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## **A socio-ecological framework for the analysis of forest edges dynamics and their consequences on ecosystems services in temperate landscapes**

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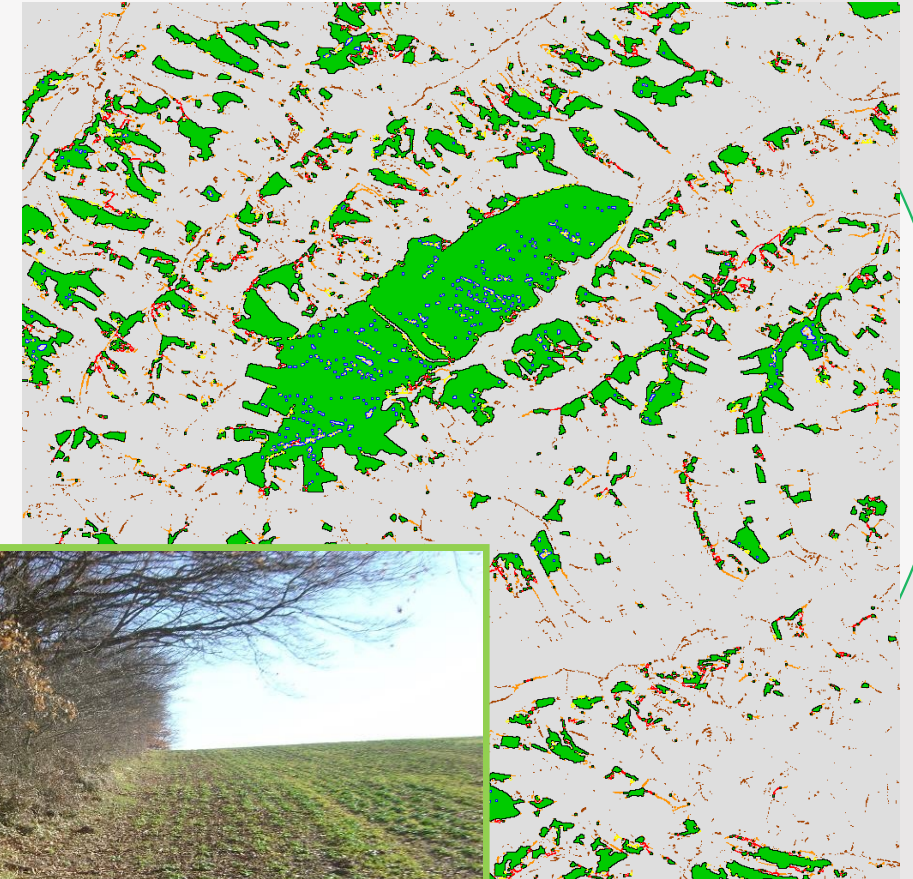
**Marc Deconchat, Audrey Alignier, Annie Ouin, Emilie Andrieu, Antoine Brin, Luc**



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# Forest edges: many facets of a very common landscape component

- ▣ Forest edges are very common in many temperate landscapes
- ▣ Ecological « edge effect »: what does it mean?
- ▣ Forester/farmer: place of interaction?

