

SPOT Farm East (Elveden) 2016— Residual Herbicide <u>Demonstration Report</u>



Background

The urea based selective residual herbicide active linuron has been the major residual herbicide applied to the potato crop of the UK on loamy and sandy loam soil types for over 30 years. This active provides cost effective, crop safe control of many weeds observed on these soil types including S.nettle, Fat Hen, B.Bindweed and Mayweeds. The future of this active is currently uncertain in the present regulatory environment. Approval currently continues until March 2020 but it is highly likely the active will lose its approval registration before this time with current indications that the latest final use up will be mid 2018.

Aims

This demonstration aimed to assess the efficacy and crop safety of alternative residual herbicides and residual herbicide mixtures avoiding the use of linuron. The majority of the treatments included a recently approved (2014) a.i. - metabromuron. Two non replicated blocks A and B were

planted on different dates. Block A planted 21st April to correspond with traditional planting dates and Block B 27th May to allow comparison later in the season to coincide an open day - 5th July.

Site Details

The demonstration site - Lodge Warren was a loamy sand. Block A and Block B were planted with Maris piper with an identical seed stock (Scotch S FG5 97484-7090) the stock was treated with Storite Super (thiabendazole and imazalil) post harvest and in addition the seed was treated with Monceren DS (pencycuron) @ 1kg/T at planting.

Region	West Suffolk
Field Name	Lodge Warren
Soil type	Loamy sand
Variety	Maris Piper

Fertiliser Applications

Soil Information	Soil Index	Available Nutrients from FYM application kg/ha	Base Fertiliser Applied kg/ha	Top Dressing Applied kg/ha
Nitrogen	0	4	140	70
Phosphate	3	61	50	
Potash	2-	174	230	
Magnesium	1	30		80
рН	7.8			70

Application details

	Block A	Block B
Planting Date	21 st April	27 th May
Application date	13-14 th May	6 th June
Ground Cover assessment	1 st June	22 nd June
Weed counts	13 th June	4 th July

The treatments were identical on both Block A and Block B

Treatment List

Trt No.	Water Volume	Herbicide Application	Cost £/ha
1	300 l/ha	STANDARD Afalon (linuron 500g/l) 1.35l + Stomp Aqua (pendimethalin 455g/l) 2.2 l/ha + Shotput (metribuzin 70%) 200g/ha	£34
2	200 l/ha	Praxim (metobromuron 50g/l) 3l + Shotput (metribuzin 70%) 300g/ha	£63
3	200 l/ha	Praxim (metobromuron 500g/l) 3I + Stomp Aqua (pendimethalin 455g/l) 2.2 I/ha	£73
4	200 l/ha	Praxim (metobromuron 500g/l) 3I/ha + Defy (prosulfocarb800g/l) 4I/ha	£82
5	200 l/ha	Praxim (metobromuron 500g/l) 3 l/ha + Artist (metribuzin 17.5% + flufenacet 24%) 1 kg/ha	£83
6	200 l/ha	Praxim (metobromuron 500g/l) 2 l/ha + Stomp Aqua (pendimethalin 455g/l) 2.2 l/ha + Shotput (metribuzin 70%) 200 g/ha	£59
7	200 l/ha	Praxim (metobromuron 500g/l) 2 l/ha + Stomp Aqua (pendimethalin 455g/l) 2.2 l/ha + Gamit 36SC (clomazone 360 g/l) 125ml/ha	£63
8	200 l/ha	Praxim (metobromuron 500g/I) 2 I/ha + Defy (prosulfocarb800g/I) 3I/ha + Shotput (metribuzin 70%) 200 g/ha	£61
9	200 l/ha	Defy (prosulfocarb800g/I) 4I/ha	£26
10	200 l/ha	Praxim (metobromuron 500g/l) 4l/ha	£74
11	200 l/ha	Stomp Aqua (pendimethalin 455g/l) 2.9 l/ha	£23
12	200 l/ha	Shotput (metribuzin 70%) 500g/ha	£12

Figure 1 : Treatments and Costing

Note: diquat 3I/ha + NI Wetter 200ml/ha applied in addition to all above applications

Demonstration Plan

														_
Praxim		Praxim		Defy 4l		Praxin	14I	Stomp	A 2.91	Shotpu	t 500g	U/T	10 m	
Stomp		Defy 31												
Clomaz	zone 12	Shotpu	t 200g											
107		108		109		110		111		112				
					Unpla	nted							2 m	
								İ						
ofolos	1 251	Praxim	. 21	Praxin	. 21	Praxin	. 21	Praxim	. 21	Praxin	0.71	U/T	10 m	
				Stomp		Defy 4		Artist 1		Stomp		0/1	TO III	
Shotpu			8			., .,					it 200g			
101		102		103		104		105		106				
					Unpla	nted							2 m	
										<u> </u>				
Praxim		Praxim		Defy 4		Praxin	n 41	Stomp	A 2.9l	Shotpu	t 500g	U/T	10 m	
	A 2.2 l zone 12	Defy 31 Shotpu												
								l		l				
207		208		209		210		211		212				
					Unpla	nted							2 m	
														_
0.5-1-	2.251	Praxim	1	Descri		Descri	- 71	Do -		Descri	- 7'		10	
				PraxIn Stomp		Praxin Defv 4		Praxim Artist 1		PraxIn Stomp		U/T	10 m	
Shotpu			8			,					ıt 200g			
201		202		203		204		205		206				
					Unplai	nted							2 m	
2 B	eds	2 B	eds		eds		eds	2 B	eds		2 Beds		1 Bed	
													Tramli	ne
		BLOCK	A : Plo	ts Plant	ted and	spraye	dats	tandard	crop ti	mings				

Figure 2 : Demonstration Plan

Observations - Block A

Assessments of ground cover, Figure 3 and weed counts, Figure 4 were undertaken on Block A

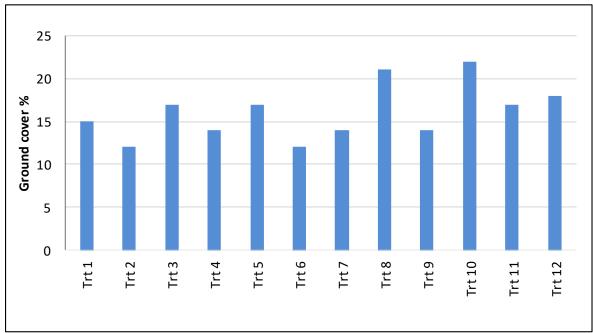


Figure 3: Block A Ground cover % 1st June

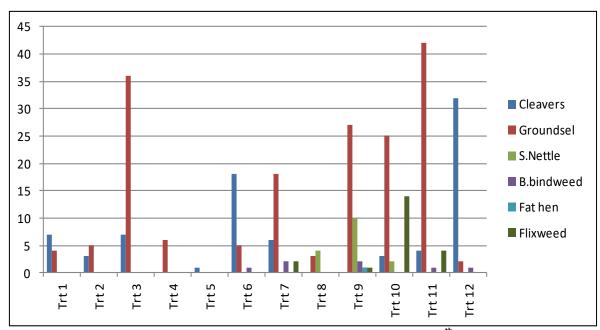


Figure 4: Block A Weed count assessments 2x1.5m Bed 13th June

Observations - Block B

Assessment of ground cover, Figure 5 and weed counts, Figure 6 were undertaken on Block B

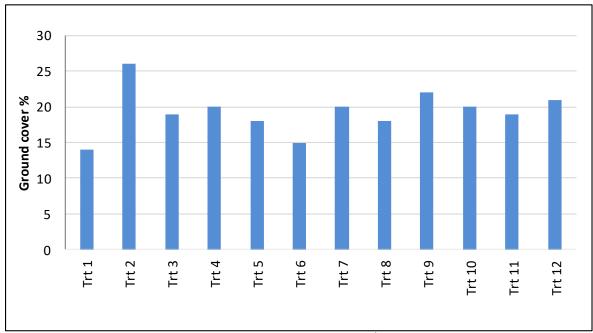


Figure 5: Ground cover % 22nd June

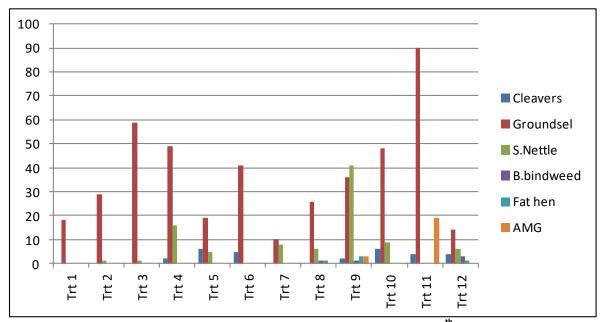


Figure 6 : Block B Weed count assessments 2x1.5m Bed 4th July

No phytoxicity was observed for any treatments within Block A, assessment 1st June and Block B, assessment 22nd June. These assessments occurred at approximately 20% ground cover for all plots. However minor veinal yellowing (characteristic of metribuzin uptake) was observed on Trt 12 Block A on 7th June.

