

## TRIAL SUMMARIES

### Lentil, Herbicide Tolerance (Group B), MRZ Wimmera (Horsham), Victoria

#### Aim

To evaluate the tolerance of PBA Hurricane XT to post sowing pre-emergent and in-crop application timings of Group B herbicides in comparison with PBA Jumbo2.

#### Treatments

Varieties: PBA Hurricane XT and PBA Jumbo2

Herbicide Treatments: See Table 1

#### Other Site Details

<b>Sowing Date</b>	21 May
<b>Planting Density</b>	120
<b>Stubble height (cm)</b>	Standing (20)
<b>Row Spacing (cm)</b>	36
<b>Fertiliser (kg/ha)<sup>1</sup></b>	80

1. MAP (9.2, 20.2, 0, 2.7) + Zn (2.5)

#### Results and Interpretation

**Key Messages:** All results need to be treated with caution, due the dry conditions, frosts and weed burden at the trial site. Similar to previous research PBA Hurricane XT showed tolerance to imidazolinone herbicides and improved tolerance compared with PBA Jumbo2 to sulfonylureas and sulfonamide herbicides. Flowering applications, as expected generally had the most significant reduction on grain yield. The improved weed control in several of the herbicide treatments meant that significant yield gains were commonly observed in the herbicide treatments.

- **Establishment and Plant Growth:** Establishment was very slow and variable due to the dry start to the season. PBA Hurricane XT generally had slightly higher establishment than PBA Jumbo2 (approximately 5 plants/m<sup>2</sup>), however there was no impact of the post sowing pre-emergent herbicide applications on establishment (data not shown). This may be due to the extremely dry conditions following sowing meaning herbicides were not leaching into the soil layers of the germinating seedling. Growth throughout the season was slow and impacted by dry seasonal conditions and several frost events during vegetative and reproductive growth stages. The site also had a significant weed burden which impacted on results.
- **Herbicide Damage:** Visual herbicide damage score was recorded about 21 weeks after sowing following all herbicide applications. The visual damage symptoms from the Group B herbicide treatments included stunting of growth, chlorosis and reddening, curling of leaves and plant death. The conventional variety PBA Jumbo2 showed significant visual damage from all the herbicide treatments except for 'SU2' applied PSPE and flumetsulam applied at 8 node stage (Table 1). The most severe herbicide damage was caused by in-crop application of 'SU1', 'SU2', 'Imi1' at flowering (Table 1). In contrast, the imidazolinone tolerant variety PBA Hurricane XT showed tolerance to all the PSPE and in-crop application treatments except 'SU1' and 'SU2' applied at flowering, which caused severe flower loss (Table 1).

**Table 1.** The effect of various Group B herbicide application timings on visual herbicide damage scores (0 – no damage, 100 – complete plant death) and biomass at flowering of lentil varieties at Horsham, Victoria in 2018.

Active ingredient (gai/ha)	Application Timing	Herbicide Damage (0-100)		Biomass (t/ha)	
		PBA Hurricane XT	PBA Jumbo2	PBA Hurricane XT	PBA Jumbo2
Nil (0)		0	0	1.81	1.90
<b>Sulfonylureas</b>					
'SU1'	PSPE	14	97	1.84	0.83
	4 node	13	80	2.00	0.97
	8 node	13	75	1.99	1.07
	Flowering	92	97	1.63	1.07
'SU2'	PSPE	18	9	2.21	1.94
	4 node	8	34	2.30	1.90
	8 node	11	44	2.43	1.61
	Flowering	75	79	2.01	1.72
<b>Imidazolinones</b>					
'Imi1'	PSPE	3	79	2.35	1.31
	4 node	5	59	2.45	1.49
	8 node	4	31	2.59	1.88
	Flowering	8	82	2.51	1.56
'Imi2'	PSPE	0	51	2.89	1.56
	4 node	1	16	2.11	1.54
	8 node	4	16	2.28	1.95
	Flowering	3	11	2.49	2.09
<b>Sulfonamide</b>					
Flumetsulam (20)	PSPE	1	60	2.34	1.27
	4 node	9	19	2.21	1.84
	8 node	1	4	2.51	2.10
	Flowering	10	23	2.24	2.32
<b>LSD<sub>ChemTrt</sub> (P&lt;0.05)</b>		<b>13</b>		<b>0.41</b>	
<b>LSD<sub>Var</sub> (P&lt;0.05)</b>		<b>3</b>		<b>0.11</b>	
<b>LSD<sub>ChemTrt*Var</sub> (P&lt;0.05)</b>		<b>16</b>		<b>0.49</b>	

