

Drivers of early community assembly during restoration of species-rich grasslands (Bagno Serebryskie, SE Poland)



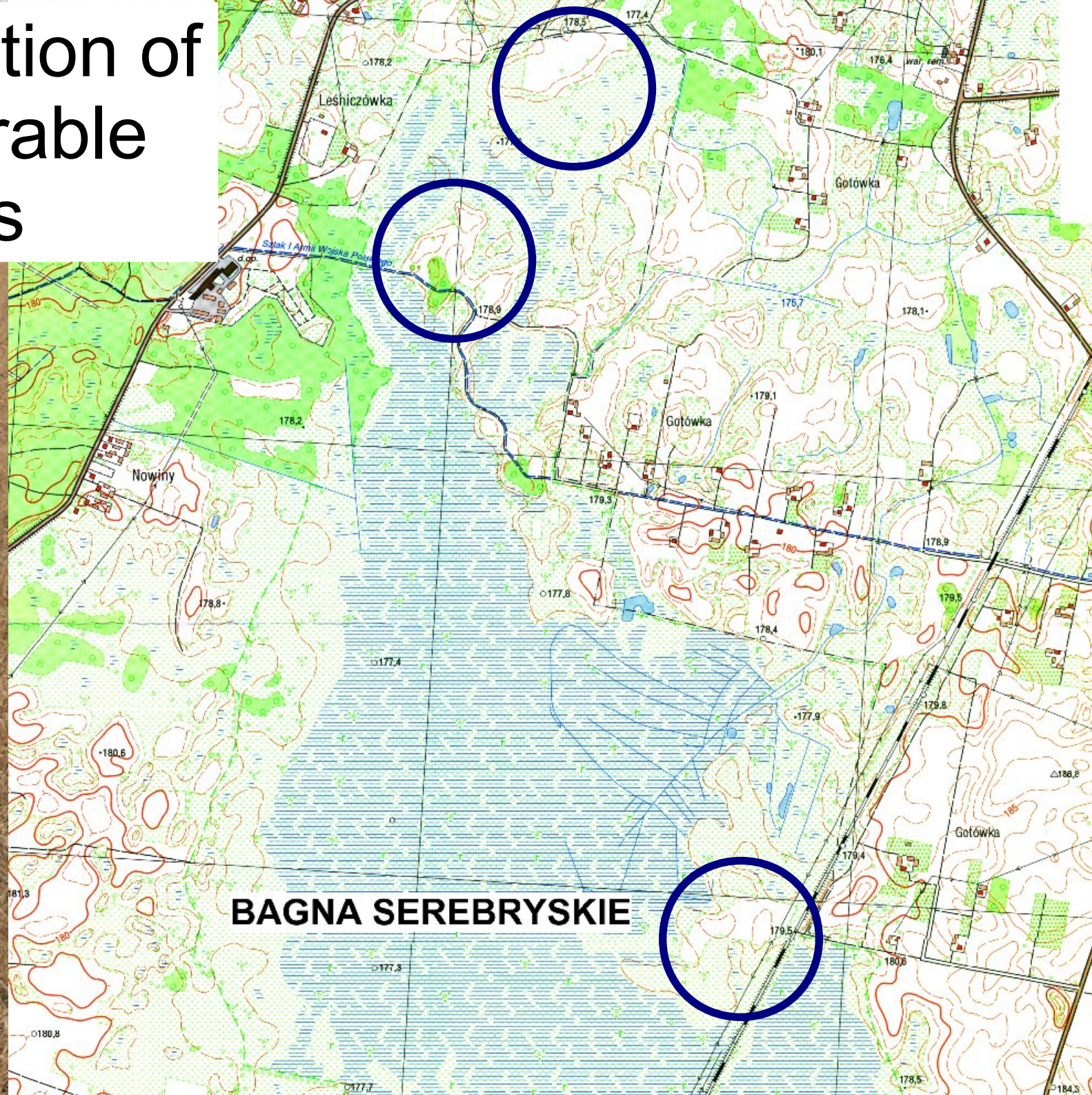
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dr Wiktor Kotowski (PhD advisor)

SUBJECT OF MY THESIS:

