Flanders
State of the Art

Restoration of coppice-with-standards management

Effects on ground vegetation and bryophytes

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NATURE AND FOREST

EuroCoppice

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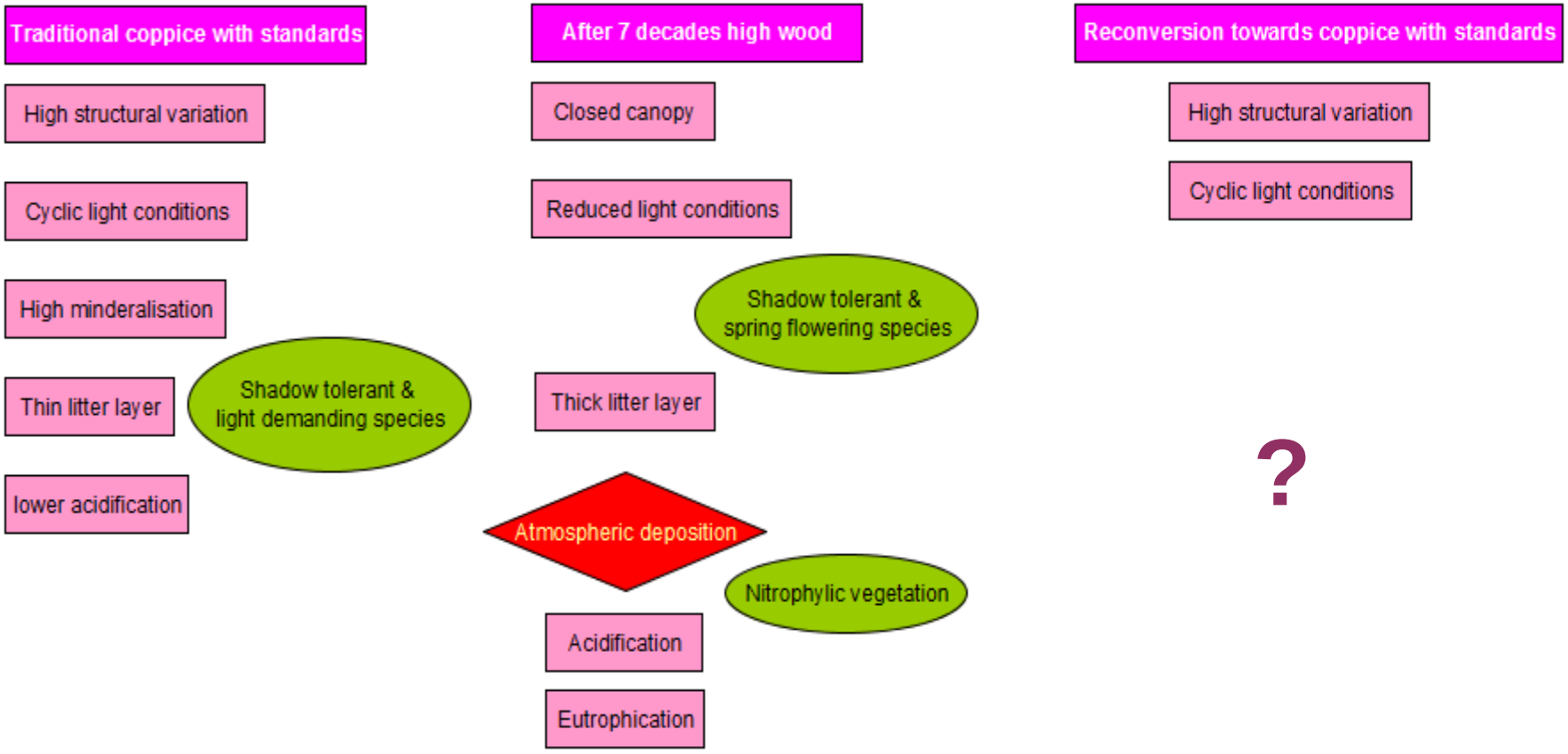
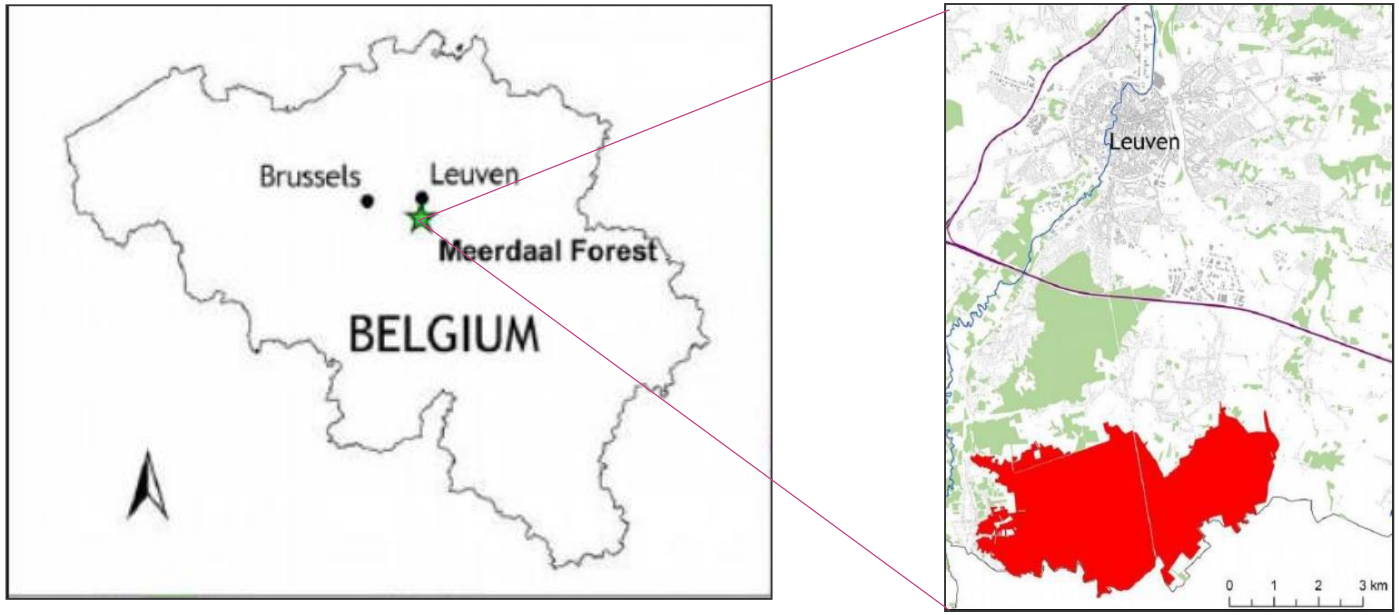
Outline

