Diversity and plant invasion in primary and secondary sandy grasslands in Kiskunság

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Steppe Oak Woods and Pannonic Sand Steppes Conference

6 - 8 Oktober 2011
Kecskemét

Primary grassland in Kiskunság: Sandy grassland in Hungary

- Open and closed sand steppes: ÁNÉR ID: G1 and H5b, Natura2000: 6260
- Area according to the MÉTA:

- G1: 10700 ha , (Danubial Lowland : 9440 ha, 88%)
- H5b: 28000 ha, (Danubial Lowland: 20500 ha, 73%)

- Endemic species: *Dianthus diutinus, Dianthus serotinus, Gypsophila fastigiata ssp. arenaria*, ec.
- Dominant grasses: *Festuca vaginata, Stipa borysthenica*

Secondary grassland in Kiskunság: old-fields

- Uncharacteristic dry and semi dry grasslands and tall herbs: ÁNÉR ID: OC, Natura 2000:
- Area according to the MÉTA:

  about 157000 ha (Alföld: 68000 ha, 43%)
- Species: *Cynodon dactylon, Poa angustifolia, Elymus repens, Stipa capillata*, ec.
- Environmental conditions: coarse calcareous sand or sandy sill loam,
  - decreasing water table,
  - drying,
  - more nutrient as in open sandy grassland

Dry sandy habitats

source: MÉTA-program - Actual habitat Map of Hungary, 2005*

	In Hungary (ha)	In Danubial Lowland (ha)
Open sand steppes	10 700	9 440
Closed sand steppes	28 000	20 500
Closed lowland steppe oak woodland	~6 000	1 200
Open sand steppe oak woodland whith opening	290	190
Poplar-juniper steppe woodland	3 000	2 990
Uncharacteristic dry/semi-dry grasslands	157 000	68 000
Old-fields (estimation !)	350 000	Great Plain (whole !): 164 000

*http://www.novenyzetiterkep.hu

Problems

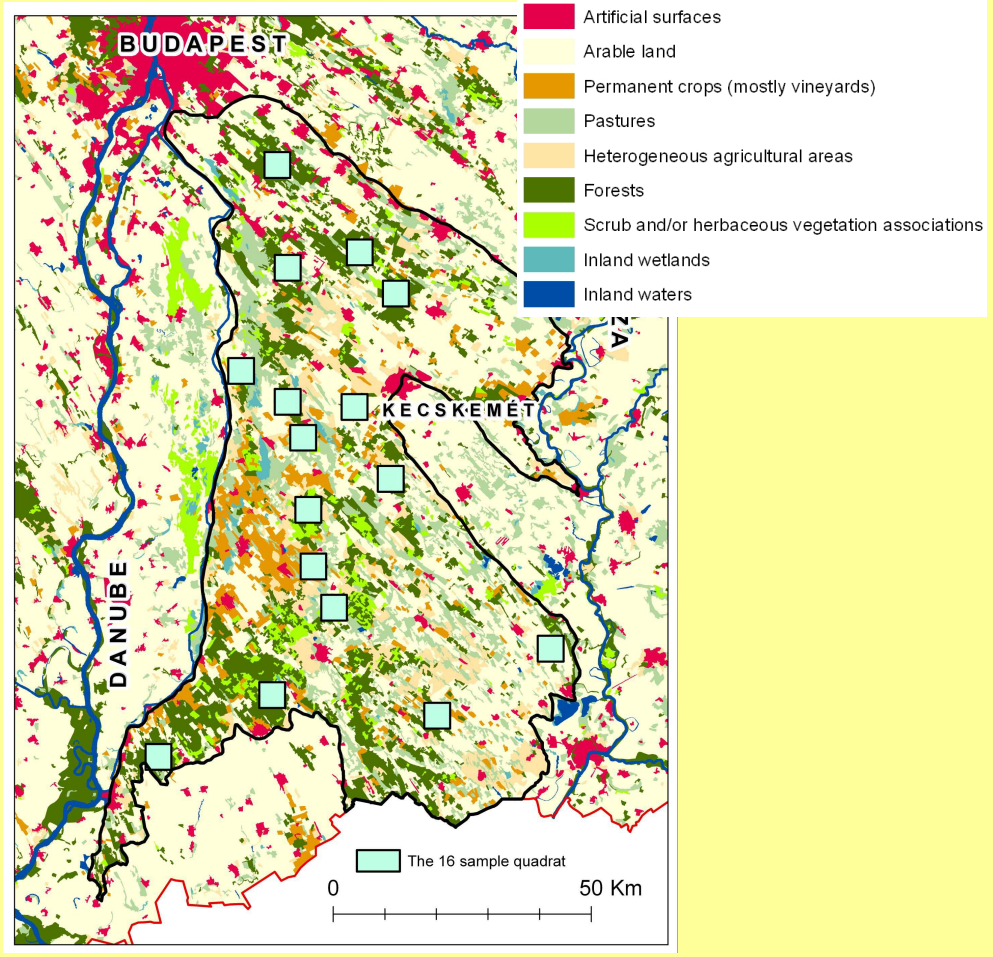
- What are the differences and similarities between the vegetation of natural sandy habitats and old-fields?
- Does the sandy grasslands regenerate on old-fields?
- How can be measured the regeneration success of old-fields?
- What are the invasive species and how much are there?
- Why are there invasive species and

- What to do with them?