**Establishment and formation of vegetation
after topsoil inversion and seed transfer
on the abandoned arable land
in the Bagno Serebryskie Nature Reserve**



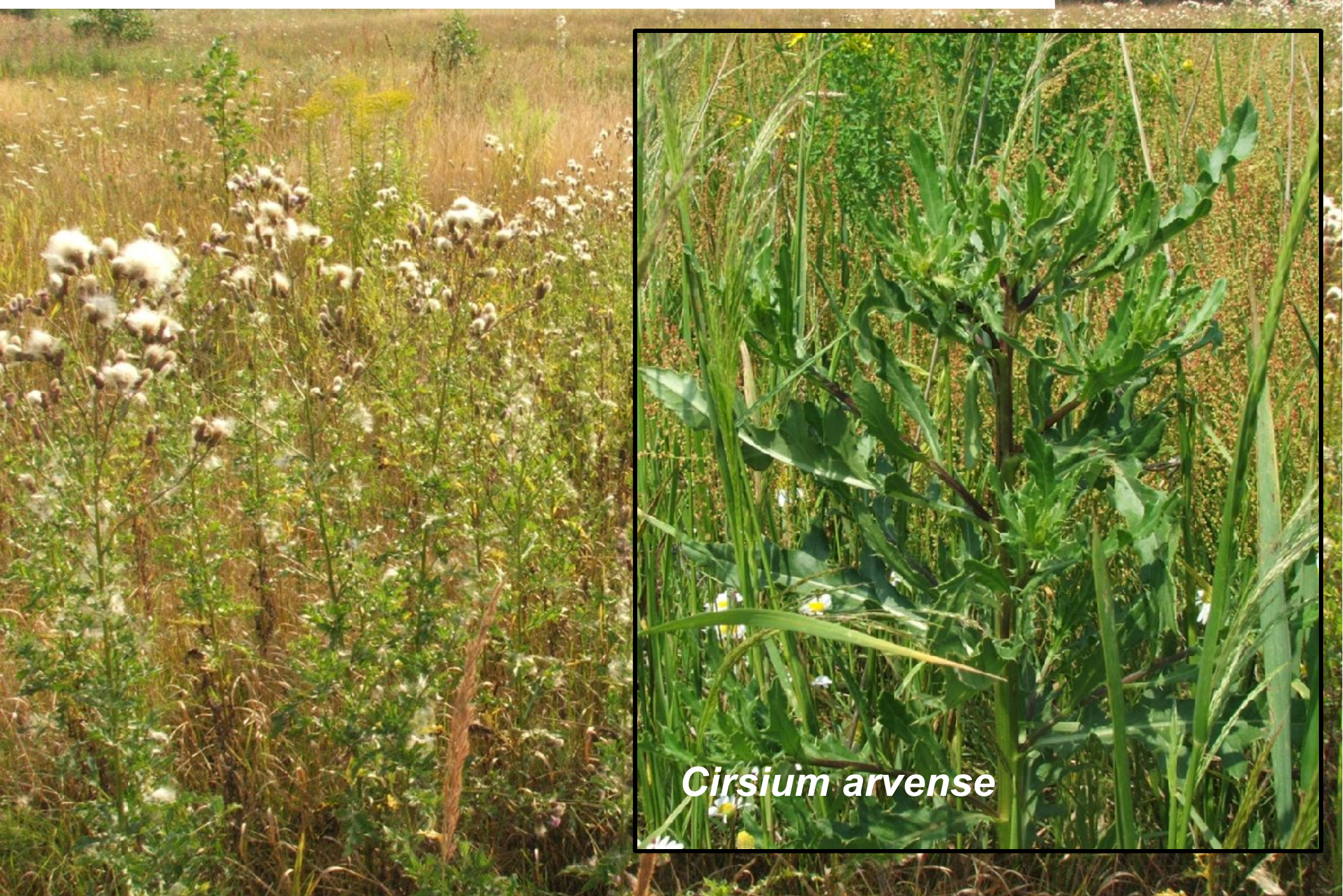
Location of ex-arable areas



Plant cover in the ex-arable areas



Plant cover in the ex-arable areas



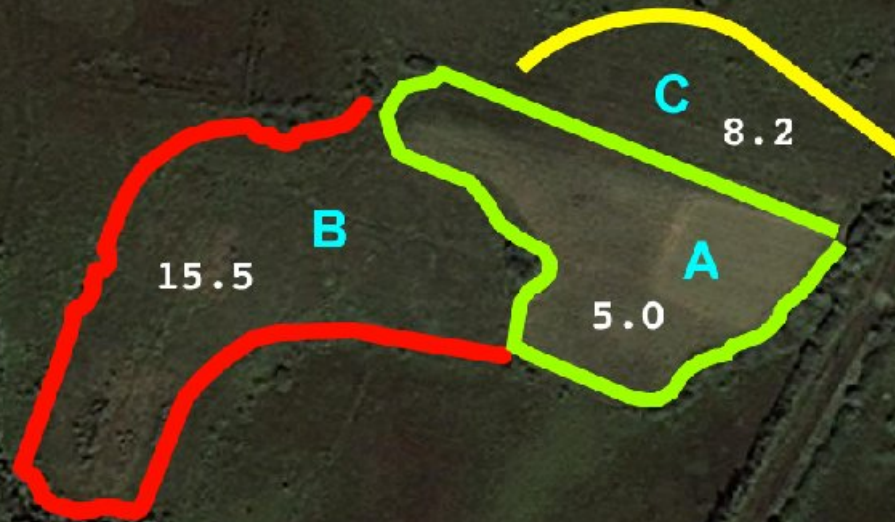
Cirsium arvense

Plant cover in the ex-arable areas



Erigeron annuus

[mg P₂O₅ / 100g gleby]



**SPECIES PLANNED
TO BE INTRODUCED
- examples**



Rhinanthus minor



Centaurea jacea



Gentiana pneumonanthe



Succisa pratensis

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**SPECIES PLANNED
TO BE INTRODUCED
– examples**

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Dianthus superbus



Campanula glomerata



Briza media



*Campanula
sibirica*

**SPECIES PLANNED
TO BE INTRODUCED
- examples**

Re-creation works:

- mowing,
- deep ploughing,
(average depth of ploughing 28,5 cm)
- periodic harrowing or cultivating,
- vacuum harvesting,
- hand sowing.

