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1 Range extension and behavioural observations of the flat-headed cusimanse  
2 (*Crossarchus platycephalus*) in Gabon

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**Abstract**

The present work reports on new records of the flat-headed or Cameroon cusimanse (*Crossarchus platycephalus*) obtained from camera trap surveys carried out between 2021 and 2023 in central and northwestern Gabon. These records – in the form of high-definition videos – extend the southern limit of the species’ known range by 172 km, as well as provide additional evidence of group living and co-occurrence with the blue duiker (*Philantomba monticola*) and moustached guenon (*Cercopithecus cephus*). These findings suggest that *C. platycephalus* may be more widespread than previously thought in Gabon, and that a review of existing camera trap datasets could help determine its precise distribution and habitat requirements.

**Keywords**

Behaviour; camera trap; carnivore; central Africa; group size; mongoose; occurrence; tropical forest

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## 57 **Introduction**

58 The flat-headed or Cameroon cusimanse (*Crossarchus platycephalus*) is a small carnivore  
59 belonging to the Herpestidae (mongoose) family that inhabits the tropical forests of central  
60 Africa (Angelici & Do Linh San, 2016). Currently listed as Least Concern by the International  
61 Union for the Conservation of Nature (IUCN), the species' population trend and precise  
62 distribution within range countries are unknown, as are key aspects of its ecology and  
63 behaviour. Previous studies have highlighted its association with dense undergrowth and  
64 proximity to freshwater (Oguntuase & Agbelusi, 2013), as well as a degree of tolerance to  
65 forest degradation (Petrozzi et al., 2014). Like other species of the genus *Crossarchus*, *C.*  
66 *platycephalus* is thought to be primarily diurnal and social (Goldman, 1987; Bahaa-el-din et al,  
67 2013).

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69 In Gabon, *C. platycephalus* has only been previously reported to occur in and around Minkébé  
70 National Park in the northeast (Bahaa-el-din et al., 2013), though no photographic records of  
71 these observations have been published. Here, we present new records of the species obtained  
72 from camera trap surveys carried out across central and northwestern Gabon, which together  
73 extend the southern limit of its range and provide additional information regarding its  
74 behaviour and ecology.

75

## 76 **Methods**

77 Records of *C. platycephalus* were obtained from three independent camera trap surveys carried  
78 out across Gabon's Ngounié, Moyen-Ogooué, and Estuaire provinces between 2021 and 2023

79 (Table 1). Together, these surveys deployed a sampling effort of 14,865 camera trap days over  
80 a combined area of 327,400km<sup>2</sup> of tropical forest. The general objective of all surveys was to  
81 collect updated information on the spatial distribution and behaviour of terrestrial forest  
82 mammals and birds. In all cases, camera trap placement was targeted at habitat features that  
83 maximised the detection of a range of species, such as animal trails, burrows, and water points.  
84 Camera traps were attached to trees at a height of 30–40 cm and set to record still images as  
85 well as 20-second, 1-minute, or 2-minute videos depending on the project (Table 1). All videos  
86 were recorded in high definition (1080 × 1920 pixels).

87

88 Species identification was carried out based on morphological and behavioural descriptions of  
89 *C. platycephalus* obtained from the scientific and grey literature (Bahaa-el-din et al, 2013;  
90 Goldman, 2013; Petrozzi et al., 2014; Angelici & Do Linh San, 2016; Oguntuase et al., 2018).  
91 Individuals of the species range in total body length from 45 to 62 cm (including 15–21 cm for  
92 the tail), shoulder-height from 18 to 20 cm, and body mass from 0.5–1.5 kg. They are  
93 characterized by short, rounded ears, and a long nose that extends past the lower lip. The fur  
94 of *C. platycephalus* is brown-black and grizzled in appearance, with distinctive lighter hair on  
95 the head and between the eyes. Identification was also aided by observations of multiple  
96 individuals in social groups, a behaviour which is uncommon or unknown in other physically  
97 similar species such as the marsh mongoose (*Atilax paludinosus*) and the long-nosed mongoose  
98 (*Xenogale naso*) (Bahaa-el-din et al., 2013; Petrozzi et al., 2014; Angelici & Do Linh San,  
99 2016; Oguntuase et al., 2018). Records for which observed individuals could not be confidently  
100 identified to species level were removed from the study. Successive records at the same camera  
101 trap were considered as independent sightings if separated by more than one hour.

