

On the road to extinction? The status of elephant *Loxodonta africana* in Guinea Bissau and western Guinea, West Africa

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Abstract We carried out a nationwide survey of elephant *Loxodonta africana* in Guinea Bissau, a small West African country for which records of elephant are limited. We also investigated parts of western Guinea along the border with Guinea Bissau likely to harbour a transboundary elephant population. Standardized interviews with hunters were held in 110 villages in Guinea Bissau and 60 villages in Guinea, and field surveys were carried out to validate interviewee responses. Results suggest that elephants are mainly restricted to an area between the Corubal River (Guinea Bissau) and the Kogon River (Guinea) and that elephants occur only seasonally in Guinea. Based on the number,

geographical localization and interpretation of observed tracks, our estimate of the minimum number of elephants in Guinea Bissau is 4–10 animals. We did not observe any signs of young elephants. The most immediate threat to elephants is a road scheme between Guinea Bissau and Guinea that cuts through elephant range. The future of elephants in this region depends on the capacity of the two countries to manage their common elephant population jointly. In particular, the creation of a transboundary park is urgently needed.

Keywords Elephants, extinction, Guinea, Guinea Bissau, *Loxodonta africana*, small population, West Africa.

Introduction

Limited data are available on the distribution and number of elephants *Loxodonta africana* in Guinea Bissau. Reiner & Simoes (1998) reviewed historical reports (the most recent from 1993) of elephants and found that only the savannah elephant subspecies *L. africana africana* occurs in the country. Elephants disappeared from the north-west (i.e. west of the Rio Geba, Fig. 1) in the 1950s and have gradually become restricted to the area of the Rio Corubal. Seasonal cross-border movements to and from Guinea have been reported (Limoges, 1989; Thibault, 1993) but rarely confirmed because of the lack of data from Guinea. Da Silva Naga & Serra (2001) described a seasonal route used by elephants from the Corrubal river to the Balana river (Guinea Bissau, Fig. 1). Based on informal interviews in villages Silva (2003) found that post-1999 observations of elephants were restricted to the area in

and around the eastern part of the Québo administrative sector and between Dulombi village and the Corubal river (Fig. 1). Nationwide population estimates have always been <100 and have fluctuated below 50 since the early 1980s (Table 1). However, these estimates are unreliable because most were not based on field surveys.

Here we present the result of a systematic survey conducted on both sides of the Guinea Bissau-Guinea border. Our aims were to assess the current elephant distribution in Guinea Bissau, to provide a nationwide estimate of the minimum number of animals and to document any cross-border movements between Guinea Bissau and Guinea.

Methods

The surveys were carried out in the administrative sectors of Gabù, Boé, Galomaro, Xitole, Québo, Bedanda and Cacine in Guinea Bissau, and in the administrative sectors of Kanfarandé, Sansalé and Dabiss in Guinea (Fig. 1). The study area lies in the Guinean savannah biome, where the annual rainfall varies from 1,400 mm in the north to 2,500 mm along the coast. The human population in the study area is mostly rural and vegetation is cleared for agriculture throughout the area.

We conducted the survey from November 2003 to January 2004 as part of a survey of large- and medium-sized mammals, with standardized interviews of hunters and surveys for animal signs. Surveys for elephant

