Table 1 Suppl. Description of cultivars including the species/hybrid type (Lp = *Lolium perenne*, Lm - *Lolium multiflorum*, Fp - *Festuca pratense*, Fg - *Festuca glaucescens*, Fa - *Festuca arundinacea*), ploidy (2x = diploid, 4x= tetraploid, 6x = hexaploid, all hybrids studied are tetraploids), hybridization, associated breeder and publication.

	Cultivar	Mode of hybridisation	Breeder	Reported in
Controls	AberBite (Lp4x)		IBERS, UK	
	AberMagic (Lp2x)	NA	IBERS, UK	
	Caballo (Lm4x)	NA	DLF, Czech Repblic	
	Podium (Lm2x)	NA	DLF, Czech Repblic	
	Fure (Fp2x)	NA	Graminor Ltd., Norway	
	Kora (Fa6x)	NA	DLF, Czech Repblic	
LpFp	Fabel	amphiploid	Graminor Ltd., Norway	Østrem *et al*. (2013)
	FuRs0142	amphiploid	Graminor Ltd., Norway	
	Prior	amphiploid	IBERS, UK	Lewis *et al*. (1973)
LmFa	FuRs0352	introgression	Graminor Ltd., Norway	
	Bečva	introgression	DLF, Czech Republic	Fojtik (1994)
	Lofa	introgression	DLF, Czech Republic	Fojtik (1994)
LmFp	AberNiche	introgression	IBERS, UK	
	Agula	amphiploid	Szelejewo, Poland	Zwierzykowski *et al*. (1998)
	Felopa	amphiploid	Szelejewo, Poland	Zwierzykowski *et al*. (1998)
	Sulino	amphiploid	Szelejewo, Poland	Zwierzykowski *et al*. (1998)
	Hostyn	introgression	DLF, Czech Republic	
	Perseus	amphiploid	DLF, Czech Republic	Houdek (2005)
	Perun	amphiploid	DLF, Czech Republic	Fojtik (1994)
	Achilles	amphiploid	DLF, Czech Republic	
LmFg	Lueur	amphiploid	INRA, France	Ghesquiere *et al*. (1996)

Table 2 Suppl. Results of *ANOVA*, investigating the effect of year and cultivar for traits dry matter yield (DMY) and ground cover score (GC) (over five years), and quality parameters including water soluble sugars (WSS), buffering capacity (BC), protein content (CP) and dry matter digestibility DMD (over 3 years) (*** - *P*< 0.001); ** - *P*< 0.01; * - *P*< 0.05); ns - not significant).

	N	Sum square	DF	*F*-value	Pr (>*F*)	Significance
GC						
Block	3	3.2	2	4.205	0.0162	*
Year	5	111.9	4	88.4499	< 2.2e^{-16}	***
Cultivar	21	233	20	42.5648	< 2.2e-^{16}	***
Year :cultivar	26	54.4	80	2.6468	1.43E-08	***
DMY						
Block	3	10	2	2.2049	0.1128	ns
Year	5	453	4	94.0058	< 2.2e-16	***
Cultivar	21	202	20	7.7019	2.86e-16	***
Year:cultivar	26	146	80	1.3137	0.0643	ns
DMD						
Block	3	4232	2	4.54e^{+00}	0.0125	*
Year	3	146369	2	2.43e^{+02}	< 2.2e^{-16}	***
Cultivar	21	49049	20	6.28e^{+00}	2.58e^{-11}	***
Year:cultivar	24	9960	40	1.01e^{+00}	0.4658	ns
WSS						
Block	3	3465	2	1.9355	0.148688	ns
Year	3	53554	2	58.5692	< 2.2e^{-16}	***
Cultivar	21	240788	20	16.5316	< 2.2e-16	***
Year:cultivar	24	29674	40	2.0323	0.001627	**
BC						
Block	3	1605	2	0.3363	0.715	ns
Year	3	156132	2	62.2085	< 2.2e^{-16}	***
Cultivar	21	112698	20	4.289	2.07e^{-07}	***
Year:cultivar	24	40290	40	0.8692	0.6888	ns
CP						
Block	3	2452	2	8.7232	0.0002854	***
Year	3	36854	2	218.6549	< 2.2e^{-16}	***
Cultivar	21	24879	20	11.9325	< 2.2e^{-16}	***
Year:cultivar	24	4491	40	1.468	0.0572	ns

