15TH EUROPEAN HEATHLANDS NETWORK WORKSHOP

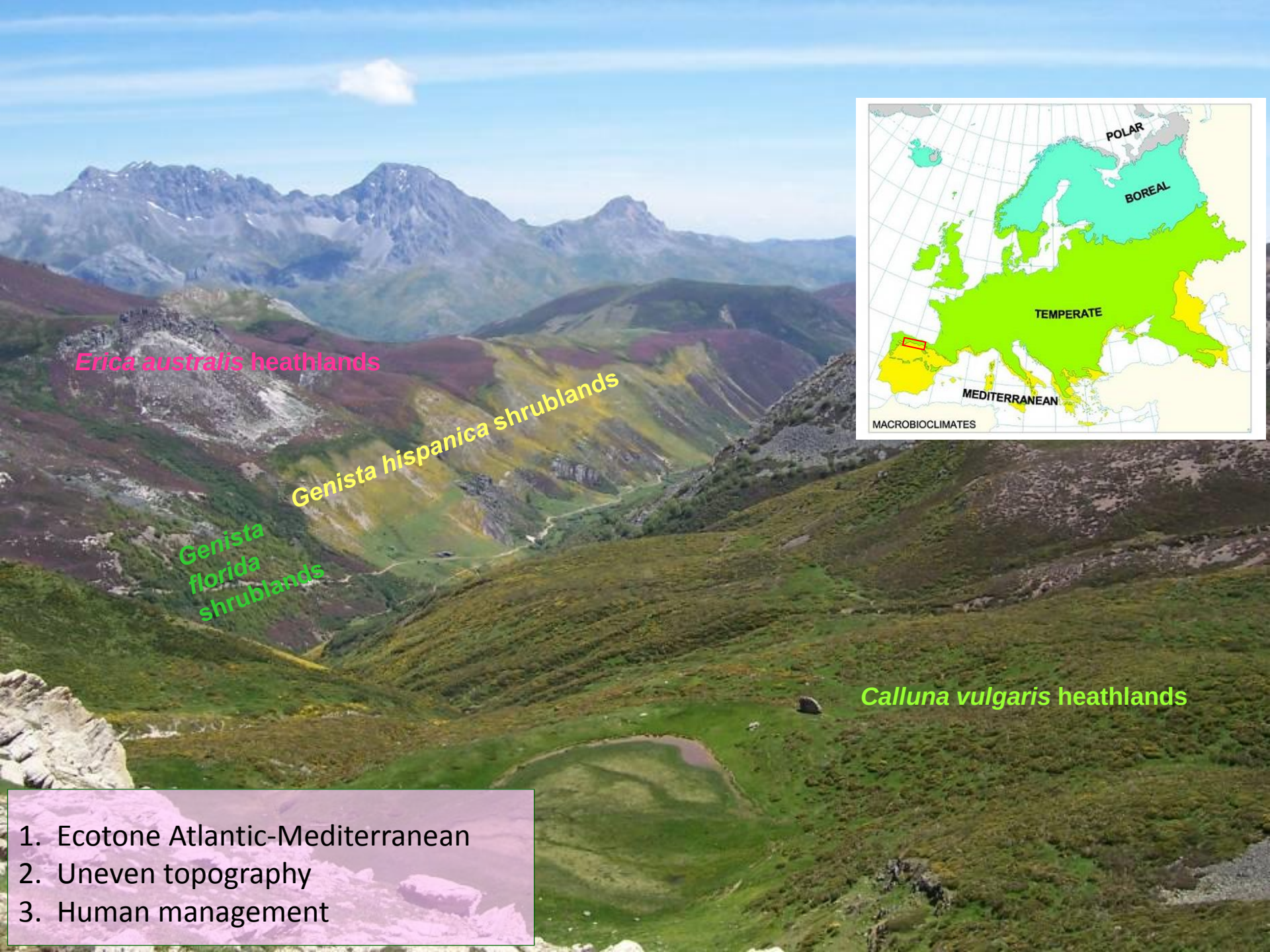
Lowland heaths under pressure: *challenges in ecological restoration*

Aug 20 – 25/26 | 2017

Nijmegen | Dwingeloo | The Netherlands

Concluding remarks on the 15th European Heathlands Network Workshop

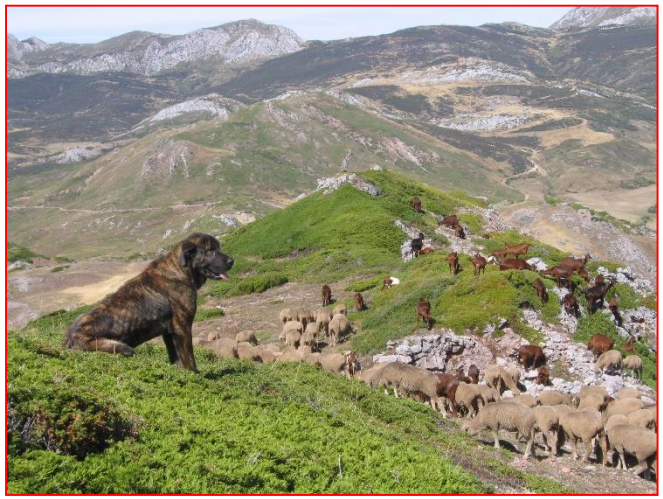
Henk Siepel



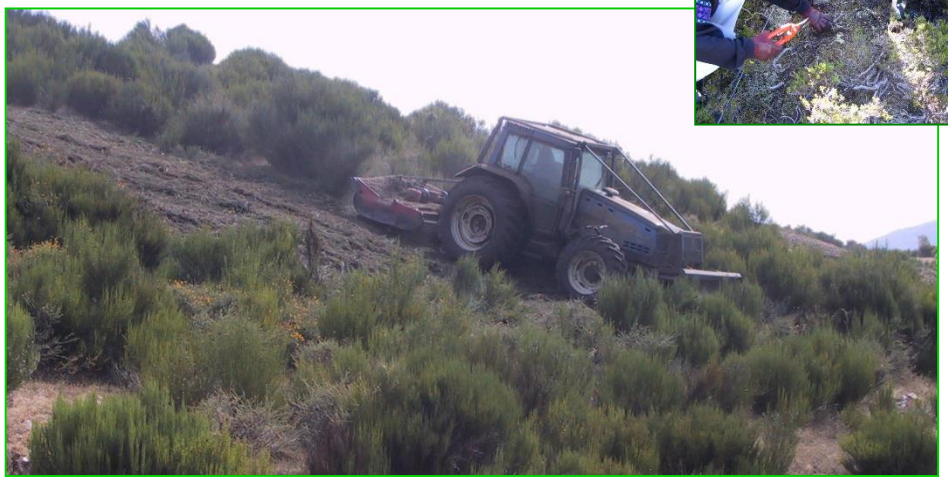
1. Ecotone Atlantic-Mediterranean
2. Uneven topography
3. Human management

Building/Mature-PHASE

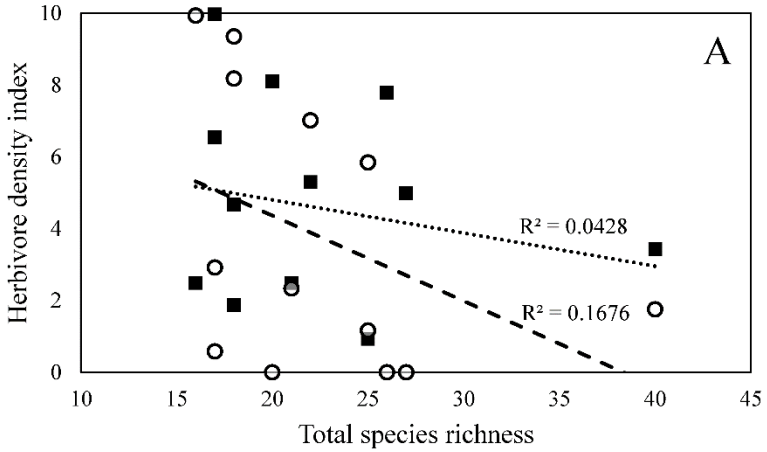
Burning

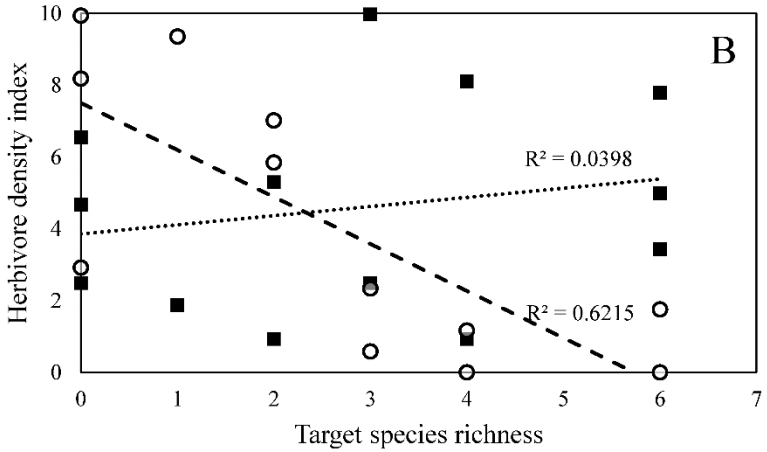


Cutting



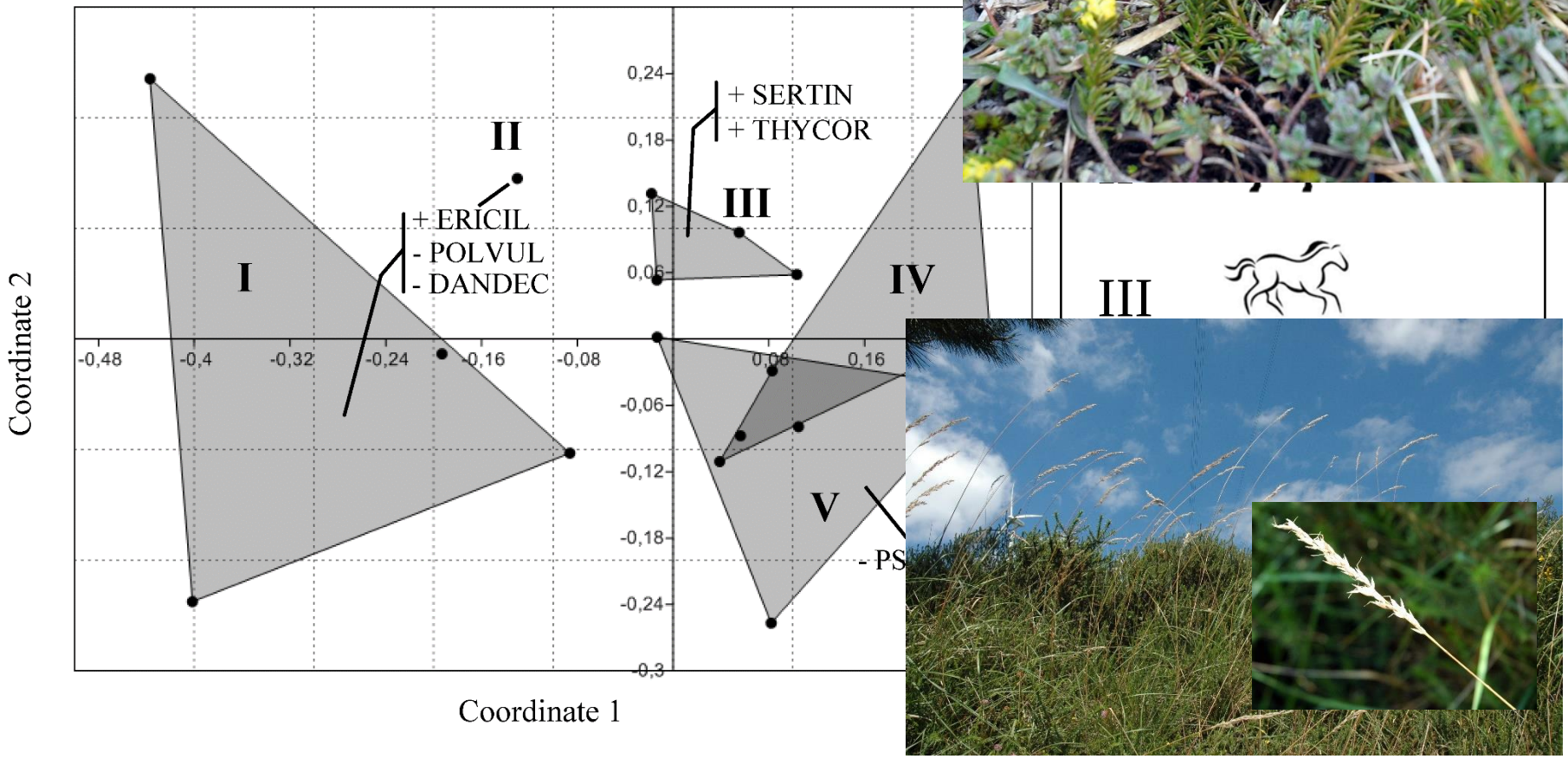
Grazing levels impact species richness and diversity





