Functional connectivity and green infrastructure FUNgreen

Sara Cousins (Stockholm University)

Funded projects final conference, 12-13 November 2019, Brussels

BiodivERsA COFUND Call (2015-2016)

« Understanding and managing biodiversity dynamics to improve ecosystem functioning and delivery of ecosystem services in a global change context: the cases of soils and sediments, and land- river and sea-scapes »

CONSORTIUM DESCRIPTION

FUNgreen consortium members:

Partner 1 (coordinator): Sara Cousins, Stockholm University, Sweden

Partner 2: Olivier Honnay, KU Leuven, Belgium

Partner 3: Peter Poschlod, University of Regensburg, Germany

Partner 4: Anna Traveset, IMEDEA Mallorca, Spain

Self-funded or sub-contracted partners

Partner 5: James Bullock, Centre for Ecology and Hydrology, UK

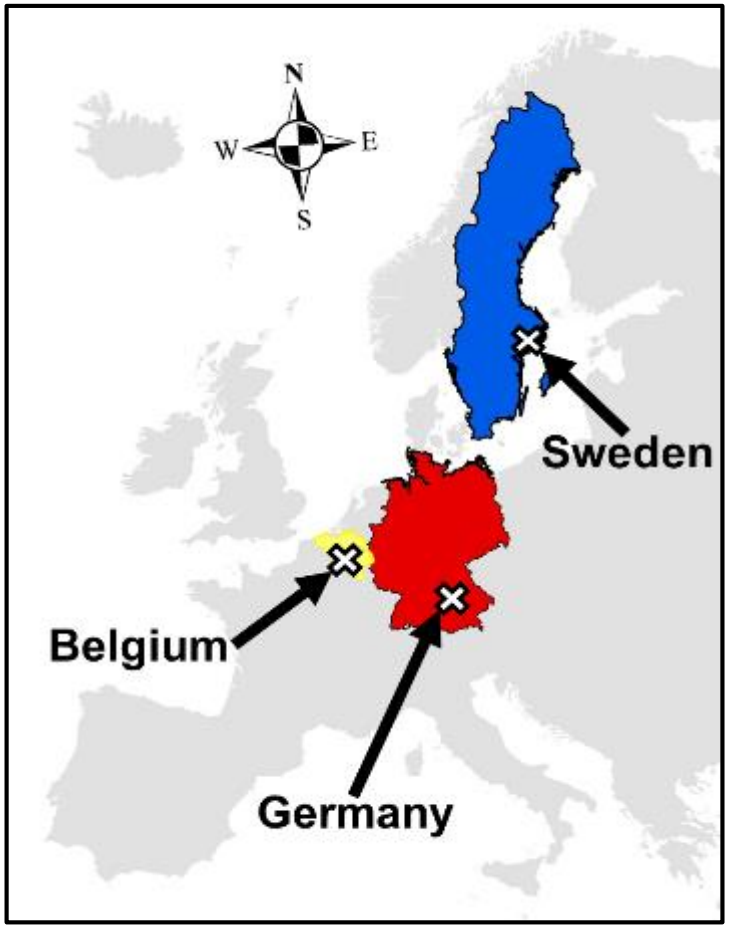
Partner 6: Danny Hooftman, Lactuca, Netherlands

PROJECT DESCRIPTION

36 landscapes across 3 countries, surrounding ancient or restored grasslands.

Past and present landscape composition and landscape connectivity were assessed

Plant species, pollinator networks, genetic material and ecosystem services sampled in focal grasslands and in the wider landscape

