

Short communication

A PRELIMINARY SURVEY OF *ERYTHROCEBUS PATAS* IN ANBESA CHAKA,
BAMBESI WOREDA OF BENISHANGUL-GUMUZ REGION, WESTERN ETHIOPIA

Solomon Yirga¹, Manyingerew Shenkut¹, Mezgebu Ashagrie¹ and Demissew Sertse²

¹ Department of Biology, Faculty of Science, Addis Ababa University, PO Box 1176,
Addis Ababa, Ethiopia. E-mail: solyirga@yahoo.com

² Holetta Agricultural Research Centre, PO Box 2003, Addis Ababa, Ethiopia

ABSTRACT: A preliminary survey conducted in Benishangul-Gumuz Region, Bambesi Woreda from late January to early February, 2010 resulted in finding two groups of the same taxon of patas monkeys. Each of the two groups had one adult male, and one of them consisted of 33 individuals, where as the other had a total of 23 individuals including the adult males, adult and sub-adult females and infants. The survey was conducted on foot and by a vehicle and behavioural data were collected using adlibitum method. From the structure of the two groups and the season during which they probably had their newborns, they belong to the species *Erythrocebus patas* which are also found elsewhere. However, the long black fur coloration along the shoulder, back and upper fore limbs of the males is different from any of the four different subspecies, namely, *E. patas patas*, *E. patas villiersi*, *E. patas pyrhoneotus* and *E. patas baumstarki*, and others found in Athi plains, southeast of Nairobi and east of the rift valley, which have pink faces and a blue nasal spot and not given subspecific names. Thus, it is reasonable to think of the Benishangul patas as subspecies, as they are distinct from the other subspecies.

Key words/phrases: Anbesa Chaka, *Erythrocebus patas*, *Erythrocebus patas* subspecies

INTRODUCTION

Patas monkeys are closely allied to *Cercopithecus* spp. (Napier and Napier, 1976). Especially, their skull (Groves, 1972), dentition (Napier and Napier, 1976), scrotum colour in males (Groves, 1972; Napier and Napier, 1976) and absence of sexual swellings in females (Groves, 1972; Napier and Napier, 1976; Groves, 2001) make them similar to vervets. However, characters such as their coat coloration, predominantly terrestrial mode of locomotion, behaviour and social organization (Napier and Napier, 1976; Hall, 1966) distinguish them as different groups.

The taxonomy of *Erythrocebus patas* has been somewhat controversial as to whether to put them as a species of *Cercopithecus* or a species in a different genus *Erythrocebus* (Groves, 1972). Some authors, for example, Dandelot (1971) and Kingdon (1997) considered *E. patas* as a species of genus *Cercopithecus*. The cercopithecine taxonomy and systematics regarding the relationships of the different species groups of *Cercopithecus* and *Erythrocebus* has been one reason of the controversy (Disotell, 2000).

Sarich's (1970) earlier work, using micro-complement fixation of albumins, found *C. aethiops* and *E. patas* closer to each other than *C. aethiops* to the other species of *Cercopithecus* that were tested (*C. Diana*, *C. cephus*, and *C. mona*). If these trees approximate the true pattern of cladogenesis, and cercopithecine taxonomy is to reflect the cladistic relationship, then either *Erythrocebus* must be subsumed in *Cercopithecus*, or as Groves (1989; 2004) proposed the taxon *Chlorocebus* must be resurrected to include *C. aethiops* in a separate genus.

It seems relatively clear that the *aethiops* group of guenons is more closely related to *Erythrocebus*. Thus, Grove's resurrection of *Chlorocebus* seems sensible (Disotell, 2000).

Coat coloration of patas monkeys is described as shaggy reddish (red-brown) with gray white ventral parts (Ankel-Simons, 2007). But, there is colour difference between males and females; males are brighter than females (Groves, 2001). The fur is comparatively coarse-rust tan on the back and smooth bright off-white on the lower segments of limbs, chin and underside of body and tail. The shoulders are also covered with a

spotted gray long fur (Groves, 1972; Ankel-Simons, 2007).

