GLOBAL WILDLIFE PROGRAM CONFERENCE

Reducing Human Wildlife Conflict & Enhancing Coexistence

April 3rd to 7th, 2017 | la Lope and Libreville, Gabon

Panel Session 4, Mitigation approaches to reduce HWC:

"Beehive trials in Gamba (Gabon) with ecophysiological approaches"

Ref: Ngama S, Korte L, Bindelle J, Vermeulen C, Poulsen JR (2016) How Bees Deter Elephants: Beehive Trials with Forest Elephants (*Loxodonta africana cyclotis*) in Gabon (C Wicker-Thomas, Ed). PLoS ONE 11: e0155690.

Presenter:

Steeve Ngama

PhD Candidate, Central African Forests, TERRA Research Centre, Gembloux ABT, University of Liège, Belgium.

Research Fellow, IRAF-CENAREST, Gabon.

Advisers: **Pr. Cédric Vermeulen** and **Pr. Jerôme Bindelle**, Gembloux ABT, University of Liège, Belgium

Content

Objectives

<u>Global</u>: contributing to the wellbeing of people sharing space and resources with elephants and enhancing elephants' management and conservation strategies.

<u>Specific</u>: getting more insight on interactions of local bees and elephants (because bees are potential elephant deterrent and livelihood enhancer**)**

