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Residual Control of Paradoxa Grass in Barley

Trial ID: DH2201	Location: Mullaley	Trial Year: 2022	
	Investigator: Dean Hancock		

Paradoxa grass (*Phalaris paradoxa*) is an important weed of winter crops, particularly in seasons when wet conditions occur in late autumn and early winter. Improved understanding of the potential for residual paradoxa grass management is needed due to increasing levels of Group 1 (A) and 2 (B) post-emergent herbicide resistance.

This project was developed to evaluate a range of residual herbicides for paradoxa grass (phalaris) control in wheat. However, a mix-up occurred at sowing with the paddock planted to barley rather than the planned wheat crop.

Although Sakura and Luximax are not registered for use in barley, the trial was continued to generate efficacy data on paradoxa grass but also evaluate crop safety in barley. All of the herbicides applied have annual ryegrass control registrations with three of them having paradoxa grass control claims when applied at planting in wheat: Sakura, TriflurX and Mateno Complete. Overwatch has a paradoxa grass suppression claim when applied at planting.

Objective:	To evaluate herbicide options for residual control of <i>Phalaris paradoxa</i> in cereals	
Situation:	Barley cv. Spartacus CL	
Planting Date:	30/05/2022	
Equipment:	Direct drilled with a tyne planter on 33 cm row spacings at a depth of 3 cm at 50 kg/ha	
Weeds:	Paradoxa grass and annual ryegrass	
Application:	A	B
Application Date:	30/05/2022	11/07/2022
Application Description:	Incorporated by sowing (IBS) on day of application	In-crop
Crop Stage at Application:	Pre-plant	~4 leaf stage
Weed Stage at Application:	Pre-emergent (both weeds)	~5 leaf stage (paradoxa grass) ~1 tiller stage (annual ryegrass)
Nozzles:	AIXR11002	
Volume:	100 L/ha	
Trial Design:	Randomised complete block, 14 treatment x 4 replicates	
Plot Size:	4m x 12m	
Keywords:	Barley, paradoxa grass, phalaris, annual ryegrass, residual	

Trial establishment and sowing was delayed due to ~80 mm of rain being received in early to mid-May. Soil conditions were still wet at planting with an extra 5 mm of rain received within a few hours of planting.

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Treatments

All treatments except Sakura and Luximax have existing registrations for use in barley. Mateno Complete is registered for use in barley but only at 750 mL/ha, not 1000 mL/ha. Sakura and TriflurX have label claims for residual paradoxa grass control in wheat with Overwatch having a suppression claim in wheat. Mateno Complete has a registration for residual paradoxa grass control when applied at planting but not for post emergent control. All products have annual ryegrass registrations.

The crop establishment count was delayed due to poor crop emergence across both the trial and surrounding commercial paddock.

Pest Scientific Name				Barley Spartacus CL 13/09/2022 EMERGENCE /m ² 106 DAP AA	Phalaris paradoxa Paradoxa Grass		Lolium rigidum Annual Ryegrass
Pest Name					1/08/2022 COUNT /m ² 4 x 1 m ² 63 DAA/ 21 DAB	13/09/2022 COUNT /m ² 8 x 1 m ² 106 DAA/ 64 DAB AA	
Crop Name							
Crop Variety							
Assessment Date							
Assessment Type							
Assessment Unit							
Assessment Area							
Plant-Evaluation Interval							
ARM Action Codes							
Trt No.	Treatment	Product Rate	Appln. Code				
1	Untreated	-	-	50-	0.25-	1.4-	3.8a
2	Sakura	118g/ha	A	39-	0-	0.4-	0e
3	Boxer Gold	2500ml/ha	A	39-	0.06-	0.1-	0.4bcde
4	TriflurX	1500ml/ha	A	41-	0-	0.1-	0.8abcde
5	Avadex Xtra	1600ml/ha	A	40-	0.13-	1.3-	2.3ab
	TriflurX	1500ml/ha	A				
6	Rifle 440	1350ml/ha	A	42-	0.38-	0.3-	1.6abcd
7	Luximax	500ml/ha	A	38-	0.13-	1.4-	0.1cde
8	Overwatch	1250ml/ha	A	45-	0-	0.1-	2.0abc
9	Bolta Duo	3000ml/ha	A	40-	0-	0.1-	0.6bcde
10	Diablo Duo	3000ml/ha	A	31-	0-	0.3-	0.9abcde
11	Arcade	3000ml/ha	A	31-	0.31-	0.6-	0.1de
12	Mateno Complete	1000ml/ha	A	45-	0.06-	0-	0e
13	Arcade	3000ml/ha	B	34-	0.06-	0.6-	1.1abcde
14	Mateno Complete	1000ml/ha	B	37-	0.13-	0.4-	1.0abcde
LSD P=,05				nsd	nsd	nsd	1.64 - 2.99t
Treatment Prob.(F)=				0.7368	0.5352	0.7447	0.0148

Means followed by same letter or symbol do not significantly differ (P=.05, LSD).

t=Mean descriptions are reported in transformed data units, and are not de-transformed.

