Table S2. Species diversity and their distribution (P%) in the grasslands

Plant species	***Botanic family***	***Parts of the hill***								
		Summit			***Midslope***			***Footslope***		
		2020	2021	2022	2020	2021	2022	2020	2021	2022
Anthriscus sylvestris L.	*Apiaceae*	2.9	3.9	0.8	5.7	3.5	9.3			
Carum carvi L.		0.7			0.8					
Achillea millefolium L.	*Asteraceae*	6.5	7.8	3.8	4.1	3.5	2.8	0.7		1.7
Achillea ptarmica L.										0.6
Artemisia vulgaris L.		0.7	0.6	2.3				0.7	1.3	1.1
Cirsium arvense L.		4.3	5.0	1.5	9.8	2.5	1.1	1.4	6.7	4.6
Conyza canadensis L.		0.7						0.7		
Bidens tripartita L.							1.1			
Gnafalium sylvaticum L.			1.1			1.0		0.7		
Hieracium umbellatum L.			0.6	3.8	0.8					
Hypochaeris radicata L.						0.5				
Leontodon autumnalis L.						0.5				
Leucanthemum vulgare Lam.						0.5				
Pilosella caespitosa (Dumort.) P.D. Sell et C.West		0.7	2.8	1.5						
Pilosella officinarum F.V. Schultz et Sch.Bip.		0.7								
Sonhus spp.						3.0		0.7	1.3	
Taraxacum officinale F.H. Wigg.		0.7		0.8	4.1	6.0	4.4	12.7		2.9
Tragopogon pratensis L.									1.3	
Myosotis arvensis (L.) Hill.	*Boraginaceae*									0.6
Campanula patula L.	*Campanulaceae*		0.6	0.8	0.8		2.2			0.6
Campanula rotundifolia L.					0.8	1.5		0.7		
Cerastium arvense L.	*Caryophyllaceae*						1.1			
Silene vulgaris (Moench) Garcke		0.7	0.6		1.6		2.2	0.7		
Stellaria graminea L.			1.7	8.3		2.0	3.8	0.7		4.6
Carex spp.	*Cyperaceae*			0.8						
Convolvulus arvensis L.	*Convolvulaceae*					0.5	1.1			
Equisetum arvense L.	*Equisetaceae*	12.3	12.8	12.0	4.1	9.5	9.9	5.6		10.9
Equisetum sylvaticum L.			2.2							
Lathyrus pratensis L.	*Fabaceae*		0.6			0.5			2.7	0.6
Lotus corniculatus L.		0.7		1.5	0.8	1.5	0.5	4.9	6.0	0.6
Medicago lupulina L.						0.5				
Trifolium pratense L.										0.6
Trifolium repens L.		0.7								

https://doi.org/10.3390/xxxxx

Vicia cracca L.		14.5	5.6	6.8	4.5	9.5	6.6	16.9	9.4	13.8
Vicia sepium L.					4.1		0.6	5.6		4.6
Hypericum perforatum L.	*Hypericaceae*							0.7		
Luzula campestris L.	*Juncaceae*						1.1			
Galeopsis speciosa Mill.	*Lamiaceae*						0.5			
Mentha arvensis L.		0.7			0.8	1.0				
Prunella vulgaris L.			0.6		0.8					
Stachys palustris L.			5.0					0.7	4.0	
Epilobium montanum L.	*Onagraceae*	0.7	1.1							
Plantago lanceolata L.	*Plantaginaceae*	0.7		0.8		0.5		0.7		
Agrostis stolonifera L.	*Poaceae*	2.9	1.1	0.8	0.8	0.5	1.6	2.1	0.7	1.7
Alopecurus pratensis L.					0.8		1.1		0.7	0.6
Anthoxanthum odoratum L.			0.6	0.8						
Dactylis glomerata L.		9.4	10.1	5.3	6.5	9.0	3.8	12.7	10.1	4.0
Elytrigia repens L.		9.4	3.4	6.0	17.1	8.0	11.0	4.9	6.0	16.1
Festuca ovina L.		0.7								
Festuca pratensis Huds.		8.0	1.7	2.3	0.8	2.0			3.4	4.0
Festuca rubra L.		15.1	16.2	22.6	23.0	14.5	15.9	20.6	18.1	17.2
Phleum pratense L.			0.6	2.3	3.3	3.0	3.3	1.4	1.3	1.7
Poa pratensis L.			0.6	0.8	0.8	0.5		1.4	0.7	0.6
Rumex acetosella L.	*Polygonaceae*		0.6	4.5		0.5				
Rumex crispus L.		0.7	0.6	0.8			1.1	0.7		
Fragaria vesca L.	*Rosaceae*	0.7						1.4		2.3
Geum rivale L.		1.4	1.7	0.8		2.0	2.7			0.6
Geum urbanum L.			2.2	1.5			2.2			
Galium aparine L.	*Rubiaceae*	0.7								
Galium mollugo L.			2.2	3.8	3.3	10.0	7.1			3.4
Galium spurium L.			5.0			2.0				
Veronica arvensis L.	*Scrophulariaceae*		1.1							
Veronica chamaedrys L.		1.4								
Veronica longifolia L.		0.7								
Veronica teucrium L.				3.0			0.5			
Viola arvensis Murr.	*Violaceae*						1.1			

