10.1071/CP22370

Crop & Pasture Science

Supplementary Material

Diverse systems and strategies to cost-effectively manage herbicide-resistant annual ryegrass (*Lolium rigidum*) in no-till wheat (*Triticum aestivum*)-based cropping sequences in south-eastern Australia

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Diverse systems and strategies to cost-effectively manage herbicide-resistant annual ryegrass (*Lolium rigidum*) in no-till wheat (*Triticum aestivum*)-based cropping sequences in south-eastern Australia

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Supplemental Files

Table S1. Details of fertiliser applications, pre-emergent and in-crop herbicides used on wheat and canola grain crops under conservative (C) and aggressive (A) weed management regimes in year 1 of the on-farm studies at Eurongilly, NSW. Inputs were identical for Experiments 1 and 2 unless otherwise indicated.[a]

Timing	Input year 1	Crop and intensity of weed management			
		Wheat(C)	Wheat(A)	Canola(C)	Canola(A)
Sowing	**Fertiliser**				
	Mono-ammonium phosphate (kg N/ha)	2.5	7.5	2.5	7.5
	(kg P/ha)	5.5	16.5	5.5	16.5
	Pre-emergent herbicides				
	Trifluralin @ 576 g/ha + Diuron@ 500 g/ha	Yes			
	Pyroxasulfone @ 100 g/ha + tri-allate @ 1000 g/ha		Yes		
	Trifluralin @ 960 g/ha + atrazine 990 g/ha			Yes	
	Trifluralin @ 960 g/ha				Yes
In-Crop	**Herbicides**				
	Prosulfocarb @ 1200 g/ha + s-metalochlor @ 180 g/ha at 2-3 leaf stage	Yes			
	Prosulfocarb @ 2000 g/ha + s-metalochlor @ 300 g/ha + pinoxaden @ 15 g/ha + cloquintocet @ 3.75 g/ha at 2-3 leaf stage		Yes		
	Butroxydim @ 20 g/ha + atrazine @ 810 g/ha at 2-3 leaf stage			Yes	
	Glyphosate dry @ 621 g/ha at 2-3 leaf and 6 leaf stages				Yes
	Fertiliser - stem-elongation growth stage[b]				
	Ammonium sulphate (kg N/ha)			21	21
	(kg S/ha)			24	24
	Urea (kg N/ha)	40	80 (Exp 1) 144 (Exp 2)	40 (Exp1) 64 (Exp2)	80 (Exp 1) 144 (Exp 2)

[a] The full details of seed-dressings used can be found in Supplementary information Table S3.

Table S2. Details of fertiliser applications, pre-emergent and in-crop herbicides used on the wheat grain and hay crops or canola in year 2 of the on-farm studies at Eurongilly, NSW. Inputs were identical for Experiments 1 and 2 unless otherwise indicated.[a]

Timing	Input year 2	Crop and intensity of weed management			
		Wheat(C)	Wheat(A)	Wheat hay	Canola(A)
Sowing	**Fertiliser**[b]				
	Mon-ammonium phosphate (kg N/ha)	2.5	7.5	2.5	7.5
	(kg P/ha)	5.5	16.5	5.5	16.5
	Ammonium sulphate (kg N/ha)	21	21	21	21
	(kg P/ha)	24	24	24	24
	Pre-emergent herbicides				
	Trifluralin @ 960 g/ha	Yes			
	Pyroxasulfone @ 100 g/ha + tri-allate @ 1000 g/ha		Yes		
	Trifluralin @ 960 g/ha + propyzamide @ 750 g/ha				Yes
In-Crop	**Herbicides**				
	2-methyl-4-chlorophenoxyacetic acid @ 251 g/ha + chlorsulfuron @ 15 g/ha + clopyralid @ 90 g/ha at 3-4 leaf stage	Yes			
	Prosulfocarb @ 2000 g/ha + s-metalochlor @ 300 g/ha + bromoxynil @ 141 g/ha + pyrasulfotole @ 25 g/ha + pinoxaden 30 g/ha + cloquintocet @ 8 g/ha at 2-3 leaf stage		Yes		
	Clopyralid @ 90 g/ha + imazamox @ 9.9 g/ha + imazapyr @ 4.5 g/ha + clethodim @ 120 g/ha at 2-3 leaf stage				Yes (Exp 1)
	Glyphosate dry @ 621 g/ha at 2-3 leaf and 6 leaf stages				Yes (Exp 2)
	Glyphosate @ 1083 g/ha after hay-cut and removal			Yes	

[a] The full details of seed-dressings used can be found in Supplementary information Table S3.