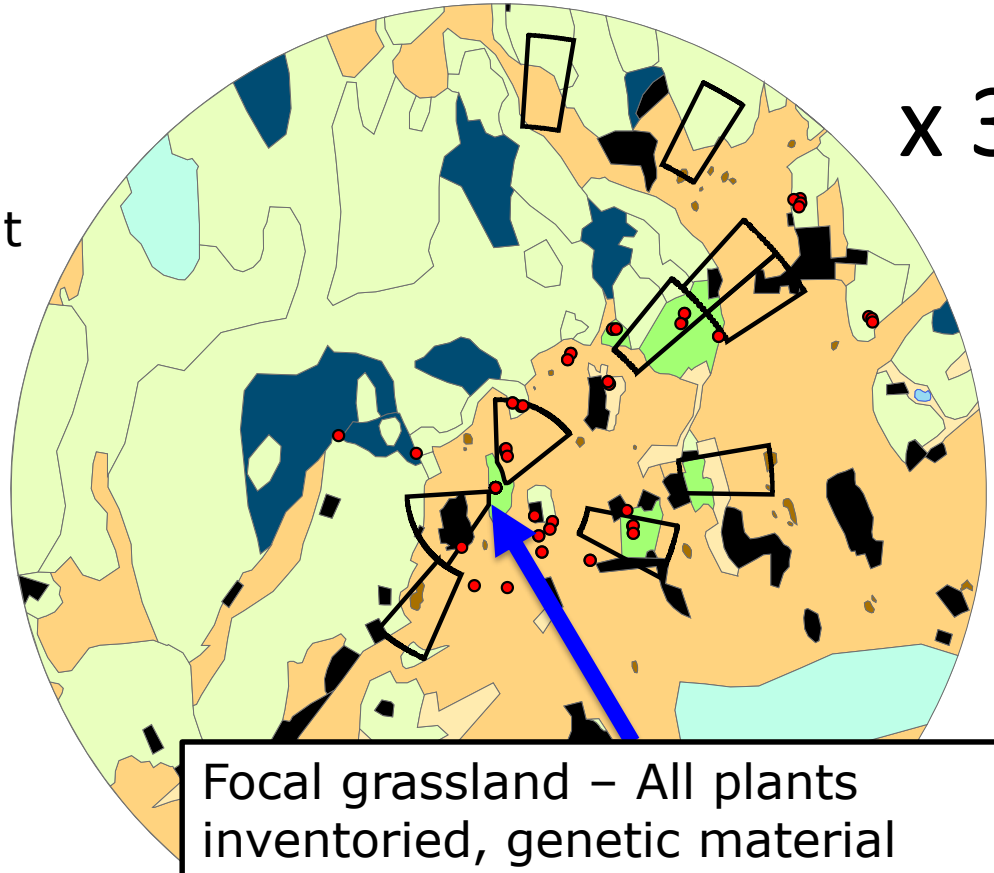


PROJECT DESCRIPTION

To disentangle effects of landscape structure and anthropogenic management on plant dispersal and diversity.

Do habitat corridors and stepping stones support plant movement through an unsuitable matrix?

Can “green infrastructure” habitats help offset grassland loss?



x 36

Focal grassland – All plants inventoried, genetic material collected (2 species), pollinator networks mapped in detail

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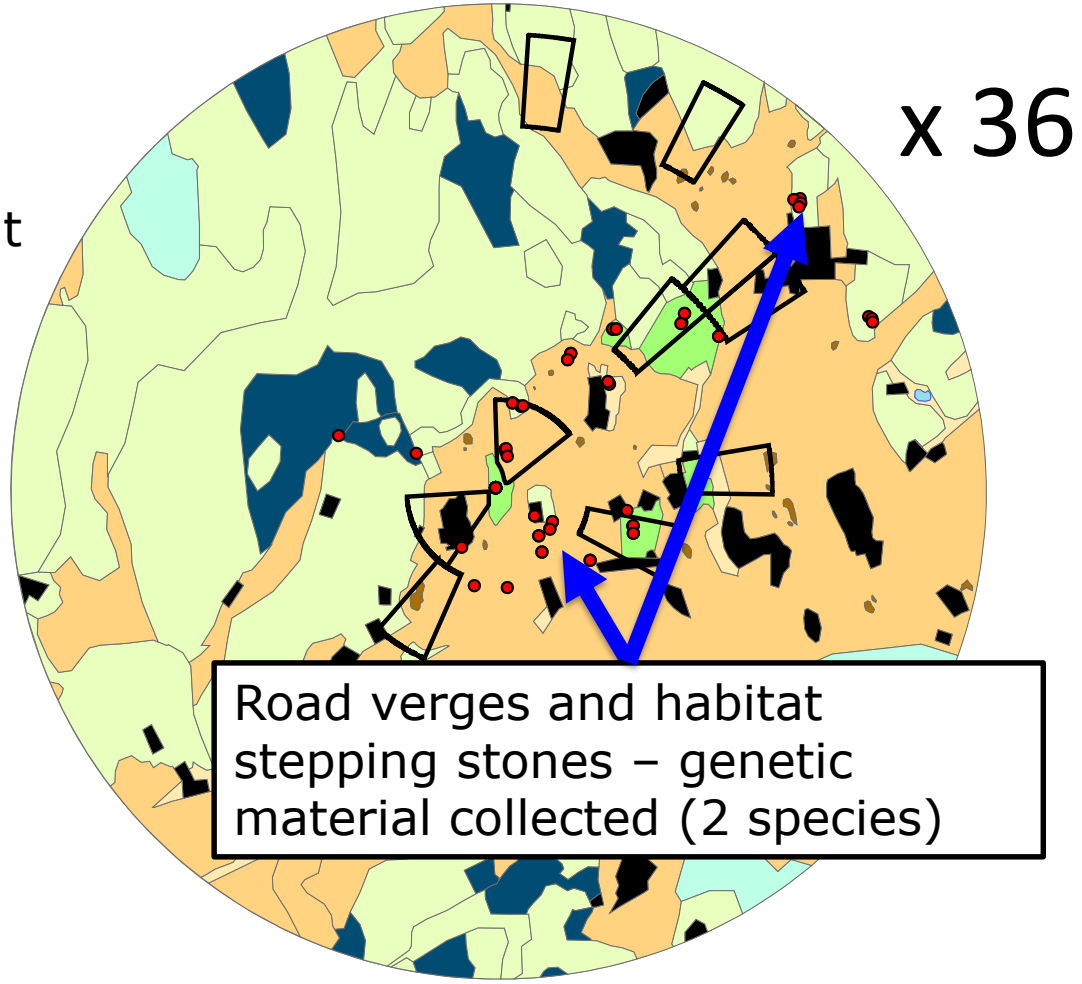