Discussion

Comparison of the ground cover assessments on block A and B suggest no restrictions to crop growth from any of the residual herbicide applications treatments.

An untreated area, Figure 7, allowed an assessment of weed species present on the site, these were dominated by groundsel, cleavers, s.nettle and annual meadow grass (AMG). Weed species present at lower levels include fathen, flixweed, b.bindweed, field pansy and cranesbill.

It was considered only the weed species present at higher levels allow a comparison of efficacy from the various treatments within this demonstration.

Untreated Area



Figure 7: Untreated area

Assessments - Groundsel

The observed total weed count of groundsel from block A and B, Figure 7 reveals variation between treatments

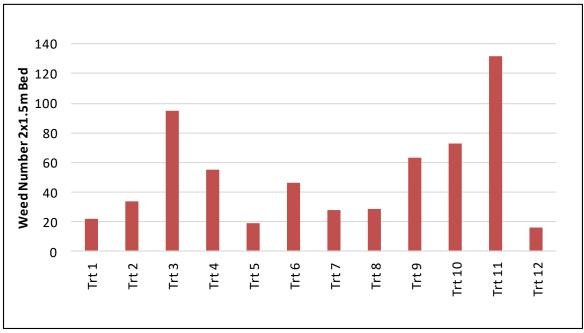


Figure 7: Groundsel counts Total 3m Bed block A & B

Best Performance

- Trt 12 Shotput (metribuzin 70%) 500g/ha (Figure 8 A)
- Trt 5 Praxim (metobromuron 500g/l) 3l/ha + Artist (metribuzin 225g/kg, flufenacet 240g/kg) 1kg/ha
- Trt 1 Afalon (linuron 500g/l) 1.2 l/ha + Stomp Aqua (pendimethalin 455g/l) 2.2 l/ha + Shotput (metribuzin 70%) 200g/ha

Worst Performance

- Trt 11 Stomp Aqua (pendimethalin 455g/l) 2.9 l/ha (Figure 8 B)
- Trt 3 Praxim (metobromuron 500g/l) 3l/ha + Stomp Aqua (pendimethalin 455g/l) 2.2 l/ha
- Trt 10 Praxim (metobromuron 500g/l) 4l/ha



Figure 8 A & B: Trt 12 and Trt 11 Block A 14th June

The results indicate the level of metribuzin applied has the largest influence on the residual control of groundsel within this demonstration. Clomozone in a 3 way combination also provided good control of groundsel.

Assessments - S.Nettle

The observed total weed count of s.nettle from block A and B, Figure 9 reveals variation between treatments

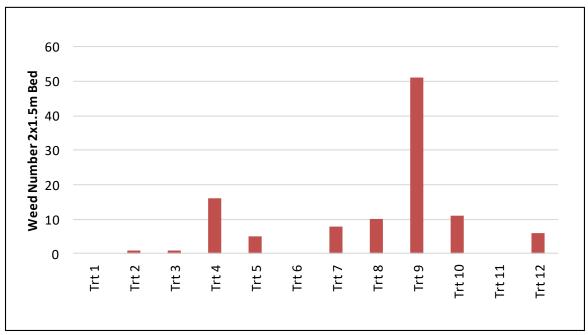


Figure 9: S.Nettle counts Total 3m Bed block A & B

Best Performance

- Trt 1 Afalon (linuron 480 g/l) 1.35 l/ha + Stomp Aqua(pendimethalin 455g/l) 2.2 l/ha + Shotput (metribuzin70%) 200g/ha (Figure 10A)
- Trt 6 Praxim (metobromuron 500g/l) 3l/ha + Stomp Aqua(pendimethalin 455g/l) 2.2 l/ha + Shotput (metribuzin70%) 200g/ha
- Trt 11 Stomp Aqua (pendimethalin 455g/l) 2.9 l/ha

Worst Performance

- Trt 9 Defy (prosulfocarb 800 g/l) 4l/ha (Figure 10B)
- Trt 4 Praxim (metobromuron 500g/l) 3l/ha + Defy (prosulfocarb 800 g/l) 4l/ha
- Trt 10 Praxim (metobromuron 500g/l) 4l/ha



Figure 10 A & B: Trt 1 and Trt 9 Block A 14th June

The results indicate the application of pendimethalin has the largest influence on the residual control of S.nettle

Assessments - Cleavers

The observed total weed count of cleavers from block A and B, Figure 10 reveals variation between treatments

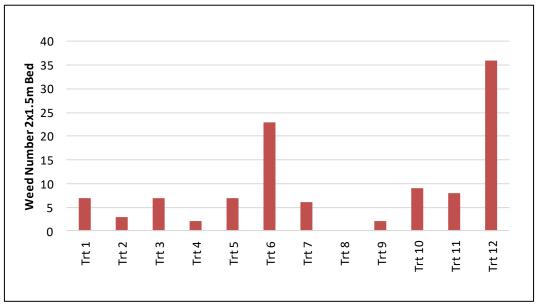


Figure 11: Cleaver counts Total 3m Bed block A & B

Best Performance

- Trt 8 Praxim (metobromuron 500g/l) 2l/ha + Defy (prosulfocarb 800 g/l) 3l/ha + Shotput (metribuzin70%) 200g/ha (Figure 12A)
- Trt 9 Defy (prosulfocarb 800 g/l) 4l/ha
- Trt 4 Praxim (metobromuron 500g/l) 3l/ha + Defy (prosulfocarb 800 g/l) 4l/ha

Worst Performance

- Trt 12 Shotput (metribuzin 70%) 500g/ha (Figure 12B)
- Trt 6 Praxim (metobromuron 500g/l) 2l/ha + Stomp Aqua (pendimethalin 455g/l) 2.2 l/ha + Shotput (metribuzin 70%) 200g/ha
- Trt 10 Praxim (metobromuron 500g/l) 4l/ha



Figure 12 A & B: Trt 8 and Trt 12 Block A 14th June

The results indicate prosulfocarb is likely to have the greatest influence on control although considerable variation occurred across the trial with the greatest level of cleavers occurring on one side of the trial which may have affected the results

Assessments - Annual Meadow Grass (AMG)

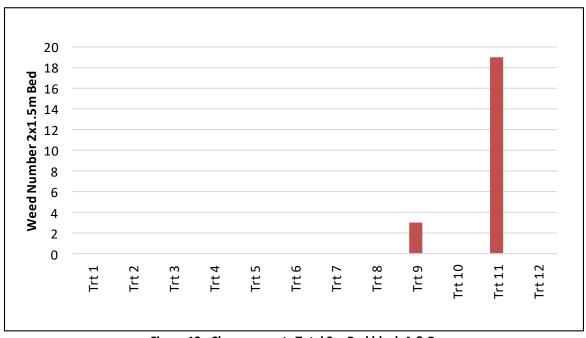


Figure 13: Cleaver counts Total 3m Bed block A & B

Best Performance

All treatments except 9 & 10

Worst Performance

- Trt 11 Stomp Aqua (pendimethalin 455g/l) 2.9 l/ha (Figure 14 B)
- Trt 9 Defy (prosulfocarb 800 g/l) 4l/ha



Figure 14 A & B: Trt 5 and Trt 11 Block A 14th June

The results indicate good control of AMG by many of the combination treatments. AMG is susceptible to metribuzin pre-emergence and results indicated no AMG within treatments containg product/combinations with metribuzin. Other treatments without metribuzin also indicate some activity from metobromuron (Trt 10, Trt 2)

Conclusions

The weed spectrum on this site was more limited than expected with only low levels of B.Bindweed, Fathen and Mayweed observed allowing no comparison of treatment performance with respect to these problematic weeds. High levels of Groundsel, Cleavers, S.nettle, AMG and Flixweed (Block A only) were observed allowing a comparison of the treatments with regard to control of these weeds.

