Table S1. Average proportion (%) of weed species biomass in the years under consideration of the experiment.

Weed species	1977 [1]				1997				2017			
	CC		CR		CC		CR		CC		CR	
	H–	H+	H–	H+	H–	H+	H–	H+	H–	H+	H–	H+
Equisetum arvense L.					–	0.1	–	–	–	1.8	–	–
Apera spica-venti (L.) P. Beauv.	54.4	56.9	8.6	4.5	41.6	30.2	6.1	–	50.8	24.4	8.6	20.0
Avena fatua L.					–	–	–	–	–	7.9	11.9	16.3
Poa annua L.					0.0	–	0.3	–	0.2	–	–	–
Centaurea cyanus L.	21.0	8.6	5.9	9.1	38.8	41.8	–	–	36.5	63.2	0.1	–
Cirsium arvense (L.) Scop.					–	–	–	–	3.7	2.6	–	–
Chamomilla suaveolens (Pursh) Rydb.					0.6	–	–	–	–	–	–	–
Matricaria maritima ssp. inodora (L.) Dostál					0.8	–	3.6	–	3.1	–	–	2.3
Sonchus arvensis L.					–	–	–	–	0.0	0.2	–	36.7
Myosotis arvensis (L.) Hill	7.4	5.2	16.1	9.1	0.3	–	11.2	–	0.2	–	13.7	–
Camelina microcarpa Andrz.					0.7	–	–	–	0.4	–	–	–
Capsella bursa-pastoris (L.) Medik.					0.0	–	0.2	–	2.0	0.0	15.7	–
Thlaspi arvense L.					0.1	–	0.4	–	0.5	–	15.3	–
Arenaria serpyllifolia L.					0.6	–	0.2	–	0.1	–	–	–
Scleranthus annuus L.					0.1	–	0.2	–	–	–	–	–
Stellaria media (L.) Vill.					4.7	–	16.5	–	0.5	–	7.9	–
Vicia hirsuta (L.) Gray					–	–	–	–	–	–	6.4	3.3
Galium aparine L.					4.1	27.9	54.1	100	0.7	–	–	7.9
Galeopsis tetrahit L.					–	–	–	–	–	–	0.2	4.7
Lamium amplexicaule L.					–	–	–	–	–	–	3.0	–
Fumaria officinalis L.					–	–	–	–	–	–	9.9	–
Fallopia convolvulus (L.) Á. Löve					–	–	0.1	–	–	–	1.6	3.3
Polygonum aviculare L.					–	–	–	–	–	–	0.2	2.3
Veronica arvensis L.					0.2	–	1.0	–	0.1	–	1.2	–
Veronica hederifolia L.s.str.					6.2	–	–	–	–	–	–	–
Veronica persica Poir.					–	–	–	–	0.7	–	0.5	3.3
Viola arvensis Murray					1.2	–	6.2	–	0.5	–	3.7	–
Total	82.8	70.7	30.6	22.7	100	100	100	100	100	100	100	100

[1] in 1977 only dominant species were identified and separated; – not occurred.

Table S2. Hierarchical taxonomic classification of weed species observed in the experiment in 1997 and 2017 – adopted to calculate taxonomic distinctness index (Δ^+).

Weed species	Genus	Family	Order	Class	Division	Kingdom
Equisetum arvense L.	*Equisetum*	*Equisetaceae*	*Equisetales*	*Equisetopsida*	*Pteridophyta*	*Plantae*
Apera spica-venti (L.) P. Beauv.	*Apera*	*Poaceae*	*Poales*	*Liliopsida*	*Spermatophyta*	*Plantae*
Avena fatua L.	*Avena*	*Poaceae*	*Poales*	*Liliopsida*	*Spermatophyta*	*Plantae*
Poa annua L.	*Poa*	*Poaceae*	*Poales*	*Liliopsida*	*Spermatophyta*	*Plantae*
Centaurea cyanus L.	*Centaurea*	*Asteraceae*	*Asterales*	*Magnoliopsida*	*Spermatophyta*	*Plantae*
Cirsium arvense (L.) Scop.	*Cirsium*	*Asteraceae*	*Asterales*	*Magnoliopsida*	*Spermatophyta*	*Plantae*
Chamomilla suaveolens (Pursh) Rydb.	*Chamomilla*	*Asteraceae*	*Asterales*	*Magnoliopsida*	*Spermatophyta*	*Plantae*
Matricaria maritima ssp. inodora (L.) Dostál	*Matricaria*	*Asteraceae*	*Asterales*	*Magnoliopsida*	*Spermatophyta*	*Plantae*
Sonchus arvensis L.	*Sonchus*	*Asteraceae*	*Asterales*	*Magnoliopsida*	*Spermatophyta*	*Plantae*
Myosotis arvensis (L.) Hill	*Myosotis*	*Boraginaceae*	*Boraginales*	*Magnoliopsida*	*Spermatophyta*	*Plantae*
Camelina microcarpa Andrz.	*Camelina*	*Brassicaceae*	*Capparales*	*Magnoliopsida*	*Spermatophyta*	*Plantae*
Capsella bursa-pastoris (L.) Medik.	*Capsella*	*Brassicaceae*	*Capparales*	*Magnoliopsida*	*Spermatophyta*	*Plantae*
Thlaspi arvense L.	*Thlaspi*	*Brassicaceae*	*Capparales*	*Magnoliopsida*	*Spermatophyta*	*Plantae*
Arenaria serpyllifolia L.	*Arenaria*	*Caryophyllaceae*	*Caryophyllales*	*Magnoliopsida*	*Spermatophyta*	*Plantae*
Scleranthus annuus L.	*Scleranhtus*	*Caryophyllaceae*	*Caryophyllales*	*Magnoliopsida*	*Spermatophyta*	*Plantae*
Stellaria media (L.) Vill.	*Stellaria*	*Caryophyllaceae*	*Caryophyllales*	*Magnoliopsida*	*Spermatophyta*	*Plantae*
Vicia hirsuta (L.) Gray	*Vicia*	*Fabaceae*	*Fabales*	*Magnoliopsida*	*Spermatophyta*	*Plantae*
Galium aparine L.	*Galium*	*Rubiaceae*	*Gentianales*	*Magnoliopsida*	*Spermatophyta*	*Plantae*
Galeopsis tetrahit L.	*Galeopsis*	*Lamiaceae*	*Lamiales*	*Magnoliopsida*	*Spermatophyta*	*Plantae*
Lamium amplexicaule L.	*Lamium*	*Lamiaceae*	*Lamiales*	*Magnoliopsida*	*Spermatophyta*	*Plantae*
Fumaria officinalis L.	*Fumaria*	*Fumariaceae*	*Papaverales*	*Magnoliopsida*	*Spermatophyta*	*Plantae*
Fallopia convolvulus (L.) Á. Löve	*Fallopia*	*Polygonaceae*	*Polygonales*	*Magnoliopsida*	*Spermatophyta*	*Plantae*
Polygonum aviculare L.	*Polygonum*	*Polygonaceae*	*Polygonales*	*Magnoliopsida*	*Spermatophyta*	*Plantae*
Veronica arvensis L.	*Veronica*	*Scrophulariaceae*	*Scrophulariales*	*Magnoliopsida*	*Spermatophyta*	*Plantae*
Veronica hederifolia L.s.str.	*Veronica*	*Scrophulariaceae*	*Scrophulariales*	*Magnoliopsida*	*Spermatophyta*	*Plantae*
Veronica persica Poir.	*Veronica*	*Scrophulariaceae*	*Scrophulariales*	*Magnoliopsida*	*Spermatophyta*	*Plantae*
Viola arvensis Murray	*Viola*	*Violaceae*	*Violales*	*Magnoliopsida*	*Spermatophyta*	*Plantae*

