African Primates 13: 1-8 (2019)

Range Extension of the King Colobus *Colobus polykomos* (Zimmermann, 1780) in North Fouta Djallon (Guinea)

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Abstract: Surveys we conducted between April 2012 and February 2014, and inquiries made among the local population, confirmed the occurrence of the King Colobus (*Colobus polykomos*) in the Lebekere subprefecture, in the northern sector of the Fouta Djallon mountain range, Guinea. This is the first time *C. polykomos* has been verified in this region, extending the species boundaries of the known distribution 125 km further to the northeast. Twenty-nine direct observations of the species were recorded. All observations of *C. polykomos* were made in patches of semi-deciduous forest. The ongoing loss and fragmentation of this habitat suggest that the population is in decline.

Key words: King Colobus, *Colobus polykomos,* Colobinae, distribution, Fouta Djallon, Guinea, Senegal

Résumé: Des études de terrain menées entre avril 2012 et février 2014, ainsi que des enquêtes auprès de la population locale, ont confirmé la présence du Colobe blanc-et-noir d'Afrique Occidentale *Colobus polykomos* dans la sous-préfecture de Lébékéré (Guinée), dans le secteur nord de la chaîne montagneuse de Fouta Djallon. Ceci constitue la première vérification de la présence de *C. polykomos* dans la région, et étend ainsi les limites de l'aire de répartition actuellement connue de 125 km vers le nord-est. Vingt-neuf observations directes ont été enregistrées. L'ensemble des observations de *C. polykomos* a été fait dans des parcelles de forêts semi-décidues. La perte et la fragmentation continues de ces habitats suggèrent un déclin de la population.

INTRODUCTION

The King Colobus, also known as the Western Black and White Colobus, Western Pied Colobus or Ursine Black and White Colobus, *Colobus polykomos* (Zimmermann, 1780) is an arboreal colobine occurring from Guinea-Bissau, western and southern Guinea, Sierra Leone, Liberia, and east to the Sassandra River in Ivory Coast (Oates *et al.* 2008; Oates 2011; Figure 1). However, the northeastern limit of its distribution in Guinea is not well determined. Booth (1958) suggested its potential presence in some forest patches in northern Guinea and southern Senegal down to the basin of the Gambia River, a distribution that was later published without verification in several

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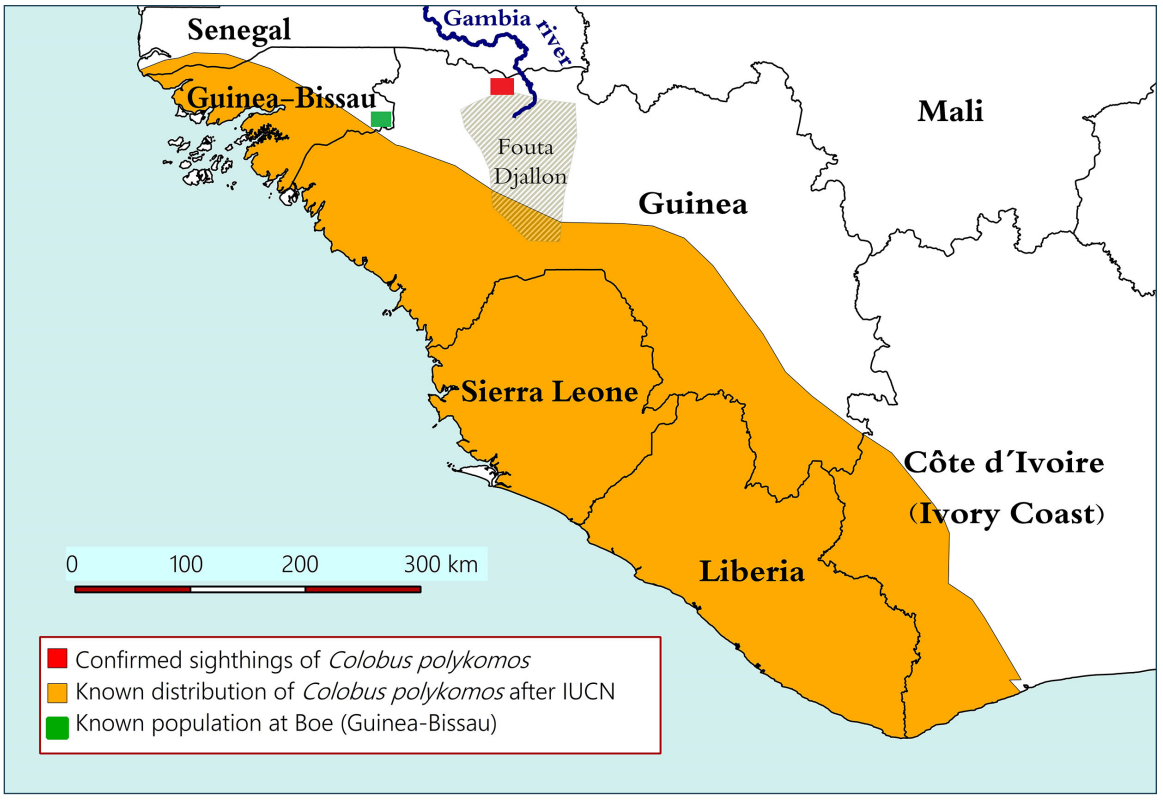

