1987

Brome grass control in wheat

G. S. Gill

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TRIAL TITLE: Brome grass control in wheat

TRIAL NUMBER: 87GE29

OFFICERS: G.S. Gill and R.L. Thomas

LOCATION: East Chapman Research Station

CROP: Gutha, Blade sown at 50 kg/ha

DATE SOWN: 19/6/87

SOIL TYPE: Eradu sand

BLANKET TREATMENT: 75 kg DAP

GROUND PREPARATION: Nil

EXPERIMENTAL DESIGN: RBD

PLOT SIZE: 3 m x 20 m

SPRAYING DETAILS

SPRAYING DATE:	(i)	19/6/87	TIME:	(i)	1.30 p.m. - 3.00 p.m.
	(ii)	9/7/87		(ii)	2.00 p.m. - 3.30 p.m.
	(iii)	22/7/87		(iii)	4.30 p.m. - 5.30 p.m.

EQUIPMENT: Honda

NOZZLE TYPE:	(i)	110015	PRESSURE:	(i)	150 kPa
	(ii)	80015LP		(ii)	100 kPa
	(iii)	80015		(iii)	125 kPa
			VOLUME:	(i)	56.0 L/ha
				(ii)	66.3 L/ha
				(iii)	78.0 L/ha

WIND SPEED:	(i)	8-10 kph	DIRECTION:	(i)	NW
	(ii)	5-10 kph		(ii)	South
	(iii)	0-5 kph		(iii)	NW

TEMPERATURE:		DRY BULB	WET BULB	RH
	(i)	17.5°C	15°C	
	(ii)	17.0°C	12.5°C	
	(iii)	17.3°C	15°C	

MOISTURE:		SURFACE	DEPTH
	(i)	Moist	Moist
	(ii)	Dry	Moist
	(iii)	Moist	Moist

CHEMICAL: See Table 1

ADDITIVES:

CROP GROWTH STAGE:	(i)	IBS	WEED GROWTH STAGE:	(i)	-
	(ii)	Z12		(ii)	Z11-12
	(iii)	Z13-14		(iii)	Z12-14

Table 1. The effect of some herbicide treatments on wheat and brome grass density, number of fertilie wheat ears and grain yield

Treatment	Crop density (m^{-2})		Weed density (m^{-2})		Wheat ears (m^{-2})		Grain yield (t/ha)	
	Gutha	Blade	Gutha	Blade	Gutha	Blade	Gutha	Blade
Pendimethalin 500 g/ha IBS	97	97	41 (6.4)	40 (6.3)	165	205	0.80	1.12
Pendimethalin 750 g/ha IBS	99	97	14 (3.8)	14 (3.8)	179	205	0.94	1.35
Metribuzin 150 g/ha IBS	90	127	40 (6.2)	24 (4.9)	172	179	0.77	1.11
Metribuzin 150 g/ha Z12	58	70	82 (9.1)	85 (9.2)	136	152	0.48	0.81
Metribuzin 250 g/ha Z12	58	82	48 (7.0)	64 (8.0)	136	178	0.40	0.87
Metribuzin 350 g/ha Z12	30	63	11 (3.4)	38 (6.2)	77	167	0.14	0.88
Metribuzin 150 g/ha Z14	61	73	88 (9.4)	87 (9.3)	147	160	0.47	0.75
Metribuzin 250 g/ha Z14	55	83	54 (7.4)	50 (6.8)	137	173	0.34	0.87
Metribuzin 350 g/ha Z14	41	67	18 (3.9)	29 (5.3)	93	151	0.20	0.82
Metribuzin 450 g/ha Z14	21	51	9 (2.9)	8 (2.8)	48	118	0.05	0.50
Pendimethalin 250 g/ha + Metribuzin 150 g/ha IBS	108	113	20 (4.5)	22 (4.7)	189	179	0.82	1.22
Bladex 500 ml/ha + Metribuzin 200 g/ha Z12	36	52	54 (7.4)	47 (6.8)	96	172	0.18	0.59
Weed-free control	94	117	0 (0.7)	1 (1.1)	201	207	0.97	1.47
Weedy control	83	104	155 (12.5)	117 (10.7)	157	179	0.56	0.76
lsd (P = 0.05)	17		(1.8)		35		0.22	

IBS = incorporated by sowing; Z12 or Z14 = post-emergence at 2 or 4 leaf stage of the crop; weed density data were subjected to square-root transformation ($\sqrt{X} + 0.5$).

Metribuzin is recommended for the control of Bromus spp. in cereals in the United States of America (USA) and Europe. However, metribuzin is also known for its crop toxicity problems and it is therefore important to restrict its use to varieties with superior herbicide tolerance.

Out of the germplasm screened at Wongan Hills, cv. Blade was found to have good tolerance to metribuzin. Therefore, it was decided to include this variety in trials aimed at achieving selective control of brome grass in wheat.