[b] Further details of the additional fertiliser N rates applied to different crop and weed management control measures are presented in Tables S5 (Experiment 1) and S7 (Experiment 2).

Table S3. Details of seed-dressings used on wheat and canola grain crops under conservative (C) and aggressive (A) weed management regimes in year 1 and seed-dressings applied to wheat grain and hay crops or canola in year 2 of both on-farm studies at Eurongilly, NSW.

Seed-dressings year 1	**Crop and intensity of weed management**			
	Wheat(C)	**Wheat(A)**	**Canola(C)**	**Canola(A)**
Raxil® (tebuconazole + triflumuron) @ 100ml/100 kg seed	Yes			
Dividend® (difenoconazole + metalaxyl-M) @ 260ml/100 kg seed		Yes		
Jockey® (Fluquinconazole) @ 2L/100 kg + Gaucho 600® (Imidacloprid) @ 400ml/100 kg seed			Yes	Yes
Seed-dressings year 2	**Crop and intensity of weed management**			
	Wheat(C)	**Wheat(A)**	**Wheat hay**	**Canola(A)**
Raxil® @ 100ml/100 kg seed	Yes		Yes	
Dividend® @ 260ml/100 kg seed		Yes		
Jockey® @ 2L/100 kg + Gaucho 600® @ 400ml/100 kg seed				Yes

Table S4. Autumn pre-sowing measures of deep soil (0-1.6m) mineral N (kg N/ha) following different crop sequences and conservative (C) or aggressive (A) weed control measures in Experiment 1 at Eurongilly, NSW.

Experiment 1: Year 1	**Year 2**		**Year 3**
Main treatment plots	**Pre-sowing soil mineral N** (kg N/ha)	**Treatment sub-plots and code**[a]	**Pre-sowing soil mineral N** (kg N/ha)
Wheat(C)	169	0.1-Wheat(C)	101
		0.2-Wheat(A)	na[c]
		1.1-Canola(A)	na
Wheat(A)	172	0.3-Wheat(C)	117
		0.4-Wheat(A)	na
		1.2-Canola(A)	na
Canola(C)	155	1.3-Wheat(C)	104
		1.4-Wheat(A)	na
		2.1-Wheat hay	na
Canola(A)	144	1.5-Wheat(C)	128
		1.6-Wheat(A)	168
		2.2-Wheat hay	155
Lupin	204	1.7-Wheat(C)	126
		1.8-Wheat(A)	na
		2.3-Canola(A)	na
Fied pea BM	231	1.9-Wheat(C)	149
		1.10-Wheat(A)	155
		2.4-Canola(A)	168
Fallow	250	1.11-Wheat(C)	152
		1.12-Wheat(A)	na
		2.5-Canola(A)	na
LSD[b] (P<0.05)	37		28

[a] Further details of entire 3-year sequence provided in Table 4.

[b] Least significant difference.

[c] na indicates data not available.

Table S5. Rates and costs of fertiliser-N applied to the different cropping sequences and conservative (C) or aggressive (A) weed control measures used in Experiment 1 at Eurongilly, NSW[a].