Methods – research sites in the Kiskunság region

- 16 research sites of 5x5 km, representing the land-use heterogenity – Kiskun Longterm

- Actual habitat maps , 1: 5000 resolution based on the aerial photos from 2005



Methods - Field sampling

- Total 605 relevés:

161 relevés on old-fields, 20x20m
161 relevés of natural habitats, 20x20m
75 relevés on agricultural fields,
201 relevés on forest plantation

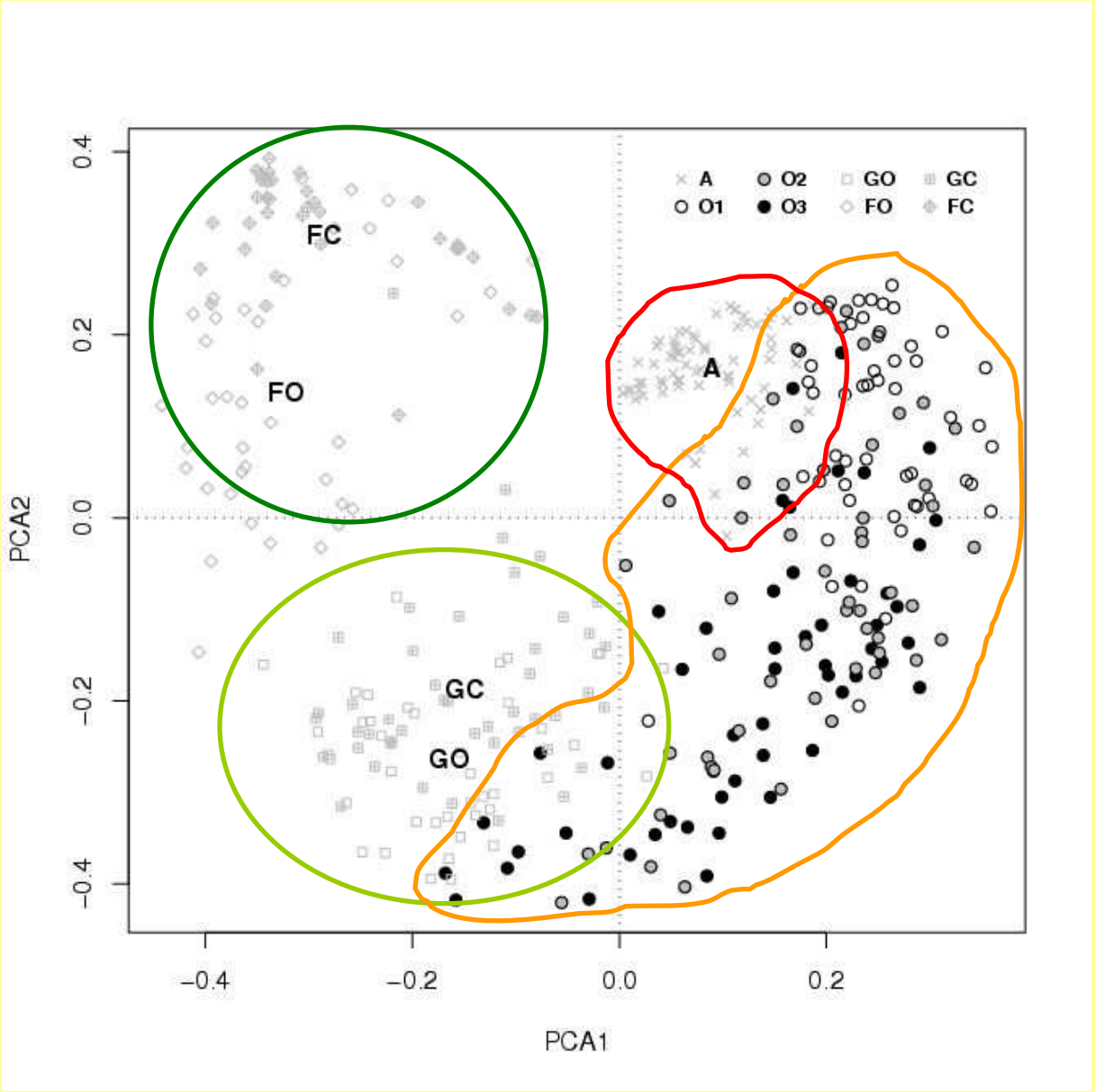
-Age groups of old-fields

1: 1-7 years old, O1
2: 8-20 years old, O2
3:21-40 years old, O3

- Indicators of regeneration success: total species number, neophyte number, characteristic species number

