

Defra BD5210 Appendices

Appendix 1. Crop provision (ha, all funding mechanisms) in each geographic region in winters 2012/13 (A), 2013-14 (B) and 2014-15 (C). In (B and (C),. Also shown in the total area delivered per intervention tetrad as a percentage of the target quantity of 6.7 ha.

A)

Area	Treatment	Farm	Crop type		SRG:WBSM ratio	Total	% target met
			WBSM	SRG			
Dyfi/Glaslyn	Single	4	0.5			1.2	18
			0.3				
			0.3				
			0.1				
	Single total		1.2				
	Mixed	1	2.1	1.1	0.52	3.2	48
	Mixed total		2.1	1.1			
Llyn	Single	1	0.6			1.0	15
		2	0.4				
		Single total		1.0			
	Mixed	1	1.5	2.2		3.7	55
	Mixed total		1.5	2.2	0.68		
Total			6.2	3.3		9.5	

B)

Area	Treatment	Farm	Crop type		SRG:WBSM ratio	% target	% target met
			WBSM	SRG			
Clwydians	Single	1	1.0			3.0	45
		2	2.0				
		Single tot		3.0			
	Mixed	1	0.5	0.6	0.5	5.1	76
2			0.6				
3			0.5				
	Mixed tot		2.9	1.7			
			3.4				
Dyfi/Glaslyn	Single	1	0.2			1.9	28
		2	0.3				
		3	0.8				
		4	0.3				
		5	0.3				
		Single tot		1.9			
	Mixed	1	1.0	1.1	0.63	6.2	93
			2	1.1			
3			0.3				
	Mixed tot		3.8	2.4			
			2.4				
Llyn	Single	1	1.0			1.9	28
		2	0.9				
		Single tot		1.9			
	Mixed	1	5.0	2.3	0.46	7.3	109
	Mixed tot		5.0	2.3			
Total			18.6	6.4		25.0	

C)

Area	Treatment	Farm	Crop type		SRG:WBSM ratio	Total	% target met
			WBSM	SRG			
Clwydians	Single	1	0.7				
		2	2.0				
	Single tot		2.7			2.7	40
	Mixed	1	0.5	0.6			
2			0.6				
3		2.4	1.2				
Mixed tot		2.9	2.4	0.83	5.3	79	
Dyfi/Glaslyn	Single	1	0.2				
		2	0.3				
		3	0.8				
		4	0.3				
		5	0.5				
	Single tot		2.1			2.1	31
Mixed	1			1.0			
	2	2.1	1.1				
	3	0.4					
	4		0.4				
Mixed tot		2.5	2.5	1.00	5.0	75	
Llyn	Single	1	1.0				
		2	0.9				
	Single tot		1.9			1.9	28
	Mixed	1	5.0	2.5			
5.0			2.5	0.50	7.5	112	
Total			17.1	7.4		24.5	

Appendix 2. WBSM seed delivery and retention.

P-values for sources of variation in seed yield for WBSM crops in October (A), and seed retention in WBSM crops between October and January (B).

A)

Effect	Response variable		
	Seed heads m ⁻²	Seed count m ⁻²	Seed weight m ⁻²
Winter	0.5715	0.0060	0.1551
Region	0.0693	0.0234	0.2454
Cereal mix	0.5379	0.1199	0.2078
Winter * Region	0.1849	0.3263	0.3886
Winter * Cereal mix	0.5124	0.4473	0.6861

B)

Effect	Response variable	
	Seed heads m ⁻²	Ground seed m ⁻²
Winter	0.0397	0.5199
Region	0.0093	0.1218
Cereal_mix	0.0114	0.0023
Month	<.0001	<.0001
Winter*Month	0.0207	<.0001
Month*Cereal_mix	<.0001	<0.0001
Region * Month	<.0001	0.1305

Appendix 3. SRG seed delivery and retention.