- Introduction
- Restoration project
  - → Aims
  - → Method
  - → Results
  - → Discussion
- Conclusions

Introduction

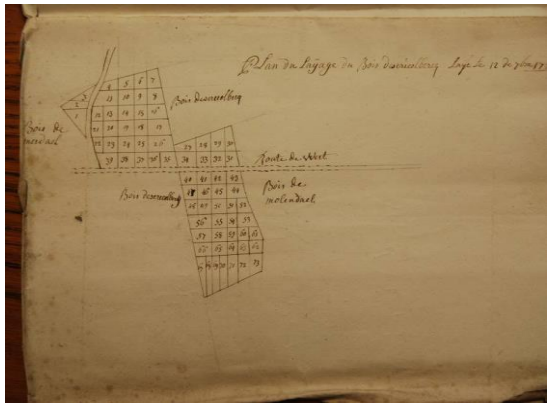


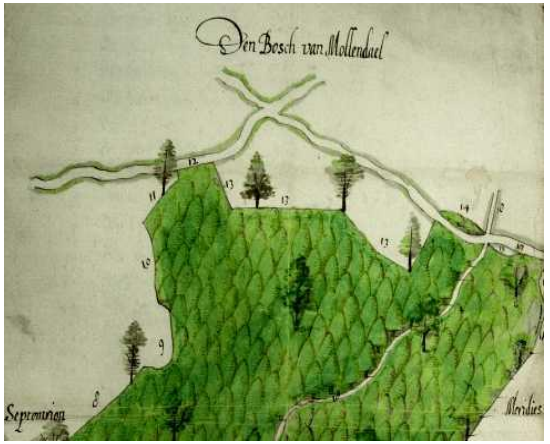
Introduction: Meerdaalwoud



Introduction: Long tradition of CwS

- Coppice with standards
  - → Cutting cycle: 20 -> 14 yrs
  - → Coppice
    - × Hazel, some Hornbeam, Maple
  - → Reduced importance of coppice over time
  - → Standards
    - × Important position Oak
    - × G: 15-20m² in 19th century
- Gradual conversion to high forest
  - → Since 1940's
  - → Relative high basal area (30-35m²)



