

Rufford Small Grant

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Distribution, Habitat, and diet composition preferences as conservation issue of three pangolins species in Deng-Deng National Park (DDNP)-Cameroon



Lom-Pangar hydroelectric dam located near the Deng-Deng National Park



Forest destroyed by flooding

Progress Report

submitted to The Rufford Foundation

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Abstract

During the first survey trip in the Deng-Deng National Park, we aim to record and monitor living and feeding burrows assumed belonging to the Giant pangolin during three months in various savannah vegetation cover of the northern park. 15 cameras were established on living burrows and feeding sites in the different savannah vegetation types occurring in northern region. We assessed insects prey assemblages especially termites in the potential habitat to evaluate the food availability for pangolins. Several types of cover lands were described and three of them were investigated.

Keywords: Deng-Deng, savannah, pangolins, habitat, diet composition

Background

Morphological and genetics features of pangolin population, forage behavior, trend and traffic routes are relevant informations for successful conservation programs, but these data are still lacking for many pangolins and hindering conservation efforts (Gomez & Sy, 2018). Pangolins species reintroduction programs might benefit from prior, knowledge of their origin, the insect assemblages and vegetation of the intended release habitat and specifically the presence of prey known to satisfy the feeding ecology (Lee *et al.*, 2017). Today, little is known about the natural history of African pangolins species, their diet, habitat preferences, seasonal changes in behavior and these gaps impede the ability to develop effective conservation strategies for these threatened species. While, Loss of natural forest habitat for agriculture and various development projects are a primary threat to the long-term persistence of many species (Whitmore, 1997). This project will be useful to know what kind and composition of habitats are required to support viable populations of different species within protected areas and other pangolin sanctuaries. Here, our knowledge of the food and habitat preferences of three species of pangolin found in Cameroon will be known in a national park that occurs in the northern forest-savannah transition zone. While an improved understanding of pangolins population and ecological features will help at long-term to design and manage more viable pangolin sanctuaries by ensuring that an adequate mix of different habitat is included within sanctuaries and that sufficient area of key habitats is incorporated to be able to sustain viable populations of each species.

Overall aim: This project aims to characterize the habitat preferences and food preferences as well as the distribution of the Giant ground pangolin, Black-bellied, and White-bellied pangolin in a savannah-forest ecotone in Deng-Deng national park.

First trip objectives

- (1) To characterize in the savannah the different types of habitat for the Giant pangolin;
- (2) to record Giant pangolin presence signs and monitor them with 15 camera traps in the various habitat in the savannah;
- (3) to collect ants and termite species in the various habitats;
- (4) to collect and analyze stomach and dung content analysis.

Purchase of equipment

Cameras, memory cards, and others materials were purchased online in the United State of America on March 2019 and shipped to Cameroon.

Field work

Study area

The first trip survey concerned the savannah area located in the northern part of the Deng-Deng National Park. Deng-Deng National Park is located in the East Region of Cameroon (latitude $13^{\circ} 23$ to $13^{\circ} 34$ East and longitude $05^{\circ} 5$ to $05^{\circ} 25$ North, 682 km^2 , average altitude of 703 m) and lies in the North-Eastern part of the lower Guinean forest. It is bounded by the Lom & Pangar rivers to the east, a segment of the Cameroon railway line and settlement to the west, a stretch of forest and savannah mosaic to the north and by roads and settlement in the south (Diangha, 2015). This park is crossed by a part of the Chad-Cameroon pipeline that drives the crude oil from Chad to Cameroon for the refinery in its northern and middle West region.