Table 3 Suppl. Results of *ANOVA*, investigating the effect of year and hybrid type for traits dry matter yield (DMY) and ground score (GC) (over five years), and quality parameters including water soluble sugars (WSS), buffering capacity (BC), protein content (CP) and dry matter digestibility DMD (over 3 years). (*** - $P < 0.001$); ** - $P < 0.01$; * - $P < 0.05$); ns - not significant)

	N	Sum square	DF	*F*-value	Pr (>*F*)	Significance
GC						
Block	3	3.2	2	2.126	0.1213	
Year	5	111.9	4	36.9569	$< 2.2e^{-16}$	***
Control/hybrid type	10	233	9	34.1947	$< 2.2e^{-16}$	***
Year: control/hybrid type	15	54.4	36	1.9963	0.0011	**
DMY						
Block	3	10	2	1.863	0.1572	ns
Year	5	453	4	42.9865	$< 2.2e^{-16}$	***
Control/hybrid type	10	202	9	8.4908	$3.83e^{-11}$	***
Year:control/hybrid type	15	146	36	1.5355	0.0314	*
DMD						
Block	3	4232	2	$4.35e^{+00}$	0.0144	*
Year	3	146369	2	$1.51e^{+02}$	$< 2.2e^{-16}$	***
Control/hybrid type	10	49049	9	$1.12e^{+01}$	$1.95e^{-13}$	***
Year:control/hybrid type	13	9960	18	$1.14e^{+00}$	0.3204	ns
WSS						
Block	3	3465	2	1.3001	0.2754	
Year	3	53554	2	20.0953	$1.70e^{-08}$	***
Control/hybrid type	10	240788	9	20.0782	$< 2.2e^{-16}$	***
Year:control/hybrid type	13	29674	18	1.2372	0.2381	ns
BC						
Block	3	1605	2	0.2927	0.7467	ns
Year	3	156132	2	28.4754	$2.81e^{-11}$	***
Control/hybrid type	10	112698	9	4.5675	2.32e-^{05}	***
Year:control/hybrid type	13	40290	18	0.8165	0.6789	ns
CP						
Block	3	2452	2	6.4483	0.0020	**
Year	3	36854	2	96.9226	$< 2.2e^{-16}$	***
Control/hybrid type	10	24879	9	14.5398	$< 2.2e^{-16}$	***
Year:control/hybrid type	13	4491	18	1.3123	0.1867	ns

Table 4 Suppl. The mean ground cover visual score on a scale from 0 to 9 (0 - no ground cover, 9 - full ground cover) per cultivar for each year and the overall mean for a five year period, including mean yield per hybrid type for each year and five year mean. Superscripts indicate significant differences in mean GC score among cultivars.

Cultivar	2014	2015	2016	2017	2018	Mean	SD
Pure species controls							
AberBite (Lp4x)	7.0	6.5	5.0	6.5	4.7	$5.9^{b,c}$	1.0
AberMagic (Lp2x)	7.3	6.3	5.8	6.3	4.3	6.0^{c}	1.1
Caballo (Lm4x)	4.8	4.3	4.1	4.5	3.5	$4.2^{a,b,c}$	0.6
Podium (Lm2x)	4.6	4.5	3.8	4.1	3.0	$4.0^{a,b}$	0.8
Fure (Fp2x)	4.6	5.0	3.8	5.5	0.5	3.9^{a}	1.9
Kora (Fa6x)	6.2	3.1	5.0	5.8	3.7	$4.8^{a,b,c}$	1.3
LpFp							
Fabel	6.6	6.8	5.7	6.5	5.3	6.2	0.9
FuRs0142	6.3	6.5	5.5	6.1	5.0	5.9	1.0
Prior	5.5	5.8	4.5	5.3	3.5	4.9	1.0
Mean	6.1	6.3	5.2	6.0	4.6	5.7^{c}	-
SD	0.7	1.0	0.8	0.8	1.2	-	1.1
LmFa							
FuRs0352	3.8	1.8	2.2	2.2	0.8	2.1	1.1
Bečva	4.6	3.5	3.6	4.1	3.3	3.9	0.7
Lofa	5.7	3.8	4.0	4.7	3.5	4.3	1.0
Mean	4.7	3.1	3.3	3.7	2.6	3.5^{a}	-
SD	0.9	1.2	0.9	1.3	1.3	-	1.3
LmFp							
AberNiche	4.1	3.4	3.5	3.7	4.0	3.7	0.6
Agula	4.8	4.0	3.0	3.7	2.5	4.3	1.0
Felopa	4.3	3.8	3.8	3.8	1.8	3.6	1.1
Sulino	4.8	4.0	4.0	3.8	1.7	3.7	1.3
Hostyn	5.3	4.7	4.7	5.3	3.8	4.8	0.7
Perseus	5.5	4.7	5.0	5.7	4.8	5.1	0.7
Perun	4.7	5.0	4.3	5.0	3.5	4.5	0.7
Achilles	4.8	4.8	4.1	5.3	4.3	4.7	0.8
Mean	4.9	4.3	4.1	4.5	3.3	4.2^{a}	-
SD	0.6	0.9	0.7	1.0	1.3	-	1.0
LmFg							
Lueur	4.3	2.7	2.3	3.2	2.1	2.9^{a}	0.9

