Lentil, Herbicide Tolerance (Group C application timing), Mallee (Pinnaroo), South Australia.

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Aim
To evaluate the impact of rate and application timing on tolerance of PBA Hurricane XT to a range of Group C herbicide on deep sandy soils in the Mallee.

Treatments
Herbicide treatments: Four herbicides were applied at 3 rates to PBA Hurricane XT lentils grown on a deep sandy soil (sand dune) at Pinnaroo (Table 1). Each treatment was applied either by Incorporated by Sowing (IBS) or Post Sowing Pre-Emergent (PSPE). Nil herbicide treatments were included in the factorial trial design.

Table 1. Group C herbicides and rates applied

Herbicide (concentration of the ai)	Low Rate	Moderate Rate	High Rate
Diuron (900 g/kg)	400 g/ha	800 g/ha	1600 g/ha
Simazine (900 g/kg)	400 g/ha	800 g/ha	1600 g/ha
Terbuthylazine (875 g/kg)	425 g/ha	850 g/ha	1700 g/ha
Metribuzin (750 g/kg)	120 g/ha	180 g/ha	280 g/ha

***Some of the herbicide treatments in this research contain unregistered herbicides, application rates and timings and were undertaken for experimental purposes only. The results within this document do not constitute a recommendation for that particular use by the author or author's organization.*

Table 2. Other Site Details

	Pinnaroo – Sand
Sowing Date	25 April
Plant Density (plants/m^2)	120
Stubble height (cm)	5
Row Spacing (cm)	28
Fertiliser (kg/ha)[1]	50

[1] Granulock Z (N 11, P 21.8, S 4, Zn 1)

Results and Interpretation

- Key messages: The application of all Group C herbicide products decreased grain yields of lentils grown on the deep sand soil at Pinnaroo. Application IBS reduced crop damage and had lower levels of grain yield loss for all chemicals compared with PSPE.

- Establishment and Plant Growth: There was a significant detrimental impact of all group C herbicides on lentil establishment (Figure 1). There was also a significant decline in lentil establishment due to increasing rates of herbicide applications; Nil treatments having the highest lentil population (73 plants/m^2) and high herbicide rates the lowest establishment (41 plants/m^2). Applying these herbicides by IBS rather than PSPE improved establishment by about 20%.

- Herbicide damage: Herbicide damage was assessed in July using a 0-100 scoring scale. There was significant damage from all herbicide products even at low rates of application (Figure 2). Herbicide damage was less when herbicides were applied using the IBS method compared with the PSPE strategy.

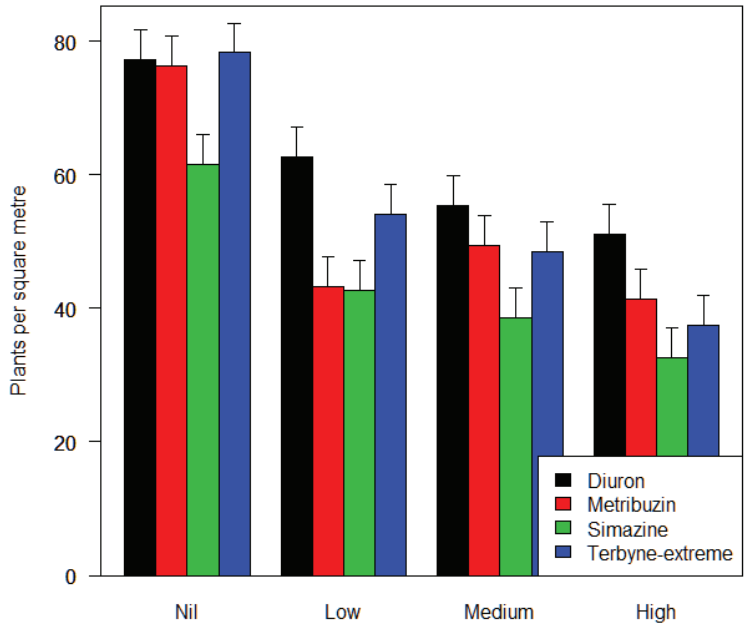

Figure 1. Effect of group C herbicides and application rates on lentil establishment. Error bars represent standard errors.