Figure 1. Location of the confirmed sightings of King Colobus *Colobus polykomos* in Lebekere subprefecture in northern Guinea, known distribution of the species according to the IUCN (Oates *et al.* 2008), and known population at Boe (Guinea-Bissau; Guilherme 2014).

handbooks (Kingdon 1997). The actual presence of *C. polykomos* in this region was not confirmed and subsequent researchers considered it questionable. Therefore, the region has not been included in the species' distribution maps recently published (Oates 2011; Groves & Ting 2013; Korstjens & Galat-Luong 2013).

C. polykomos is categorized as "Vulnerable" by the IUCN (Oates *et al.* 2008) because its population has decreased by >30% in the last 30 years. Therefore, precise information on its distribution would contribute a great deal to an assessment of its current conservation status. Because of the frequent political instability in Guinea since its independence in 1958, its mammal fauna has been poorly studied (Barnett & Prangleyv 1997). Since 2012, the Spanish branch of the Jane Goodall Institute has been performing wildlife inventories and conservation activities in northern Guinea.

Here we report several sightings of *C. polykomos* in northern Guinea, demonstrating the existence of a population in this region. These sightings expand the known distribution of *C. polykomos* at the northern limit of its range.

MATERIALS AND METHODS

The Lebekere subprefecture (a third level administrative division, after regions and prefectures) in northern Guinea covers an area of 890 km^2. Lebekere (12º05'-12º21'N, 12º12'-12º33'W) is located on the northern slopes of the Fouta Djallon Massif and exhibits considerable altitudinal variation (240 to 1,136 meters). Fouta Djallon is one of the few and most significant mountain ranges in West Africa, a portion of the continent dominated by lowlands. The study area straddles two eco-regions, consisting primarily of Guinean Forest-Savanna mosaic, but also including some West Sudanian Savanna (Jane Goodall Institute 2013a). Its main ecological characteristics have been described in greater detail by the World Wildlife Fund (2014). The area was once mostly semi-deciduous forest, but much of it has been transformed into cropland and many of the remaining forest patches are degraded as a result of clearings and exploitation for firewood (Alonso & Hernansaiz 2013; Jane Goodall Institute 2013b).

Intensive fieldwork was carried out near the village of Sabé in a study area measuring 30 km². Field surveys were conducted over 260 days in natural and semi-natural habitats between April 2012 and February 2014 and on each survey 2-3 km routes were walked, totaling 650 km. Each route was repeated on average twice every three months. Two of the authors (CA and AH) and a local field assistant, all with extensive experience with surveying and tracking West African fauna, walked slowly and silently recording the direct (visual or auditive) contacts with mammals (Ross & Reeve 2011). Perpendicular distances to the nearest animal sighted were not collected; therefore, density estimates were not calculated. At the same time, camera traps (Bushnell, model 119445) were set in forest patches and waterholes during the dry season. The guides by Dorst & Dandelot (1972), Kingdon (1997), and Oates (2011) were consulted for species identification.