Table 5 Suppl. Pairwise comparisons for mean ground score cover between years.

Contrast	Estimate	SE	df	*t*-ratio	*P*-value
2014 - 2015	0.85277778	0.16116935	41.9052586	5.29119081	3.94E-05
2014 - 2016	1.22013889	0.11323099	43.8176721	10.7756619	1.61E-12
2014 - 2017	0.45555556	0.12986536	51.3380887	3.50790655	0.00807482
2014 - 2018	2.24513889	0.16874102	66.7445902	13.3052348	0
2015 - 2016	0.36736111	0.14326250	43.9378863	2.56425165	0.09500125
2015 - 2017	-0.3972222	0.11311882	47.2348778	-3.5115486	0.00839385
2015 - 2018	1.39236111	0.14742419	69.9780075	9.44459073	0
2016 - 2017	-0.7645833	0.10408807	53.4716520	-7.3455422	1.18E-08
2016 - 2018	1.0250000	0.15345620	63.3539210	6.67943019	6.98E-08
2017 - 2018	1.78958333	0.12400305	56.9409938	14.4317689	1.10E-11

Table 6 Suppl. Pairwise comparisons for mean ground score cover between cultivars of the same hybrid type for each year. Due to number of comparisons, only significantly different (< 0.05) comparisons shown.

