

Symposium on Fire Management in Cultural and Natural Landscapes, Nature Conservation and Forestry in Temperate-Boreal Eurasia
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Relight the Fire

Burning as Restoration Tool in the Netherlands

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Relight the Fire: *Burning as Restoration Tool in the Netherlands*

Introduction

Main factors responsible for biodiversity loss in the Netherlands:

- Eutrophication
- Acidification
- Changes in land use

Result: Grass/Moss/Shrub-encroachment

- High and dense vegetation
- Decrease in plant species diversity
- Decrease in variation of vegetation structure
- Cooler and moistier, more homogeneous microclimate

Restoration measures to counteract these effects

- sod-cutting
- grazing
- mowing
- Limited success

→ Burning?

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Main Questions

Ministry of Agriculture, Nature and Food Quality

Survival plan of Woodland and Nature:

Burning is normally used as conservation measure, but can fire also be used as a restoration tool?

Literature study on prescribed burning: (2008-2009)

Focus on:

- (1) Physio-chemical soil properties
- (2) Nutrient-state and -availability
- (3) Differential effects on biota (including flora, fungi and fauna) in comparison with other measures
- (4) Environmental parameters (type of vegetation; weather conditions, etc) that influence the outcome of burning-management
- (5) Type of burning technique used on the outcome of the measure.

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Dune fires: first insights

Experiments and spontaneous fires

Ameland
Terschelling
Castricum



Experimental, controlled fires:
Ameland (2003)
Terschelling (2004)

Wildfires:
Terschelling(2004)
Castricum (2004)

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Questions

- Biomass removal?
 - Herb layer
 - Moss layer
 - Litter layer
- Effects on carabid fauna
 - Recovery (restoration?) of communities?
 - Survival or settlement?

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Castricum Wildfire

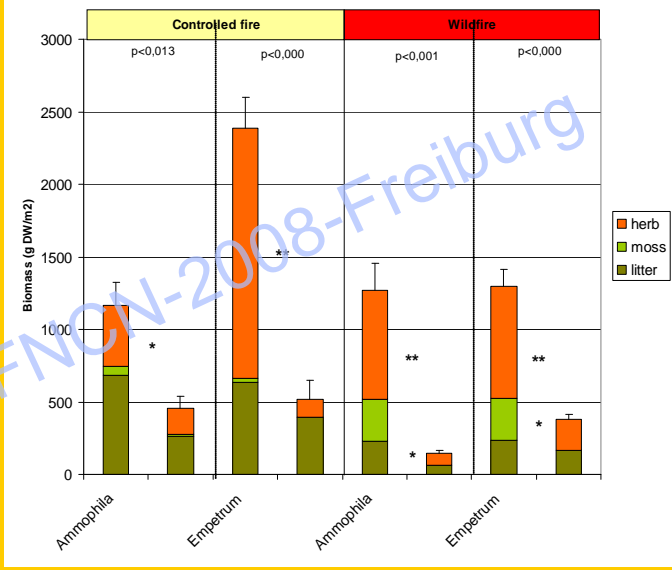


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Biomass removal

Controlled burning: no significant reductions in moss/litter layers

Wildfire: Significant reductions found in all layers



Species	Controlled fire			Wildfire		
	herb	moss	litter	herb	moss	litter
Ammophila	~400	~700	~1200	~100	~500	~100
Empetrum	~1700	~700	~2400	~100	~500	~100

Note: Biomass values are approximate based on the chart. Significant differences are indicated by asterisks (, **).*

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Biomass removal: Conclusions

- Biomass removal low in controlled experiments compared to wildfires
- Controlled fires were not intense enough.
- Possible reasons:
 - Too “carefully” executed?
 - Burning by means of headfire
 - Moist weather conditions