Fagúndez, J. (2016). Grazing effects on plant diversity in the endemic Erica mackayana heathland community of north-west Spain. *Plant Ecology & Diversity*, *9*(2), 207-217.

Grazing levels impact community composition



Fagúndez, J. (2016). Grazing effects on plant diversity in the endemic Erica mackayana heathland community of north-west Spain. *Plant Ecology & Diversity*, *9*(2), 207-217.

Conclusions: Regeneration life cycle

Persistence of plants
in growth stages

Lifespan

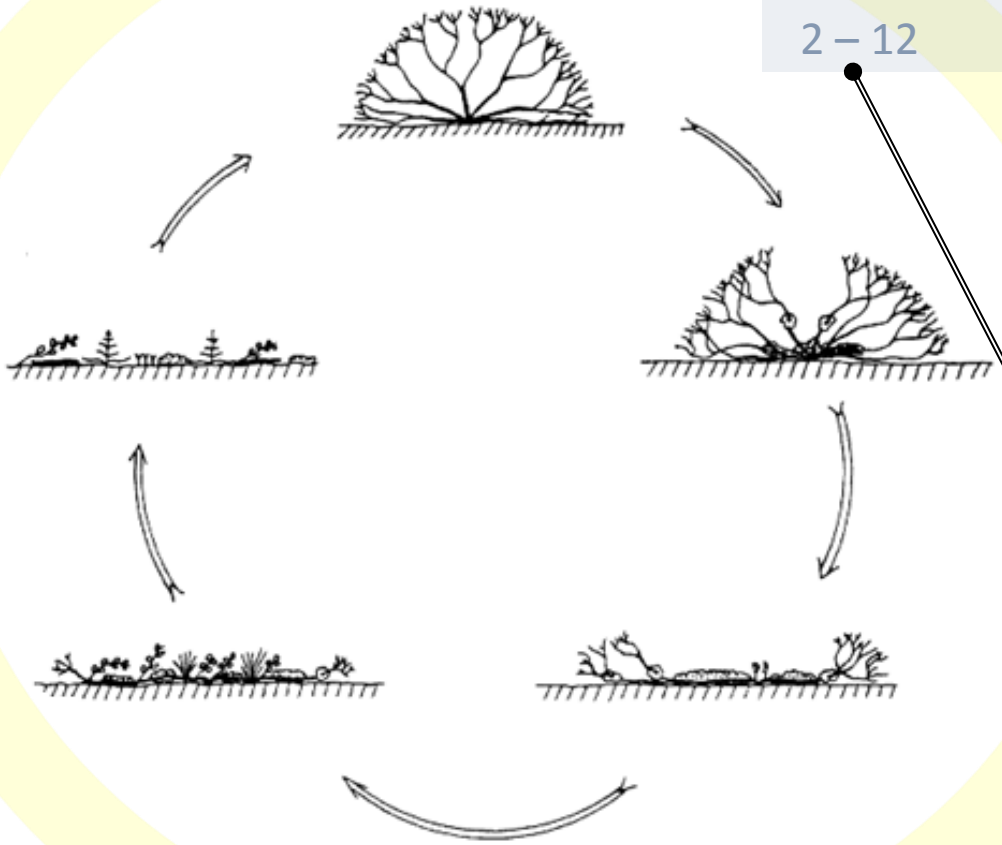
Primary cycle:
~ 8 - 15 years

Regeneration cycle:
- **resprouting**
9 - 12 years (+ x)
- **layering**
5 – 15 years (+ x)

„real life span“
19 – 25 years (1R)
20 – 30 years (2R)

No evidence for plants older than 28 years.

No evidence for more than two regeneration cycles.



Building
Layering 2 – 12
Resprouting 1 – 3

Mature
3 – 6

Degeneration
2 – 15
5 - 10

Uncertainty in deriving individual plant age from growth phase

European habitats

Dry heathland
2310 Dry sand heaths with Calluna and Genista
2330 Inland dunes with open Corynephorus and Agrostis grasslands
4030 European dry heaths
6230 Species-rich Nardus grassland

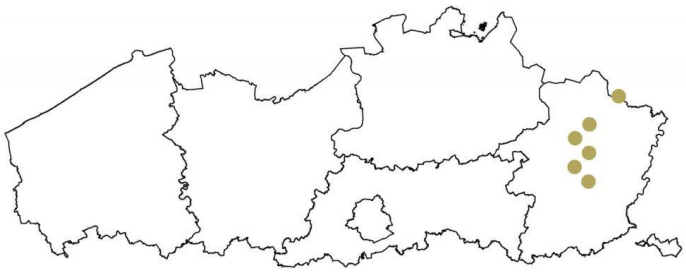
Wet heathland
4010 Northern Atlantic wet heaths
7150 Depressions on the peat substrates of the Rynchosporion

Bogs
7140 Quaking bogs and transition mires

Aquatic habitats
3110 Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae)
3130 Oligotrophic to mesotrophic standing waters (littorelletea uniflorae)
3150 Natural eutrophic lakes with Magnopotamion or Hydrocharition -type vegetation

Amphibians

Dragonflies



Heaths near Toruń – military training area

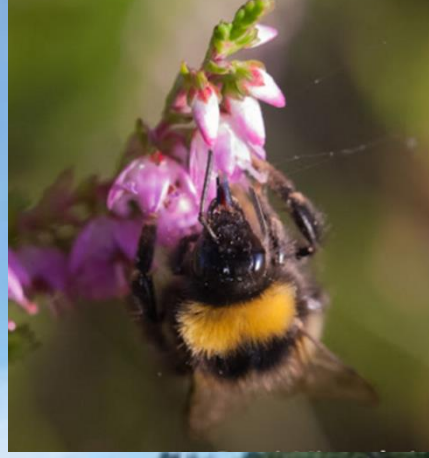
Forest succession

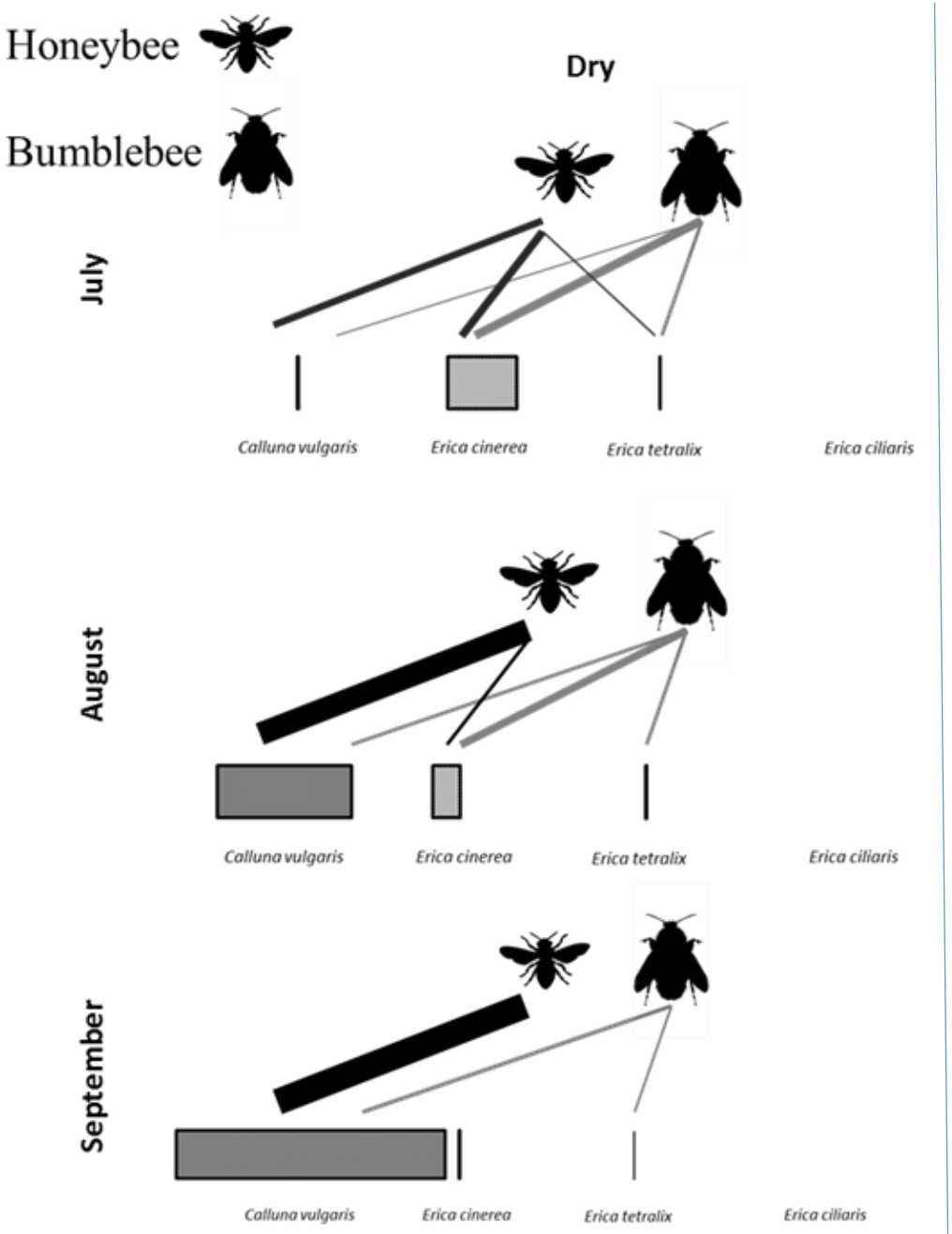
Difference between pH measured *in situ* and in laboratory