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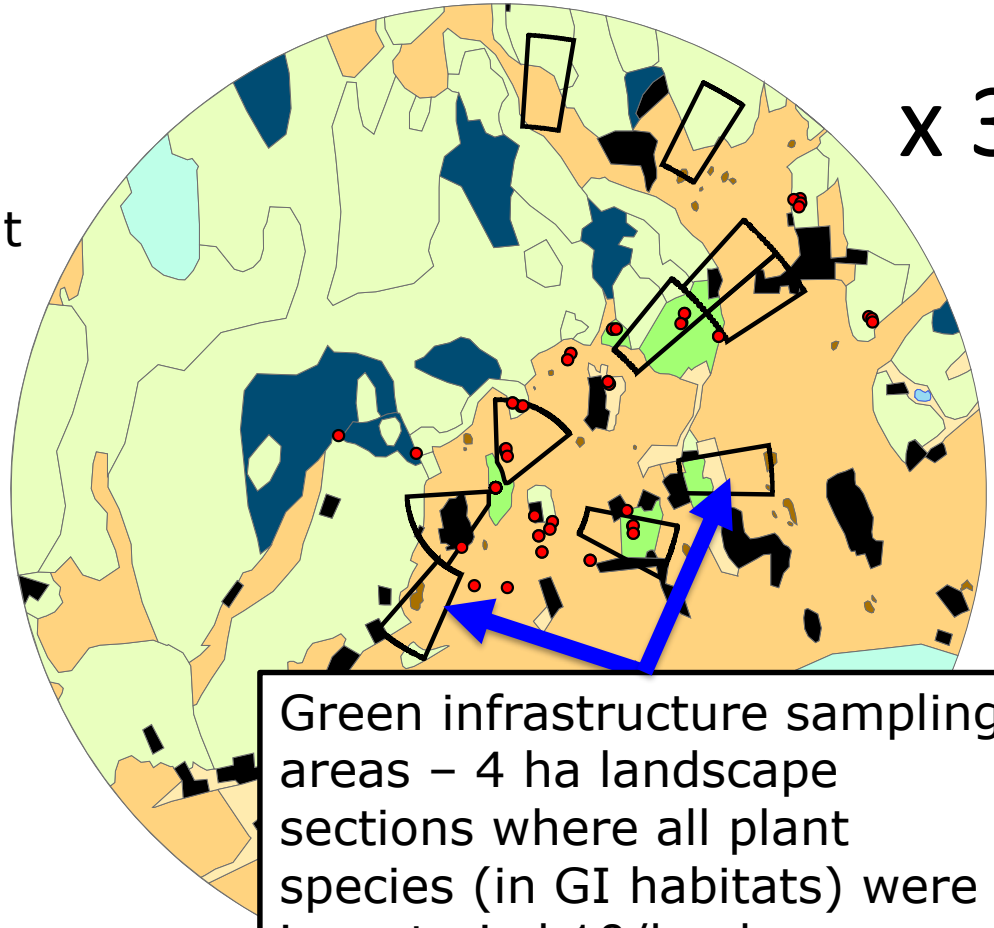
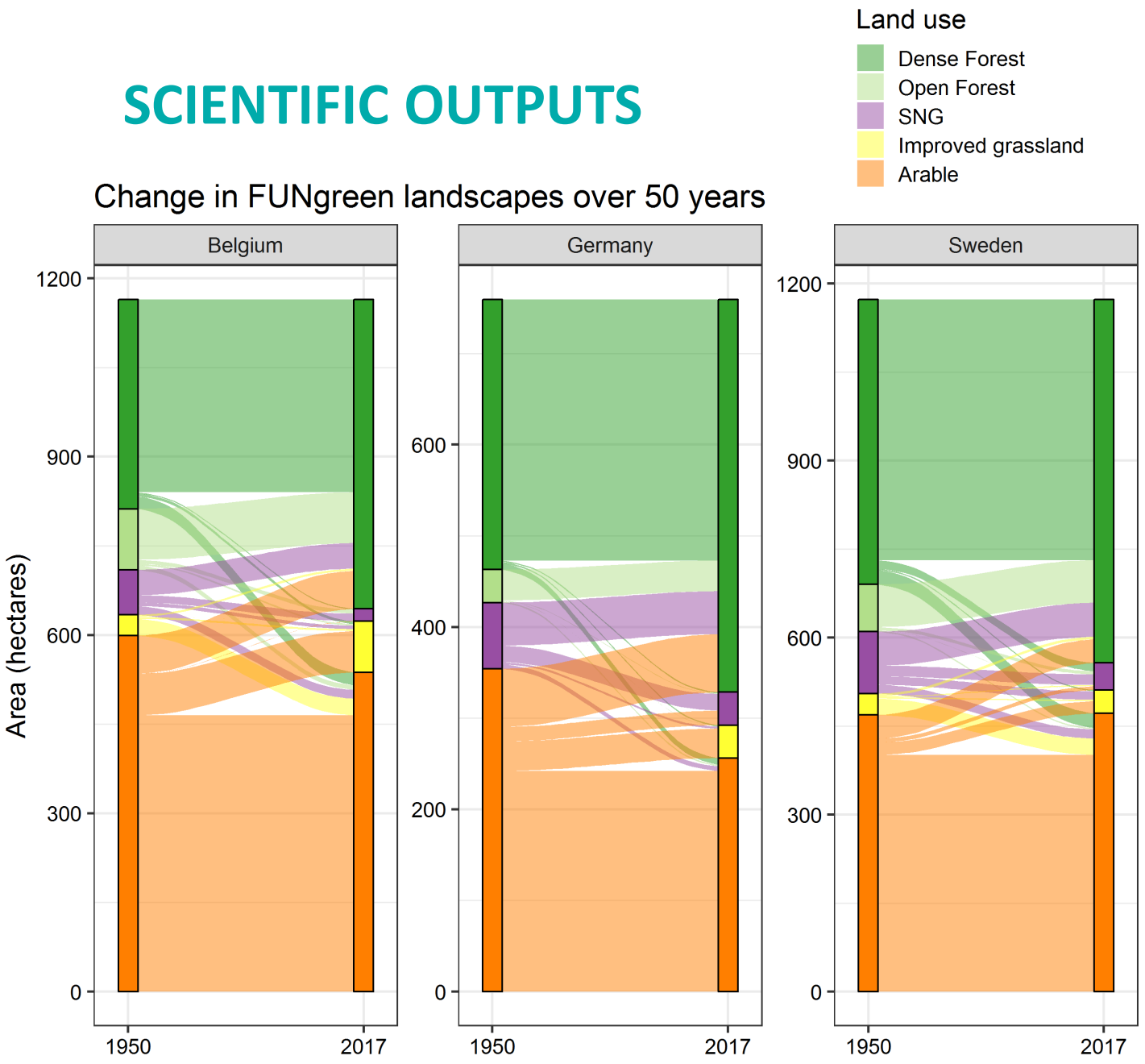