At East Chapman (yellow sand) cv. Blade outyielded Gutha under weed-free as well as weedy conditions, thus lending support to the WADA decision to recommend this variety for 1988 sowings in the area (Table 1). Metribuzin incorporated into the soil by the sowing operation achieved better weed control and higher grain yield than equivalent rate (150 g/ha) of the herbicide at Z12 or Z14 stage of the crop. Gutha showed considerably lower tolerance to metribuzin than Blade (Table 1). Pendimethalin (Stomp®) on its own or in tank-mix with metribuzin, was not only effective in controlling brome grass but was also safe on both varieties. The mixture of Bladex® and metribuzin, a recommendation for brome control in USA, caused unacceptable damage to both varieties.

TRIAL TITLE: Competition between wheat and mixtures of brome grass and doublegees

TRIAL NUMBER: 87GE30

OFFICERS: G.S. Gill and R.L. Thomas

LOCATION: East Chapman Research Station

CROP: Wheat cv. Gutha sown at 50 kg/ha

DATE SOWN: 20/6/87

SOIL TYPE: Erradu sand

BLANKET TREATMENT: 75 kg DAP

GROUND PREPARATION: Nil

EXPERIMENTAL DESIGN: Randomized block design

PLOT SIZE: 3 m x 20 m

SPRAYING DETAILS

SPRAYING DATE:	(1)	23/7/87 (Z13-Z14)	TIME:	(1)	5-6 p.m.
	(2)	6/8/87 (Z16-22)		(2)	1-2 p.m.

EQUIPMENT: Honda

NOZZLE TYPE: 80015LP

PRESSURE: 125 kPa

VOLUME: 78 L/ha

WIND SPEED:	(1)	0-5 km/h	DIRECTION:	(1)	W-NW
	(2)	0-10 km/h		(2)	N

TEMPERATURE:	DRY BULB	WET BULB	RH
(1)	16°C	13.5°C	
(2)	21.5°C	14°C	

MOISTURE:	SURFACE	DEPTH
(1)	Moist	Moist
(2)	Dry	Moist

CHEMICAL: Barrel®

ADDITIVES:

CROP GROWTH STAGE: See Table 4

WEED GROWTH STAGE:

Table 2. The effect of competition between wheat, brome grass (BR) and doublegees (DG) on the shoot dry matter of the three species and the grain yield of wheat

Treatment	BR/m^2	DG/m^2	Shoot DM g/m^2			Grain yield (t/ha)
			WH	BR	DG	
1. BR0* + DG0 - no control	0 (0.70)	0	180.5	0.0 (0.0)	0.0 (0.0)	1.26
2. BR50 + DG0 - no control	45 (6.65)	0	152.7	17.5 (1.26)	0.0 (0.0)	1.00
3. BR50 + DG50 - no control	58 (7.65)	14	129.6	16.5 (1.18)	23.0 (1.14)	0.91
4. BR50 + DG50 - Barrel at Z15	39 (6.18)	0	140.7	19.7 (1.28)	0.1 (0.03)	1.00
5. BR100 + DG0 - no control	67 (8.15)	0	131.9	28.6 (1.46)	0.0 (0.0)	0.86
6. BR100 + DG50 - no control	86 (9.25)	17	121.0	27.9 (1.44)	15.7 (1.19)	0.86
7. BR100 + DG50 - Barrel at Z15	110 (10.40)	0	95.1	34.8 (1.54)	0.0 (0.0)	0.74
8. BR200 + DG0 - no control	156 (12.45)	0	82.6	53.3 (1.71)	0.0 (0.0)	0.60
9. BR200 + DG50 - no control	140 (11.85)	13	99.9	43.7 (1.62)	6.9 (0.84)	0.75
10. BR200 + DG50 - Barrel at Z15	119 (10.80)	0	107.2	35.9 (1.53)	0.0 (0.0)	0.74
11. BR0 + DG50 - no control	0 (0.70)	21	133.3	0.0 (0.08)	32.9 (1.52)	1.03
12. BR0 + DG50 - Barrel at Z15	0 (0.70)	0	153.0	0.0 (0.01)	0.0 (0.0)	1.23
lsd (P = 0.05)	(0.16)	-	30.1	(0.23)	(0.18)	0.17

* Numbers with BR and DG prefixes denote plants/m^2. Figures in parentheses are square root transformation of brome grass density and log transformation of brome grass and doublegee shoot dry matter.

Comments

Performance of Barrel was unaffected by the delay in spraying time from Z13 to Z15. Therefore, for the sake of brevity, results are presented only for Z15 application.

Due to the environmental conditions prevalent at the time, densities of doublegees obtained were much lower than expected.

Brome grass was the stronger competitor in the present study and with its increasing density, the proportion of doublegees in the shoot biomass decreased markedly. Consequently removal of doublegees from the mixtures did not improve grain yield of wheat.