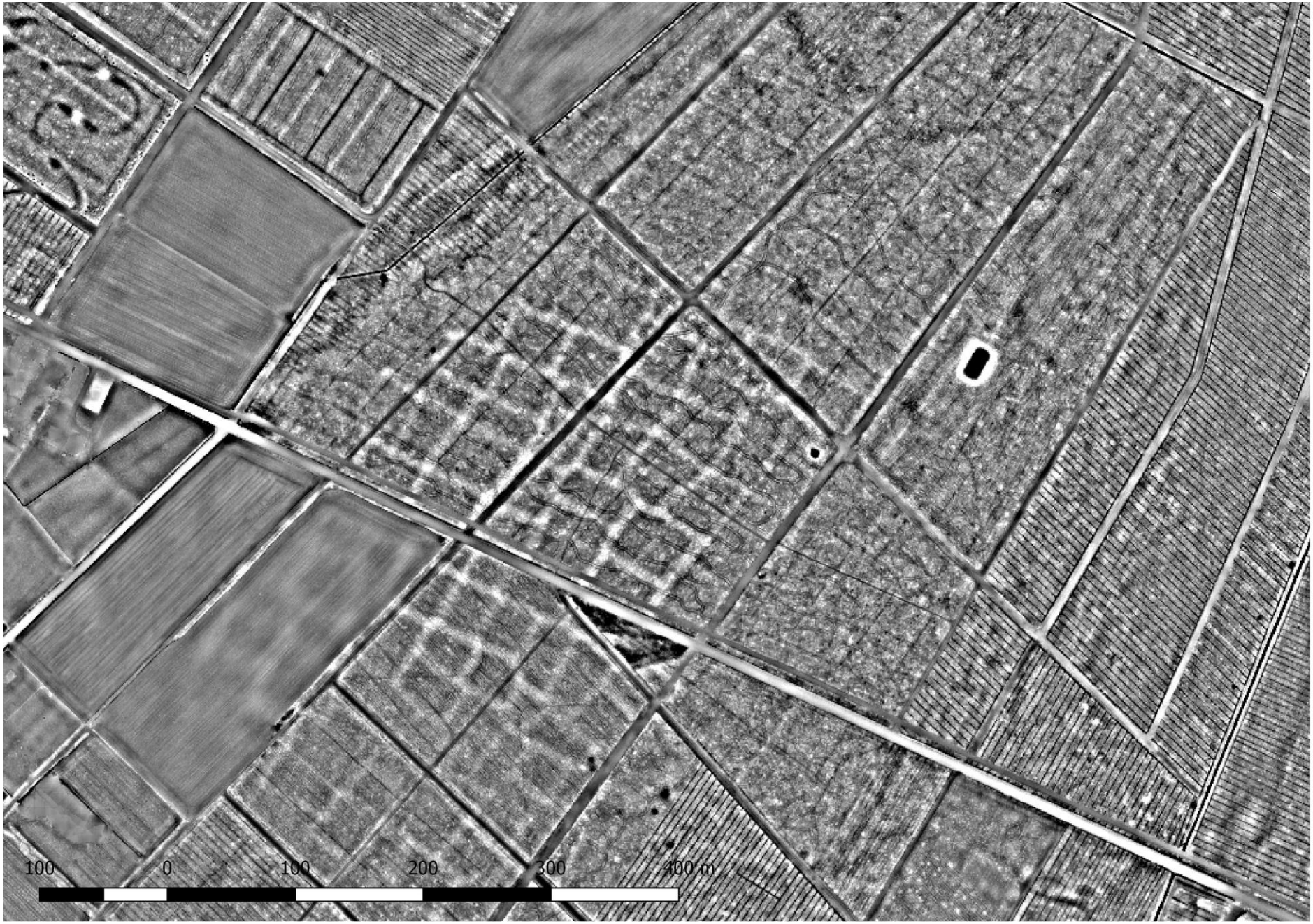
Date	Calluna *in situ*	Calluna laboratory	Calluna difference	Pinus *in situ*	Pinus lab.	Pinus difference
May n=8	3.05	3.57	0.52	3.08	3.72	0.64
June n=10	2.91	3.64	0.74	3.10	3.95	0.85
Aug. n=8	3.17	3.62	0.44	3.14	3.60	0.46
Sept. n=8	2.63	3.39	0.77	3.03	3.81	0.78

Heather beetle attack 2015

Lochmaea suturalis



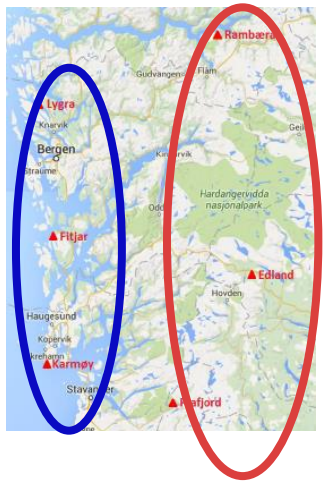

Honeybee
Bumblebee
Dry
Wet
July
August
September
Calluna vulgaris
Erica cinerea
Erica tetralix
Erica ciliaris
Cal
E. cin
E. tet
E. cil

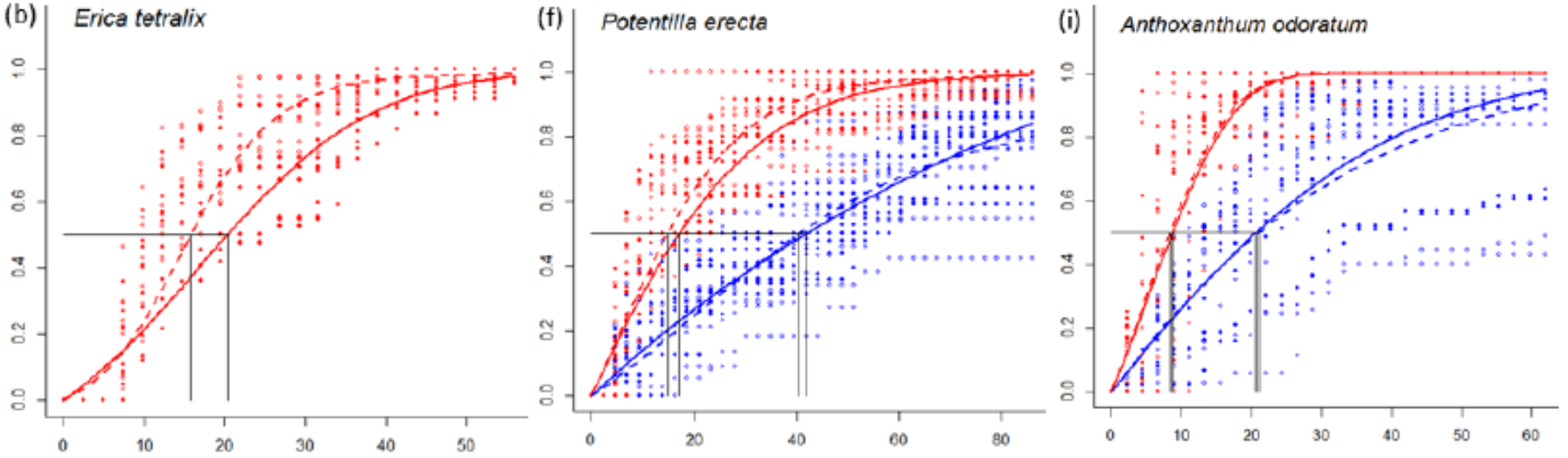

100
0
100
200
300
400 m

oxygen
fire-friendly
weather conditions
biomass
in a flammable state
enough fuel
ignition
(© Liv Guri Velle)

Smoke-induced germination acros heathland flora

Species tested **(2 dwarf-shrubs, 5 forbs, 11 grams)**	**18**
Smoke responses	14
Coast > inland (heath 1; forbs 4; grams 6)	11

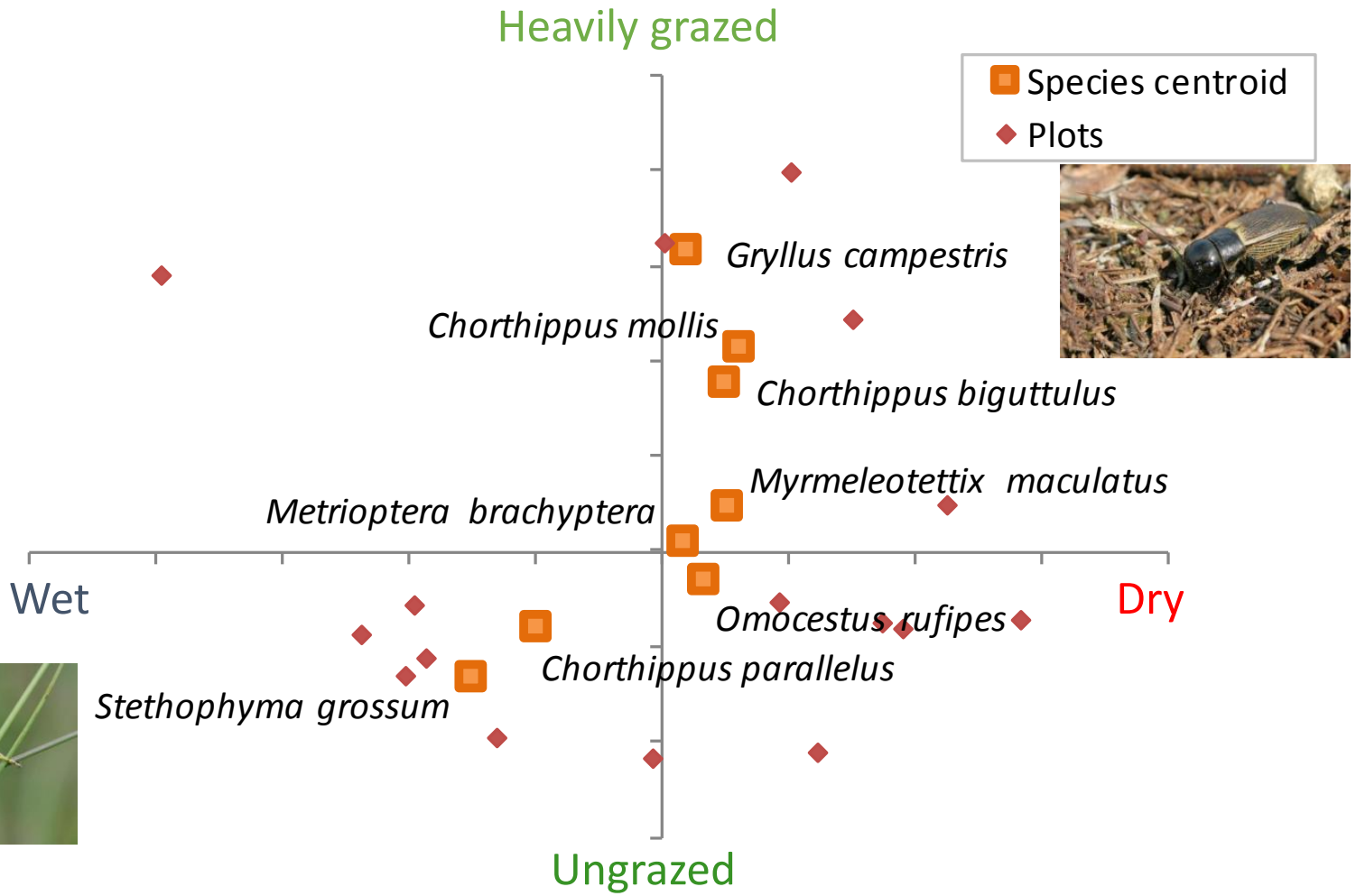




(Bruvoll 2016)