A) Means and P values for univariate tests of difference in sward composition, condition and seed availability in January, along with seed retention since October, on SRG plots between winters and between ryegrass types. Percentage ryegrass composition for all plots was measured once in January 2015 and so values could not be compared between winters. B) P-values for differences in SRG sward condition and seed availability in January between studies: Wales (this study, winters 2012/13 – 2014/15) and Shropshire (BD1455, winters 2007/08 – 2008-09, 1-cut plots only).

A)

Type	Response variable	Between winters				Between grass type		
		12/13	13/14	14/15	P	IRG	PRG	P
Vegetation	% standing heads	4.39	7.5	13.05	0.0007	16.56	8.45	0.2195
	% exposed lodged heads	33.9	31.56	23.44	0.0005	40.22	21.24	0.0407
	% concealed lodged heads	42.98	32.6	16	<0.0001	29.82	20.32	0.4149
	% bare ground	-0.12	0.32	3.56	0.0008	8.53	0.00	0.0377
	% seedless grass	17.23	27.11	41.43	<0.0001	7.45	46	0.0354
	% rush cover	0.5	4.1	2.45	0.0017	0.00	3.65	0.4765
	% ryegrass composition					52.19	46.42	0.6182
	Seed	October seed head density m ⁻²	173.77	219.36	56.54	<0.0001	231.33	62.17
October Accessible seed head density m ⁻²		56.72	92.65	25.33	<0.0001	102.67	23.08	0.0341
% October seed heads remaining in January		39.8	43.29	21.29	<0.0001	43.33	22.91	0.0113
% October accessible heads remaining in January		20.05	25.05	12.09	<0.0001	26.32	11.93	0.001
Seed bearing spikelet density m ⁻²		83.97	695.47	38.56	<0.0001	586.7	58.12	0.1256
Accessible spikelet den m ⁻²		2.79	145.9	16.6	<0.0001	127.7	15.35	0.014
Fallen seed density m ⁻²		587.29	154.66	362.39	0.0003	547.59	249.78	0.2046
Accessible fallen seed density m ⁻²		0	0	0		0	0	

B)

Type	Response variable	Terms in model			Direction of difference
		Study	Grass type	Study*Grass type	
Vegetation	% standing seed heads	0.2068	0.0840	0.6921	
	% exposed lodged seed heads	0.7668	0.0119	0.7853	IRG>PRG
	% concealed lodged seed heads	0.6980	0.1845	0.9994	
	% bare ground	0.1154	0.0295	0.0659	IRG>PRG
	% seedless grass	0.4314	0.0097	0.5203	PRG>IRG
	% rush cover	0.4874	0.4874	0.4874	
Seed	October seed head density m ⁻²	0.0049	0.0057	0.8440	S>W, IRG>PRG
	October Accessible seed head density m ⁻²	0.0042	0.0062	0.9210	S>W, IRG>PRG
	% October seed heads remaining in January	0.0002	0.2521	0.0125	PRG worse in W
	% October accessible seed heads remaining in January	0.0113	0.1341	0.1819	S>W
	Seed bearing spikelet density m ²	0.0001	0.0843	0.7038	S>W
	Accessible spikelet density m ²	0.0005	0.4092	0.894	S>W
	Fallen seed density m ²	0.4583	0.0962	0.9021	
	Accessible fallen seed density m ²	0.0028	0.0090	0.0090	IRG best in S

Appendix 5. Tetrad-level breeding abundance and change in abundance of YH in relation to region and treatment status.