Year 1	Cultivar 1	Year 2	Cultivar 2	Estimate	SE	df	*t*-ratio	*P*-value
2014	Fabel	2018	Prior	3.1667	0.5096	150.1115	6.2144	0.0000
2015	Fabel	2016	Prior	2.3333	0.5096	150.1115	4.5791	0.0301
2015	Fabel	2018	Prior	3.3333	0.5096	150.1115	6.5415	0.0000
2017	Fabel	2018	Prior	3.0000	0.5096	150.1115	5.8874	0.0001
2014	FuRs0142	2018	Prior	2.8333	0.5096	150.1115	5.5603	0.0005
2015	FuRs0142	2018	Prior	3.0000	0.5096	150.1115	5.8874	0.0001
2017	FuRs0142	2018	Prior	2.6667	0.5096	150.1115	5.2332	0.0023
2015	Prior	2018	Prior	2.3333	0.4116	60.3205	5.6690	0.0015
2014	Bečva	2015	FuRs0352	2.8333	0.5096	150.1115	5.5603	0.0005
2014	Bečva	2016	FuRs0352	2.5000	0.5096	150.1115	4.9061	0.0088
2014	Bečva	2017	FuRs0352	2.5000	0.5096	150.1115	4.9061	0.0088
2014	Bečva	2018	FuRs0352	3.8333	0.5096	150.1115	7.5227	0.0000
2015	Bečva	2018	FuRs0352	2.6667	0.5096	150.1115	5.2332	0.0023
2016	Bečva	2018	FuRs0352	2.8333	0.5096	150.1115	5.5603	0.0005
2017	Bečva	2015	FuRs0352	2.3333	0.5096	150.1115	4.5791	0.0301
2017	Bečva	2018	FuRs0352	3.3333	0.5096	150.1115	6.5415	0.0000
2018	Bečva	2018	FuRs0352	2.5000	0.5096	150.1115	4.9061	0.0088
2018	Bečva	2014	Lofa	-2.3333	0.5096	150.1115	-4.5791	0.0301
2014	FuRs0352	2018	FuRs0352	3.0000	0.4875	48.0426	6.1537	0.0005
2015	FuRs0352	2014	Lofa	-3.8333	0.5096	150.1115	-7.5227	0.0000
2015	FuRs0352	2017	Lofa	-2.8333	0.5096	150.1115	-5.5603	0.0005
2016	FuRs0352	2014	Lofa	-3.5000	0.5096	150.1115	-6.8686	0.0000
2016	FuRs0352	2017	Lofa	-2.5000	0.5096	150.1115	-4.9061	0.0088
2017	FuRs0352	2014	Lofa	-3.5000	0.5096	150.1115	-6.8686	0.0000
2017	FuRs0352	2017	Lofa	-2.5000	0.5096	150.1115	-4.9061	0.0088
2018	FuRs0352	2014	Lofa	-4.8333	0.5096	150.1115	-9.4852	0.0000
2018	FuRs0352	2015	Lofa	-3.0000	0.5096	150.1115	-5.8874	0.0001
2018	FuRs0352	2016	Lofa	-3.1667	0.5096	150.1115	-6.2144	0.0000
2018	FuRs0352	2017	Lofa	-3.8333	0.5096	150.1115	-7.5227	0.0000
2018	FuRs0352	2018	Lofa	-2.6667	0.5096	150.1115	-5.2332	0.0023
2014	AberNiche	2018	Felopa	2.3333	0.5096	150.1115	4.5791	0.0301
2014	AberNiche	2018	Sulino	2.5000	0.5096	150.1115	4.9061	0.0088
2015	AberNiche	2017	Perseus	-2.3333	0.5096	150.1115	-4.5791	0.0301
2018	AberNiche	2018	Sulino	2.3333	0.5096	150.1115	4.5791	0.0301
2014	Achilles	2018	Agula	2.3333	0.5096	150.1115	4.5791	0.0301
2014	Achilles	2018	Felopa	3.0000	0.5096	150.1115	5.8874	0.0001
2014	Achilles	2018	Sulino	3.1667	0.5096	150.1115	6.2144	0.0000
2015	Achilles	2018	Agula	2.3333	0.5096	150.1115	4.5791	0.0301
2015	Achilles	2018	Felopa	3.0000	0.5096	150.1115	5.8874	0.0001
2015	Achilles	2018	Sulino	3.1667	0.5096	150.1115	6.2144	0.0000
2016	Achilles	2018	Felopa	2.3333	0.5096	150.1115	4.5791	0.0301
2016	Achilles	2018	Sulino	2.5000	0.5096	150.1115	4.9061	0.0088
2017	Achilles	2016	Agula	2.3333	0.5096	150.1115	4.5791	0.0301
2017	Achilles	2018	Agula	2.8333	0.5096	150.1115	5.5603	0.0005
2017	Achilles	2018	Felopa	3.5000	0.5096	150.1115	6.8686	0.0000
2017	Achilles	2018	Sulino	3.6667	0.5096	150.1115	7.1957	0.0000
2018	Achilles	2018	Felopa	2.5000	0.5096	150.1115	4.9061	0.0088
2018	Achilles	2018	Sulino	2.6667	0.5096	150.1115	5.2332	0.0023
2014	Agula	2018	Agula	2.3333	0.4875	48.0426	4.7862	0.0354
2014	Agula	2018	Felopa	3.0000	0.5096	150.1115	5.8874	0.0001
2014	Agula	2018	Sulino	3.1667	0.5096	150.1115	6.2144	0.0000
2015	Agula	2018	Sulino	2.3333	0.5096	150.1115	4.5791	0.0301
2016	Agula	2014	Hostyn	-2.3333	0.5096	150.1115	-4.5791	0.0301
2016	Agula	2017	Hostyn	-2.3333	0.5096	150.1115	-4.5791	0.0301
2016	Agula	2014	Perseus	-2.5000	0.5096	150.1115	-4.9061	0.0088
2016	Agula	2017	Perseus	-2.6667	0.5096	150.1115	-5.2332	0.0023
2018	Agula	2014	Felopa	-2.3333	0.5096	150.1115	-4.5791	0.0301