Using land cover maps (from US Geological Service, 2012) and a characterization of the forest structure of each patch, it was estimated with gvSIG 1.12.0 that the total surface area of forest patches suitable for the colobus within the area surveyed was 4.5 km². In these forest patches, large trees (5-20 m) can be found, such as *Sterculia tragacantha* (Malvaceae), *Cola cordifolia* (Malvaceae), *Khaya senegalensis* (Meliaceae), *Spondias mombin* (Anacardiaceae), *Ceiba pentandra* (Malvaceae), *Bombax costatum* (Malvaceae), and *Chlorophora regia* (Moraceae). There are also species with smaller dimensions (average height of 5 m), such as *Monodora tenuifolia* (Annonaceae), *Markhamia tormentosa* (Bignoniacea), *Saba senegalensis* (Apocynaceae), *Oxytenanthera abyssinica* (Bambuseae), and *Diospyros mespiliformis* (Ebenaceae).

Inquiries were made in 11 villages (including Sabé) in the Lebekere subprefecture in November 2012. People interviewed were asked about the potential presence of *C. polykomos* (Jane Goodall Institute 2013a). For these inquiries, images extracted from Kingdon (1997), presenting the size and appearance of the species of interest compared to a human being, were shown to the villagers.

RESULTS

C. polykomos were observed during 26 itineraries (10%) in an area (12°15'-12°16'N, 12°22'-12°23'W; Figure 2) between 673 and 1,061 m above sea level.