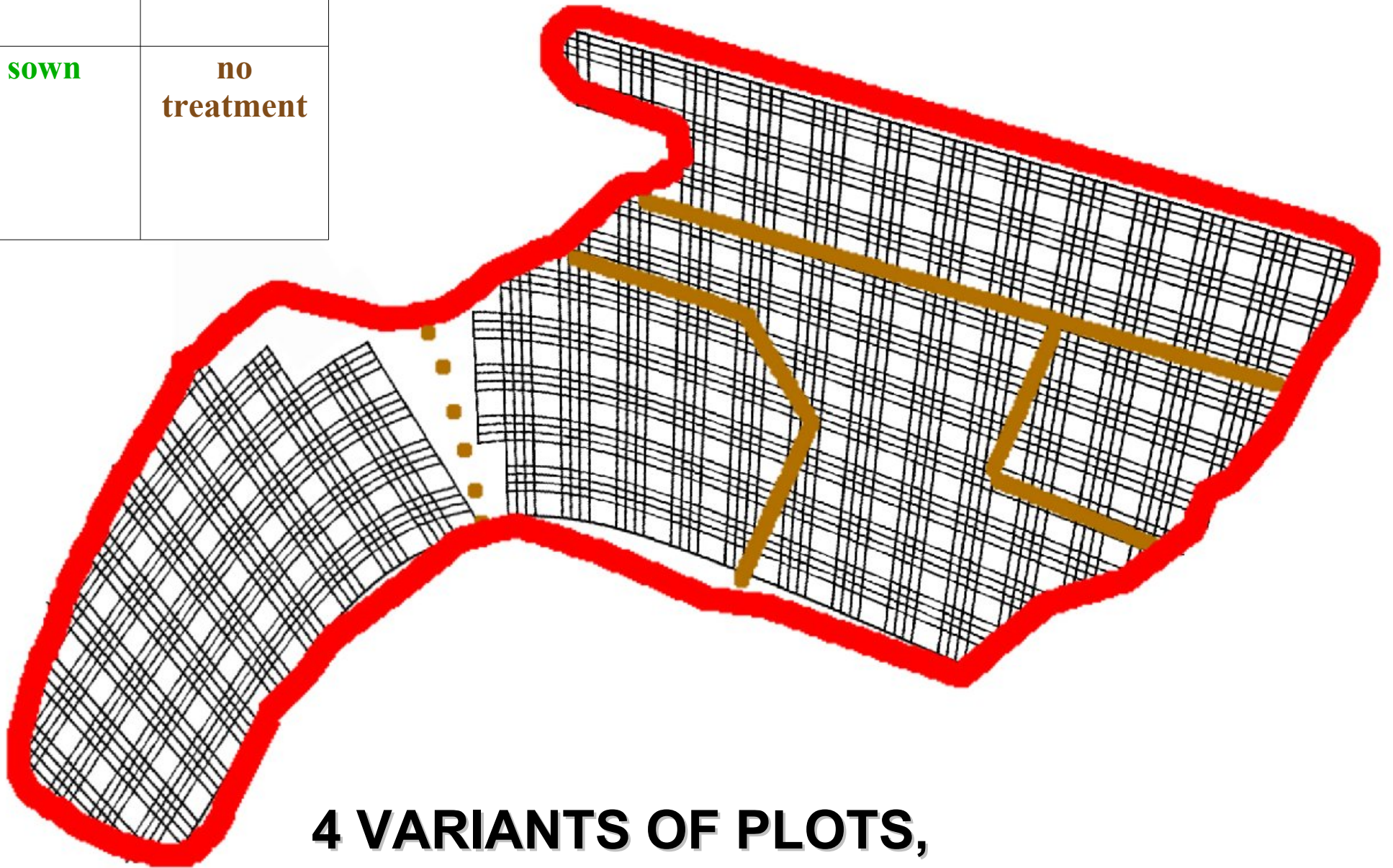


Goal:

**introduce a broad pool
of locally-available species
from the range of habitats
related to the wetness
gradient
present in restoration
sites;
let the habitat
