Demonstration of Legumes for Reliable Profitability in the Western Region - Chickpeas, Beacon

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Take Home Messages

- There were no significant differences between herbicide treatments due to the low weed burden.
- Attention to detail and good planning is essential when growing high-value legumes in the region.

Aim

To explore the agronomic options for weed control through the use of a variety of herbicides to address this constraint.

Background

The Liebe Group have identified a need to continue to demonstrate legume crops throughout the region and build on the existing momentum developed through this project. The aim of establishing new demonstration sites in 2020 was to further explore the constraints to adoption, as well as demonstrate the agronomy packages available to growers to determine if particular legumes are profitable in their farming system within a different season. Weed control was a significant constraint on chickpea crop performance in 2018/2019.

Trial Details

Trial location	Kirby Property, Beacon
Plot size & replication	36.6m x 500m x 2 replications
Soil type	Heavy red clay
Paddock rotation	2017 Barley, 2018 Barley, 2019 Fallow
Sowing date	28/04/2020
Sowing rate	100 kg/ha PBA Striker Chickpeas
Fertiliser	28/04/2020: 40 kg/ha Crop builder 14, 30 kg/ha Urea 27/06/2020: 700 g/ha SOA
Herbicides, Insecticides & Fungicides	See treatment list and 27/06/2020: 180 g/ha Clethodim, 23.4 g/ha Haloxfop, 01/08/2020: 25 g/ha Alpha-Cypermethrin

Treatments

	Treatment
1	Simazine 1.1 kg/ha + Isoxaflutole 75 g/ha PSPE (Control)
2	Isoxaflutole 75 g/ha + Terbuthylazine 750 g/ha pre-emergent
3	Terbuthylazine 1.05 kg/ha + Flumioxazin 90 g/ha pre-emergent
4	Terbuthylazine 1.05 kg/ha + Metribuzin 150 g/ha pre-emergent + Imazethapyr 35 g/ha PSPE

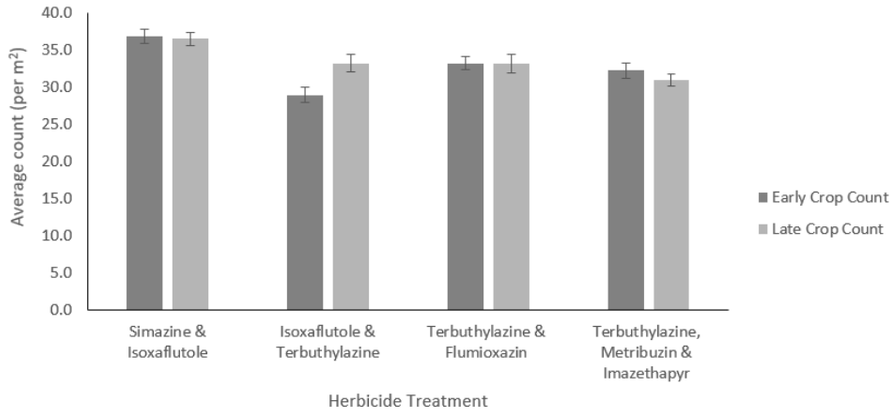
Chemical	Active
Simazine	900 g/kg Simazine
Balance	150 g/kg Isoxaflutole
Palmero TX	75 g/kg Isoxaflutole, 750 g/kg Terbuthylazine
Terbyne Xtreme	875 g/kg Terbuthylazine
Terrain	500 g/kg Flumioxazin
Metribuzin	750 g/kg Metribuzin
Spinnaker	700 g/kg Imazethapyr

Soil Composition

Depth (cm)	pH ($CaCl_2$)	Col P (mg/kg)	Col K (mg/kg)	S (mg/kg)	N (NO_3) (mg/kg)	N (NH_4) (mg/kg)	EC (ds/m)	OC (%)
0-10	5.4	19	177	12	16	3.3	0.09	0.4
10-20	5.4	10	139	7	11	<1	0.06	0.4
20-30	5.5	3	132	6	3	<1	0.04	0.3
30-40	5.9	<2	147	7	2	<1	0.05	0.1
40-50	6.7	<2	356	10	3	<1	0.08	0.1

Results

Figure 1: Early (22/06/2020) and late (07/08/2020) crop density (per m²) of PBA Striker Chickpeas in herbicide trial at



Beacon in 2020. Error bars are ± 1 S.E.

Chickpea density was not significantly different between each treatment type. It was observed that crop density was inconsistent, with a variation of more than ten plants (per m²) within plots that were treated the same. The maximum average density rate was observed from the Simazine & Isoxaflutole treatmenmt (2) applied at sowing (Figure 1), however this difference was not significant.

