# Residual Weed Control in Chickpea

**Trial ID:** **DH2305** **Location:** **Narrabri** **Trial Year:** **2023**
**Investigator:** **Dean Hancock**

For more than 25 years, broadleaf weed control in northern region chickpeas has been heavily reliant on herbicides from just two modes of action; Group 27 eg Balance or Group 5 eg Terbyne Xtreme or Simazine. Recent registrations of Group 14 herbicides (Terrad'or, Terrain, Reflex and Voraxor) for use in pulses has provided new options that may reduce the herbicide resistance selection pressure.

The primary objective of this project was to validate the benefits and fit of the Group 14 herbicides alone or in combination with existing chemistry to refine weed management strategies in chickpeas. Similar trials were conducted in winter 2022.

In addition, all the evaluated group 14 herbicides have equivalent use patterns in faba beans. Generating sound residual efficacy data in faba beans can be challenging because of the rapid crop development and canopy closure. Instead of duplicating trials in faba beans, 3 extra herbicide treatments, that are ONLY registered in faba beans, were included in the chickpea trials.

| **Objective:** | **To evaluate Group 14 herbicide options in chickpeas when applied alone, or with Balance and Terbyne Xtreme** | |
|---|---|---|
| **Crop & Hybrid** | **Chickpea cv. PBA Seamer** | |
| **Planting Date:** | **21/06/2023** | |
| **Planting Details:** | **Tyne planter on 30 cm row spacings and 75 kg/ha planting rate** | |
| **Application:** | **A** | **B** |
| **Application Timing:** | **Pre-plant** | **PSPE (Post-sowing, pre-emergence)** |
| **Application Date:** | **16/06/2023 (5 days pre-plant)** | **21/06/2023** |
| **Days After Previous Application:** | **-** | **5 DAA** |
| **Nozzles:** | **AIXR11002** | |
| **Volume:** | **100 L/ha** | |
| **Trial Design:** | **Randomised complete block of 12 treatments x 4 replicates** | |
| **Plot Size:** | **4 m x 12 m** | |
| **Keywords:** | **Chickpea, wild oats, wireweed, residual** | |

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NB: **Treatments 15-17 are ONLY registered in faba beans.** These treatments were included in this project as benchmarks for weed efficacy in faba bean use patterns.

| **Crop Name** | | | | **Chickpea** | | |
|---|---|---|---|---|---|---|
| **Crop Variety** | | | | **PBA Seamer** | | |
| **Pest Scientific Name** | | | | | ***Avena sp.*** | ***Polygonum aviculare*** |
| **Pest Name** | | | | | **Wild Oats** | **Wireweed** |
| **Assessment Date** | | | | **20/07/2023** | **21/07/2023** | **3/08/2023** |
| **Assessment Type** | | | | **EMERGENCE** | **COUNT** | **COUNT** |
| **Assessment Unit** | | | | **/m²** | **/m²** | **/m²** |
| **Assessment Area** | | | | **4 m row** | **4 x 0.1 m²** | **4 m²** |
| **Plant-Evaluation Interval** | | | | **29 DAP** | | |
| **Treatment-Evaluation Interval** | | | | | **35 DAA/30 DAB** | **48 DAA/43 DAB** |
| **ARM Action Codes** | | | | | **AL** | |
| **Trt No.** | **Treatment** | **Product Rate** | **Appln. Code** | | | |
| 1 | Untreated | - | - | 12.0- | 149a | 5.6a |
| 2 | Terrain | 180g/ha | A | 10.3- | 93ab | 1.5bc |
| 3 | Terrad'or | 40g/ha | A | 12.8- | 89abc | 4.8a |
| 4 | Terrain | 180g/ha | A | 8.0- | 24g | 0.3bc |
| | Balance | 100g/ha | B | | | |
| 5 | Terrad'or | 40g/ha | A | 15.0- | 47b-g | 3.3ab |
| | Balance | 100g/ha | B | | | |
| 6 | Terrain | 180g/ha | A | 7.8- | 40c-g | 1.1bc |
| | Terbyne Xtreme | 860g/ha | B | | | |
| 7 | Terrad'or | 40g/ha | A | 13.3- | 36d-g | 1.6bc |
| | Terbyne Xtreme | 860g/ha | B | | | |
| 8 | Reflex | 1250ml/ha | B | 9.3- | 33efg | 0.3bc |
| 9 | Balance | 100g/ha | B | 16.0- | 70a-e | 1.2bc |
| 10 | Balance | 100g/ha | B | 14.0- | 36d-g | 0.3bc |
| | Terbyne Xtreme | 860g/ha | B | | | |
| 11 | Balance | 100g/ha | B | 9.5- | 51b-g | 0.5bc |
| | Simazine 900 DF | 1000g/ha | B | | | |
| 12 | Balance | 100g/ha | B | 13.5- | 34efg | 0.1c |
| | Reflex | 1250ml/ha | B | | | |
| 13 | Terbyne Xtreme | 860g/ha | B | 12.0- | 59b-f | 0.7bc |
| 14 | Terbyne Xtreme | 860g/ha | B | 14.8- | 28fg | 0.1c |
| | Reflex | 1250ml/ha | B | | | |
| 15 | Group 5 | 830g/ha | B | 15.3- | 80a-d | 2.9abc |
| 16 | Group 2 | 70g/ha | B | 19.3- | 44b-g | 0.4bc |
| 17 | Group 2 | 70g/ha | B | 15.5- | 56b-f | 0.1c |
| | Terbyne Xtreme | 860g/ha | B | | | |
| 18 | Voraxor | 200ml/ha | B | 13.3- | 49b-g | 0.2bc |
| | | | LSD P=.05 | nsd | 31.4-83.4 | 3.10 |
| | | | Treatment Prob.(F)= | 0.0917 | 0.0514 (p=10%) | 0.0110 |

