Enclosure-exclosure : management tools of forest-ungulates

Journée d'étude

« Gestion rationnelle et conservation de la grande faune »

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In temperate forest, ungulates feeding activity can lead to :

- Overgrazing (vegetation)

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Conflicts with other forest functions :

- Timber production
- Conservation

Identify the functional traits of vegetation that changes with ungulate pressions

Indicators of ecological changes (habitat impacts)

Calculating indicators of habitat changes :

- Systematic inventory

- Enclosure-exclosure device

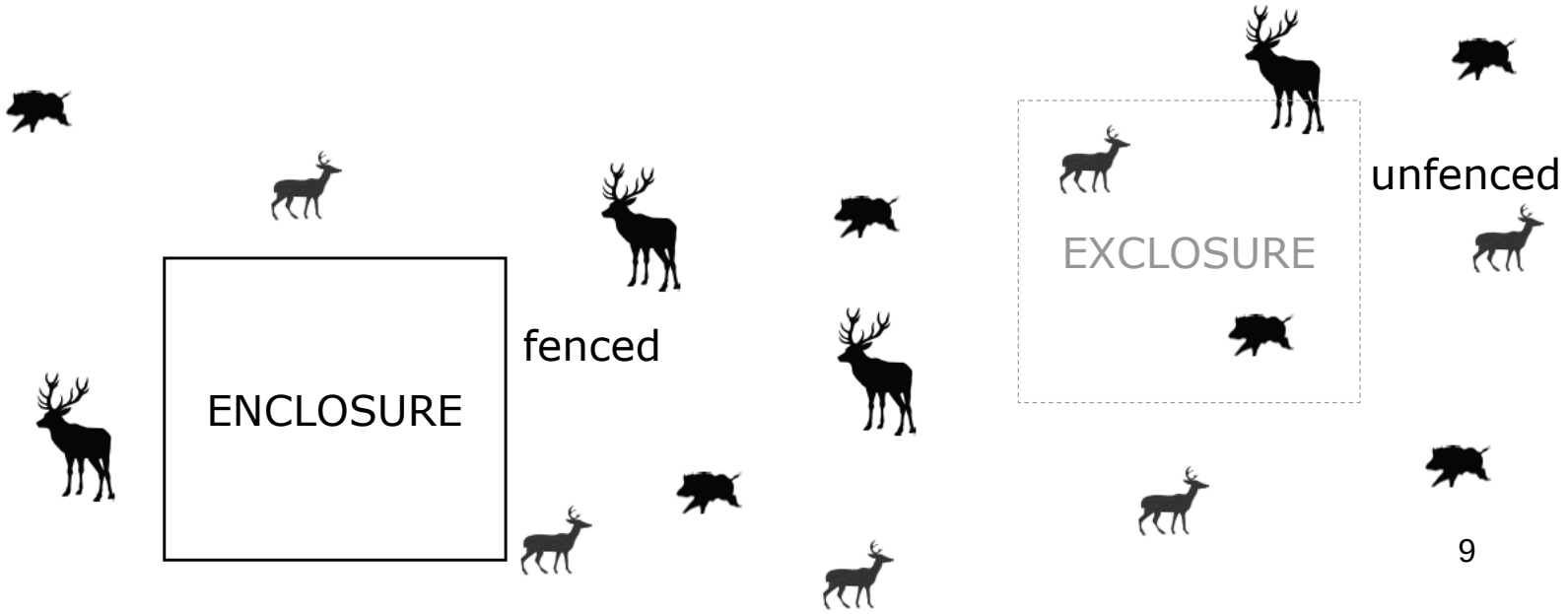
Calculating indicators of habitat changes :

- Systematic inventory
  - High accuracy
  - Requires considerable investment of time, people and money

- Enclosure-exclosure device
  - Visual approach
  - Compare natural density with controlled density