Patas colour tones and patterns and facial colorations vary considerably with localities (Napier and Napier, 1976). Particularly, Hill (1966) and Dandelot (1971) grouped *E. patas* in to four subspecies based on their facial coloration and geographic distribution. These four subspecies are *E. p. patas*, *E. P. villiersi*, *E. p. pyrrhonotus* and *E. p. baumstarki*. *E. p. patas* is geographically distributed in western savannah from Senegal to Chad and is morphologically characterized by pale pink face and black nasal spot. *E. P. villiersi* occur from Air (Asben) massif in the Sahara to north of the bend of the Niger River and shares morphological similarities with *E. p. patas* but it differs by its small size. *E. p. pyrrhonotus* is found from Cameroon through southern Sudan and western Ethiopia to localized areas of Kenya, northern Uganda and Tanzania. This subspecies is characterized by blackish face and adults develop a white nasal spot and there is also a black fronto-temporal line. *E. p. baumstarki* is restricted to northern Tanzania (Isbell and Chism, 2007). *E. P. baumstarki* is paler than *E. P. pyrrhonotus* without black fronto-temporal bands (line); otherwise it is similar to *E. P. pyrrhonotus*.

In addition, Groves (1972) pointed out that there are also patas monkeys on the Athi plains, south-east of Nairobi and east of the Rift valley which are different from the four sub-species described above, having a pink face with a blue nasal spot. However, they were not assigned a subspecific name or taxon level.

The muzzle of patas monkeys is comparatively long and their eyes set close to each other (Ankel-Simons, 2007). Patas monkeys are highly sexually dimorphic species. Male patas monkeys are considerably larger than females with an average body length of 65 to 88 cm and tails of about the same length. Females are on average 50 cm long and their tails also measure about 50 cm (Ankel-Simons, 2007). Average body weight of adult male patas monkeys is around 12–13 kg and that of the females is around 6–7 kg (Bonadio, 2000). The patas monkey has a slender body with long limbs and a long tail (Fleagle, 1999).

Patas monkeys are active during the day and climb into trees in the evening where they spend the night being safe from large predators (Ankel-Simons, 2007). Although they usually sleep in trees at the edge of the forest, most of their diurnal activities like foraging takes place in the open grass where they can move by quadrupedal

walking and running (Fleagle, 1999). They are extremely alert, fast runners (55 km/h) and they frequently stand bipedally to look over the tall grass for potential predators or other interspecific/intraspecific groups (Napier and Napier, 1976; Fleagle, 1999).

The diurnal activity pattern of patas monkeys is comprised of two main feeding periods with a rest period of one to three hours in the hottest time of the day (Hall, 1966). Both the daily travel distance and the home range size are greater in patas than other cercopithecoid monkeys. This can be attributed to its higher preference for grassland with low habitat quality in the case of patas (Nakagawa, 1999). Day ranges of patas are extraordinarily variable from group to group and from season to season, ranging from 700 m to nearly 12,000 m. Sometimes the group forages cohesively and other times members of a group are separated by as much as 800 m (Fleagle, 1999; Hall, 1966). The estimated home ranges are over 5,000 ha, which is the largest known home range from any nonhuman primate species (Fleagle, 1999).

The bulk of their diet seems to be grass seeds, new shoots, and acacia gums and seeds. They also eat the beans of tamarind trees and a variety of other tough savannah fruits, seeds, and berries (Bonadio, 2000). They supplement their herbivorous diet with insects (like ants and grasshoppers) and various other prey items (Nakagawa, 2000; Ankel-Simons, 2007; Isbell and Young, 2007). They are opportunistic omnivores and will eat what is available, including leaves, branches, eggs, and small animals. They normally pick up bits of food items to eat as they walk (Fleagle, 1999).

Patas monkeys live in groups and their group size ranges from 5 to 74 individuals of mostly related females and their young with a single adult male. The group sizes and range may vary from place to place (Fleagle, 1999; Bonadio, 2000; Hall, 1966; Struhasker and Gartlan, 1970). The lone adult male in the group of patas functions as the guard or watch dog of the group whereas the females are group leaders that initiate group movement and direction as well as engaging in territorial disputes (Chism *et al.*, 1984). On the other hand, subordinate males often live together in all-male satellite bands, but there is considerable turnover of males in patas groups during a breeding season. In the groups' spatial position, adult male is peripheral to the group, except during day resting, mating and grooming.

Otherwise females will harass the male if it is too close (Hall, 1966).

Timing of reproduction seems to vary somewhat with geography. In most populations mating takes place in June through September, and babies are born between November and January (Bonadio, 2000). The patas monkeys (*Erythrocebus patas*) mostly give birth in the dry season as opposed to guenons (Nakagawa, 2000; Struhsaker and Gartlan, 1970).

