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RESTORATION OF PANNONIC GRASSLANDS: CASE STUDIES, LESSONS AND A FEW STORIES

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Kiskunság National Park, [2] Hermann Otto Institute

- A few words about Northen Kiskunság
- How does 2000 hectares of grasslands having been restored during the last 30 years look like nowadays?
- When does a grassland restoration project end?
- The devil rests in the details…
- Will grassland-dwelling species survive the next decades? (If so, where?)

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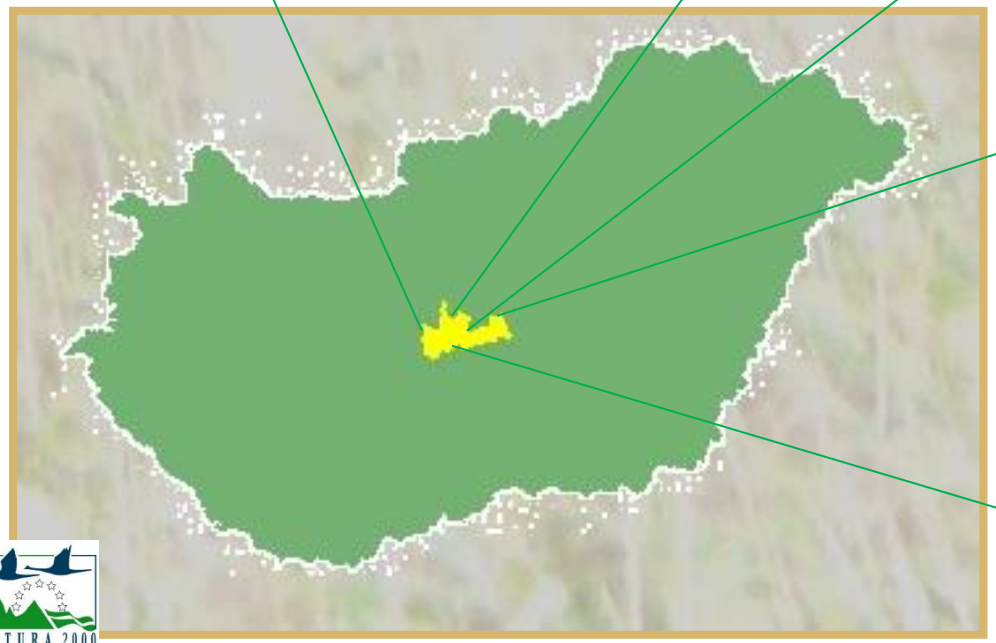
Northen Kiskunság



Natural (and semi-natural) habitat types

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6260* Pannonic sand steppes (*open sand steppes*)

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6260* Pannonic sand steppes (*closed sand steppes*)

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91N0*Pannonic inland sand dune thicket (Junipero-Populetum albae)

(*Poplar-juniper sand dune forests and thickets*)

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91I0* Euro-Siberian steppic woods with *Quercus spp.* (*open steppic oak forests on sand* and closed lowland *steppic oak woodlands*)

