des forêts humides des terres hautes à l'Est de Madagascar. Les conséquences et l'intérêt aussi bien pour la biogéographie que pour la conservation sont également discutés.

MOTS-CLES.- Distribution, Cheirogaleidae, *Allocebus*, Vocalization, Conservation, Evolution

INTRODUCTION

One of the most scarcely known Malagasy lemurs is the nocturnal hairy-eared dwarf lemur, *Allocebus trichotis*. This species is heavily threatened by the continued destruction of the eastern rain forests (MITTERMEIER *et al.*, 1994). It was given the highest priority rating in the IUCN/SSC Primate Specialist Group's Lemurs of Madagascar (MEIER *et al.*, 1991) and was put in the IUCN Red List as a critically endangered species. Until 1990, our knowledge upon this species was confined to only 5 museum specimens with unclear and unreliable origin and it was believed to be totally extinct (PETTER *et al.*, 1977). Then, MEIER and ALBIGNAC (1991) rediscovered *A. trichotis* in northeastern Madagascar in the tropical lowland rain forest area of Mananara. They provide a first description of live animals and stressed basic information on habitat, sleeping sites, nutrition, and conservation status. Later on, RUMPLER *et al.*

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(1995) investigated its karyology and found no differences to the *Microcebus/Cheirogaleus/Mirza* clade.

Up to now, this cryptic and highly endangered nocturnal lemur species was only known from the primary lowland rain forest area around Mananara in northeastern Madagascar. Conducting a field study on the distribution of mouse lemurs in central eastern Madagascar, we discovered this species for the first time in a highland rain forest area in eastern Madagascar, in the vicinity of a very popular touristic area, the area of Andasibe.

We give here a first account on its discovery in this area along with further information on its distribution, morphology, ecology and behaviour and also provide a first description of its vocalization. The information presented is based on three survey studies in October 1994 and April and September 1995 and interviews with local villagers. Additionally, further data on its biology were gained by two animals housed at Parc botanique and zoologique de Tsimbazaza (PBZT), Antananarivo, Madagascar.

RESULTS AND DISCUSSION

DISTRIBUTION

To date, published information on *A. trichotis* localities is restricted to the area of Mananara. We discovered this species for the first time in a highland primary rain forest area, the area of the Forêt de Vohidrazana, close to the very popular touristic area of Andasibe.

During a nocturnal census in the area southward of the river of Sandrasoa, one of us (NR) spotted four *A. trichotis* by headlamp about 2 km west of the railway station of Fanovana. Exploring tree holes of dead trees in this area later on, we found a sleeping tree of this species. Four animals slept together in the same hole of a dead fallen tree from which two escaped. The other two could be caught and are kept until now in PBZT.

Interestingly, recent and yet unpublished findings provided new evidence for a more widespread occurrence of *A. trichotis* in Madagascar. A sighting of three animals was made in the Reserve naturelle integrale de Zahamena (RAKOTOARISON, 1995). One animal could be captured there. Further possible sightings were made in Cap Masoala (STERLING & RAKOTOARISON, pers. observ.) and in the Reserve Speciale d'Anjanaharibe-Sud (SCHMID, pers. observ.). A distribution map with known and suggested localities is presented in figure 1.

Altogether, these reports support the working hypothesis that *A. trichotis* possesses a broader distribution range in eastern Madagascar than previously assumed. Its cryptic and nocturnal life style in the dense primary rain forest, however, and its overall similarity to *Microcebus rufus*, to which it often lives in sympatry, makes its detection difficult. Thus, according to our interviews with local villagers in the area of Ambavaniasy only some of them distinguish *Allocebus trichotis* from *Microcebus rufus*. « Antsidy mavo » (Antsidy = mouse-like lemur, mavo = grey) is then used for the first species, « Antsidy mena » (mena = red) for the latter.