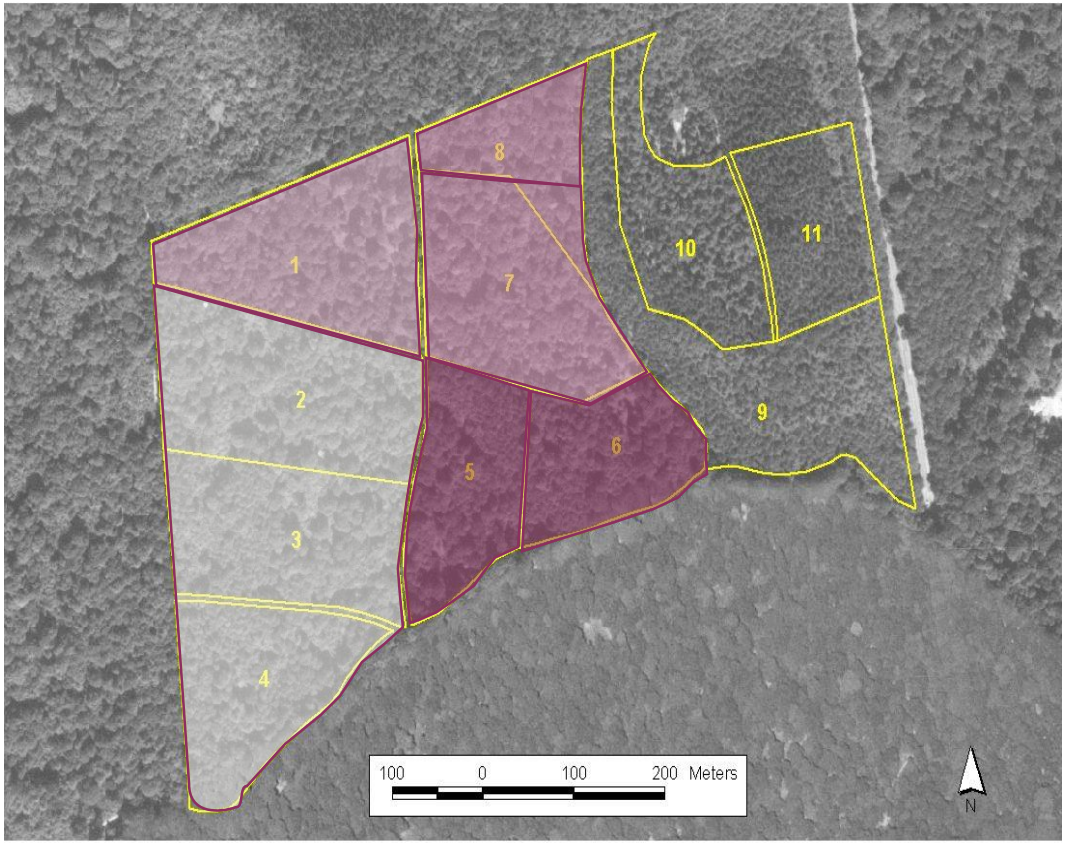


Vandekerkhove et al. 2016, iForest – Biogeosciences and Forestry 9, 509-517

Restoration project: Aims

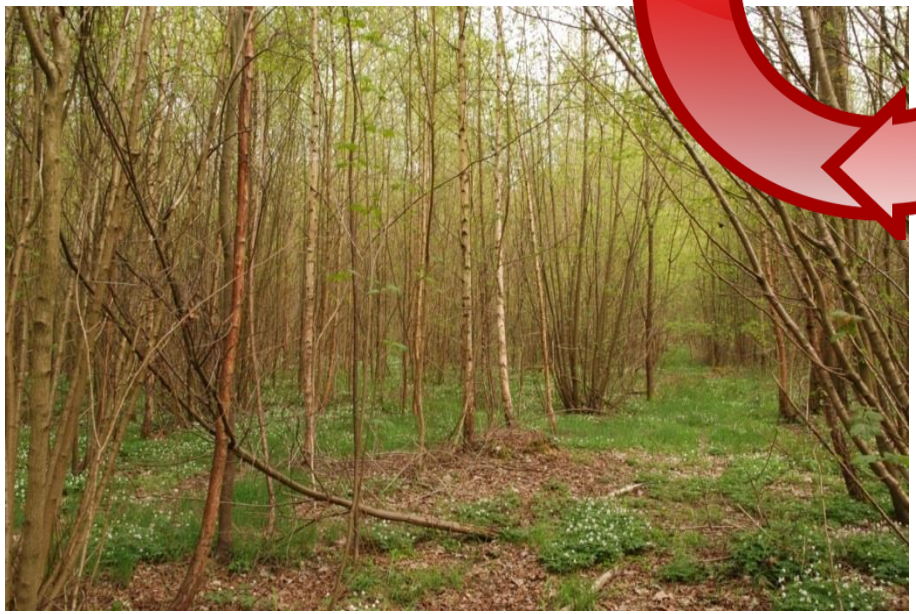
- Restoration project
  - → Cultural heritage
  - → Silvicultural values
  - → Specific nature values related to CwS*
- Research question
  - → Can conversion of High forest to Coppice-with-standards restore the original flora?
    - × Winners – losers?
    - × Vascular plants and bryophytes

