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Knockdown Control of Common Sowthistle in Fallow

Trial ID: **LB2123** **Location:** **Bongeen** **Trial Year:** **2021**
Investigator : **Linda Bailey**

Common sowthistle is one of the most common problem weeds in the northern cropping region. It is particularly difficult to manage in fallow due to increasing levels of glyphosate tolerance together with a capability to emerge in all seasons. In recent years, a number of new Group 14 (G) herbicides have been registered for improved speed of weed burndown/brownout and control when mixed with glyphosate or paraquat.

This project was designed to evaluate the impact of mixtures of glufosinate (Biffo formulation) with Group 14 (G) herbicides when used as a single or 1st knock application.

Objective:	**To evaluate mixtures of glufosinate with Group 14 herbicides for the knockdown control of common sowthistle in fallow**				
Situation:	**Initially, fallow with 2020/21 sorghum stubble, ~25% ground cover. Site planted to sorghum 8 days after application**				
Application Date:	**8/12/2021**				
Nozzles:	**AIXR110015**				
Volume:	**100 L/ha**				
Weed Type:	**Common Sowthistle Cohort 1**	**Common Sowthistle Cohort 2**	**Bladder Ketmia**	**Native Sensitive Plant**	**Rhynchosia**
Weed Density:	**0.3/m²**	**0.4/m²**	**0.3/m²**	**0.3/m²**	**2.1/m²**
Weed Stage at Application:	**Fruit development**	**3-6 leaf**	**Cotyledon - 5 stems**	**1 leaf - 3 stems**	**1-5 leaf**
Weed Size at Application:	**50 cm tall x 30 cm diameter**	**1 cm tall x 2-5 cm diameter**	**10 cm tall x 10 cm diameter**	**5 cm tall x 5-10 cm diameter**	**5 cm tall x 5-15 cm diameter**
Crop Type:	**Sorghum**				
Planting Date:	**16/12/2021 (8 days after treatment applied)**				
Row Spacing:	**1m**				
Trial Design:	**Randomised block of 12 treatments x 4 replicates**				
Plot Size:	**4m x 12m**				
Keywords:	**Common sowthistle, knockdown, fallow**				

A fallow paddock with uniform populations of both seedling and advanced common sowthistle was selected in mid-November and sprayed in early December 2021. Cumulative rainfall of >220 mm was received in the 2 weeks between site selection and trial establishment. This provided sufficient soil moisture for the grower to plant a late plant sorghum crop.

The Group 14 (G) herbicides evaluated in this trial (Sharpen, Valor and Voraxor) all have use patterns that permit use shortly prior to sorghum planting. This allowed an assessment of weed efficacy and also an evaluation of sorghum crop safety.

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Pest Scientific Name			*Sonchus oleraceus*			
Pest Name			Common Sowthistle			
Crop Name						Sorghum
Description			Cohort 1	Cohort 2	Regrowing	
Assessment Date			15/12/2021	15/12/2021	28/01/2022	28/01/2022
Assessment Type			BURNDOWN	BURNDOWN	COUNT	EMERGENCE
Assessment Unit			%	%	/m²	/m²
Assessment Area			Plot	Plot	10 m x 1 m	4 m row
Treatment-Evaluation Interval			7 DAA	7 DAA	51 DAA	51 DAA/ 43 DAP
Trt No.	**Treatment**	**Product Rate**				
1	Biffo	3750ml/ha	97-	100-	0.00-	6.4-
2	Biffo	5000ml/ha	95-	99-	0.05-	6.4-
3	Biffo	10000ml/ha	98-	100-	0.00-	6.3-
4	Biffo Hasten	3750ml/ha 1% v/v	95-	100-	0.00-	6.9-
6	Biffo Valor Hasten	3750ml/ha 30g/ha 1% v/v	94-	100-	0.00-	6.6-
7	Biffo Valor Hasten	5000ml/ha 30g/ha 1% v/v	99-	100-	0.00-	6.2-
8	Biffo Sharpen Hasten	3750ml/ha 26g/ha 1% v/v	98-	100-	0.00-	5.8-
9	Biffo Sharpen Hasten	5000ml/ha 26g/ha 1% v/v	100-	100-	0.00-	6.8-
10	Biffo Voraxor Hasten	3750ml/ha 100ml/ha 1% v/v	100-	100-	0.00-	6.5-
11	Biffo Voraxor Hasten	5000ml/ha 100ml/ha 1% v/v	100-	100-	0.00-	6.4-
12	Sharpen Hasten	26g/ha 1% v/v	96-	99-	0.00-	6.4-
		LSD P=.05	nsd	nsd	nsd	nsd
		Treatment Prob.(F)=	0.1452	0.6611	0.5436	0.3007