2018	Agula	2014	Hostyn	-2.8333	0.5096	150.1115	-5.5603	0.0005
2018	Agula	2017	Hostyn	-2.8333	0.5096	150.1115	-5.5603	0.0005
2018	Agula	2014	Perseus	-3.0000	0.5096	150.1115	-5.8874	0.0001
2018	Agula	2016	Perseus	-2.5000	0.5096	150.1115	-4.9061	0.0088
2018	Agula	2017	Perseus	-3.1667	0.5096	150.1115	-6.2144	0.0000
2018	Agula	2018	Perseus	-2.3333	0.5096	150.1115	-4.5791	0.0301
2018	Agula	2015	Perun	-2.5000	0.5096	150.1115	-4.9061	0.0088
2018	Agula	2017	Perun	-2.5000	0.5096	150.1115	-4.9061	0.0088
2018	Agula	2014	Sulino	-2.3333	0.5096	150.1115	-4.5791	0.0301
2014	Felopa	2018	Felopa	3.0000	0.4875	48.0426	6.1537	0.0005
2015	Felopa	2018	Felopa	2.0000	0.4116	60.3205	4.8592	0.0227
2017	Felopa	2018	Felopa	2.0000	0.4023	41.1632	4.9717	0.0255
2014	Felopa	2018	Sulino	3.1667	0.5096	150.1115	6.2144	0.0000
2018	Felopa	2014	Hostyn	-3.5000	0.5096	150.1115	-6.8686	0.0000
2018	Felopa	2015	Hostyn	-2.8333	0.5096	150.1115	-5.5603	0.0005
2018	Felopa	2016	Hostyn	-2.8333	0.5096	150.1115	-5.5603	0.0005
2018	Felopa	2017	Hostyn	-3.5000	0.5096	150.1115	-6.8686	0.0000
2018	Felopa	2014	Perseus	-3.6667	0.5096	150.1115	-7.1957	0.0000
2018	Felopa	2015	Perseus	-2.8333	0.5096	150.1115	-5.5603	0.0005
2018	Felopa	2016	Perseus	-3.1667	0.5096	150.1115	-6.2144	0.0000
2018	Felopa	2017	Perseus	-3.8333	0.5096	150.1115	-7.5227	0.0000
2018	Felopa	2018	Perseus	-3.0000	0.5096	150.1115	-5.8874	0.0001
2018	Felopa	2014	Perun	-2.8333	0.5096	150.1115	-5.5603	0.0005
2018	Felopa	2015	Perun	-3.1667	0.5096	150.1115	-6.2144	0.0000
2018	Felopa	2016	Perun	-2.5000	0.5096	150.1115	-4.9061	0.0088
2018	Felopa	2017	Perun	-3.1667	0.5096	150.1115	-6.2144	0.0000
2018	Felopa	2014	Sulino	-3.0000	0.5096	150.1115	-5.8874	0.0001
2014	Hostyn	2018	Sulino	3.6667	0.5096	150.1115	7.1957	0.0000
2015	Hostyn	2018	Sulino	3.0000	0.5096	150.1115	5.8874	0.0001
2016	Hostyn	2018	Sulino	3.0000	0.5096	150.1115	5.8874	0.0001
2017	Hostyn	2018	Sulino	3.6667	0.5096	150.1115	7.1957	0.0000
2014	Lueur	2016	Lueur	2.0000	0.4000	37.8596	5.0000	0.0264

Table 7 Suppl. Pairwise comparisons for mean yield between years-

Contrast	Estimate	SE	df	*t*-ratio	*P*-value
2014 - 2015	-3.4332144	0.18918192	46.2463517	-18.147688	0
2014 - 2016	0.51681037	0.20120762	21.4016891	2.56854275	0.11241351
2014 - 2017	-1.6443402	0.23079725	44.8882221	-7.1246092	6.64E-08
2014 - 2018	1.02235219	0.24966421	23.7566568	4.09490888	0.00351045
2015 - 2016	3.95002475	0.18390082	50.6120289	21.4791037	0
2015 - 2017	1.7888742	0.1871537	57.731573	9.55831593	1.57E-11
2015 - 2018	4.45556658	0.27702434	75.2798891	16.0836645	0
2016 - 2017	-2.1611506	0.22230151	51.3615298	-9.7217088	0
2016 - 2018	0.50554183	0.23921519	36.2726765	2.11333495	0.23653939
2017 - 2018	2.66669238	0.26824327	64.414876	9.94132073	6.64E-12