The applications of individual a.i.'s allowed assessment of the strengths and weakness of the a.i. within this demonstration, Figure 15, with respect to the individual weeds present however it should be noted this was a non replicated demonstration and these are trends observed. Validation of these observations would require replicated trials within multiple sites and ideally more than one season.

Active Ingredient	metribuzin	metobromuron	prosulfocarb	pendimethalin	clomazone
Weeds					
S.nettle	m.susceptible	m.susceptible	-	susceptible	-
Cleavers	-	-	susceptible	-	m.susceptible
Groundsel	susceptible	L.susceptible	-	-	m.susceptible
Flixweed	-	m.susceptible*	m.susceptible*	-	-
AMG	susceptible	susceptible	-	-	-

Figure 15: Comparison of A.I. performance

The best overall performance was observed with treatments 5 (metabromuron, metribuzin and flufenacet) and treatment 8 (metobromuron, prosulfocarb and metribuzin), Figure 16. The inclusion of three active substances provided a broader weed spectrum control compared to the application of two active substances



Figure 16: A: Treatment 5



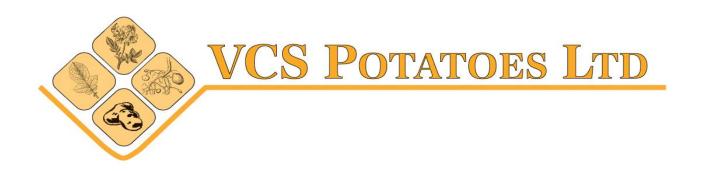
B: Treatment 8

However treatment 5 and 8 were expensive options, Figure 1, £83/ha and £61/ha respectively and an adequate level of weed control was observed by a number of treatments including the standard treatment 1 (linuron, pendimethalin and metribuzin, £34/ha) within the demonstration. It should be noted all the above observations and assessments have been assessed from a demonstration block and replication of the treatments over a number of sites would be required to validate the trends observed.

Acknowledgements

VCS Potatoes Ltd would like to thank Elveden Farms, VCS (UK) Ltd and AHDB Potatoes for their assistance with this trial.

G.Tomalin VCS Potatoes Ltd 22nd December 2016



SPOT Farm East (Elveden) 2017—Residual and Postemergence Contact Herbicide Demonstration Report



Background

The urea based selective residual herbicide active linuron has been the major residual herbicide applied to the potato crop of the UK on loamy and sandy loam soil types for over 30 years. This active provides cost effective, crop safe control of many weeds observed on these soil types including S.nettle, Fat Hen, B.Bindweed and Mayweeds. This active is now being revoked, the final date for sales was 3rd June 2017 with a last date for application 3rd June 2018.

Aims

This demonstration aimed to assess the efficacy and crop safety of alternative residual herbicides and residual herbicide mixtures avoiding the use of linuron. Following the revocation date for Linuron, two of the remaining actives are varietal dependant in their phyto-toxitcy charcterisitcs — metribuzin, clomazone. The demonstration also assessed the crop safety of the herbicides with regard to twenty three popular varieties grown in the UK. In addition when the crop was 15cm height a post emergence herbicide was applied to 3 plots. The planting and residual herbicide application dates were later than standard application timings to coincide with an open day in early July

VCS Potatoes Limited
2 Burnt Cottages, Badingham road, Framlingham, Suffolk IP13 9HX
Tel: 07768 030003 email: graham@vcsagronomy.com

Site Details

The demonstration site – Bishop Hill Middle was a loamy sand. The complete trial was planted on xx April. The seed size of the different varieties varied from 35x45mm, 45x55mm and 55x60mm. All the seed was treated with Monceren DS (pencycuron) @ 1kg/T at planting.

Region	West Suffolk
Field Name	Bishops Hill Middle
Soil type	Loamy sand

Fertiliser Applications

Soil Information	Soil Index	Available Nutrients from FYM application kg/ha	Base Fertiliser Applied kg/ha	Top Dressing Applied kg/ha
Nitrogen	0	4	102.5	131
Phosphate	3	61	50	
Potash	1	174	270	
Magnesium	1	30		70
рН	7.8			

Varieties

Category	Varieties
Processing Varieties	R. Burbank, Royal, Daisy, Performer, Challenger, Shepody, Innovator, Forza
Prepack Varieties	Lanorma, Soraya, Jelly, Marfona, Nectar, Vales sovereign, Saxon, Melody
Crisping Varieties	Brooke
Salad Varieties	Maris Peer, Leontine
Ware Varieties	Maris Piper, Eurostar, Rooster, Markies

Application details

	Date
Planting Date	21 st April
Application date – Pre emergence Residual Herbicides	13-14 th May
Application Date – Contact Herbicides	20 th June
Weed count 1	15 th June
Weed count 2	3 rd July
Weed count 3 (full plot)	31 st August

Treatment List

Trt No.	Water Volume	Herbicide Application 1. 30 th May pre emergence	Herbicide Application 2. 20 th June @ 15cm crop height	Residual Cost £/ha
1	300 l/ha	Untreated		£0
2	200 l/ha	VCS 1717 2.5 l/ha + Retro 3l/ha + NI wetter		ТВС
3	200 l/ha	Stomp Aqua 2.8 l/ha +Retro 3l/ha + Nl Wetter		£22
4	200 l/ha	Praxim 4I/ha Retro 3I/ha + NI Wetter		£72
5	200 l/ha	Gamit 25EC 200ml/ha + Retro 3l/ha + NI Wetter		£15
6	200 l/ha	Flufenacet 600g/ha A.I. + Retro 3I/ha + NI Wetter		ТВС
7	200 l/ha	Artist 1.2 kg/ha + Stomp Aqua 2l/ha + Retro 3l/ha + NI Wetter		£45
8	200 l/ha	Praxim 2.5 I/ha + Stomp Aqua 2 I/ha + shotput 200g/ha + Retro 3I/ha + NI Wetter		£66
9	200 l/ha	Praxim 2.5 l/ha + Defy 3l/ha + Shotput 200 g/ha + Retro 3l/ha + NI Wetter		£71
10	200 l/ha	Stomp Aqua 2 I/ha + Shotput 400g + Retro 3I/ha + NI Wetter		£26
11	200 l/ha	STANDARD Afalon 1.35l + Stomp Aqua 2 l/ha + Shotput 200g + Retro 3l/ha + NI Wetter		£33
12	200 l/ha	Shotput 600g + Retro 3l/ha + NI Wetter		£14
13	200 l/ha	Shotput 600g + Retro 3l/ha + NI Wetter Irrigated 15mm 20 hours post app		£14
14	200 l/ha	STANDARD Afalon 1.35l + Stomp Aqua 2 l/ha + Shotput 200g + Retro 3l/ha + NI Wetter	Shotput 200g/ha	£33+£5
15	200 l/ha	STANDARD Afalon 1.35l + Stomp Aqua 2 l/ha + Shotput 200g + Retro 3l/ha + NI Wetter	Shotput 500g/ha	£33+£12
16	200 l/ha	STANDARD Afalon 1.35l + Stomp Aqua 2 l/ha + Shotput 200g + Retro 3l/ha + NI Wetter	Titus 30g/ha + Shotput 200g/ha + NI Wetter	твс

Figure 1 : Treatments and Costing

Note: diquat 3I/ha + NI Wetter 200ml/ha co-applied with all residual applications