Experiment 1: Year 1			**Year 2**			**Year 3**		
Main treatment plots	**N rate[b]** (kg N/ha)	**Cost[c]** (A$/ha)	**Sub-plots and code**	**N rate[b]** (kg N/ha)	**Cost[c]** (A$/ha)	**Crop**	**N rate[d]** (kg N/ha)	**Cost[c]** (A$/ha)
Wheat(C)	40	65	0.1-Wheat(C)	21	50	Wheat(A)	86	139
			0.2-Wheat(A)	113	199	Wheat(A)	40	65
			1.1-Canola(A)	113	199	Wheat(A)	40	65
Wheat(A)	80	130	0.3-Wheat(C)	21	50	Wheat(A)	86	139
			0.4-Wheat(A)	113	199	Wheat(A)	40	65
			1.2-Canola(A)	113	199	Wheat(A)	40	65
Canola(C)	61	115	1.3-Wheat(C)	21	50	Wheat(A)	86	139
			1.4-Wheat(A)	140	243	Wheat(A)	40	65
			2.1-Wheat Hay	37	76	Wheat(A)	40	65
Canola(A)	101	180	1.5-Wheat(C)	21	50	Wheat(A)	86	139
			1.6-Wheat(A)	140	243	Wheat(A)	40	65
			2.2-Wheat Hay	37	76	Wheat(A)	40	65
Lupin	0	0	1.7-Wheat(C)	21	50	Wheat(A)	86	139
			1.8-Wheat(A)	67	125	Wheat(A)	40	65
			2.3-Canola(A)	67	125	Wheat(A)	40	65
Field pea BM	0	0	1.9-Wheat(C)	21	50	Wheat(A)	53	86
			1.10-Wheat(A)	67	125	Wheat(A)	40	65
			2.4-Canola(A)	67	125	Wheat(A)	40	65
Fallow	0	0	1.11-Wheat(C)	21	50	Wheat(A)	53	86
			1.12-Wheat(A)	67	125	Wheat(A)	40	65
			2.5-Canola(A)	67	125	Wheat(A)	40	65

[a] The mono-ammonium phosphate (MAP) applied to crops each year at sowing was predominantly to supply P. The small amounts of N (2.5-7.5 kg N/ha) that accompanied the MAP have not been included in the calculations.

[b] Data represent the amounts of N applied as urea and/or ammonium sulphate (21 kg N/ha) deemed necessary to achieve designated target crop yields and to balance N supply based on measurements of pre-sowing soil mineral N indicated in Table S4 as described in the Materials and Methods and Tables S1 and S2.

[c] Calculated based on the costs of ammonium sulphate (A$2.38 /kg N) and urea (A$1.62 /kg N) at the time of experimentation.

[d] Only top-dressed urea applied in year 3.

Table S6. Total production costs (inputs + operational) for the different crop sequences and conservative (C) or aggressive (A) weed control measures used in Experiment 1 at Eurongilly, NSW.

Experiment 1: Year 1			Year 2			Year 3		
Treatment code	Production costs (A$/ha)		Crop	Production costs (A$/ha)		Crop	Production costs (A$/ha)	
	Herbicide	Total		Herbicide	Total		Herbicide	Total
0.1-Wheat(C)	56	283	Wheat(C)	34	226	Wheat(A)	87	444
0.2-Wheat(C)	56	283	Wheat(A)	154	692	Wheat(A)	87	381
0.3-Wheat(A)	142	586	Wheat(C)	34	278	Wheat(A)	87	448
0.4-Wheat(A)	142	586	Wheat(A)	154	709	Wheat(A)	87	386
1.1-Wheat(C)	56	283	Canola(A)	84	609	Wheat(A)	87	358
1.2-Wheat(A)	142	586	Canola(A)	84	622	Wheat(A)	87	359
1.3-Canola(C)	62	453	Wheat(C)	34	272	Wheat(A)	87	445
1.4-Canola(C)	62	453	Wheat(A)	154	738	Wheat(A)	87	382
1.5-Canola(A)	46	704	Wheat(C)	34	274	Wheat(A)	87	450
1.6-Canola(A)	46	704	Wheat(A)	154	738	Wheat(A)	87	386
1.7-Lupin	65	321	Wheat(C)	34	299	Wheat(A)	87	453
1.8-Lupin	65	321	Wheat(A)	154	644	Wheat(A)	87	387
1.9-Pea BM	66	160	Wheat(C)	34	280	Wheat(A)	87	402
1.10-Pea BM	66	160	Wheat(A)	154	641	Wheat(A)	87	393
1.11-Fallow	35	45	Wheat(C)	34	321	Wheat(A)	87	403
1.12-Fallow	35	45	Wheat(A)	154	649	Wheat(A)	87	386
2.1-Canola(C)	62	453	Wheat Hay	35	814	Wheat(A)	87	363
2.2-Canola(A)	46	704	Wheat Hay	35	760	Wheat(A)	87	362
2.3-Lupin	65	321	Canola(A)	84	557	Wheat(A)	87	364
2.4-Pea BM	66	160	Canola(A)	84	562	Wheat(A)	87	359
2.5-Fallow	35	45	Canola(A)	84	574	Wheat(A)	87	360