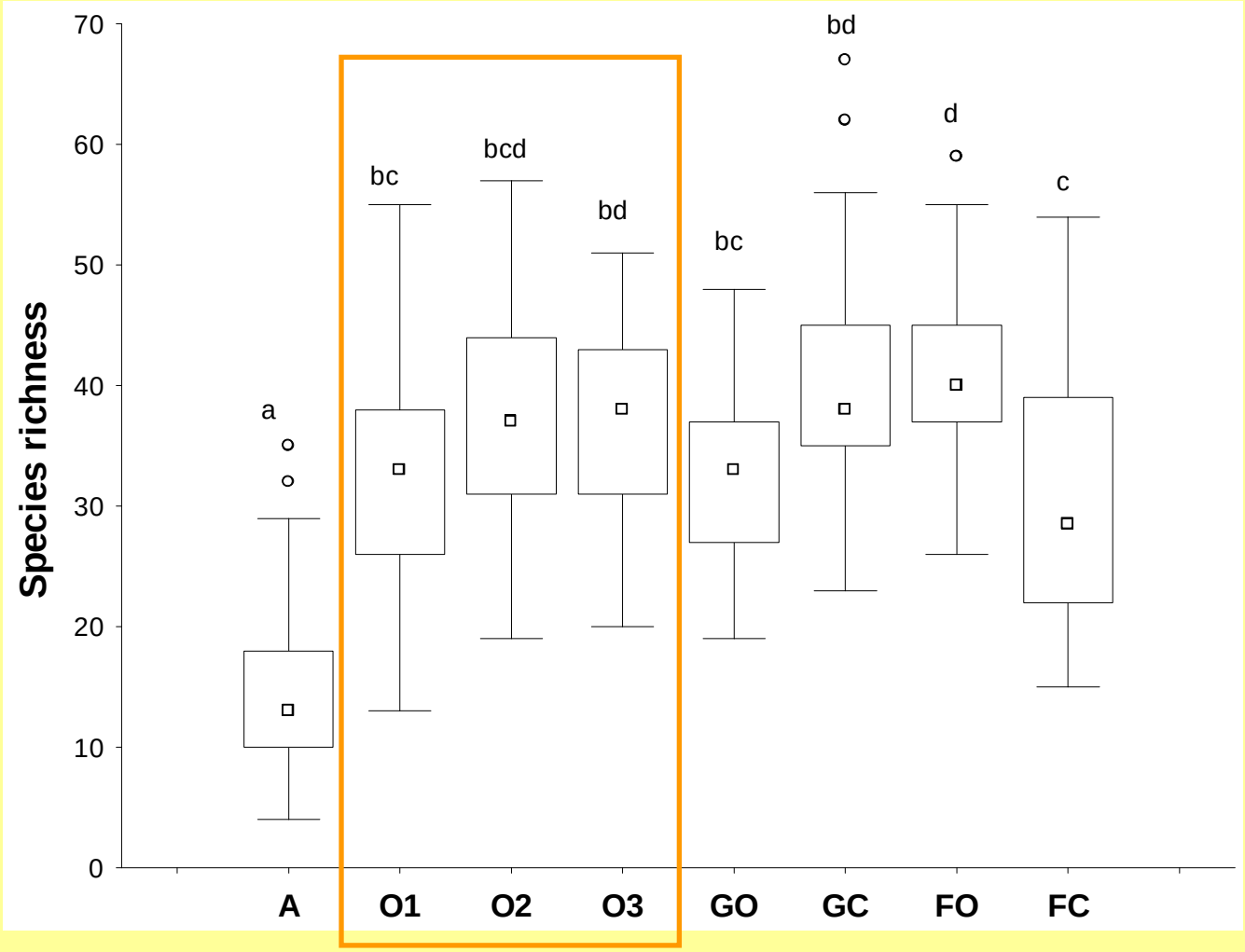
PCA of the releve's

- A: arable field, fruit and vineyards,
- O1, O2, O3: age-group of old-fields
- GO: open grassland,
  GC: closed grassland,
  FO: open forest,
  FC: sandy closed forest



In: Csecserits et al 2011, Plant Biosystems

Total species number of plants (species richness)



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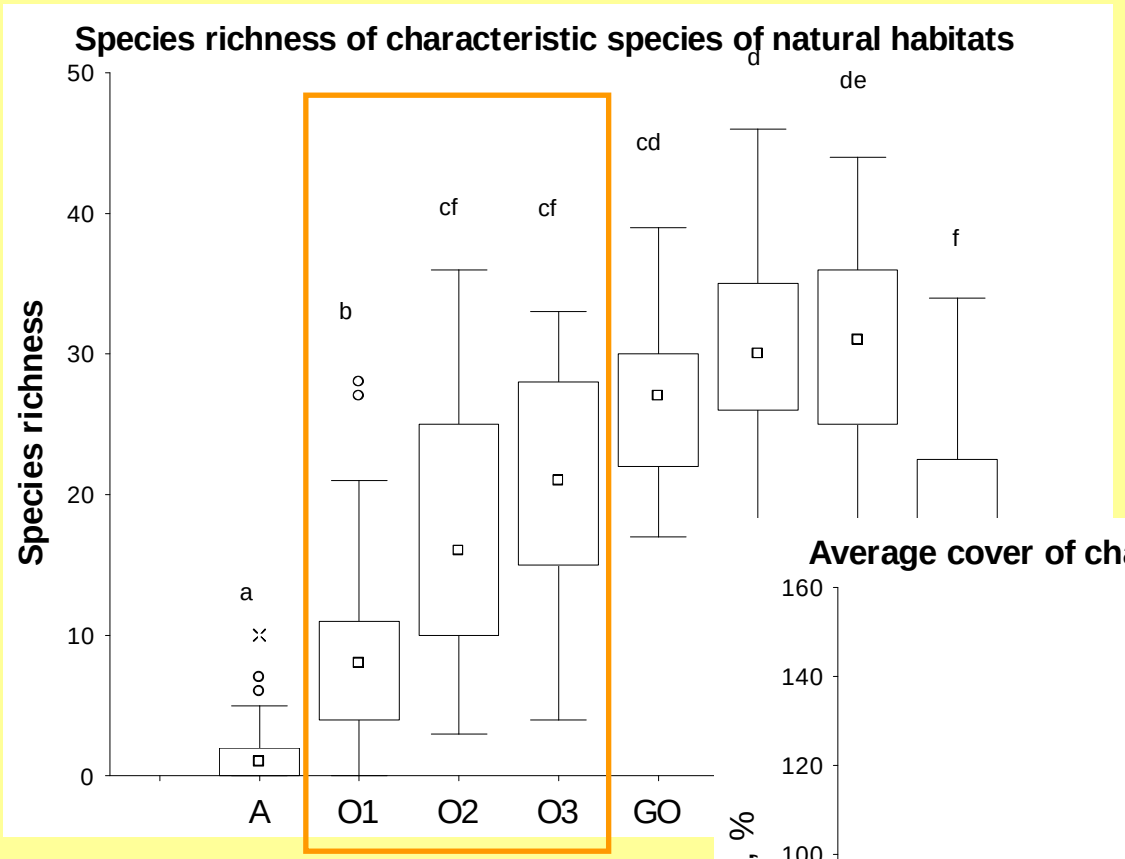

