

Seed collection, propagation and plantation of loess grassland species in the Körös-Maros National Park (Csanádi puszta)

„Élőhely védelem és helyreállítás a Körös-Maros Nemzeti Park
Igazgatóság területén”
KEOP-3.1.2/2F09-2009-0013



Németh A., Makra O., Balogh L., Szatmári M.,
Kotymán L., Sallainé Kapocsi J.
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- **Loess grasslands: The 1/5 of the original vegetation of Hungary and 1/3 of the Great Hungarian Plain was loess grassland**
- **On the largest extent on the Great Hungarian Plain, on the so called Békés-Csanád loess region in SE Hungary.**
- **The most beautiful stands are structured, closed, multilevel, species rich, and rich in dicotyledon species.**
- **The stands in the Körös-Maros region:**
- **Fragmented, lower, species that live only here are: *Salvia nutans*, *Adonis vologensis*, characteristically live here : *Anchusa barrelieri*, *Linaria biebersteinii***
- **Csernozjom soil- agricultural activities (plowing up most of the stands during the last 200 years)**

The remained fragments:

- On higher points among alkali grasslands,
- On narrow grassland-remains near roads and railway lines
- On kurgans,
- On earthworks

Weak regeneration potential !

- The large distance between stands
- Stands are situated on small areas
- Higher nutrient content
- Humid climate,
- Forest and shrubs

Generalist species come back easily (*Salvia austriaca*, *S. nemorosa*, *Verbascum phoeniceum*, *Thymus sp.*), but specialist not (*Anchusa barrelieri*, *Phlomis tuberosa*, *Potentilla recta*, *Viola ambigua etc.*)!





The aim was to create more species rich places on former plough-lands

Collection of propagules (42 species)

Propagation (34 species)

Plantation (32 species)



Astragalus exscapus



Amygdalus nana



Anchusa barrelieri



Ajuga laxmannii



Euphorbia pannonica



Potentilla recta



Phlomis tuberosa



Adonis vologensis



Inula germanica



Vincetoxicum hirundinaria



Salvia verticillata



Taraxacum serotinum



Salvia austriaca



Teucrium chamaedrys



Thalictrum minus



Viola ambigua



Vinca herbacea



Linum austriacum



**Hylotelephium telephium
subsp. maximum**

Collection of seeds



42 species, The minimum amount of the collected seeds

Ajuga laxmannii (1000), *Amygdalus nana* (200), *Anchusa barrelieri* (500), *Asperula cynanchica* (100), *Astragalus austriacus* (100), *Astragalus cicer* (100), *Astragalus exscapus* (100), *Carduus hamulosus* (50), *Clematis integrifolia* (50), *Euphorbia glareosa* (100), *Euphorbia salicifolia* (100), *Euphorbia seguieriana* (100), *Filipendula vulgaris* (500), *Hypericum elegans* (100), *Inula germanica* (500), *Inula salicina* (100), *Linaria biebersteinii subsp. strictissima* (200), *Linum austriacum* (200), *Ornithogalum pyramidale* (200), *Oxytropis pilosa* (50), *Peucedanum alsaticum* (100), *Phlomis tuberosa* (1000), *Potentilla recta* (50), *Ranunculus ficaria* (100), *Ranunculus illyricus* (100), *Salvia austriaca* (200), *Salvia verticillata* (200), *Scutellaria hastifolia* (100), *Hylothelephium telephium subsp. maximum* (100), *Senecio doria* (200), *Senecio jacobaea* (100), *Silene bupleuroides* (100), *Silene otites* (100), *Stachys recta* (100), *Sternbergia colchiciflora* (500), *Traxacum serotinum* (100), *Teucrium chamaedrys* (500), *Thalictrum minus* (500), *Verbascum phoeniceum* (200), *Vinca herbacea* (100), *Vincetoxicum hirundinaria* (100), *Viola ambigua* (100).



