

## Harvest management options in chickpeas 2017

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### Key words

Chickpea, desiccation, harvest, yield

### GRDC code

NGA0004

### Call to action/take home messages

- All herbicide desiccant treatments improved the percentage leaf drop and level of stem dry down in chickpeas when compared to single application of glyphosate.
- No impact on chickpea yield from any of the treatments.
- There was no significant difference in % defective grains, protein or moisture between herbicide treatments.
- None of the alternative herbicide desiccant options showed any benefit over current registered options.

### Background

Desiccation of chickpea crops with herbicides can help growers plan a timely and efficient harvest and maximise yield and grain quality. Desiccation can also aid in evening out of areas of late maturing crops as well as provide late weed control. Commonly desiccation occurs when 70-90% of the grain is mature to prevent reduced quality to harvested grain.

The aim of this first year of work undertaken by Northern Grower Alliance (NGA) was to screen a range of desiccant options to determine their effectiveness and assess for impact on yield and grain quality.

Five small plot trial sites were conducted across a range of northern growing areas in 2017. Trials were established in commercial chickpea crops at Warra, Pittsworth, Pallamallawa, Bellata and Mullaley on either PBA Seamer<sup>®</sup> or PBA HatTrick<sup>®</sup>. This paper will present the results from registered desiccant options, however other treatments were also screened in these trials with no clear benefits apparent.

Desiccant herbicide options were applied 10-14 days before estimated commercial harvest with details in Table 1. The recommended crop stage for desiccation of chickpeas is when physiologically mature and less than 15% green pods. Do not harvest within 7 days of application.

**Table 1.** Trial site details

Trial Site	Variety	Planting date	Desiccation application	Majority crop stage at desiccation	Harvest date
Warra	PBA Seamer <sup>®</sup>	21/5/17	10/10/17	50% golden pod	14/11/17
Pittsworth	PBA Seamer <sup>®</sup>	29/5/17	20/10/17	90% golden pod	10/11/17
Pallamallawa	PBA HatTrick <sup>®</sup>	8/6/17	18/10/17	50% golden pod	1/11/17
Bellata	PBA Seamer <sup>®</sup>	10/5/17	3/11/17	50% golden pod	16/11/17
Mullaley	PBA Seamer <sup>®</sup>	26/6/17	3/11/17	90% golden pod	27/11/17

A visual assessment of crop discoloration and /or leaf drop together with stem dry down was taken at all sites approximately two weeks after application. Plots were harvested with a small plot header and yield, protein and moisture were obtained for all sites with screenings and test weight determined for three of the five trials.

## Results

### *Plant discolouration/burndown*

A visual assessment of percentage plant discolouration/burndown was conducted at four of the five sites at approximately two weeks after the desiccation application.

**Table 2.** % Plant discolouration/burndown approximately two weeks after application at Warra, Pallamallawa, Pittsworth and Mullaley

	Warra	Pallamallawa	Pittsworth	Mullaley	Mean across 4 sites
<b>Product/ha</b>					
<b>Untreated</b>	61 g	69 g	51 h	83 c	66
<b>Weedmaster® Argo® 1.1L</b>	85 f	88 ef	84 de	96 ab	88
<b>Weedmaster Argo 1.8L</b>	87 ef	99 ab	92 abc	95 ab	93
<b>Weedmaster Argo 1.1L + Ally® 5g</b>	97 ab	100 a	91 abc	98 ab	97
<b>Weedmaster Argo 1.1L + Sharpen® 34g + Hasten™ 1%</b>	94 b-e	95 b-e	94 a	93 bc	94
<b>Reglone® 2L + X-77 0.2%</b>	95 bcd	85 f	79 ef	96 ab	89
<b>P value=</b>	<0.01	<0.01	<0.01	0.03	
<b>LSD =</b>	7.2	9.3	4.5	11.2	

At the Warra site, all treatments gave a significantly higher percentage of plant discolouration than Weedmaster Argo at 1.1L/ha and two treatments were significantly improved compared to the 1.8L/ha Weedmaster Argo application.