102

103 **Results and Discussion**

104 *Crossarchus platycephalus* was identified in 14 still images and 33 videos, representing 21  
105 independent sightings obtained across 13 distinct camera trap locations (see Table S1 for full  
106 records). The overall trapping rate for the species was 0.14 independent sightings per 100  
107 camera trap days, suggesting occurrence at very low densities. The closest sighting to the  
108 border of the current known range – based on the latest IUCN Red List assessment (Angelici  
109 et al. 2016) – was 110 km and the furthest 232 km. Together, these records extend the southern  
110 limit of the species' known range by 172 km (Figure 1A). All records were from secondary  
111 tropical forests located outside of Gabon's protected area network, with two locations lying  
112 within 10 km of areas of high human density (e.g. Ntoum and Lambaréné) (Figure 1B). All  
113 cameras at which the species was detected were placed in dense vegetation undergrowth, with  
114 the majority either targeting large fallen trees (39%; Figure 1C and D) and animal trails (31%),  
115 followed by burrows (15%), and streams (15%). The latter microhabitat characterisation  
116 concurs with the habitat preferences previously reported for the species (Oguntuase &  
117 Agbelusi, 2013).

118

119 Previous records of *C. platycephalus* have highlighted its tendency to live in family groups,  
120 generally consisting of a mating pair and their young (Petrozzi et al., 2014; Oguntuase et al.,  
121 2018). In this study, the average number of individuals observed per video was 2.4 (n=33;  
122 Figure 1E), with the largest group observed in a single video being composed of seven  
123 individuals. Average group size is, however, likely to be higher than reported here owing to  
124 the challenges of clearly differentiating individuals and sexes from successive camera trap  
125 videos. Records of *C. platycephalus* also revealed the potential for previously undocumented  
126 inter-specific interactions with the blue duiker (*Philantomba monticola*) and moustached  
127 guenon (*Cercopithecus cephus*). On one occasion, *P. monticola* was observed vocalising  
128 towards a group of *C. platycephalus*, whilst on another both species appeared to be foraging

129 on the forest floor beneath a group of *C. cephus* moving in the canopy (Figure 1F). High-  
130 definition videos of these instances can be found in Videos S1 – S4.

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132 The new observations reported here have important implications for our understanding of the  
133 ecology and conservation of *C. platycephalus*. First, they represent a significant range  
134 expansion for the species, whose previously documented occurrence in Gabon was restricted  
135 to the country's northeastern border with Cameroon and the Republic of Congo. Second, they  
136 suggest that the species could be found even further south, given its propensity to be found in  
137 secondary forest and apparent tolerance to human disturbance. Future research should focus on  
138 assessing the limits of this potential range extension, for example by reviewing existing camera  
139 trap data collected both inside and outside of Gabon's protected areas. Indeed, the lack of  
140 records from such datasets is notable, and may reflect sampling bias (e.g. a focus on large trails)  
141 or identification issues (e.g. difficulties in distinguishing between mongoose species from poor  
142 quality media). Lastly, our work provides much needed spatial information with which to  
143 review current threats to the species. In particular, bushmeat hunting has been highlighted as a  
144 potential threat to *C. platycephalus* (Petrozzi et al., 2014; Gaubert et al., 2015; Angelici & Do  
145 Linh San, 2016). Although bushmeat hunting of mammals (including mongooses) is common  
146 in Gabon, the range extension reported here may assist in designing future conservation  
147 strategies that mitigate negative impacts on previously undocumented populations.

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#### 156 **Data availability statement**

157 Geographic coordinates and videos of the reported records are provided in Supporting  
158 Information.

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185 **Tables**186 **Table 1.** Summary of camera trap surveys from which detections of *Crossarchus platycephalus* were obtained.

Study site	Aim	Habitat	Total area (hectares)	Study period	Sampling effort (camera trap days*)	Camera model	Camera settings
Non-protected land between Waka National Park and Lambaréné	Assessment of mammal community changes across a gradient of hunting pressure as part of the GCRF- TRADE hub project	Formerly logged, secondary forest and savannah	11,200	Nov 2021 – Oct 2022	9,604	Browning Recon Force Elite HP4	3 images + 20- second video
South Estuary Concession	Mammal community inventory	Formerly logged, secondary forest	270,000	Jul – Oct 2022	3,182	Browning Recon Force Elite HP4	2-minute video
Plantation Forestière de la Mvoum	Mammal community comparison between conservation and plantation areas	Plantation and Formerly logged, secondary forest	46,200	May – Aug 2023	2,079	Browning Recon Force Elite HP4	1-minute video