Table S7. Autumn pre-sowing deep-soil (0-1.6m) measures of soil mineral N (kg N/ha) following different crop sequences and conservative (C) or aggressive (A) weed control measures in Experiment 2 at Eurongilly, NSW.

Experiment 2: Year 1	**Year 2**		**Year 3**
Main treatment plots	**Pre-sowing soil mineral N** (kg N/ha)	**Treatment sub-plots and code**[a]	**Pre-sowing soil mineral N** (kg N/ha)
Wheat(C)	82	0.1-Wheat(C)	128
		0.2-Wheat(A)	171
		1.1-Canola(A)	141
Wheat(A)	162	0.3-Wheat(C)	151
		0.4-Wheat(A)	168
		1.2-Canola(A)	240
Canola(C)	118	1.3-Wheat(C)	137
		1.4-Wheat(A)	171
		2.1-Wheat Hay	164
Canola(A)	134	1.5-Wheat(C)	137
		1.6-Wheat(A)	171
		2.2-Wheat Hay	164
Lupin	141	1.7-Wheat(C)	202
		1.8-Wheat(A)	264
		2.3-Canola(A)	280
Field pea BM	166	1.9-Wheat(C)	214
		1.10-Wheat(A)	255
		2.4-Canola(A)	258
Fallow	179	1.11-Wheat(C)	155
		1.12-Wheat(A)	180
		2.5-Canola(A)	150
LSD[b] (P<0.05)	39		54

[a] Further details of entire 3-year sequence provided in Table 4.

[b] Least significant difference

Table S8. Rates and costs of fertiliser-N applied to the different cropping sequences and conservative (C) or aggressive (A) weed control measures used in Experiment 2 at Eurongilly, NSW[a].

Experiment 2: Year 1			**Year 2**			**Year 3**		
Main treatment plots	**N rate[b]** (kg N/ha)	**Cost[c]** (A$/ha)	**Sub-plots and code**	**N rate[b]** (kg N/ha)	**Cost[c]** (A$/ha)	**Crop**	**N rate[b]** (kg N/ha)	**Costs[c]** (A$/ha)
Wheat(C)	40	65	0.1-Wheat(C)	93	167	Wheat(A)	76	123
			0.2-Wheat(A)	153	265	Wheat(A)	25	35
			1.1-Canola(A)	153	265	Wheat(A)	51	82
Wheat(A)	144	233	0.3-Wheat(C)	21	50	Wheat(A)	51	82
			0.4-Wheat(A)	85	154	Wheat(A)	25	35
			1.2-Canola(A)	85	154	Wheat(A)	0	0
Canola(C)	85	154	1.3-Wheat(C)	57	109	Wheat(A)	51	82
			1.4-Wheat(A)	129	226	Wheat(A)	25	35
			2.1-Wheat hay	21	50	Wheat(A)	25	35
Canola(A)	165	283	1.5-Wheat(C)	41	83	Wheat(A)	51	82
			1.6-Wheat(A)	109	193	Wheat(A)	0	0
			2.2-Wheat hay	21	50	Wheat(A)	25	35
Lupin	0	0	1.7-Wheat(C)	41	83	Wheat(A)	0	0
			1.8-Wheat(A)	109	193	Wheat(A)	0	0
			2.3-Canola(A)	109	193	Wheat(A)	0	0
Field pea BM	0	0	1.9-Wheat(C)	21	50	Wheat(A)	0	0
			1.10-Wheat(A)	85	154	Wheat(A)	0	0
			2.4-Canola(A)	85	154	Wheat(A)	0	0
Fallow	0	0	1.11-Wheat(C)	21	50	Wheat(A)	51	82
			1.12-Wheat(A)	77	141	Wheat(A)	25	35
			2.5-Canola(A)	77	141	Wheat(A)	51	82

[a] The mono-ammonium phosphate (MAP) applied to crops each year at sowing was predominantly to supply P. The small amounts of N (2.5-7.5 kg N/ha) that accompanied the MAP have not been included in the calculations.