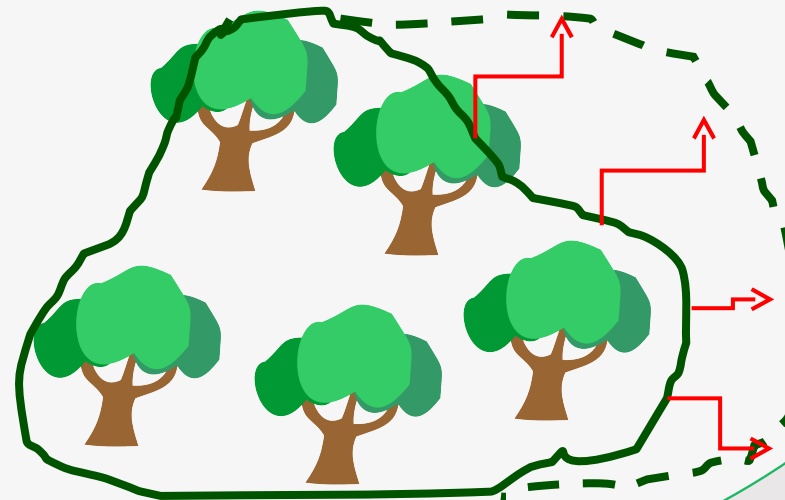


# Forest edges: 2 adjacent vegetation structures

- ▣ Forest / non-forest discontinuity
- ▣ Different types of forests
- ▣ Many possible non-forest habitats
  - Water bodies
  - Human infrastructures
  - « No thing » (cliffs)

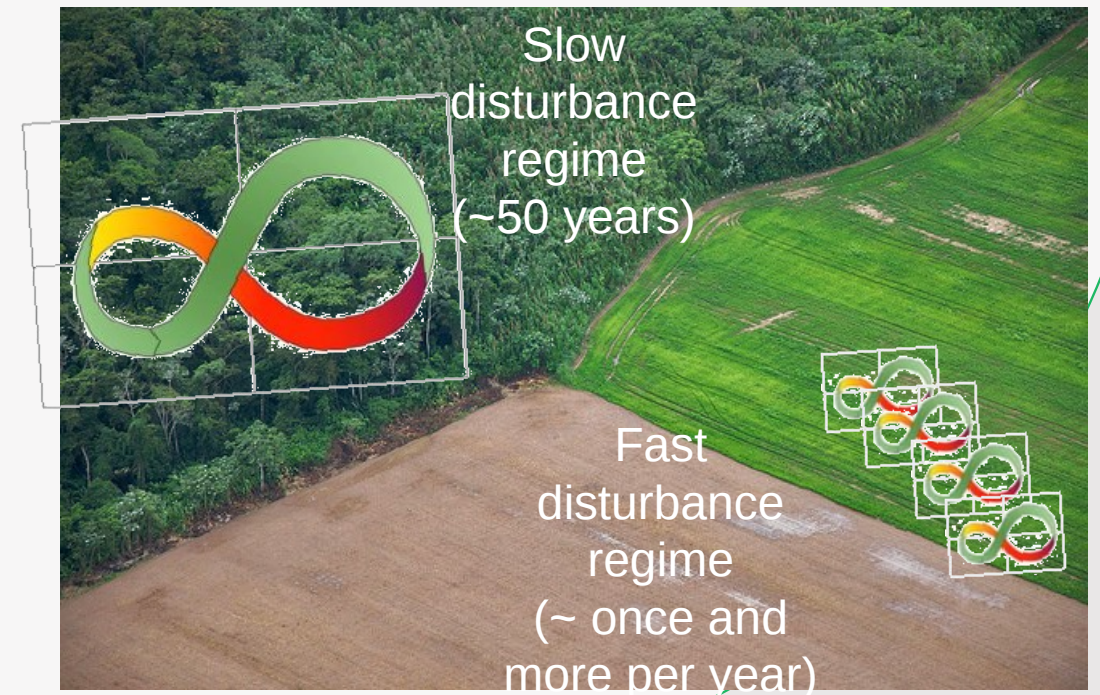
# Forest edges: Dynamics

- Natural dynamic of forest is expansion
- Older edges can disappear into the forest behind new edge
- Or, new edge can appear by clearing part of the forest
- Edges have an age



# Forest edges: 2 rates of disturbance

- ▣ Forest edges has to be reset regularly
- ▣ Disturbance of vegetation limits tree expansion
- ▣ Higher rate of disturbance in non-forest habitat than in forest



# Forest edges: 2 managers



- ▣ Forester / farmer
- ▣ Their own objectives
- ▣ Edges are a consequence of their practices
- ▣ Farming is the main origin of forest edges in temperate landscapes
- ▣ Private ownership of land induces stability of edges

