

First records of Liberian Mongoose *Liberiictis kuhni* in Sapo National Park, southeast Liberia

Tina VOGT¹, Bernhard FORSTER¹, Joshua N. QUAWAH², Chris RANSOM³,
Chloe HODGKINSON⁴ and Ben COLLEN⁵

Abstract

Liberian Mongoose *Liberiictis kuhni* was photographed three times between November 2011 and February 2012 in two sites within Sapo National Park, southeast Liberia. These photographs, taken during the day in the early and late afternoon, confirm its presence 80 km further south than previously recorded in Liberia. Currently listed as Vulnerable by *The IUCN Red List of Threatened Species*, the species was previously only known from northeastern Liberia and western Côte d'Ivoire. Further survey work is required to establish the limits of its distribution.

Keywords: camera-trapping, daytime activity, extension of known range

Premières observations de Mangoustes du Libéria *Liberiictis kuhni* dans le Parc National de Sapo, au sud-est du Libéria

Résumé

La Mangouste du Libéria *Liberiictis kuhni* a été photographiée trois fois entre novembre 2011 et février 2012 sur deux sites du Parc National de Sapo, au sud-est du Libéria. Ces photographies, prises la journée, en début et fin d'après-midi, confirment sa présence à une distance de 80 km au sud des sites sur lesquels sa présence a été précédemment enregistrée au Libéria. Actuellement classée «Vulnérable» par la *Liste Rouge des Espèces Menacées de l'UICN*, l'espèce n'était jusqu'alors connue qu'au nord-est du Libéria et à l'ouest de la Côte d'Ivoire. Des études complémentaires sont nécessaires pour déterminer les limites de son aire de répartition.

Mots-clés: piège photographique, extension d'habitat, activité diurne

Liberian Mongoose *Liberiictis kuhni* is a poorly documented small carnivore of the area defined by White (1983) as the Upper Guinean Rainforest. Described in 1958 from eight skulls found in northeastern Liberia (Hayman 1958), the first complete specimens were not secured until 1974 (Schlitter 1974) with the first live specimen captured in Gbi National Forest, northeastern Liberia in 1989 (Taylor 1992). It has a primarily dark brown body and a bushy tail, with prominent dark stripes on the neck, which are bordered by white. Compared with other mongoose species, Liberian Mongoose has rather long claws and an elongated snout with small, reduced cheek teeth, but long, sharp canines (Schlitter 1974).

Listed as Vulnerable on *The IUCN Red List of Threatened Species* (IUCN 2012), reliable information on the species's population status and distribution range is not available. However, the population is assumed to be declining: it is hunted for meat using dogs, shotguns and snares (Taylor 1992, Greengrass 2011) and extensive habitat loss is occurring in its range due to logging, mining and conversion to agriculture (FAO 2011). Liberian Mongoose occurs in both primary and secondary forests, and is found mainly in swamp forest and streambeds with deep sandy soils where earthworms, its preferred food source, are abundant (Schreiber *et al.* 1989, Dunham 2011). Known to turn over large areas of the forest floor while foraging, Liberian Mongoose is thought to play an important role as an 'ecosystem engineer' by increasing small-scale ecosystem heterogeneity, affecting seed predation, movement and germination (Dunham 2011). Recorded in the

wild in northeastern Liberia and Tai National Park, western Côte d'Ivoire (Goldman & Taylor 1990, Colyn *et al.* 1998), the furthest south it has been found previously in Liberia is Nimbowehn, Gbi National Forest. It was assumed that the species is very likely to occur in similar suitable habitats in adjacent areas, including Sapo National Park (= Sapo NP) in southeast Liberia, approximately 80 km south of Gbi. However, previous attempts to confirm this species's presence in Sapo NP, by live-traps and camera-traps, were unsuccessful (Robinson 1983, Taylor 1992). While a 2010 survey of a commercial hunting camp on the southern border of Sapo NP recorded the killing of two individuals, the identity of the specimens was unconfirmed (Greengrass 2011).

