EuroCoppice

cost EUROPEAN COOPERATION IN SCIENCE AND TECHNOLOGY

COST is supported by the EU Framework Programme Horizon 2020

Coppicing restoration in two contrasting land use situations: effects on biodiversity of vascular plants (and invertebrates)

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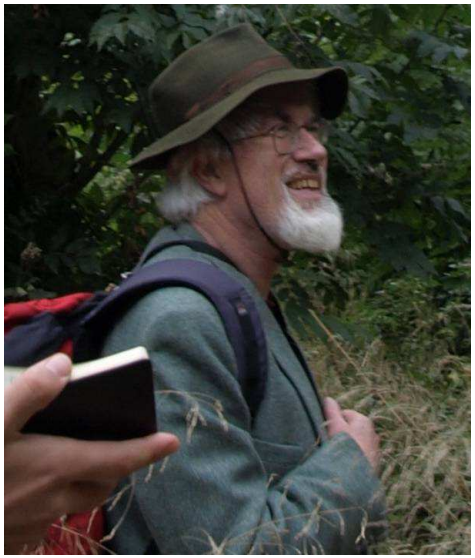
New Phytologist – Two Tansley Reviews on temperate forests



New Phytologist

Review

Tansley review

Ancient woodlands: modern threats

Oliver Rackham

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Received: *22 April 2008*
Accepted: *5 June 2008*

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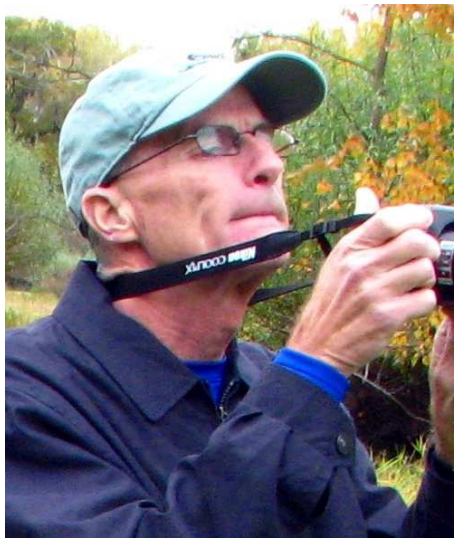

New Phytologist

Review

Tansley review

Forest ecosystems of temperate climatic regions: from ancient use to climate change

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Received: *1 June 2016*
Accepted: *21 August 2016*

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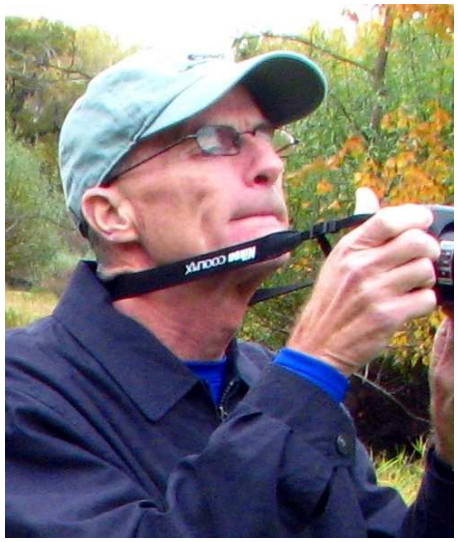

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1. Land use / management
2. Climate change
   - nitrogen excess
   - altered phenology
   - drought / fire

Effects of the past land use

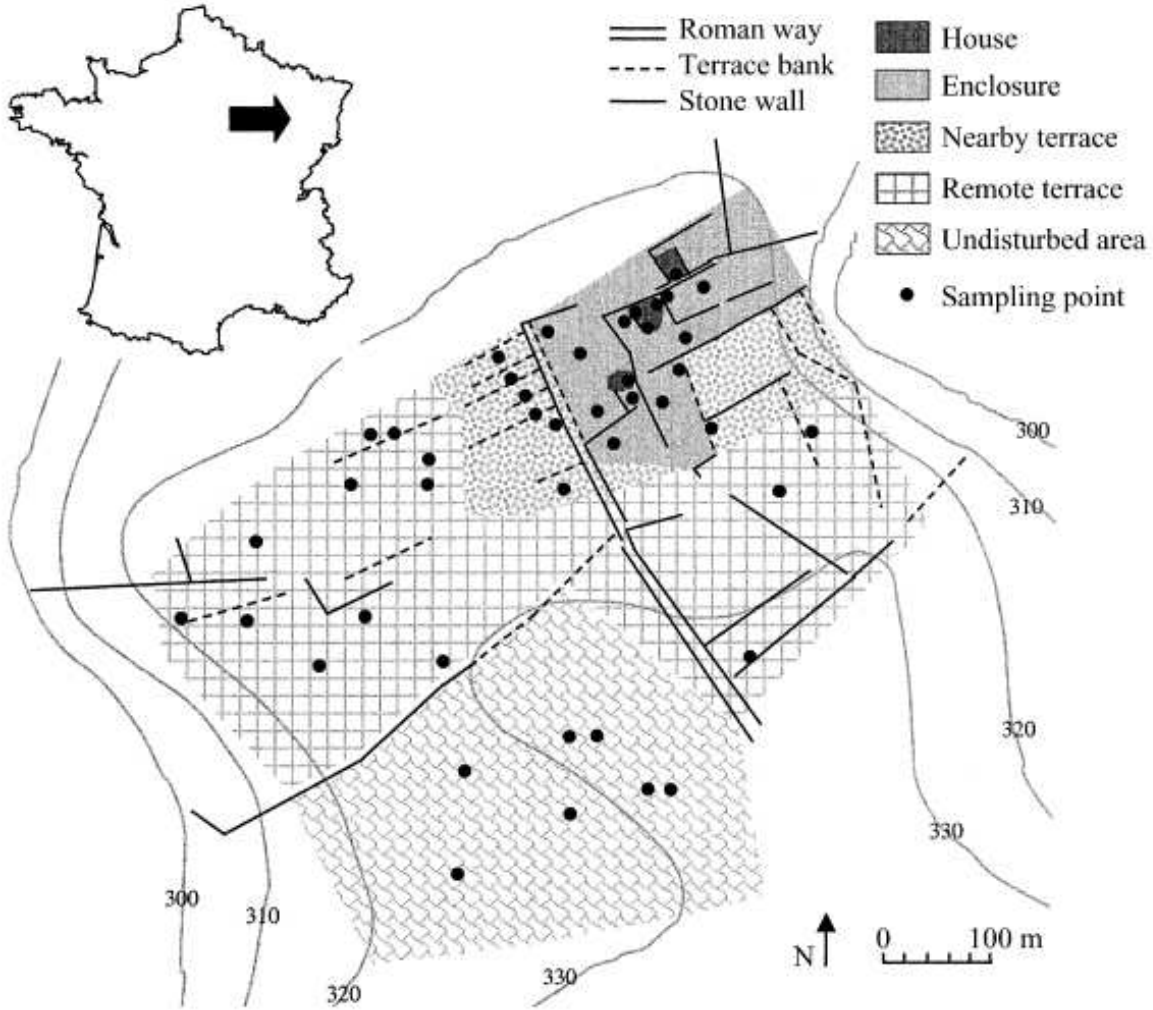


FIG. 1. Map of the site with indications of former land use intensity according to archaeological investigations.