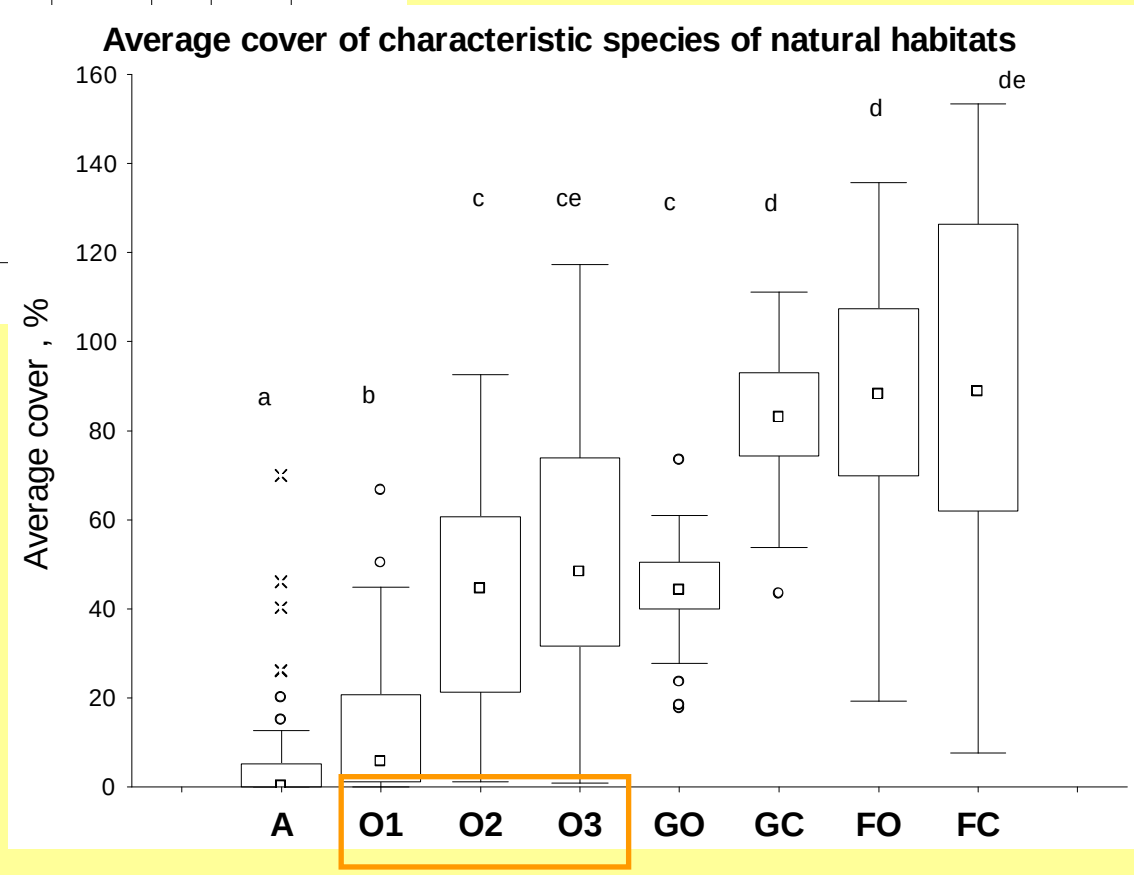

A: agricultural crop,
O1, O2, O3: old-fields
GO: open grassland,
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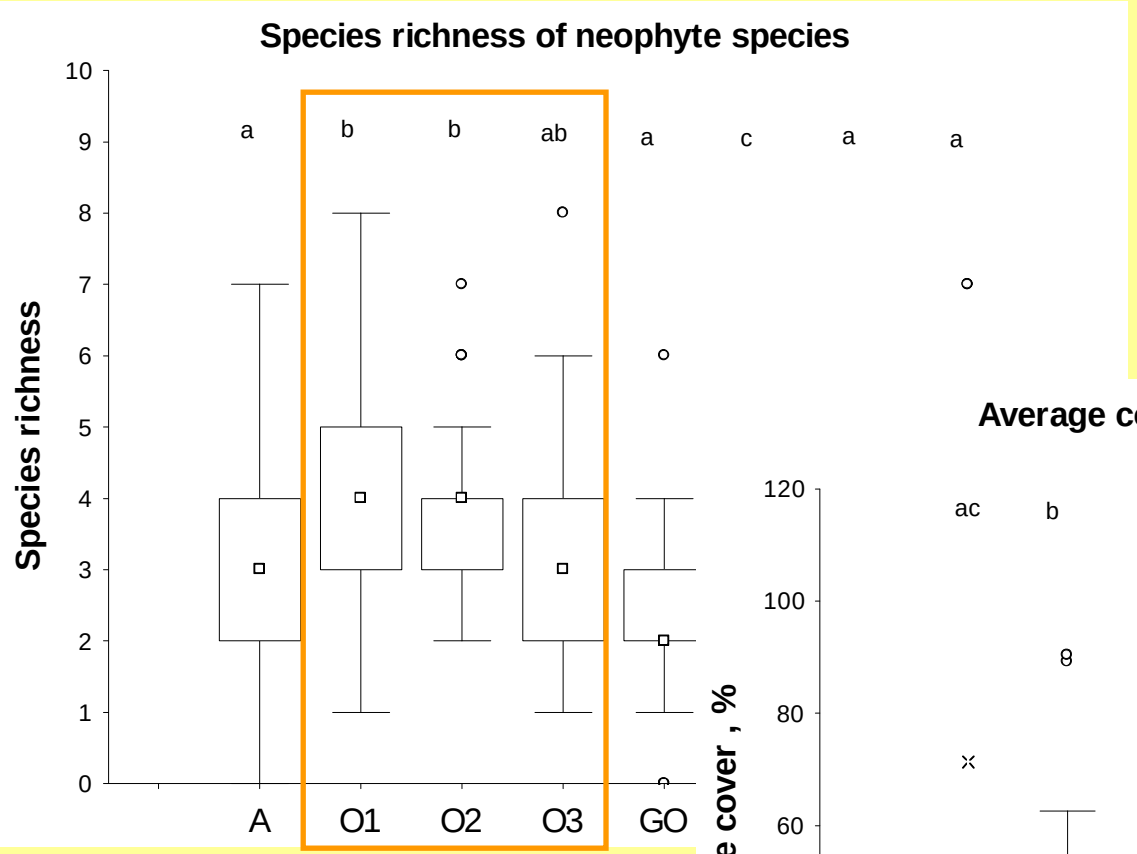
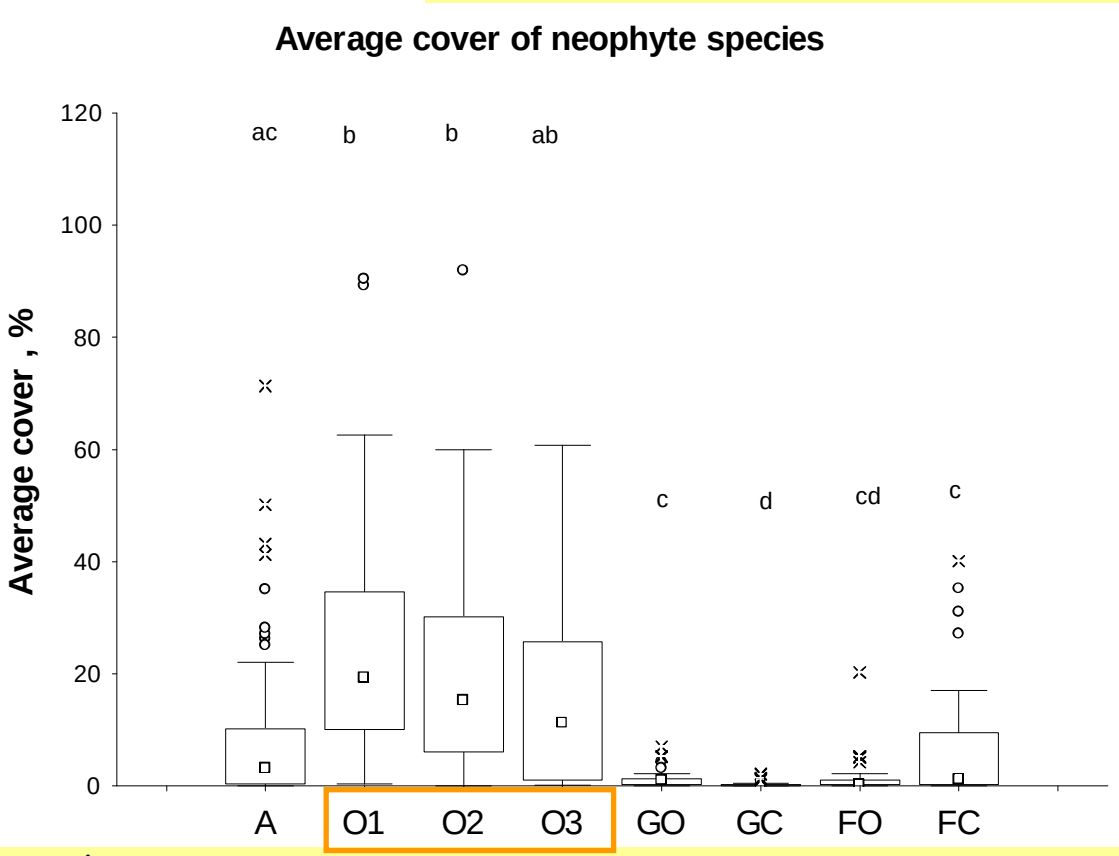
FO: open forest, FC:
closed forest