Sapo NP, Liberia's only National Park, comprises an area of 180,365 ha and represents one of the most nearly intact tropical forest ecosystems in Liberia. Contained within one of the largest remaining blocks of the threatened Upper Guinean Forest, Sapo NP consists entirely of lowland rainforest, including swampy areas, dryland and riparian forests. The terrain throughout the park is generally homogeneous, with lower (100–200 m) elevations and gently rolling hills in the southwestern and central parts to higher elevations of approximately 400 m in the steeper ridges of the northeast. Sapo NP harbours an exceptional biodiversity with high rates of endemism and provides one of the last strongholds for several globally Endangered species such as Pygmy Hippopotamus *Choeropsis liberiensis*, West African Chimpanzee *Pan troglodytes verus* and Jentink's Duiker *Cephalophus jentinki*.

In 2001, Fauna & Flora International (FFI) in collaboration with the Liberian government's Forestry Development Authority (FDA) established a long-term faunal biomonitoring programme in Sapo NP, which was re-started in 2007 following the end of the civil war (Waitkuwait & Suter 2001, Waitkuwait 2003, Vogt 2011). In 2008, with the support of the Zoological Society of London (ZSL), the programme was complemented by regular systematic camera-trapping surveys (Collen *et al.* 2011). Surveys were designed to detect wide-ranging and cryptic species (Collen *et al.* 2011). Following O'Brien *et al.* (2010) a grid of 32 infrared heat- and motion- sensitive digital cameras, spaced at 2 km intervals and mounted 40 cm from the ground, was set for a minimum of 35 days and at 24-hour operation mode in each of two different areas of Sapo NP. The centre of each grid square was located using a GPS Garmin map 62s unit, and one camera was secured in an optimal location (e.g. next to a recently used animal trail), in a 100-m radius from the centre of the grid square. Altitudes were measured by a GPS Garmin map 62s unit. All positions are given under the WGS84 datum. No baits or inedible lures were used. One to three surveys were conducted annually. In the southwestern part of Sapo NP (Survey Grid 1), the camera grid was established four times, in January–March 2008, May–July 2009, December 2010 – January 2011 and October–November 2011. In the northern part (Survey Grid 2), the camera grid was established four times, in November–December 2008, February–April 2009, June–July 2011 and February–March 2012 (Fig. 1).

Liberian Mongoose was not recorded before late 2011 despite a prior survey effort of 4,500 camera-trap days. Its first photograph was taken on 8 November 2011 by a camera in southwestern Sapo NP, at 5°18'45.6"N, 8°43'32.6"W and 118 m measured altitude (Fig. 2). It was taken at 14h06, in a swampy area within primary lowland forest. A second record from the northern part of the Park (55 km from the first) was obtained during February 2012, at 25°29'26.5"N, 8°23'18.1"W and 202 m measured altitude (Fig. 3). Two series of pictures of Liberian Mongoose were taken by the same camera, on a gentle slope within primary forest: the first on 8 February at 16h58, the second on 13 February at 14h05. No photograph showed more than one animal.



Fig. 2. The first photograph of a Liberian Mongoose *Liberiictis kuhni* in Sapo National Park, Liberia: 8 November 2011. © FFI/FDA/ZSL



Fig. 3. The second record of Liberian Mongoose *Liberiictis kuhni* in Sapo National Park, Liberia, in the north: 13 February 2012. © FFI/FDA/ZSL

These first verifiable records of Liberian Mongoose in Sapo NP provide valuable information on the distribution range of this poorly documented species. Explanations for the comparatively low detection rate and the fact that the animal was not recorded before the fourth year of the ongoing camera study at present remain speculative and require more investigation. The survey was not specifically designed for this species, but to detect medium to large forest-dwelling species. It further has been found that effective detection distance is strongly positively related to species body mass and weakly negatively to species average speed of movement (Rowcliffe *et al.* 2011). In the context of our study it is plausible that, at least in part, low detection rates are explained by the small body size of *L. kuhni*. However, comparison with detection rates of ground-living mammal species of similar or lower size/weight class at the same time suggest that this is not the case. Table 1 shows the number of trap events over the same time period of several species of similar or lower weight than Liberian Mongoose, namely African Brush-tailed Porcupine *Atherurus africanus*, two species of the large-spotted genet complex (*Genetta bourloni* and *G. pardina*), Marsh Mongoose *Atilax paludinosus*, Fire-footed Rope Squirrel *Funisciurus pyrropus* and Red-legged Sun Squirrel *Heliosciurus rufobrachium*. Compared

