

# Improving knowledge on Forest elephant's ecophysiology (*Loxodonta africana cyclotis*) for better wildlife conservation

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Fig.1: Forest elephant (*Loxodonta africana cyclotis*) in a bush nearby farms. Ngama, 2013.

## Context

- ❖ Conservation of large wildlife species is a major issue in Africa (Ahlering et al., 2013; Clark & Poulsen, 2012).
- ❖ Elephant (fig.1, fig.3) is both the charismatic largest terrestrial mammal species and the worst crop raider (Walker, 2010).
- ❖ Crop raiding threatens people livelihoods (fig.4, fig.5) and elephants themselves when hungry farmers shoot or trap them (Ahlering et al., 2013).
- ❖ Crop raiding drivers related to elephants' ecophysiology remain largely unknown (Ahlering et al., 2013; Jachowski, et al., 2013).



Fig.3: Forest elephant (*Loxodonta africana cyclotis*) raiding in a farm at night. Ngama, 2013.

## Methods

- A pilot study was conducted between July and November 2014 in Gabon (fig.2) to have a first view on environmental drivers to elephants' crop raiding.
- 16 crop fields surveyed during 19 weeks.
- Registered parameters:
  - Damaged field surfaces
  - Presence of fruit trees species eaten by elephants around farms
  - Presence of fruiting trees
  - Slopes around fields
  - Numbers of intrusions in the fields
  - Numbers of elephants' raiders

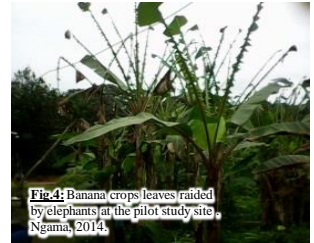


Fig.4: Banana crops leaves raided by elephants at the pilot study site. Ngama, 2014.

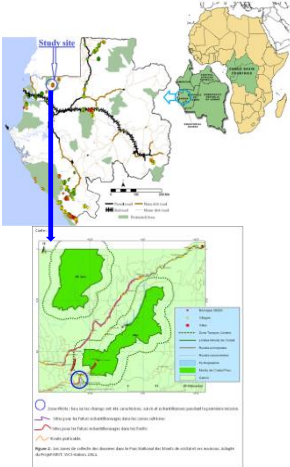


Fig.2: The pilot study site. Ngama, 2014, adapted from Walker (2010).



Fig.5: Banana plantation raided and totally destroyed by elephants in the study site. Moussavou, 2014.

## Results

- ❖ Elephants made 180 intrusions in plantations representing in totals the equivalent of 486 elephants' crop raiders and 29300 m<sup>2</sup> of damaged crops' surfaces.
- ❖ The number of elephants raiding on farms is not proportional to damaged crops' surfaces (cf Table).
- ❖ While the presence of some fruiting trees around crop fields lead to more damages, steep slopes efficiently discouraged elephants (cf Table).

Table: Importance of elephants' intrusions and damaged surfaces in plantations according the presence of fruit trees, fruiting trees and slopes.

Slopes	Means of elephants' raiders per field				Percentage of damaged crops' surfaces			
	Absence of fruit trees (n=11)	Presence of fruit trees		Averages	Absence of fruit trees (n=11)	Presence of fruit trees		Averages
		Absence of fruits (n=4)	Presence of fruits (n=2)			Absence of fruits (n=4)	Presence of fruits (n=2)	
Low (10% <) (n=11)	27±25 <sup>a</sup>	52±21 <sup>b</sup>	24±11 <sup>a</sup>	29±23	95,37 <sup>a</sup>	12,29 <sup>b</sup>	69,64 <sup>c</sup>	67
Medium (10% -30%) (n=1)	44	-	-	44	100	-	-	100
Steep (>30%) (n=5)	0	0	-	-	0	0	-	0
Averages	23 <sup>a</sup>	39 <sup>b</sup>	24 <sup>a</sup>	29	71	7	69,64	75

"n" in brackets are numbers of surveyed fields. (a, b) Numbers in the same rows with different letters are significantly different (α=0,005).

## Next steps

- ❖ We hypothesize that elephants' physiological statuses have a great influence on their crop raiding behavior.
- ❖ We will investigate potential links between nutritive value of raided plants and elephants' physiological status through:
  - faecal androgen and estrogen hormones assays
  - nutritive value of foraged plants (energy, crude protein, fiber and minerals contents)
  - parasitological assays (according the McMaster technique to determine parasitic loads).

## Literature

- Ahlering et al., 2013. Conservation Biology, 27, 569–575  
 Clark & Poulsen, 2012. Tropical Forest Conservation and Industry Partnership: An Experience from the Congo Basin. A John Wiley & Sons, Inc., Publication, 259p.  
 Jachowski, et al., 2013. Functional Ecology, 27, 1166–1175.  
 Walker, 2010. Moving Away From Prescriptive Pachyderm Palliatives: Toward an Integrated Assessment of Farmer-Elephant Conflict in Gabon. PhD thesis, University of Michigan. USA. 127p.



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