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VOLUME 53 : PART 2  
ANTHROPOLOGICAL PAPERS OF  
THE AMERICAN MUSEUM OF NATURAL HISTORY  
NEW YORK : 1976





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ANTHROPOLOGICAL PAPERS OF THE AMERICAN MUSEUM OF NATURAL HISTORY

Volume 53, part 2, pages 255-262, figures 1,2

Issued August 11, 1976

Price. 65 cents a copy

ISSN 0065-9452

## ABSTRACT

The synonymy of *Lemur macaco* and *L. fulvus* proposed by Schwarz (1936) has been accepted by many workers. The evidence for "intermediate" forms upon which this opinion was based is shown to be inadequate, and a case of sympatry of the two species in northern Mada-

gascar is reported. Consequently it is clear that these forms can no longer be regarded as distinct only at the subspecific level. The name *L. fulvus* "*flavifrons*," still used by some authors, is based on inadequate material and cannot be identified with any known lemur population.

## INTRODUCTION

Although in his invaluable revision of Lemuridae Ernst Schwarz (1931) maintained *L. fulvus* (E. Geoffroy, 1812) and *L. macaco* Linnaeus, 1766, as distinct species within the genus *Lemur*, he subsequently (1936) synonymized the two under *L. macaco*. This synonymy, which was never universally accepted, has been adopted by many recent students of the Malagasy prosimian fauna, most influentially by Petter and his associates (e.g., Petter, 1962; Albignac, Rumpler and Petter, 1971).

Schwarz's revised opinion was based on the examination of materials (primarily skins) collected in Madagascar by Rand and Archbold during the Franco-Anglo-American expedition of 1929-1931, and which had thus been unavailable to him at the time of his original survey. Among these collections, Schwarz believed that he could discern morphological and chromatic intermediates between *L. macaco* and *L. fulvus*, and it is for this reason that he effected the synonymy. The pertinent material consisted (a) of specimens of *L. fulvus sanfordi* Archbold, 1932, and (b) of specimens he regarded as belonging to *L. "flavifrons"* (Gray, 1867) and *L. "nigerrimus"* Sclater, 1880, which in his 1931 paper he had assigned to the valid subspecies *L.f. collaris* (E. Geoffroy, 1812) and *L. f. albifrons* (E. Geoffroy, 1812), respectively. In Schwarz's view, the new material revealed that "*nigerrimus*" and "*flavifrons*" represented male and female of the same subspecies, by priority *L. f. flavifrons*. Somewhat oddly, Schwarz neglected to mention that the original descriptions of the type specimens of "*flavifrons*" and "*nigerrimus*" each stated that the (living) individual concerned was male (Gray, 1867; Sclater, 1880).

It is impossible now to identify with precision the Rand-Archbold material upon which Schwarz based his conclusion of synonymy, since he mentioned only that its provenance was Maromandia in northwest Madagascar (see fig. 1). I have, however, had the opportunity to examine all the Rand-Archbold material preserved in the American Museum of Natural History, the British Museum (Natural History), London [B.M.(N.H.)], and in the Muséum National d'Histoire Naturelle, Paris (M.N.H.N.), and in no case is it possible to identify *Lemur* material recorded as being collected in Maromandia and its vicinity as anything other than *L. macaco*. It is unfortunate that the technique of preservation of the skin of the type specimen of "*flavifrons*" [B.M.(N.H.) 67.10.5.19] does not allow precise determination of the sex of the individual; but its pelage and coloration are most suggestive of a female *L. macaco*. The type of "*nigerrimus*" (M.N.H.N. 1882-2753) may be a male *L. macaco* lacking the pronounced ear tufts typical of the form, although it could, as originally suggested by Schwarz (1931), be a melano of a *fulvus* subspecies. In any event, no locality information is recorded for either specimen. In its turn *L.f. sanfordi* was without doubt correctly assessed by Archbold (1932); the female is virtually indistinguishable from the female of *L. f. albifrons*, and the only similarity of the male to *L. macaco* is its possession of tufted ears. In short, the existing evidence for forms "intermediate" between *L. fulvus* and *L. macaco* is highly dubious.

The primary purpose of the present note is, however, to present positive evidence of the specific distinctness of the monotypic *L. macaco* and the polytypic *L. fulvus*. In the course of a

survey of lemur distributions in northern Madagascar, undertaken between August and November of 1974, *L. macaco* and *L. fulvus* (almost certainly *L. f. fulvus*) were discovered living sympatrically.