x 36

Green infrastructure sampling areas – 4 ha landscape sections where all plant species (in GI habitats) were inventoried 10/landscape

SCIENTIFIC OUTPUTS

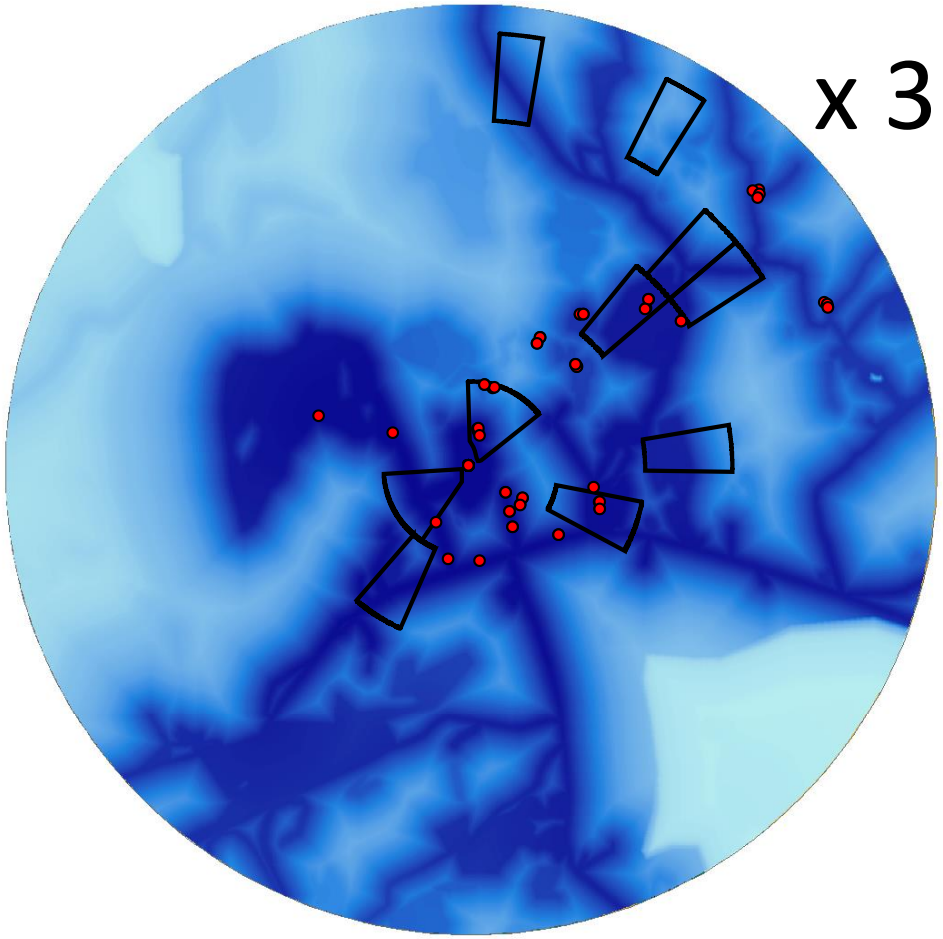
Large scale loss of grassland across all countries (to forest or arable land)