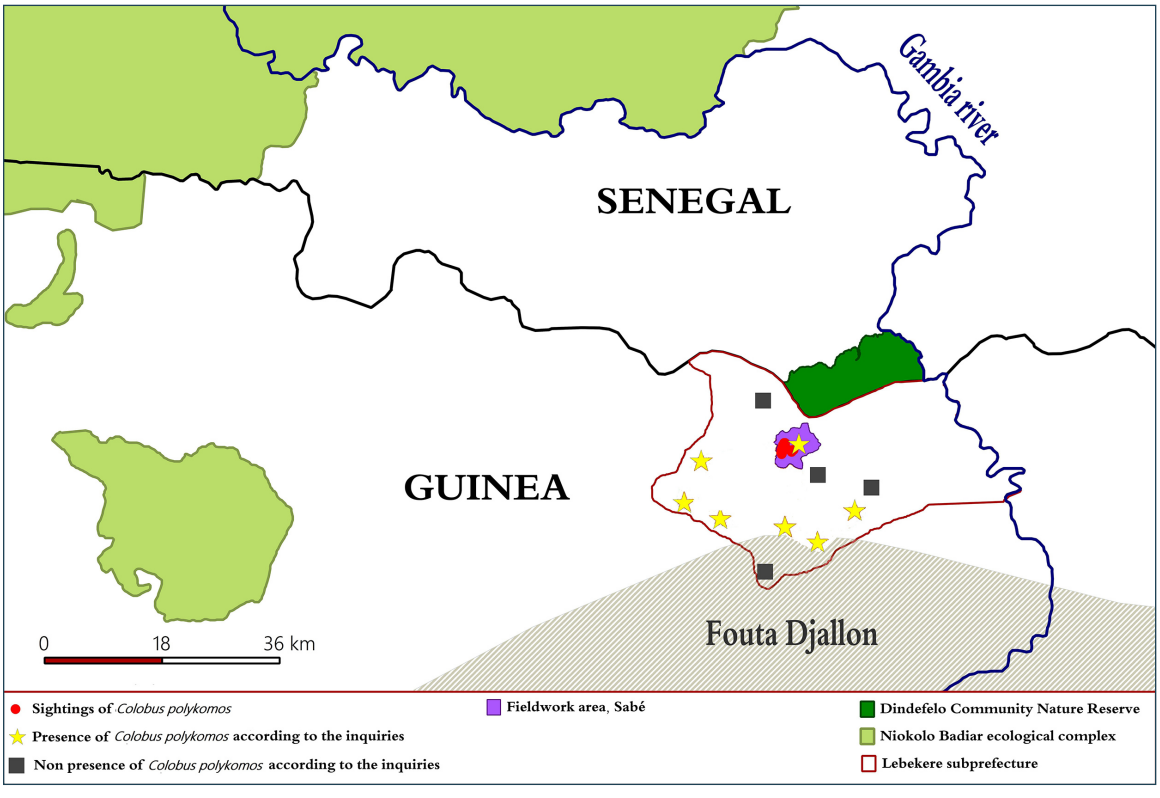

Figure 2. Presence of King Colobus *Colobus polykomos* in Lebekere subprefecture (Guinea). Confirmed area based on our own sighting records, including camera-trapping surveys (circle), and localities where reports from interviews were carried out among local communities, either positive (stars) or negative (black squares).

Figure 3. King Colobus *Colobus polykomos* in Sabé (Guinea). Photograph by Asher Hernansaiz.

These animals were identified as *C. polykomos* based on their distinguishing morphological characteristics: pure white and long, non-tufted tail (approximately 90 cm long); long hair with silver tonalities over the head; and large and white epaulettes (Groves & Ting 2013; Figures 3, 4, & 5). In addition, images of *C. polykomos* were obtained with camera traps placed on the ground at a waterhole on April 17th 2013 (Figure 6). A total of 29 sightings were recorded inside the forest patches with the tallest trees and more mature structure. The number of individuals per group ranged from 2 to 15 (mean = 6.9; S.D. = 4.5). In 27.5% of the sightings, the colobus monkeys were observed descending from the canopy and walking on the ground while they performed their daily activities.

Inquiries in villages of the Lebekere subprefecture suggested the presence of *C. polykomos* in seven localities, including our field study area in Sabé (Figure 2, Table 1). The convex polygon connecting these locations covers about 260 km². Colobus monkeys are well known by the local inhabitants, who regularly visit the forests surrounding their villages and crop fields to collect firewood or fruits. *C. polykomos* is locally known as "Bando" or "Thialakourou" in the Pulaar language. Most of the older inhabitants interviewed (between 40 and 70 years old) reported having memories of this species from their childhood.

Figure 4. King Colobus *Colobus polykomos* in Sabé (Guinea). Photograph by Covadonga Alonso.

Table 1. Presence or absence of the King Colobus *Colobus polykomos* as reported by local people interviewed in the surveyed villages in Lebekere subprefecture (Guinea).

Village	Coordinates	Presence (P) / Absence (A)
Belesse	N12º 11' 12.9" W12º 31' 43.2"	P
Fina II	N12º 09' 51.1" W12º 28' 40.0"	P
Guilere	N12º 19' 51.4" W12º 25' 03.4"	A
Hore Wedou	N12º 14' 43.7" W12º 30' 16.9"	P
Kerowani	N12º 13' 35.5" W12º 20' 26.1"	A
Korihoy	N12º 05' 26.2" W12º 24' 53.1"	A
Missira	N12º 09' 09.4" W12º 23' 12.8"	P
Sabe	N12º 16' 08.7" W12º 22' 02.0"	P
Sinthiou	N12º 12' 31.5" W12º 15' 54.9"	A
Talle	N12º 07' 52.3" W12º 20' 28.0"	P
Thiangue Yandi	N12º 10' 32.7" W12º 17' 19.4"	P

DISCUSSION

Our surveys in northern Guinea confirmed the presence of *C. polykomos* in the Lebekere subprefecture, extending approximately 125 km to the northeast the limit of the distribution area previously reported (Oates 2011; Groves & Ting 2013) and a larger area is suggested from inquiries. We acknowledge that presence suggested by inquiries is less reliable than direct observations, because people interviewed are prone to answer positively, regardless of the actual status of the species. But that is not the case in every circumstance, as deduced by the negative answers obtained in four out of eleven Guinean localities. Inquiries are useful to delimitate areas where presence of elusive mammals is probable and to encourage further field investigation (e.g., Martínez-Martí *et al.* 2016).