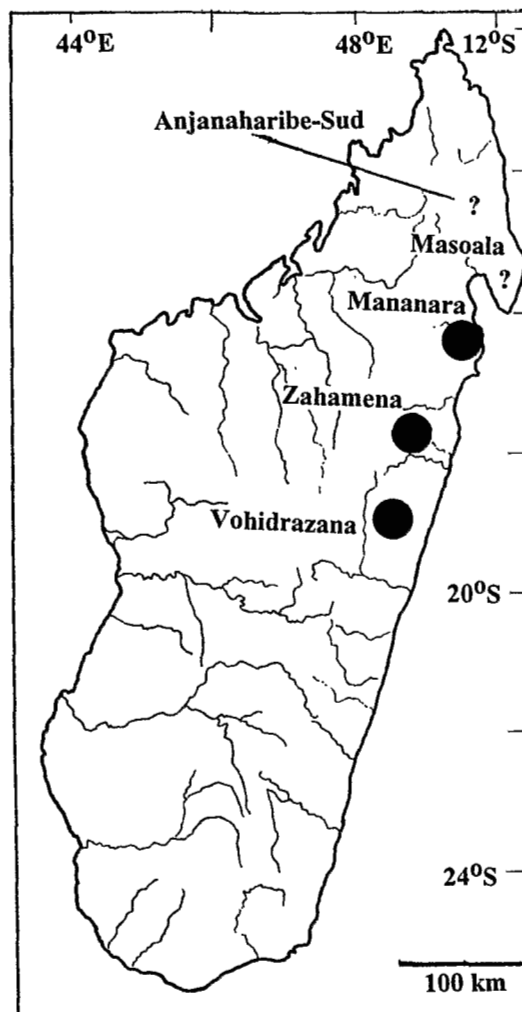


Fig. 1. Geographical distribution of *A. trichotis* based on recent sightings (dots= sightings confirmed by caught animal; ? = sightings unconfirmed)

MORPHOMETRIC DESCRIPTION

A summary of the morphological measurements taken from two animals captured in the rain forest, Forêt de Vohidrazana, and from one animal in R.N.I de Zahamena along with a comparison to existing data is provided in table I. Compared to the existing data, the adult male of Vohidrazana is larger and has a shorter tail than the animals of the lowland forest. Its phenotype corresponds well to the description already given by MEIER *et al.* (1991).

Habitat, sleeping site and sleeping groups

The habitat of *A. trichotis* in the area of Forêt de Vohidrazana are slopes with primary highland rain forest vegetation of an altitude between 680 and 1235 m. The canopy height ranges between 15 and 20 m. We found and caught *Microcebus rufus* in sympatry. Several *Indri indri* groups were heard. According to interviews with local

villagers the following lemur species are found in the same range : *Hapalemur* ssp., *Lepilemur* ssp., *Avahi* ssp., *Cheirogaleus* ssp., *Propithecus* ssp., *Varecia variegata* and *Eulemur fulvus*.