SCIENTIFIC OUTPUTS

Resistance surfaces based on plant dispersal methods (bird, **Euclidian**, human, wind, **Livestock**)

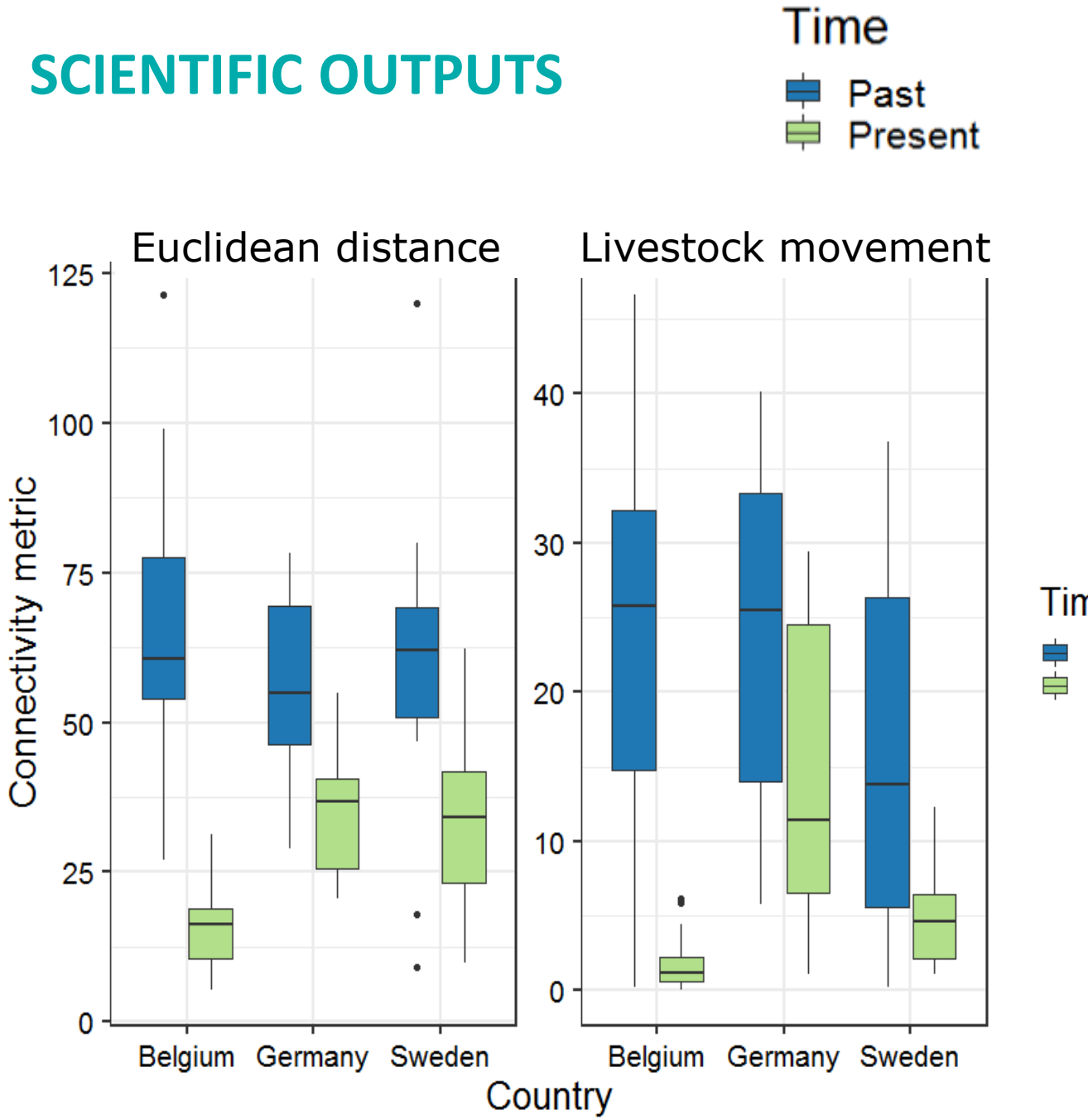
Bold=significant



Darker blue = better connected

SCIENTIFIC OUTPUTS

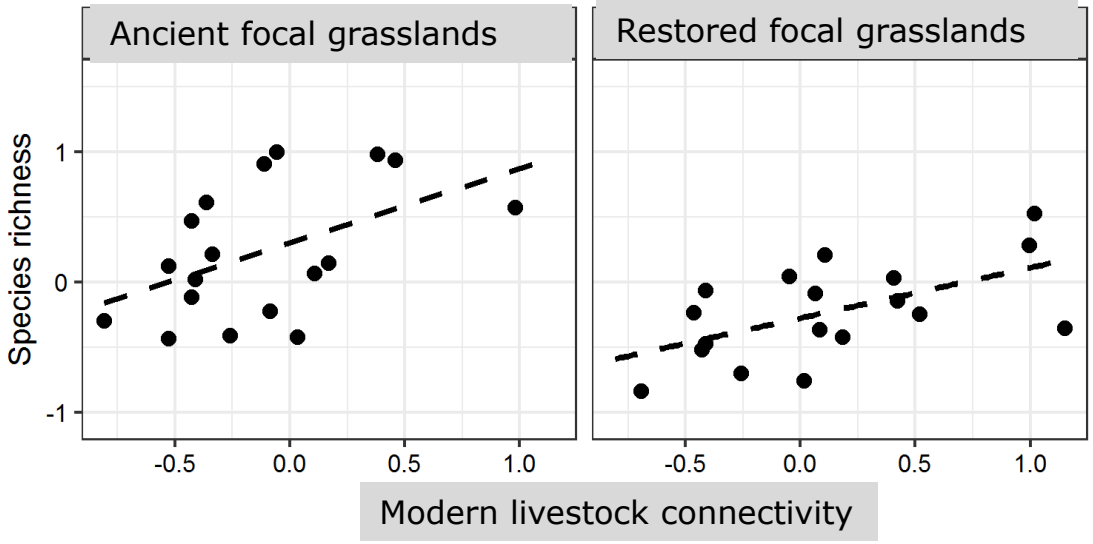