# Forest edges: objects of a management

- ▣ Edges are consequence of management
- ▣ But they are also managed themselves
  - To control tree dynamics
  - To exploit their resources
- ▣ Generally managed by/for farmers

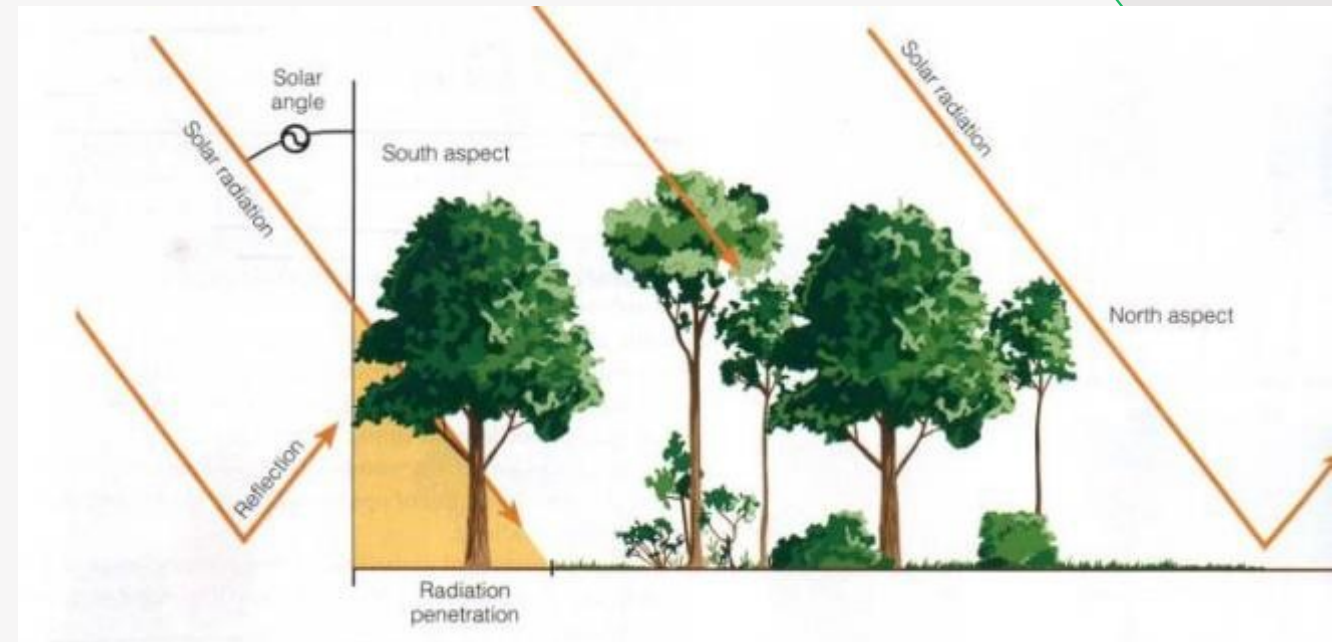


▣ Importance of secondary



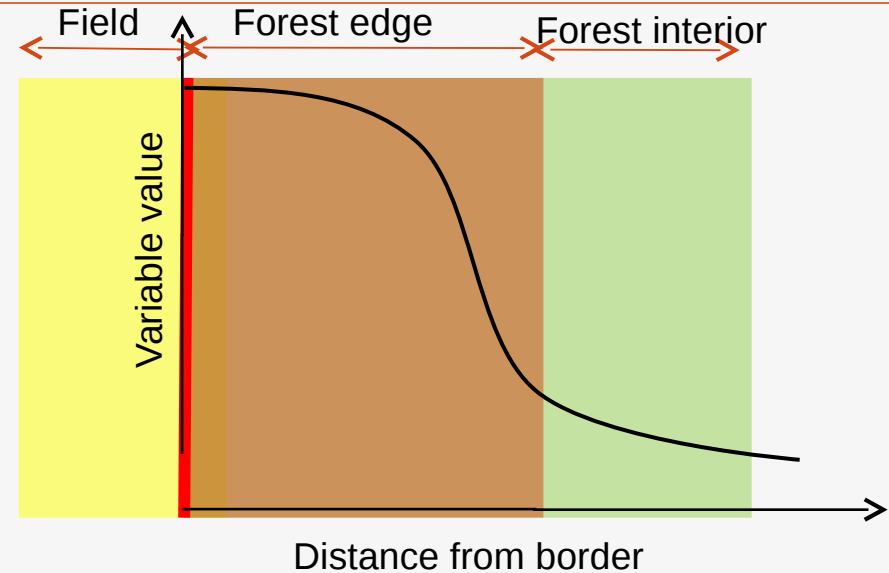
# Forest edges: physical gradients

- Discontinuity of vegetation structure □ heterogeneity