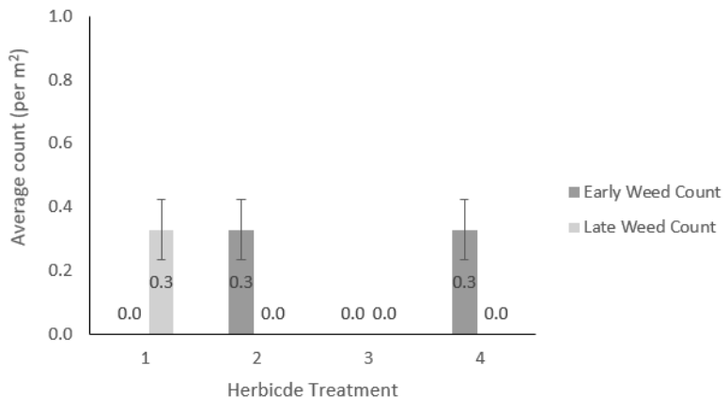


Figure 2: Early (22/06/2020) and late (07/08/2020) weed density (per m²) in PBA Striker Chickpeas in herbicide trial at Beacon in 2020. Error bars are ± 1 S.E.

Average weed density showed little variation. Weed control was observed to be extremely effective throughout the trial area, including at the fence lines. The weeds observed were summer weeds (*Argemone ochroleuca*) that were not actively growing. The low weed burden demonstrates that effective weed management in the year before a chickpea crop is possible – reducing the reliance on herbicides in the chickpea season.

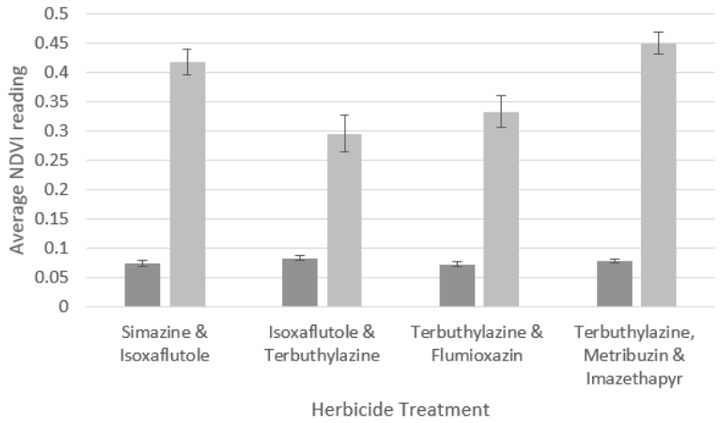


Figure 3: Early (22/06/2020) and late (07/08/2020) Normalized Difference Vegetation Index (NDVI) readings taking in PBA Striker Chickpeas in herbicide trial at Beacon in 2020. Error bars are ± 1 S.E.

The average NDVI reading across each treatment type was not significantly different (Figure 3).

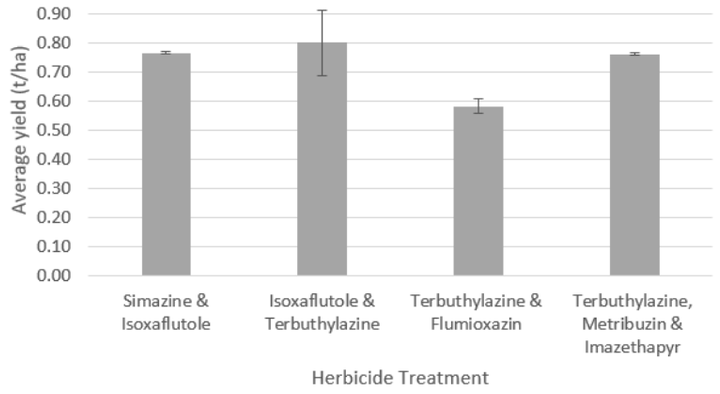


Figure 4: Average yield (t/ha) of PBA Striker chickpea in herbicide trial at Beacon in 2020. Error bars are ± 1 S.E.

The average yield of chickpea at Beacon was 730 kg/ha whilst herbicide treatments were not significantly different (Figure 4).

Comments

It appears that weed control in the previous year was highly effective in controlling weeds present, as such there were no significant differences between the weed control treatments in 2020. It should also be noted that there was a blockage at seeding, so the trial did not receive any inoculant and did not nodulate. The urea was added to ameliorate any lack of nitrogen brought about by this lack of nodulation.

In all treatments, costs exceeded income (Table 2). Differences in yield were not attributed to the herbicide treatments applied, so the slightly lower losses that arise from treatment 4 (Terbuthylazine, Metribuzin & Imazethapyr) are not seen as significant.

Acknowledgements

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Peer review

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