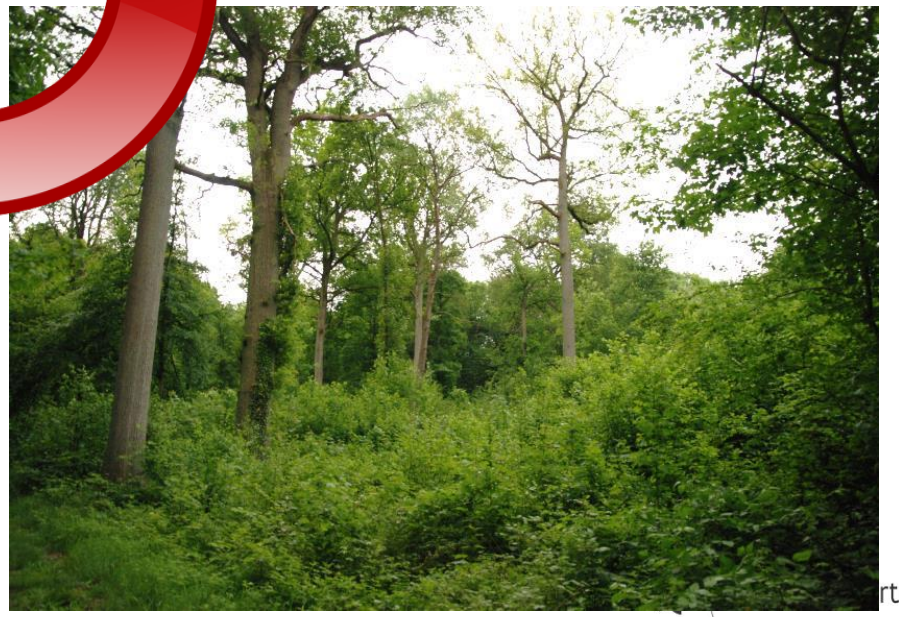
Restoration project



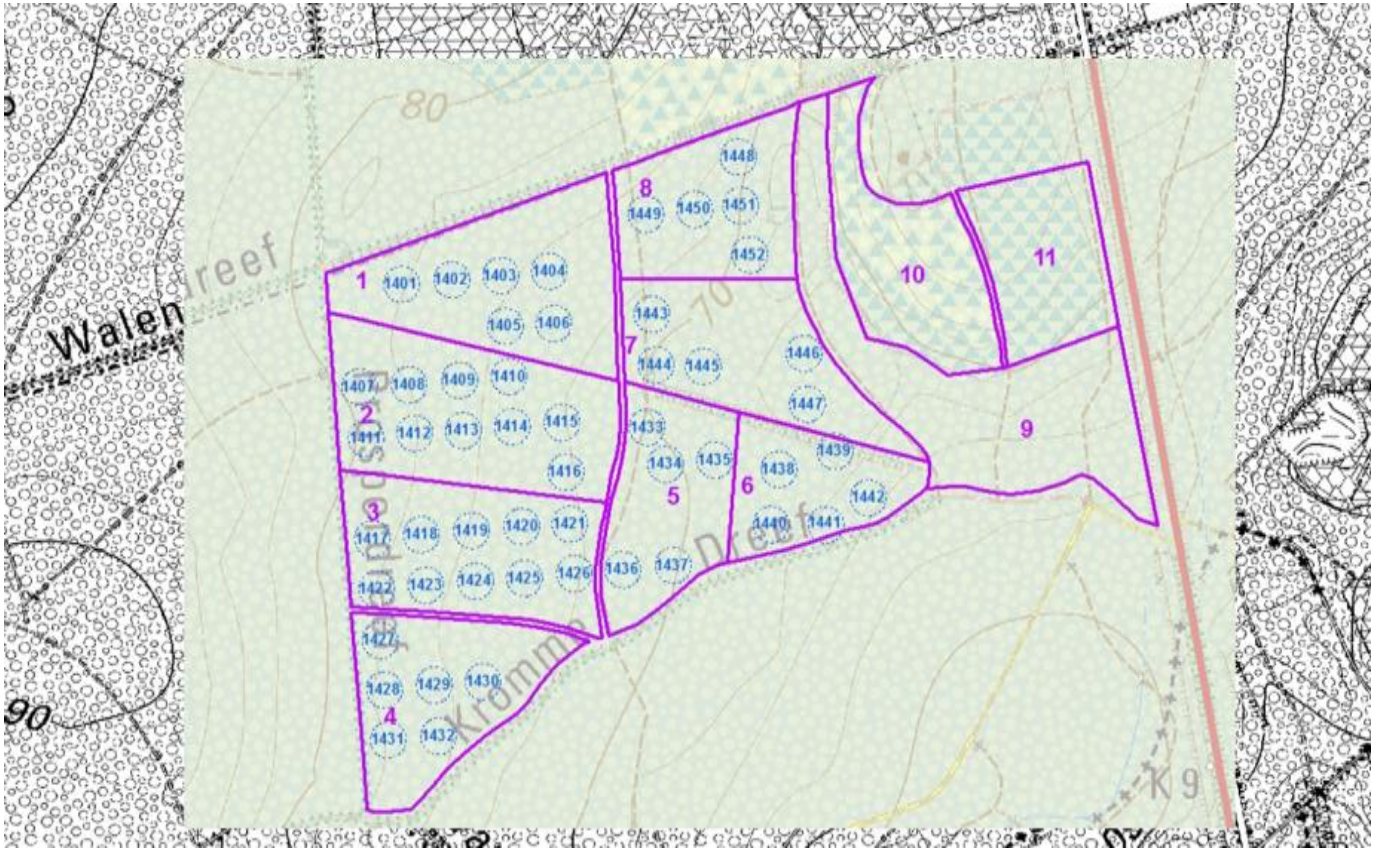
8 coupes of 2-3 ha; cutting cycle 16 years