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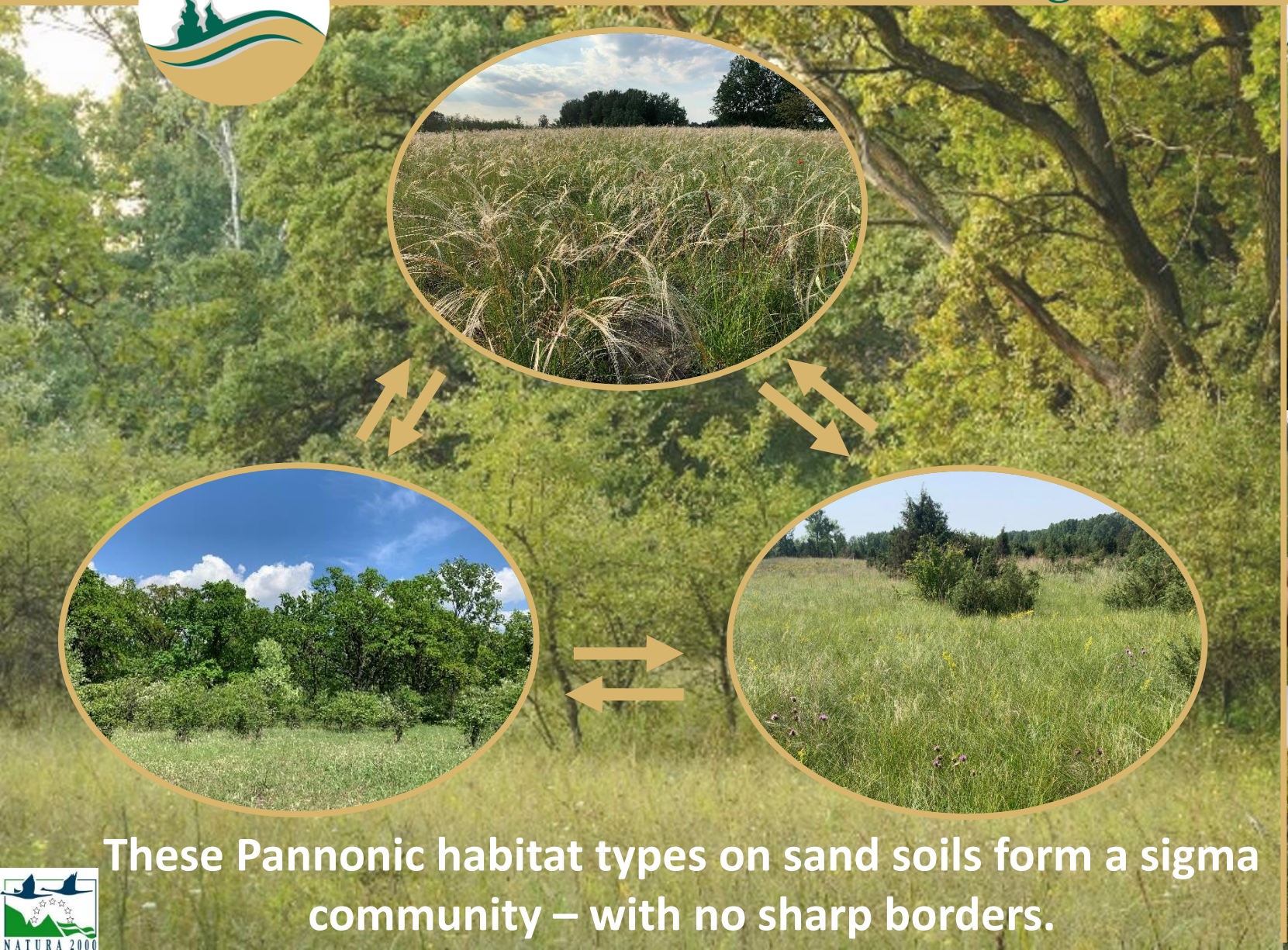

These Pannonic habitat types on sand soils form a sigma community – with no sharp borders.

Characteristic species of Community interest







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Sand Iris (*Iris humilis ssp. arenaria*)

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Keeled Plump Bush-cricket *(Isophya costata)*

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Hungarian Meadow Viper *(Vipera ursinii ssp. rakosiensis)*

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Great Bustard *(Otis tarda)*

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Imperial Eagle *(Aquila heliaca)*

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European Ground Squirrel *(Spermophilus citellus)*

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This region is a hotspot of biodiversity in Europe.

Due to sand soils, intrazonal habitat types are present – unique habitats with considerable large number of endemic taxa.

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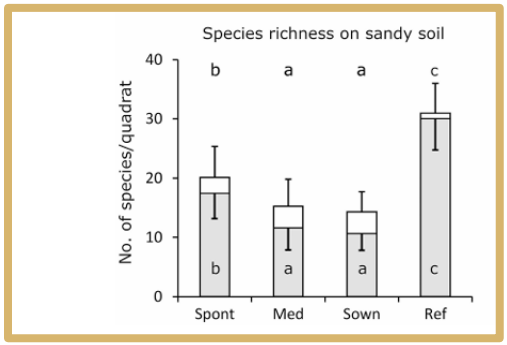
How does 2000 hectares of grasslands restored during the last 30 years look like nowadays?

