Dry sowing and pre-emergent herbicides

This trial is funded by GRDC in collaboration with the University of Adelaide

Key findings

- The dry sowing treatment had lower crop establishment in all treatments compared to sowing into moist soil.
- No additional herbicide was found in the row after rain for the dry time of sowing.
- For the moist soil sowing treatment there was a greater concentration of herbicide in the inter-row as indicated by the reduced growth of ryegrass.

Why do the trial?

To evaluate the effectiveness of pre-emergent herbicides and crop safety in dry sowing conditions.

How was it done?

Plot size 1.5m x 10m

Fertiliser DAP @ 50kg/ha + 2% Zn

Seeding date Dry sowing 24th April 2008
Wet sowing 1st May 2008

Variety Derrimut wheat

The trial was a randomised complete block design with 3 replicates, 8 herbicide treatments and 2 times of sowing.

The seeding equipment used narrow points on 225mm (9") spacing with press wheels.

The dry time of sowing was on the 24th April just prior to the opening rains on the 27th April 2008 and the wet time of sowing was on the 1st May, shortly after the rain (22.4mm).

The herbicide treatments (Table 1) were applied using a hand boom one hour prior to sowing.

Table 1: Herbicide treatments and active ingredients for the pre-emergent herbicide and dry sowing trial at Hart in 2008.

Herbicide treatment	Active ingredients
Nil	
Trifluralin 480 1.8L/ha	trifluralin 480g/L
Trifluralin 480 3.0L/ha	trifluralin 480g/L
Boxer Gold IBS 2.5L/ha	S-metolachlor 120g/L + prosulfocarb 800g/L
Boxer Gold IBS 3.5L/ha	S-metolachlor 120g/L + prosulfocarb 800g/L
Trifluralin 480 1.4L/ha + Avadex Xtra 1.6L/ha	trifluralin 480g/L + tri-allate 500g/L
Trifluralin 480 1.4L/ha + Dual Gold 500ml/ha IBS	trifluralin 480g/L + S-metolachlor 960g/L
Tri-athlete 2.3L/ha	trifluralin + cinmethylin

For the Boxer Gold treatments soil samples were taken on the seed row (on row) and between the seed rows (inter-row) before and after the rain to measure herbicide movement.

The soil was placed in trays and ryegrass sown. The germination and dry matter of the ryegrass was measured and used against known concentrations of Boxer Gold.

Plant emergence counts were taken on all plots.

All plots were assessed for grain yield, and screenings with a 2.0mm screen.

Results

Plant emergence was not significantly affected by herbicide treatment, but was significantly lower with dry sowing (Table 2).

Grain yield increased significantly in the wet time of sowing. This may be due to the higher plant number.

Protein was 0.5% higher in the dry time of sowing.

Table 2: Plant number (plants per square metre) grain yield (t/ha), protein (%) and time of sowing at Hart in 2008.

Time of sowing	Plant number (plants/m²)	Grain yield (t/ha)	Protein (%)
Dry (24th April)	99	0.93	14.6
Wet (1st May)	148	1.26	14.1
LSD (0.05)	16	0.09	0.4

Pre-emergent herbicides significantly affected grain yield independent for both of sowing times (Table 3). Trifluralin 480 1.8L/ha, Trifluralin 480 1.8L/ha + Avadex Xtra 1.6L/ha and Tri-athlete 2.3L/ha were the highest yielding treatments.

The nil treatment was one of the lowest yielding treatments. This result may be attributed to a higher weed density.

Table 3: Grain yield (t/ha) and herbicide treatment averaged for both times of sowing.

Treatment	Grain Yield (t/ha)
Nil	1.02
Trifluralin 480 1.8L/ha	1.15
Trifluralin 480 3.0L/ha	1.07
Boxer Gold IBS 2.5L/ha	1.07
Boxer Gold IBS 3.5L/ha	1.08
Trifluralin 480 1.4L/ha + Avadex Xtra 1.6L/ha	1.12
Trifluralin 480 1.4L/ha + Dual Gold 500ml/ha IBS	1.09
Tri-athlete 2.3L/ha	1.18
LSD (0.05)	0.09

No additional chemical was washed into the row between the 24th April and the 28th April for the dry sowing treatments. During this time there was a 23mm rain event (27th April) where it was expected that the soluble components of the Boxer Gold would move into the row. This is shown in table 4 where the relative herbicide activity (RHA) is similar for both dry and wet sampling times in the dry time of sowing. RHA is a function of herbicide activity in the inter-row compared to the herbicide activity on the row.

Table 3 shows that during the wet sowing operation more herbicide moved from the row to the inter-row than the in the dry sowing operation. This is affected by the level of soil throw generated by the seeding points and the row spacing. During the dry sowing operation it was noted that the soil was cloddy (clods up to 5cm diameter) and these clods were falling back into the row. The wet sowing operation created a better seed bed and distinct furrows were left behind the seeder.

For the wet sowing treatments there was a greater concentration of herbicide in the inter-row. This is supported by a lower ryegrass germination in the inter-row (Table 4)

Table 4: Bioassay results of soil samples taken from the Boxer Gold 3.5L/ha treatments.

Sowing date	Sampled	Rate	Ryegrass wet weight (g)			Ryegrass germination (%)		
		L/ha	On row	Inter row	RHA	On row	Inter row	RHA
Dry (24 Apr)	Dry (24 Apr)	3.5	2.33	1.29	181	89	61	146
Dry (24 Apr)	Wet (28 Apr)	3.5	4.02	2.14	188	86	75	115
Wet (1 May)	Wet (1 May)	3.5	1.26	0.52	242	80	49	163

RHA=relative herbicide activity in inter row as compared to on-row