and internal
community processes
select species.**



ploughed sown	ploughed
sown	no treatment



**4 VARIANTS OF PLOTS,
30-50 REPLICATES OF EACH VARIANT**

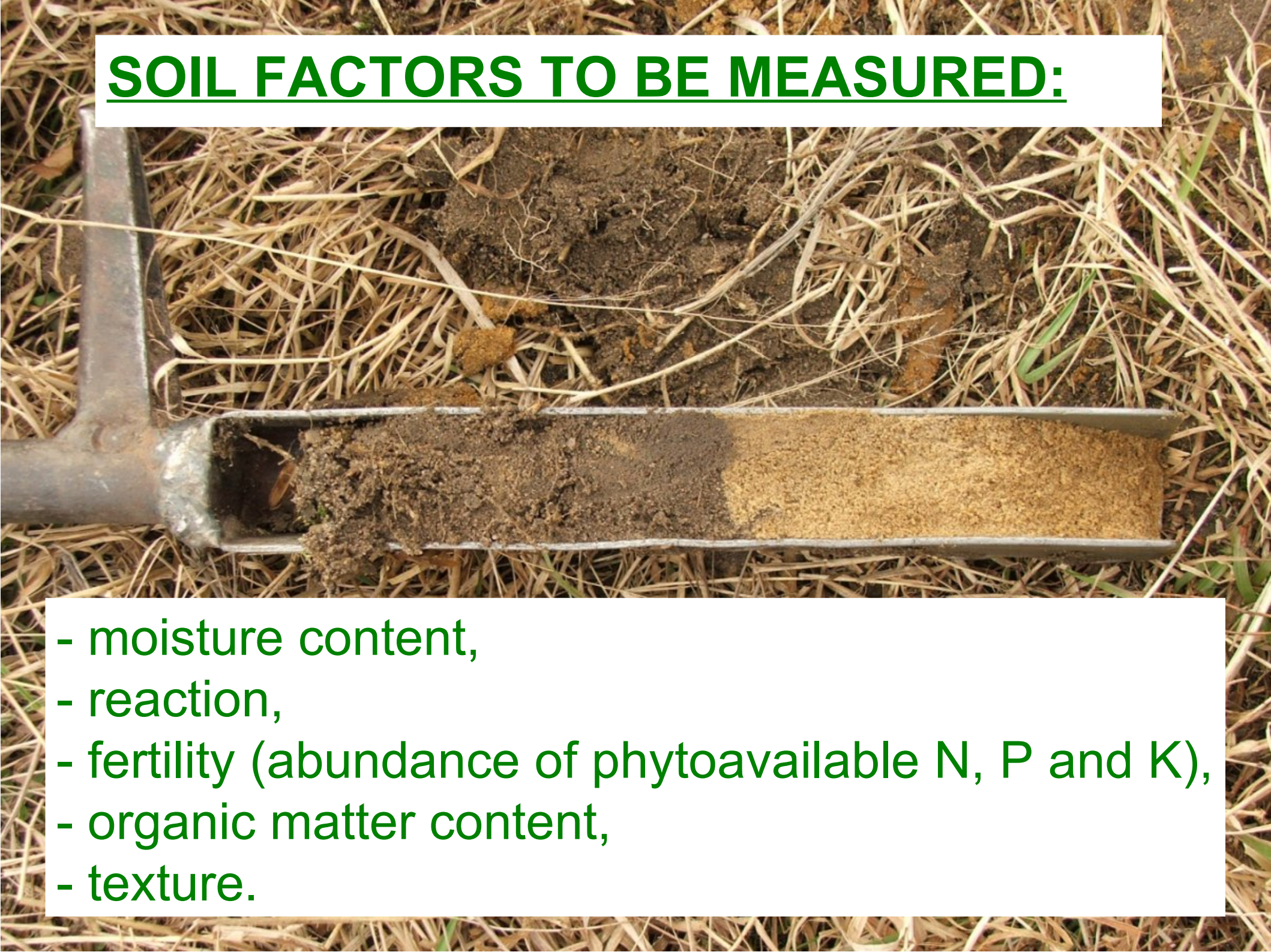
QUESTIONS:

1. What are the main ecological filters during the early assembly of restored communities? Are they abiotic factors, i.e. soil conditions in the first 2 years after sowing or biotic factors, i. e. competition in the second year after sowing and onwards?

Hypothesis: Competition (and not the abiotic conditions) is the main ecological filter for the species pool introduced in the restoration process.

Method: Vegetation survey using Londo 's scale, canonical analysis of relations between certain environmental factors and the number of species of certain functional types (hydrology, pH, autumn germination, germination percentage, seedlings growth rate etc.)

SOIL FACTORS TO BE MEASURED:

- 
- moisture content,
 - reaction,
 - fertility (abundance of phytoavailable N, P and K),
 - organic matter content,
 - texture.

QUESTIONS:

2. Does mechanical elimination of the segetal and ruderal species stimulate recruitment of the introduced plants and supports their establishment?

Hypothesis: Mowing, deep ploughing and periodic harrowing or cultivation will decrease viability and number of specimen of segetal and ruderal species and their soil seed bank.

Method: Comparison of plant species composition of ploughed and unploughed plots.

QUESTIONS:

3. Is it possible to accelerate the establishment by seeds transfer done by sowing seeds harvested with a petrol garden vacuum harvester?

Hypothesis:

The restoration can be facilitated by transfer of seeds collected with a vacuum harvester and their hand sowing

Method: Comparison of plant species composition of sown and unsown plots

Conclusions:

Seed material should be collected in summer, every 2-3 weeks - it is eaten up by insects, snails, slugs, birds and rodents. Collecting in autumn might be too late.

Labour needed for vacuum harvesting is the bottle neck of the restoration

If you sow the target species in autumn, you should plough the restoration area at least half a year before.

If you sow the target species in spring, you should plough the restoration area a year before (time for periodic harrowing or cultivating to inhibit "weeds" growth is needed).

The background image shows a natural restoration site. In the foreground, a person in blue jeans and a brown jacket is using a tool to work on the ground. To the right, another person in grey pants and a dark jacket is standing. In the background, there are trees, a white car, and some white bags. The sky is clear and blue.

What would I like to learn during the Summer School?

**More information on economically viable ways of use of restored areas, please!
How to maintain the ecological effect of nature restoration?!**

Thank you for your attention :-)