Species ordination: *Grasshoppers*

(6 Early, 5 Late successional species)



WallisDeVries et al. (2016) AGEE 234: 72-80

Increment of birch and aspen within two years

	B. pendula		*P. tremula*	
	Grazed	Fenced off	Grazed	Fenced off
Heathland	26 ± 6*	38 ± 10	1 ± 5	1 ± 9
Basophilic Grassland	17 ± 10	16 ± 9	0 ± 5	8 ±3

* Mean height increment from 2014 to 2016 in cm ± standard error

Recommendations for management of pioneer trees

-> Mechanical removal of trees appears inevitable

-> Birch stumps shoots should be removed in first summer after felling

-> Shoot removal should (if possible) be implemented during vegetation period

SHEEP AND GOAT CONSULT

EWES LOVE BIRCH

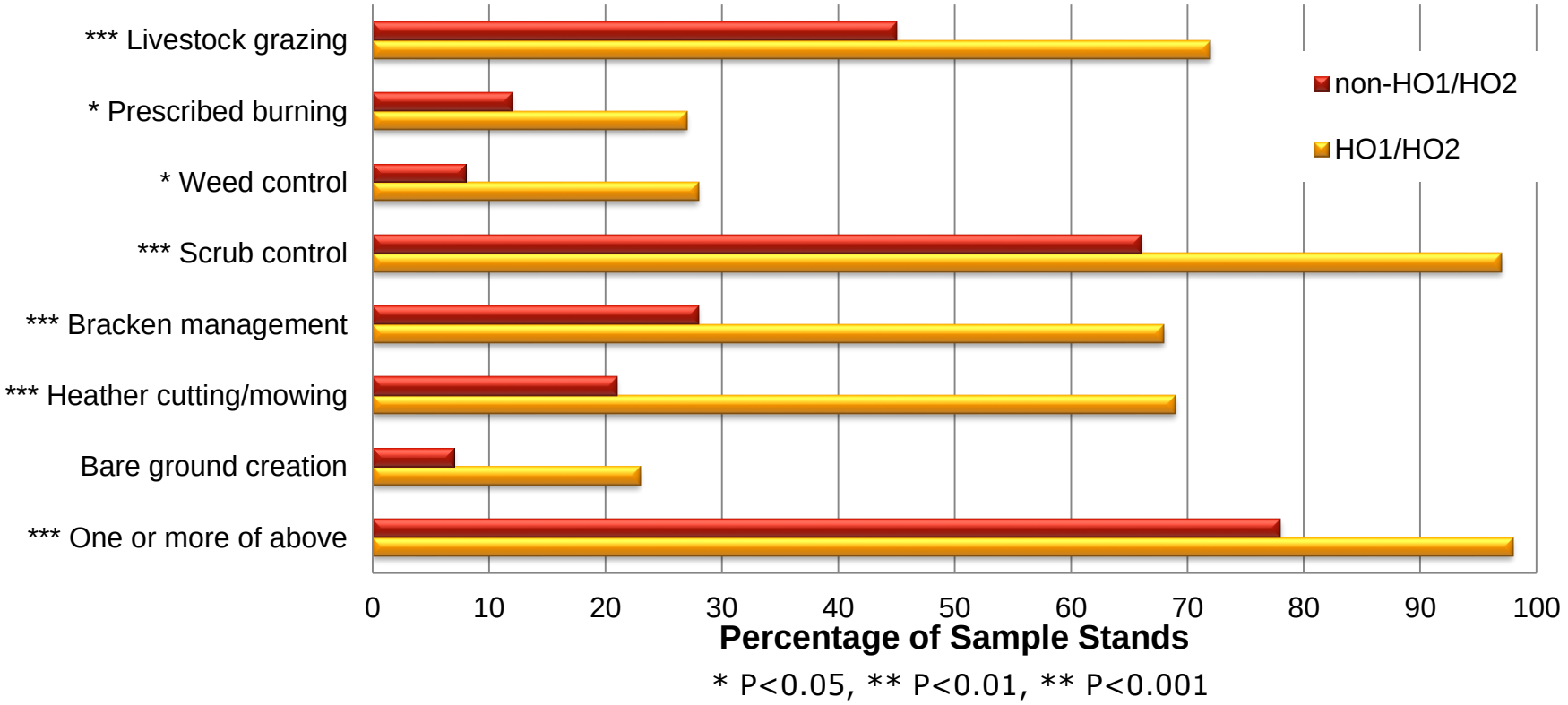
ESPECIALLY IF THEY USUALLY HAVE GRASS

Conclusion

The Heathland Farm is a concept for the system restoration and innovation of nature conservation and food production through cultural heritage.

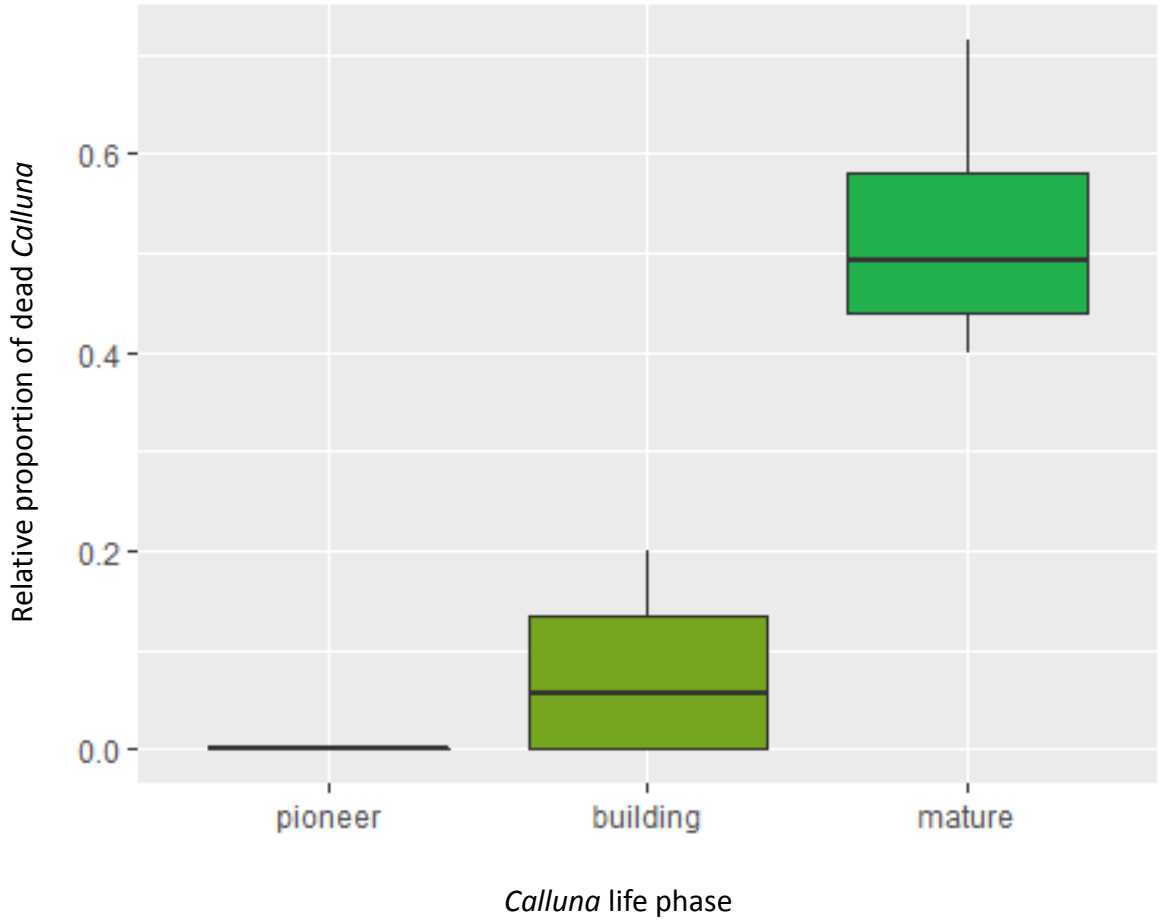
What were the general impacts of the agreements?

Sites within agreements had more positive management, resulting in more condition targets improving (more bare soil, positive indicators increasing and negative decreasing).

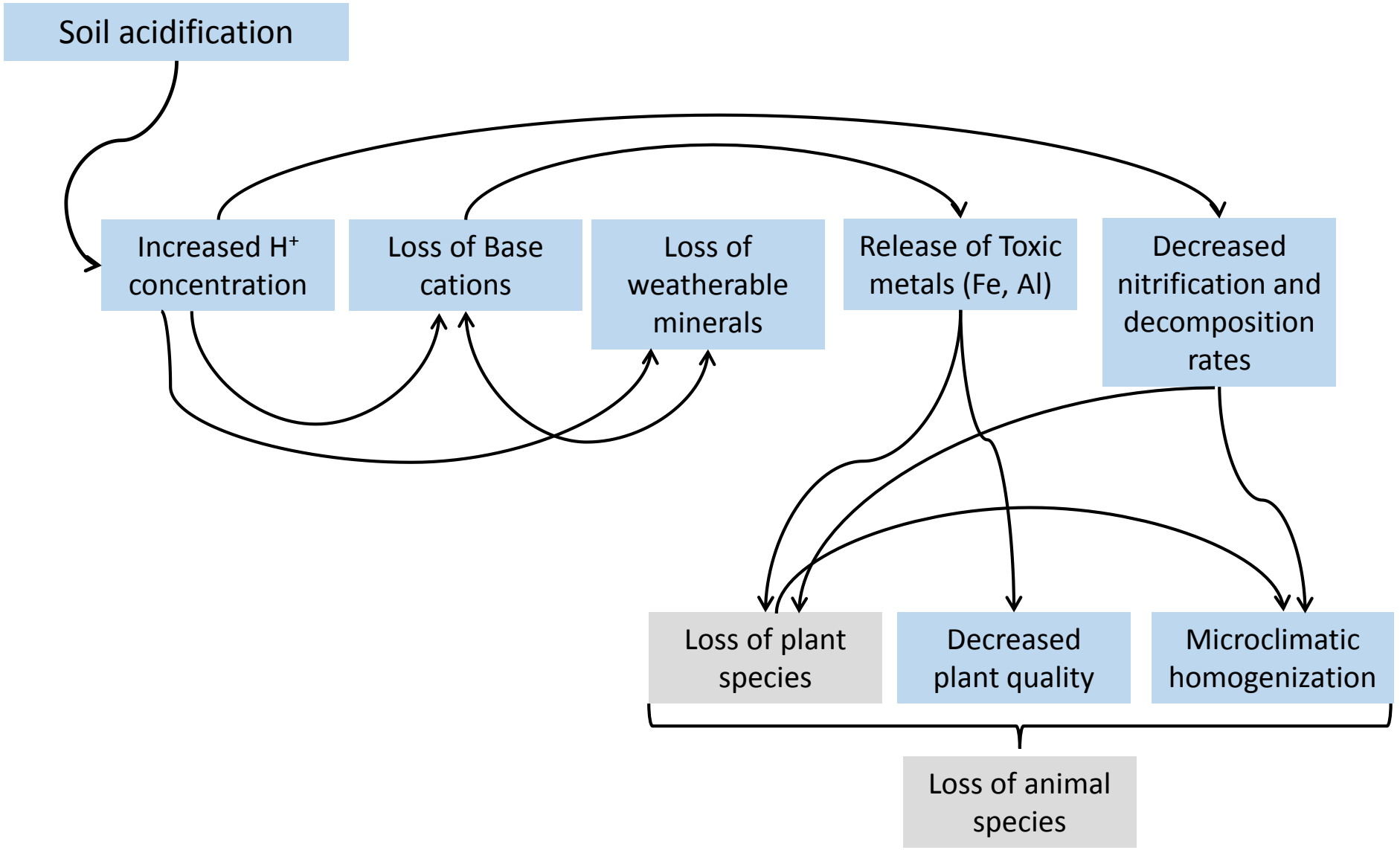


Lüneburg Heath	Combat non-target species	Target community restoration	Effects on seed bank	Nitrogen removal	NP-ratio	Cost-benefit ratio	Appre-ciation
Grazing	☺	☺	☺	☺	☹		☺
Mowing		☺		☹	☹	☺	
Prescribed burn.	☺			☹	☺		
Choppering	☺	☺	☹	☺			☹
Sod-cutting	☺	☺	☹	☺			☹