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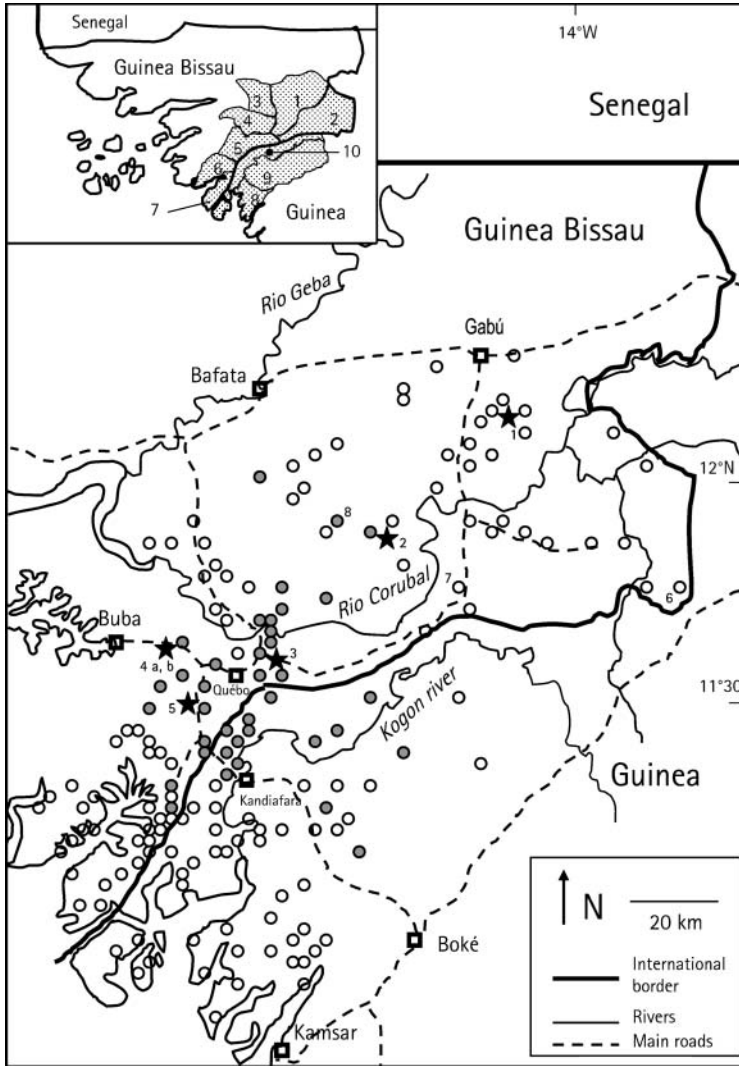


Fig. 1 The study area in Guinea Bissau and Guinea, illustrating the villages (circles) in which the questionnaire survey was conducted. Filled and open circles represent villages where elephants were and were not reported, respectively. Numbered stars refer to sites where elephant tracks were found (Table 3). Other numbers refer to places mentioned in the text: 6, Binasse area; 7, Madina do Boé village; 8, Dulombi village. The inset shows Guinea Bissau and Guinea with administrative sectors surveyed (shaded area): 1, Gabú; 2, Boé; 3, Galomaro; 4, Xitole; 5, Qébo; 6, Bédanda; 7, Cacine; 8, Kanfarandé; 9, Dabiss; 10, Sansalé.

sign were limited to Guinea Bissau. In each administrative sector we selected 15–20 villages, with a total of 110 villages in Guinea Bissau and 60 villages in Guinea (Fig. 1). To select an interviewee in each village we

Table 1 Historical population estimates of elephants in Guinea Bissau, with the year the estimate was made and the reference.

Year of estimate	Nationwide population estimate	Reference
1962	<100	Sanchez Ariño (1974)
1984	20	Roth & Douglas-Hamilton (1991)
1987	10	Pfeffer (1989)
1987	40	Burriel & Douglas-Hamilton (1987)
1987	20	Cumming <i>et al.</i> (1990)
1988	40	Douglas-Hamilton (1988)
1989	40	Pfeffer (1990)
1991	10–40	MDRA (1991)
1992	35	Douglas-Hamilton (1992)

asked the chief hunter to introduce us to the most experienced active hunter, to whom we showed colour pictures, from Kingdon (1997), of 42 species. The elephant picture was the first to be shown. When a species was recognized 10 additional closed and open-ended questions were asked (Table 2). Interviews were conducted in the local language. To test the hunters’ knowledge and the reliability of responses, we included in the list of pictured species five additional African large mammals absent from West Africa. When a hunter said one or more of these species occurred in the hunting area of the village his questionnaire responses were discounted from the analysis. In addition to interviews and surveys we broadcast a message on Gabú’s local radio, which has a large local audience, asking villagers to report to the nearest forestry officers any recent direct or indirect observations of elephants. Reports were checked in the field by one of us.

Table 2 Interview questions, with the number of respondents and number of positive responses for Guinea Bissau and Guinea, and the percentage of positive responses for both countries combined.