Experimental set-up chronosequence





Restoration project: experimental set-up



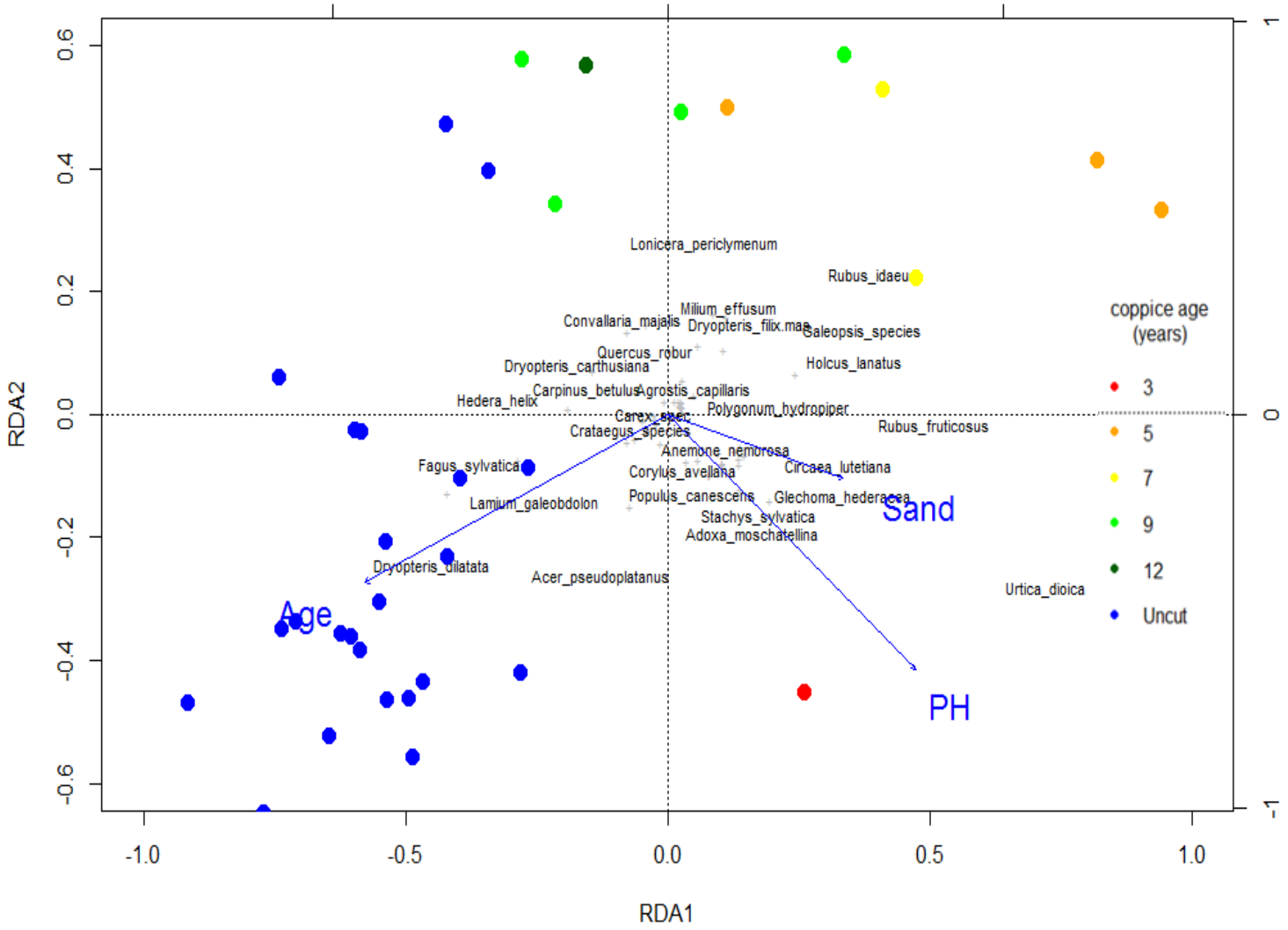
Systematic random sampling on Grid 50x50
Circular plots : min 5 per coupe.

Experimental setup

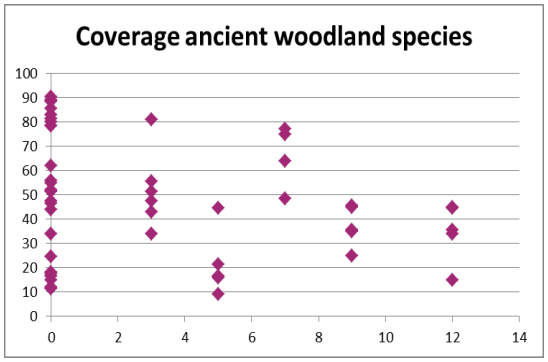
- Within each circular plot
  - → Vegetation relevee (16x16m square)
  - → Dendrometry
  - → Light: fish-eye photography
  - → Soil sample
  - → Bryophytes : 2 subplots/circle
    - × Presence of bryophyte spp.
      - → Dead wood
      - → Living wood (stem bases)
      - → Litter
- Selection relevant environmental factors: Permanova
- Ordination
- Linear regression

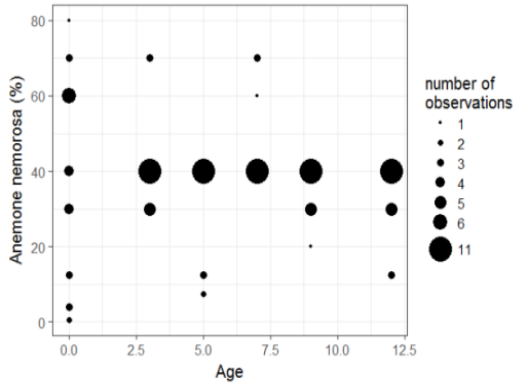
Results Coppice with Standards then and now