The area of sympatry lies to the south and east of Beramanja (fig. 1), separated from the coast and from the main north-south artery

(Route Nationale 6) by the Galoka mountain chain, which rises in places to over 3500 feet. *Lemur macaco* is common throughout this region, its range extending from the area of Anivorano Nord, in the north, to some kilometers south of Maromandia (along the coast) and the region of Befandriana Nord (in the interior), in the south (fig. 1, insert). The range of other *L. f.*

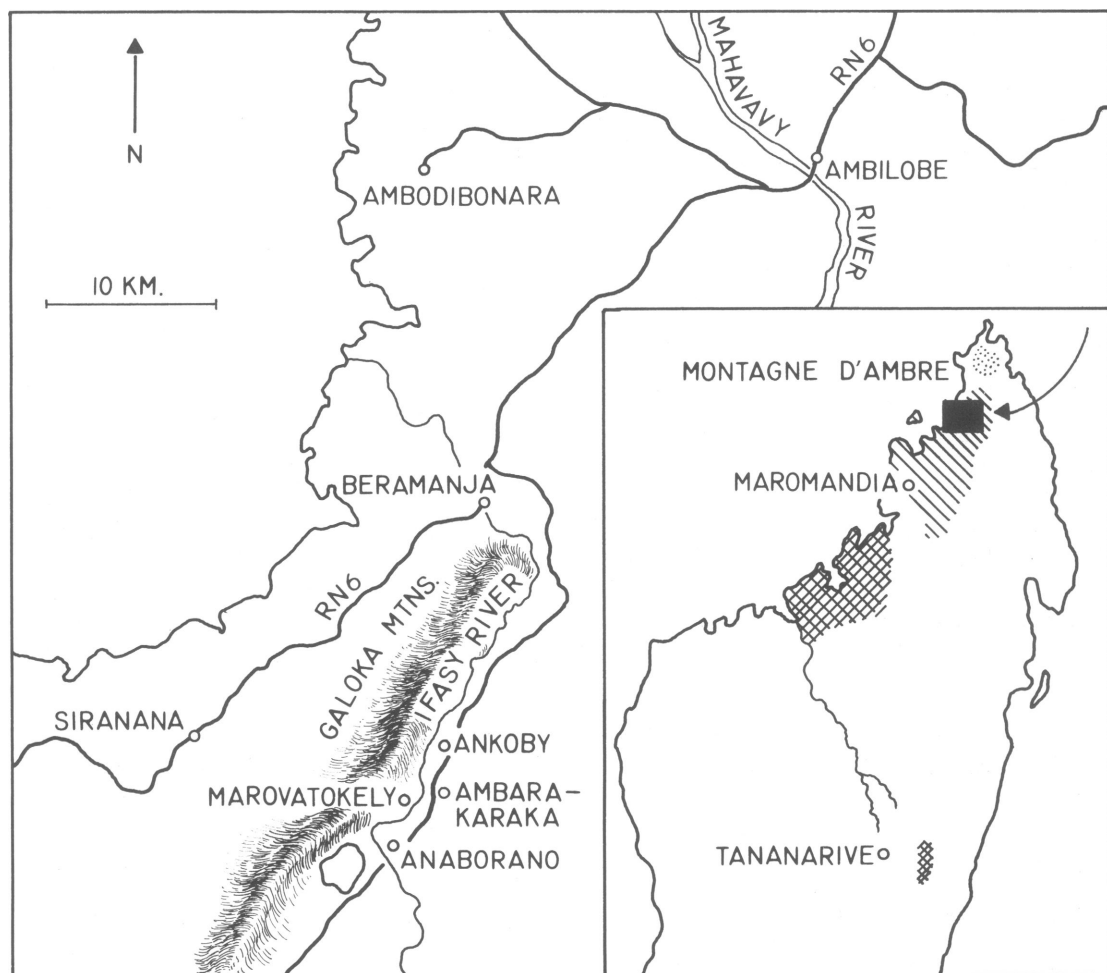


FIG. 1. Map showing region discussed in text. Insert shows location of this area (black, arrowed, containing both *L. macaco* and *L. fulvus*) and distributions of *Lemur macaco* (hatched), other *Lemur fulvus fulvus* (crosshatched), and *Lemur fulvus sanfordi* (stippled). The ranges shown are approximate, and are not necessarily continuous in all places, but are more accurate than any previously published range data for the lemurs concerned.