P% – index of relative abundance of species

Table S3. Seed species composition in seed bank of the permanent grassland (%), 2020–2022 spring

Botanic family	***Plant species***	***Parts of the hill***								
		Summit			***Midslope***			***Footslope***		
		2020	**2021**	**2022**	**2020**	**2021**	**2022**	**2020**	**2021**	**2022**
Asteraceae	*Centaurea cyanus* L.		6.9							
	Cirsium arvense (L.) Scop.	7.7	4.0	7.8	9.1	9.2	19.0	2.6	14.3	6.1
	Lapsana communis L.		1.0							
	Sonchus oleraceus L.	3.1	1.0	0.9	1.0	1.7	13.9	3.5	4.5	4.9
Betulaceae	*Betula pendula* Roth.	3.1	1.0	1.7			3.4			
Boraginaceae	*Myosotis arvensis* L.		1.0	3.5						
Brassicaceae	*Capsella bursa-pastoris* (L.) Medik.	1.5								
	Erysimum cheiranthoides L.		7.8			0.6			2.7	
	Sinapis arvensis L.			0.9						
Caryophyllaceae	*Silene alba* (Mill.) E. H. L. Krause			18.3			3.4			
	Stellaria media (L.) Vill.	12.3	9.9	2.6	24.2	12.6		2.7	3.6	
	Silene vulgaris L.	12.3			20.3	33.3		8.0	2.7	
	Spergula arvensis L.	3.1	1.0			1.7		0.9		
Chenopodiaceae	*Chenopodium album* L.	33.8	28.7	43.5	14.1	12.6	34.5	8.0	21.4	20.7
Fabaceae	*Lotus corniculatus* L.	1.5	15.7	9.5	6.1	19.0	8.6	2.6	25.0	48.8
	Trifolium arvense L.		1.0	5.2	3.0		8.6	1.8		2.4
	Trifolium medium Grufb.			0.9			1.7			
	Trifolium repens L.		3.0		1.0	2.9			1.8	3.7
	Vicia cracca L.							1.8		
	Vicia hirsuta L.						3.4		15.2	9.8
	Vicia villosa Roth.				1.0					
Juncaceae	*Juncus bufonius* L.		2.0			1.1			0.9	
Lamiaceae	*Galeopsis ladanum* L.		5.0							
	Galeopsis tetrahit L.							0.9		
	Lamium purpureum L.							1.8		1.2
	Stachys palustris L.	1.5	1.0							
Onagraceae	*Epilobium montanum* L.		4.0							
Papaveraceae	*Fumaria officinalis* L.	10.8			4.0			24.7		
	Papaver rhoeas L.							29.1	0.9	
Poaceae	*Agropyron pectinatum* (Bieb.) P.B			0.9						
	Echinochloa crus- galli L.			0.9			1.7			2.4
	Poa annua L.		1.0							
Polygonaceae	*Fallopia convolvulus* (L.) A. Löve.	4.6	1.0	2.5	2.0			2.7		
	Rumex acetosella L.		2.0			0.6				
	Rumex crispus L.			0.9				0.9		
Scrophulariaceae	*Veronica arvensis* L.	1.5	2.0		2.0	3.5		1.8		
Violaceae	*Viola arvensis* Murr.	3.2			12.2	1.1	1.7	6.2	7.0	

Table S4. Seed species composition in seed bank of the permanent grassland (%), 2020–2022 autumn