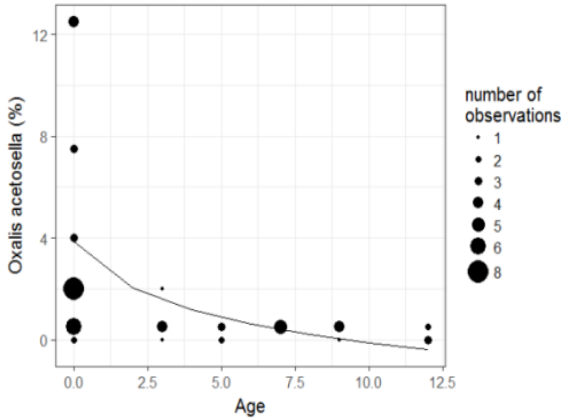
Results herb layer

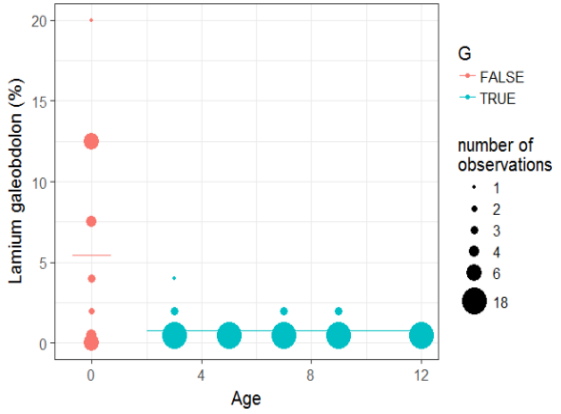


Herb layer

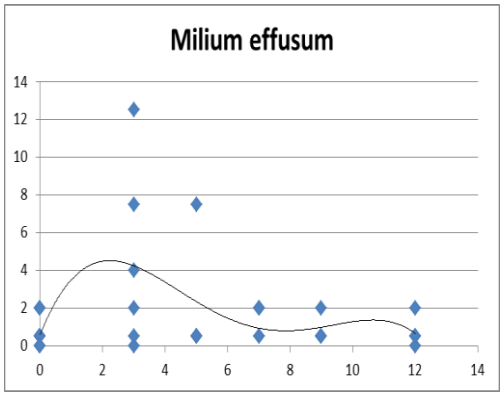


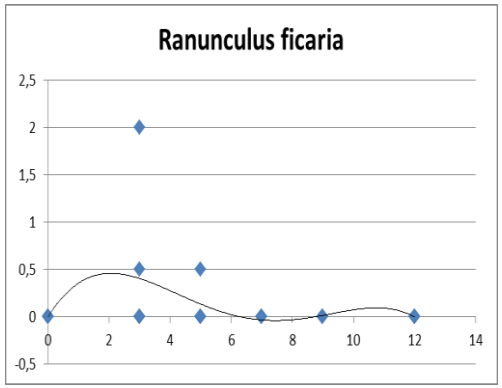


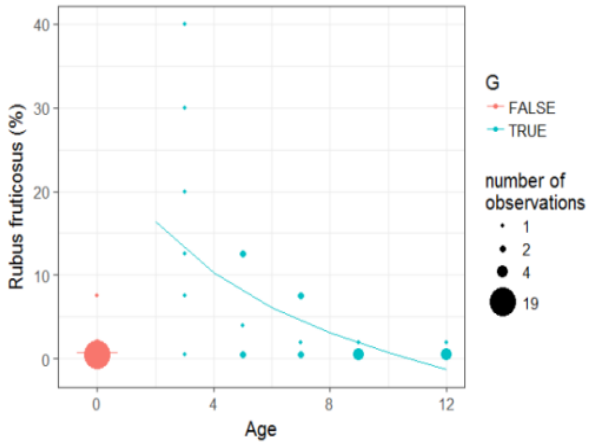


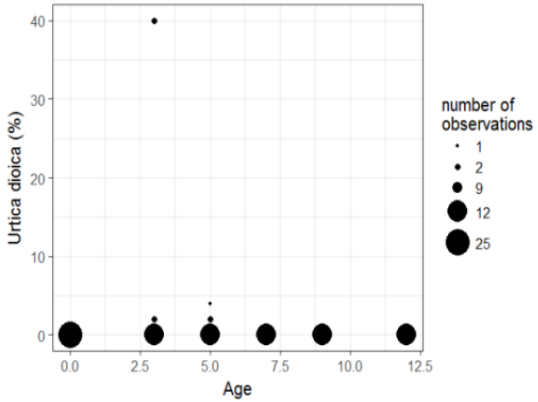


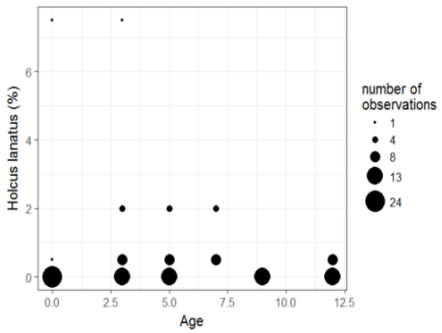