Region	Tetrad	Sqr treatment	Locality treatment	Distance treatment				Baseline		Repeat		Change
				Single Dist	Single dist cat	Mixed dist	Mixed dist cat	Year	Territories	Year	Territories	Territories
Clwydians	SH94Q	Mixed	Mixed	23.41	Distant	2.39	Adjacent	2013	8	2015	7	-1
Clwydians	SH94R	Control	Mixed	22.05	Distant	2.12	Adjacent	2013	3	2015	3	0
Clwydians	SH94S	Control	Mixed	20.80	Distant	3.36	Adjacent	2013	1	2015	0	-1
Clwydians	SH94V	Mixed	Mixed	22.02	Distant	1.30	Intervention	2013	9	2015	2	-7
Clwydians	SH94W	Mixed	Mixed	20.58	Distant	0.70	Intervention	2013	6	2015	5	-1
Clwydians	SH94X	Mixed	Mixed	19.23	Distant	2.70	Adjacent	2013	12	2015	4	-8
Clwydians	SJ04A	Mixed	Mixed	20.74	Distant	2.39	Adjacent	2013	2	2015	2	0
Clwydians	SJ04B	Mixed	Mixed	19.20	Distant	2.12	Adjacent	2013	4	2015	2	-2
Clwydians	SJ04C	Control	Mixed	17.75	Distant	3.36	Adjacent	2013	0	2015	2	2
Clwydians	SJ06Z	Control	Control	12.52	Distant	28.51	Distant	2013	0	2015	0	0
Clwydians	SJ07V	Control	Control	14.39	Distant	30.39	Distant	2013	0	2015	0	0
Clwydians	SJ07W	Control	Control	16.29	Distant	32.29	Distant	2013	6	2015	4	-2
Clwydians	SJ15H	Control	Single	2.50	Adjacent	18.90	Distant	2013	0	2015	0	0
Clwydians	SJ15I	Single	Single	0.81	Intervention	20.30	Distant	2013	0	2015	0	0
Clwydians	SJ15J	Single	Single	1.75	Intervention	21.79	Distant	2013	0	2015	0	0
Clwydians	SJ15M	Control	Single	2.73	Adjacent	20.43	Distant	2013	7	2015	8	1
Clwydians	SJ15N	Control	Single	1.36	Intervention	21.73	Distant	2013	4	2015	5	1
Clwydians	SJ15P	Single	Single	2.06	Adjacent	23.13	Distant	2013	3	2015	6	3
Clwydians	SJ15S	Control	Single	4.08	Distant	22.03	Distant	2013	13	2015	14	1
Clwydians	SJ15T	Control	Single	3.32	Adjacent	23.24	Distant	2013	6	2015	2	-4
Clwydians	SJ15U	Control	Single	3.67	Adjacent	24.55	Distant	2013	0	2015	2	2
Clwydians	SJ16E	Control	Control	11.91	Distant	29.27	Distant	2013	13	2015	15	2
Clwydians	SJ16J	Control	Control	11.62	Distant	30.15	Distant	2013	11	2015	8	-3
Clwydians	SJ16K	Control	Single	3.83	Adjacent	24.61	Distant	2013	14	2015	16	2