Filipendula vulgaris



Linum austriacum



**Vincetoxicum
hirundinaria**



**Ornithogalum
brevistylum**



Anchusa barrelieri



Salvia verticillata



Verbascum phoeniceum



Viola ambigua



Channel near Mezőhegyes



Dam near Maros, Makó

**Grassland near railway line,
Végegyháza**



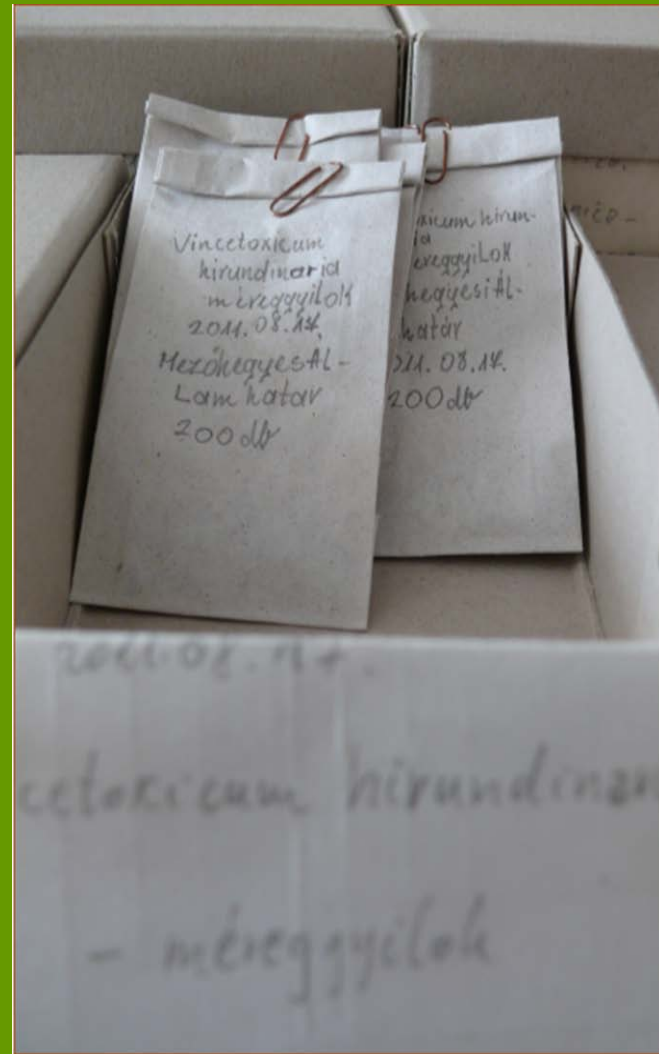






The clearing of the seeds







Propagation

Special soil mixture, or
Kekkila DSM 2W,
Stender A250



Seeding in light chamber



Seeding outside



Transplanting seedlings

fajnév	The used propagulums	Potting number of individuals	Living plants at the end	
<i>Ajuga laxmannii</i>	1030	37	12	47%
<i>Amygdalus nana</i>	284	41	41	
<i>Anchusa barrelieri</i>	691	146	146	
<i>Asperula cynanchica</i>	600	118	118	
<i>Astragalus austriacus</i>	400	46	26	
<i>Astragalus cicer</i>	500	129	128	
<i>Carduus hamulosus</i>	192	21	21	
<i>Euphorbia salicifolia</i>	720	68	121	
<i>Filipendula vulgaris</i>	1200	571	566	
<i>Hypericum elegans</i>	600	239	239	
<i>Inula germanica</i>	2614	59	55	
<i>Linum austriacum</i>	800	501	486	
<i>Ornithogalum brevistylum</i>	600	162	Not seen	
<i>Peucedanum alsaticum</i>	700	25	25	
<i>Phlomis tuberosa</i>	1600	774	578	
<i>Potentilla recta</i>	1000	124	124	
<i>Ranunculus ficaria</i>	276	157	Not seen	
<i>Salvia austriaca</i>	800	186	183	70%
<i>Salvia verticillata</i>	1400	131	127	
<i>Scutellaria hastifolia</i>	105	14	14	
<i>Hylotelephium telephium</i> <i>subsp. maximum</i>	174	154	154	
<i>Senecio doria</i>	600	509	506	
<i>Senecio jacobaea</i>	362	72	68	
<i>Silene bupleuroides</i>	300	220	181	73%
<i>Silene otites</i>	1500	1056	1040	
<i>Stachys recta</i>	600	44	44	42%
<i>Teucrium chamaedrys</i>	1405	519	211	
<i>Thalictrum minus</i>	1400	590	590	
<i>Verbascum phoenicum</i>	1400	100	100	43%
<i>Vinca herbacea</i>	4	8	8	
<i>Vincetoxicum hirundinaria</i>	200	94	91	
<i>Viola ambigua</i>	318	137	136	