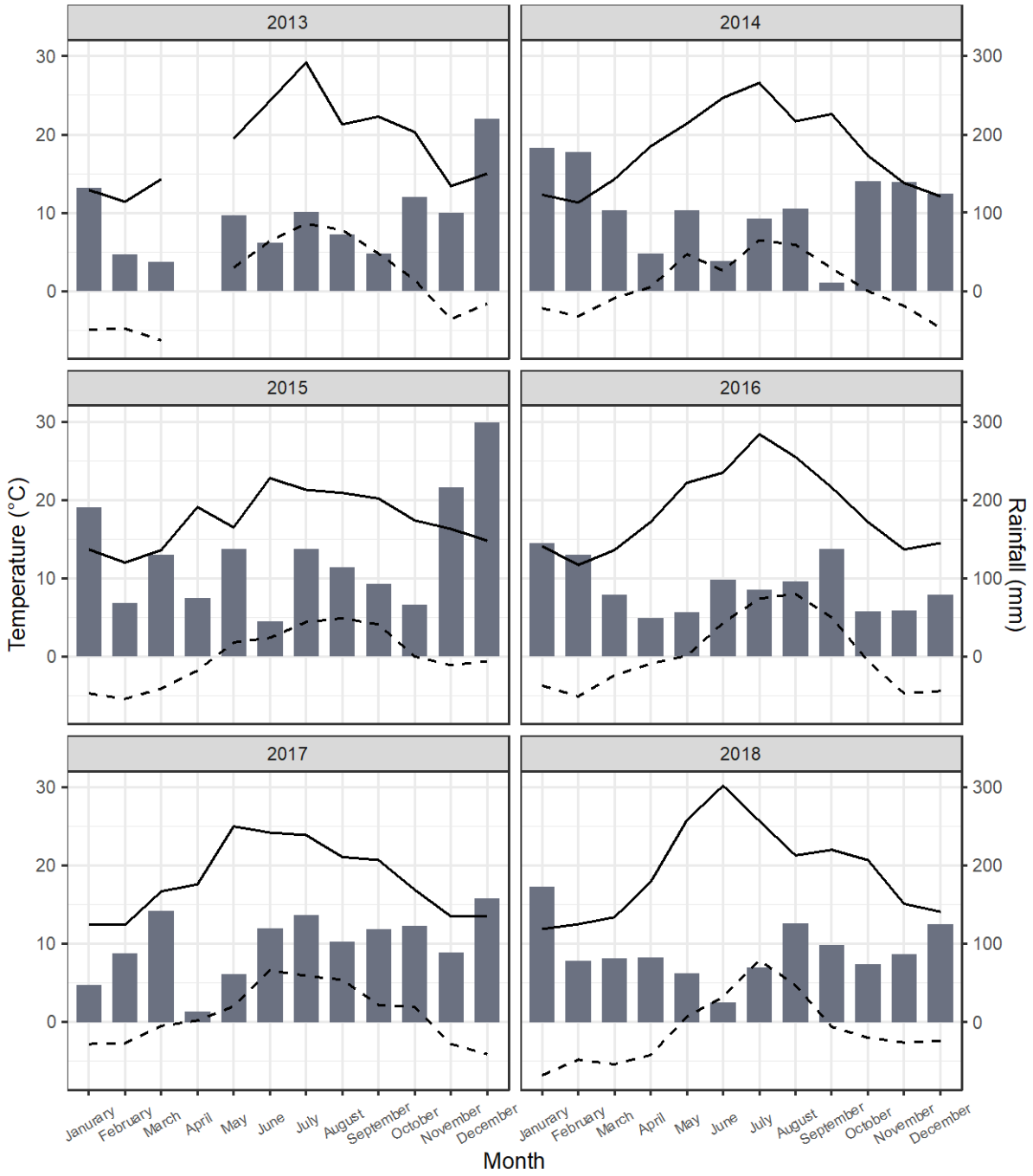

Fig.1 Suppl. Meteorological data for experimental years, including total rainfall (*grey bars*) maximum temperature (*solid lines*) and minimum (*dashed lines*) for each month. April 2013 values missing for this site.