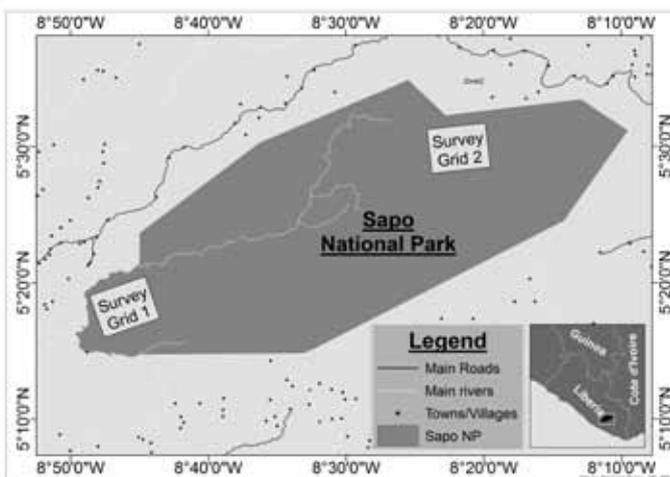


Fig. 1. Sapo National Park, Liberia, showing the location of the two camera-trap grids used in 2008–2011.

Table 1. Number of trap events of selected mammal species similar to or lighter than Liberian Mongoose *Liberiictus kuhni* in weight, during two camera-trapping surveys in Sapo National Park, Liberia, 2011–2012.

Species ¹	Weight (kg) ²	Number of trap events ³	
		November 2011	February 2012
<i>Atherurus africanus</i>	1.5 – 4.0	111	35
<i>Genetta burloni</i>	1.2 – 3.1	17	10
<i>Genetta pardina</i>	1.2 – 3.1	10	10
<i>Atilax paludinosus</i>	2.2 – 5.0	39	57
<i>Funisciurus pyrropus</i>	0.16 – 0.30	47	13
<i>Heliosciurus rufobrachium</i>	0.25 – 0.40	6	39
<i>Liberiictus kuhni</i>	2.0 – 2.3	1	2

¹English names are given in the text. Species recorded, but heavier than Liberian Mongoose, are excluded from the table.

²after Kingdon (1997).

³Following previous authors (e.g. O'Brien *et al.* 2003) each 'trap-event' is an independent photographic event, taken at least 30 minutes apart in cases where the same social group may be involved in successive pictures.

with capture frequencies of these species, records of Liberian Mongoose remain few. While this might relate to behavioural reasons, it might also indicate rarity of this species in Sapo NP.

Due to a history of illegal settlements of armed artisanal gold miners in the central and southern parts of the park, until recently security restricted monitoring and field research in Sapo NP to the southwestern and northeastern parts. However, since the successful evacuation of most miners in late 2010, the biomonitoring programme was consequently extended over a wider area, and data collection will commence in these formerly inaccessible parts. It is hoped that the ongoing camera-trap study will reveal further information on Liberian Mongoose. Further survey work should also be carried out to determine the limits of its distribution throughout Liberia.

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¹Fauna & Flora International Liberia, Henry Andrews Building, Tubman Blvd, Congo Town, Monrovia, Liberia.

Email: martina.vogt@fauna-flora.org

²Forestry Development Authority, Whein Town, Paynesville, Monrovia, Liberia.

³Conservation Programmes, Zoological Society of London, Regent's Park, London NW1 4RY, U.K.

⁴Fauna & Flora International, 4th Floor, Jupiter House, Station Road, Cambridge, U.K.

Email: chloe.hodgkinson@fauna-flora.org

⁵Institute of Zoology, Zoological Society of London, Regent's Park, London NW1 4RY, U.K.