NB Application problems with Treatment 5 (Biffo 5000 mL/ha + Hasten 1%). Data excluded

Means followed by same letter or symbol do not significantly differ (P=.05, LSD).
Mean comparisons performed only when AOV Treatment P (F) is significant at mean comparison OSL.
nsd= no significant difference

Knockdown Control of Common Sowthistle in Fallow

Trial ID: LB2123 **Location:** Bongeen **Trial Year:** 2021

Pest Scientific Name Pest Name			*Hibiscus trionum* Bladder Ketmia	*Neptunia gracilis* Native Sensitive Plant	*Rhynchosia minima* Rhynchosia
Assessment Date Assessment Type Assessment Unit Treatment-Evaluation Interval			15/12/2021 BURNDOWN % 7 DAA	15/12/2021 BURNDOWN % 7 DAA	15/12/2021 BURNDOWN % 7 DAA
Trt No.	Treatment	Product Rate			
1	Biffo	3750ml/ha	90cd	98a	90a
2	Biffo	5000ml/ha	94abc	100a	93a
3	Biffo	10000ml/ha	94abc	100a	95a
4	Biffo Hasten	3750ml/ha 1% v/v	93bcd	98a	90a
6	Biffo Valor Hasten	3750ml/ha 30g/ha 1% v/v	95abc	99a	83a
7	Biffo Valor Hasten	5000ml/ha 30g/ha 1% v/v	96ab	100a	94a
8	Biffo Sharpen Hasten	3750ml/ha 26g/ha 1% v/v	98ab	100a	93a
9	Biffo Sharpen Hasten	5000ml/ha 26g/ha 1% v/v	99a	100a	94a
10	Biffo Voraxor Hasten	3750ml/ha 100ml/ha 1% v/v	99a	100a	87a
11	Biffo Voraxor Hasten	5000ml/ha 100ml/ha 1% v/v	99a	100a	96a
12	Sharpen Hasten	26g/ha 1% v/v	94abc	95b	10c
		LSD P=.05	5.4	2.9	17.0
		Treatment Prob.(F)=	0.0021	0.0034	0.0001

NB Application problems with Treatment 5 (Biffo 5000 mL/ha + Hasten 1%). Data excluded

Assessment Type
BURNDOWN = % Burndown/brown out

DAA = Days after Application
DAP = Days after Planting

Knockdown Control of Common Sowthistle in Fallow

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Conclusions:

This trial was established to evaluate the effectiveness of three Group 14 herbicides as mixing partners with glufosinate for the control of common sowthistle. Treatments were applied in early December to a common sowthistle population of ~1 weed/m^2, with ~25% stubble cover from the previous sorghum crop. There were two distinct cohorts of common sowthistle; small rosettes (~3-6 leaf and ~5 cm diameter) and advanced stages with seed heads (~30 cm diameter, ~50 cm height). Bladder ketmia, Rhynchosia and the native sensitive plant were also present. The site received ~ 14 mm of rainfall in the 2 days following treatment application. Sorghum was planted across the site at 8 days after application (8 DAA).

A visual burndown assessment of common sowthistle was conducted at 7 DAA. All treatments provided 99-100% burndown of the rosette growth stage with 94-100% burndown of the advanced sowthistle cohort. There was no significant difference between any treatment. An assessment of the number of regrowing common sowthistle was made at 51 DAA. The site received ~84 mm of rainfall between the two assessment timings. Excellent levels of control were obtained from all treatments on both growth stages of common sowthistle with no significant difference between treatments.