Major declines in overall functional connectivity (despite increases in hedgerow and road verges)

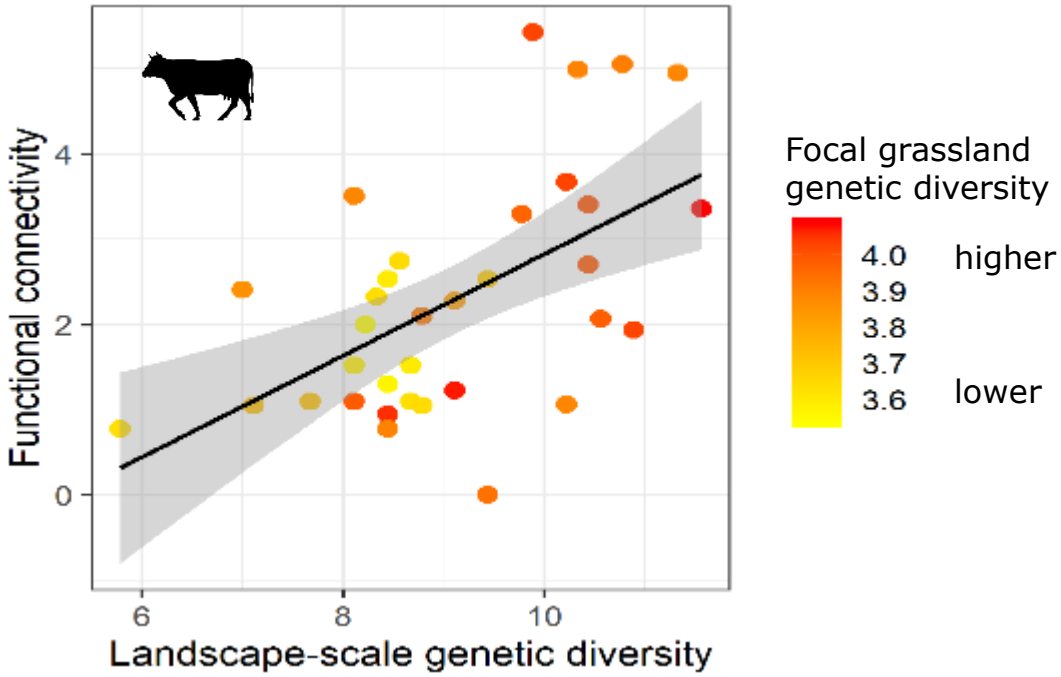


SCIENTIFIC OUTPUTS

High functional connectivity by livestock movement vital for plant species and genetic diversity in **focal** grasslands