Demonstration Plan

The column	1				1	1		1						1		1	1	1	1						1		_
Second Part	ow 1 Ro	w 2	Row 3	Row 4	Row 5	Row 6	Row 7	-	3	Row 10	Row 11	Row 12	Row 1	Row 1	Row 1	Row 1	Row 1	Row 1	Row 19	Row 20	Row 2	Row 22	Row 23	Row 2	Row 25	-	
THE STATE OF																		Burban									00000
## 15 451 461 465 466 467 468 469 470 471 472 473 476 475 476 475 476 470 481 482		Σ̈́	Pe	a a	.Ea	ర్	S	Σ̈́	я	8	So	2	Je	Š	ž		Ē	P.	Da	요	ž	Se	Brc	V _i	Sax		
220 417 438 496 440 441 442 443 444 445 446 447 448 49 49 490 490 490 490 490 490 490 490 4	4	61	462	463	464	465	466	467	468	469	470	471		V .			476	477	478	479	480	481	482	483	484		
THE SEATON AND ALL AND	4	137	438	439	440	441	442	443	444	445	446							453	454	455	456	457	458	459	460		2m
THE APPROXIMATION AND ADDRESS OF STOLEN STOLEN AND ADDRESS OF STOL		112	414	415	416	417	410	410	420	421	422	422					420	430	430	421	422	422	424	425	426		
390 390 390 390 390 390 390 390 390 390	4	113	414	415	416	417	418	419	420	421	422	423					428	429	430	431	432	433	434	435	436		1.5m
365 866 867 868 869 870 870 870 871 872 878 878 878 878 878 878 878 878 878	3	89	390	391	392	393	394	395	396	397	398	399		3		1	404	405	406	407	408	409	410	411	412		
341 342 343 344 345 346 347 348 349 330 351 352 353 354 355 356 377 388 359 360 361 362 363 364 364 364 364 364 364 364 364 364	3	165	366	367	368	369	370	371	372	373	374	375					380	381	382	383	384	385	386	387	388		
Tri 3 Artist 1.2 kg/ha + Stomp Aqua 2.2 l/ha 317 318 319 320 321 322 323 324 325 326 327 328 329 330 331 332 333 334 335 336 337 338 339 340 1.5m 1	3	141	342	343	344	345	346	347	348	349	350	351					356	357	358	359	360	361	362	363	364		
1.5m	3	17	318	319	320	321	322	323	324	325									334	335	336	337	338	339	340		2m
Tri 9 Praxim 2/Uha + Defy 3/ha + Shotput 200g/ha 269 270 271 272 273 274 275 276 277 278 279 280 281 282 283 283 284 285 286 287 288 289 290 291 292 270 271 272 273 274 275 276 277 278 279 280 291 292 293 294 295 295 255 255 255 255 255 255 255 255	2	193	294	295	296	297	298	299	300	301										311	312	313	314	315	316		2m
245 246 247 248 249 250 251 252 253 254 255 256 257 258 259 250 251 252 253 254 255 256 257 258 259 260 261 262 263 264 265 266 267 268 1.5m 221 222 223 224 225 226 227 228 229 230 231 232 233 234 235 236 237 238 239 240 241 242 243 244 1.5m 171 12 Shotput 600 g/hs + Court 100 g/hs 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	2	169	270	271	272	273	274	275	276	277									286	287	288	289	290	291	292		2m
221 222 223 224 225 226 227 228 229 230 231 232 233 234 235 236 237 238 239 240 241 242 243 244 261 247 248 249 249 249 249 249 249 249 249 249 249	2	.45	246	247	248	249	250	251	252	253	254							261	262	263	264	265	266	267	268		2m
197 198 199 200 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 201 215 216 217 218 219 220 201 215 216 217 218 219 220 216 217 218 219 210 218	2	21	222	223	224	225	226	227	228	229										239	240	241	242	243	244		2m
173 174 175 176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 1.5m	1	.97	198	199	200	201	202	203	204	205	206	207					212	213	214	215	216	217	218	219	220		2m
149 150 151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175	1	.73	174	175	176	<u>17</u> 7	178	179													192	193	194	<u>19</u> 5	196		
1.5m 1.	1	49	150	151						157			+ App	2 Shot	put 20	0g/ha	_			167	168						
1.5m 1.											15 Lin	uron 1.	35 I/ha + App	+ Stom	p A 2.2	l/ha+ 0g/ha	Shotpu	t 200g/									
BLOCK A : Residual applications only											: 16 Lin + Ap	uron 1. p 2 Titu	35 I/ha	+ Stom	np A 2.2	! I/ha + 00g/ha	Shotpu + NI We	t 200g/ etter									
BLOCK A : Residual applications only	1	.01						Unplai	nted														122				1 Bed
					BLOCK	A : Res	idual a	applicat	ions on	ıly																	Tramline
BLOCK B: Residual applications + Contact applications post emergence																											
					BLOCK	B : Res	idual a	pplicat	ions + C	ontact	applica	ations p	ost em	ergenc	e												

Figure 2 : Demonstration Plan

Observations - Residual Herbicide Weed counts 15th June

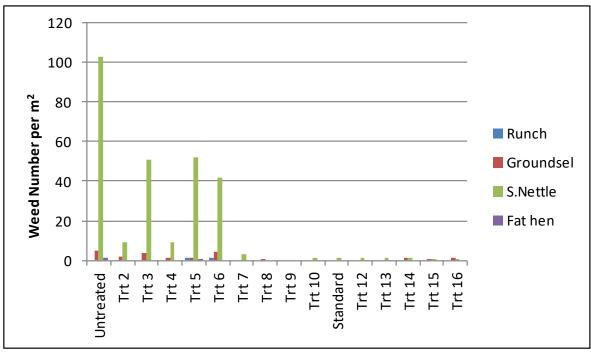


Figure 3: Block A Weed count assessments 2x1m Bed 15th June

Observations - Residual Herbicide Weed counts 3rd July

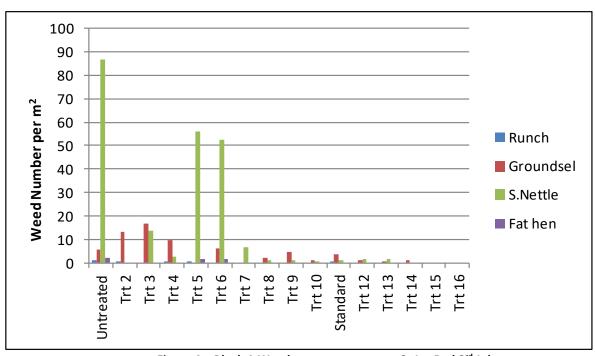


Figure 4: Block A Weed count assessments 2x1m Bed 3rd July

No phytoxicity was observed for any residual treatments (treatments 1-13) although a marginally lower crop height was observed within Forza and Innovator within treatment 12 and 13 which contained higher levels of active metribuzin.

Observations – Contact Herbicide Phytotoxicity

At an average 15cm crop height, 20th June, a post emergence contact herbicide application was applied to Strip 14, 15 and 16. These treatments were assessed for levels of phytotoxicity – leaf yellowing/chlorosis 10 days after application – see Figure 5

	Phytotoxicity Score (0	none – 9 severe) – post assessed 30 th June	t emergence treatments			
Variety	Treatment 14 200g/ha Shotput	Treatment 15 500g/ha shotput	Treatment 16 200g/ha Shotput + 30g/ha Titus+ 200ml NI Wetter			
Maris Piper	2	6	4			
Performer	1	4	3			
Eurostar	2	5	2			
Lanorma	1	2	2			
Challenger	0	0	0			
Shepody	2	4	3			
Maris Peer	2	5	4			
Leontine	0	3	1			
Royal	0	2	1			
Soraya	0	1	2			
Rooster	0	1	2			
Jelly	1	2	1			
Markies	0	1	1			
Melody	2	4	4			
Innovator	4	7	5			
Russet Burbank	1	2	2			
Daisy	1	3	2			
Forza	4	8	6			
Marfona	0	0	0			
Nectar	1	4	3			
Brooke	0	0	1			
Vales sovereign	0	0	1			
Saxon	0	0	0			

Figure 5 : Phytoxoicity Score – Post emergence applications

Discussion

An untreated area, Figure 7 & 8, allowed an assessment of weed species present on the site, these were dominated by small nettle and groundsel with a lower level of runch and fat hen. Weed species also present at very low levels include cranesbill, fools parsley, field pansy and black bindweed.