Species number and cover of neophyte





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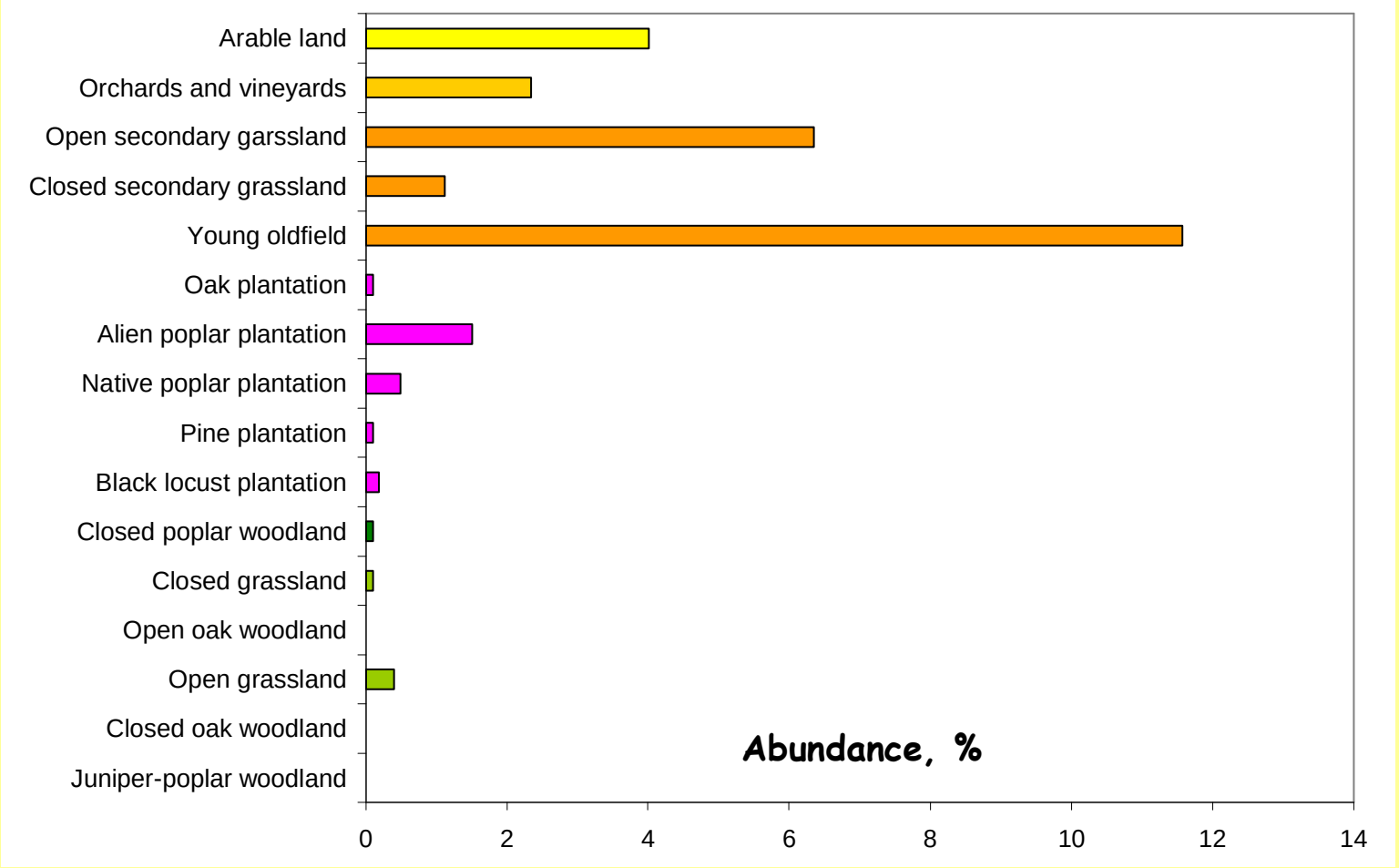
In: Csecserits et al 2011, Plant Biosystems

