Chickpea plantback trial - Longerenong

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Aim

To demonstrate the risk of sowing certain crop types in the year following application of common pre-emergent herbicide mixtures to chickpeas.

Take home messages

- *No visual herbicide damage symptoms or yield effects were evident in 2008 wheat, barley, IT canola or lentil crops sown after the application of common herbicides to chickpeas in 2007.*

Method

Four herbicide treatments were applied to chickpeas sown on Wimmera grey clay at Longerenong College (Table 1). The trial was sown on 23 May 2007 and treatments were applied post-sowing pre-emergence on the 30 May 2007.

Table 1. 2007 chemical treatments to chickpeas, including active ingredients and herbicide group.

Treatment	Active ingredients	Group
Balance® 100g/ha + Simazine 555g/ha	Isoxaflutole 750g/kg + Simazine 900g/kg	H + C
Lexone® 180g/ha + Simazine 555g/ha	Metribuzin 750g/kg + Simazine 900g/kg	C + C
Atrazine 444g/ha + Simazine 444g/ha	Atrazine 900g/kg + Simazine 900g/kg	C + C
Spinnaker® 50g/ha + Simazine 555g/ha	Imazethapyr 700g/kg + Simazine 900g/kg	B + C

Soil testing was conducted before sowing in 2007.

Four different crop types were sown over the top of the 2007 plots to assess crop damage from the residual effects of the 2007 herbicide treatments. MAP (55 kg/ha) was applied at sowing.

Location: Longerenong

Replicates: 1 (Demonstration)

Sowing date: 13 June

Seeding density: Wheat: 70 kg/ha, barley: 80 kg/ha, lentils: 45kg/ha, canola: 5kg/ha

Crop type: Wheat cv. Wyalkatchem; barley cv. Buloke; lentils cv. Nugget; IT canola cv. Pioneer 45C75

Seeding equipment: Pivot seeder knife points, press wheels, 202mm row spacing

The 2008 crops and any emerging weeds were assessed for signs of herbicide damage approximately 13 days and 69 days after emergence (7 June and 2 September respectively) using the EWRC scoring system.

The 2007 chickpea and 2008 crops were treated with standard inputs.

The 2008 crops were harvested on 5 January 2009.

Results

281mm of rain was recorded at Longerenong from application of the herbicide treatments in 2007 to sowing of the crops in 2008.

Table 2. Monthly rainfall for Longerenong during 2007 and 2008 (source: Bureau of Meteorology).

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
2007	72.2	21.8	4.8	63.2	60.2	5.8	38.0	12.6	18.4	7.4	45.2	22.4	372.0
2008	48.4	0.6	6.8	8.2	37.2	30.0	47.2	32.2	21.8	6.8	10.2	72.8	322.2

Soil tests revealed the site had a pHwater 8.4 (0-10cm) and 1.1 percent organic carbon.

Plant counts were recorded for each of the 2008 crop types. All of the crops established well with wheat at 139 plants/m^2, barley 109 plants/m^2, lentils 76 plants/m^2 and canola 71 plants/m^2.

No herbicide damage was detected on any of the crops or weeds growing in 2008. All plots were scored as 1 on the EWRC scale (no effect).

Due to seasonal conditions, the lentil and canola plots were not harvested. The barley plots yielded higher than wheat. There was no clear evidence of any herbicide effect (Table 3).

Table 3. 2008 yields of wheat and barley resown on top of 2007 residual herbicide treatments.

2007 herbicide treatment	2008 wheat yield (t/ha)	2008 barley yield (t/ha)
Balance 100g/ha + Simazine 555g/ha	0.77	2.14
Lexone 180g/ha + Simazine 555g/ha	0.85	2.01
Atrazine 444g/ha + Simazine 444g/ha	1.06	1.98
Spinnaker 50g/ha + Simazine 555g/ha	1.19	2.21

Interpretation

Unfortunately the dry spring meant that canola and lentil plots could not be harvested, so there can be no conclusion whether the lack of herbicide symptoms in lentils and canola corresponded to yield.

Plantback periods for the chemicals used (Table 4) were satisfied for all crop types except:

- lentils sown after Balance – both the time period and rainfall period were not satisfied
- IT canola sown after Balance – minimum rainfall requirement was not received
- Cereals sown after Spinnaker – minimum rainfall requirement was not received
- Although a plantback period is not specified for lentils after Spinnaker, with less than 300mm between spraying and sowing, some damage was expected.

Table 4. Plantback restrictions, according to labels, for chemicals and crop types in this trial.

Chemical	Crop type	Minimum recropping interval	Minimum rainfall requirement (mm)[1]
Balance	Wheat	10 weeks	100
	Barley	10 weeks	100
	Lentils	21 months	500
	IT canola	9 months	350
Lexone	**DO NOT** plant treated areas to sensitive crops, such as brassicas, sunflowers, beetroot, cucurbits, lettuce or onions, for at least 6 months following application of Lexone® DF®, as crop injury may result. Thoroughly work the soil prior to the planting of these crops.		
Spinnaker	Wheat[2,3]	10 months	300
	Barley[2]	10 months	300
	Lentils	NS	
	IT canola	0 months	0
Atrazine	6 months for all sensitive crops[4] for rates up to 2.5L/ha, and 18 months where higher rates used.		
Simazine	9 months for all sensitive crops[4] where rates up to 3.8L/ha have been used.		

NS Not specified on label for this crop type.

[1] *Minimum rainfall total from application of herbicide to planting of the subsequent crop. Some herbicides specify particular rainfall conditions; please check the label for these details.*

[2] *Additional requirements: Do not apply pre-emergence later than the end of June. Do not use the 100g/ha rate where rainfall from spraying to sowing is expected to be less than 400mm.*

[3] *Plantback period specified is for conventional wheat. Clearfield wheat the same as IT canola.*

[4] *Sensitive crops include wheat, barley, oats, IT and conventional canola.*

Given the label specifications for plantbacks, damage from herbicide residue would be expected in lentils sown after Spinnaker and Balance, and for IT canola sown after Balance. It is likely that rainfall in November and December 2007 and January 2008 kept the topsoil moist, which, combined with warm summer soil temperatures, was enough to break down the herbicide for recropping.

Application

Even with summer rainfall, it is difficult to determine the level of residual herbicide in the soil. Tests are available but are costly and do not necessarily give an accurate measure as residue levels can change quickly depending on soil conditions.

Although no crop damage was experienced in this tria,l it is recommended that extreme caution be exercised if sowing a non-cereal after using Balance or Spinnaker in chickpeas. In very dry seasons with no summer rain, it may be safer to sow a Clearfield wheat after Spinnaker instead of a conventional variety to avoid herbicide damage.

IT canola is tolerant of Spinnaker residues but is NOT tolerant of Balance residues. Commercially the accepted practice is to sow a cereal after chickpeas to make the most of any nitrogen fixed by the crop. Canola is generally not sown after chickpeas due to the depletion of soil moisture reserves by the chickpeas.

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