- Biomass at Maturity:** In PBA Hurricane XT, biomass at maturity was significantly higher in some of the herbicide treatments than in the control (Table 1). This is most likely due to higher residual weed infestation in the control plots, competing for moisture and nutrients. In contrast, in PBA Jumbo2, no treatments resulted in a biomass increase and several had a biomass decrease relative to the control. All application timings of 'SU1' and the post sowing, pre-emergent application of 'Imi1' and flumetsulam caused significant biomass reduction (Table 1). Overall the relative biomass response was not as significant as what could be expected in a 'normal' season. Previous experiments have shown complete biomass loss for intolerant varieties for some of the treatments tested here.
- Grain Yield and Harvest Index:** Grain yields of the varieties were very low due to dry seasonal conditions and several frost events during the vegetative and reproductive growth stages, being 0.33 t/ha for PBA Hurricane XT and 0.38 t/ha for PBA Jumbo2 in the nil treatment (Table 2). Hence, results need to be treated with caution. Similar to trends observed for biomass, the grain yield of PBA Hurricane XT in the nil treatment was 31-40% less than in treatments where 'Imi1' was applied PSPE, and 'Imi2' was applied at PSPE, 4 node and 8 node stages (Table 2). These results highlight the benefits of improved weed control options associated with herbicide tolerant varieties. Application of 'SU1' at flowering caused a 100% yield loss in PBA Hurricane XT (Table 2). Similarly, application of 'SU2' at flowering caused a significant yield reduction. In comparison, PBA Jumbo2 incurred significant yield loss from PSPE and in-crop application of 'SU1' and 'Imi1' (Table 2). All herbicides caused the highest yield loss when applied at

flowering (Table 2). For example, application of 'SU1', 'SU2' and 'Imi1' at flowering caused a 100% yield loss. Similarly, application of flumetsulam and 'Imi2' at flowering reduced grain yield by 40% and 63%, respectively in PBA Jumbo2 (Table 2).

- Harvest index was generally very low, less than 0.25, due to flower losses caused by dry seasonal conditions and repeated reproductive frost events. Severe flower loss and harvest index reduction was caused by 'SU1' applied at flowering in PBA Hurricane XT, and all herbicide treatments applied at flowering in PBA Jumbo2.

**Table 2.** The effect of various Group B herbicide rates and application timings on grain yield (t/ha) and harvest index of lentil varieties at Horsham, Victoria in 2018.

Active ingredient (g/ha)	Application Timing	Grain Yield (t/ha)		Harvest Index	
		PBA Hurricane XT	PBA Jumbo2	PBA Hurricane XT	PBA Jumbo2
Nil (0)		0.33	0.38	0.18	0.20
<b>Sulfonylureas</b>					
'SU1'	PSPE	0.38	0.14	0.19	0.14
	4 node	0.39	0.14	0.18	0.11
	8 node	0.26	0.18	0.13	0.14
	Flowering	0.00	0.00	0.00	0.00
'SU2'	PSPE	0.34	0.40	0.14	0.19
	4 node	0.38	0.26	0.17	0.16
	8 node	0.41	0.28	0.17	0.15
	Flowering	0.22	0.00	0.13	0.03
<b>Imidazolinones</b>					
'Imi1'	PSPE	0.48	0.22	0.20	0.18
	4 node	0.38	0.21	0.16	0.15
	8 node	0.46	0.32	0.18	0.17
	Flowering	0.38	0.01	0.16	0.02
'Imi2'	PSPE	0.55	0.29	0.20	0.18
	4 node	0.52	0.35	0.25	0.20
	8 node	0.48	0.32	0.22	0.17
	Flowering	0.39	0.17	0.16	0.09
<b>Sulfonamide</b>					
Flumetsulam (20)	PSPE	0.46	0.28	0.20	0.23
	4 node	0.36	0.33	0.18	0.19
	8 node	0.42	0.46	0.18	0.22
	Flowering	0.40	0.23	0.18	0.10
<b>LSD<sub>ChemTrt</sub> (P&lt;0.05)</b>		<b>0.11</b>		<b>0.05</b>	
<b>LSD<sub>Var</sub> (P&lt;0.05)</b>		<b>0.04</b>		<b>0.01</b>	
<b>LSD<sub>ChemTrt*Var</sub> (P&lt;0.05)</b>		<b>0.14</b>		<b>0.06</b>	