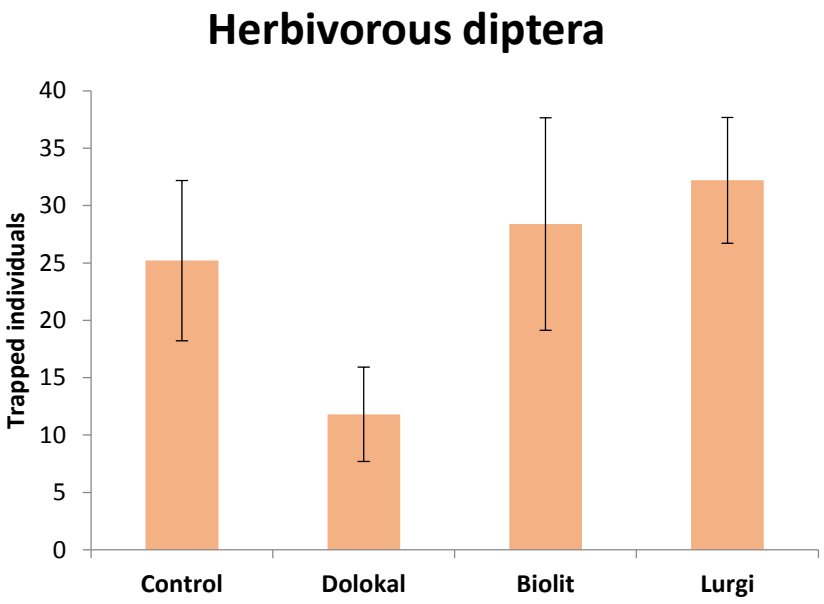
Drougth damage & land use gradient

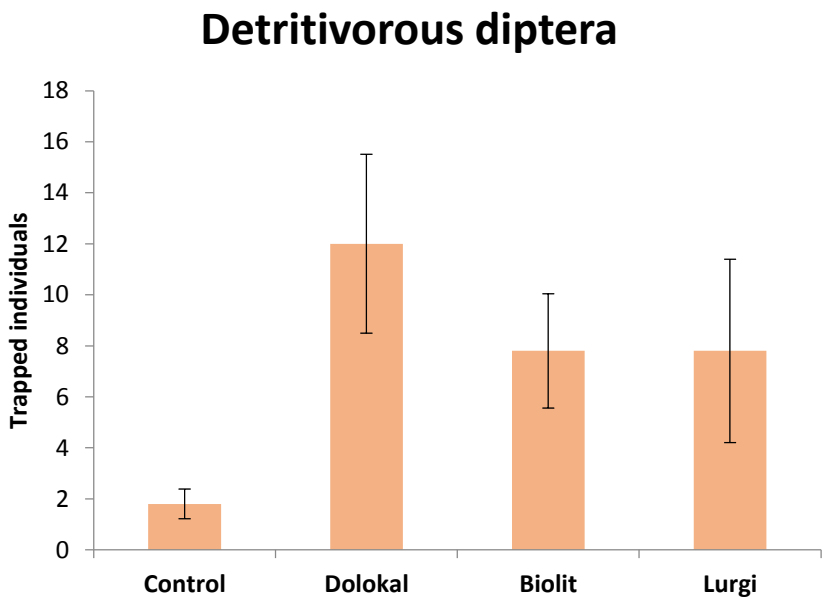


The soil acidification cascade

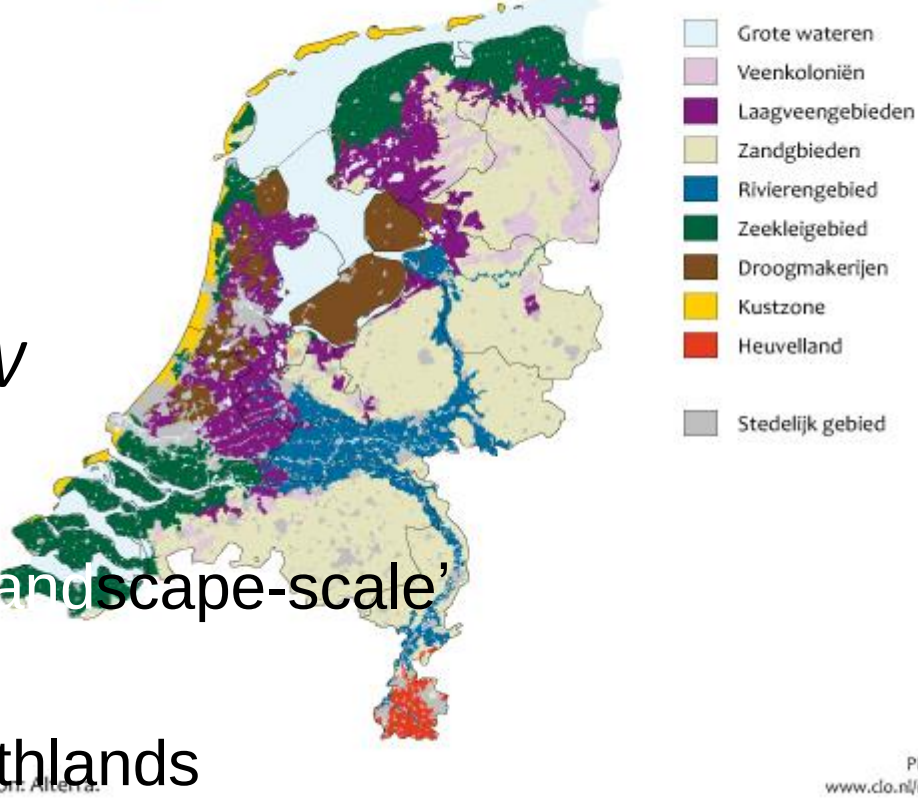


Preliminary results: invertebrates

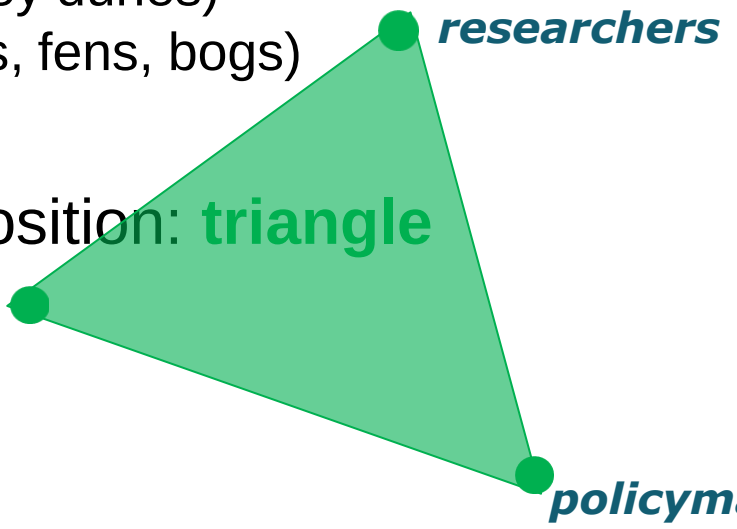




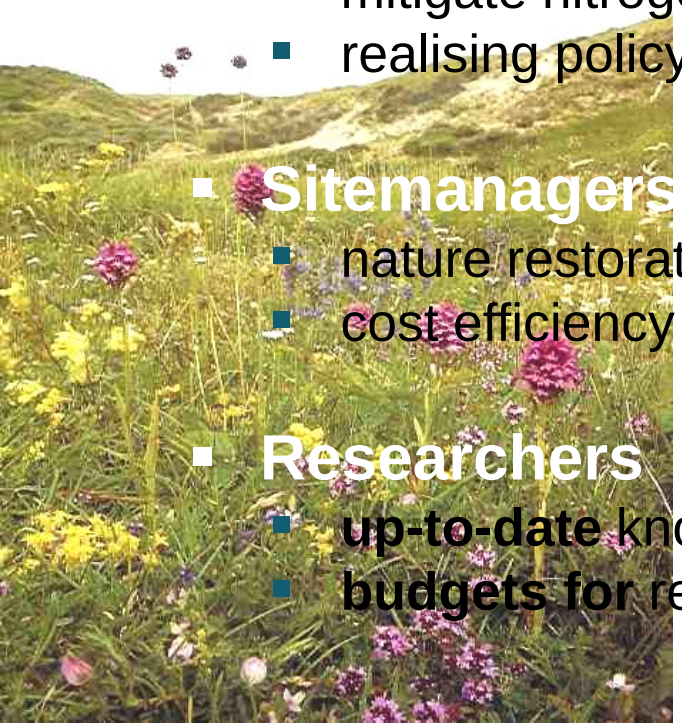
OBN Knowledge *netw*



- 8 Expert Teams (ET's) at 'landscape-scale'
- 3 ET's are relevant for heathlands
  - Dry sandy areas (drift sans dunes, heathlands, woods)
  - Dunes and coastal areas (grey dunes)
  - Wet sandy areas (heathlands, fens, bogs)
- ET's have a tripartite composition: **triangle**