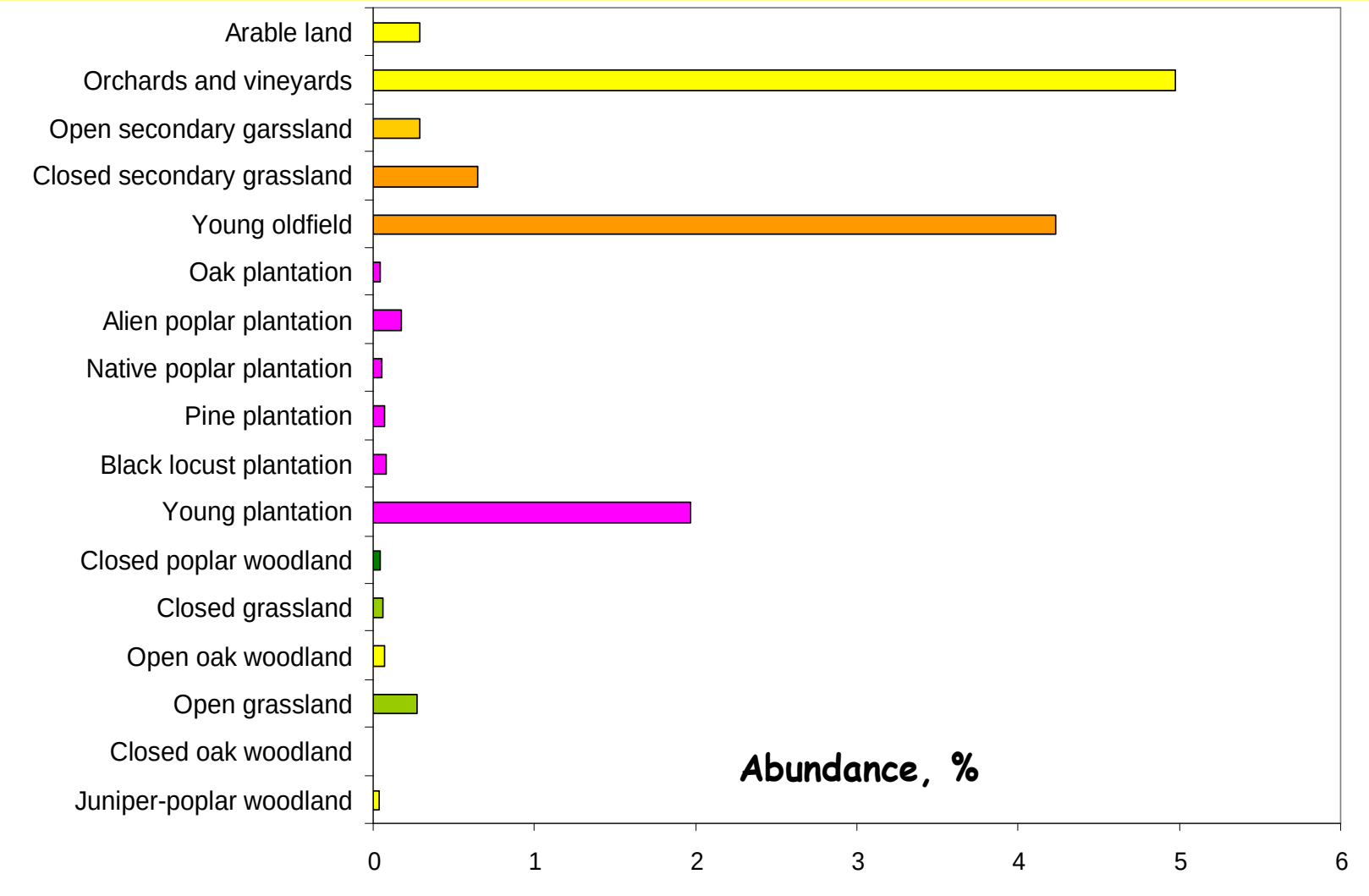
Which species are the most frequent invasive species in Kiskunság?