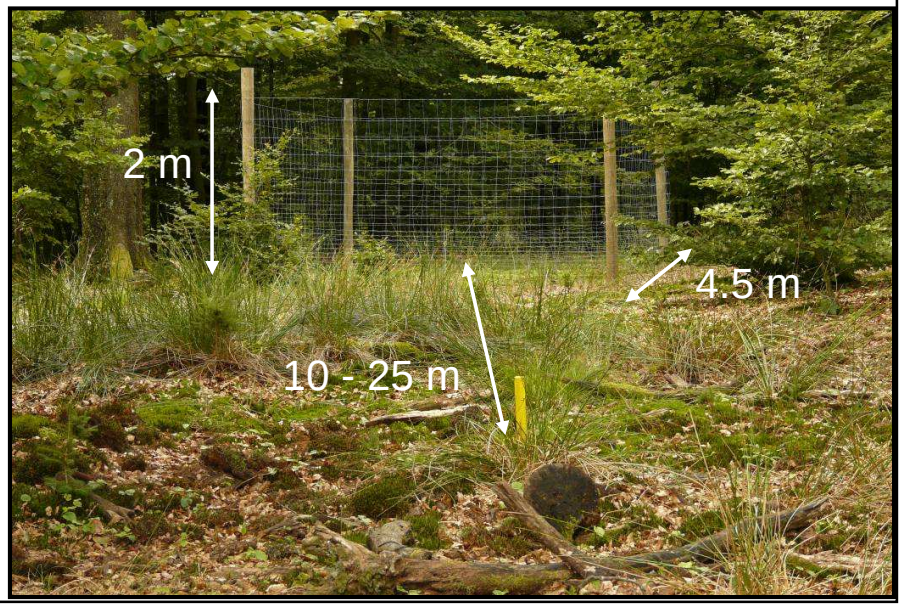
Enclosure-exclosure device

- Compare
  - Enclosure: controlled density (for this study 0 ungulates)
  - Exclosure: natural density



Enclosure-exclosure device

- Compare
  - Enclosure: controlled density (for this study 0 ungulates)
  - Exclosure: natural density
- Dimension
  - 4.5 x 4.5 m
  - Fence 2 m
  - Remote 10 – 25 m



Study area

- Temperate deciduous forest
- Ardenne Region (southern Belgium, Florenville)
- Forest gaps (area with ground vegetation and regeneration)
- Comparison of 2 areas