Dupouey et al.
2002
Ecology

NE France

Effects of the past land use

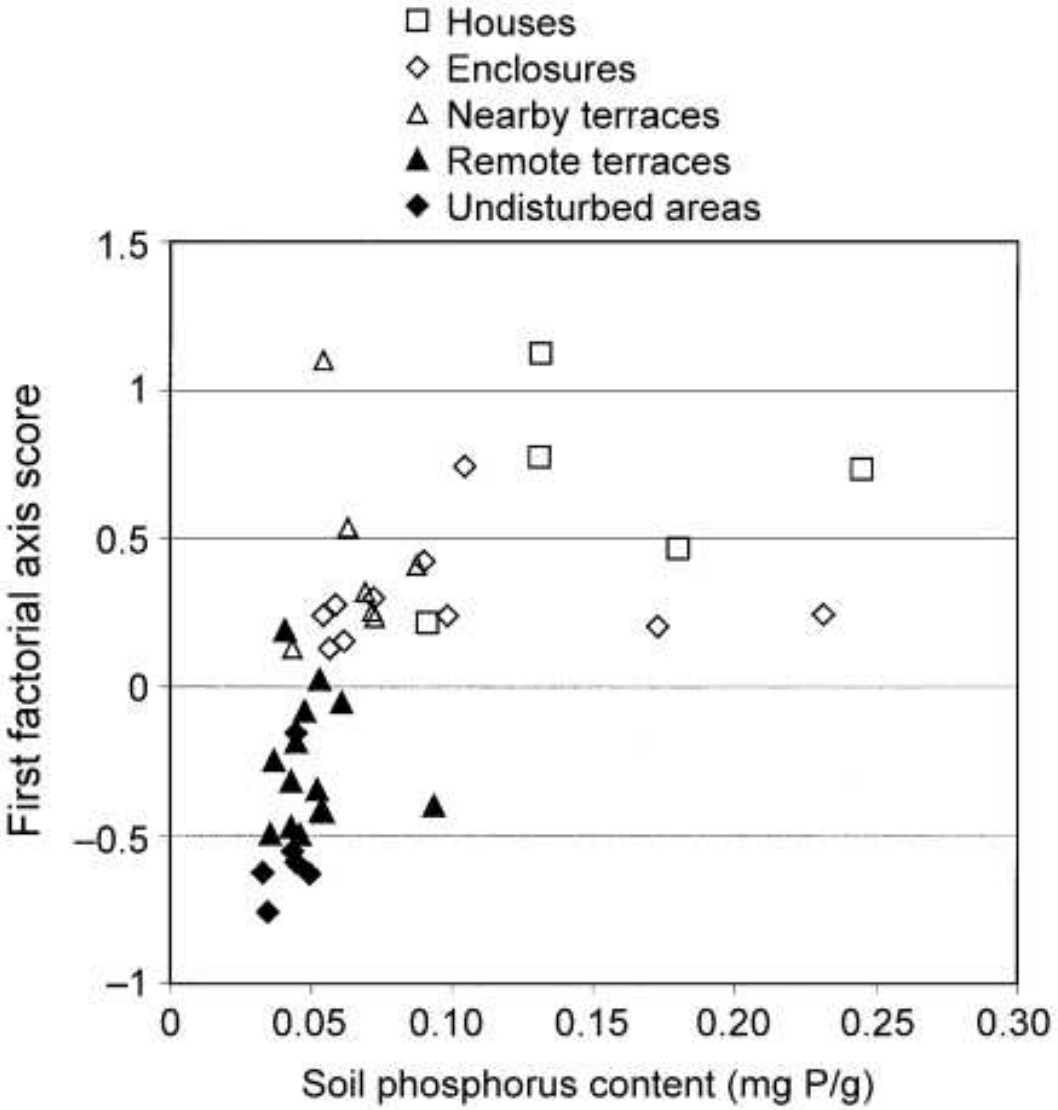


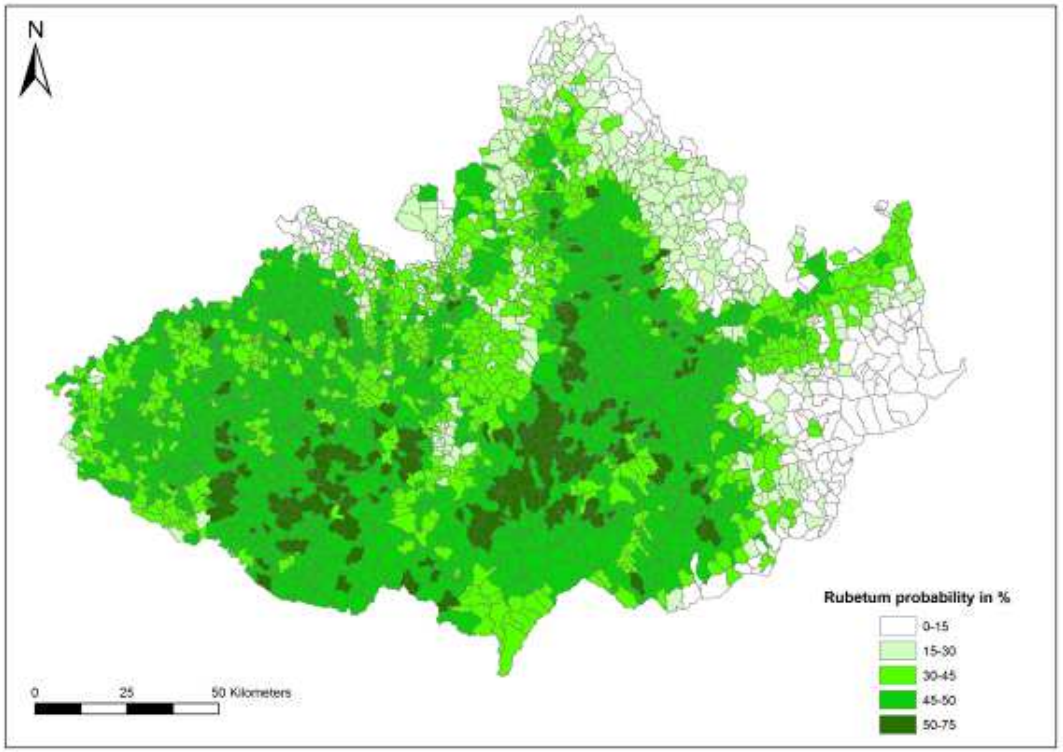
FIG. 3. Position along the first axis of a factorial correspondence analysis of vegetation data vs. soil phosphorus content.

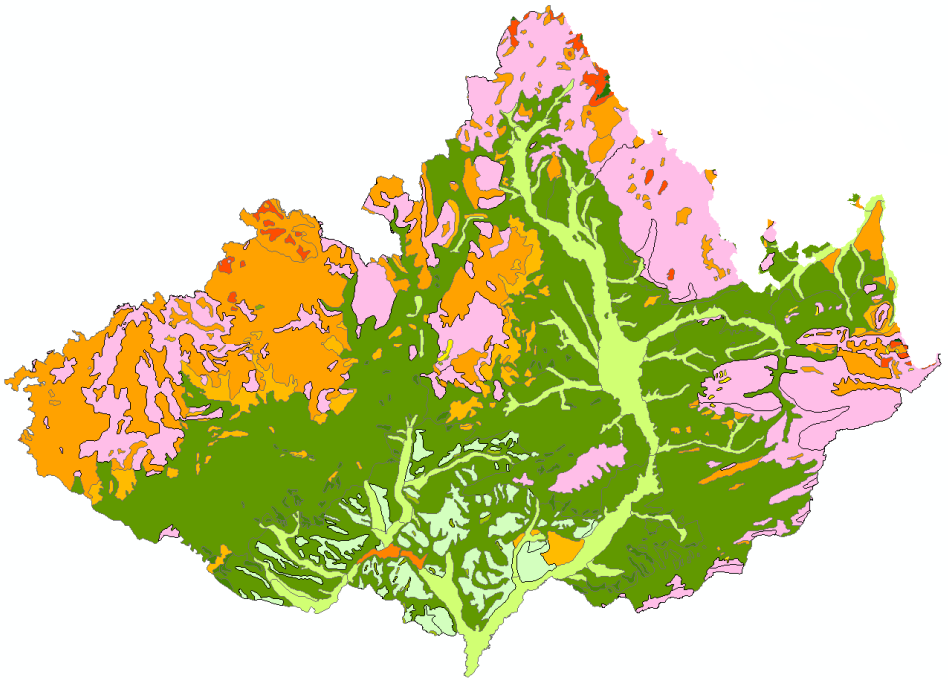
Dupouey et al.
2002
Ecology

NE France

Effects of the past land use

Moravia, Czech Republic
22,349 km^2





coppicing intensity

(modelled probability)