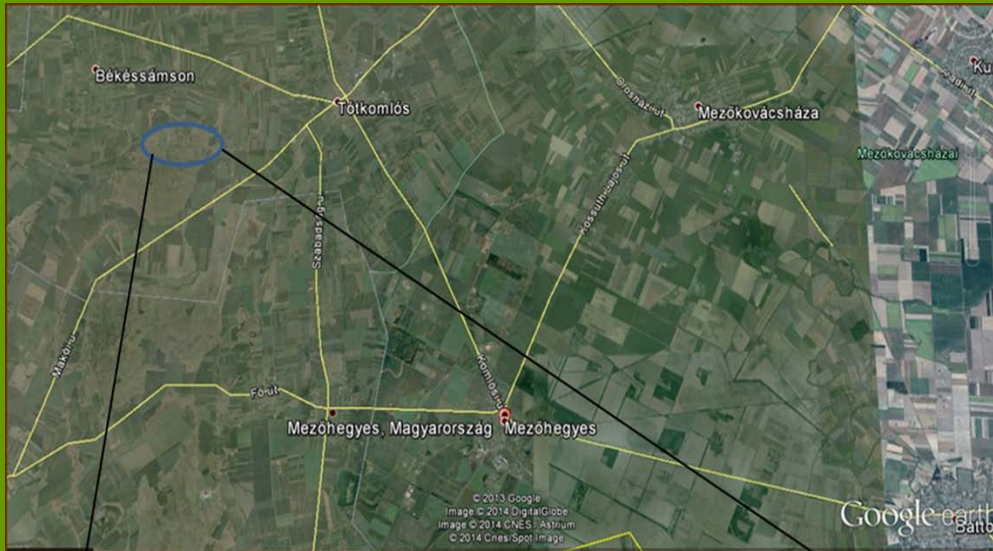




Waiting for plantation

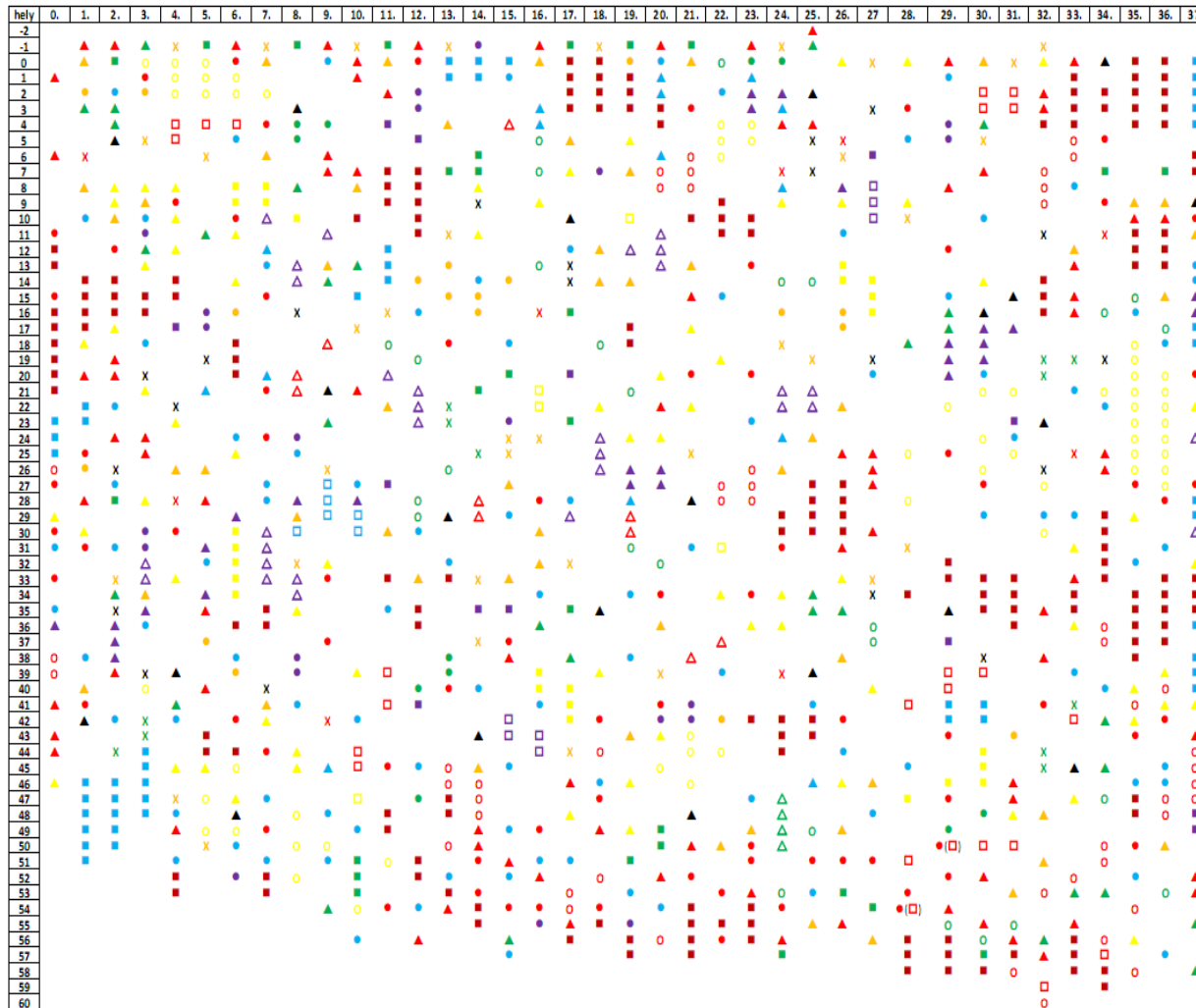
TÓTKOMLÓS

The selection of the places of plantation



A kitelepítés helyszínei.

1. terület kitéleltési rend



fajnév	jelölés	tőszám egy rácsponiban
<i>Ajuga laxmannii</i>	□	2
<i>Anchusa barbellieri</i>	■	1
<i>Asperula cynanchica</i>	■	2
<i>Astragalus austriacus</i>	□	3
<i>Astragalus cicer</i>	○	1
<i>Carduus hamulosus</i>	■	1
<i>Euphorbia salicifolia</i>	●	3
<i>Filipendula vulgaris</i>	▲	2
<i>Hypericum elegans</i>	▲	2
<i>Inula germanica</i>	X	10
<i>Linum austriacum</i>	●	2
<i>Ornithogalum brevistylum</i>	▲	10
<i>Peucedanum alsaticum</i>	▲	1
<i>Phlomis tuberosa</i>	■	1
<i>Potentilla recta</i>	X	2
<i>Ranunculus ficaria</i>	●	10
<i>Salvia austriaca</i>	▲	2
<i>Salvia verticillata</i>	■	3
<i>Scutellaria hastifolia</i>	△	4
<i>Hylotelephium telephium</i> subsp. maximum	○	4
<i>Senecio doria</i>	○	2
<i>Senecio jacobaeae</i>	X	2
<i>Silene bupleuroides</i>	□	4
<i>Silene otites</i>	●	4
<i>Stachys recta</i>	△	4
<i>Teucrium chamaedrys</i>	△	5
<i>Thalictrum minus</i>	▲	2
<i>Verbascum phoeniceum</i>	●	2
<i>Vinca herbacea</i>	□	3
<i>Vincetoxicum hirsutina</i>	X	3
<i>Viola ambigua</i>	▲	3

The planning of plantation of 5914 plants, 32 species, to 9 places

<i>Species</i>	1. area	2. area	3. area	4. area	5. spot	6. spot	7. spot	8. spot	9. spot