Botanic family	***Plant species***	***Parts of the hill***								
		Summit			***Midslope***			***Footslope***		
		2020	**2021**	**2022**	**2020**	**2021**	**2022**	**2020**	**2021**	**2022**
Apiaceae	*Anthriscus sylvestris* L.					3.1				
Asteraceae	*Cirsium arvense* (L.) Scop.	16.8	3.6	10.4	19.6	19.0	15.6	7.5	3.1	6.9
	Sonchus asper L.					1.1				
	Sonchus oleraceus L.	5.1	1.2	3.0	1.8	7.3	1.4	1.5	10.2	5.0
Betulaceae	*Betula pendula* Roth.	3.4	1.8	3.0	1.8	1.1	4.2			1.0
Boraginaceae	*Myosotis arvensis* L.					1.1				
Brassicaceae	*Erysimum cheiranthoides* L.	1.7			1.8		2.8		0.8	
Caryophyllaceae	*Agrostemma githago* L.	1.7			1.8			3.0		
	Silene alba (Mill.) E. H. L. Krause			7.5			26.8			15.8
	Stellaria media (L.) Vill.	8.5	1.8		7.1	3.2	2.8	1.5	5.5	
	Silene vulgaris L.		7.8			9.5			3.1	
Chenopodiaceae	*Chenopodium album* L.	44.1	72.4	47.8	16.1	32.5	22.5	16.4	18.1	11.9
Fabaceae	*Lotus corniculatus* L.		4.2	20.8		9.5	15.5		33.9	26.7
	Trifolium arvense L.	3.4			10.7	3.2	2.8	6.0	4.7	5.9
	Trifolium medium Grufb.								1.6	
	Trifolium repens L.			1.5						
	Vicia hirsuta L.		2.4	4.5			4.2	10.4	7.1	20.8
Juncaceae	*Juncus bufonius* L.				12.5				0.8	
Lamiaceae	*Lamium purpureum* L.	3.4						1.5		1.0
	Stachys palustris L.	1.7								
Papaveraceae	*Fumaria officinalis* L.	3.4			14.3			40.2		
	Papaver rhoeas L.								0.8	
Poaceae	*Agropyron repens* L.								2.4	
	Echinochloa crus-galli L.								1.6	
Polygonaceae	*Fallopia convolvulus* (L.) A. Löve.		1.8	1.5			1.4	1.5	2.4	
	Polygonum persicaria L.							1.5		
	Rumex acetosella L.	1.7			1.8					
	Rumex crispus L.									3.0
Scrophulariaceae	*Veronica arvensis* L.	3.4	0.6		10.7	1.1		3.0		
Violaceae	*Viola arvensis* Murr.	1.7	2.4			8.3		6.0	3.9	2.0

Table S5. Seed species composition in seed bank of the grass-grain crop rotation (%), 2020–2022 spring

Botanic family	***Plant species***	***Parts of the hill***								
		Summit			***Midslope***			***Footslope***		
		2020	**2021**	**2022**	**2020**	**2021**	**2022**	**2020**	**2021**	**2022**
Asteraceae	*Centaurea cyanus* L.	1.2								
	Cirsium arvense (L.) Scop.		0.2					0.5		0.4
	Sonchus asper (L.) Hill									50.0
	Sonchus oleraceus L.							0.5		
	Tripleurospermum perforatum M. Lainz			0.2				4.5	0.2	0.9
Betulaceae	*Betula pendula* Roth.	4.8	0.2	0.7	1.0				0.2	
Boraginaceae	*Myosotis arvensis* L.			0.3	1.0	0.4	0.3	6.4		1.3
Brassicaceae	*Capsella bursa-pastoris* (L.)Medik.		0.2			0.3		1.0	0.7	0.4
	Erysimum cheiranthoides L.		1.5	1.4	1.5	60.0	11.8	6.4	32.1	5.0
Caryophyllaceae	*Stellaria media* (L.) Vill.	7.1			1.0		0.7	1.5	0.2	0.2
	Spergula arvensis L.	1.2	8.8	14.5		3.7	6.3		3.3	2.4
Chenopodiaceae	*Chenopodium album* L.	23.8	6.6	4.8	33.4	2.5	4.6	20.3	4.0	2.0
Fabaceae	*Trifolium repens* L.							1.0		
	Vicia villosa Roth.								0.2	
Juncaceae	*Juncus bufonius* L.	1.2			0.5					
Lamiaceae	*Lamium purpureum* L.							1.0	0.9	0.4
Papaveraceae	*Fumaria officinalis* L.				0.5			1.5		
Plantaginaceae	*Plantago lanceolata* L.		0.2							
Poaceae	*Echinochloa crus-gali* L.			45.3		0.1	8.9		1.2	8.6
	Setaria viridis P. B.	13.1	58.8	8.0	1.0	6.4	1.0	1.5	12.5	3.1
Polygonaceae	*Fallopia convolvulus* (L.) A. Löve.	3.6	3.5	11.6	13.9	3.4	50.0	13.9	8.3	9.9
	Polygonum persicaria L.	1.2	0.5	0.7		2.8	5.6		7.3	3.5
	Rumex acetosella L.		0.7		1.5			1.0		
Scrophulariaceae	*Veronica arvensis* L.	2.4	2.4	7.9	3.1	11.3	2.6	32.1	12.6	0.4
Violaceae	*Viola arvensis* Murr.	40.5	16.4	4.6	41.6	9.1	8.2	6.9	16.3	11.5