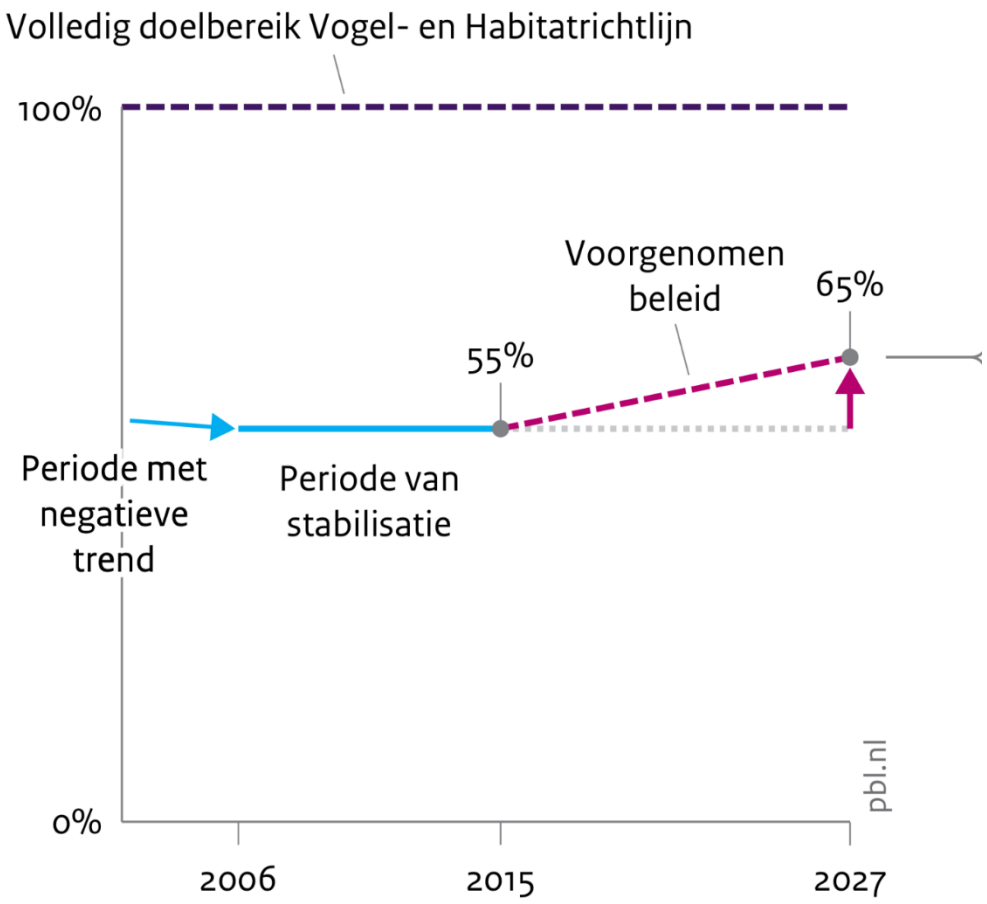


Wins of OBN Knowledge network



- **Policymakers**
  - independant/recent/validated knowledge on measures to mitigate nitrogen deposition in N2000-areas (court!)
  - realising policy goals N2000, WFD, GAP
- **Sitemanagers**
  - nature restoration N2000-areas, red list species
  - cost efficiency management
- **Researchers**
  - **up-to-date** knowledge; exchange with other diciplines
  - **budgets for** research and (a little bit for) publications

Effect on biodiversity



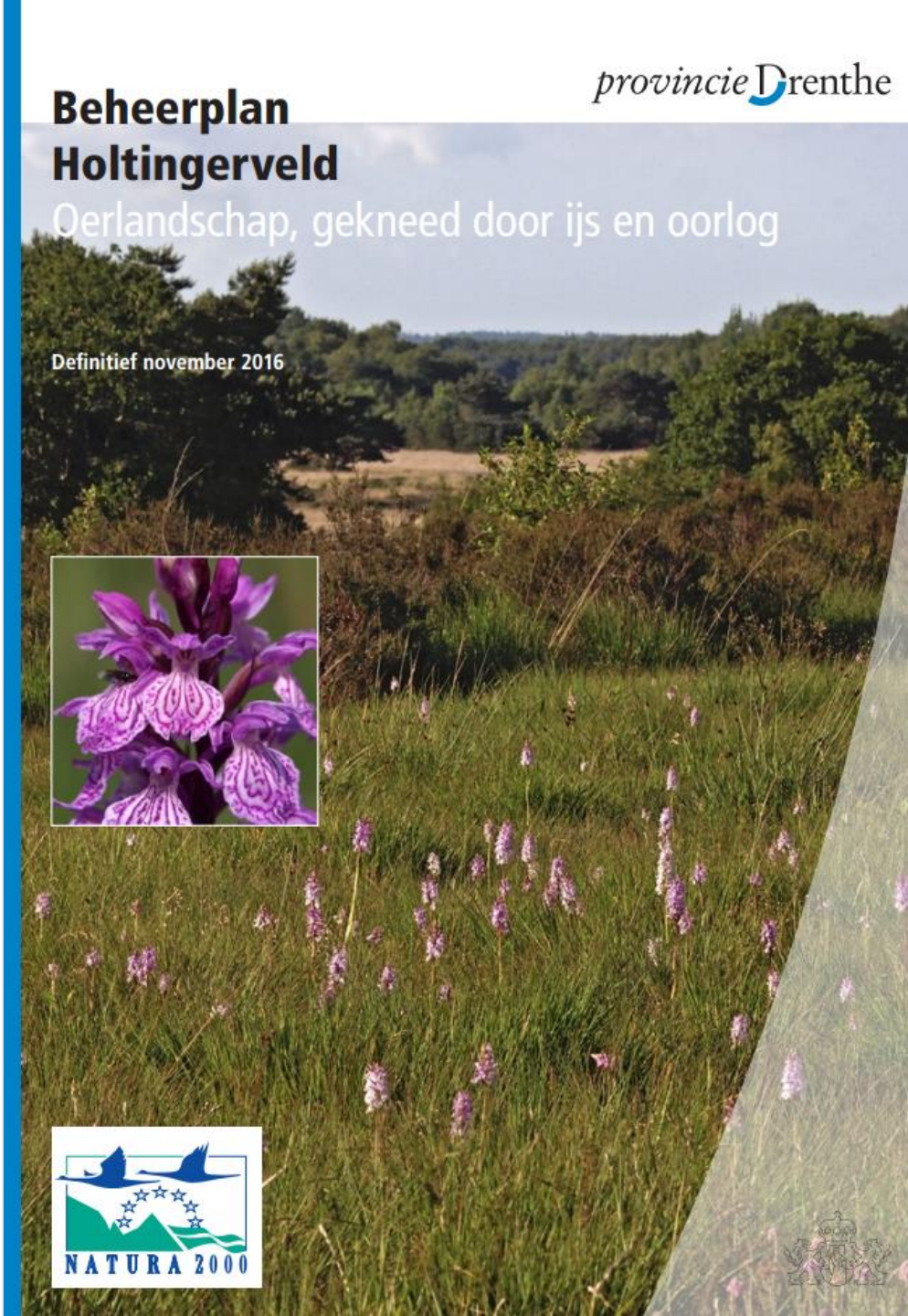
Bron: PBL

provincie Gelderland

Work to be done

Tasks Province

- Drafting of management plans
- Mapping of habitat types
- Implementing management
- Restoration measures
- Research
- Communication
- Enforcement and licensing