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Regeneration after wildfire

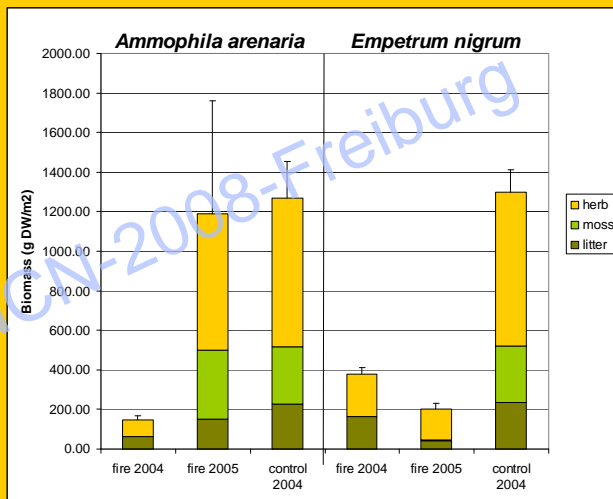
***Ammophila* sites:**

Fast vegetative regeneration

***Empetrum* sites:**

No regeneration of *Empetrum*

→ risk of grass-encroachment



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Regeneration after wildfire



1 day

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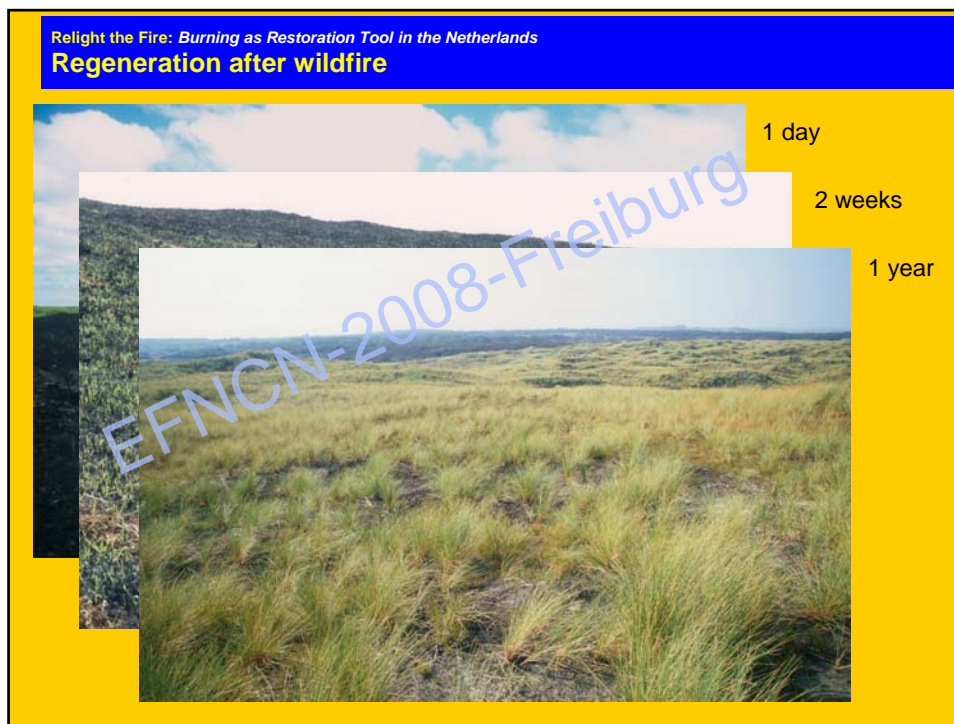
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Regeneration after wildfire



1 day

2 weeks

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Regeneration: Conclusions

- Wildfire on Terschelling was too intense.
- Grass-encroached sites: rapid vegetative regrowth; seed-bank possibly destroyed
- Empetrum sites: no regrowth of Empetrum; risk of grass-encroachment

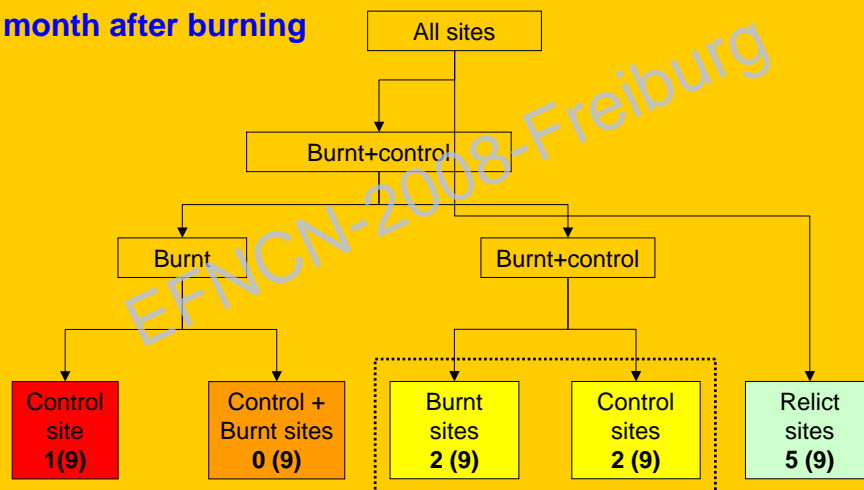
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Fauna response