Patas monkeys are adapted to ground living and open country (Ankel-Simons, 2007). They are widely distributed in semidesert, savannah grassland and woodland from Senegal to Western borders of Ethiopia, north to Nubia and south to Serengeti and Athi plain and west side of mount Kilimanjaro, Air and Ennedi (Groves, 2001). In Ethiopia, the range of geographic distribution of patas monkey is found sporadically along the western border in deciduous savanna-woodland of North West (around Metemma) to west (Guba (in the previous western Gojjam/the present Benishangul-Gumuz Region), Gambela region (formerly in Illubabor) south of Gilo River and Akobo River) and south to the northern limit of the Omo National park and eastern part of the Omo River (Bolton, 1973; Yalden *et al.*, 1977). The altitudinal range of this patas monkey does not appear to extend much above 1000m and mostly it is 500–

1000 m (Bolton, 1973; Yalden *et al.*, 1977; Yalden *et al.*, 1996).

Prior to this research work, no systematic field data have been available on the population status, human-patas interaction, behaviour and ecology of the Ethiopian *E. patas* other than the geographic distribution surveys of the seventies.

The purpose of this preliminary survey was to search for and locate *E. patas* primarily to:

1. determine the presence of *E. patas* at the study area;
2. gather preliminary information on their social organization, ecology, behaviour and morphological features.

Study area

The study area is located in western Ethiopia, Bambesi district, Assosa Zone of Benishangul-Gumuz National Regional State (Fig. 1). It is around 624 km to 639 km from Addis Ababa. The range of the study area consists of mosaic of bamboo forest, woodland, riverine forest and cultivated lands. Within these habitats Sorghum, *Syzygium* spp. and *Ficus* spp. have been observed frequently apart from varieties of woody plant species. In addition to its flora, different primate fauna like patas, grivet monkeys, olive baboons and Colobus guereza are dwelling in the study area.

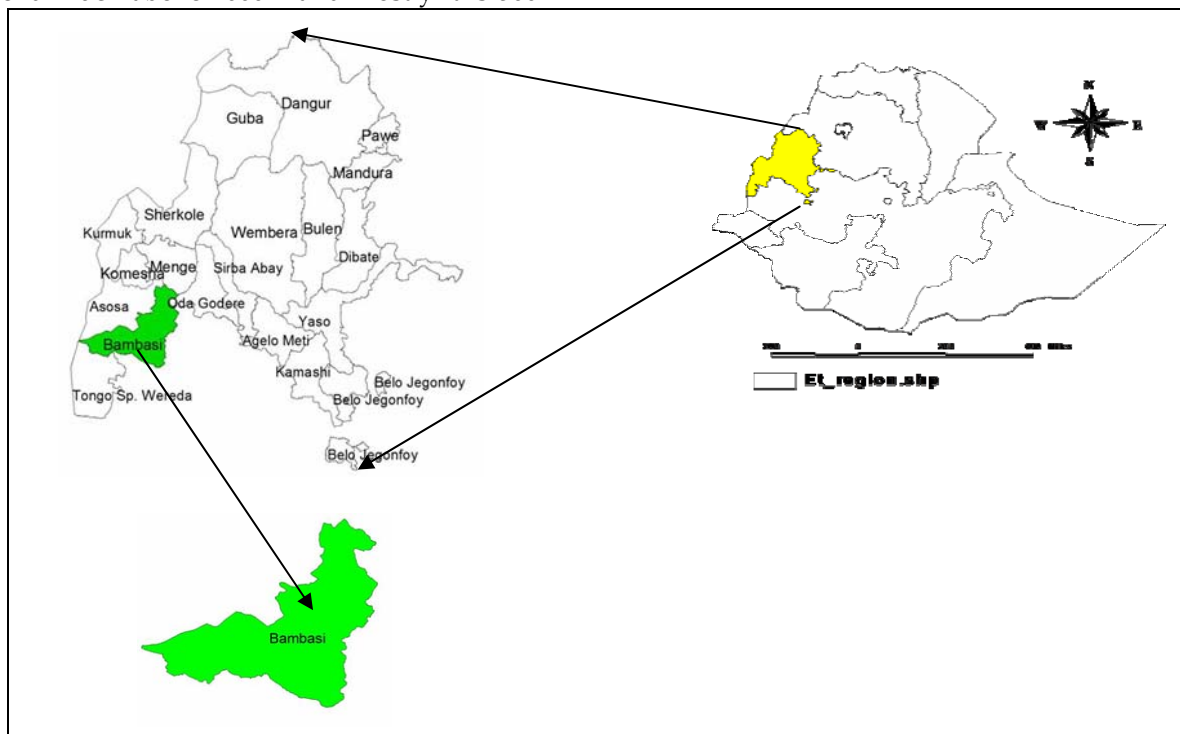


Fig. 1. Location of the study area.