Micro-organismen

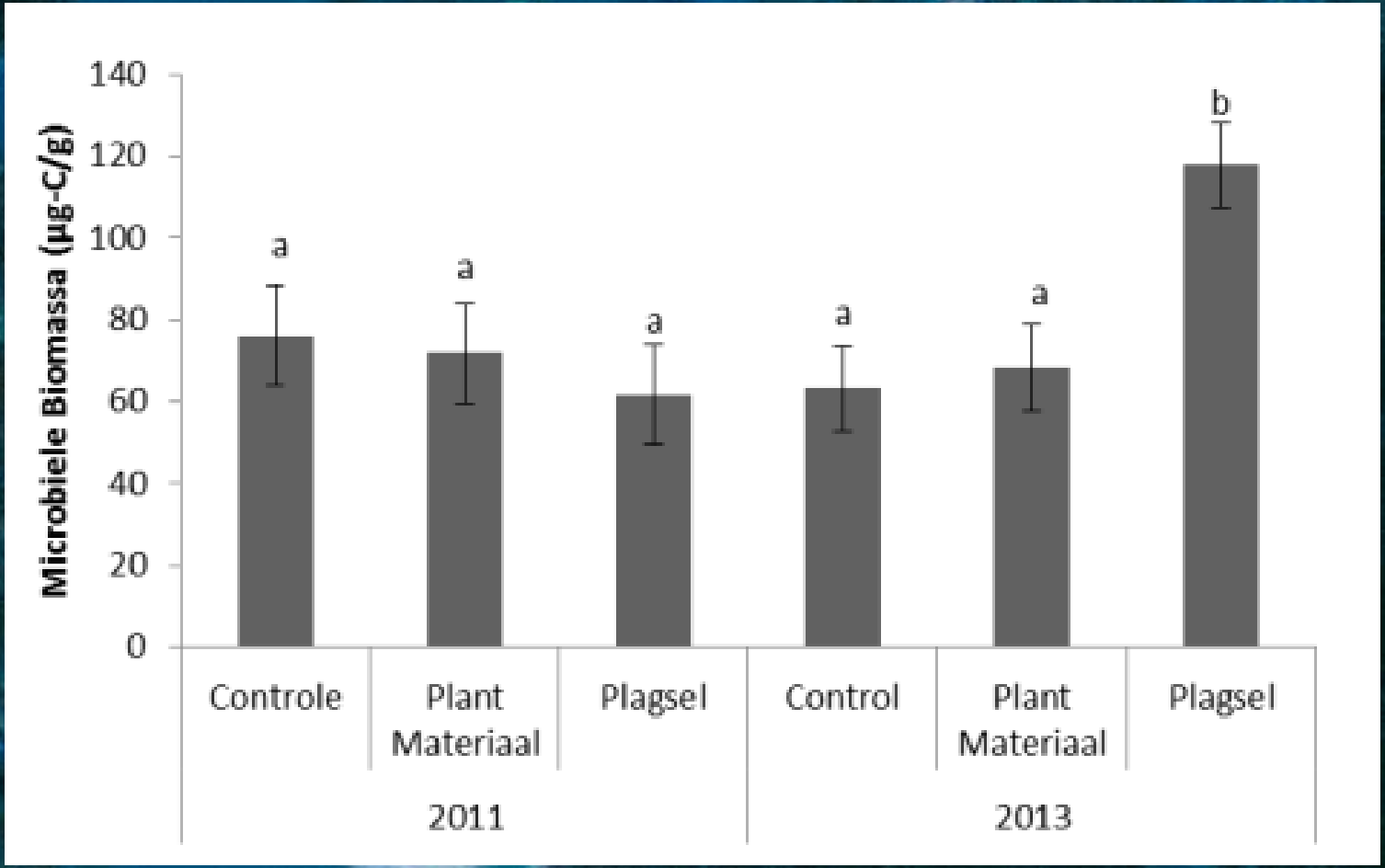
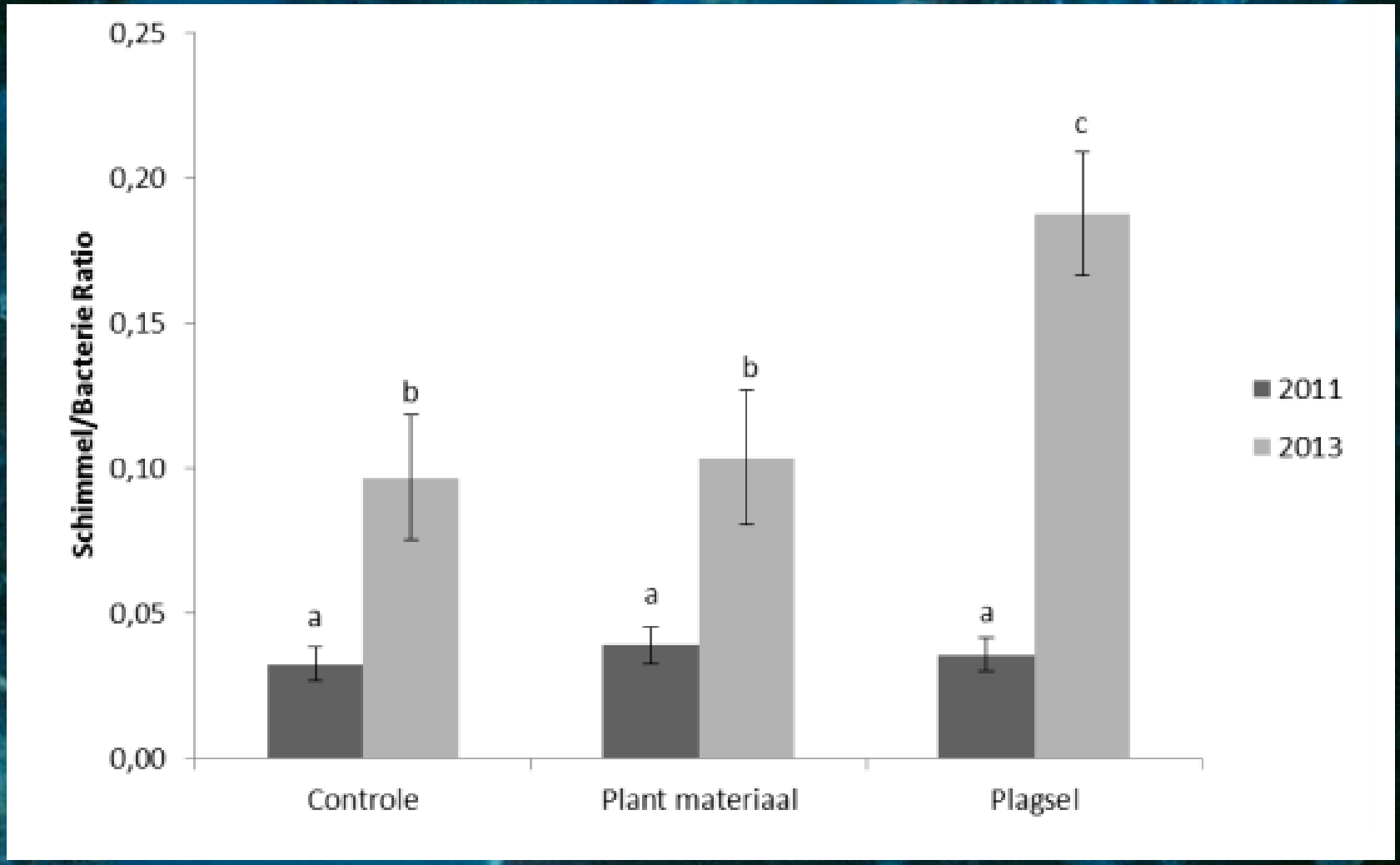
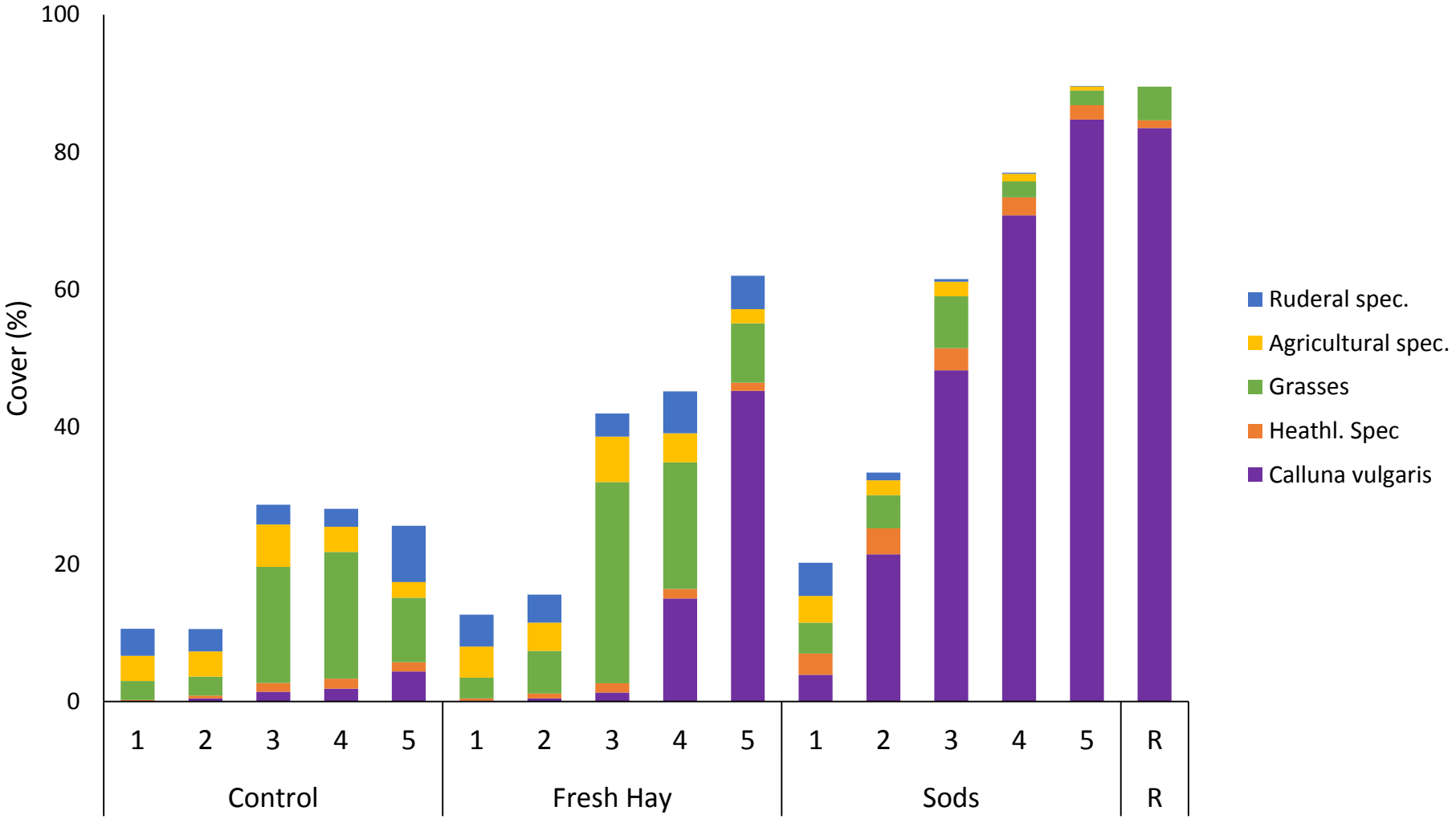


Foto Karl Ritz

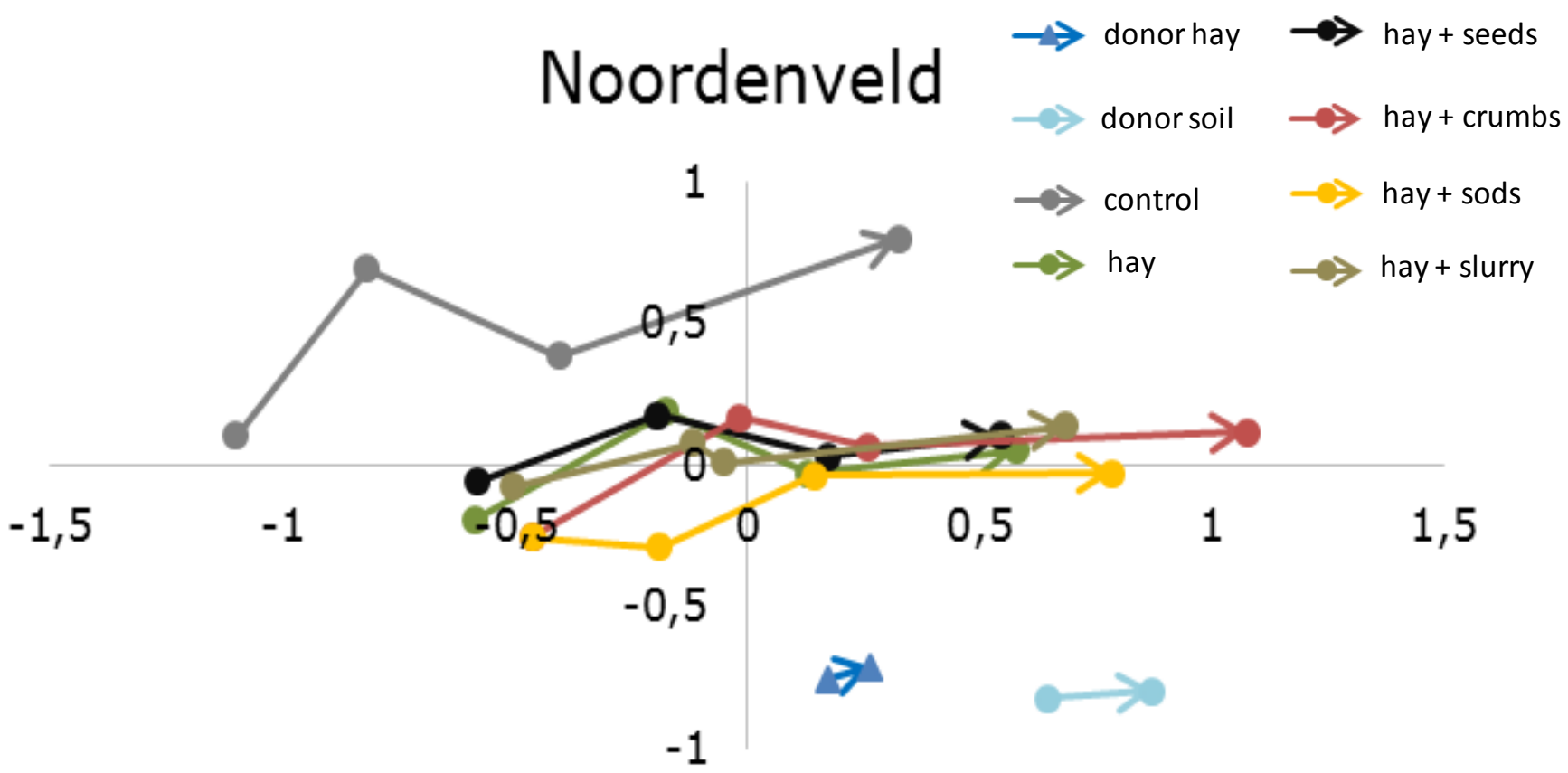
Fungi:Bacteria Ratio



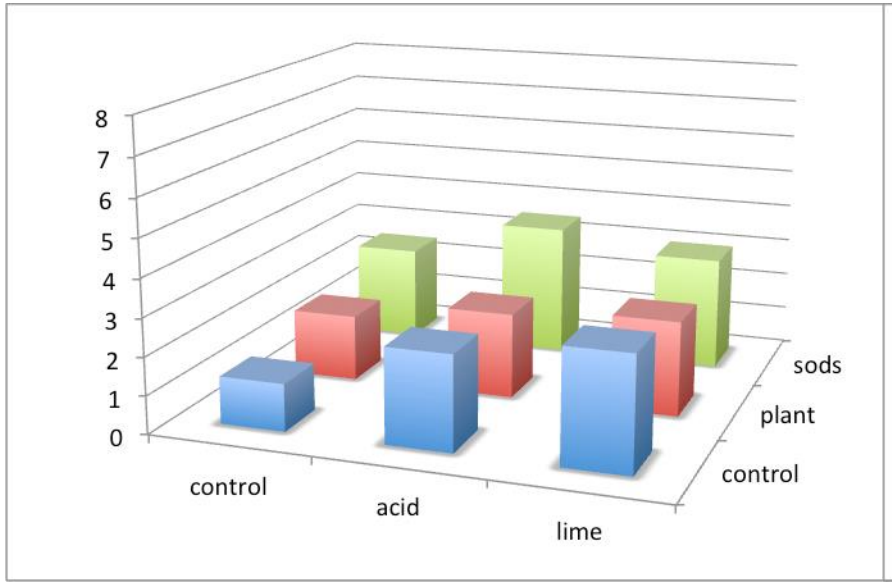
Cover different groups (dry)