- Gradients of physical parameters



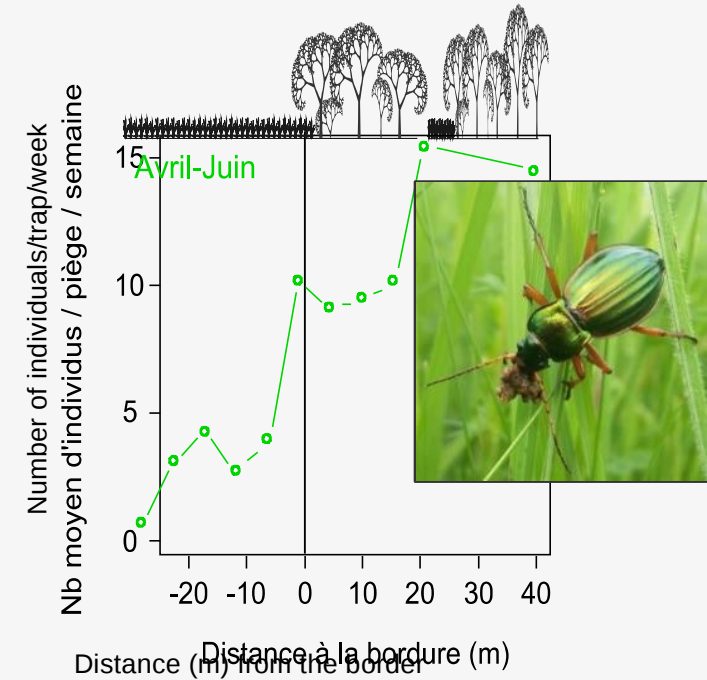
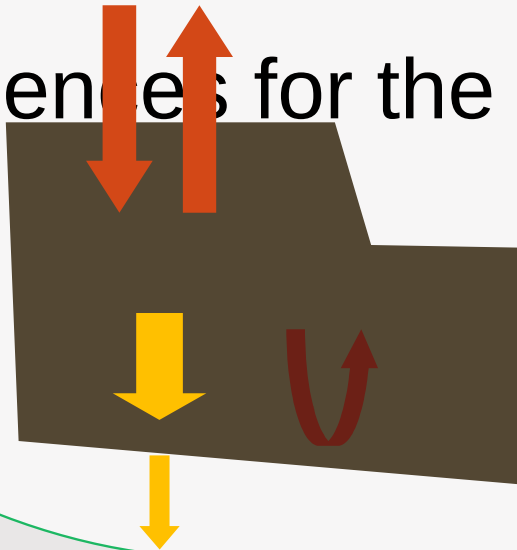
# Forest edges: biological gradient

- Species influenced by physical conditions
- Re-distribution of individuals
- Secondary edge effect
- Biological gradient/heterogeneity



# Forest edges: interfaces between habitats

- Edges influence fluxes of matter, energie, information
- Edges as filters
- Consequences for the adjacent