Links facilitated by livestock movement between habitats help poor dispersers spread across the landscape

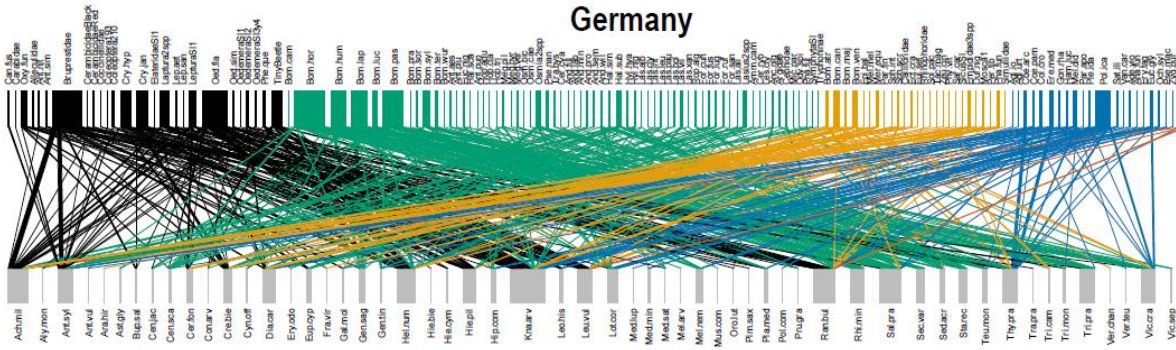


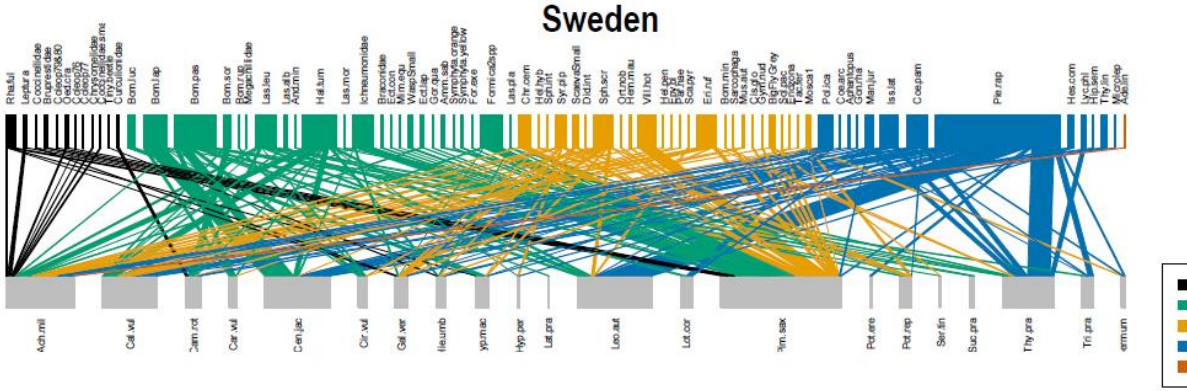


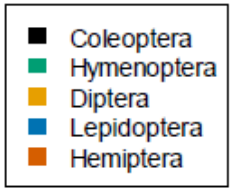
SCIENTIFIC OUTPUTS

Pollinators in restored grasslands are **similar** to ancient grasslands

Isolated focal grasslands get **less** flower visits





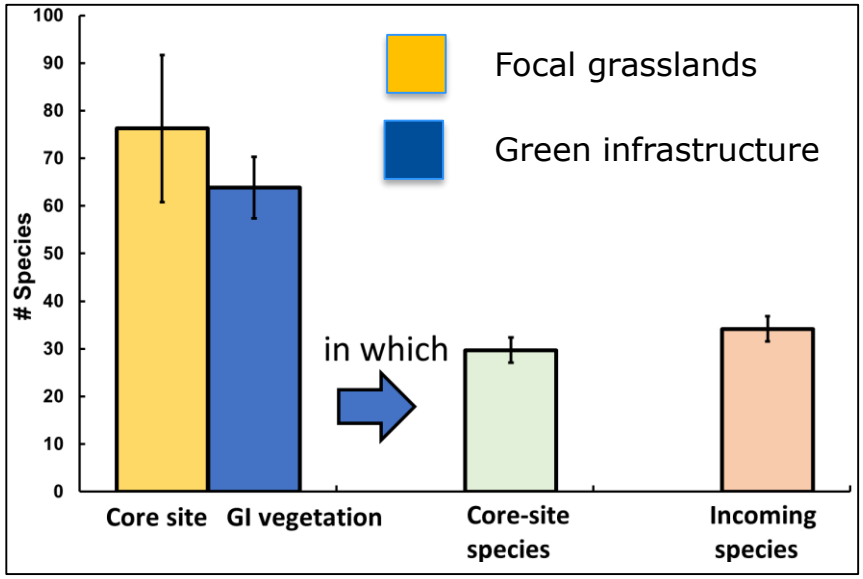


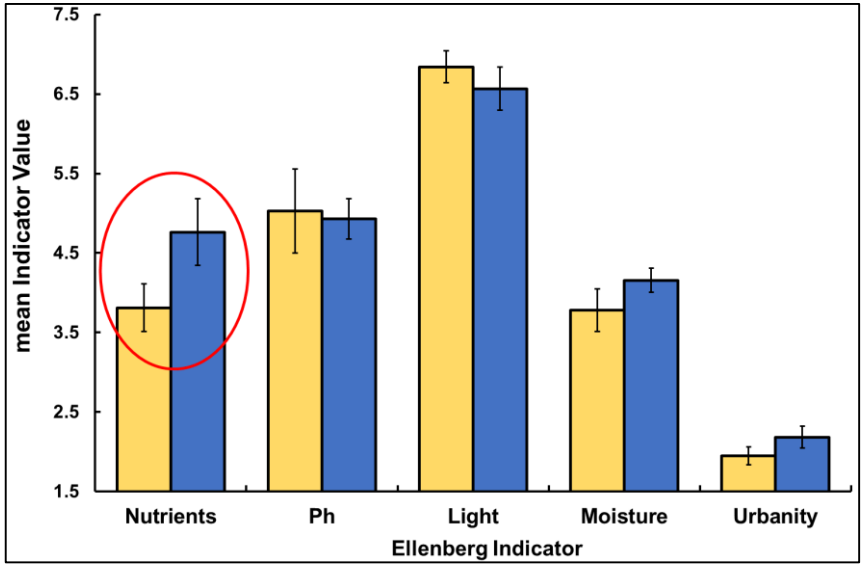
SCIENTIFIC OUTPUTS

Most Green Infrastructure does not support large grassland plant populations (especially when not well connected)

Generally more **nutrient demanding** species from the wider landscapes

Dispersal and establishment limitation affecting green infrastructure diversity



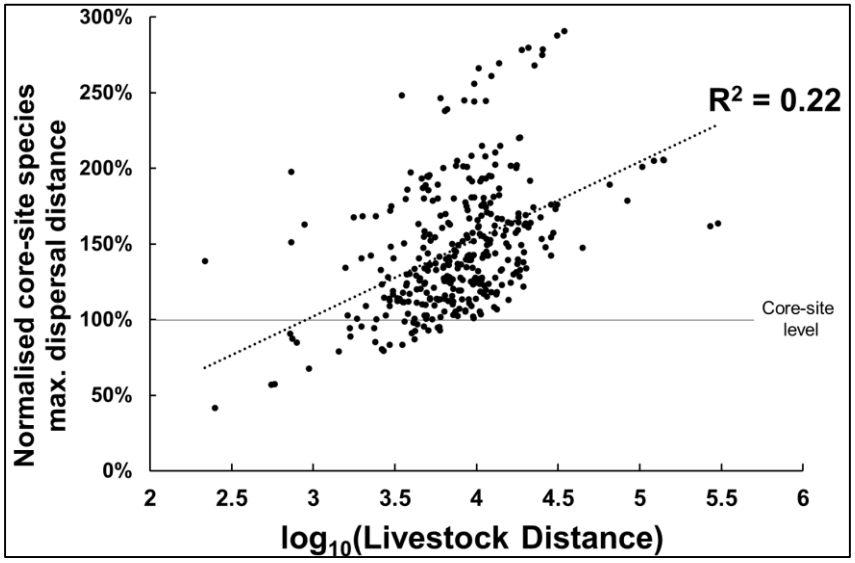


SOCIETAL / POLICY OUTPUTS

Connectivity provided by grazing animals is key for **biodiversity** across many taxa.

Livestock transport a large number and variety of seeds, and subsidies for (e.g.) shepherds is likely more economically viable than active **restoration** measures (seed sowing).

Isolation by distance severely **negative** for focal species.



SOCIETAL / POLICY OUTPUTS

Ecosystem services
Increasing connectivity is expected to lead to higher biodiversity and greater **pollination** services in the GI - but core grasslands are still much better for **carbon storage**.

Time is an important factor however, with poor dispersers and specialist species less able to take advantage of new links and restored grasslands

SOCIETAL / POLICY OUTPUTS

Presentations and discussions with **land management groups, national policy makers and local authorities**

Publication of plain language reports/articles

Participation in public **documentaries** and **media** appearances

500000 Euro from Swedish Environmental Protection Agency "**Landscape indicators for Biodiversity**" 2019-2021

Documentary: https://www.zdf.de/dokumentation/planet-e/planet-e-schaefer-in-not---ein-traditionsberuf-vor-dem-ende-100.html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