Late Middle Ages

Szabó et al., 2015
J Hist Geography

potential natural vegetation

Oak-hornbeam forest

Acidophilous beechwoods

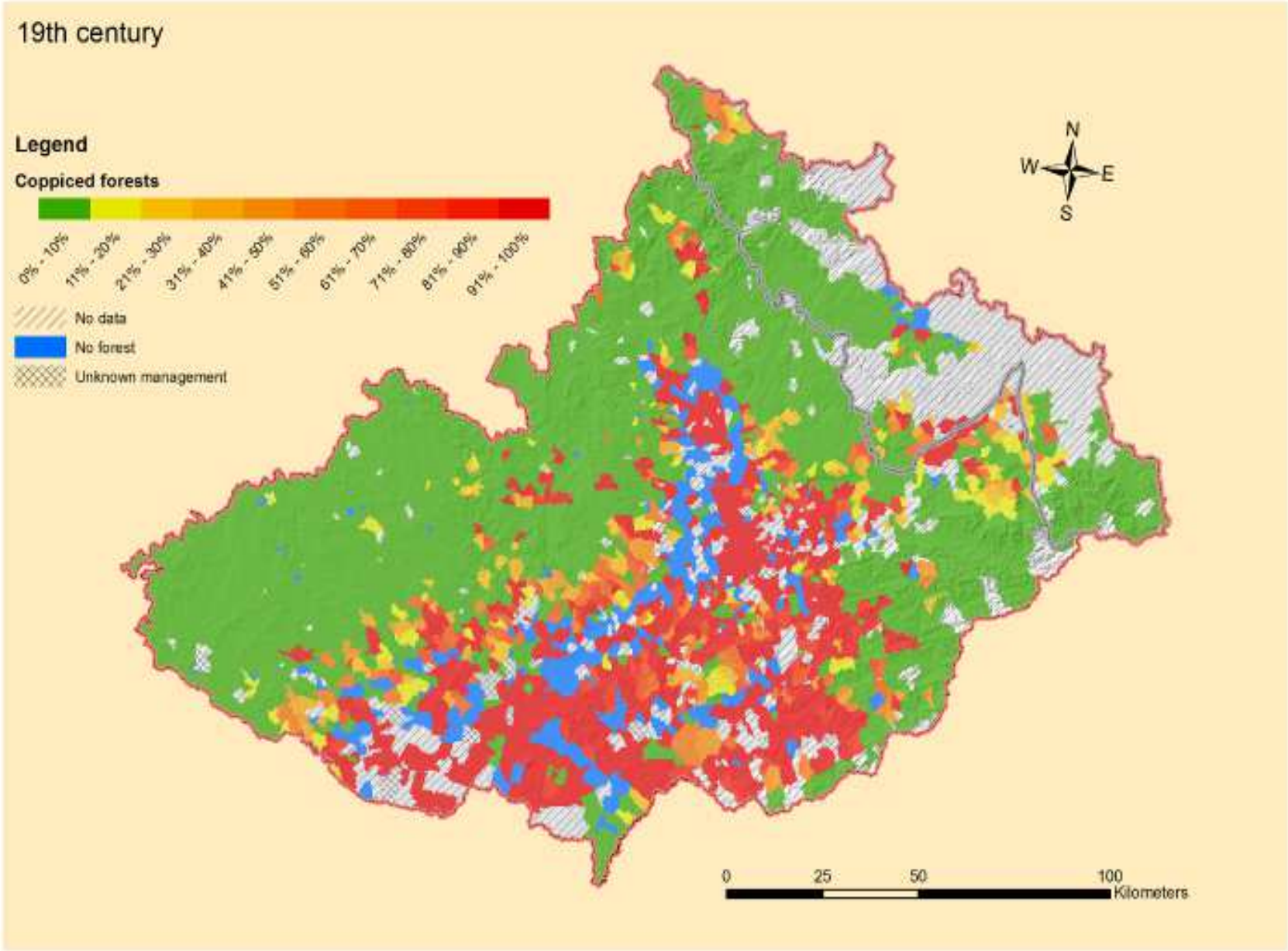
Eutrophic beechwoods

Spruce forest

Coppicing, 19th century

Moravia+Silesia (E-Czech Rep.) 28,000 km^2

Source: historical forest database, www.longwood.cz



Settlement and land use pattern

Banat, SE-Romania

Present-day pattern of coppicing vs. high forest

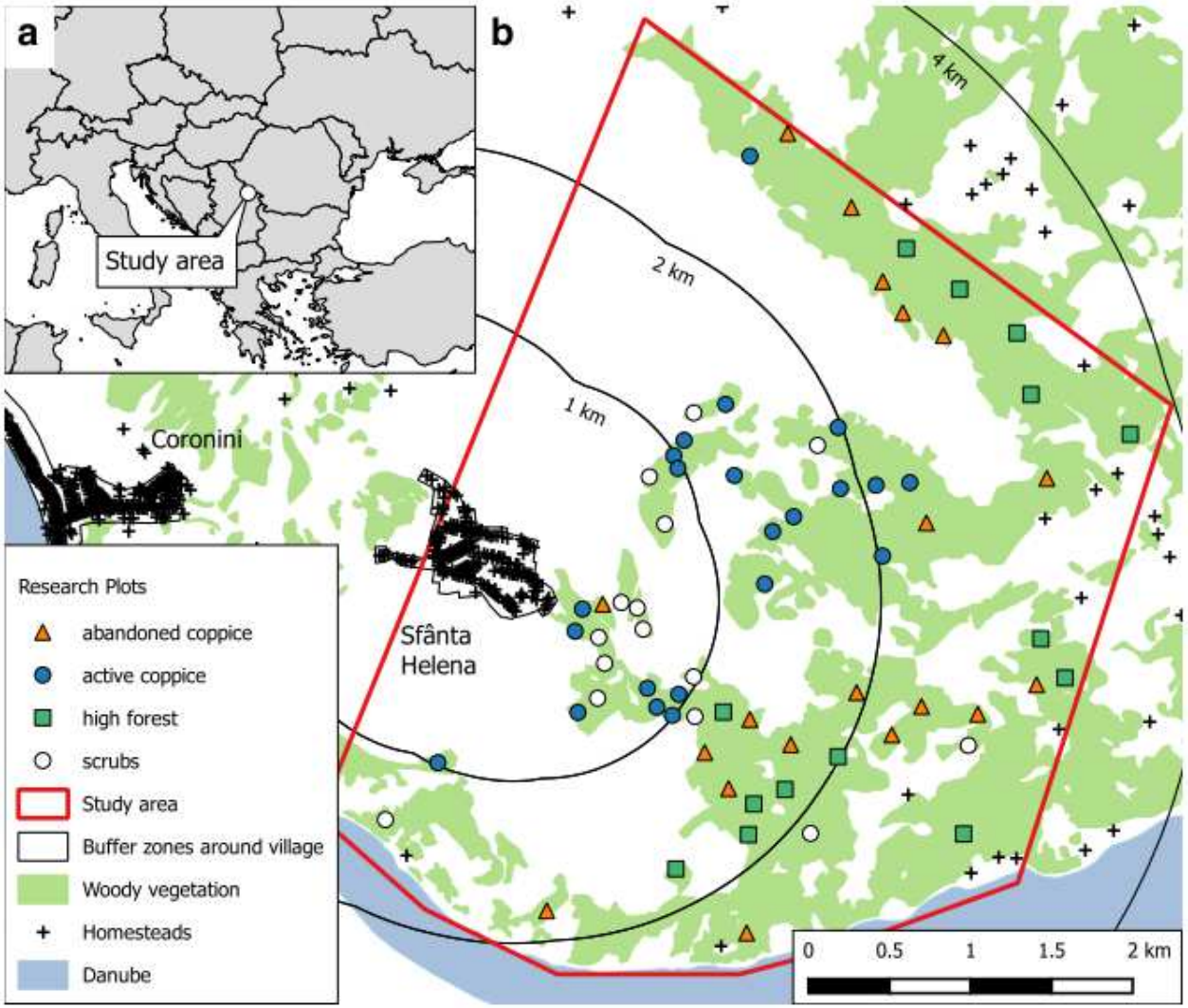
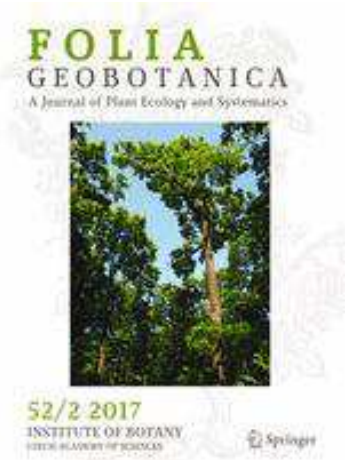


Fig. 1 **a** – Location of the study area. **b** – Location of research plots within woody vegetation in the study area. Classification of research plots into structural woody vegetation types is shown using different symbols.