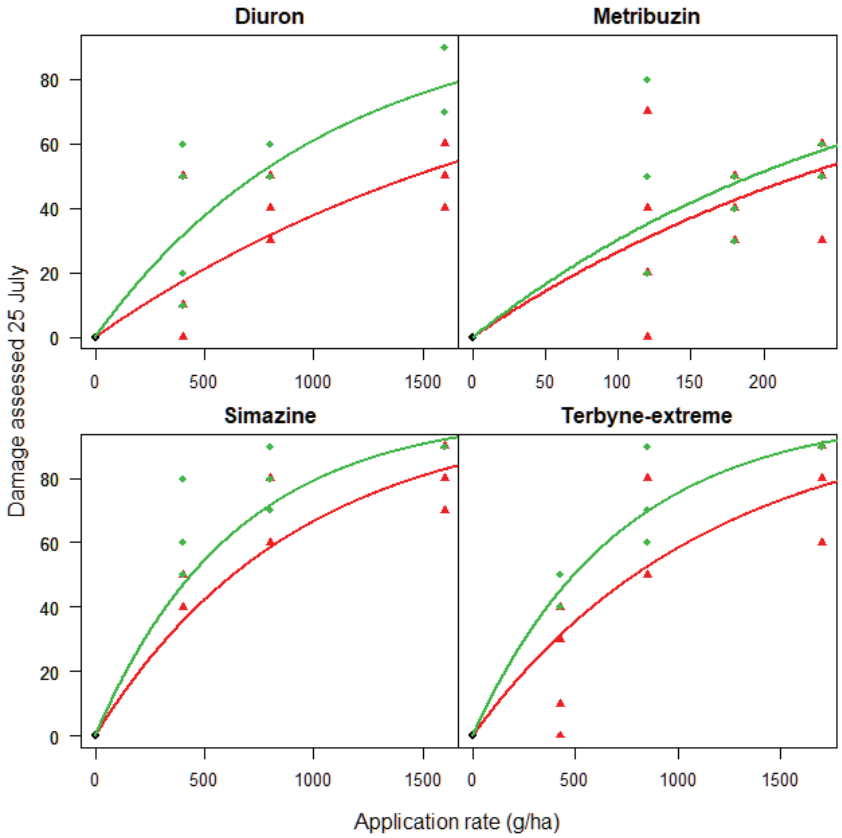

Figure 2. Effect of herbicide type, application rate and application method on damage assessed 25 July 2019. Green diamonds: PSPE and Red triangles: IBS.

- Grain yield: There were significant effects of herbicide type, application rate and application method on final grain yield. Diuron and Terbuthylazine treatments decreased grain yields with increasing dose. For instance, increasing doses of Diuron decreased grain yields by 35%, 53% and 65% and Terbuthylazine by 32%, 57% and 78% compared to the respective NIL treatments. Decrease in lentil yields following Metribuzin application was 22%, 30% and 28% lower than the NIL treatment with the increasing rates (Table 3). Lentil yield following the application of Simazine at a lower rate decreased yield by 45% whereas medium and high rates reduced yields by 56% and 60% compared to the NIL treatment (Table 3).

Application of herbicides by IBS method produced greater yields compared to PSPE application for all herbicides (Table 4). The effect of the placement method on grain yield was greatest in Terbuthylazine treatment and least in Simazine treatments.

Table 3: Effect of herbicide type and rate of application on grain yield (kg/ha)

Herbicide	Nil	Low	Medium	High
Diuron	534	349	252	188
Metribuzin	449	352	315	324
Simazine	567	311	252	224
Terbuthylazine	508	347	217	110

LSD = 95

Table 4: Effect of herbicide type and method of application on grain yield (kg/ha)

Herbicide	Diuron	Metribuzin	Simazine	Terbuthylazine
IBS	409	407	362	387
PSPE	252	313	315	205

LSD = 63

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