[b] Data represent the amounts of N applied as urea and/or ammonium sulphate (21 kg N/ha) deemed necessary to achieve designated target crop yields and to balance N supply based on measurements of pre-sowing soil mineral N indicated in Table S9 as described in the Materials and Methods and Tables S1 and S2.

[c] Calculated based on the costs of ammonium sulphate (A$2.38 /kg N) and urea (A$1.62/kg N) at the time of experimentation.

Table S9. Total production costs (inputs + operational) for the different crop sequences and conservative (C) or aggressive (A) weed control measures used in Experiment 2 at Eurongilly, NSW.

Experiment 2: Year 1			Year 2			Year 3		
Treatment	Production costs (A$/ha)		Treatment	Production costs (A$/ha)		Treatment	Production costs (A$/ha)	
	Herbicide	Total		Herbicide	Total		Herbicide	Total
0.1-Wheat(C)	41	289	Wheat(C)	30	377	Wheat(A)	85	517
0.2-Wheat(C)	41	289	Wheat(A)	112	672	Wheat(A)	85	438
0.3-Wheat(A)	161	756	Wheat(C)	30	281	Wheat(A)	85	494
0.4-Wheat(A)	161	756	Wheat(A)	112	566	Wheat(A)	85	439
1.1-Wheat(C)	41	289	Canola(A)	35	648	Wheat(A)	85	465
1.2-Wheat(A)	161	756	Canola(A)	35	535	Wheat(A)	85	403
1.3-Canola(C)	75	442	Wheat(C)	30	333	Wheat(A)	85	475
1.4-Canola(C)	75	442	Wheat(A)	112	624	Wheat(A)	85	462
1.5-Canola(A)	63	711	Wheat(C)	30	309	Wheat(A)	85	468
1.6-Canola(A)	63	711	Wheat(A)	112	598	Wheat(A)	85	395
1.7-Lupin	62	299	Wheat(C)	30	294	Wheat(A)	85	405
1.8-Lupin	62	299	Wheat(A)	112	599	Wheat(A)	85	402
1.9-Pea BM	85	204	Wheat(C)	30	290	Wheat(A)	85	418
1.10-Pea BM	85	204	Wheat(A)	112	566	Wheat(A)	85	398
1.11-Fallow	39	72	Wheat(C)	30	293	Wheat(A)	85	479
1.12-Fallow	39	72	Wheat(A)	112	551	Wheat(A)	85	456
2.1-Canola(C)	75	442	Wheat Hay	31	807	Wheat(A)	85	448
2.2-Canola(A)	63	711	Wheat Hay	31	810	Wheat(A)	85	450
2.3-Lupin	62	299	Canola(A)	35	577	Wheat(A)	85	417
2.4-Pea BM	85	204	Canola(A)	35	543	Wheat(A)	85	403
2.5 Fallow	39	72	Canola(A)	35	532	Wheat(A)	85	495

Table S10. Details of significant differences between weed control strategies on annual ryegrass (ARG) spike density and seedbank counts measured during Experiment 1 at Eurongilly, NSW[a]. The same italicised letter indicates the data were not significantly different (P<0.05).