Chiny

2.5 deer/km²

Low density

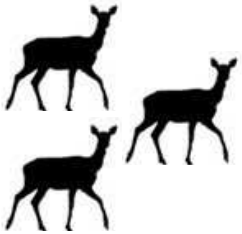
5 enclo-exclo

Sainte-Cécile

7.5 deer/km²

High density

12 enclo-exclo

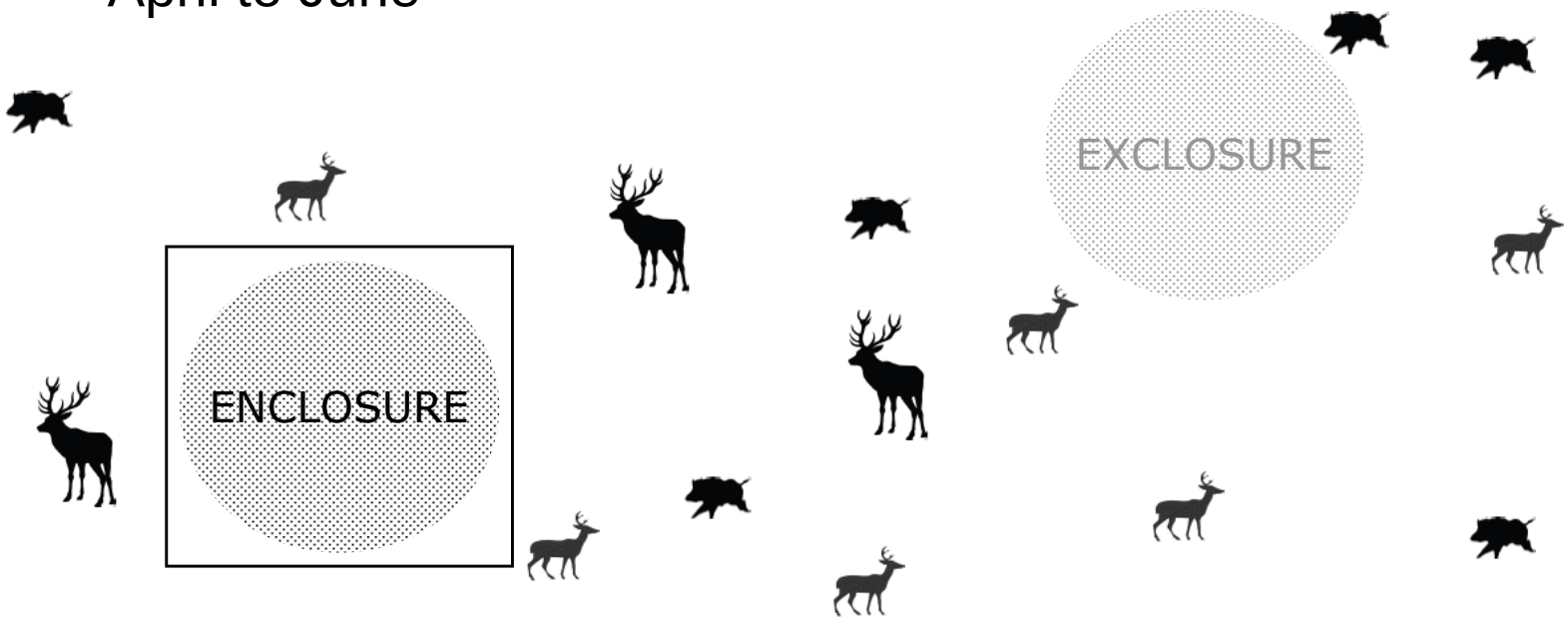


Enclosure-exclosure device

- Ungulates
  - *Cervus elaphus* L.
  - *Capreolus capreolus* L.
  - *Ovis aries musimon* Schreber
  - *Sus scrofa* L.

Data acquisition

- 2 m radius plot
- April to June



Data acquisition

Measurements of ground vegetation and regeneration

- Presence/absence of species

Data acquisition

Measurements of ground vegetation and regeneration

- Presence/absence of species
- Continuous variable :

Ground vegetation	Regeneration
▪ Richness (number of species) ▪ Total cover ▪ Gramineae cover ▪ Cover and height • *Rubus fruticosus* L. • *Rubus idaeus* L. • *Vaccinium myrtillus* L.	▪ Richness (number of species) ▪ Total cover ▪ Seedling density ▪ Average height

