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Video and camera traps to investigate animal ecophysiology and enhance wildlife management: case study on bees and elephant interactions in Gabon

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:

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Content

Experiment design

Results

Going further

Context

- **Elephant species :** Elephant species : vulnerable or endangered (IUCN red list)
 - Habitat loss
 - Poaching for ivory
 - Human-elephant conflicts
- **Elephant damages on crops:** (1) human-elephant conflicts (Walker 2012; Abernethy et al. 2013)
 - (2) less conservation action support
 - (3) 25-90% poverty increase with up to 100% income decrease
- **Bees:** promising low tech, eco-friend elephant deterrent, income increaser ; (King 2010)
 - (1) How bees deter elephants? (2) Do bees deter forest elephant as savanna ones?
- **Ecophysiology:**
 - investigate how physiology matters on others animal life processes;
 - suitable to investigate mechanisms behind population declines and achieve tangible conservation outcomes. (Bradshaw 2003)

Purpose

- Using ecophysiology to:
- know how bee physiology matters on its defensive behavior;
- better understand bees and elephants interactions.

Study site



To see if beehives could deter elephant:
6 trees of *Irvingia gabonensis* and 4 trees of *Sacoglottis gabonensis* (whose fruits are consumed by forest elephants).



14 beehives were hung on 7 experimental trees (2 beehives/tree), 3 trees served as controls (without beehives) and all were equipped with a camera trap.





Photos from **Camera traps**:
to monitor elephant **feeding behavior** and reactions



Videos from a Canon PowerShot S31Bee camera:
To monitor **bee physiology** (reproduction and population growth) and **defensive behavior** → **bee activities (b.mvt/min)**
(Woyke 1992, Smith et al. 2015)

Experimental sites were monitored weekly during 70 weeks

- 8151 photos of elephants, representing 4h31min42s of time spent by elephants at experimental sites, which was mostly at night.
- 255 elephant visits.



17.7 kg of honey harvested (4.1 ± 2.1 kg per productive beehive)



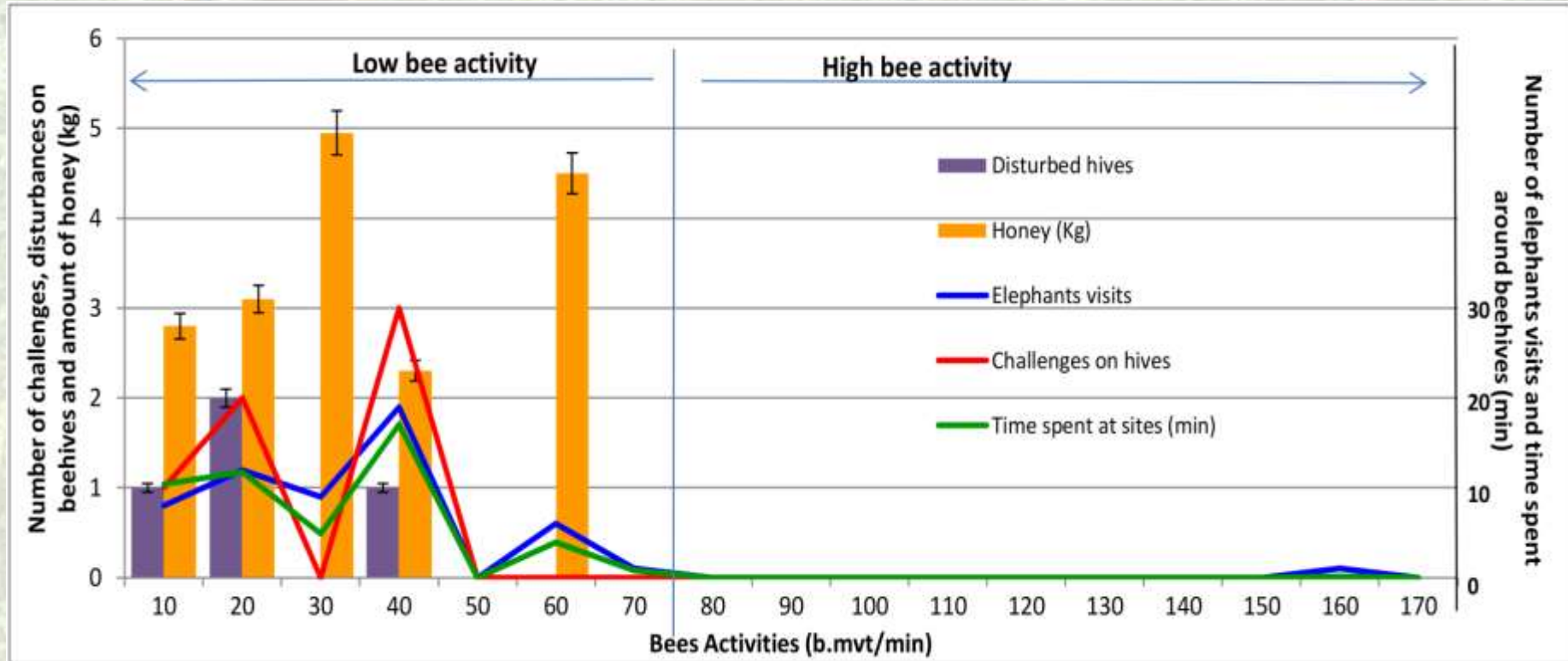


Figure.2: Elephants behavior on sites and honey collected according to bee activity.

Simple bee or beehive presence do not deter forest elephants as their savanna congeners

To both deter forest elephants and produce honey local honey bees have to be well monitored and maintained at the level of 50-70 b.mvt/min

- 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 completely destroyed by elephants in Monts de Cristal NP.

Reproduction statuses and parasitism suspected as drivers !

[For details missing in this presentation, see:](#)

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Thank you !