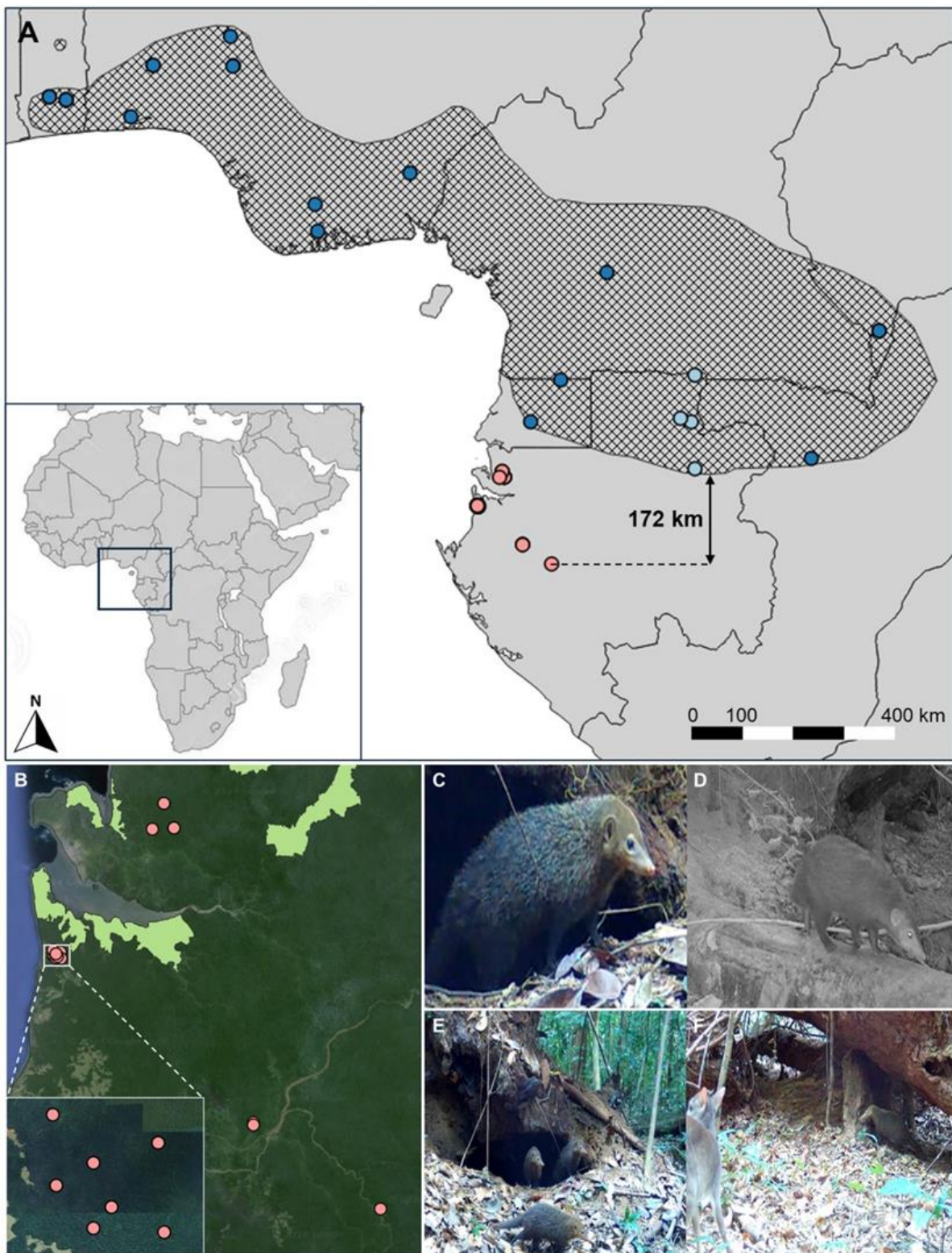
187 \*A camera trap day is defined as one camera active for one day.

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194 **Figure 1.** (A) Location of new observations reported for *Crossarchus platycelaphus* (pink dots) in  
195 Gabon, relative to the current known range of the species (cross-hatched) as downloaded from the  
196 International Union for the Conservation of Nature (IUCN). Previous records of the species outside and

197 inside of Gabon, obtained from the Global Biodiversity Information Facility (GBIF) and Bahaa-el-din  
198 et al. (2013), are represented by dark and light blue dots, respectively. (B) Distribution of new  
199 observations in central and northwestern Gabon, with green polygons in representing national parks.  
200 The inset map shows the location of records from the South Estuary Concession study area. (C-F)  
201 Example stills obtained from camera traps showing individual appearance during the day (C) and at  
202 night (D), group living (E), and co-occurrence with the blue duiker (F).