Table S6. Seed species composition in seed bank of the grass-grain crop rotation (%), 2020–2022 autumn

Botanic family	***Plant species***	***Parts of the hill***								
		Summit			***Midslope***			***Footslope***		
		2020	**2021**	**2022**	**2020**	**2021**	**2022**	**2020**	**2021**	**2022**
Asteraceae	*Cirsium arvense* (L.) Scop.							0.4		0.5
	Sonchus oleraceus L.			0.5		0.3	0.7	0.4	0.4	0.5
	Tripleurospermum perforatum M. Lainz	0.2					0.7	0.6		1.6
Betulaceae	*Betula pendula* Roth.	0.1	0.7	1.4	0.1			0.6		
Boraginaceae	*Myosotis arvensis* L.	0.1		0.7	0.9	0.3	0.3	0.2	1.4	0.5
Brassicaceae	*Capsella bursa-pastoris* (L.) Medik.	0.1	0.3	0.2	0.1		0.3		0.7	1.1
	Erysimum cheiranthoides L.	0.2		0.2	40.0	17.3	3.8	20.9	7.6	6.5
Caryophyllaceae	*Stellaria media* (L.) Vill.			0.5		0.6	1.0		0.7	1.1
	Spergula arvensis L.	4.8	22.1	23.7	7.4	11.1	27.2	5.3	10.4	10.9
Chenopodiaceae	*Chenopodium album* L.	2.5	6.8	11.0	2.6	10.8	6.2	4.1	7.6	8.2
Lamiaceae	*Galeopsis speciosa* Mill.						0.3			
	Lamium purpureum L.						0.3	1.2	1.8	2.7
Papaveraceae	*Fumaria officinalis* L.	0.1								
	Papaver rhoeas L.			0.2			0.3			
Poaceae	*Agropyron pectinatum* (Bieb.) P.B									0.5
	Echinochloa crus-gali L.		55.1	37.6		22.8	9.4		19.1	8.7
	Setaria viridis P. B.	79.8	6.6	4.0	5.8	4.7		14.9	3.2	3.8
Polygonaceae	*Fallopia convolvulus* (L.) A. Löve.	0.8	0.2	9.9	0.6	1.8	13.8	2.5	12.9	20.7
	Polygonum persicaria L.			0.9	1.3	2.6	17.7	0.8	4.7	7.1
	Rumex acetosella L.		0.2		0.2	0.3				
Scrophulariaceae	*Veronica arvensis* L.	0.4	0.2		30.0	3.2	3.8	20.9	2.9	3.8
Violaceae	*Viola arvensis* Murr.	10.9	7.8	9.2	11.0	24.3	14.2	27.2	26.6	21.8

Table S7. Seed species composition in seed bank of the field crop rotation with a row crop (%), 2020–2022 spring