<i>Ajuga laxmannii</i>	11								
<i>Amygdalus nana</i>	41								
<i>Anchusa barrelieri</i>	59	37	23	10					
<i>Asperula cynanchica</i>	50	30	7	2					
<i>Astragalus austriacus</i>	18								
<i>Astragalus cicer</i>	77	37	20	22					
<i>Carduus hamulosus</i>	13								
<i>Euphorbia salicifolia</i>	70	27							
<i>Filipendula vulgaris</i>	142	84	30	28		12	12	18	
<i>Hypericum elegans</i>	108	50	20	14					15
<i>Inula germanica</i>	60	50							
<i>Linum austriacum</i>	200	74	36	50		10	12	18	
<i>Ornithogalum brevistylum</i>	150	50							
<i>Peucedanum alsaticum</i>	21								
<i>Phlomis tuberosa</i>	175	73	80	51	50	18	18	41	58
<i>Potentilla recta</i>	67	24	16	13					
<i>Ranunculus ficaria</i>	110	40	17	30					100
<i>Salvia austriaca</i>	73	25	20	22					10
<i>Salvia verticillata</i>	71	30	10						
<i>Scutellaria hastifolia</i>	14								
<i>Hylotelephium telephium</i> <i>subsp. maximum</i>	104	36	8	8					
<i>Senecio doria</i>	95	92	100	70		15	15	15	65
<i>Senecio jacobaea</i>	40	14		12					
<i>Silene bupleuroides</i>	88	28	20	20					
<i>Silene otites</i>	324	100	100	50		32	32	68	228
<i>Stachys recta</i>	40								
<i>Teucrium chamaedrys</i>	150								
<i>Thalictrum minus</i>	168	88	50	32		24	24	45	69
<i>Verbascum phoeniceum</i>	39	5	20	22					
<i>Vinca herbacea</i>	18		21	23					
<i>Vincetoxicum</i> <i>hirundinaria</i>	60								
<i>Viola ambigua</i>	73	42	9	3					

