agronomy

Supplementary Materials:

Table S1. P-values from the analysis of variance by location and age of stand for the effect of block, seeding year (2017 and 2018), red clover planting season (fall and spring), accumulated fall growing degree days from planting to end of GDD accumulation (nested within seeding year), and their respective two-way interactions for Kernza grain yield, intermediate wheatgrass summer biomass, fall biomass, total intermediate wheatgrass biomass (summer + fall), red clover summer biomass, and weed summer biomass. P-values with * significant at<0.05 and ** significant at<0.01.

	Kernza Grain Yield		**IWG Summer Biomass**		**IWG Fall Biomass**	**Total IWG Biomass**	**Red Clover Summer Biomass**		**Weed Summer Biomass**	
	1st year	**2nd year**	**1st year**	**2nd year**	**1st year**	**1st year**	**1st year**	**2nd year**	**1st year**	**2nd year**
Arlington										
Block	0.38	0.07	0.41	0.32	0.35	0.49	0.26	0.6	0.17	0.02*
Seeding year (S)	<0.01**	<0.01**	<0.01**	<0.01**	<0.01**	<0.01**	<0.01**	<0.01**	0.53	0.38
Clover (C)	0.04*	0.12	0.09	0.29	0.08	0.05	0.14	0.02*	0.03*	0.59
Fall GDD (F)	<0.01**	0.12	<0.01**	<0.01**	<0.01**	<0.01**	<0.01**	0.21	<0.01**	<0.01**
S × C	0.28	0.63	0.44	0.63	0.72	0.39	0.02	0.57	0.47	0.13
C × F	0.08	<0.01**	0.14	<0.01**	<0.01**	0.21	<0.01**	<0.01**	<0.01**	<0.01**
Lancaster										
Block	0.52	0.36	0.66	0.03*	0.59	0.6	0.5	0.36	0.67	0.1
Seeding year (S)	0.78	0.03*	0.03*	0.25	<0.01**	0.01	0.82	0.04*	0.06	0.01*
Clover (C)	0.73	0.18	0.47	0.36	0.28	0.91	0.04*	0.08	0.84	0.72
Fall GDD (F)	<0.01**	0.12	<0.01**	<0.01**	<0.01**	<0.01**	0.17	0.35	<0.01**	0.01*
S×C	0.81	0.38	0.31	0.41	0.66	0.46	0.79	0.21	0.66	0.35
C×F	0.61	0.22	0.23	0.04*	0.05*	0.38	0.1	< 0.01**	0.53	0.08

Table S2. Means by growing degree days (GDD) at Arlington and Lancaster when red clover is planted in the fall and spring of the first and second year intermediate wheatgrass managed for dual-use (grain and forage (IWG) harvest in the summer), red clover summer biomass (RC), and weed summer biomass (Weeds). Means with the same letter within each parameter are not different at alpha = 0.05.

Arlington																
	First year								**Second year**							
Fall red clover																
GDD	Grain		IWG		RC		Weeds		Grain		IWG		RC		Weeds	
54	.-	-	0	f	1777	ab	1608	abcde	-	-	0	f	3754	abcd	277	bc
138	49	b	953	cde	1487	ab	475	def	71	abc	721	abcdf	1726	abcd	1003	ab
162	32	b	30	ef	15	c	7986	a	403	a	4442	ab	232	cd	633	abc
420	188	ab	1997	bc	1716	ab	175	fg	75	abc	712	abcdf	3148	abcd	213	abc
468	293	ab	5302	a	1	c	242	defg	421	a	4900	a	135	d	174	bc
728	460	a	6536	a	20	c	18	g	428	a	4648	a	520	bcd	246	bc
972	100	ab	3418	ab	1067	b	2946	abcd	252	ab	3177	abc	2461	abcd	365	abc
Spring red clover																
54	-	-	0	f	2442	ab	2342	abcd	-	-	173	cdf	3844	abc	307	abc
138	94	ab	1594	bcd	1016	b	1593	abcde	50	abc	485	bcdf	3026	abcd	686	abc
162	92	ab	340	def	43	c	5731	ab	95	abc	1282	abcdf	3774	abcd	236	abc
420	145	ab	1948	bc	1580	ab	299	efg	65	abc	427	cdf	4054	abc	610	abc
468	409	a	5884	a	16	c	1076	abcdef	179	abc	1996	abcdf	4988	ab	-	-
728	365	a	5299	a	10	c	692	abcdef	246	ab	4508	ab	1566	abcd	41	bc
972	508	a	6095	a	1	c	90	efg	86	abc	2392	abcd	3288	abcd	111	bc
Lancaster																
First year									Second year							
Fall red clover																
GDD	Grain		IWG		RC		Weeds		Grain		IWG		RC		Weeds	
103	16	a	54	def	0	a	11932	a	222	a	6499	ab	565	abc	417	ab
156	17	a	3846	abc	45	a	8954	ab	1156	a	9685	a	7	c	106	ab
291	3	a	59	def	153	a	8686	ab	121	a	4329	ab	0	c	2266	a
335	126	a	682	abcdef	0	a	12878	ab	165	a	2096	ab	395	bc	889	ab
473	260	a	4485	ab	0	a	429	b	220	a	5175	ab	309	bc	252	ab
597	238	a	3557	abcde	14	a	4193	ab	641	a	7894	a	1041	abc	-	-
798	148	a	3364	abcd	2	a	1121	ab	328	a	9916	a	1104	abc	-	-
865	9	a	2063	abcdef	26	a	2114	ab	218	a	3179	ab	610	abc	712	ab
Spring red clover																
103	18	a	75	cdef	807	a	5144	ab	207	a	3141	ab	4184	ab	146	ab
156	38	a	1448	abcdef	721	a	6862	ab	882	a	7172	ab	1475	abc	264	ab
291	14	a	338	bcdef	470	a	5507	ab	632	a	4286	ab	3455	ab	225	ab
335	35	a	1082	abcdef	58	a	3265	ab	535	a	4910	ab	237	bc	525	ab
473	116	a	1500	abcdef	563	a	1465	ab	216	a	1845	ab	3311	ab	68	b
597	498	a	6328	a	157	a	6209	ab	457	a	6528	ab	630	abc	1367	ab
798	240	a	4229	ab	92	a	679	ab	243	a	2890	ab	2425	abc	-	-
865	70	a	4755	ab	63	a	1238	ab	444	a	3822	ab	433	bc	1003	ab