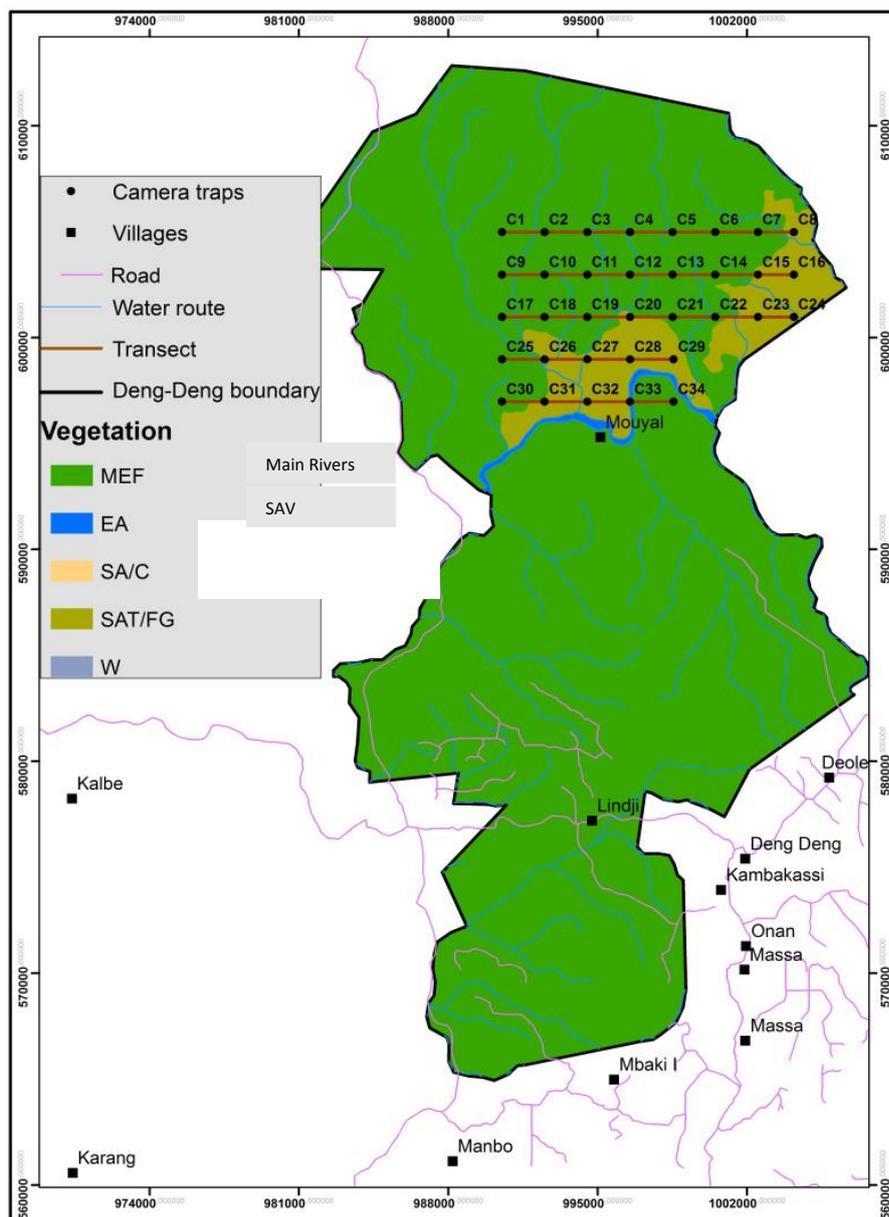


Figure1: Map showing the study area with pre-established transects and preplanned camera locations
MEF=moist evergreen forest; SAV= Savannah

Methods

1. Assessment of pangolins presence in the various land cover of the savannah

The Giant pangolin (*Smutsia gigantea*), which burrows were found in the previous survey to be more distributed in the savannah and overlapping the distribution of the Aardvard (*Oryteropus afer*) was the main target of this survey trip. We established 15 camera traps in the northern part of the Deng-Deng National Park from June 08th to 18th, 2019, during the rainy season. The cameras installed include 6 Cuddebacks (X Change Color Model 1279) and 4 Bushnells Aggressor and 5 Moltrie 30i camera traps set on the active living burrows (LB) and others feeding sites including feeding burrows (FB) and ground feeding site or termite mounds with scratches (feeding activity). The cameras were strapped at a height of 40-50 cm above the ground on trees (Figure 3A) set at the distance of 3-4 m from the target according to the protocol adapted from Acrenaz *et al.* (2002). However, this protocol could not always be respected for some Giant pangolin that burrows were located either on very steep slopes or halfway up a termite mound. The environment around each camera was described.



Figure 2: Camera traps installation in the savannah area: A) setting of camera's positions, B) recent living burrow C) camera strapped on scrub targeted a living burrow, D) installed camera targeting termites' mounds.

The following map shows the location of camera traps in the northern area of Deng-Deng National Park.