Mean comparisons performed only when AOV Treatment P (F) is significant at mean comparison OSL.

nsd = no significant difference

ARM Action Codes

AA = Automatic arcsine square root % transformation

DAP = Days after Planting

DAA = Days after Application A

DAB = Days after Application B

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Conclusions:

This trial was conducted near Mullaley in Northern NSW. All herbicides were applied and incorporated by sowing (IBS) with Arcade and Mateno Complete also applied when the crop was at the 4 leaf stage. There was a mix up at sowing and the paddock was planted with barley instead of wheat. A decision was made to continue the trial and assess weed efficacy but also crop safety.

Application of the at-planting treatments was on the 30th of May 2022, with sowing later the same day. Sowing was conducted with a knife point, press wheel planter (on 33 cm row spacing) at a sowing depth of ~3 cm. The soil condition was wet and not ideal for planting. Rainfall started within hours of sowing and although the amount was low (~5 mm) it caused crusting and impacted on the uniformity and magnitude of crop emergence. The surrounding commercial paddock also had poor emergence.

The in-crop treatments were applied at 42 days after planting (42 DAP) when the crop was at the 4 leaf stage. Crop emergence was poor and variable with an emergence assessment delayed. Trace levels of weeds were present at this application but insufficient to warrant a count.

An initial weed assessment was conducted at 63 DAP with paradoxa grass counts still very low (untreated ~0.3 plants/m²). There was no significant difference between any treatment despite Sakura, TriflurX, Overwatch, Bolta Duo and Diablo Duo all having nil counts.

A second weed assessment was conducted 106 DAP. Paradoxa grass levels were still very low (untreated ~1.4 plants/m²). There was no significant difference between any treatment. Mateno Complete (IBS) was the only treatment to have a nil count of paradoxa grass.

Annual ryegrass was present at ~4 plants/m² in untreated plots. Treatments of Sakura, Boxer Gold, Luximax, Bolta Duo, and the IBS applications of Arcade and Mateno Complete significantly reduced annual ryegrass counts. Sakura and the IBS application of Mateno Complete were the only treatments having nil counts of annual ryegrass.

A count of crop establishment was very delayed and not conducted until 106 days after planting (106 DAP). The length of delay meant the emergence data was of questionable value due to the difficulty in distinguishing individual plants. There were no significant differences in establishment counts despite the untreated having the largest establishment counts (~50 plants/m²).

In this situation, paradoxa grass counts were too low to generate sound data (trial site missed the heavy paradoxa grass area by ~100 m). No useful data was generated on barley crop safety due to the impact of crusting and the very delayed assessment.

Application Description		
	A	B
Application Date:	30/05/2022	11/07/2022
Application Start Time:	2:00 PM	10:00 AM
Application Stop Time:	4:00 PM	10:30 AM
Interval to Previous Application:		42 days
Application Method:	SPRAY	
Application Timing:	IBS	EARLY POST-EM
Application Placement:	SOIL	PLOT
Air Temperature Start, Stop:	14, 14 C	14, 13 C
% Relative Humidity Start, Stop:	75, 79	71, 69
Wind Velocity & Direction Start:	15 km/h, NW	9 km/h, E
Wind Velocity & Direction Stop:	13 km/h, NW	9 km/h, SE
Wet Leaves (Y/N):		No
% Cloud Cover:	80	30
First Moisture Occurred On:	30/05/2022	
Time to First Moisture:	20 min	

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Crop Stage at Each Application

	A	B
Stage Majority, %:	Pre-plant	GS14 85%
Stage Minimum, %:		GS13 5%
Stage Maximum, %:		GS22 10%

Pest Stage at Each Application

	A	B
Pest 1:	<i>Phalaris paradoxa</i> paradoxa grass	
Stage Majority:	Pre-emergent 100%	GS15
Stage Minimum:		GS12
Stage Maximum:		GS24
Pest 2:	<i>Lolium rigidum</i> Annual Ryegrass	
Stage Majority:	Pre-emergent 100%	GS21
Stage Minimum:		GS12
Stage Maximum:		GS26

Application Equipment

	A	B
Application Equipment:	Polaris	
Equipment Type:	BOOM	
Operation Pressure:	400 kPa	
Nozzle Type:	AIXR11002	
Nozzle Spacing:	50 cm	
Boom Length:	4 m	
Boom Height:	50 cm	
Ground Speed:	11 km/h	
Application Amount:	100 L/ha	

Rainfall:

Weather Station Name:	Mullaley (Goolhi)
Distance:	8 km

Date	Amount	Unit	Comments
30/04/2022	257	mm	Rainfall Jan 1 to April 30
16/05/2022	82	mm	Rainfall May 1 to May 16
30/05/2022	5	mm	Rained 20 minutes after planting
30/06/2022	16	mm	Monthly total
31/07/2022	25	mm	Monthly total
31/08/2022	103	mm	Monthly total
20/09/2022	97	mm	Monthly total