Botanic family	*Plant species*	*Parts of the hill*								
		Summit			*Midslope*			*Footslope*		
		2020	2021	2022	2020	2021	2022	2020	2021	2022
Asteraceae	*Cirsium arvense* (L.) Scop.	0.4	0.7				0.5		0.4	
	Sonchus oleraceus L.		2.1						0.9	0.5
	Tripleurospermum perforatum M. Lainz				1.2		0.5	7.5		0.5
Betulaceae	*Betula pendula* Roth.			0.8		0.8		1.7		
Boraginaceae	*Myosotis arvensis* L.			0.8	1.2	2.3	0.9	0.8	2.7	2.3
Brassicaceae	*Capsella bursa-pastoris* (L.) Medik.	0.8						0.8	0.4	
	Erysimum cheiranthoides L.	2.9			2.5	0.8		8.8	4.9	3.7
	Sinapis arvensis L.						3.0			
Caryophyllaceae	*Stellaria media* (L.) Vill.	0.4			2.5			0.8		
	Spergula arvensis L.	26.8			30.9			24.3	0.4	
Chenopodiaceae	*Chenopodium album* L.	11.7	31.8	26.3	7.4	34.0	16.8	5.9	21.3	20.5
Fabaceae	*Vicia hirsuta* L.								0.4	0.5
	Vicia villosa Roth.						0.5			
Lamiaceae	*Lamium purpureum* L.	0.4		0.8	1.9		0.5	2.9		2.3
	Stachys palustris L.	0.4								
Papaveraceae	*Fumaria officinalis* L.					0.8				0.5
	Papaver rhoeas L.		0.7	0.8		0.8				
Poaceae	*Agropyron pectinatum* (Bieb.) P.B			0.8						
	Echinochloa crus-gali L.			24.0			5.94			10.0
	Setaria viridis P. B.	17.3	30.6	12.7	3.7	7.6	0.5		5.8	3.1
Polygonaceae	*Fallopia convolvulus* (L.) A. Löve.	2.1	18.1	18.7	1.9	24.1	33.7	9.2	33.3	37.9
	Polygonum persicaria L.	0.4		4.5	7.4	3.8	21.3	4.2	5.8	5.5
	Rumex acetosella L.			0.8	0.6	0.8		0.4		
Scrophulariaceae	*Veronica arvensis* L.	6.3	16.0	1.5	7.4	0.8		3.8	0.9	0.9
Violaceae	*Viola arvensis* Murr.	30.1		7.5	31.4	23.4	15.9	28.9	22.8	11.8

Table S8. Seed species composition in seed bank of the field crop rotation with a row crop (%), 2020–2022 autumn

Botanic family	***Plant species***	***Parts of the hill***								
		Summit			***Midslope***			***Footslope***		
		2020	**2021**	**2022**	**2020**	**2021**	**2022**	**2020**	**2021**	**2022**
Asteraceae	*Centaurea cyanus* L.							1.1		
	Cirsium arvense (L.) Scop.			0.7	1.6	0.4	0.5	0.5	0.3	0.4
	Sonchus oleraceus L.	1.5	0.5	2.0		2.5	1.0		1.7	
	Tripleurospermum perforatum M. Lainz			0.7				0.5	7.5	5.2
Betulaceae	*Betula pendula* Roth.			2.0	1.1	0.4			0.3	1.2
Boraginaceae	*Myosotis arvensis* L.	1.5			1.6	0.8	1.5	5.3	3.9	3.6
Brassicaceae	*Capsella bursa-pastoris* (L.) Medik.	1.5						1.1	1.1	
	Sinapis arvensis L.					0.4				
	Erysimum cheiranthoides L.				1.1		1.1	1.6	6.7	1.6
Caryophyllaceae	*Agrostemma githago* L.	0.8			1.1					
	Sckeranthus annuus L.	0.8								
	Stellaria media (L.) Vill.		0.9					0.5	0.3	0.4
	Spergula arvensis L.		0.9	0.7	0.5					
Chenopodiaceae	*Chenopodium album* L.	36.4	16.1	24.5	49.2	21.7	27.8	31.0	18.4	18.3
Fabaceae	*Lotus corniculatus* L.					0.4				0.4
	Trifolium arvense L.					0.4				
	Vicia villosa Roth.						0.5			
Juncaceae	*Juncus bufonius* L.			0.7						
Lamiaceae	*Lamium purpureum* L.					0.8	0.5	2.1	1.4	2.4
	Stachys palustris L.								0.3	
Papaveraceae	*Fumaria officinalis* L.				1.1				0.3	
	Papaver rhoeas L.			1.4			0.5			
Poaceae	*Echinochloa crus-gali* L.		35.9	29.2		11.5	7.8		8.4	8.2
	Setaria viridis P. B.	37.8	15.2	6.1	8.6	3.3		2.7	1.4	
Polygonaceae	*Fallopia convolvulus* (L.) A. Löve.	1.5	22.1	24.5	4.3	27.5	25.3	12.8	26.3	30.2
	Polygonum persicaria L.	0.8	2.3	1.4	1.6	9.4	5.7		3.9	2.4
	Rumex acetosella L.		0.5		2.1		2.6		0.3	
Scrophulariaceae	*Veronica arvensis* L.	0.8	0.5		25.6	0.8	0.5	7.5	0.8	0.4
Violaceae	*Viola arvensis* Murr.	16.6	5.1	6.1	0.5	19.7	24.7	33.3	16.7	25.3