Monitoring 2006 ➔ 2012

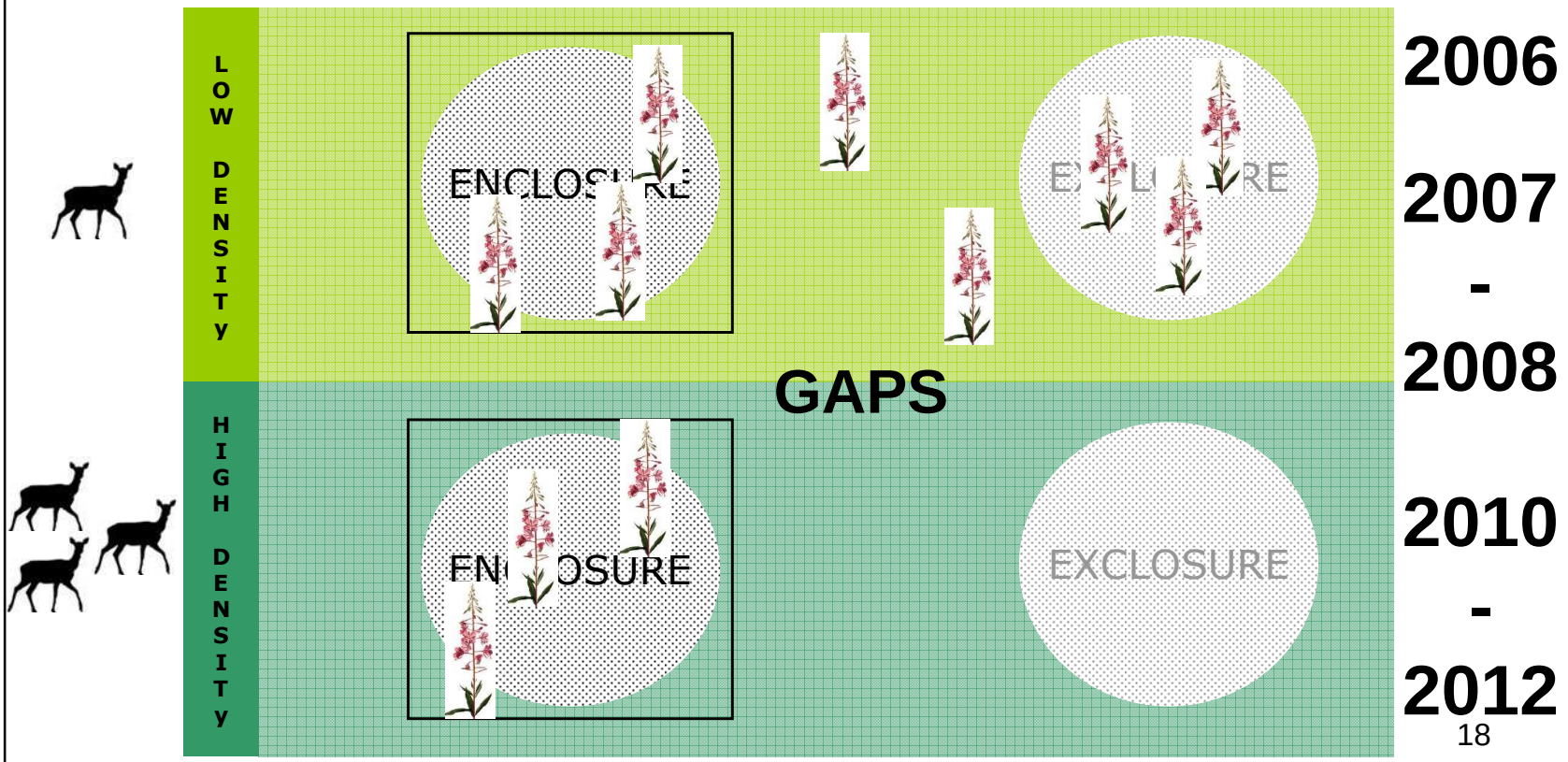
(Bi-)Annual indicators

Multiannual indicators

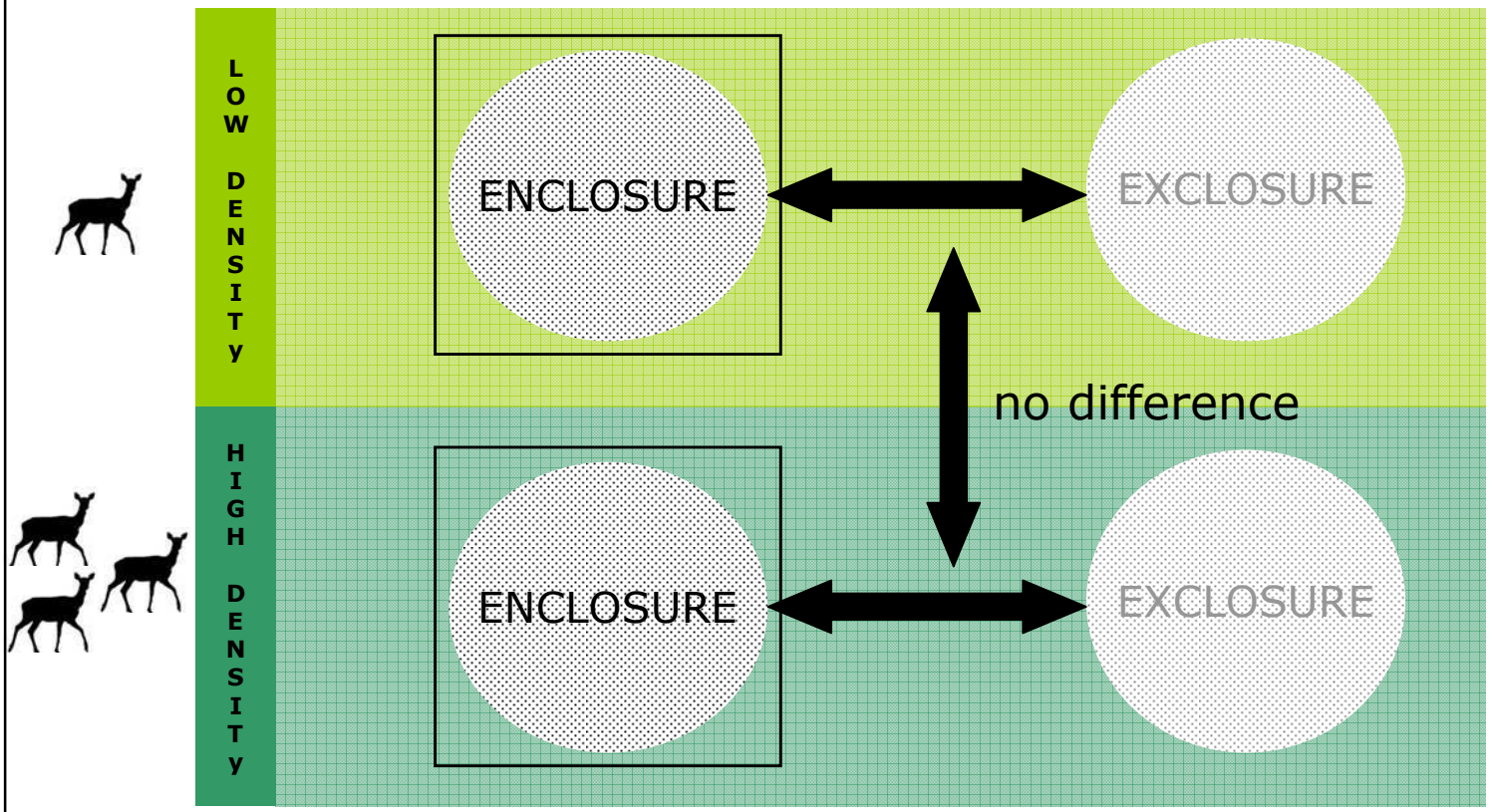
Presence of species

- *Rubus idaeus* L.
- *Sorbus aucuparia* L.
- *Chamerion angustifolium* (L.) Holub

Presence/absence of species (*Chameriom*)



Continuous variable



Annual indicators

- Ground vegetation richness
- Regeneration richness
- Height *Rubus fruticosus* L.
- Height *Rubus idaeus* L.
- Seedling density

2006

2007

-

2008

Multiannual indicators

- Ground vegetation richness
- ~~Regeneration richness~~
- Height *Rubus fruticosus* L.
- ~~Height *Rubus idaeus* L.~~
- Seedling density
- Total cover
- Height *Betulus* sp.
- Height *Fagus sylvatica* L.