Table S3. Weed species and their functional trait values adopted to calculate functional diversity index (Q) in the experiment in 1997 and 2017.

Weed species	Height, m	Growth habit	SLA, mm^2/mg	Season of emergence	Seed No./shoot	Tr value
Equisetum arvense L.	0.5	erect	10.4	spring	no seeds	3.5
Apera spica-venti (L.) P. Beauv.	1.5	erect	19.1	autumn or spring	1,000 – 10,000	3
Avena fatua L.	1.3	erect	21.8	spring	100 – 1,000	3
Poa annua L.	0.3	erect	36.4	autumn or spring	100 – 1,000	4
Centaurea cyanus L.	1	erect	26.0	autumn or spring	1,000 – 10,000	3
Cirsium arvense (L.) Scop.	1.5	erect	15.4	spring	1,000 – 10,000	3.5
Chamomilla suaveolens (Pursh) Rydb.	0.5	erect	23.3	spring	1000 – 10,000	4.5 [1]
Matricaria maritima ssp. inodora (L.) Dostál	1	erect	19.7	autumn or spring	10,000 – 1 00,000	4
Sonchus arvensis L.	1.5	erect	21.7	spring	10,000 – 100,000	3.5
Myosotis arvensis (L.) Hill	0.5	erect	29.4	autumn or spring	100 – 1,000	3.5
Camelina microcarpa Andrz.	0.6	erect	20.0	autumn	100 – 1,000	3
Capsella bursa-pastoris (L.) Medik.	0.7	erect	30.0	autumn or spring	1,000 – 10,000	4
Thlaspi arvense L.	0.5	erect	24.6	autumn or spring	1,000 – 10,000	4
Arenaria serpyllifolia L.	0.3	prostrate	20.1	autumn or spring	100 – 1,000	2
Scleranthus annuus L.	0.2	erect	36.3	autumn or spring	100 – 1,000	2.5
Stellaria media (L.) Vill.	0.6	prostrate	53.7	autumn or spring	10,000 – 100,000	4.5
Vicia hirsuta (L.) Gray	0.6	climbing	22.1	autumn or spring	100 – 1,000	3.5
Galium aparine L.	2	climbing	34.7	autumn or spring	100 – 1,000	4.5
Galeopsis tetrahit L.	1	erect	31.0	spring	100 – 1,000	3.5
Lamium amplexicaule L.	0.3	erect	19.7	autumn or spring	100 – 1,000	3.5
Fumaria officinalis L.	0.5	erect	28.5	spring	100 – 1,000	4
Fallopia convolvulus (L.) Á. Löve	2	climbing	23.9	spring	100 – 1,000	3.5
Polygonum aviculare L.	0.6	prostrate	28.9	spring	100 – 1,000	3.5
Veronica arvensis L.	0.5	erect	25.4	autumn or spring	100 – 1,000	3.5
Veronica hederifolia L.s.str.	0.3	prostrate	22.1	autumn or spring	100 – 1,000	4
Veronica persica Poir.	0.5	prostrate	39.6	autumn or spring	100 – 1,000	4.5
Viola arvensis Murray	0.5	erect	24.3	autumn or spring	100 – 1,000	3.5

[1] N value by Ellenberg (1974) was used after scale converting.