*fulvus* (see also fig. 1, insert) is patchy, as is the case for a number of other lemur subspecies or monotypic species (i.e., *Phaner furcifer*,<sup>1</sup> *Cheirogaleus* (= "*Microcebus*") *coquereli*, *L. f. rufus*, *Haplemur griseus occidentalis*, *Daubentonia madagascariensis*). The bulk of its population is limited in the south and west by the Betsiboka River and in the North by Analava, but the subspecies is also represented in a small area around Andasibé (Périnet), in the eastern rain forest. The range of the isolate reported here is not known; groups were located in August, 1974, in forest to the east of Ankoby, and in October of the same year in the vicinity of the villages of Ambarakaraka and Marovatokely (fig. 1), but time was not available for a thorough survey of the region.

It is worth noting that in the local Sakalava dialect a clear distinction is drawn between *L. macaco* ("akomba," "ankomba") and *L. fulvus* ("boromitoko"), and that the Malagasy of the region are, of course, perfectly well aware of the difference between the species. Our informants required no prompting, for instance, to reveal that the one exhibits sexual dichromatism whereas the other does not, and that they are never seen to mingle in the same social groupings. It is, in fact, quite possible that the significance of folk taxonomy is too often overlooked by scientists. In my experience the vernacular tends, if anything, to underestimate the number of species present in a given area. Distinctions made by local people are thus highly likely to correspond to those made on the basis of western scientific criteria, and the fact that identical distinctions are made by observers of vastly differing Weltanschauung must lend added weight to the reality of the differences perceived. In any event, the term

"boromitoko" does not appear to be widely known outside the area lying between Beramanja and Anaborano, which suggests a rather restricted distribution of *L. fulvus* in this region of Madagascar.

Capture of a boromitoko (involving obtaining an official permit) for positive identification was not practicable in the available time, so a definitive identification as to subspecies cannot be given. On the basis of sightings of about 20 individuals, however, and on that of a number of somewhat indifferent color slides (e.g., fig. 2), it is virtually certain that the subspecies concerned is *Lemur fulvus fulvus*. *Lemur macaco*, with its black males and pale russet females, both with tufted ears, is distinctively different from *L. f. fulvus*, in which it is difficult to distinguish between the sexes, both of which possess brown body pelage and predominantly black heads with variable markings.

The population density of *L. f. fulvus* in this area appears to be substantially less than that of *L. macaco*, which is vastly easier to find, only partly because its flight response in the presence of humans is less highly developed. There can be little doubt that the sympatry of the two forms in this region is of long standing, especially since *L. f. fulvus* is totally isolated from other populations of its subspecies, and the southern portion of the intervening area is largely devoid of forest vegetation. Like the local Malagasy, I was unable to discover any evidence of genetic or social intergrading or intermixing between the two species.

## CONCLUSION

The sympatry reported here clearly indicates that *L. macaco* and *L. fulvus* are not conspecific, and confirms the recent tentative suggestion of Rumpler (1975), based on a continuation of the breeding experiments reported by Albignac, Rumpler, and Petter (1971), that *L. macaco* and *L. fulvus* should be maintained as separate species. Further, there is no evidence that the names *L. "flavifrons"* or *L. "nigerrimus"* can be validly applied to any known lemur population, despite the fact that some recent authors continue to use at least the former.

<sup>1</sup>Petter, Schilling, and Pariente have suggested (1971) that *P. furcifer* may well be polytypic, although they refrained from formal identification of subspecies. I am inclined to agree with them, and in this case both resulting subspecies would exhibit the patchy distribution noted here: one (the larger) is represented on the Montagne d'Ambre and in the Iaraka area of the Masoala Peninsula, the other in the regions of Soalala (Réserve Naturelle no. 8, Tsingy de Namoroka), Belo sur Tsiribihina (from Ansalova in the north to Morondava in the south), and Morombé (from Manja and Beroroha in the north, Sakaraha in the south and the Massif d'Isalo in the interior).



FIG. 2. *Lemur fulvus fulvus*, apparently a male, photographed near the village of Ambarakaraka. Conversion from a color slide.

#### ACKNOWLEDGMENTS

I am most grateful for the cooperation of the authorities of the Direction des Eaux et Forêts de Madagascar, both in Tananarive and in the Province of Diego-Suarez, and to M. Guy Rama-

nantsoa, who introduced me to the north of Madagascar. I thank Ms. Marjorie Shepatin for drafting figure 1, and Drs. Karl Koopman and Niles Eldredge for their comments on the manuscript. The fieldwork was supported by a grant from the National Geographic Society.

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