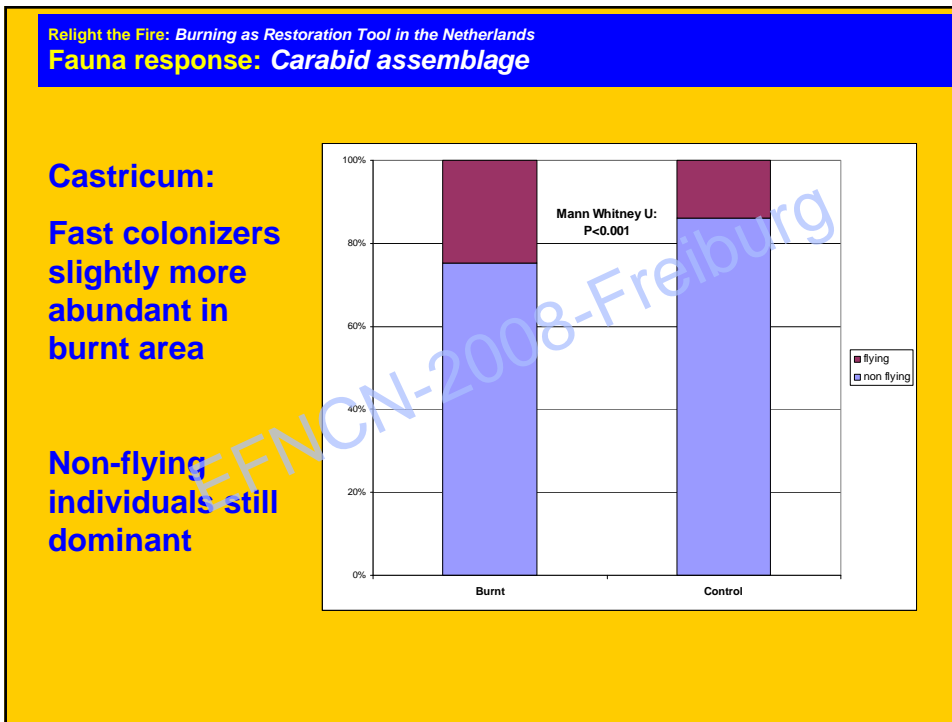
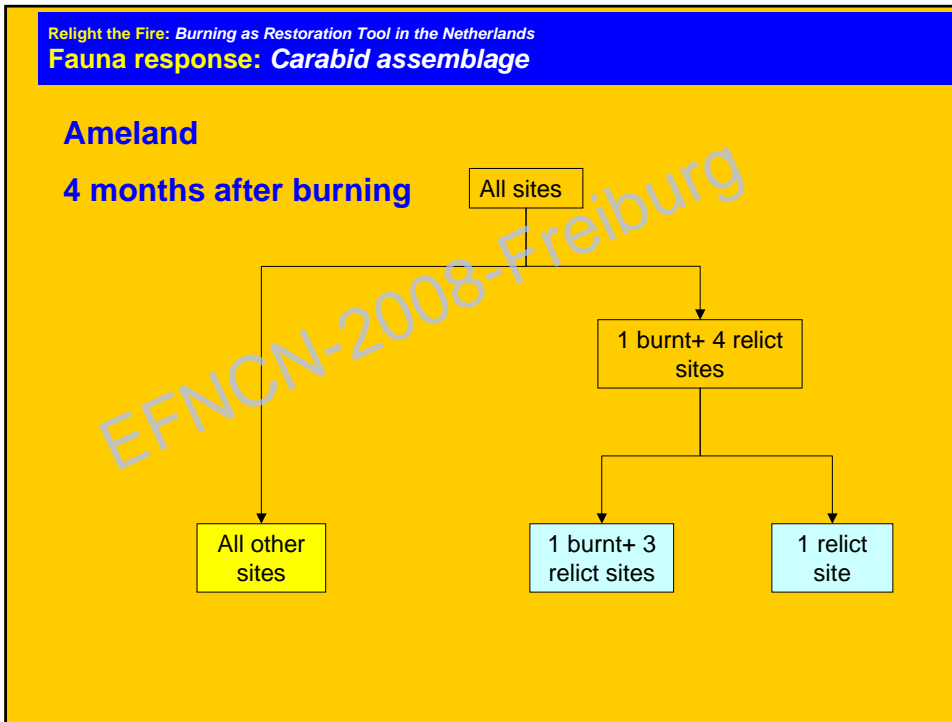
- Carabid populations:
- Ameland (controlled fire)
- Castricum (wildfire)
- Questions
- Recovery (improvement?) of species assemblages?
- Survival or settlement?