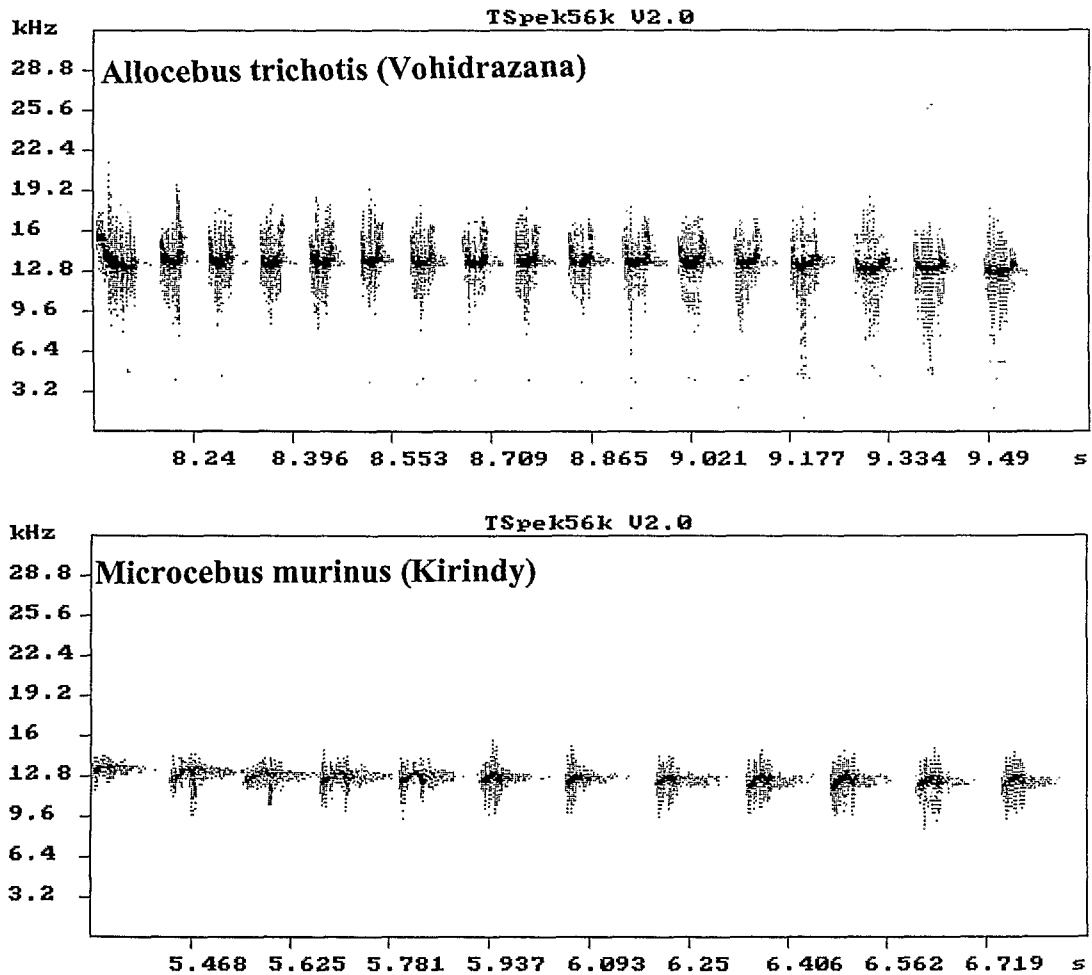


Fig. 2. Sonagram of an attention call of *A. trichotis* and a context-homologous call of *Microcebus murinus* (calls were recorded with Sennheiser MKH 416 microphone on a TDK MA90 Metall cassette, Sony professional walkman WM-D-6C).

The eight located *Allocebus* were all found at the edge of the primary rain forest. Sightings of four animals were made in dense vegetation at a height of 4 to 6 m by means of a headlamp during a nocturnal census. Four animals were found during the day, resting inside a hole in a relatively large dead tree trunk. From these, two adult animals escaped, one adult and one juvenile male were caught by hand. From these animals measurements were taken. The sleeping site of these four animals (site 1 in table II) as well as two further sleeping sites where local villagers have caught this species are characterized in table II.

Seasonality

Reliable information upon seasonality in activity and reproduction of wild and captive animals is lacking (MEIER *et al.*, 1991).

We have measured body weights and testes sizes of the adult male kept in PBZT over six consecutive months to get first data upon potential seasonal changes. Results are presented in table III. They imply a seasonal activity and reproduction mode for this species with a time of increased body weight and reduced activity in the drier and colder season from Mai to August. Testes regressed to a non-measurable size during this period. They start to increase again in early September. According to local villagers, *A. trichotis* can be hardly found from June to September. It emerges again from the end of September/beginning of October and can be seen until Mai. These findings provided some evidence for both, seasonality in general activity and seasonality in breeding activity similar to that found in *Microcebus* (ZIMMERMANN, 1995).

Vocalization

Nothing is known upon social and communication behaviour in *A. trichotis*. We recorded attention calls of the two animals maintained in PBZT and analyzed them by means of computer spectrography. **A sonagram is presented in figure 2**, measurements of the acoustic characteristics in table IV.

Call structure of the short whistle series is harmonic and similar to that of *Mirza ssp.* and *Microcebus ssp.* and quite distinct to *Phaner* (ZIMMERMANN, in press), a trend implying closer affinities to the *Microcebus/Mirza* than to the *Phaner* clade.