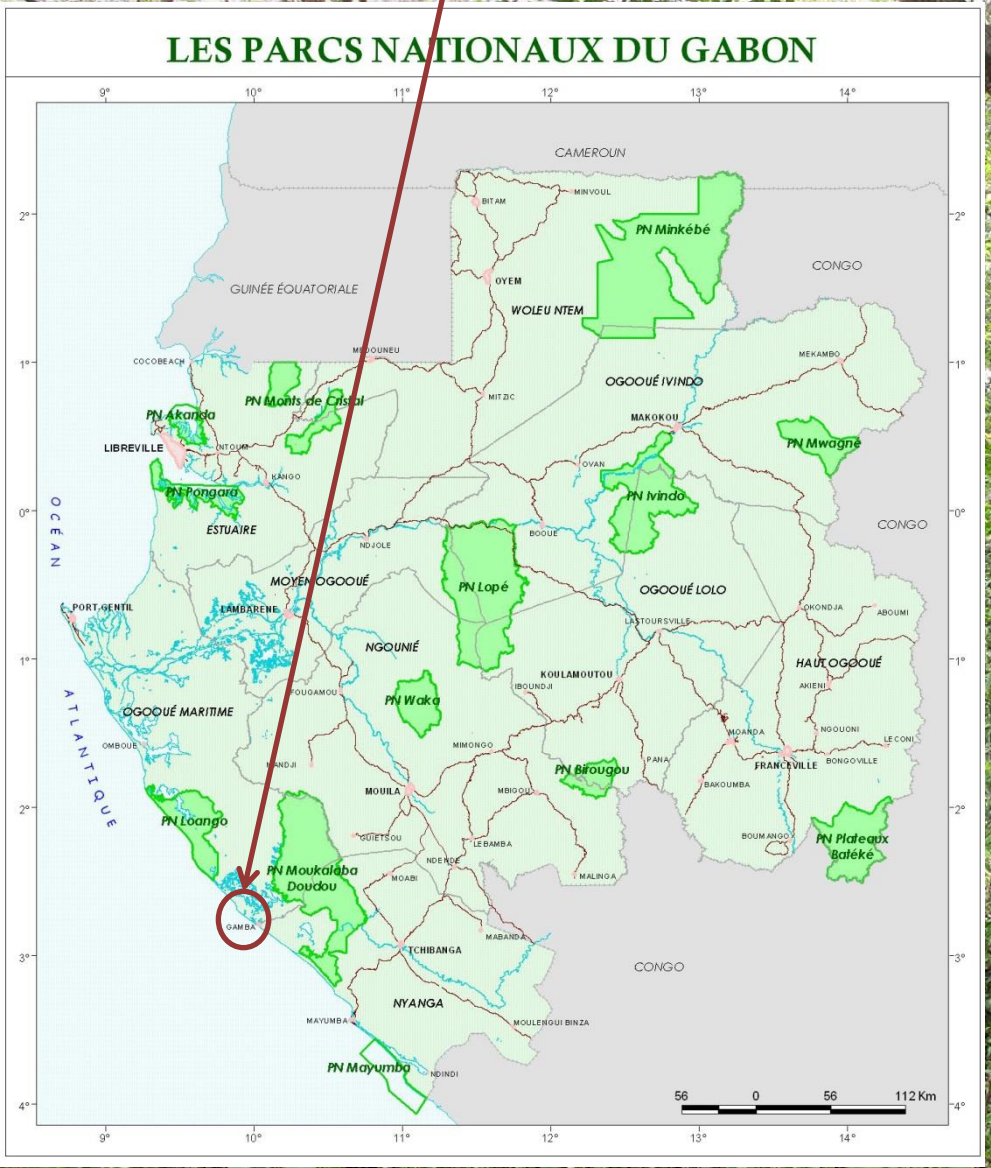
Research question

How local bees interact with local forest elephants in term of deterrent method and honey producer?

Hypothesis

Local honey bees (*Apis mellifera adansonii*) are able to achieve the dual purposes of deterring forest elephants (*Loxodonta africana cyclotis*) and producing honey.

Study site


LES PARCS NATIONAUX DU GABON
CAMEROUN
GUINÉE ÉQUATORIALE
CONGO
OCÉAN ATLANTIQUE
PN Minkébé
PN Monts de Cristal
PN Akanda
PN Pongara
PN Ivindo
PN Mwagne
PN Lopé
PN Waka
PN Birougou
PN Loango
PN Moukalaba Doudou
PN Plateaux Batéké
PN Mayumba
LIBREVILLE
PORT-GENTIL
FRANCEVILLE
MOUILA
OYEM
WOLEU NTEM
OGOOUÉ IVINDO
OGOOUÉ LOLO
OGOOUÉ MARITIME
HAUT-OGOOUÉ
MOYEN-OGOOUÉ
NGOUNIÉ
ESTUAIRE
NYANGA
56 0 56 112 Km


CONGO BASIN COUNTRIES

6 trees of *Irvingia gabonensis* **and 4 trees of** *Sacoglottis gabonensis* **(whose fruits are consumed by forest elephants).**

14 beehives were hung on 7 of them and all were equipped with a camera trap.

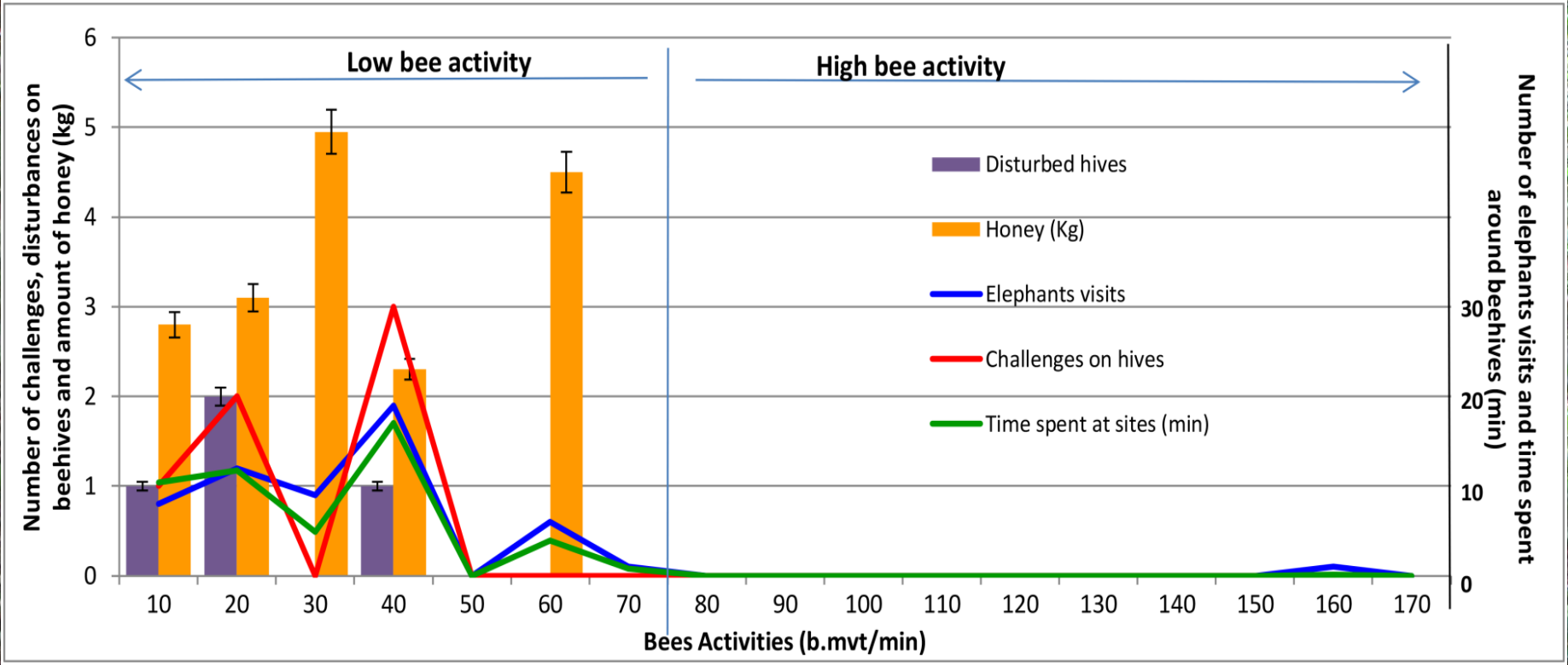
Hives were monitored weekly during 70 weeks