Method

Surveys for *Patas* were conducted in Anbesa Chaka, Bambesi woreda, Benishangul-Gumuz. (late January-early February 2010). During these surveys a total of 28 hours were spent watching *E. patas*. Surveys were undertaken on foot and using a slow moving vehicle.

During the survey, the main road from Babesi district to Assosa was used as the main survey route. In addition to this main route, in the locality between Anbesa Chaka and Garabiche/Songa, three survey routes to the right and left sides along the main road were used. At the time of survey when *E. patas* were encountered data on their location, morphology, group size, social structure and behaviour were recorded through direct observation. Their location was recorded using Global Positioning System. Group size was determined by simple counting. Social structure such as age and sex were determined based on their morphology, size and coloration through direct observation. The behavioural data were collected through adlibetum method (Altman, 1974; Lehner, 1996).

RESULTS AND DISCUSSION

In the survey conducted, two groups were observed in a range between Anbesa Chaka and Garabiche/Songa. The first and second groups were encountered at almost the same time at 9°48.5'N and 34°42.6'E in agricultural lands around Garabiche/Songa woodlands and at 9°53.76' and 34°40.27' in the bamboo forest along the main road to Assosa and its adjacent cultivation sites, respectively. The two groups were observed between 624 km and 637 km from Addis Ababa to Assosa or 23 km to 36 km from Assosa.

Usually, *patas* monkeys' social structures have one-male and all male groups (Napier and Napier, 1976), but the two groups observed in this survey were one-male groups. The size of the first group was 23 and that of the second was 33. In both groups, most adult females carried their infants ventrally. This revealed that their birth

bearing season is most likely during the dry season until the end of January. This period is similar to the *patas* studied elsewhere (Struhasker and Gartlan, 1970). As they are dwelling outside natural reserve areas, they are prone to the danger of human presence and activities. However, the fact that they are able to survive in such an area in good numbers shows that the habitat quality is better compared to studies conducted elsewhere (Hall, 1966; Struhasker and Gartlan, 1970).

Behaviourally, the *patas* monkeys are fast runners and silent. During a half-day continuous follow-up, no vocalization was detected. Thus, in their communication, visual signals such as body postures and facial expressions might play important roles. Normally, group movement was led by a dominant female while the groups' adult male usually takes its peripheral position at the back. The male frequently climbed a tree and watched the surrounding. When he detected any threat he swiftly runaway into the group and took the leading position.

As the time of survey was sorghum harvesting season, *patas* monkeys were mostly observed feeding in the sorghum harvesting sites. *Patas* monkeys are crop pests for the local crop harvesting people; hence the monkeys are usually chased whenever they are encountered. Perhaps, as a result of this, the *patas* monkeys are silent and tried to disguise themselves in trees.

Morphologically, *patas* monkeys observed are highly sexually dimorphic, both in their size and colour. As in other *patas* subspecies (Groves, 2001), the adult male is brighter and bigger than adult females. Both adult male and females have black face with white moustache, reddish-brown head crown, brownish-white neck, black line/strip on temporal suture/lines and whitish ventral parts. Besides these common features, the male is characterized by white beard, white cheek tuft, gray forelimb and chest, long dark-gray/black fur back on the shoulder towards upper arm, brown on the back (thorax to tail), dark-brown tail, blue scrotum and white posterior hind limbs (Fig. 2). However, dorsal parts of the females are tan.



Fig. 2. Back and front views of adult male patas monkey (*Erythrocebus patas*) of the study group.

CONCLUSION

Some features of the adult male, especially the long dark-gray/black fur on its back shoulder that extends to upper forelimbs, distinguish patas monkey in the study site from other patas monkeys described so far. There is, therefore, a possibility that patas described in this study could be considered as potential new subspecies. The survey conducted in and around Anbesa Chaka is also the first investigation to reveal the presence of patas monkey in this part of Ethiopia. Though our preliminary survey showed a distinct morphological feature/coloration, and structure of the groups observed, further morphological, behavioural and molecular studies should be conducted to arrive at a definite conclusion on the taxonomic status of the group.

ACKNOWLEDGEMENT

We thank Addis Ababa University School of Graduate Studies and Research and Professor John Kappleman for financial support for this study. We also thank Bambesi Woreda Administration for permission to conduct the survey, and the anonymous reviewers for their constructive comments.