CONSERVATION

Until now, the area where we discovered *A. trichotis* is unprotected. The primary highland rain forest is currently logged with increasing rate by local villagers for tavy culture. For effective future preservation of this rare and highly endangered species, three major actions are being undertaken simultaneously:

1. Habitat protection

Habitat protection is a vital need and more effective by creating a network of protected areas. We are currently discussing with VITA (Volunteers in Technical Assistance) and governmental agencies (ANGAP) to enlarge the Parc National de Mantadia towards the south to preserve a part of the primary highland rain forest where *Allocebus* was found.

2. Long-Term Field Studies

Longterm field studies are urgently needed to improve conservation programs for this species in the near future. Thus, we have already started surveys especially in the area of Ambavaniasy, Andasibe and Mantady to get information upon the present distribution, population density and status of this species in the highland primary rain forests. Furthermore, the biology, life history and population variability of both lowland and highland rain forest populations have to be studied and compared to get information on habitat requirements, predation pressures, feeding ecology, social organisation, communication and taxonomic status.

3. Breeding Programs

We have already initiated a breeding program for this species in captivity to enlarge our present knowledge of the taxonomy, behavior, physiology and genetics. It should be expanded to enhance the possibility for exchanging animals of known origin for the establishment of self-sustaining populations in captivity.

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Table I. Measurements of hairy-eared dwarf lemurs at different localities

Animals	M (ad) *	M (sad) *	M (sad) **	M (sad)***	M(ad)***	M(ad)***	F (ad)***	F (ad)***
Body weight (g)	65 ¹	36 ¹	45 ²	58	75 ³ , 98 ⁴	98 ⁴	80 ³ , 78 ⁴	90 ⁴
Interorbital distance, mm	9.6	-	8.9	4	7	8	6	9
Extraorbital distance, mm	23.4	-	23.2	24	23	27	30	25
Head length, mm	38.3	34.5	35.7	-	-	-	-	-
Head width, mm	25.85	21.9	23.3	-	-	-	-	-
Ear length, mm	17.9	15	16.3	-	-	-	-	-
Ear width, mm	19.2	11.35	15.2	-	-	-	-	-
Hindfoot length, mm	25.5	23.6	36	-	-	-	-	-
Tail length, mm	140	113	120	135	195	160	165	150
Body length, mm	120	55	80	-	-	-	-	-
Head/body length, mm	178.3	147.5	157.7	140	125	135	145	130

Locality: *Vohidrazana, **Zahamena, ***Mananara (2); 1=July, 2=March, 3=September, 4= February ; M= male, F= female, ad=adult, sad= subadult

Table II. Characterization of sleeping holes of *A. trichotis*

Hole	Tree height	Height hole	Diameter tree at hole	Diameter Entrance	Depth Hole
1	8m	2.15m	0.637m	0.042m	0.61m
2	12 m	1.4 m	0.715 m	0.045-0.05 m	0.42 m
3	15m	1.45m	1.62m	0.14m	1.00m

Table III. Seasonal changes in body weight and testes sizes of an adult *A. trichotis* male in captivity

Month	APR	MAI	JUN	JUL	AUG	SEP
Body weight (g)	65	78	85	65	60	60
Testes width (mm)	9.1	-	-	-	-	11.3
Testes length (mm)	8.9	-	-	-	-	10.5

Table IV. Acoustic characteristics of attention calls in *A. trichotis* (n= 10 series/N=2 males)

		Fundamental frequency (kHz)			Unit duration (ms)			Interunit interval (ms)		
		Mean(SD)	Min	Max	Mean(SD)	Min	Max	Mean(SD)	Min	Max
Onset	Start	12.842(0.923)	11.62	15.04	53(14)	31	75	40(11)	28	63
	Peak	16.128(0.327)	15.52	16.64						
Middle	Start	12.832(0.47)	11.84	13.44	39(6)	31	44	46(7)	31	56
	Peak	16.546(0.821)	15.52	17.6						
End	Start	12.329(0.936)	10.4	13.92	49(9)	31	59	64(12)	44	84
	Peak	14.892(1.394)	12.8	16.64						
Series duration (ms)		Mean	Min	Max						
		1525(185)	1125	1703						
Units/sec		12.4(0.7)	12	14						
Number units/series		18.7(2)	14	21						