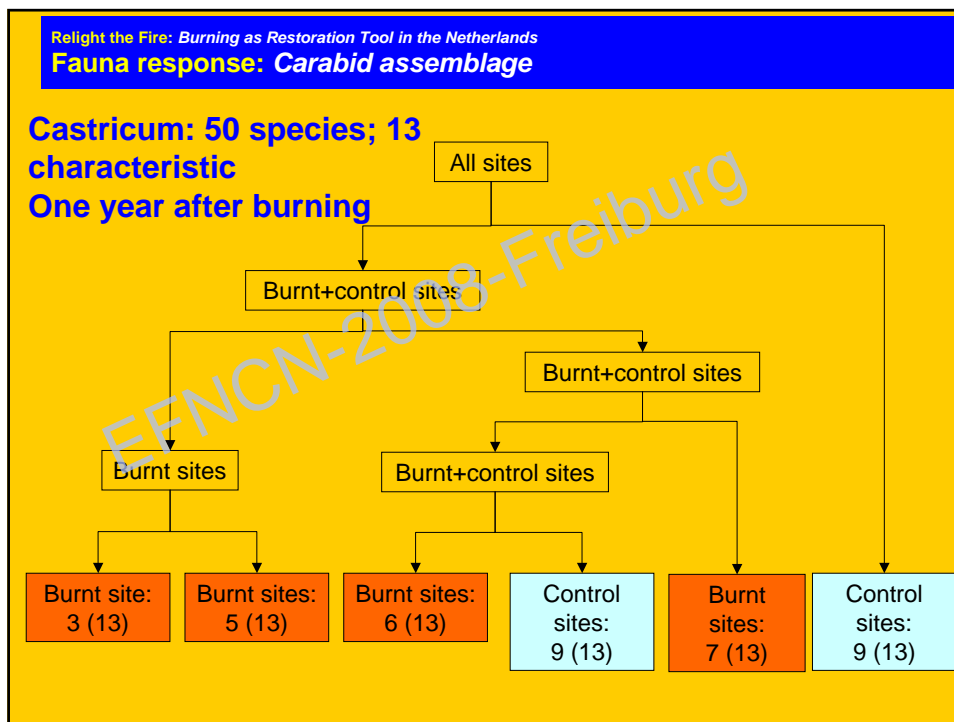
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Fauna response: Carabid assemblage

Ameland: 42 species: 9 characteristic species

1 month after burning







- Relight the Fire: Burning as Restoration Tool in the Netherlands**
Fauna response: Conclusions
- Carabid assemblage is primarily determined by initial state of (surrounding) vegetation
 - Ameland + Terschelling: species-poor,
 - Castricum: species-rich + characteristic
 - After burning: same species pool colonizes area
 - Settlement at least partly from dispersion
 - Fast settlement of characteristic species only occurs when relict situations are directly bordering burnt area

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Concluding remarks

Burning as restoration tool:

- First data on dune grasslands: not very promising as *incidental restoration tool*
- Literature study should focus further on:
 - Possible viability when ideal burning technique is used?
 - Viability of *regular interval* burning?
 - Effects of burning in different systems
 - Dry heath
 - Wet heath
 - Grass-encroached raised bog remnants
 - Effects on other processes:
 - Nutrients
 - Soil chemical properties
 - Other fauna-groups

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Fauna response: *Carabid assemblage*

- All remarks, references, literature comments, etc. are welcome!