- *Conyza canadensis, Asclepias syriaca, Celtis occidentalis*
- In natural habitats: *Conyza canadensis, Celtis occidentalis, Robinia pseudo-acacia*
- On old-fields: *Ambrosia artemisiifolia, Conyza canadensis, Asclepias syriaca*

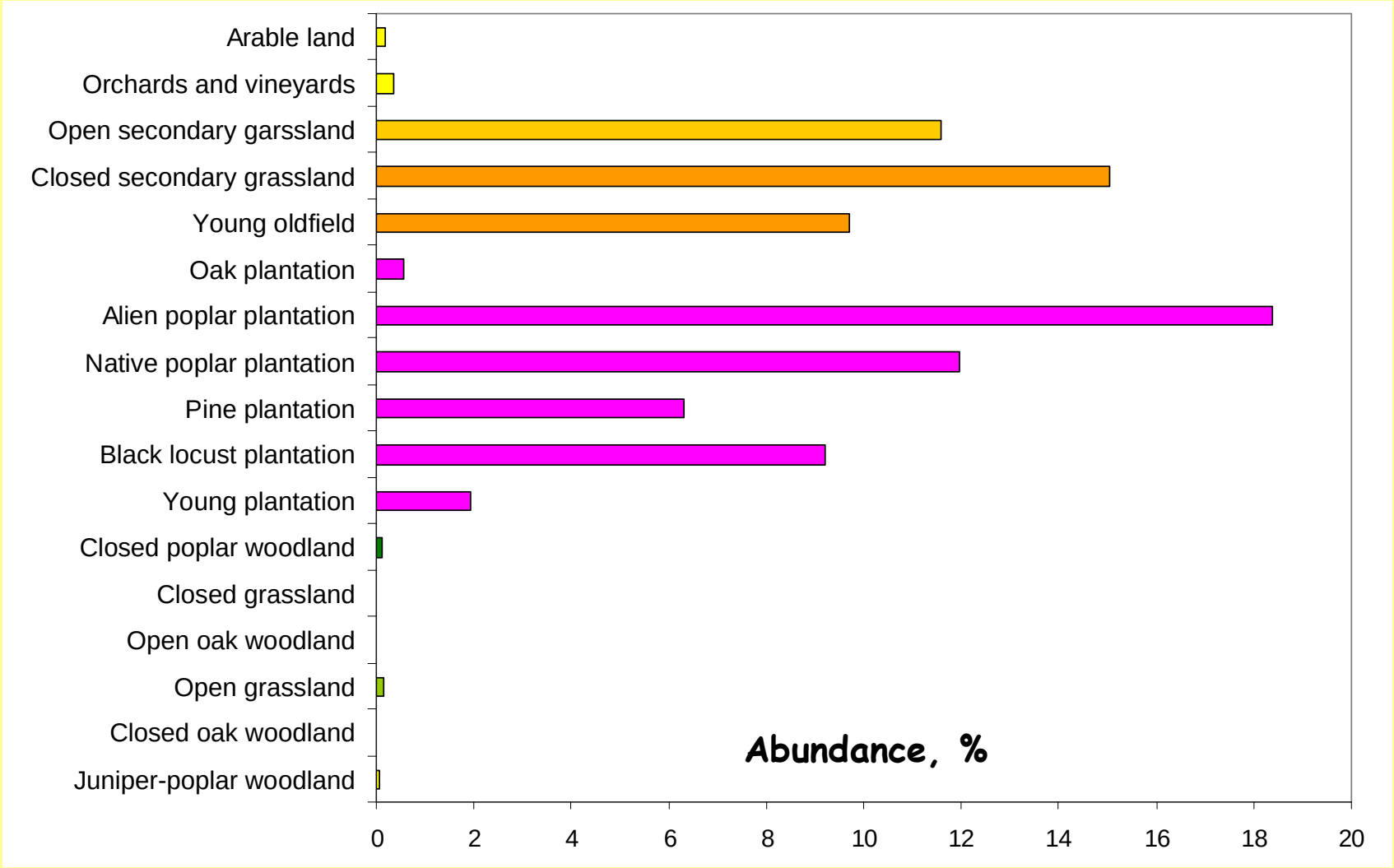
Most frequent neophyte species in Kiskunság



- Abundance of ragweed (*Ambrosia artemisiifolia*)