Clwydians	SJ16Q	Control	Single	4.88	Distant	25.96	Distant	2013	0	2015	0	0
Clwydians	SJ17A	Control	Control	13.87	Distant	31.11	Distant	2013	6	2015	3	-3
Clwydians	SJ17B	Control	Control	15.83	Distant	32.96	Distant	2013	0	2015	3	3
Clwydians	SJ17F	Control	Control	13.62	Distant	31.93	Distant	2013	0	2015	0	0
Clwydians	SJ17G	Control	Control	15.62	Distant	33.74	Distant	2013	0	2015	0	0
Dyfi	SH50S	Control	Single	3.01	Adjacent	35.80	Distant	2012	3	2015	1	-2
Dyfi	SH50W	Control	Single	2.42	Adjacent	37.71	Distant	2012	0	2015	0	0
Dyfi	SH50X	Single	Single	1.02	Intervention	35.71	Distant	2012	0	2015	0	0
Dyfi	SH50Y	Single	Single	2.06	Adjacent	33.71	Distant	2012	0	2015	0	0
Dyfi	SH60B	Control	Single	2.42	Adjacent	37.72	Distant	2012	3	2015	1	-2
Dyfi	SH60C	Single	Single	1.02	Intervention	35.72	Distant	2012	0	2015	0	0
Dyfi	SH60D	Control	Single	2.06	Adjacent	33.73	Distant	2012	4	2015	7	3
Dyfi	SH60G	Single	Single	3.72	Adjacent	37.84	Distant	2012	4	2015	5	1
Dyfi	SH60H	Control	Single	3.01	Adjacent	35.85	Distant	2012	2	2015	3	1
Dyfi	SH60I	Control	Single	3.50	Adjacent	33.86	Distant	2012	5	2015	4	-1
Dyfi	SH70K	Control	Control	15.58	Distant	42.55	Distant	2012	0	2015	2	2
Dyfi	SH70L	Control	Control	15.16	Distant	40.69	Distant	2012	3	2015	2	-1
Dyfi	SH70Q	Control	Control	17.51	Distant	43.31	Distant	2012	1	2015	0	-1
Dyfi	SH70R	Control	Control	17.14	Distant	41.48	Distant	2012	0	2015	0	0
Dyfi	SN79J	Control	Control	14.40	Distant	43.77	Distant	2012	5	2015	8	3
Dyfi	SN79P	Control	Control	16.23	Distant	44.42	Distant	2012	12	2015	15	3
Dyfi	SN79U	Control	Control	18.10	Distant	45.15	Distant	2012	6	2015	6	0
Glaslyn	SH53U	Control	Mixed	33.93	Distant	3.19	Adjacent	2012	0	2015	0	0
Glaslyn	SH53Z	Control	Mixed	33.81	Distant	1.84	Intervention	2012	0	2015	0	0
Glaslyn	SH54Q	Control	Mixed	35.93	Distant	2.72	Adjacent	2012	13	2015	13	0
Glaslyn	SH54V	Mixed	Mixed	35.81	Distant	0.76	Intervention	2012	0	2015	0	0
Glaslyn	SH54W	Control	Mixed	37.81	Distant	2.40	Adjacent	2012	16	2015	14	-2
Glaslyn	SH54X	Control	Mixed	39.81	Distant	4.36	Distant	2012	0	2015	0	0
Glaslyn	SH54Y	Control	Mixed	41.81	Distant	6.34	Distant	2012	1	2015	0	-1