The main threats to most *C. polykomos* populations are hunting and habitat loss (Oates *et al.* 2008). In Lebekere, the major problem is deforestation and increasing demand for new croplands, since hunting activities have not been reported. During the last decade, in the area around Sabé, about 0.45 km² of forest (including regenerated forest) has been chopped down for farmland every year (Alonso & Hernansaiz 2013). Because *C. polykomos* rarely inhabits young forest or cleared land (Fimbel 1994), this practice reduces the habitat availability and decreases the probability of long-term survival of the population. Presumably, the populations of *C. polykomos* in Lebekere will decline if the progressive reduction of their habitat is not reversed. Tackling this problem is one of the main objectives of a trans-border Guinean-Senegalese reserve proposed by the Spanish branch of the Jane Goodall Institute.

Currently, the remaining forest patches in Lebekere are relatively isolated from each other. It is assumed that, in the past, such patches were larger and better connected. This situation probably facilitated a wider range for the colobus populations, possibly extended even to the neighboring Senegalese region. Villagers interviewed here reported the past occurrence of colobus monkeys more than 10-20 years ago.

This species favors forest patches with dense canopy and large trees, where they perform most of their activities (McGraw 2007) and find their preferred food, consisting of seeds and leaves (Dasilva 1994). Colobus are arboreal, but most - if not all - species also occasionally feed on the ground or travel across open ground in areas of fragmented forests (Fashing *et al.* 2007; Fashing & Oates 2013; Fleury & Brugière 2013). *C. polykomos*, in particular, has been reported to use the ground to flee from humans in regions where they are hunted or to move from one forest patch to another (Gippoliti & Dell'Omo 2003; Korstjens & Galat-Luong 2013). Therefore, the high frequency of observations of the *C. polykomos* on the ground in our study area may relate to the scarcity and small size of suitable forests.

The study area is located 90 km east from the Niokolo-Badiar ecological complex, which includes the Niokolo Koba National Park and the

Figure 5. King Colobus *Colobus polykomos* in Sabé (Guinea). Photograph by Asher Hernansaiz.

Badiar Biosphere Reserve, and is adjacent to the Dindefelo Community Nature Reserve, in southern Senegal. Mammal communities in these protected areas have been inventoried extensively, but no records of *C. polykomos* have been reported (Dupuy 1971; Adie *et al.* 1996; Aransay 2010). The population in Lebekere might be isolated from the main distribution of the species. Nevertheless, we cannot rule out the existence of intermediate populations in northern and central Guinea. The closest known population in Guinea-Bissau is that of the Boé region (Gippolitti & Dell'Omo 2003; Guillherme 2014), but it is separated from Lebekere by c. 175 km. We recommend further studies on the Fouta Djallon mountain massif, with special emphasis on the eastern sector, towards the basin of the Gambia River, to obtain better knowledge of the northern limits of their distribution. Confirmation of the presence or absence of intermediate populations, connecting Lebekere and those in the rest of Guinea, would facilitate a more informed assessment of the conservation status of the species.

Figure 6. King Colobus *Colobus polykomos* in Sabé (Guinea). Camera traps (Bushnell, model 119445).

ACKNOWLEDGEMENTS

We would like to especially thank Alpha Oumar Barry, for his exceptional work as a research assistant. Our thanks are also extended to the Republic of Guinea (Direction National des Eaux et Forêts) and the Republic of Senegal (Direction des Eaux et Forêts, Chasses et de la Conservation des Sols); the authorities of the Lebekere subprefecture and the Dindefelo Community Nature Reserve; the inhabitants of Sabé; the participants of the surveys, not only the people interviewed but also the members of the team; the staff of the Spanish branch of the Jane Goodall Institute, specially Ferran Guallar and Federico Bogdanowicz; Gray G. Tappan and the US Geographical Service for the lease of the forest coverage maps; Leticia Portuondo and Carlos Martínez from the Roots & Shoots Madrid group; the Cheikh Antha Diop University in Dakar, Catherine Sayer from the IUCN and Germán López from Alicante´s University, for their bibliographic support; Jose Luis Alonso for his photographical support; Isabel Vique, Brian Webster and Jane Goodall Institute volunteers for the English translation; Ingrid Bezikofer and Magali Lecocq for the French translation; and three anonymous reviewers whose comments improved the draft.

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Received: 18 January 2016
Accepted: 9 July 2018