Bee activities were estimated as the number of bee movements per minute" (b.mvt/min) using the slowdown speed video mode of a Canon PowerShot S3IS camera.

Main Results:

- 8151 photos of elephants, representing 4h31min42s of time spent by elephants at experimental sites, which was mostly at night.
- 255 elephant visits.
- 46 challenges on beehives (40 on empty and 6 on active ones).
- 19 beehive disturbances (15 on empty and 4 on active ones) (Fig. 1).
- 17.7 kg of honey harvested (4.1±2.1 kg per productive beehive).

* Local honey bees can deter forest elephants and produce honey
* Bees hum and empty beehives do not deter forest elephants all the time



Figue.2: Elephants behavior on sites and honey collected according to bee activity. Elephant visits, time spent at sites, number of challenges on beehives, number of disturbances on beehives and honey harvested in regard to bee activity expressed in bee movement per minute (b.mvt/min), quantifying the number of bees entering and exiting a beehive per minute. At 70 b.mvt/min elephants stopped visiting and spending time at experimental sites. Note that elephants neither disturbed hives nor approached beehives within 5 m when bee activity surpassed 40 b.mvt/min. at 70 b.mvt/min and greater, honey production dropped off.

Others constraints:

1- No data available on beekeeping in Gabon (Small amount of honey, periods of honey harvest, swarming issue, health)

2- Need of a cost/benefit assessment of using beehives in plantations

Apiculture advantages

1- Benefit for the preservation of wild bee colonies
2- Benefit for agriculture production through pollination
3- Enhance livelihoods through:
    3,1- honey production and selling
    3,2- lots other products such as wax and candles
4- Affordable technology
5- Easily transferable technics
6- Easy to make local people being engaged and responsible
7- Alternative to negative activities such as poaching or bush meat sales.

We must go further by transferring knowledge to local people

Beehives set up

Beehives monitoring

Honey harvest and extraction

Candle made by local people

Beehives construction

Beehives in Monts de Cristal

We must go beyond aspirin (symptomatic) treatments (Hoare, 2012) through investigating crop raiding root causes with multidisciplinary approaches such as ecophysiological ones

- What lead elephant to face threats such as bees ?
- What could explain nutritional behaviour and crop selection of elephants?

Banana leaves eaten by elephants in Monts de Cristal NP.

Banana farm completly destroyed by elephants in Monts de Cristal NP.

What do we mean by “ecophysiology” ?

Ecophysiology examines the relevance of physiological processes tosocial, behavioural and ecological constraints with an eco-centric view (Bradshaw 2010)

On going trials

RQ: Which environmental factors and methods facilitate or disable elephant’s crop raiding in the context of Monts de Cristal, Gabon?

Hypothesis: two factors, high slops and fruit trees presence, respectively prevent and enables elephants crop raiding in Monts de Cristal National Park.

RQ: Would elephants be attracted by secondary forests vegetation and crops because of parasitism, stress and reproduction?

Hypothesis: Stress and related elevated parasitism lead elephants to select particular plants species in secondary forests.

About 1000 samples of elephant dung and food items for hormonal, parasitism, DNA and nutrition analyses

Thank you !

Gembloux Agro-Bio Tech
Université de Liège

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