It was considered only the weed species present at higher levels allow a comparison of efficacy from the various treatments within this demonstration. The below compares residual performance only excluding post emergence treatments 14,15 & 16.



Figure 7: Untreated area 3rd June



Figure 8: Untreated area 31st August

Assessments - Groundsel

The observed total weed count of groundsel from observations on 15th June and 3rd July, Figure 8 reveals variation between treatments

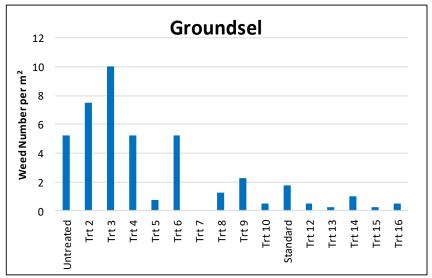


Figure 8: Groundsel counts Total 4m²

Best Performance

- Trt 7 Artist (metribuzin 225g/kg, flufenacet 240g/kg) 1.2 kg/ha + Stomp Aqua (pendimethalin 455g/l) 2 l/ha (Figure 9 A)
- Trt 13 Shotput (metribuzin 70%) 600g/ha Praxim (metobromuron 500g/l) 3l/ha + Artist (metribuzin 225g/kg, flufenacet 240g/kg) 1kg/ha
- Trt 12 Shotput (metribuzin 70%) 600g/ha (irrigation applied within 24 hrs)

Worst Performance

- Trt 3 Stomp Aqua (pendimethalin 455g/l) 2.8 l/ha (Figure 9 B)
- Trt 2 VCS 1717 (new a.i.) 2.5 l/ha
- Trt 6 flufenecet 600g/ha



Figure 9 A & B: Trt 7 and Trt 7 3rd July

The results indicate the level of metribuzin applied has the largest influence on the residual control of groundsel within this demonstration. Clomozone also provided good control of groundsel.

Assessments - S.Nettle

The observed total weed count of s.nettle from observations on 15th June and 3rd July, Figure 10 reveals variation between treatments

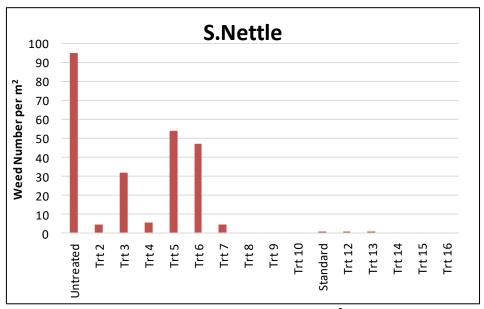


Figure 10: S.Nettle counts Total 4m²

Best Performance

- Trt 8 Praxim (metobromuron 500g/l) 2.5l/ha + Stomp Aqua(pendimethalin 455g/l) 2 l/ha + Shotput (metribuzin70%) 200g/ha (Figure 11A)
- Trt 9 Praxim (metobromuron 500g/l) 2.5l/ha + Defy (prosulfocarb 800 g/l) 3l/ha + Shotput (metribuzin70%) 200g/ha
- Trt 10 Stomp Aqua (pendimethalin 455g/l) 2 l/ha + Shotput (metribuzin70%) 400g/ha

Worst Performance

- Trt 5 Gamit 25EC (clomazone xx g/l) (Figure 10B)
- Trt 6 flufenecet 600g/ha
- Trt 3 Stomp Aqua (pendimethalin 455g/l) 2.8 l/ha



Figure 10 A & B: Trt 8 and Trt 5 Block A 3rd July

The results indicate the application of combination of actives including pendimethalin, metobromuron and metribuzin have a large influence on the residual control of S.nettle Assessments – Fat Hen

The observed total weed count of fat hen from observations across the whole strip on 31st August, Figure 12



Figure 11: Fat Hen counts - complete strip

Best Performance

- Trt 7 Artist (metribuzin 225g/kg, flufenacet 240g/kg) 1.2 kg/ha + Stomp Aqua (pendimethalin 455g/l) 2 l/ha (Figure 12A)
- Trt 2 VCS 1717 (new a.i.) 2.5 l/ha
- Trt 8 Praxim (metobromuron 500g/l) 2.5l/ha + Stomp Aqua(pendimethalin 455g/l) 2 l/ha + Shotput (metribuzin70%) 200g/ha
- Trt 10 Stomp Aqua (pendimethalin 455g/l) 2 l/ha + Shotput (metribuzin70%) 400g/ha
- Trt 11 Standard Linuron (linuron 500g/l) 1.2l/ha + Stomp Aqua(pendimethalin 455g/l) 2 l/ha + Shotput (metribuzin70%) 200g/ha
- Trt 12 Shotput (metribuzin 70%) 600g/ha

Worst Performance

- Trt 5 Gamit 25EC (clomazone xx g/l) (Figure 12B)
- Trt 6 flufenecet 600g/ha



Figure 12 A & B: Trt 2 and Trt 6 3rd July

The results indicate metribuzin is likely to have the greatest influence on control although initial assessment of the new active coded VCS 1717 indicate good control on this site.

Assessments - Runch

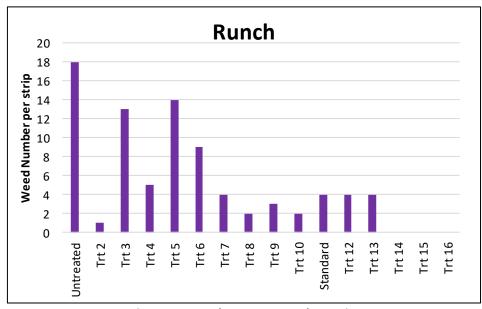


Figure 13: Runch counts-complete strip

Best Performance

- Trt 2 VCS 1717 (new a.i.) 2.5 l/ha(Figure 14A)
- Trt 8 Praxim (metobromuron 500g/l) 2.5l/ha + Stomp Aqua(pendimethalin 455g/l) 2 l/ha + Shotput (metribuzin70%) 200g/ha
- Trt 10 Stomp Aqua (pendimethalin 455g/l) 2 l/ha + Shotput (metribuzin70%) 400g/ha

Worst Performance

- Trt 3 Stomp Aqua (pendimethalin 455g/l) 2.8 l/ha
- Trt 5 Gamit 25EC (clomazone xx g/l) 200ml/ha
- Trt 6 flufenecet 600g/ha



Figure 14 A & B: Trt 2 and Trt 3 3rd July

The results indicate good control of Runch by many of the combination treatments. Runch is susceptible to metribuzin pre-emergence and results indicated good control with all treatments containing metribuzin. Initial assessment of the new active coded VCS 1717 also indicated good control on this site.

Assessments – Post Emergence Herbicide Varietal Sensitivity

The application of post emergence herbicides caused varying levels of scorch on this demonstration. The effects of Shotput (metribuzin) were varietal and rate dependant, treatment 14, Shotput 200g/ha (metribuzin 70%w/w) and treatment 15 Shotput 500g/ha (metribuzin 70%w/w). The effects of Titus (rimsulfuron), treatment 16 when applied in addition with Shoptput 200g/ha(metribuzin) were quite distinct across all varieties with a mottling pattern. However in addition to the leaf mottling a leaf scorch was obsevered which was varietal dependant, similar to the levels observed within treatment 14

Overall the levels of scorch due to post emergence metribuzin were lower than would have been anticipated on susceptible varieties within this demonstration.



Figure 17 Markies Figure 18 Challenger
Treatment 15 Shotput 500g/ha (metribuzin 70%)

Conclusions – Residual Herbicides

The weed spectrum on this site was more limited than expected with only low levels of B.Bindweed and Mayweed observed allowing no comparison of treatment performance with respect to these problematic weeds. High levels of Groundsel and S.nettle and moderate levels of Fat Hen and Runch were observed allowing a comparison of the treatments with regard to control of these weeds.