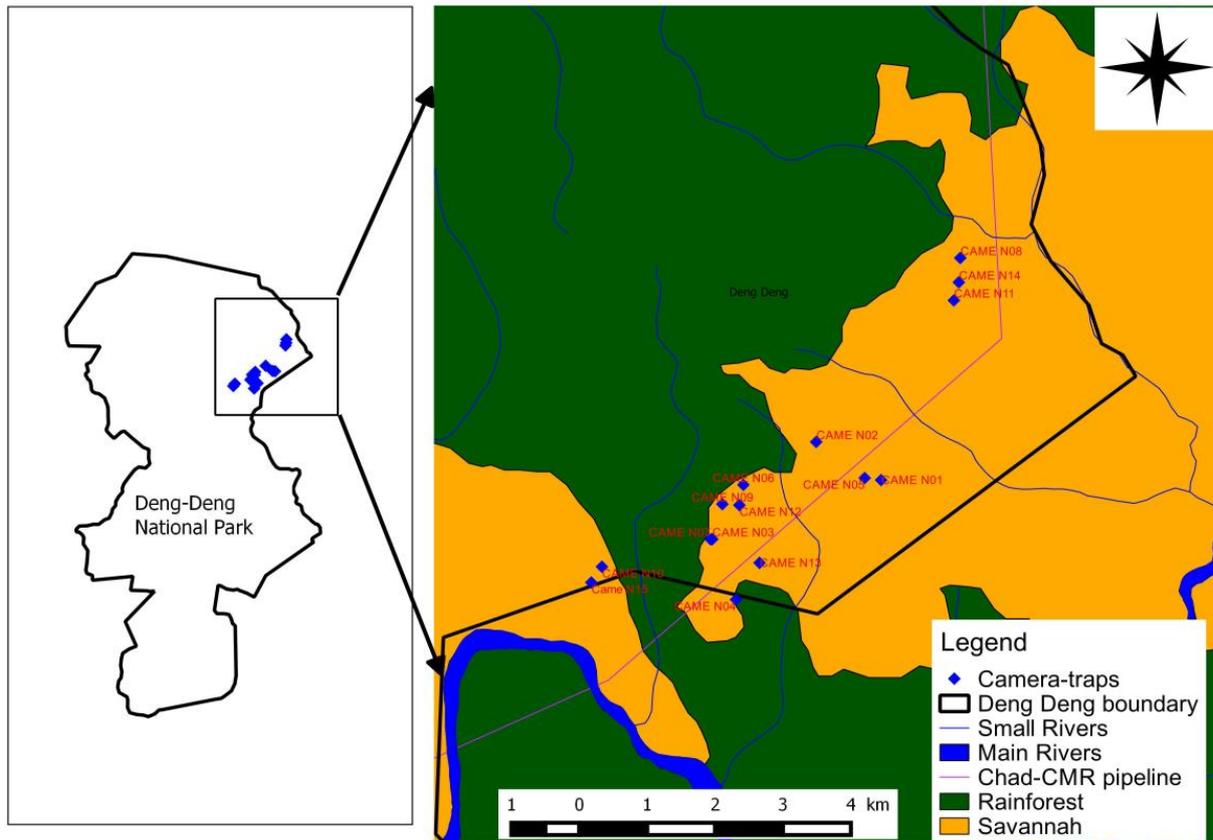


Figure 2: Camera-traps locations in the savannah area of the Deng-Deng National Park-Cameroon

1.1. Assessment of potential pangolin habitats

During trek along the transect, we recorded and characterized the vegetation cover following a pre-established code of vegetation describing the percent closure of canopy, undergrowth type, percent of undergrowth visibility, slope class and weather (Appendix). In each 250 m after recording the waypoint, we categorized each vegetation cover describing the canopy cover classified into one of the following categories including close-very close – open - very open. We visually quantified the undergrowth visibility around the camera locations, estimated the circular area with radius of 15 m from the center of the camera. Camera traps were established in each potential habitat types in which fresh signs of presence (living and feeding burrows) were mostly recorded. The vegetations that were not targeted during this survey trip such as Young Secondary Forest (YSF) and large block of forest were excluded and will be investigated during the next survey.



Figure 3: Different land cover of the northern part of the DDNP A) Young Secondary Forest, B) Secondary Forest C) Forest gallery, D) Savannah woodland (forest-savannah transition zone), E) grassland savannah.

We sampled termites manually on feeding signs by collecting soil from surface to 10 cm depth containing subterranean nests (Figure 4A) using an auger, then sieved and sorted in search of termites collected for 2 min with forceps (Eggleton, 2002 modified). Termites were collected at various sites, including termite mounds with scratches (Figure 4B), dead tree trunks with feeding signs and also any dead wood found (trunks and twigs), randomly selected in the different types of potential habitat. We also sampled termites on epigeal tree

nests and tree galleries up to 2 m height, on the litter, and termite's mound randomly in each type potential habitat encountered.



Figure 4: Termites sampling sites: A) termites mound with scratches; B) feeding sign on tree,

3.2. Ants sampling with the pitfall and sardine bait

Ants were sampled using pitfall and sardine bait methods on 100 m line transect (White and Edwards, 2000 modified) established in each type of potential habitat encountered in the study area. Then, 10 pitfalls of 15 cm in depth containing soapy water were placed at a distance of 10 m apart. They were recovered after 48 hours and the trapped ants were collected using forceps. Baits method enables to capture ant species belonging to foragers guild. 10 baits constituted of sardine fish and oil arranged on a piece of 10 x 10 cm white papers were placed at a distance of 20 m apart. They were retrieved after 10 minutes and the encountered ants on each paper and within a 50 cm radius were collected. The sampled insects were conserved in a 4 ml tube labeled containing 70° alcohol for termites; and 90° alcohol for ants.

4. Morphological identification of ants and termites

The insect identification based on morphological criteria are currently carried out in the Zoology laboratory, under a binocular loupe using the dichotomous keys of Bouillon and Mathot 1965; Grasse, 1986; Takematsu et al., 2003; Sornnuwat et al., 2004 for termites. Holldöbler *et al.* (1990) et Bolton (1994) for ants. The insects collected in the pangolins potential habitat are compared with the fragment found in the feces to determine the prey from the dung.

Results Expected

- Documented presence of the Giant pangolin and the White-bellied pangolin in various vegetation cover of the northern part of the Deng-Deng National Park with evidence of camera- traps photographs.
- Established a listed of insect prey available as food resources for pangolins in the savannah area

Conclusion

We intended to document pangolin presence and their food resources available in the northern part of the Deng-Deng National Park. Our first survey was conducted in the savannah area where we recorded three potential habitats for pangolins species and established 15 camera-traps.

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