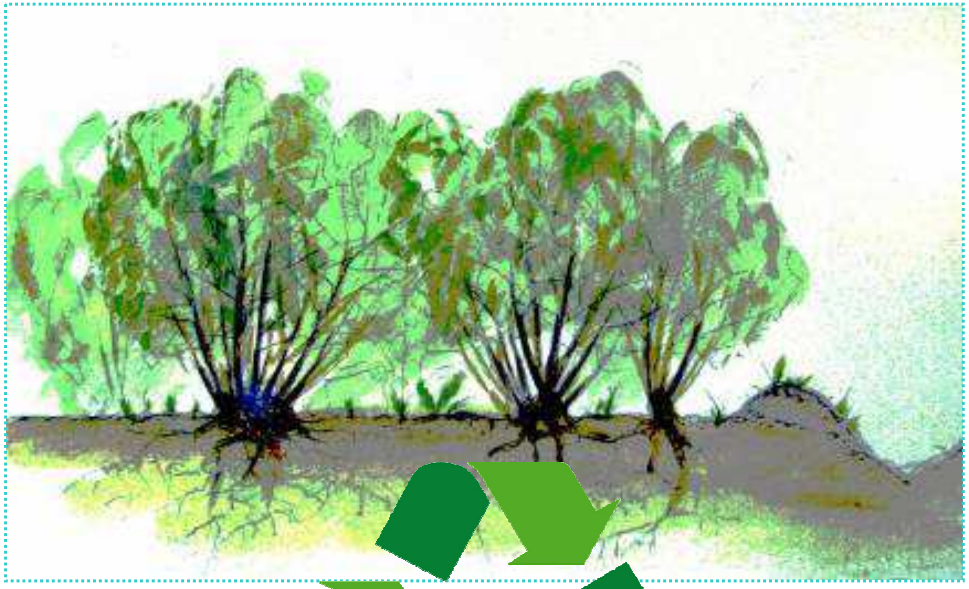


Volařík et al. 2017
Folia Geobotanica
S.I. Coppicing

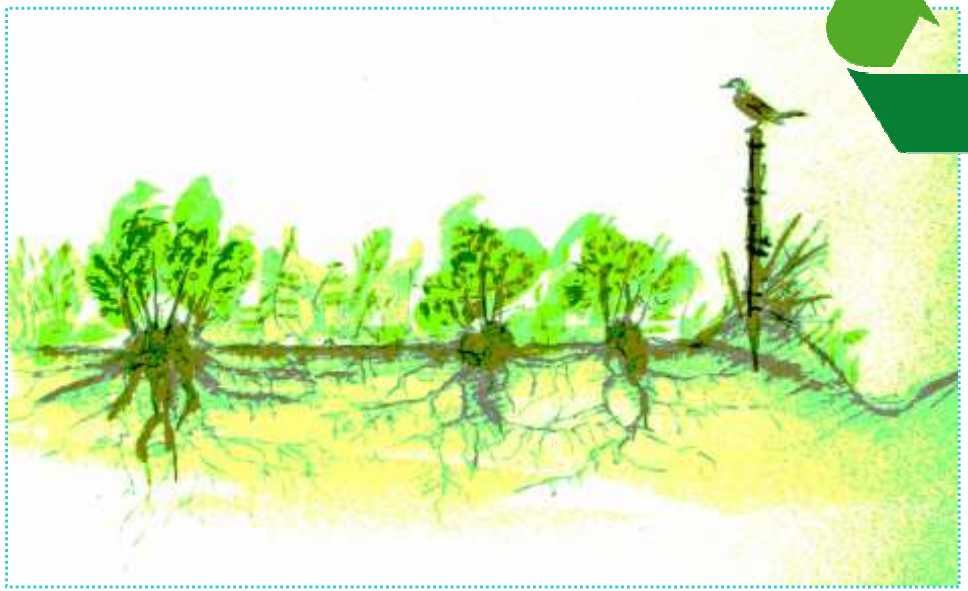
Coppicing

Short-rotation forest management system utilizing natural resprouting ability of (deciduous) tree species

1300s
7 years



1800s
40 years



Coppicing in European forests

- coppicing was extremely important in the past
- highly effective systems run for centuries
- abandoned in 19-20th centuries in many countries
  (UK, Germany, Czechoslovakia)
- coppicing abandonment had negative effects
  on biodiversity
- current efforts for coppicing restoration
  (IUFRO, EU, national level)

Main venues of coppicing research in ecology

1. Long-term legacy of coppicing at the landscape scale

2. Consequences of coppicing abandonment in the 20th century

3. Effects of coppicing restoration


Herbaceous understory
9 species


Herbaceous understory
4 species (1 invasive)

Forest herbaceous vegetation

- all non-woody vascular plant species
- technically all vascular plants lower than 1-1.3 m
- present in boreal, temperate and tropical forests

1. Plant community diversity concentrates here.

2. Impact on regeneration of woody species.

3. High rate of nutrient cycling.

4. Reflects habitat history (landscape and local levels).

5. Sensitive indicator of environmental changes.

Gilliam F.S. (2007) BioScience

Abandoned coppice, Děvín, SE Czech Republic
Age ~40 years

Increasing forest age in the past two centuries

forestry maps, Děvín, ca. 380 ha

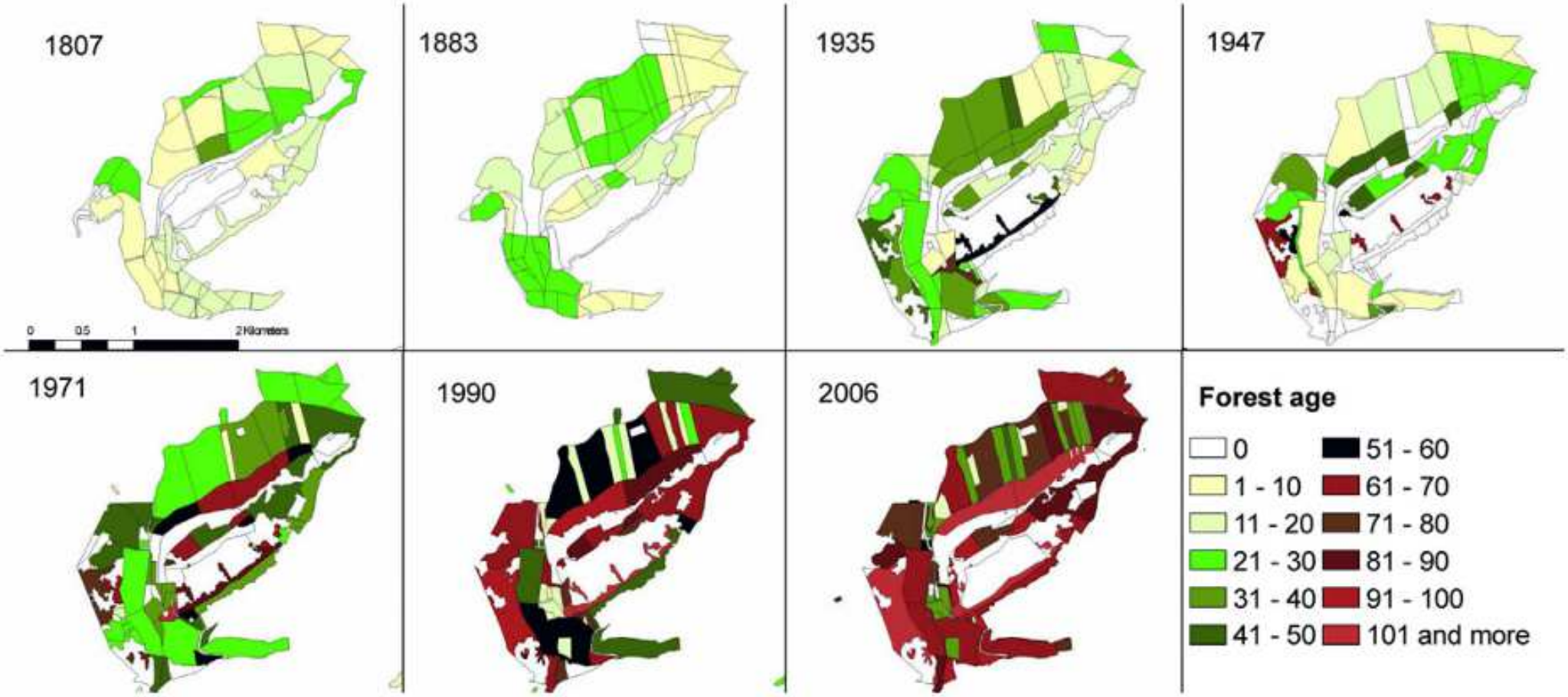
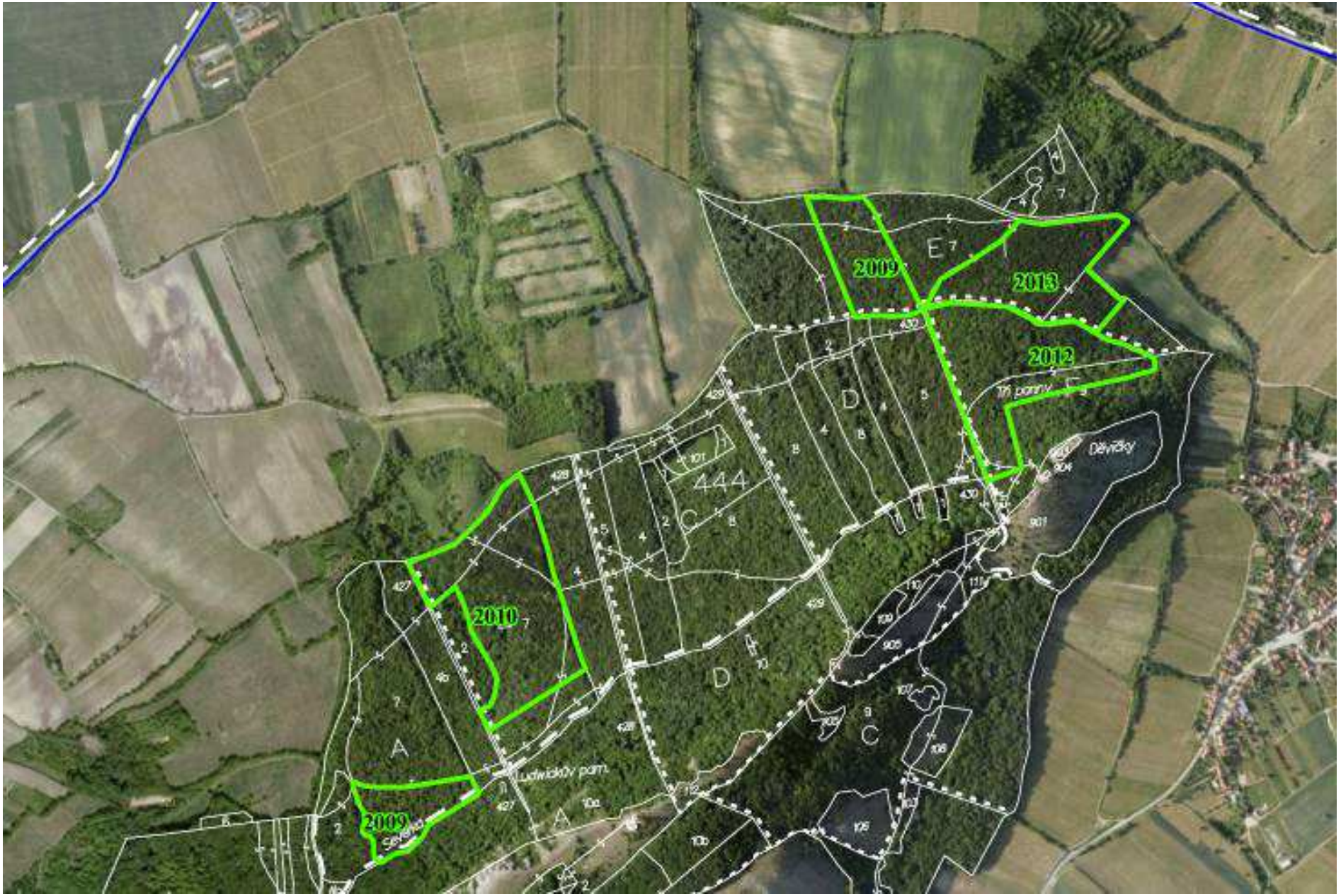