The applications of individual a.i.'s allowed assessment of the strengths and weakness of the a.i. within this demonstration, Figure 20, with respect to the individual weeds present however it should be noted this was a non replicated demonstration and these are trends observed. Validation of these observations would require replicated trials within multiple sites and ideally more than one season.

Active Ingredient	metribuzin	Metobromuron	pendimethalin	clomazone	VCS 1717	Flufenacet
Weeds						
S.nettle	m.susceptibl	m.susceptible	susceptible	-	susceptible	-
Groundsel	susceptible	L.susceptible	-	m.susceptible	-	-
Fat Hen	susceptible	L.susceptible	susceptible	-	susceptible	-
Runch	susceptible	m.susceptible*	m.susceptible	-	susceptible	-

Figure 19: Comparison of A.I. performance

A commercially acceptable performance was observed with treatments 7 (metribuzin, flufenacet and pendimethalin) ,8 (metobromuron, prosulfocarb and metribuzin),9 (metobromuron, pendimethalin and metribuzin),10 (metribuzin and pendimethalin),11STD Linuron, pendimethalin and metribuzin) ,12(metribuzin) ,13(metribuzin). However the rates of metribuzin within treatments 7,10,12 and 13 (400-600g/ha 70% metribuzin) would be considered too high for some of the varieties within the demonstration for this soil type. Therefore the best broad variety combinations observed from this demonstration, on this soil type are treatment 8 (metobromuron, prosulfocarb and metribuzin) and 9 (metobromuron, pendimethalin and metribuzin). Figure 19. The inclusion of three active substances also provides a broader control over a larger weed spectrum .



Figure 19:A:Treatment 8

B: Treatment 9

However treatment 8 and 9 were expensive options, Figure 1, £66/ha and £71/ha respectively. If the variety was tolerant of metribuzin, treatment 10 (metribuzin and pendimethalin), £26/ha, would be the most cost effective broad spectrum control.

Conclusions – Contact Herbicides

The phytotoxicity and veinal leaf yellowing due to the post emergence metribuzin on this demonstration was less than expected on varieties previously trialled. However a comparison of effects on varieties within treatment 15 (Shotput 500g/ha metribuzin 70%w/w) enables a grouping of varieties in sensitivity bands, Figure 20

Tollerant	Low Sensitivity	Moderate Sensitivity	High Sensivity
V.Sovereign	Royal	M.piper	Forza
Brooke	Daisy	Leontine	Innovator
Marfona	Lanorma	Eurostar	M.Peer
Saxon	R.Burbank	Melody	
Rooster	Jelly	Nectar	
Challenger		Performer	
Soraya		Shepody	
Markies			

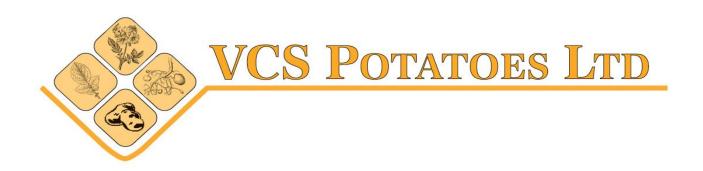
Figure 20: Sensitivity to metribuzin post emergence

It should be noted all the above observations and assessments for both residual and contact treatments have been assessed from a demonstration block and replication of the treatments over a number of sites would be required to validate the trends observed.

Acknowledgements

VCS Potatoes Ltd would like to thank Elveden Farms, VCS (UK) Ltd and AHDB Potatoes for their assistance with this trial.

G.Tomalin VCS Potatoes Ltd 29th December 2017



SPOT Farm East (Elveden) 2018 – Residual and Postemergence Contact Herbicide Demonstration Report



Background

The urea based selective residual herbicide active linuron has been the major residual herbicide applied to the potato crop of the UK on loamy and sandy loam soil types for over 30 years. This active provides cost effective, crop safe control of many weeds observed on these soil types including S.nettle, Fat Hen, B.Bindweed and Mayweeds. The approval for Linuron application ceased on 3rd June 2018. This demonstration was the third in a sequence of trials to look at options following the loss of this active.

Aims

This demonstration aimed to assess the efficacy and crop safety of alternative residual herbicides and residual herbicide mixtures avoiding the use of linuron. Following the revocation date for Linuron, two of the remaining actives are varietal dependant in their phyto-toxicity characteristics – metribuzin, clomazone. The demonstration also assessed the crop safety of the alternative herbicides with regard to twenty six popular varieties grown in the UK. In addition when the crop was 15cm height a post emergence herbicide was applied to 3 plots.

VCS Potatoes Limited
2 Burnt Cottages, Badingham road, Framlingham, Suffolk IP13 9HX
Tel: 07768 030003 email: graham@vcsagronomy.com

Site Details

The demonstration site – Common Heath 4 was a loamy sand. The complete trial was planted on 25th April. The seed size of the different varieties varied from 35x45mm, 45x55mm and 55x60mm. All the seed was treated with Monceren DS (pencycuron) @ 1kg/T at planting.

Region	West Suffolk
Field Name	Common Heath 4
Soil type	Loamy sand

Fertiliser Applications

Soil Information	Soil Index	Available Nutrients from FYM application kg/ha	Base Fertiliser Applied kg/ha	Top Dressing Applied kg/ha
Nitrogen	0	4	100	120
Phosphate	3	61	50	
Potash	1	174	270	
Magnesium	1	30		70
рН	7.8			

Varieties

Category	Varieties					
Processing Varieties	R. Burbank, Royal, Performer, Challenger, Shepody, Innovator, Forza					
	Lanorma, Soraya, Jelly, Marfona, Nectar, Melody, Sensation, Red Fantasy,					
Prepack Varieties	Georgina					
Crisping Varieties	Brooke, VR808					
Salad Varieties	Maris Peer, Leontine, Gwenne, Angelique, Iodea, Gemson, Bambino					
Ware Varieties	Maris Piper, Rooster					

Application details

	Date
Planting Date	25 th April
Application date – Pre emergence Residual Herbicides	13 th May
Application Date – Contact Herbicides	11 th June
Weed count 1	14 th June
Post emergence Assessment	20 th June

Treatment List

Trt No.	Water Volume	Herbicide Application 1. 13 th May pre emergence	Herbicide Application 2. 11 th June @ 15cm crop height	Residual Cost (not including Contact)£/ha
1		Untreated		£0
2	200 l/ha	Praxim 2.5 I/ha + Stomp Aqua 1.8 I/ha + Shotput 200g/ha + Retro 3I/ha + NI Wetter		£66
3	200 l/ha	Praxim 2.5 l/ha + Defy 3l/ha + Shotput 200g/ha + Retro 3l/ha + NI Wetter		£71
4	200 l/ha	Praxim 4I/ha Retro 3I/ha + NI Wetter		£72
5	200 l/ha	VCS 1717 2.5 l/ha(aclonifen) + Retro 3l/ha + NI Wetter		ТВС
6	200 l/ha	Defy 3 I/ha + Retro 3I/ha + NI Wetter		TBC
7	200 l/ha	VCS 1818 (2 actives) + Retro 3I/ha + NI Wetter		ТВС
8	200 l/ha	Shotput 1000g/ha + Retro 3l/ha + NI Wetter		£23
9	200 l/ha	Stomp Aqua 1.8 l/ha + Shotput 400g + Retro 3l/ha + NI Wetter		£26
10	200 l/ha	Artist 1.2 kg/ha + Stomp Aqua 1.8I/ha + Retro 3I/ha + NI Wetter		£45
11	200 l/ha	VCS 1717 2.5 I/ha(aclonifen) + Stomp Aqua 1.8 I/ha + Shotput 200g/ha + Retro 3I/ha + NI Wetter		ТВС
12	200 l/ha	VCS 1717 2.5 I/ha(aclonifen) + Defy 3I/ha + Shotput 200g/ha + Retro 3I/ha + NI Wetter		ТВС
13	200 l/ha	VCS 1717 2.5 I/ha(aclonifen) + Shotput 400g/ha + Retro 3I/ha + NI Wetter		ТВС
14	200 l/ha	VCS 1919 (3 actives) + Retro 3I/ha + NI Wetter		ТВС
15	200 l/ha	STANDARD Praxim 2.5I/ha + Stomp Aqua 1.8 I/ha + Shotput 200g + Retro 3I/ha + NI Wetter	Shotput 200g/ha	£66 + £5
16	200 l/ha	STANDARD Praxim 2.5I/ha + Stomp Aqua 1.8 I/ha + Shotput 200g + Retro 3I/ha + NI Wetter	Shotput 500g/ha	£66 + £12
17	200 l/ha	STANDARD Praxim 2.5I/ha + Stomp Aqua 2 I/ha + Shotput 200g + Retro 3I/ha + NI Wetter	Titus 30g/ha + Shotput 200g/ha + NI Wetter	£66 + £20
18	200 l/ha	STANDARD Praxim 2.5I/ha + Stomp Aqua 2 I/ha + Shotput 200g + Retro 3I/ha + NI Wetter Figure 1: Treatments and Costin	Basagran 1.1 kg/ha	£66 + TBC