- After 1995 cca. 2000 hectares of arable fields have been converted into grasslands, a large part of those on sandy soils.
- Three main restoration methods: a) spontaneous abandonment, b) alfalfa-mediated reconstruction, c) direct sawing of dominant grass species.

- Some undisputed winners:




- Average species richness of vascular plants has reached „only” a medium level…



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RESEARCH ARTICLE

WILEY

Recovery of species richness lags behind functional recovery in restored grasslands

Csaba Tölgyesi[1] | Péter Török[1] | Róbert Kun[2] | András István Csathó[3] | Zoltán Bátori[4] | László Erdős[5] | Csaba Vadász[6]

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... as species with limited dispersal ability are still absent...

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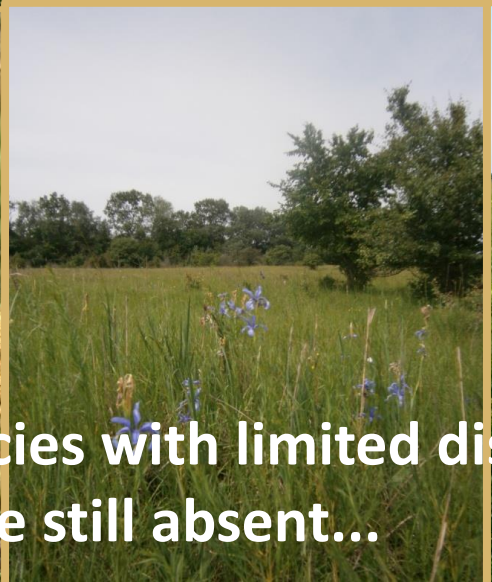


... as species with limited dispersal ability are still absent...

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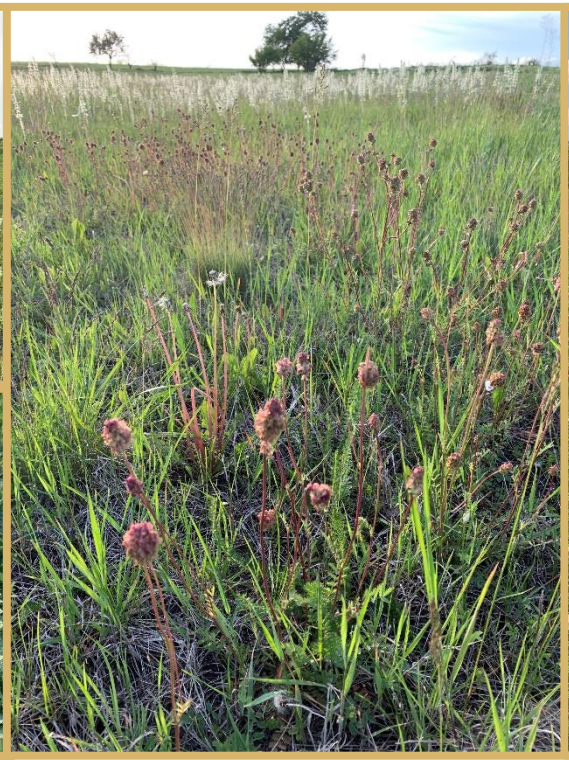
- … so either we (re)introduce these species to the reconstructed grasslands or these will not be present (for unpredictably long time).



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A twenty-year old oldfield, three years after diversification

- SUPER-G (H2020) – 16 sites, 0.5 ha each, 32 species
- Well performing species: *Onobrychis arenaria, Dianthus pontederae, Anthyllis vulneraria polyphylla*
- Other, successfully sawn species: *Melandrium viscosum, Salvia nemorosa, Seseli varium, Stachys recta, Filipendula vulgaris*
- *IT WAS POSSIBLE TO (RE)INTRODUCE SEVERAL SPECIES WITH LIMITED DISPERSAL ABILITY TO GRASSLANDS UNDER RESTORATION*