Experiment 1: Year 1		**Year 2**			**Year 3**	
Treatment code	**Spike number**	**Crop**	**Seedbank**	**Spike number**[b]	**Crop**	**Spike number**[b]
0.1-Wheat(C)	*a*	Wheat(C)	*a*	*a*	Wheat(A)	*a*
0.2-Wheat(C)	*a*	Wheat(A)	*a*	*d*	Wheat(A)	*def*
0.3Wheat(A)	*b*	Wheat(C)	*b*	*bc*	Wheat(A)	*def*
0.4-Wheat(A)	*b*	Wheat(A)	*b*	*def*	Wheat(A)	*fghi*
1.1-Wheat(C)	*a*	Canola(A)	*a*	*f*	Wheat(A)	*hij*
1.2-Wheat(A)	*b*	Canola(A)	*b*	*f*	Wheat(A)	*hij*
1.3-Canola(C)	*b*	Wheat(C)	*b*	*b*	Wheat(A)	*bcd*
1.4-Canola(C)	*b*	Wheat(A)	*b*	*def*	Wheat(A)	*efgh*
1.5-Canola(A)	*b*	Wheat(C)	*b*	*b*	Wheat(A)	*bcde*
1.6-Canola(A)	*b*	Wheat(A)	*b*	*def*	Wheat(A)	*ghij*
1.7-Lupin	*b*	Wheat(C)	*b*	*bc*	Wheat(A)	*def*
1.8-Lupin	*b*	Wheat(A)	*b*	*def*	Wheat(A)	*hij*
1.9-Pea BM	*b*	Wheat(C)	*b*	*bc*	Wheat(A)	*cdef*
1.10-Pea BM	*b*	Wheat(A)	*b*	*f*	Wheat(A)	*ij*
1.11-Fallow	*b*	Wheat(C)	*b*	*de*	Wheat(A)	*defg*
1.12-Fallow	*b*	Wheat(A)	*b*	*f*	Wheat(A)	*ij*
2.1-Canola(C)	*b*	Wheat hay	*b*	*f*	Wheat(A)	*hij*
2.2-Canola(A)	*b*	Wheat hay	*b*	*f*	Wheat(A)	*hij*
2.4-Pea BM	*b*	Canola(A)	*b*	*ef*	Wheat(A)	*j*
2.3-Lupin	*b*	Canola(A)	*b*	*f*	Wheat(A)	*j*
2.5-Fallow	*b*	Canola(A)	*b*	*f*	Wheat(A)	*j*
P value yr 1	<0.001		<0.001	<0.001		<0.001
P value yr 2				<0.001		<0.001
P interaction				0.004		<0.001

[a] Statistical details to complement the mean Experiment 1 data presented in Table 7. Additional information on the main year 1 and year 2 treatment effects on ARG seedbank counts for year 3 and year 4 seedbank determinations where there weren't significant crop/treatment x year interactions can be found in Table S11.

[b] Depicts significant crop/treatment x year interactions.

Table S11. Details of the main year 1 and year 2 treatment effects on autumn annual ryegrass (ARG) seedbank counts measured in year 3 and year 4 of Experiment 1 at Eurongilly, NSW[a]. The same italicised letter indicates the data were not significantly different (P<0.05).

Experiment 1: Year 3 seedbank counts		**Year 4 seedbank counts**	
Main Year 1 effects		**Main Year 1 effects**	
Treatment	(seeds/m^2)	**Treatment**	(seeds/m^2)
Canola(A)	716 *c*	Fallow	186 *e*
Lupin	739 *bc*	Lupin	222 *cde*
Field pea BM	918 *bc*	Canola(A)	399 *abcd*
Wheat(A)	1253 *b*	Field pea BM	416 *abcd*
Wheat(C)	3294 *a*	Canola(C)	552 *abc*
		Wheat(A)	595 *ab*
		Wheat(C)	770 *a*
Main Year 2 effects		**Main Year 2 effects**	
Treatment	(seeds/m^2)	**Treatment**	(seeds/m^2)
Wheat hay	124 *d*	Canola(A)	120 *c*
Canola(A)	303 *c*	Wheat hay	191 *bc*
Wheat(A)	774 *b*	Wheat(A)	217 *b*
Wheat(C)	7731 *a*	Wheat(C)	1891 *a*

[a] Statistical details to complement the mean Experiment 1 data presented in Table 7.

Table S12. Details of significant differences between weed control strategies on annual ryegrass (ARG) spike density and seedbank counts measured during Experiment 2 at Eurongilly, NSW[a]. The same italicised letter indicates the data were not significantly different (P<0.05).