Figure 1: Treatments and Costing

Note: diquat 3l/ha + NI Wetter 200ml/ha co-applied with all residual applications

Demonstration Plan

gwe nne Gwe nne	Angelique 5	Row 3	Row 4 uoswa9	Row 5	Maris Peer 9 8	Row 7	Georgina 8	9 Prooke	VR 808	lunovator	Forza Forza	Challenger challenger	Rosset Russet	Rowal S	Performer Performer	Rooster 17	Row Panorma	Melody Melody	Row 20	Red Fantasy 52	Soraya	Nectar Nectar	M.piper	Row 25	Row 26 Apodays	Blank Blank	Blank Se work	
													ntreate															2.0 m
643	544	545	546	547	548	549	550	551	552	553	554	555	556	557	558	559	560	561	562	563	564	565	566	567	568			1.5 m
517	518	519	520	521	522	523	524								hotput 2			535	536	537	538	539	540	541	542			2.0 m
																												1.5 m
191	492	493	494	495	496	497	498	499	Trt 3		502				506	g/ha 507	508	509	510	511	512	513	514	515	516			2.0 m
											Tet	A - Pray	im 4.0 l	/ha														2.0 m
65	466	467	468	469	470	471	472	473	474	475					480	481	482	483	484	485	486	487	488	489	490			1.5 m
													717 2.5															2.0 m
39	440	441	442	443	444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460	461	462	463	464			1.5 m
13	414	415	416	417	418	419	420	421	422	423			efy 3 I/h		428	429	430	431	432	433	434	435	436	437	438			2.0 m
																												1.5 m
87	388	389	390	391	392	393	394	395	396	397			18 (2 A		402	403	404	405	406	407	408	409	410	411	412			2.0 m
														,														1.5 m
61	362	363	364	365	366	367	368	369	370	371			9ut 1 kg 374		376	377	378	379	380	381	382	383	384	385	386			2.0 m
										Trt 9 - S	tomp A	qua 1.8	l/ha + Sł	otput 4	00 g/ha													2.0 m
35	336	337	338	339	340	341	342	343	344	345	346	347	348	349	350	351	352	353	354	355	356	357	358	359	360			1.5 m
09	210	311	212	313	214	315	216	217	210						1.8 l/ha		226	227	220	220	330	221	332	333	224			2.0 m
03	310	311	312	313	514	313	310	317	510	313	320	321	322	323	324	323	320	327	320	323	330	331	332	333	334			1.5 m
83	284	285	286	287	288	289	290								Shotput 298			301	302	303	304	305	306	307	308			2.0 m
																												1.5 m
57	258	259	260	261	262	263	264	265							272		274	275	276	277	278	279	280	281	282			2.0 m
										Trt 13	- VCS 17	17 2.5 I	/ha + Sh	otput 4	00 g/ha													2.0 m
31	232	233	234	235	236	237	238	239	240		242					247	248	249	250	251	252	253	254	255	256			1.5 m
													919 (3 a															2.0 m
05	206	207	208	209	210	211	212	213	214 r+ 15. D		216	217 Stomp	218		220 Shotput	221	222	223	224	225	226	227	228	229	230			1.5 m
79	180	181	182	183	184	185	186					p 2 Sho	tput 200	g/ha	194		_	197	198	199	200	201	202	203	204			2.0 m
												Stomp /	Aqua 2.0		hotput	200 g/h												1.5 m
153	154	155	156	157	158	159	160	161	162	163	fb Ap 164	p 2 Sho	166	167	168	169	170	171	172	173	174	175	176	177	178			2.0 m
				I		<u> </u>	I	Т							Shotput + NI We	-	a											2.0 m
127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143		145	146	147	148	149	150	151	152			
101			40:	10-	10-	107	40-				fb App	2 Basag	ran 1.1	kg/ha	Shotput			110	125	120	125	125	12:	125	12-			2.0 m
101	102	103	104	105	106	10/	108	109	110	111	112	113	114	115	116	11/	118	119	120	121	122	123	124	125	126			2 m
1 E	Bed	1	Bed	11	Bed	1 8	Bed	1 8	Bed	1 8	Bed	1 (Bed	11	Bed	1 E	led	1 E	Sed	1 8	ed	18	Sed	1 B	ed	1 Bed (t	ramline	
				BLOCK	A : Resid	dual app	lication	ns only																				
				BLOCK	B : Resid	lual app	lication	is fb cor	ntact ap	plicatio	ns post e	emergen	ice															
			l																									

Figure 2 : Demonstration Plan

Observations - Residual Herbicide Weed counts 14th June

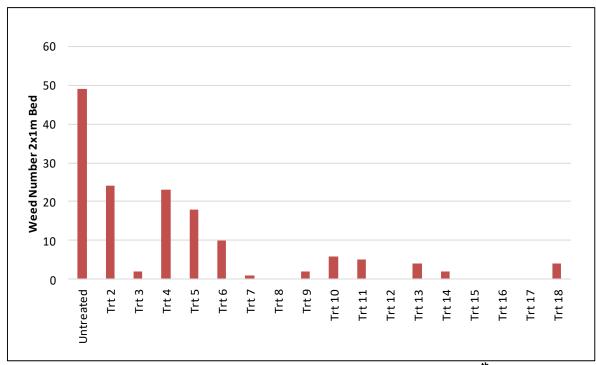


Figure 3: Weed count – Groundsel assessments 2x1m Bed 14th June

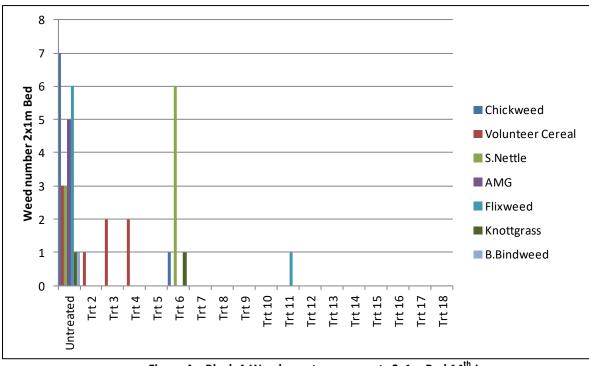


Figure 4: Block A Weed count assessments 2x1m Bed 14th June

Weed counts, figure 3 and 4, were undertaken on 14th June. The only weed which was observed with significant numbers was Groundsel, Figure 3. No phytoxicity was observed for any residual only treatments (treatments 1-14).