Herb layer





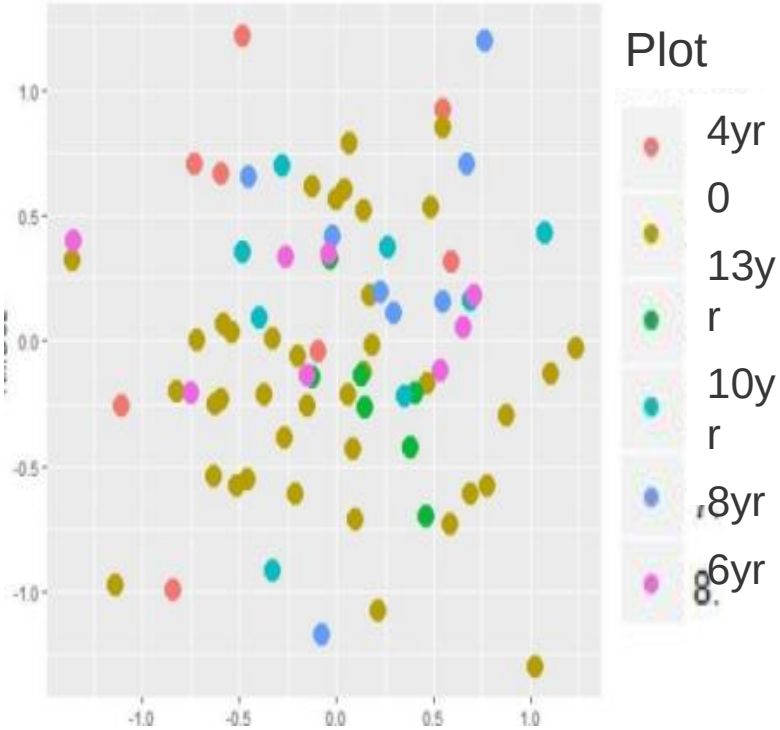






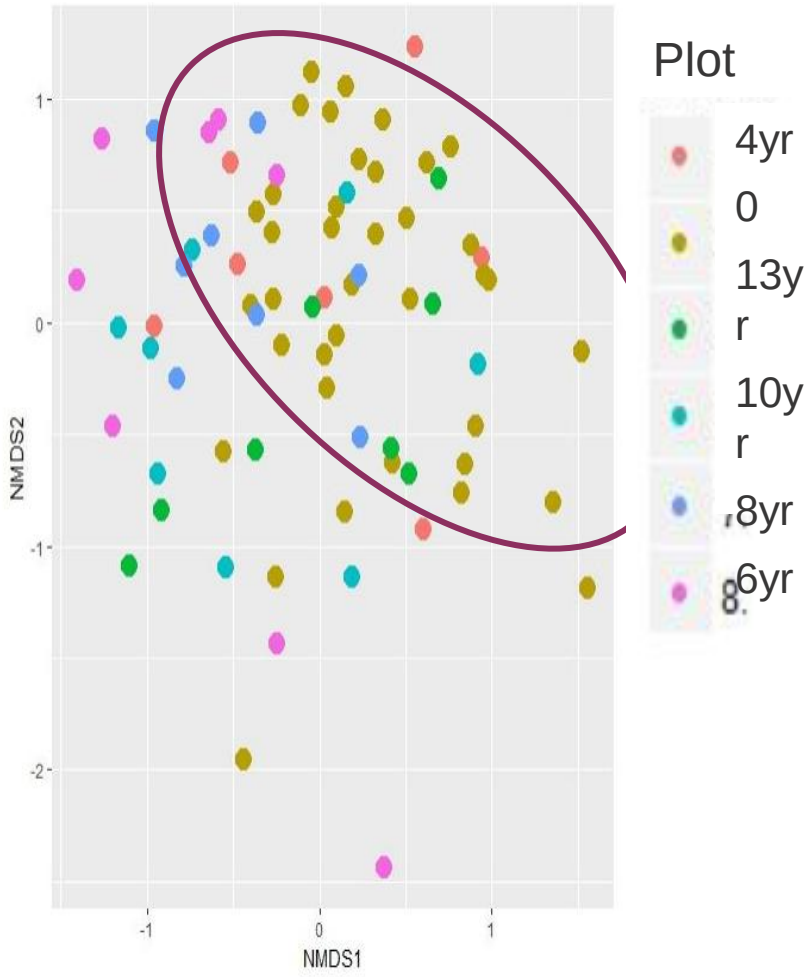
Results : bryophytes

- Ordination for all species showed no pattern related to management;



Results : bryophytes

- Deadwood related species : pattern related to dead wood amounts and canopy coverage (= microclimate)