REFERENCES

- Altman, J. (1974). Observational study of behaviour: sampling methods. *Behaviour* **49**(3-4):227-267.
- Ankel-Simons, F. (2007). *Primate Anatomy: An Introduction*, 3rd ed. Elsevier Inc.
- Bolton, M. (1973). Notes on the current status and distribution of some large mammals in Ethiopia (excluding Eritrea). *Mammalia* **37**(4):562-586.
- Bonadio, C. (2000). "Erythrocebus patas" (On-line), Animal Diversity Web. Accessed December 16, 2009 at [http:// animaldiversity.ummz.umich.edu/site/accounts/information/Erythrocebus_patas.html](http://animaldiversity.ummz.umich.edu/site/accounts/information/Erythrocebus_patas.html).
- Chism, J., Rowell, T. and Olson, D. (1984). Life history patterns of female patas monkeys. In: *Female Primates: Studies by Women Primatologists*, pp. 175-190, (Small, M.F., ed.). Alan R. Liss, New York.
- Disotell, T. (2000). The molecular systematics of cercopithecoidea. In: *Old World Monkeys*, pp. 29-56, (Whitehead, P. and Jolly, C.J., eds). Cambridge University Press.
- Dandelot, P. (1971) Order Primates. In: *The Mammals of Africa: An Identification Manual*, Part 3, pp. 1-45. Smithsonian Institution, Washington D.C.
- Fleagle, J. (1999). *Primate Adaptation and Evolution*, 2nd ed. Academic Press, USA
- Groves, C. (1972). Phylogeny and classification of primates. In: *Pathology of Simian Primates*, pp. 11-57, (Twistleton-Wykeham-Fiennes, R.N. ed.). Vol. I. Karger Basel.
- Groves, C. (1989). *A Theory of Human and Primate Evolution*. Oxford University Press, Oxford.
- Groves, C. (2001). *Primate Taxonomy*. Smithsonian Institution Press.
- Groves, C. (2004). The what, why and how of primate taxonomy. *Int. J. Primatol.* **25**(5):1105-1126.
- Hall, K.R.L. (1966). Behaviour and ecology of the wild patas monkey, *Erythrocebus patas*, in Uganda. *J. Zool.* **148**(1):15-87.
- Hill, W.C.O. (1966) *Primates: Comparative Anatomy and Taxonomy VI. Catarrhini, Cercopithecoidea*,

- Cercopithecinae*. Edinburgh University Press, Edinburgh.
15. Isbell, L. and Chism, J. (2007). Distribution and abundance of patas monkeys (*Erythrocebus patas*) in Laikipia, Kenya, 1979–2004. *Am. J. Primatol.* **69**:1223–1235.
 16. Isbell, L. and Young, T. (2007). Interspecific and temporal variation of ant species within *Acacia drepanolobium* Ant Domatia, a staple food of patas monkeys (*Erythrocebus patas*) in Laikipia, Kenya. *Am. J. Primatol.* **69**:1387–1398.
 17. Kingdon, J. (1997). *The Kingdon Field Guide to African Mammals*. Academic Press, USA
 18. Lehner, P. (1996). *Handbook of Ethological Methods*. Cambridge University Press.
 19. Nakagawa, N. (1999). Differential habitat utilization by patas monkeys (*Erythrocebus patas*) and tantalus monkeys (*Cercopithecus aethiops tantalus*) living sympatrically in northern Cameroon. *Am. J. Primatol.* **49**(3):243–64.
 20. Nakagawa, N. (2000). Foraging energetics in patas monkeys (*Erythrocebus patas*) and tantalus monkeys (*Cercopithecus aethiops tantalus*): implications for reproductive seasonality. *Am. J. Primatol.* **52**(4):169–85.
 21. Napier, J.R. and Napier, P.H. (1976). *A Hand Book of Living Primates*. Academic Press, USA.
 22. Sarich, V.M. (1970). Primate systematics with special reference to Old World monkeys: a protein perspective. **In:** *Old World Monkeys: Evolution, Systematics, and Behaviour*, pp. 175–226, (Napier, J.R. and Napier, P.H., eds). Academic Press, New York.
 23. Struhasker, T. and Gartlan, J. (1970). Observations on the behaviour and ecology of the patas monkey (*Erythrocebus patas*) in the Waza Reserve, Cameroon. *J. Zool.* **161**(1):49–63.
 24. Yalden, D., Largen, M. and Kock, D. (1977). Catalogue of the mammals of Ethiopia. 3. Primates. *Monit. Zool. Ital. N.S. Suppl.* **9**(1):1–52.
 25. Yalden, D., Largen, M., Kock, D. and Hillman, J. (1996). Catalogue of the mammals of Ethiopia and Eritrea. 7. Revised check list, Zoogeography and Conservation. *Trop. Zool.* **9**:73–164.