Questions	Guinea Bissau		Guinea		% of positive responses for both countries combined
	No. of respondents	No. of positive responses (%)	No. of respondents	No. of positive responses (%)	
Do you know this species?	110	77 (70)	59 ¹	56 (95)	79
What is its name in your local language? ²					
Does this species occur in the hunting area of your village? ³	77	24 (31)	56	14(25)	29
Does it occur	24		14		
year-round?		22 (92)		3 (23)	66
seasonally?		2 (8)		11 (77)	34
If seasonally, in which season?	2		11		
rainy		2 (100)		7 (64)	69
dry		0		4 (36)	31
Is this species	23		14		
abundant?		7 (30)		5 (36)	32
rare?		16 (70)		9 (64)	68
How has its population changed in the last 10 years?	23		14		
increased		14 (61)		1 (7)	41
stable		0		6 (43)	16
decreased		9 (39)		7 (50)	43
Do you hunt this species?	23	2 (9)	14	2 (14)	11
Does it cause crop-damage?	23	3 (13)	14	5 (36)	17
Where does it occur in Guinea Bissau / Guinea? ²					
When did you see it for the last time? ²					

¹One questionnaire was rejected on the basis of recognition of false species, see text for details.

²Open-ended question, see text for synthesis of responses

³The hunting area of the village was defined as the area in which most hunters of the village are active. This corresponds to a 10-15 km circumference around each village.

Results

A single questionnaire was rejected on the basis of recognition of absent species. Of interviewed hunters in the two countries 79% recognized the picture of elephant (Table 2). Hunters unable to recognize the species (33 in Guinea Bissau and four in Guinea) inhabited coastal villages. Most villages where the elephant was said to occur were located between the Corubal River (Guinea Bissau) and the Kogon River (Guinea; Fig. 1). While almost all interviewees in Guinea Bissau stated that elephants are present year-round, the majority of Guineans (77%) said they mainly occur during the rainy season. In both countries the species is considered rare. Crop damage appears to be limited (17% of positive responses from both countries combined; no statistical difference between the two countries; $\chi^2 = 2.6$, $df = 1$, $P > 0.1$). Most of the Bissau Guinean hunters, when asked to name a place where elephants still occur, mentioned areas that match those emerging from this study but in addition the Madina Boé and south-western surrounding areas (Fig. 1) were frequently reported (15 out of 69 responses). In these areas most direct observations of elephants reported by interviewees were old but five of

them were post- 2000. In Guinea the places mentioned as containing elephants were all located between the Kogon river and the border with Guinea Bissau.

We were shown elephant tracks at six sites (Fig. 1, Table 3). Near Mamudù Mbolo (site 1) we were able to follow intermittently the tracks of a solitary individual over *c.* 15 km. Villagers told us that it was the second time that an elephant was seen near the village, the first time being in the late 1990s. In Paiaye Numba village (site 2) a farmer who had heard our broadcast message showed us tracks of a solitary elephant that was near the village 2 days before our visit. Near Contabané village (site 3) tracks of a solitary animal were followed over *c.* 1 km in an easterly direction. In site 4a, near the village of Saré Donha, a large number of tracks of two, possibly three, animals were observed in a gallery forest, and tracks of another individual *c.* 500 m away. Measurement of footprints (Table 3) suggest that this animal did not belong to the group nearby. A few kilometres away (site 4b) the tracks of two animals were found in a degraded forest. Based on the size of footprints we cannot rule out the possibility that tracks in sites 4a and 4b belonged to the same animals. Villagers from Saré Donah and Uané stated that elephant tracks are frequently found around

Table 3 The occurrence of elephant tracks in Guinea Bissau (Fig. 1), with the age of tracks, number of animals and size of tracks.

Site no.	Nearest village (administrative sector)	GPS coordinates of tracks		Date of observation ²	Estimated age of observation (days) ³	Number of animals	Foreleg footprint length (cm)
		First footprint	Last footprint				
1	Mamudù Mbolo (Gabú)	12°07'54" N, 14°07'31" W	11°59'45" N, 14°07'21" W	18/1/2004	c. 40	1	48
2	Paiaye Numba (Gabú)	11°50'30" N, 14°26'03" W	NA ¹	25/12/2003	2	1	NA ¹
3	Contabane (Quebo)	11°33'31" N, 14°40'57" W	11°33'27" N, 14°40'45" W	22/11/2003	Unclear	1	52
4a	Saré Donha (Quebo)	11°35'37" N, 14°52'30" W	NA ¹	20/11/2003	Unclear	2(3 ?) + 1 ⁴	42; 35 / 53
4b	Uané (Quebo)	11°34'21" N, 14°53'00" W	NA ¹	20/11/2003	c. 15	2	45; 37
5	Balana (Quebo)	11°26'00" N, 14°48'10" W	11°24'49" N, 14°47'52" W	19/11/2003	Unclear	1	NA ¹

¹Not available

²By one member of this study

³According to the villager who found the track

⁴Footprints of a solitary animal observed c. 500 m away from a group of two, possibly three, animals. Tracks of the two animals observed in 4a and 4b may belong to the same animals; see text for details.

villages and that during the dry season elephants move towards the Vendu Bollanga swampy lake, on the border with Guinea. Villagers from Balana, where old tracks of a solitary individual were observed (site 5), reported that elephants use the gallery forest that borders the Balana river in their long distance movements (i.e. the route described by da Silva Nega & Serra, 2001).