Results bryophytes

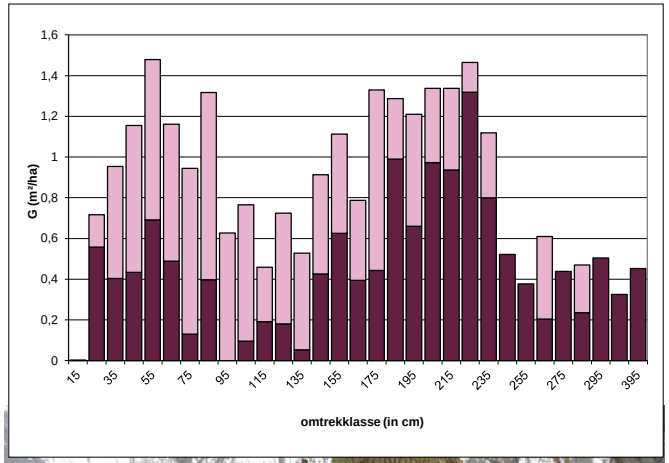
		Mgmt	#Tree	%Litter	Litter Thick	%Herb	Vol Dead wood	Stage Dead wood	N
Total	#	** (0)		** (-)	** (-)				
	Recip		* (+)						
	Cover			*** (-)					
Dead wood	#	* (0)			* (+)		* (+)		
	Recip							* (-)	
	Cover				** (-)		*** (+)		
Living wood	Recip								* (-)
Soil	#			* (-)					
	Recip								* (+)
	Even			* (+)					
	Cover			*** (-)		** (-)			

Results

- Restoration of traditional management of CwS:
  - → Not always achieves the aspired results on vegetation (vascular plants & bryophytes)
    - × peak of light-demanding competitive species immediately after the cut
    - × target species missing
    - × decline of typical shade-tolerant ancient woodland species - especially bryophytes- immediately after the cut and still apparent and not fully recovered for several species after 1 full cycle.

Discussion (1)

- Differences traditional management
  - → Conservation of dead trees
  - → Conservation of overmature trees
  - → No small woody debris removal or herb mowing



Discussion (2)

→ nutrient accumulation :
- ❖ 70 years of litter build-up
- ❖ N-deposition

⇒ Nutrient peak released during cut

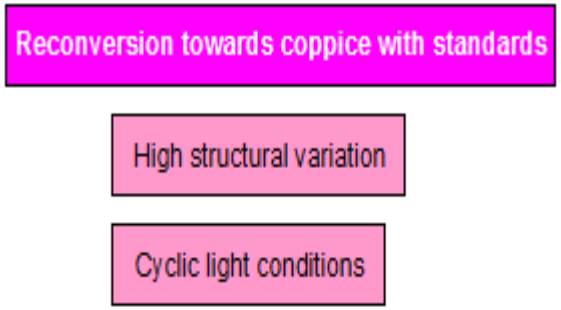
→ Seed bank depletion and insufficient dispersal capacity for target species of gap-phase (*Solidago virgaurea, Hypericum pulchrum,…)*
- ❖ (were they present/abundant in the past ?)

→ Underdeveloped coppice (canopy closure)

⇒ More and longer competition by light-demanding, nitrophilic species (*Rubus fruticosus*, *Rubus idaeus*,…)

→ 1st cycle : transition period ?

Conclusions

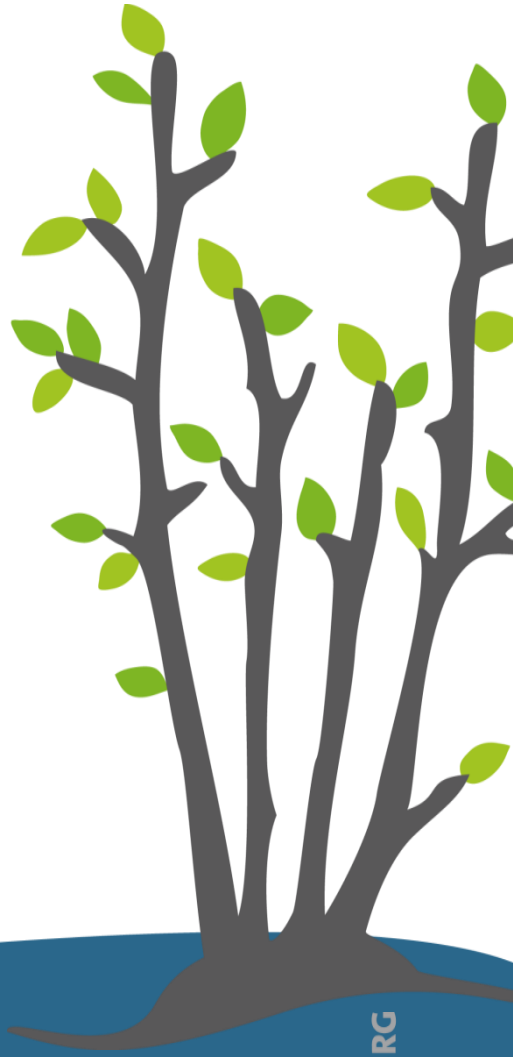


- Copying textbook recipes not always meets textbook expectations
- Conditions may look very similar but circumstances are different : there is more to it than meets the eye
  - × Abiotic conditions (depositions, …)
  - × Biotic conditions (coppice vitality, seed bank, colonisation,…)
  - × ‘minor’ differences with historical management may have large implications
- 2nd cycle?

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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