Fig. 6. Aging of Děvín Wood throughout 200 years.

Müllerová, Szabó, Hédl
2014 Forest Ecol Manag

Coppicing restoration – ancient forest

2008-2016 Děvín, ca. 380 ha

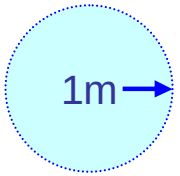


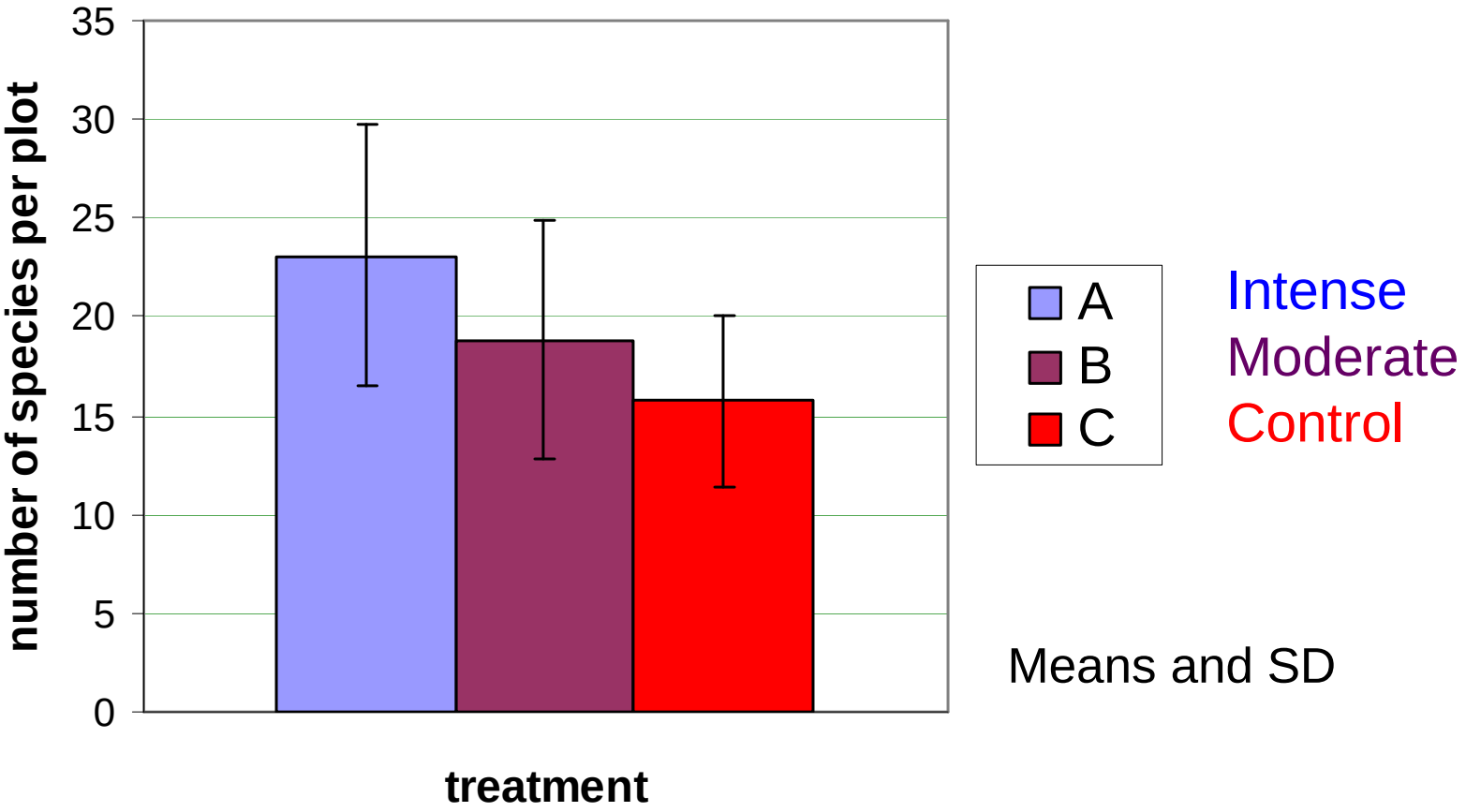
Coppicing restoration – ancient forest

2008-2016 Děvín

Three types of coppice restoration intensity

135 plots in a nested design, plot size 3.15 m^2





Means and SD

Coppicing restoration – ancient forest

2008-2016 Děvín

Three types of coppice restoration intensity