Burndown assessment of the other weeds was also conducted at 7 DAA. Biffo alone provided 90-94% burndown of bladder ketmia, 98-100% of native sensitive plant and 90-95% of Rhynchosia. There was no significant impact from the addition of Valor to either rate of Biffo on any of the weeds present. The addition of either Sharpen or Voraxor to Biffo 3750 mL/ha significantly increased burndown of bladder ketmia but with no significant benefit on native sensitive plant or Rhynchosia. Sharpen 26 g/ha alone provided equivalent burndown ratings to Biffo 5000 mL/ha on bladder ketmia (94% burndown) but was significantly poorer on both native sensitive plant (95% burndown) and Rhynchosia (10% burndown). No regrowth was apparent for any of these other weeds at 51 DAA.

Assessment at 51 DAA (43 days after planting) showed no difference in sorghum plant stand between any treatment.

In this situation, all rates of Biffo alone provided excellent levels of control of both seedling and advanced common sowthistle growth stages. The trial was unable to demonstrate any improvement in common sowthistle burndown from the addition of the Group 14 herbicides but certainly no antagonism was evident. Significant increases in level of burndown at 7 DAA were apparent when either Sharpen or Voraxor were tank mixed with Biffo at 3750 mL/ha on bladder ketmia. All treatments were safe to sorghum.

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Application Description	
Application Date	8/12/2021
Application Start Time	10:15 AM
Application Stop Time	12:15 PM
Application Method	SPRAY
Application Timing	Early Post-emergent
Application Placement	FOLIAR
Air Temperature Start, Stop	27.6, 28.9 C
% Relative Humidity Start, Stop	57.1, 57.8
Wind Velocity & Direction Start	2.3 km/h, SE
Wind Velocity & Direction Stop	2.1 km/h, SE
Soil Moisture	Slightly Wet
% Cloud Cover	40
Next Moisture Occurred On	9/12/2021

Application Equipment	
Application Equipment:	Polaris
Equipment Type:	BOOM
Operation Pressure:	300 kPa
Nozzle Type:	AIXR
Nozzle Size:	110015
Nozzle Spacing:	50 cm
Boom Length:	4 m
Boom Height:	60 cm
Ground Speed:	7.2 km/h
Application Amount:	100 L/ha

Pest Stage at Application	
Pest 1:	*Sonchus oleraceus* Common Sowthistle
Stage Majority, %	GS79 50%
Stage Minimum, %	GS13 10%
Stage Maximum, %	GS79 50%
Diameter Average	15 cm
Height Average	50 cm
Density Average	0.7/ m^2
Pest 2:	*Hibiscus trionum* Bladder Ketmia
Stage Majority, %	GS24 30%
Stage Minimum, %	GS10 10%
Stage Maximum, %	GS25 30%
Diameter Average	10 cm
Height Average	10 cm
Density Average	0.3 /m^2

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Pest Stage at Application	
Pest 3:	***Rhynchosia minima*** **Rhynchosia**
Stage Majority, Percent	GS14 30%
Stage Minimum, Percent	GS11 10%
Stage Maximum, Percent	GS60 10%
Diameter Average	10 cm
Height Average	5 cm
Density Average	2.1 /m²
Pest 4:	***Neptunia gracilis*** **Native Sensitive Plant**
Stage Majority, Percent	GS31 30%
Stage Minimum, Percent	GS11 10%
Stage Maximum, Percent	GS33 30%
Diameter Average	8 cm
Height Average	5 cm
Density Average	0.3 /m²

Rainfall:

Closest Weather Station:	SILO grid point -27.65, 151.40
Distance:	1.2 km

Date	Amount	Unit	
1/12/2021	77.4	mm	
2/12/2021	6.6	mm	
5/12/2021	4.4	mm	
6/12/2021	3	mm	
8/12/2021	0.3	mm	Application
9/12/2021	5.9	mm	
10/12/2021	8	mm	
15/12/2021	-		Assessment 1
16/12/2021	-		Planting
18/12/2021	10.5	mm	
19/12/2021	0.3	mm	
23/12/2021	18.9	mm	
24/12/2021	3.1	mm	
25/12/2021	6.3	mm	
26/12/2021	8.9	mm	
1/01/2022	1.4	mm	
6/01/2022	0.2	mm	
8/01/2022	0.1	mm	
16/01/2022	0.4	mm	
19/01/2022	13.7	mm	
20/01/2022	0.9	mm	
21/01/2022	0.1	mm	
26/01/2022	6.2	mm	
27/01/2022	13	mm	
28/01/2022	0.1	mm	Assessment 2