2006

2007

-

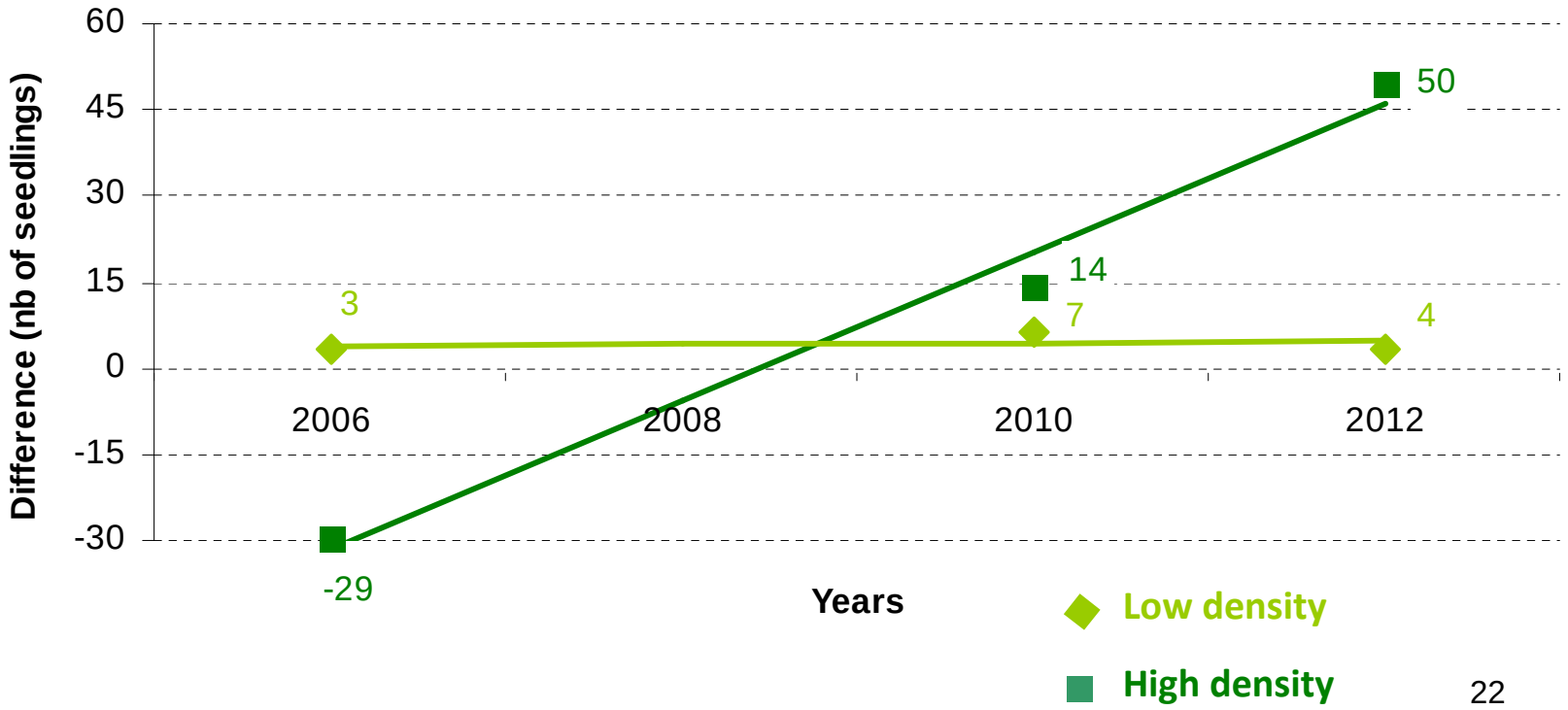
2008

2010

-

2012

Seedling density difference between enclosure and exclosure



- Visual approach – didactic
- Monitoring annual and multiannual
- Objective dialogue between the different actors involved in the management of forest-ungulates

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- Monitoring annual and multiannual
- Objective dialogue between the different actors involved in the management of forest-ungulates
- Annual indicators depends on extreme weather conditions

  >< Multiannual indicators

- Enclosures-exclosures could be an important tool in the context of forest certification they provide information to meet PEFC and FSC commitments

Perspectives

- Establishing long-term indicators (10, 15, 20 years) ?
- Installing new devices ➔ Validating indicators
  - 12 in 2008 (Florenville)
  - 15 in 2010 (Beauraing)
  - 65 in 2012 (Florenville, Neufchâteau)
- Automatic gap detection with LIDAR data
  - Mapping gaps in order to objectively scatter enclo-exclo devices


Thank You
for your attention