Experiment 2: Year 1		**Year 2**			**Year 3**		
Treatment code and Crop	**Spike number**	**Crop**	**Seedbank**	**Spike number**	**Crop**	**Seedbank**	**Spike number**
0.1-Wheat(C)	*a*	Wheat(C)	*a*	*ab*	Wheat(A)	*a*	*a*
0.2-Wheat(C)	*a*	Wheat(A)	*a*	*cd*	Wheat(A)	*ab*	*abc*
0.3-Wheat(A)	*e*	Wheat(C)	*c*	*abc*	Wheat(A)	*abc*	*abc*
0.4-Wheat(A)	*e*	Wheat(A)	*c*	*gh*	Wheat(A)	*efgh*	*defg*
1.1-Wheat(C)	*a*	Canola(A)	*a*	*i*	Wheat(A)	*bcd*	*ab*
1.2-Wheat(A)	*e*	Canola(A)	*c*	*i*	Wheat(A)	*ij*	*hi*
1.3-Canola(C)	*c*	Wheat(C)	*b*	*bc*	Wheat(A)	*ab*	*abc*
1.4-Canola(C)	*c*	Wheat(A)	*b*	*cdef*	Wheat(A)	*def*	*bcd*
1.5-Canola(A)	*e*	Wheat(C)	*d*	*fg*	Wheat(A)	*defg*	*fghi*
1.6-Canola(A)	*e*	Wheat(A)	*d*	*hi*	Wheat(A)	*ghi*	*i*
1.7-Lupin	*b*	Wheat(C)	*ab*	*ab*	Wheat(A)	*a*	*ab*
1.8-Lupin	*b*	Wheat(A)	*ab*	*cdef*	Wheat(A)	*cde*	*abcd*
1.9-Pea BM	*d*	Wheat(C)	*d*	*cdef*	Wheat(A)	*defg*	*def*
1.10-Pea BM	*d*	Wheat(A)	*d*	*hi*	Wheat(A)	*hi*	*ghi*
1.11-Fallow	*e*	Wheat(C)	*d*	*def*	Wheat(A)	*cde*	*cde*
1.12-Fallow	*e*	Wheat(A)	*d*	*hi*	Wheat(A)	*ij*	*hi*
2.1-Canola(C)	*c*	Wheat hay	*b*	*a*	Wheat(A)	*def*	*bcde*
2.2-Canola(A)	*e*	Wheat hay	*d*	*cd*	Wheat(A)	*fghi*	*efgh*
2.3-Lupin	*b*	Canola(A)	*ab*	*i*	Wheat(A)	*def*	*bcde*
2.4-Pea BM	*d*	Canola(A)	*d*	*i*	Wheat(A)	*j*	*fghi*
2.5-Fallow	*e*	Canola(A)	*d*	*i*	Wheat(A)	*fghi*	*defg*
P value yr 1	<0.001		<0.001	<0.001		<0.001	<0.001
P value yr 2				<0.001		<0.001	<0.001
P interaction				<0.001		0.025	0.037

[a] Statistical details to complement the mean Experiment 2 data presented in Table 8. Note: full details of the significant crop/treatment differences for Year 4 final ARG seedbanks are already provided in Table 8.

[b] Depicts significant crop/treatment x year interactions.

Table S13. Local grain and cereal hay prices during the on-farm studies at Eurongilly, NSW used for the calculation of gross income from various experimental treatments compared with long-term average prices (2007-2021).

Commodity	**2012**	**2013**	**2014**	**2015**	**Long-term average**
	(A$/t)[a]	(A$/t)[a]	(A$/t)[a]	(A$/t)[a]	(A$/t)[a]
Wheat grain (APW)[b]	na[d]	250	244	234	277
Wheat grain (AH)[c]	261	270	303	265	nd[f]
Canola grain	490	476	422	-[e]	528
Lupin grain	326	400	-[e]	-[e]	317
Cereal hay	-[e]	180	220	-[e]	180

[a] A$1 = ~US$0.69

[b] Australian Prime White; grain 10-11.5% protein.

[c] Australian Hard; grain 11.5-13% protein.

[d] Not applicable, no wheat grain in this quality class harvested.

[e] Indicates commodity not grown in this year.

[f] No data, historic records unavailable.