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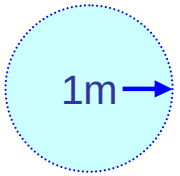
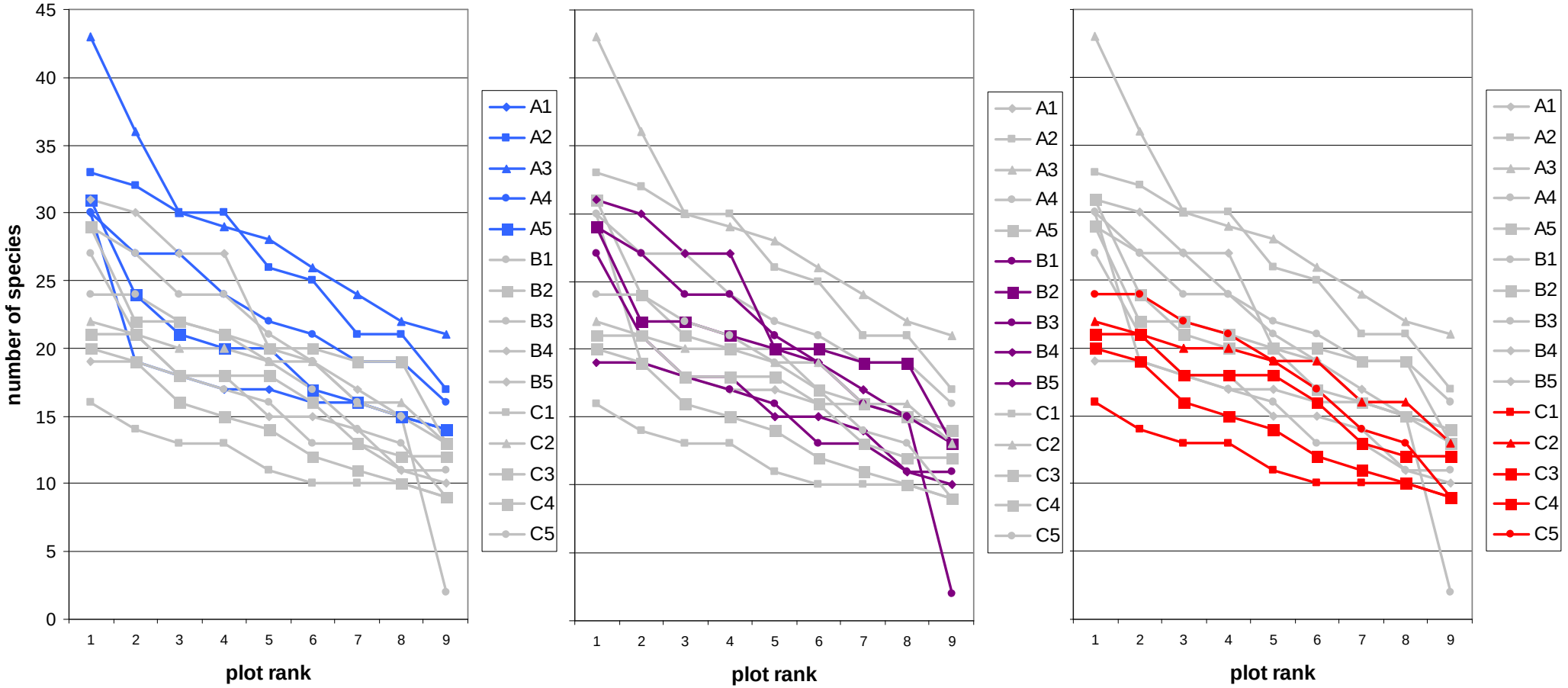


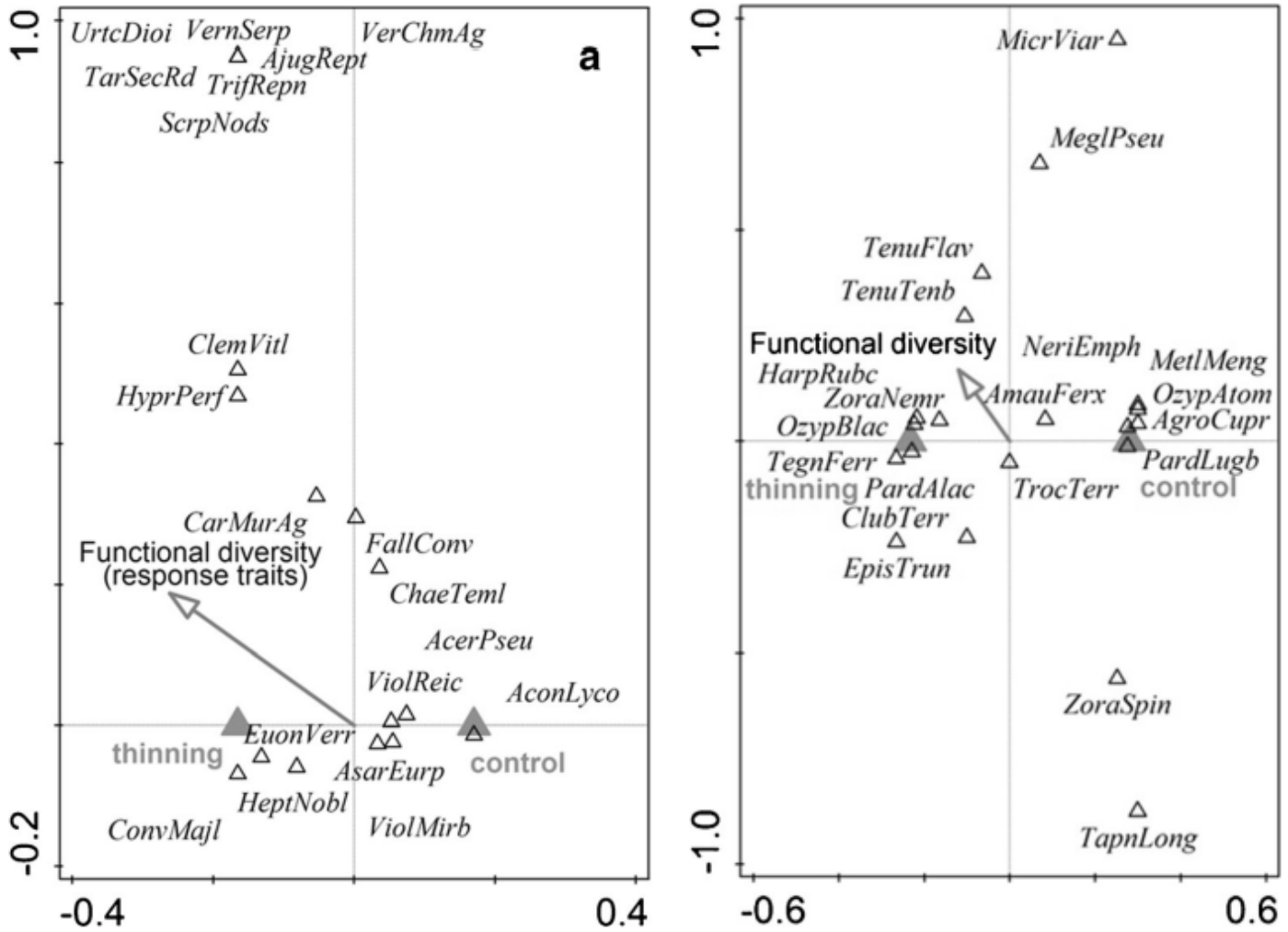


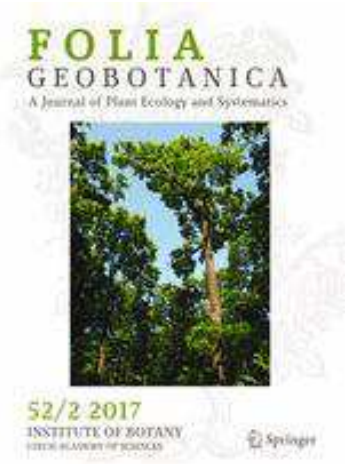
Intense Moderate Control

Coppicing restoration – ancient forest

2008-2010 Děvín

- Functional diversity of both vascular plants and spiders is positively correlated with coppicing restoration
- CCA with compositional patterns and functional diversity





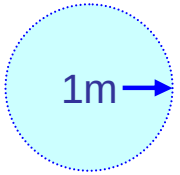
Šipoš et al. 2017
Folia Geobotanica
S.I. Coppicing