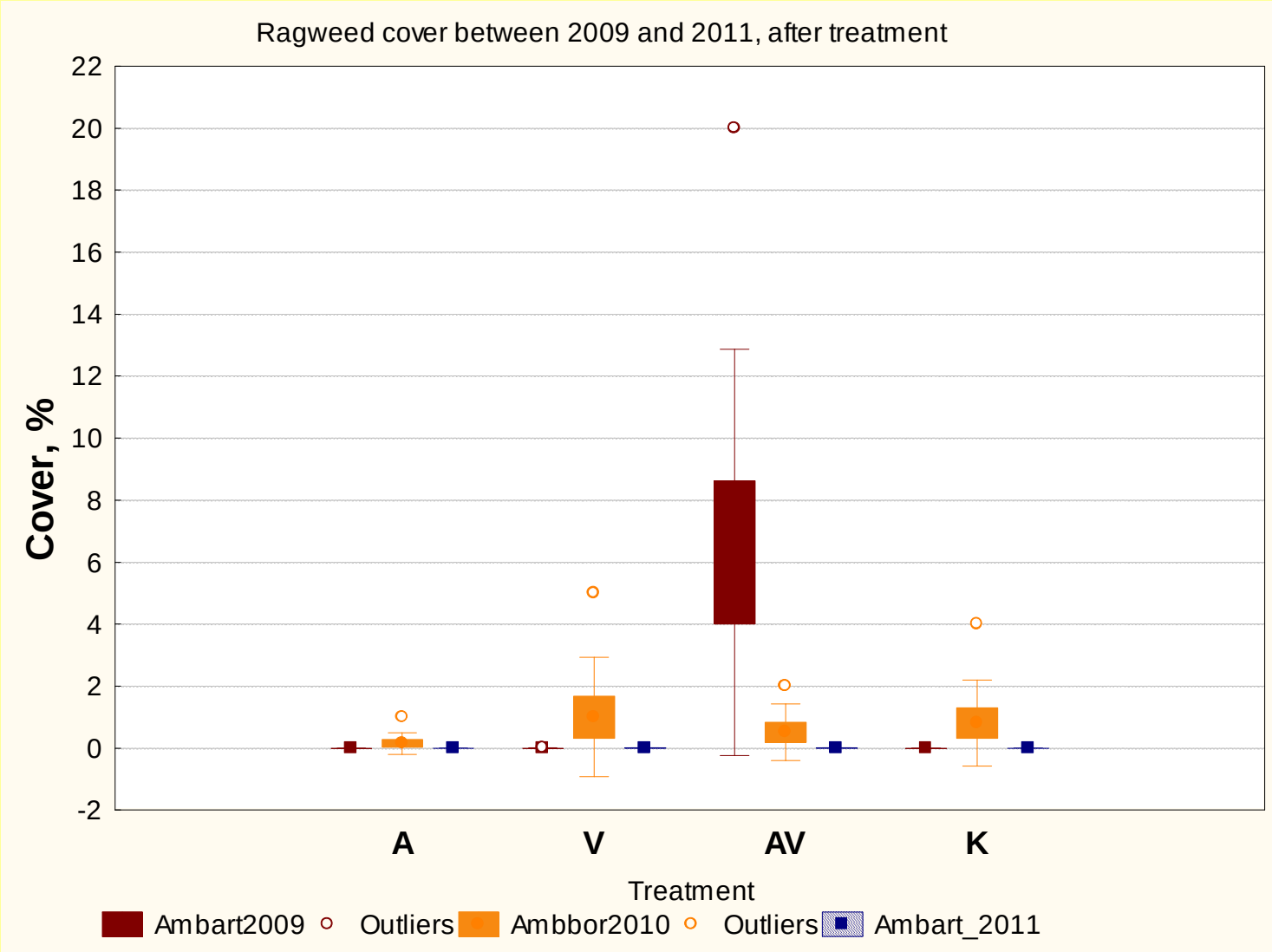


- Abundance of Canadian Horseweed (*Conyza canadensis*)

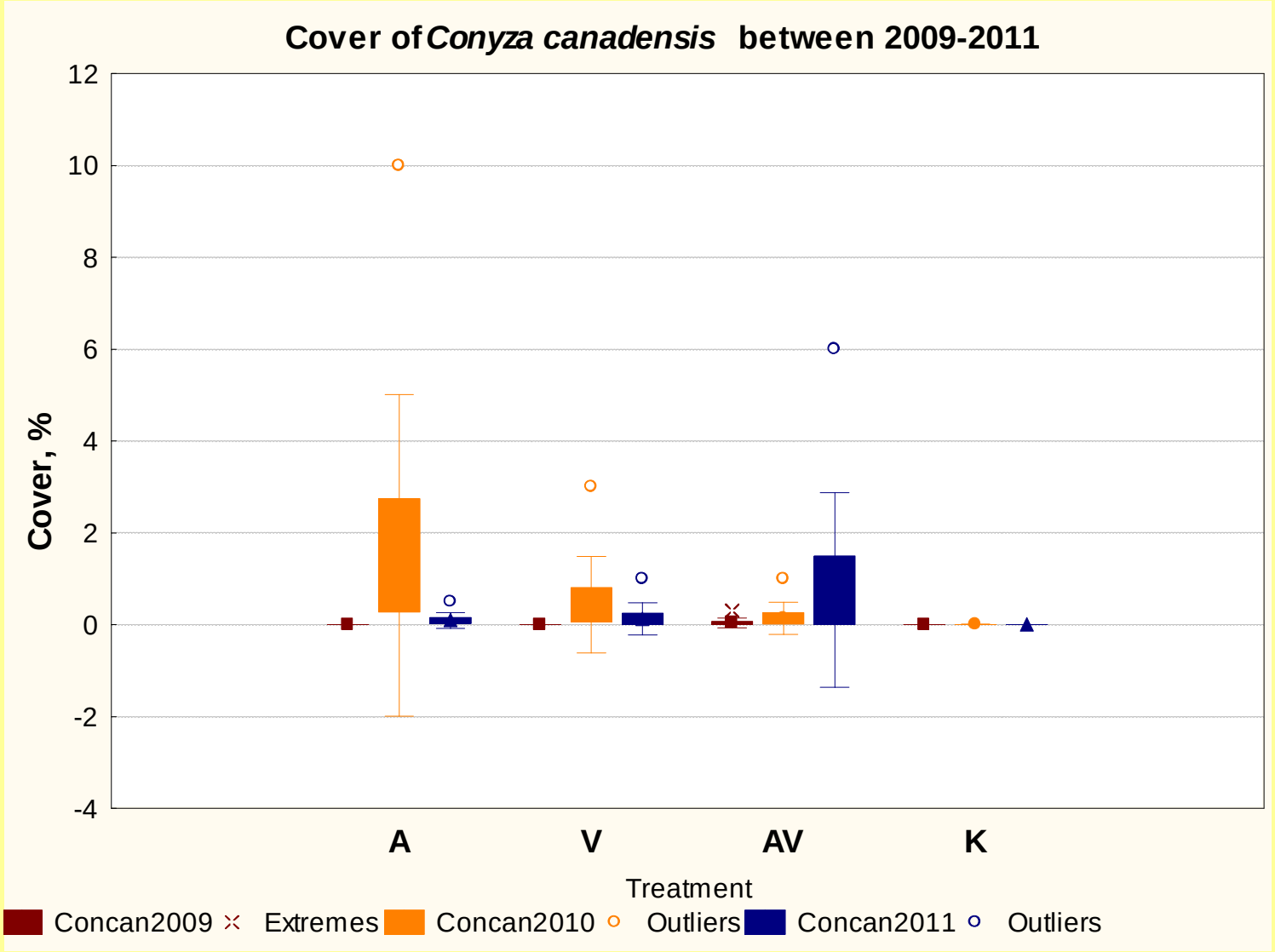


- Abundance of milkweed (*Asclepias syriaca*)

Conyza canadensis,
Annual weed from North-America



A: disturbed (dug), V: sown, AV: disturbed (dug) and sown, K: control



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„Message"

- Primary grasslands are the sources – priority in nature conservation
- Secondary grasslands are „ novel ecosystems": species rich, but neophyte species are abundant
- Secondary grasslands can be valuable, and worth protecting
- Spontaneous succession is valuable, but hardly controllable process in nature

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Thank you for your attention !