Observations – Contact Herbicide Phytotoxicity

At an average 15cm crop height, 11th June, a post emergence contact herbicide application was applied to Strip 15, 16, 17 and 18. These treatments were assessed for levels of phytotoxicity – leaf yellowing/chlorosis 10 days after application – see Figure 5

	Phytotoxicity Score	e (0 none – 9 severe) 22 nd	– post emergence treat	tments assessed
Variety	Treatment 15 200g/ha Shotput	Treatment 16 500g/ha shotput	Treatment 17 200g/ha Shotput + 30g/ha Titus+ 200ml NI Wetter	Treatment 18 1.1 Kg/ha Basagran
Gwenne	0	0	Leaf mottle observed	1
Angelique	0	0	Leaf mottle observed	0
Bambino	0	0	Leaf mottle observed	0
Gemson	0	0	Leaf mottle observed	0
Leontine	1	1	Leaf mottle observed	2
Iodea	0	0	Leaf mottle observed	3
Maris Peer	0	0	Leaf mottle observed	0
Georgina	0	0	Leaf mottle observed	0
Brooke	0	0	Leaf mottle observed	0
VR 808	2	3	Leaf mottle observed	0
Innovator	2	6	Leaf mottle observed	1
Forza	1	5	Leaf mottle observed	1
Challenger	0	0	Leaf mottle observed	0
Russet Burbank	0	0	Leaf mottle observed	2
Royal	0	0	Leaf mottle observed	0
Performer	1	2	Leaf mottle observed	0
Rooster	0	0	Leaf mottle observed	0
Lanorma	0	0	Leaf mottle observed	0
Melody	1	3	Leaf mottle observed	1
Jelly	0	0	Leaf mottle observed	0
Red Fantasy	0	3	Leaf mottle observed	1
Soraya	0	0	Leaf mottle observed	0
Nectar	1	1	Leaf mottle observed	0
M.piper	0	0	Leaf mottle observed	0
Sensation	0	1	Leaf mottle observed	0
Shepody	0	2	Leaf mottle observed	0

Figure 5 : Phytotoxicity Score – Post emergence applications

Discussion

An untreated area, Figure 7, allowed an assessment of weed species present on the site, these were dominated by groundsel with a very low level of alternative weeds. Weed species also present at very low levels include annual meadow grass, volunteer cereals, flixweed, s.nettle, knotgrass, chickweed and black bindweed. Figure 8-20 are photos of each residual treatment at 5th July.



Figure 7: Untreated area 5th July



Figure 8 : Treatment 2 area 5th July



Figure 9: Treatment 3 area 5th July



Figure 10 : Treatment 4 area 5th July



Figure 11 : Treatment 5 area 5th July



Figure 12: Treatment 6 area 5th July



Figure 13 : Treatment 7 area 5th July



Figure 14: Treatment 8 area 5th July



Figure 15: Treatment 9 area 5th July



Figure 16: Treatment 10 area 5th July



Figure 17: Treatment 11 area 5th July



Figure 18: Treatment 12 area 5th July



Figure 19: Treatment 13 area 5th July



Figure 20: Treatment 13 area 5th July

It was considered only groundsel was at sufficient levels to allow a comparison of efficacy from the various treatments within this demonstration.

Assessments - Groundsel

The observed total weed count of groundsel from observations on, Figure 21 reveals variation between treatments

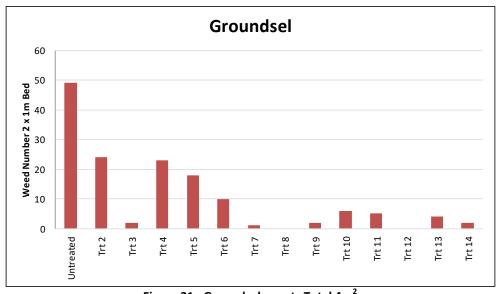


Figure 21 : Groundsel counts Total 4m²

Best Performance

- Trt 8 Shotput (metribuzin 70%) 1.0 kg/ha
- Trt 12 Shotput (metribuzin 70%) 200g/ha + VCS 1717(aclonifen) 2.5 I/ha + Defy (prosulfocarb) 3I/ha
- Trt 7 VCS 1818 (2 actives including clomazone)

Worst Performance

- Trt 2 Praxim(metabromuron) 2.5 l/ha + Stomp aqua(pendimethalin 455g/l) 1.8 l/ha + Shotput (metribuzin 70%) 200g/ha
- Trt 5 VCS 1717 (aclonifen) 2.5 l/ha
- Trt 4 Praxim (metabromuron) 4 l/ha

Assessments - Post Emergence Herbicide Varietal Sensitivity

The application of post emergence herbicides caused varying levels of scorch on this demonstration. The effects of Shotput (metribuzin) were varietal and rate dependant, treatment 15, Shotput 200g/ha (metribuzin 70%w/w) and treatment 16 Shotput 500g/ha (metribuzin 70%w/w), see figure 22-25. The effects of Basagran 1.1kg/ha treatment 18 were also varietal dependant, see figure 26-27.

Overall the levels of scorch due to post emergence metribuzin were lower than would have been anticipated on susceptible varieties within this demonstration.



Treatment 16 Shotput 500g/ha (metribuzin 70%)



Figure 26 Leontine/M.peer Figure 27 Challenger/R.burbank
Treatment 18 Basagran 1100g/ha (bentazone)

Conclusions – Residual Herbicides

The weed spectrum on this site 2018 was very limited with rapid crop growth quickly suppressing weed growth. Groundsel was the only weed species with sufficient numbers to compare treatments.

The applications of individual a.i. allowed assessment of the strengths and weakness of the a.i. within this demonstration, Figure 28, with respect to groundsel, however it should be noted this was a non replicated demonstration and these are trends observed. Validation of these observations would require replicated trials within multiple sites and ideally more than one season.

Active Ingredient	metribuzin	Metobromuron	pendimethalin	clomazone	VCS 1717	Flufenacet
Weeds						
Groundsel	susceptible	L.susceptible	-	m.susceptible	L.susceptible	-

Figure 28 : Comparison of A.I. performance

All residual applications provided a commercially acceptable performance of weed control on this site, in this season.

Conclusions – Contact Herbicides Metribuzin

The phytotoxicity and veinal leaf yellowing due to the post emergence metribuzin on this demonstration was less than expected on varieties previously assessed. However a comparison of effects on varieties within treatment 16 (Shotput 500g/ha metribuzin 70%w/w) enables a grouping of varieties in sensitivity bands, Figure 29

Tolerant	Low Sensitivity	Moderate Sensitivity	High Sensivity
V.Sovereign*	Royal	M.piper	Forza
Brooke*	Daisy*	Leontine	Innovator
Marfona	Lanorma*	Eurostar	M.Peer
Saxon	R.Burbank	Melody	VR808
Challenger*	Jelly	Nectar	
Markies	Angelique	Performer	
	Bambino	Gwenne	
	Gemson*	Shepody	
	Rooster	Georgina*	
	Soraya	lodea*	

Figure 29 : Sensitivity to metribuzin post emergence * Limited trial data

Basagran

The phytotoxicity/leaf yellowing due to post emergence bentazone was quickly out grown on this site due to high ambient temperatures. A comparison of effects on varieties within treatment 18 (Basagran 1.1kg/ha, bentazone) enables a grouping of varieties within sensitivity bands, Figure 30

Tolerant to Very Low Sensitivity Label'Ok to treat'	Moderate Sensitivity - Label 'Bordeline'	High Sensivity - Label ' <i>Do not treat</i> '
M.peer	Innovator*	R.Burbank
M.piper	Rooster*	Shepody
	Melody*	
Gwenne*		
Angelique*		Leontine*
Bambino*	Forza*	Jelly*
Gemson*	Challenger*	
lodea*	Soraya*	
Brooke*	Sensation*	
Royal*	Red Fantasy*	
Lanorma*	VR808*	
Nectar*	Performer*	
Mozart*	Georgina*	

Figure 30 : Sensitivity to bentazone post emergence * Limited trial data

It should be noted all the above observations and assessments for both residual and contact treatments have been assessed from a demonstration block and replication of the treatments over a number of sites would be required to validate the trends observed.

Acknowledgements

VCS Potatoes Ltd would like to thank Elveden Farms, VCS (UK) Ltd and AHDB Potatoes for their assistance with this demonstration.

G.Tomalin VCS Potatoes Ltd 30th March 2019