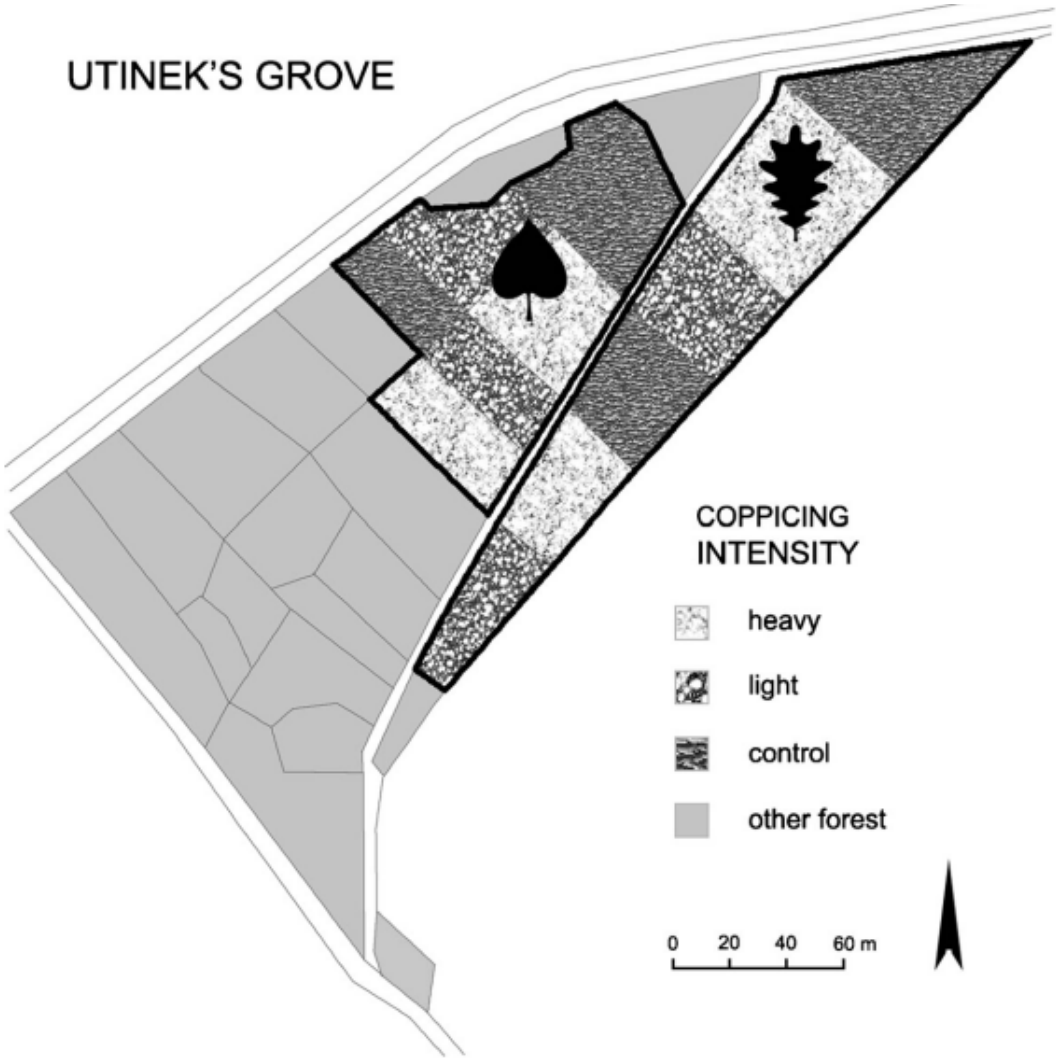
Coppicing restoration – secondary forest

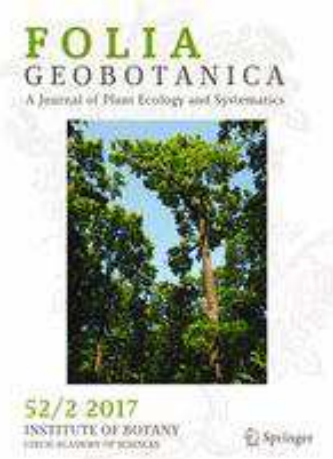
2012-2015 Utinek's Grove

Three types of coppice restoration intensity

48 plots in a nested design, plot size <u>3.15 m^2</u>







Hédl et al. 2017
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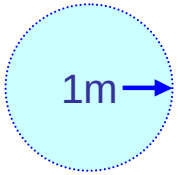
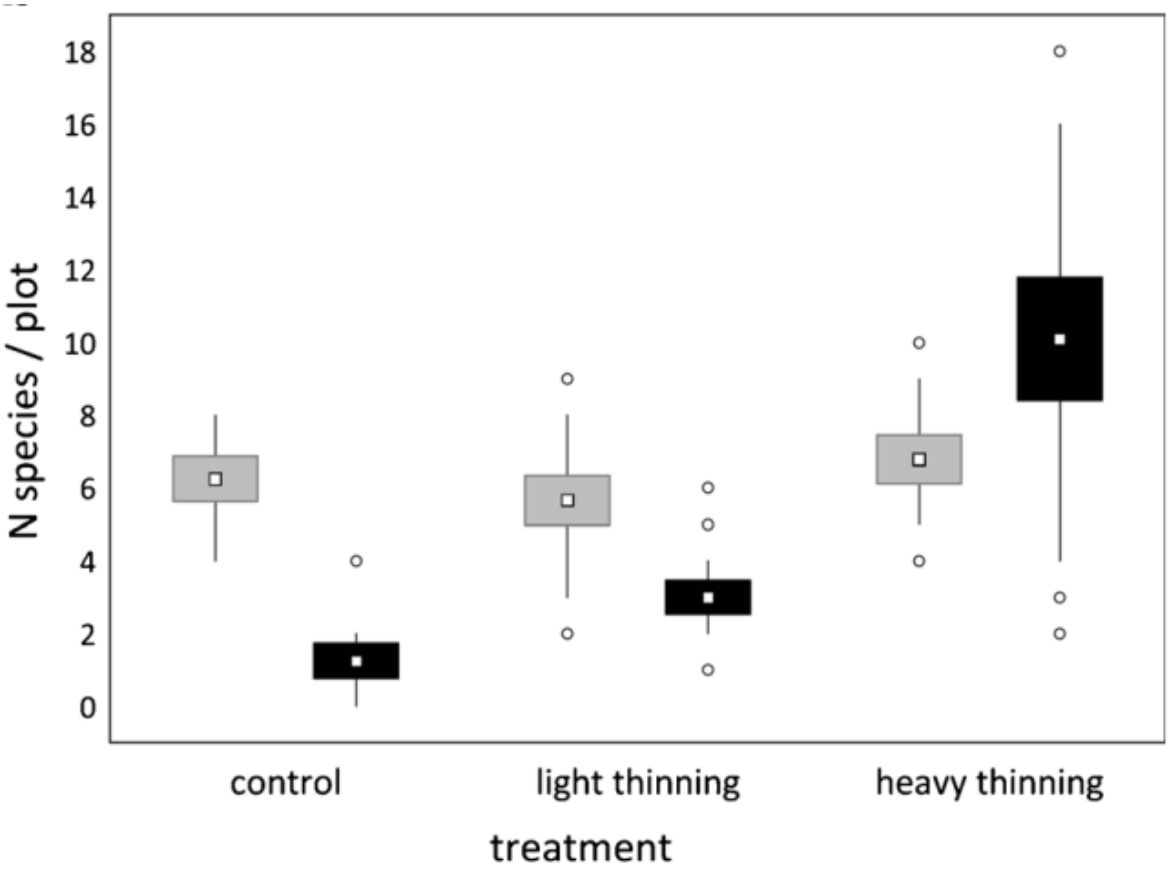
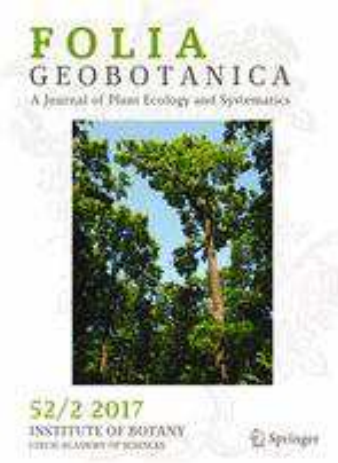




Lime (Tilia cordata)

Oak (Quercus petraea + robur)