1. 32 species,
2729 plants
2. 24 species,
1036 plants
3. 19 species,
607 plants
4. 19 species,
484 plants
- 5-9. 6 species,
1058 plants



Plantation Oct.-Nov. 2012.













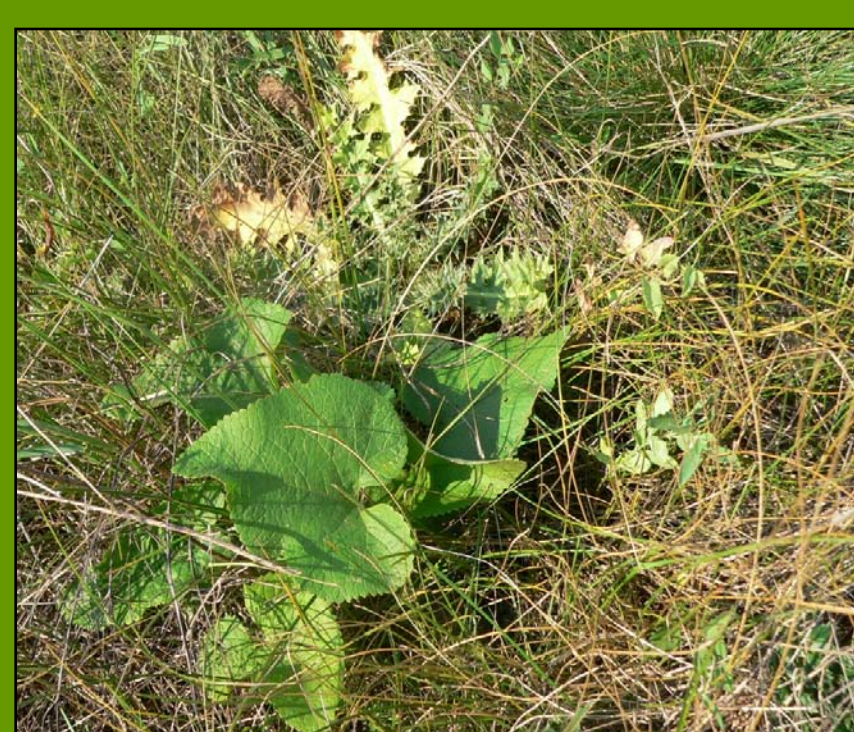




Monitoring







	2013	2014
Ajuga laxmannii	100%	100%
Amygdalus nana	20%	20%
Anchusa barrelieri	96%	93%
Asperula cynanchica	75%	93%
Astragalus austriacus	50%	22%
Astragalus cicer	89%	65%
Carduus hamulosus	100%	15%
Euphorbia salicifolia	34%	30%
Filipendula vulgaris	104%	94%
Hypericum elegans	92%	90%
Inula germanica	67%	62%
Linum austriacum	97%	85%
Peucedanum alsaticum	100%	86%
Phlomis tuberosa	98%	78%
Potentilla recta	98%	91%
Salvia austriaca	104%	96%
Salvia verticillata	99%	91%
Sedum maximum	89%	80%
Senecio doria	97%	66%
Senecio jacobaea	81%	72%
Silene bupleuroides	97%	84%
Silene otites	96%	51%
Stachys recta	93%	95%
Teucrium chamaedrys	90%	91%
Thalictrum minus	98%	90%
Verbascum phoeniceum	98%	49%
Vinca herbacea	100%	100%
Vincetoxicum hirundinaria	58%	43%
Viola ambigua	93%	72%



Thanks for:

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KMNP Directorate: Péter Bánfi, László Kotymán



Thank you for your attention!