Glaslyn	SH63E	Control	Mixed	33.81	Distant	2.14	Adjacent	2012	1	2015	0	-1
Glaslyn	SH63U	Control	Control	34.52	Distant	7.50	Distant	2012	4	2015	2	-2
Glaslyn	SH63Z	Control	Control	34.98	Distant	9.45	Distant	2012	0	2015	0	0
Glaslyn	SH64A	Mixed	Mixed	35.81	Distant	1.33	Intervention	2012	0	2015	0	0
Glaslyn	SH64B	Control	Mixed	37.81	Distant	2.64	Adjacent	2012	2	2015	3	1
Glaslyn	SH64C	Control	Mixed	39.81	Distant	4.49	Distant	2012	15	2015	11	-4
Glaslyn	SH64D	Control	Mixed	41.81	Distant	6.43	Distant	2012	7	2015	11	4
Glaslyn	SH64F	Control	Mixed	35.93	Distant	3.31	Adjacent	2012	4	2015	2	-2
Glaslyn	SH64G	Control	Mixed	37.92	Distant	4.02	Distant	2012	3	2015	2	-1
Glaslyn	SH64H	Control	Mixed	39.91	Distant	5.42	Distant	2012	11	2015	11	0
Glaslyn	SH64K	Control	Control	36.15	Distant	5.31	Distant	2012	2	2015	0	-2
Glaslyn	SH64Q	Control	Control	36.48	Distant	7.31	Distant	2012	0	2015	0	0
Glaslyn	SH64R	Control	Control	38.44	Distant	7.65	Distant	2012	3	2015	2	-1
Glaslyn	SH64V	Control	Control	36.91	Distant	9.30	Distant	2012	0	2015	0	0
Glaslyn	SH64W	Control	Control	38.86	Distant	9.58	Distant	2012	2	2015	3	1
Llyn	SH12M	Single	Single	2.55	Adjacent	14.06	Distant	2012	7	2015	1	-6
Llyn	SH12N	Single	Single	0.71	Intervention	13.39	Distant	2012	10	2015	0	-10
Llyn	SH12T	Control	Single	1.58	Intervention	11.48	Distant	2012	0	2015	0	0
Llyn	SH12U	Single	Single	2.12	Adjacent	11.02	Distant	2012	0	2015	0	0
Llyn	SH12XY	Control	Single	4.30	Distant	10.52	Distant	2012	2	2015	0	-2
Llyn	SH12ZY	Control	Single	3.81	Adjacent	9.04	Distant	2012	0	2015	0	0
Llyn	SH22U	Mixed	Mixed	11.60	Distant	1.84	Intervention	2012	0	2015	0	0
Llyn	SH22Z	Control	Mixed	13.58	Distant	1.94	Intervention	2012	0	2015	0	0
Llyn	SH23G	Control	Single	9.30	Distant	5.46	Distant	2012	0	2015	0	0
Llyn	SH23H	Control	Single	10.61	Distant	6.59	Distant	2012	0	2015	0	0
Llyn	SH23I	Control	Single	12.10	Distant	8.06	Distant	2012	0	2015	0	0
Llyn	SH23L	Control	Single	10.98	Distant	3.76	Adjacent	2012	5	2015	3	-2
Llyn	SH23M	Control	Single	12.10	Distant	5.27	Distant	2012	0	2015	0	0
Llyn	SH23N	Control	Single	13.44	Distant	7.03	Distant	2012	1	2015	0	-1

Llyn	SH23Q	Mixed	Mixed	12.02	Distant	0.98	Intervention	2012	0	2015	0	0
Llyn	SH23R	Control	Mixed	12.75	Distant	2.56	Adjacent	2012	6	2015	3	-3
Llyn	SH23S	Control	Single	13.73	Distant	4.49	Distant	2012	6	2015	3	-3
Llyn	SH23T	Control	Single	14.92	Distant	6.46	Distant	2012	1	2015	0	-1
Llyn	SH23V	Mixed	Mixed	13.95	Distant	1.17	Intervention	2012	5	2015	6	1
Llyn	SH23W	Control	Mixed	14.58	Distant	2.64	Adjacent	2012	5	2015	1	-4
Llyn	SH23X	Control	Control	15.44	Distant	4.54	Distant	2013	1	2015	0	-1
Llyn	SH32E	Control	Mixed	15.57	Distant	3.49	Adjacent	2012	0	2015	0	0
Llyn	SH33A	Control	Mixed	15.89	Distant	3.13	Adjacent	2012	3	2015	2	-1
Llyn	SH33B	Control	Mixed	16.45	Distant	3.92	Adjacent	2012	1	2015	0	-1

Appendix 6. Silage yield and quality (D-values) for paired treatment and control plots measured in one or more years.

Treatment level	Site No.	Dry weight (t ha ⁻¹)			D-value		
		201	2014	2015	2013	2014	2015
Treatment	1			4.54			52
	2		3.36			55	
	3		2.12	3.64		59	56
	4			4.14			59
	5		4.33			58	
	6		3.60			57	
	7	3.45	3.67	5.81	61	58	56
Treatment mean		3.45	3.31	4.53	61	57	56
Control	1			3.99			58
	2		3.00			58	
	3		1.58	6.05		60	54
	4			5.00			59
	5		4.87				
	6		3.47			59	
	7	4.46	5.66	5.40	60	58	54
Control mean		4.46	3.72	5.11	60	59	56