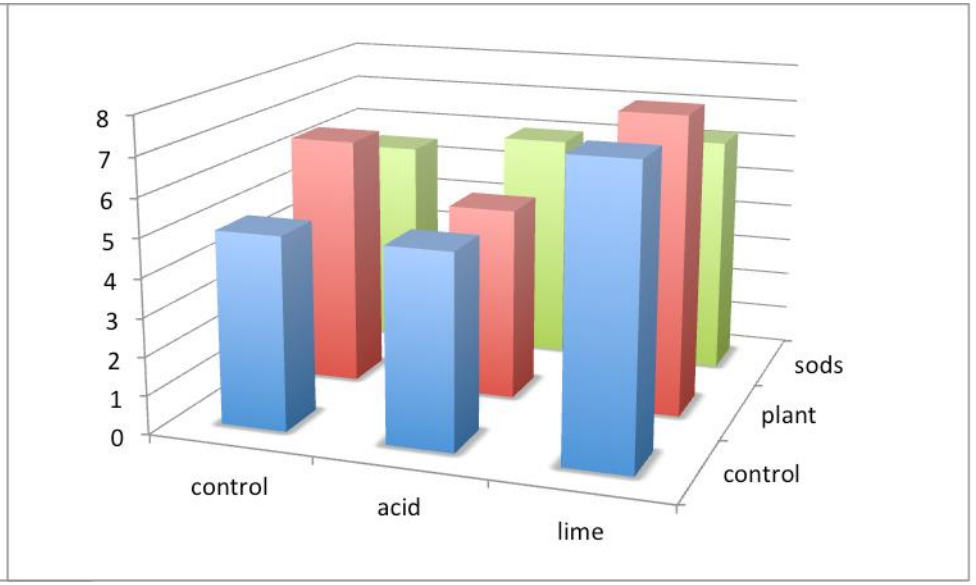
Vegetation development Noordenveld



Average number of ground beetles heathland species caught per treatment (4 areas)

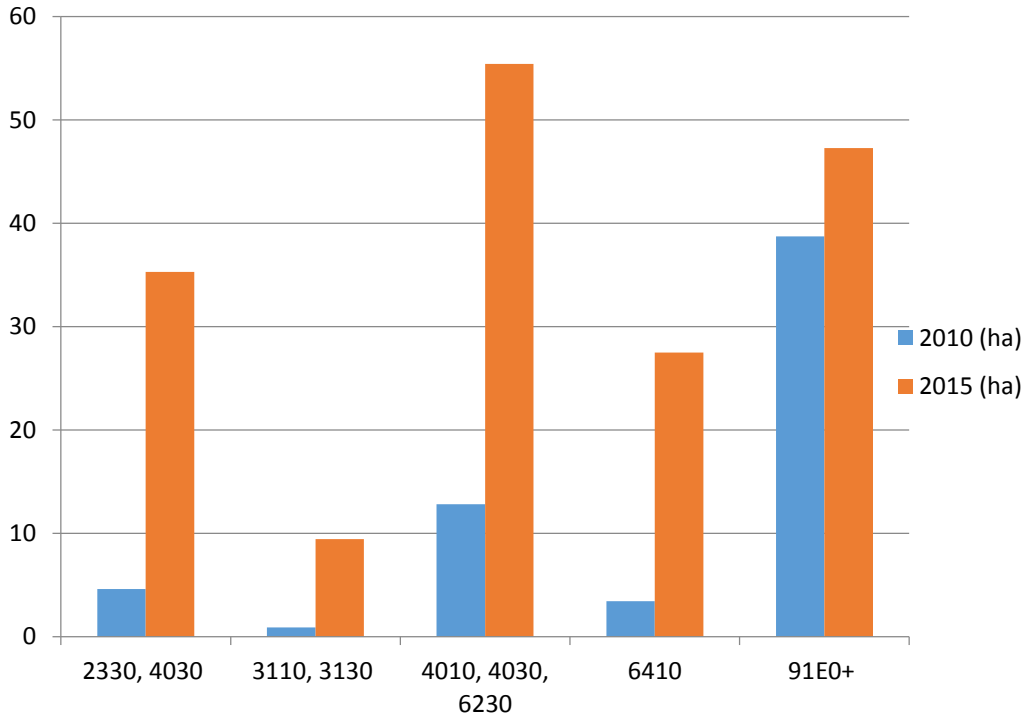


in 2012



in 2013

Results



Doelhabitat	Habitatcode	2010 (ha)	2015 (ha)
Dune heathlands	2310,2330, 4030	4,6006	35,2844
Oligotrophic waters	3110, 3130	0,8873	9,4203
Heathlands	4010, 4030, 6230+	12,803	55,4283
Molinia meadows	6410	3,4082	27,5042
Alder carrs	91E0+	38,743	47,2684

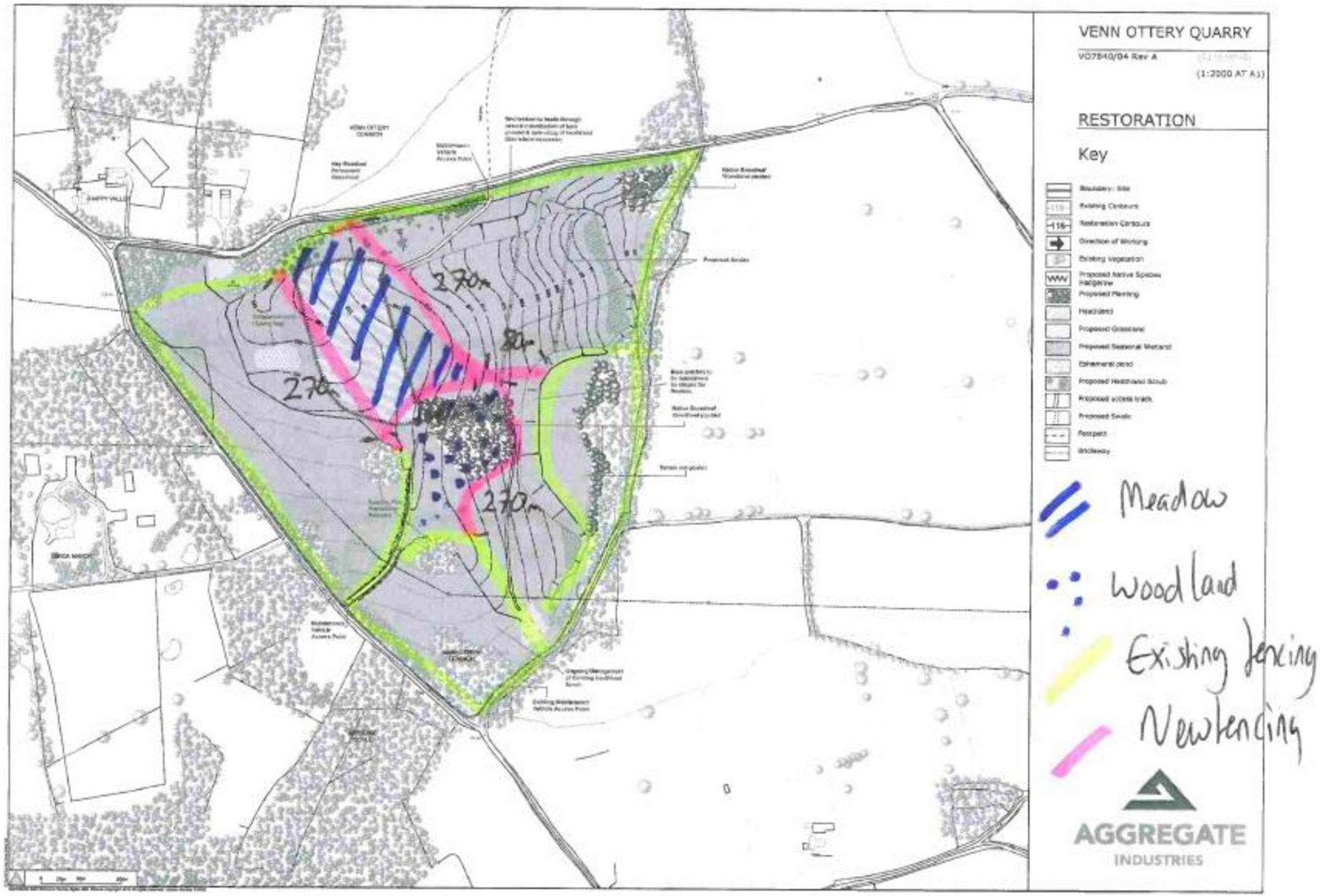
Results

- Adder: 145 unique individual
- Woodlarks: 1→10 pairs
- Nightjar: 0→8 pairs
- Great grey shrike: wintering individual

Conclusions

Feasibility of the approach

- Approach – 'painful but effective'
- Citizen science recording is incredible and natural historians keen to help
- Utilise and stimulate further improvements in monitoring and surveillance
- Regionally important species previously off radar – if lost then at risk of national homogenisation
- Value in thinking about processes in habitats – this thinking is much more management relevant
- Set methodology - Refined and tested in three areas to date
- Partnership approach and getting involvement is important – extra time for co-ordination is worth effort


VENN OTTERY QUARRY
VO7840/04 Rev A
(1:2000 AT A1)
RESTORATION
Key
Boundary - Site
Existing Contours
Restoration Contours
Direction of Working
Existing Vegetation
Proposed Native Species Hedgerow
Proposed Planting
Headland
Proposed Grassland
Proposed Seasonal Wetland
Ephemeral pond
Proposed Heathland Scrub
Proposed access track
Proposed Swale
Footpath
Bridleway
270m
270m
270m
Meadow
Woodland
Existing fencing
New fencing
AGGREGATE
INDUSTRIES

Future challenges in research (I)

1 Critical loads based on vegetation changes, but what about stoichiometry affecting animals?

2 How to mitigate expected climate effects?

3 How to balance between disturbance and restoration management?

Future challenges in research (II)

1 Burning and grazing as traditional measures do well:

- What is the best way and period of burning?
- What densities of sheep or goat do we need,
- Depending on soil type and conditions,
- Production level of the vegetation,
- Period in the season, size of the area,
- And should it be with shepherd or within fences?