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NARRATIVE

OPEN ACCESS Check for updates

Improving ecosystem services in farmlands: beginning of a long-term ecological study with restored flower-rich grasslands

András Báldi[a], Raoul Pellaton[a], Áron Domonkos Bihaly[a,b], Viktor Szigeti[a], Eszter Lellei-Kovács[a], András Máté[c], Miklós Sárospataki[b], Zoltán Soltész[a], László Somay[a] and Anikó Kovács-Hostyánszki[a]

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A three-year old clearing

- OAKEYLIFE (LIFE 16/HU/000599) – 35 ha of within-forest grassy habitats
- Well performing species: *Onobrychis arenaria, Dianthus pontederae, Anthyllis vulneraria polyphylla, Festuca rupicola, Salvia nemorosa, Seseli varium, Stachys recta, Centaurea sadleriana, Astragalus excapus*









GRASSLANDHU

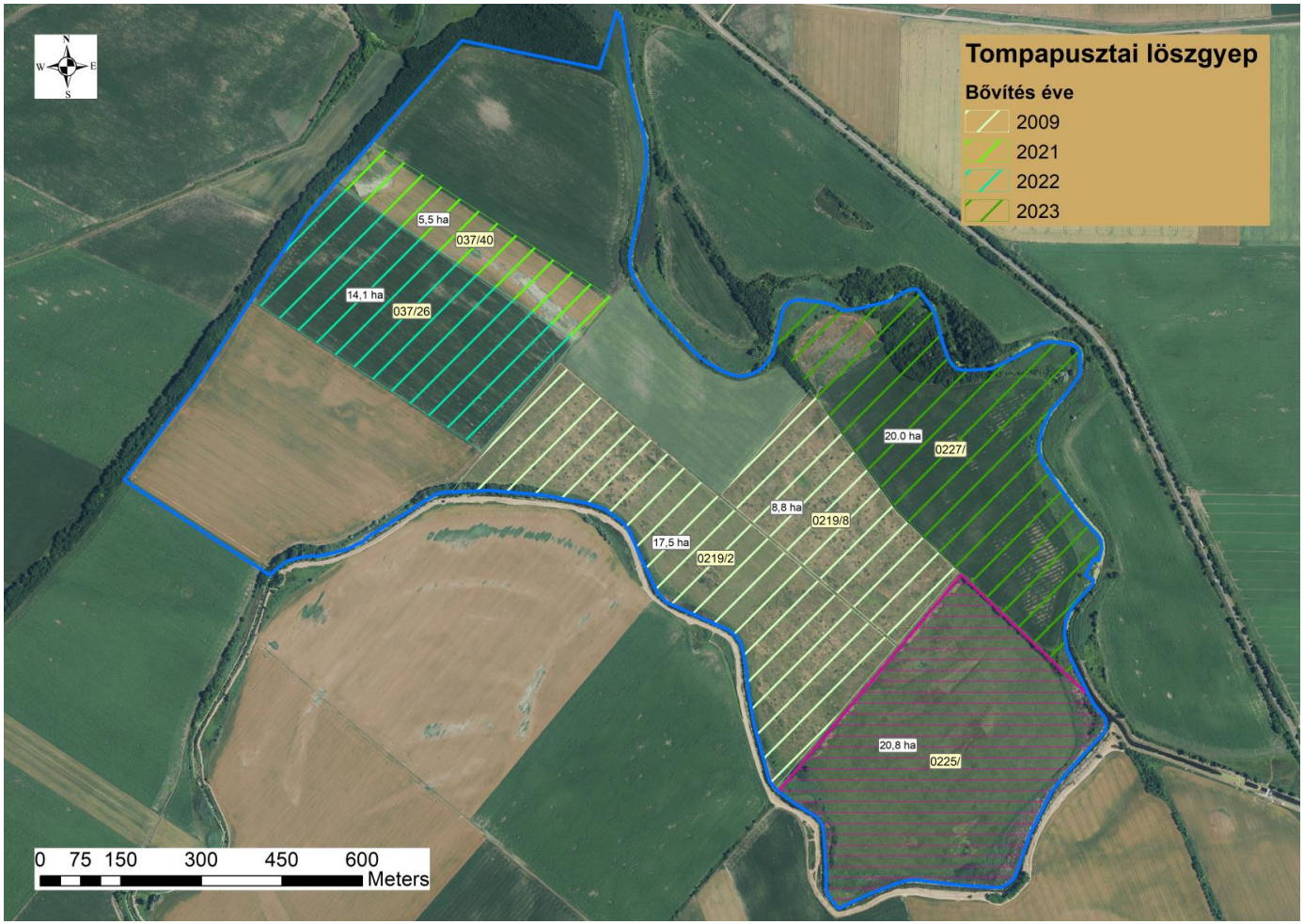
Long-term conservation of Pannonian grasslands and related habitats through the implementation of PAF strategic measures