Hédl et al. 2017
Folia Geobotanica
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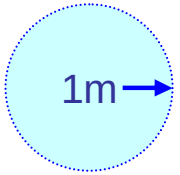
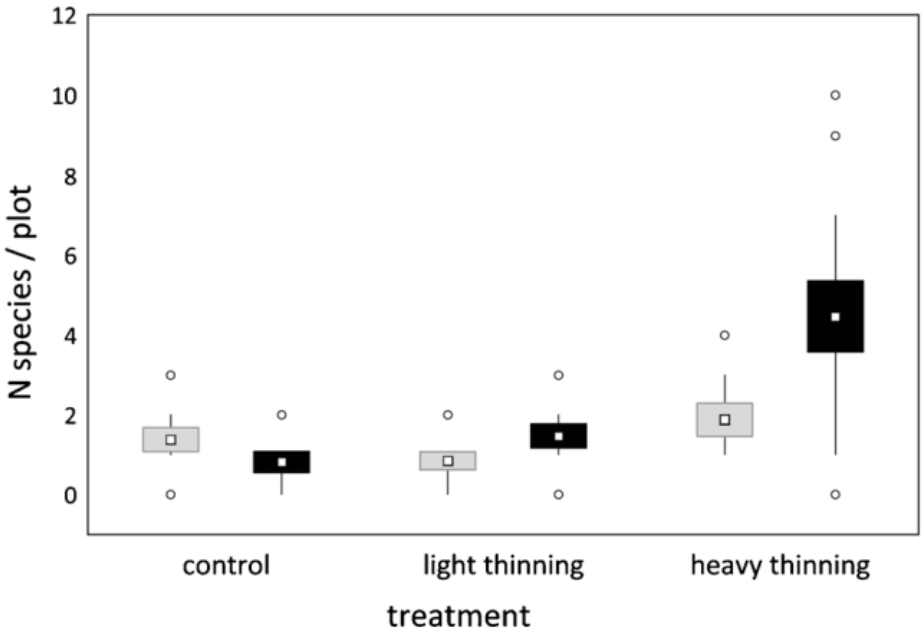
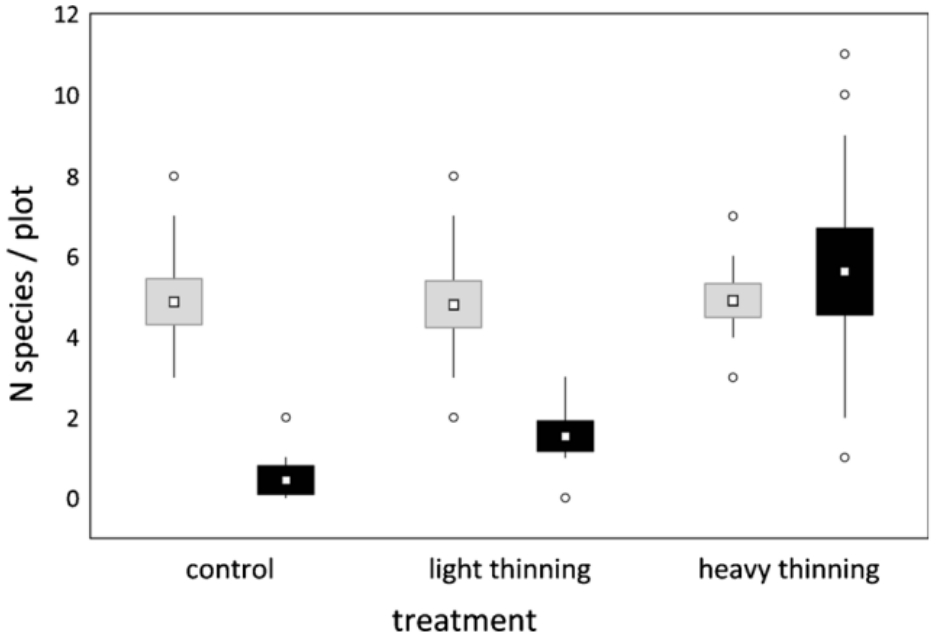






Short-lived
(weeds)

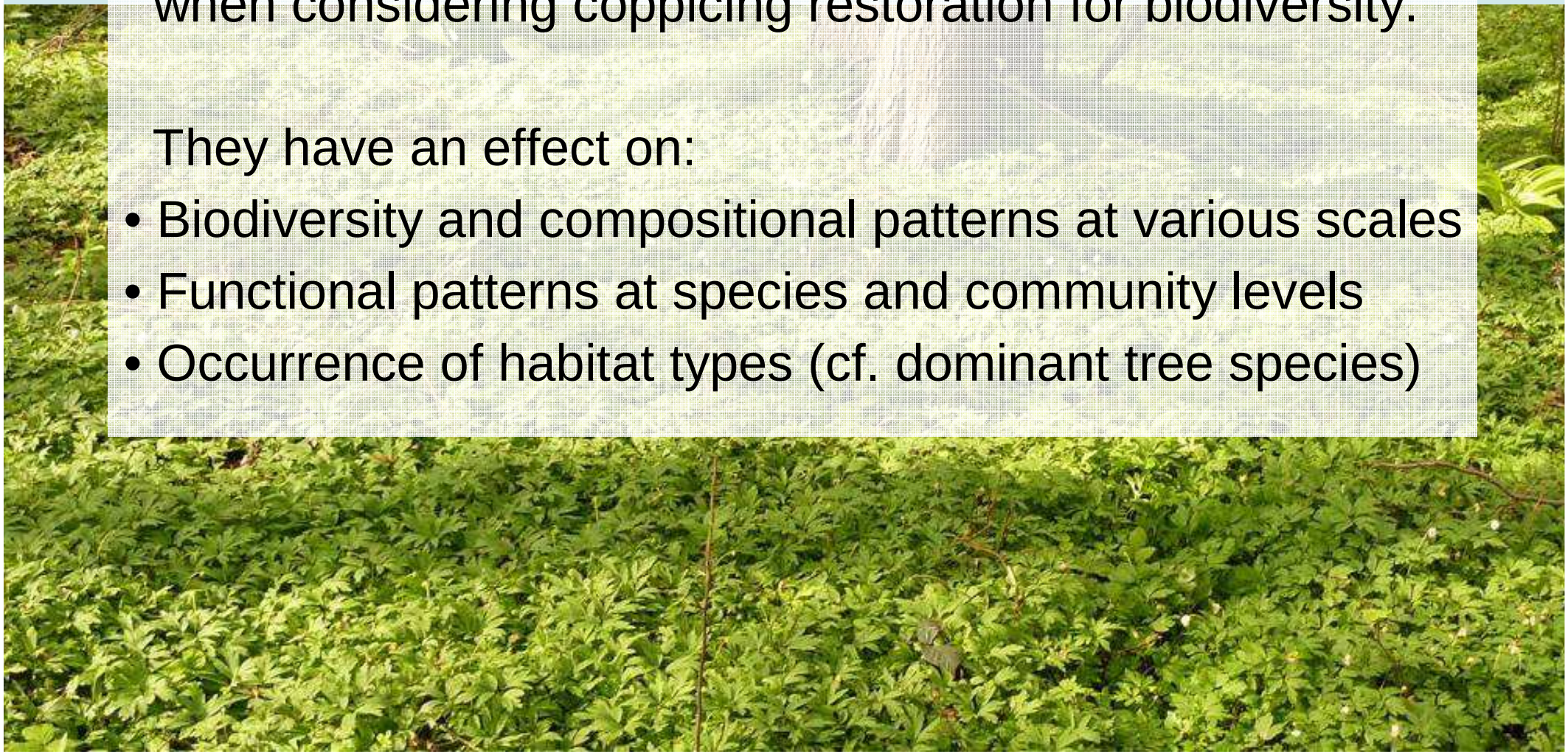
Long-lived
(perennials)

Conclusions

Land use history and management intensity DO matter, when considering coppicing restoration for biodiversity.

They have an effect on:

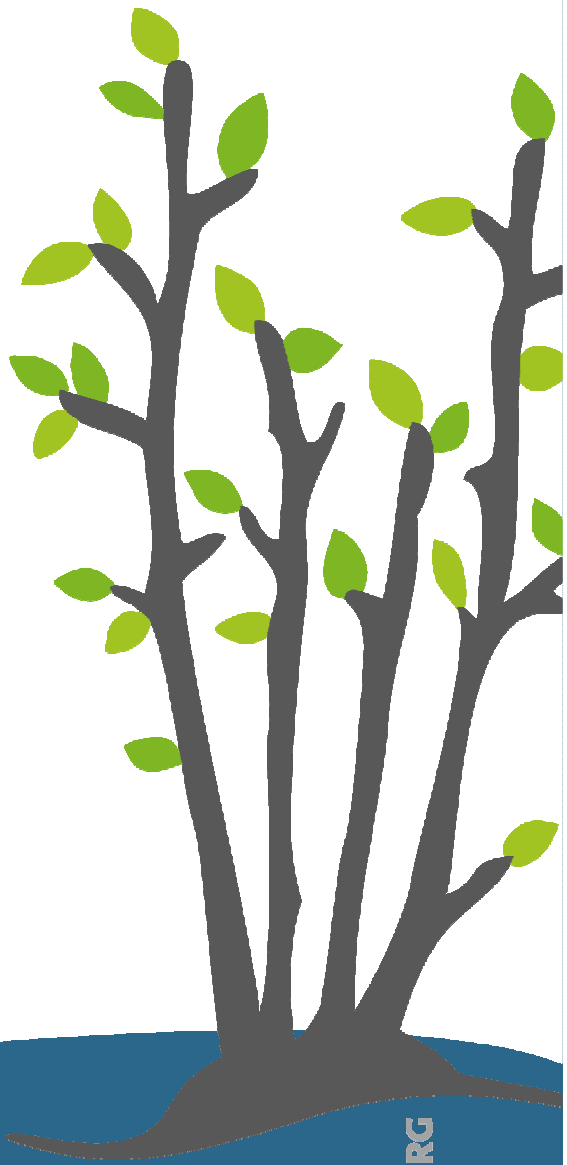
- Biodiversity and compositional patterns at various scales
- Functional patterns at species and community levels
- Occurrence of habitat types (cf. dominant tree species)



COST Action FP1301 EuroCoppice

Innovative management and multifunctional utilisation of traditional coppice forests – an answer to future ecological, economic and social challenges in the European forestry sector

… Thank you!



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Session 82 a/b - IUFRO 125th Anniversary Congress, Freiburg, Germany
15:00 – 19:30, Tuesday Sept. 19th, 2017

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COST is supported by the EU Framework Programme Horizon 2020

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