Means followed by same letter or symbol (-) do not significantly differ (P=.05, LSD).
nsd = no significant difference
Mean comparisons performed only when AOV Treatment P (F) is significant at mean comparison OSL.

ARM Action Codes
AL = Automatic log transformation of X+1

DAP = Days after Planting
DAA = Days after Application A
DAB = Days after Application B

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**Conclusions:**

This project was designed to evaluate the residual efficacy of four Group 14 herbicides (Reflex, Terrad'or, Terrain and Voraxor) when applied as standalone options or in combination with Balance or Terbyne Xtreme.

The trial was established late in June 2023 near Narrabri NSW. Application A (incorporated by sowing treatments) were applied 5 days prior to planting. The site was planted using tynes with Application B (post-sowing, pre-emergence treatments) applied immediately after sowing.

Rainfall of ~28mm of rain occurred 1 DAP (1 day after planting). Emergence counts in late July showed slow and poor chickpea establishment in all plots, including the untreated. There were no significant differences due to trial treatments.

Wild oat residual efficacy was assessed at 30 DAP. It is expected that these wild oats germinated and emerged following the rain at 1 DAP. There was a clear trend (p=10%) to reduced wild oat counts from all treatments except Terrain, Terrad'or, Balance and the Group 5 herbicide alone. No treatment provided commercially acceptable levels of activity with only Terrain followed by Balance and Terbyne Xtreme in mixture with Reflex providing >80% control.

An emergence of wireweed was assessed at 42 DAP with ~5 wireweed plants/$m^2$ in the untreated. All treatments except Terrad'or alone, Terrad'or followed by Balance or the Group 5 herbicide alone provided significant levels of control. All treatments that included Reflex or the Group 2 herbicide, Terrain followed by Balance, Balance in mixture with either Terbyne Xtreme or Simazine or Voraxor alone provided >90% reduction in wireweed counts.

In this situation, there were no crop safety issues evident from any treatment. No treatment provided acceptable control of large populations of wild oats although useful levels of suppression were evident from Terrain followed by Balance, or Terbyne Xtreme in mixture with Reflex. Both Reflex and Voraxor provided good control of wireweed (historically a weed that is poorly managed by Balance, Terbyne Xtreme and Simazine), although Balance in mixture with Terbyne Xtreme or Simazine performed effectively in this situation. The wireweed efficacy of Reflex or Voraxor may provide a clear fit for these new herbicides and evaluation of climbing buckwheat efficacy appears warranted.

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| Application Description | | |
|---|---|---|
| | A | B |
| Application Date: | 16/06/2023 | 21/06/2023 |
| Application Start Time: | 9:30 AM | 2:30 PM |
| Application Stop Time: | 10:40 AM | 4:30 PM |
| Interval to Previous Application: | - | 5 DAYS |
| Application Timing: | PRE-PLANT | PSPE |
| Air Temperature Start, Stop: | 12.9, 14.2 C | 18.4, 16.7 - |
| % Relative Humidity Start, Stop: | 55.3, 54.8 | 52.3, 61.5 |
| Wind Velocity & Direction Start: | 4.7 km/h, SE | 7 km/h, E |
| Wind Velocity & Direction Stop | 6.3 km/h, SE | 6 km/h, NW |
| Soil Moisture: | SLIGHTLY WET | |
| % Cloud Cover: | 0 | 50 |
| First Moisture Occurred On: | 22/06/2023 | 22/06/2023 |

| Application Equipment | | |
|---|---|---|
| | A | B |
| Application Equipment: | Polaris | |
| Equipment Type: | BOOM | |
| Operation Pressure: | 400 kPa | |
| Nozzle Model: | AIXR11002 | |
| Nozzle Spacing: | 50 cm | |
| Boom Length: | 4 m | |
| Boom Height: | 50 cm | |
| Ground Speed: | 11 km/h | |
| Application Amount: | 100 L/ha | |

**Rainfall:**

| | |
|---|---|
| Closest Weather Station: | On Farm |
| Distance: | 1 km |

| Date | Total | Unit | Additional Comments |
|---|---|---|---|
| 8/06/2023 | 10 | mm | |
| 13/06/2023 | 11 | mm | |
| 16/06/2023 | - | | Application A |
| 21/06/2023 | - | | Planting. Application B |
| 22/06/2023 | 28 | mm | |
| 4/07/2023 | 12 | mm | |
| 20/07/2023 | - | | Assessment 1 - chickpea emergence |
| 21/07/2023 | - | | Assessment 2 - wild oats count |
| 3/08/2023 | - | | Assessment 3 - wireweed count |