GRASSLAND-HU
LIFE17 IPE/HU/000018

Zita Zsembery project manager

A **LIFE IP GRASSLAND-HU** (LIFE17 IPE/HU/000018) projekt az Európai Unió LIFE programjának támogatásával valósul meg.

Tompapuszta loess grassland expansion (reconstruction) – 2009-2023



Tompapuszta grassland expansion I.:
2009. December
26,76 ha

Tompapuszta grassland expansion II.:
2021. December 5,5 ha
2022. March 14,1 ha

Tompapusztai grassland expansion III.:
2023. August
20,0 ha

Total: 86,80 ha

Long-term conservation of Pannonian grasslands and related habitats through the implementation of PAF strategic measures

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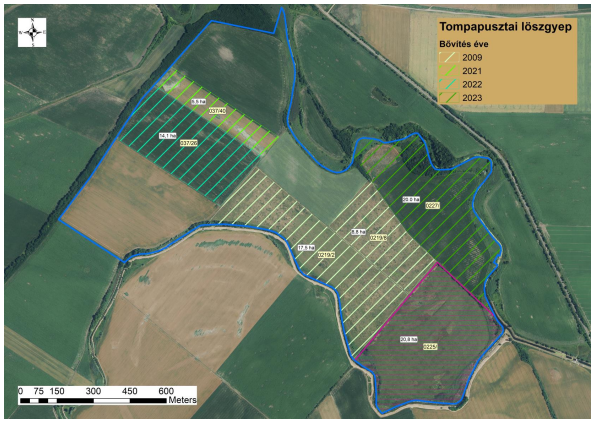
Zita Zsembery project manager

First expansion 2009.: 26,76 ha

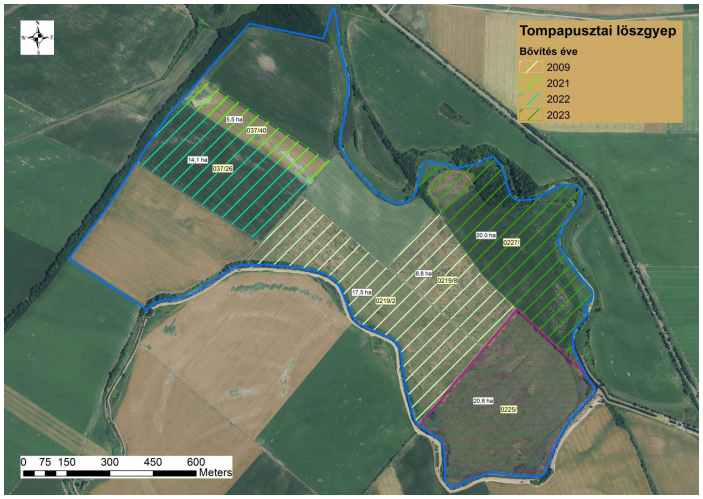
- Festuca seeds spreading
- manual sspeading of dicotyledonous plants
- hay spreading
- spontaneous regeneration
- seedling planting



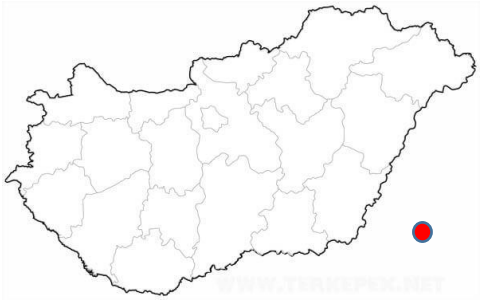
Zita Zsembery project manager

Third expansion 2023.: 20 ha

- applying disc harrow
- eradication of Ailanthus altissima shoots
- plan: Hay spreading and manual seed spreading



