Influence of the elephant (Loxodonta africana) on the landscape mosaic and the creation of microhabitats in Burkina Faso

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1. Context

- Listed as Vulnerable in the IUCN Red List
- Alarming decrease of elephant populations in West Africa

Habitat fragmentation and loss
1. Context

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Poaching
1. Context

- Paradoxically, important increases of population size on a local scale => refuge in protected areas
1. Context
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- Sudano-sahelian climate: +-900 mm
- Dry season from October to April-May
- Woody savannas
1. Context

- Elephants not hunted in West Africa
- Hunting area: installations
  - Waterholes, ponds
  - Controlled fires and green pastures
  - Anti-poaching

=> Increasing densities
1. Context

High densities, a problem?

- Damages on the ligneous, degradation of the forested habitats
- Regression of woody savannas towards grassy savannas
- Habitat loss
- Decrease in biodiversity
# 1. Context

Two other recent theories....

The theory of megaherbivores and the *Ecosystem engineers*

- Provide new food resources
- Modification and complexification of the landscape mosaic
- Creation of new microhabitats
- Positive effect on the biodiversity
2. Hypothesis

• (1) The elephants change the landscape mosaic and create new microhabitats by bringing down trees

• (2) Those microhabitats could increase the diversity and the abundance of micromammalian species
3. Objectives

• Main objective: to verify the theory of megaherbivores and its application in the case of the elephant in the savannas of Burkina Faso

• Specific objectives:
  ▫ (1) Quantifying the creation of microhabitats by the elephants, characterizing them and their environment
  ▫ (2) Analyzing their spatial organization
  ▫ (3) Studying the diversity and the abundance of micromammals in relation with the microhabitats and their repartition
4. Method

- Multi-scalar analysis
- Seasonal analysis (dry and wet seasons)
4. Method

- 4 plots of 1 km²: different use and damage densities
4. Method

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4. Method

A. Microhabitats « fallen trees » inventory

- Exhaustive statement
- Parallel transects of 1 km long every 50 m
- GPS point for every tree
- D>15 cm et L>4 m
C. Micromammals trapping (Lambert et al. 2006)

- Microhabitats map

- Microhabitats « fallen trees »
4. Method

C. Micromammals trapping (Lambert et al. 2006)

- 5 trapping grids by plot

- Microhabitats « fallen trees »

![Diagram of trapping grids and microhabitats](image-url)
4. Method

C. Micromammals trapping (Lambert et al. 2006)

- 5 trapping grids by plot
4. Method

C. Micromammals trapping (Lambert et al. 2006)

- Including 10 trapping stations each
4. Method

C. Micromammals trapping (Lambert et al. 2006)

- Scherman traps, snap-traps and pitfalls
- Prospected every morning during the trapping session
- Specimens and tissue samples brought to the Royal Belgian Institute of Natural Sciences
4. Method

D. Description of the microhabitats

- Within a radius of 25 m around every trapping station

- Composition
  - Size, specie, state, ...
  - Fruits, seeds, ...
  - Burrows, indications of use by other species, ...

- Spatial organization
  - Number by station, density by plot
  - Connectivity
### 4. Method

**E. Description of the environment (Lambert *et al.* 2006)**

- Within a radius of 10 m around every trapping station
- Density of trees, shrubs, herbaceous plants
- Ground cover, covers of the tree and shrub layers
- Food resources: fruits and seeds
5. First results

- There are plans and there is reality...
5. First results

- 2 plots, 13 days trapping session at the beginning of the wet season

<table>
<thead>
<tr>
<th></th>
<th>Plot 1 (1km²)</th>
<th>Plot 2 (1km²)</th>
<th>Total (2km²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total fallen trees</td>
<td>338</td>
<td>277</td>
<td>615</td>
</tr>
<tr>
<td>Characterized microhabitats</td>
<td>36</td>
<td>26</td>
<td>62</td>
</tr>
<tr>
<td>Catches</td>
<td>83</td>
<td>73</td>
<td>156</td>
</tr>
</tbody>
</table>

- Genetic analysis at the Museum : under process
5. First results

Number of catches and microhabitats by trapping grid

Number of catches

Number of microhabitats

$R^2 = 0.2054$
6. Perspectives

- Necessity of further prospecting:
  - by species
  - at the station level and the impact of the microhabitat density at the plot level
  - impact of the environment
  - effect of the season
  - effect of the microhabitat characteristics

- Discovery of new species?
Thank you for your attention