At three of the four sites, Warra, Pallamallawa and Pittsworth the Weedmaster Argo 1.1L/ha + Ally 5g gave a significant improvement in percentage plant discolouration when compared to Weedmaster Argo 1.1L/ha applied alone.

There was a significant rate response at two of the sites between the 1.1L/ha and 1.8L/ha rates of Weedmaster Argo.

The site at Mullaley showed no significant differences between the rates of Weedmaster Argo applied alone and other treatments, however burndown was high (above 93%) with all glyphosate treatments.

Reglone provided a significant improvement in plant discolouration/burndown when compared to Weedmaster Argo at 1.1L/ha at only one of the four sites.

### *Leaf drop*

A visual percentage of leaf drop was assessed at four of the five sites, Warra, Pittsworth, Bellata and Mullaley. All treatments improved the percentage leaf drop when compared to Weedmaster Argo applied alone.

### Stem dry down

Assessment of stem dry down was taken at all sites. This measure of percentage stem dry down was achieved by twisting the stem and assessing how easily it snapped. Plants with higher levels of moisture where stems were greener were more difficult to break. This technique was developed to simulate when plots were harvest ready.

**Table 3.** % Stem dry down approximately 2 weeks after desiccation application, mean across all five trial sites.

	Untreated	Weedmaster Argo 1.1L	Weedmaster Argo 1.8L	Weedmaster Argo 1.1L +Ally 5g	Weedmaster Argo 1.1L + Sharpen 34g + Hasten 1%	Reglone 2L + X-77 0.2%
<b>Mean of all five trial sites</b>	34%	39%	57%	83%	61%	55%

The table above represents assessment where a simple twist test was used, stems of 10 plants per plot were twisted and the number of stems that fully snapped in two twists recorded.

Across all five trial sites, Weedmaster Argo 1.1L + Ally 5g was the most consistent treatment. There was a significant increase in the percentage of stem dry down in three of the five trial sites when compared to Weedmaster Argo applied alone at both 1.1L/ha and 1.8L/ha rate and a clear trend to a higher level of stem dry down from this treatment at the other two sites.

### Yield

There were no significant differences in yield from any of the desiccation herbicide treatments applied in any of the five trials.

### Grain quality

There were no significant differences in moisture or protein at Warra, Pallamallawa, Mullaley and Bellata, whilst at Pittsworth, there was a significant decrease in moisture when comparing the desiccation treatments to the untreated.

The sites at Pallamallawa, Mullaley and Bellata were also assessed for the percentage defective grains. There were no significant differences between any treatments at any site or compared to Untreated grain.

**Table 4.** Comparison of % defective grains between key commercial desiccation treatments

	Product rates /ha					
	Untreated	Weedmaster Argo 1.1L	Weedmaster Argo 1.8L	Weedmaster Argo 1.1L +Ally 5g	Weedmaster Argo 1.1L + Sharpen 34g + Hasten 1%	Reglone 2L + X-77 0.2%
<b>Mean of all three trial sites</b>	11%	11%	11%	8%	10%	12%
<b>Range across three trial sites</b>	9-12%	10-13%	10-12%	6-10%	8-11%	11-14%

*Trials located at Pallamallawa, Bellata and Mullaley*

*Grain quality at all sites analysed for moisture, protein and screenings (grain material below 3.97mm slotted screen)*

## Conclusions

All herbicide desiccant treatments showed an improvement in the percentage of leaf drop and stem dry down when compared to a Weedmaster Argo applied alone. Weedmaster Argo 1.1L/ha + Ally 5g was the most consistent treatment giving significant advantage in terms of percentage plant discolouration and stem dry down. This indicates the addition of Ally was key to improving the levels of crop dry down.

No crop safety impacts were identified in terms of yield and grain quality from any of the treatments. Other options for desiccation that were tested (data not shown) appeared to show no benefit over currently registered treatments.

Assessments of stem dry down and discolouration was carried out approximately two weeks after application. With further work into desiccation options for chickpeas planned for the winter 2018 season, an earlier timing of assessment may give more insight into the speed and extent of crop dry down from the desiccant mixtures.

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