Petneháza, Daru-rét



~17 ha arable land converted to grassland (HUHN20124, Daru-rét, HNPI)

(04/2022)

Seeds collected from neighbouring natural areas, very high diversity seed mix species) – in 2024. 91 species found

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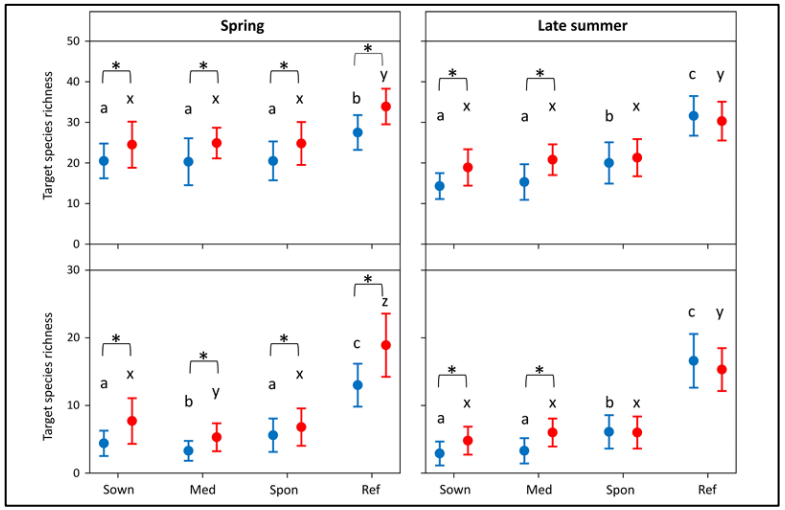
When does a grassland restoration project end?

- **Post-restoration management overrides the effects of restoration methods: grazing proved to be a better way than mowing…**



Ecological Applications, 32(1), 2022, e02463

Post-restoration grassland management overrides the effects of restoration methods in propagule-rich landscapes

Csaba Tölgyesi,[1,2,8] Csaba Vadász,[3] Róbert Kun,[4] András István Csathó,[5] Zoltán Bátori,[1] Alida Hábenczyus,[1] László Erdős,[2,6] and Péter Török[2,7]