TRIAL TITLE: Brome grass control in wheat

TRIAL NUMBER: 87WH9

OFFICERS: G.S. Gill and R.L. Thomas

LOCATION: Wongan Hills Research Station

CROP: Blade, Kulin
Sowing rate: 45 kg/ha

DATE SOWN: 24/6/87

SOIL TYPE: Sandy loam

BLANKET TREATMENT: 50 kg/ha DAP

GROUND PREPARATION: Spray seeded before seeding

EXPERIMENTAL DESIGN:

PLOT SIZE: 3 m x 20 m

SPRAYING DETAILS

SPRAYING DATE:	(i)	23/6/87	TIME:	(i)	5 p.m. - 6 p.m.
	(ii)	14/6/87		(ii)	12.00 p.m. - 1.00 p.m.
	(iii)	27/7/87		(iii)	5.30 p.m. - 6.15 p.m.

EQUIPMENT: Honda

NOZZLE TYPE:	(i)	11015	PRESSURE:	(i)	160 kPa
	(ii)	80015LP		(ii)	125 kPa
	(iii)	11015LP		(iii)	125 kPa
			VOLUME:	(i)	58 L/ha
				(ii)	77.6 L/ha
				(iii)	77 L/ha

WIND SPEED:	(i)	0-5 kph	DIRECTION:	(i)	SW
	(ii)	5-15 kph		(ii)	SW
	(iii)	Nil		(iii)	Nil

TEMPERATURE:	DRY BULB		WET BULB		RH
	(i)	13.5°C	(i)	12.0°C	
	(ii)	15.5°C	(ii)	12.0°C	
	(iii)	16.0°C	(iii)	14.0°C	

MOISTURE:	SURFACE		DEPTH	
	(i)	Moist	(i)	Moist
	(ii)	Moist	(ii)	Moist
	(iii)	Moist	(iii)	Moist

CHEMICAL:

ADDITIVES:

CROP GROWTH STAGE:	(i)	IBS	WEED GROWTH STAGE:	(i)	-
	(ii)	Z12		(ii)	Z12
	(iii)	Z14		(iii)	Z12-14

Table 3. The effect of some herbicide treatments on wheat and brome grass density, number of fertile wheat ears and grain yield

Treatment	Crop density (m^{-2})		Weed density (m^{-2})		Wheat ears (m^{-2})		Grain yield (t/ha)	
	Kulin	Blade	Kulin	Blade	Kulin	Blade	Kulin	Blade
Pendimethalin 500 g/ha IBS	92	105	54 (7.37)	59 (7.70)	141	174	1.53	1.42
Pendimethalin 750 g/ha IBS	105	101	29 (5.33)	25 (5.00)	150	155	1.53	1.58
Metribuzin 150 g/ha IBS	111	101	39 (6.10)	31 (5.60)	151	173	1.38	1.74
Metribuzin 150 g/ha Z12	75	83	163 (12.77)	134 (11.50)	114	136	0.81	1.06
Metribuzin 250 g/ha Z12	42	78	9 (2.90)	21 (4.27)	97	133	0.54	1.33
Metribuzin 350 g/ha Z12	13	82	2 (1.33)	3 (1.53)	26	138	0.16	1.42
Metribuzin 150 g/ha Z14	63	89	33 (5.37)	19 (4.30)	116	160	0.83	1.61
Metribuzin 250 g/ha Z14	15	80	1 (0.90)	1 (1.23)	15	136	0.07	0.99
Metribuzin 350 g/ha Z14	12	63	1 (0.90)	1 (0.90)	8	70	0.01	0.42
Metribuzin 450 g/ha Z14	0	41	0 (0.70)	0 (0.70)	0	22	0.00	0.09
Pendimethalin 250 g/ha + Metribuzin 150 g/ha IBS	103	105	16 (3.97)	19 (4.27)	175	179	1.65	1.87
Bladex 500 ml/ha + Metribuzin 200 g/ha Z12	36	78	31 (5.13)	26 (4.90)	73	124	0.40	1.13
Weed-free control	107	88	4 (2.00)	3 (1.73)	186	179	1.91	1.79
Weedy control	94	93	322 (17.97)	242 (15.37)	123	112	0.74	0.85
lsd (P = 0.05)	19		(2.11)		31		0.3	

IBS = incorporated by sowing; Z12 or Z14 = post-emergence at 2 or 4 leaf stage of the crop; weed density data were subjected to square-root transformation ($\sqrt{X + 0.5}$) and are presented in parentheses.

Comments

It is encouraging to note that the performance of different herbicide treatments in this experiment was consistent with the results obtained at East Chapman.

Metribuzin at 150 g/ha, incorporated into the soil by the sowing operation, performed much better than equivalent post emergence treatments (Z12 and Z14). Curiously, metribuzin 150 g/ha gave better weed control when applied at Z14 than at Z12. This could have been due to the low intensity long duration rainfall received soon after Z14 application which might have increased root uptake of the herbicide.

Pendimethalin was safe on both varieties but failed to provide a clean crop although yield responses were quite marked. Tank-mix of pendimethalin and metribuzin was safe on both varieties, gave good weed control and was the second highest yielding treatment.

Kulin showed considerably lower tolerance to metribuzin than Blade.