Because of the geographical proximity of the tracks and the fact that a single elephant can leave tracks of different sizes depending on the hardness of the terrain, we cannot reject the possibility that tracks of the solitary individual observed in sites 3, 4a and 5 belong to a single individual; similarly a single animal could have been responsible for the tracks at sites 1 and 2. On the basis of the observed tracks we therefore estimate that the number of elephants in Guinea Bissau is 4–10. Because it is not the result of an unbiased systematic census, this is an informed guess (*sensu* Blanc *et al.*, 2003).

Discussion

Based on the results of the questionnaire survey and the number of tracks observed, the central and western parts of the Québo administrative sector appear to be the last stronghold of elephants in Guinea Bissau. The species also occurs in the contiguous area between the Corubal River and Dulombi village, where elephants were known to occur historically (Reiner & Simoes, 1998) and where, in the early 1990s, an average of 0.9 elephant tracks and 0.01 dung piles per 10 km were found (Thibault, 1993). Elephants from Québo and Corubal-Dulombi probably form a single population because the Corubal river can be easily crossed during the dry season. Our survey

confirms that cross-border movements occur but their temporal pattern and the number of animals involved are unclear, as the majority of Guineans report the presence of elephants only during the rainy season.

It is difficult to obtain reliable population estimates of elephants when numbers are low (Barnes, 2002), and our estimate of 4–10 individuals should be interpreted with caution because it is based only on footprint size and ignores track decay time, detection probability and reporting rate by villagers. Although we covered a substantial part of Guinea Bissau we believe that some elephants could have been overlooked. In particular, flooded plains during our study (conducted in the early dry season) prevented us from surveying the Corubal-Dulombi area intensively. Guinea Bissau is, however, a small and relatively densely populated country with no vast wilderness and the presence of a large overlooked elephant population is unlikely.

The future of elephants in Guinea Bissau is bleak. Loss of genetic diversity because of small population size and demographic and environmental stochasticity could drive this population to extinction. Not all small populations are doomed to extinction, however, and under intense protection and management small elephant populations can thrive and recover (e.g. the elephant population in Addo National Park, South Africa, which increased from 11 animals in 1930 to >337 in 2002; Whitehouse & Kerley, 2002; Gough & Kerley, 2006). In Guinea Bissau, however, the elephant population is scattered over a large area and its demographic structure is unknown. Conservation measures so far have been limited to awareness campaigns (MDRA, 1991) and to the demarcation (with sign boards) of parts of the route used

by elephants in their seasonal movements to the south of Québo. The campaign seems to have been successful because no killing of elephants has been reported in the last decade. The most imminent threat to elephants in the region is a plan to pave the track linking Kandiafara (Guinea) to Québo (Guinea Bissau). This track, which is currently passable for only 6 months of the year, runs through the elephant range (Fig. 1).

Further surveys for elephants are required in both Guinea Bissau and Guinea, in particular in the Corubal-Dulombi and Madina da Boé and surrounding western areas in Guinea Bissau, and in Guinea along the border with Guinea Bissau, where a small elephant population was reported by a few hunters during interviews. A plan is required that focuses on the management of a very small population and integrates lessons learnt from elsewhere in Africa. The project to create a National Park in the Corubal-Dulombi area (which started in the 1990s but was not completed because of civil unrest) needs to be reactivated. The Guinea Bissau–Guinea transboundary protected area project (funded since 2000 by the European Union) has a key role to play in the conservation of elephants in this area. The project plans to prepare a joint land use plan that includes several core areas devoted to biodiversity conservation, and knowledge of the routes used by elephants in their cross-border movements is vital. The future of elephants in this region depends to a great extent on the success of this project, as well as on the capacity of Guinea Bissau and Guinea to cooperate both politically and technically in the management of their common elephant population.

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Biographical sketches

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