# Forest edges: are very diverse

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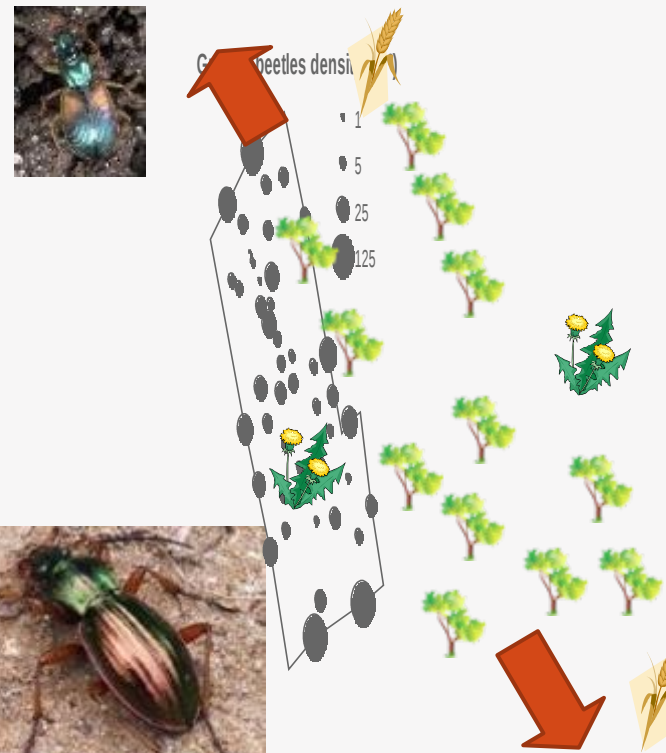
- Many factors influence edge characteristics
- Which one are the most important for edges effects?
- Which one can we modify?

# Forest edges: key role in ecosystem services

- Some fluxes support ecosystem services (or dys-services)
- Modifications of edges may enhance ecosystem

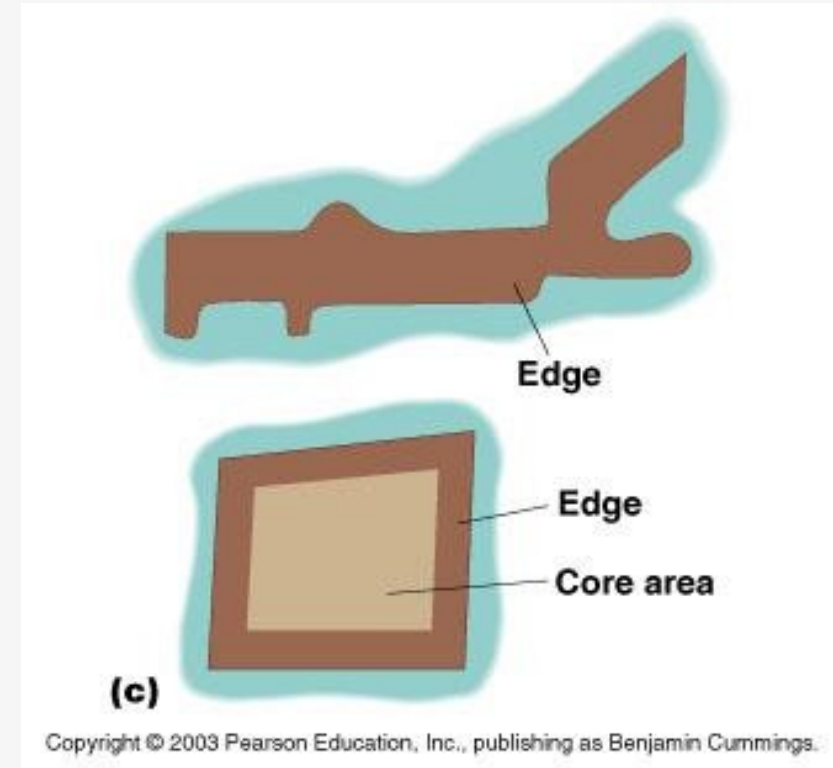


Density of overwintering carabids (m<sup>-2</sup>)



# Forest edges: limits between inside and outside

- At larger scales, edges are limits of forest fragments
- Core area/edge area
- Edge effects at fragment scale are not the same as local edge effect



# Forest edges: a spatially-defined socio-ecological system

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