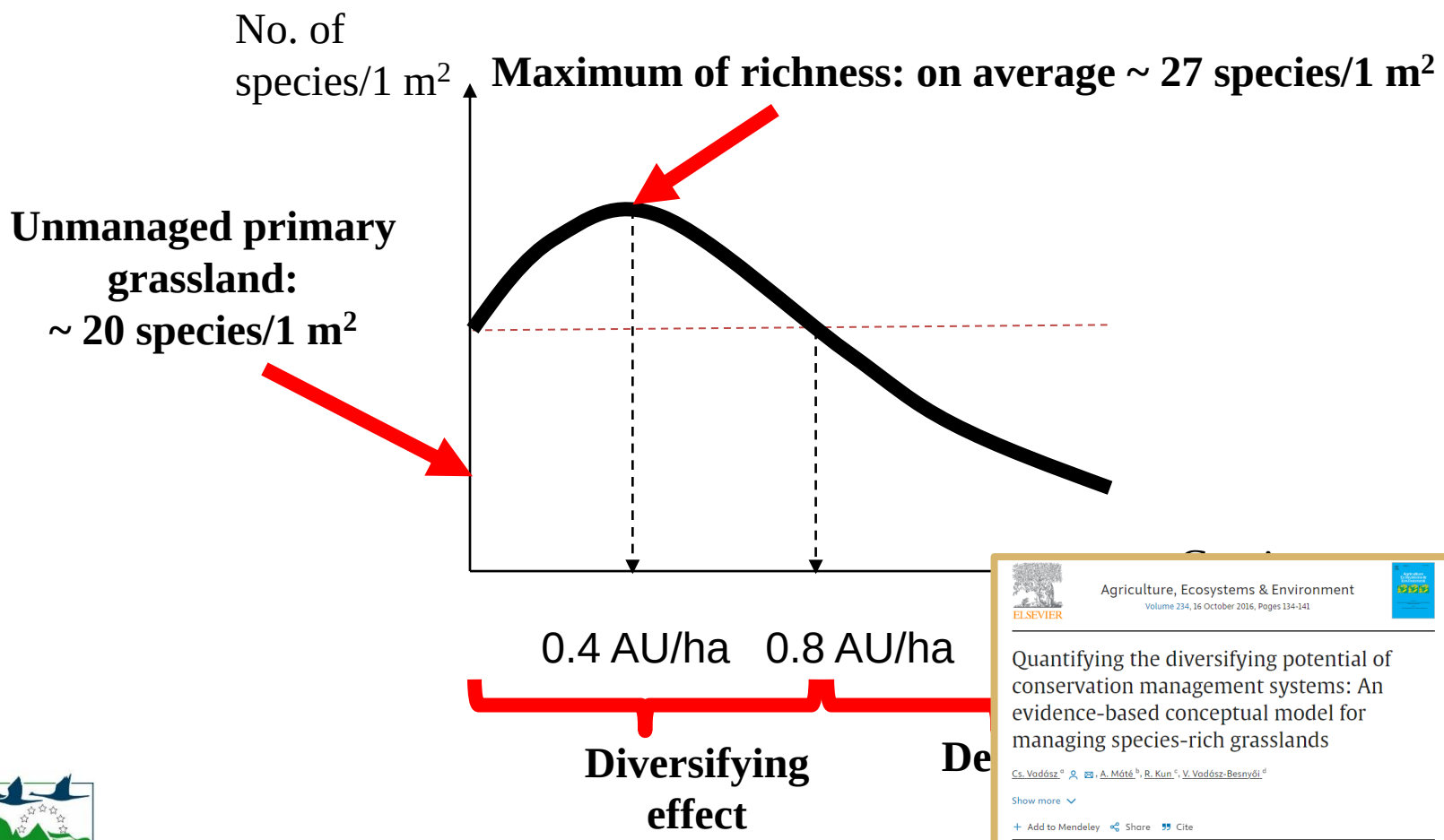
…but the devil rests in the details…







…as grazing pressure directly shapes species richness…



Agriculture, Ecosystems & Environment
Volume 234, 16 October 2016, Pages 134-141

Quantifying the diversifying potential of conservation management systems: An evidence-based conceptual model for managing species-rich grasslands

Cs. Vadász, A. Máté, R. Kun, V. Vadász-Besnyői

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https://doi.org/10.1016/j.agee.2016.03.044

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- **… and so does the method of grazing (**e.g. Continuous stocking, Deferred stocking, Rotational stocking such as HILF, HIMF, HIHF, MILF, MIMF, MIHF, LILF, LIMF, LIHF – see a summary in *Grazing Methods: A Viewpoint* by M. Kothmann **)…**

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… also, the type (species, breed) of grazing animals…

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- … and the knowledge of the sheperd (in the case of herding).

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INFORMING DECISION-MAKING WITH INDIGENOUS AND LOCAL KNOWLEDGE AND SCIENCE

Journal of Applied Ecology

Knowledge co-production with traditional herders on cattle grazing behaviour for better management of species-rich grasslands

Zsolt Molnár[1] | András Kelemen[2] | Róbert Kun[3] | János Máté[4] | László Sáfián[5] | Fred Provenza[6] | Sandra Díaz[7] | Hossein Barani[8] | Marianna Biró[9] | András Máté[10] | Csaba Vadász[11]

Grazing can have quite different effects on the diversity of grasslands: it can facilitate of completely block regeneration.

Will grassland-dwelling species survive the next decades? (If so, where?)

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The microclimate-modifying effect of woody species is becoming more and more important.

We hypothesize that a lot of „grassland-dwelling” species will „move” to forest steppes (6260 →91N0,91I0).

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Thank you for your attention