Efficacy and safety of pre-emergent herbicides when wet- and dry-sowing

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Aim

To evaluate the crop safety and efficacy on annual ryegrass of soil-incorporated pre-emergent herbicides in dry and wet sowing conditions.

Take home messages

- *Sowing into moist soil improved crop emergence compared to dry soil, but did not increase yield*
- *Under low and variable ryegrass pressure, herbicides did not reduce overall ryegrass density, but did reduce inter-row ryegrass density*
- *There was no difference in efficacy between the 1.5L/ha and 3.0L/ha of TriflurX®.*

Method

Location: Herbicide resistance site, Jil Jil

Replicates: 3

Sowing date: 25 April (dry); 20 May (wet)

Sowing Rate: 70kg/ha

Crop type: Barley cv. Sloop Vic

Seeding equipment: Avon Richardson seeder no-till (knife points, press wheels) 300mm row spacing

Two herbicides, Boxer Gold® (prosulfocarb 800g/L + s-metolachlor 120g/L) and TriflurX® (480g/L trifluralin), were applied prior to sowing in both wet and dry soil conditions at Jil Jil, north of Birchip. The first time of sowing was in dry conditions on 25 April. The second time of sowing was on 20 May following 20mm rain on 17 May 2008. Herbicide treatments were applied and incorporated by sowing (Table 1).

Table 1. Treatments applied and incorporated by sowing at two times of sowing.

Treatment	Rate L/ha
Control	-
Boxer Gold® 2.5L/ha	2.5L/ha
Boxer Gold® 3.5L/ha*	3.5L/ha
TriflurX® 1.5L/ha	1.5L/ha
TriflurX 3.0L/ha	3.0L/ha

**The use of Boxer Gold above 2.5L/ha is not registered in wheat and barley and was used in this research trial only to demonstrate the effect of the mix on ryegrass control. When using any of these herbicides always follow the instructions on the registered label.*

Crop emergence was estimated by counting seedlings in 3m of crop row (3 x 1m row) on 18 June for the wet-sowing treatment, and 23 July for the dry-sown treatment. Total ryegrass density was estimated on 18 June in the dry-sown block using ten 0.1m^2 quadrats randomly positioned in each plot. Ryegrass density in the inter-row was also estimated to determine the effectiveness of incorporation at sowing. This was achieved by splitting the inter-row into ten 30mm sections using a 500mm x 300mm rectangular frame with 30mm divisions. This meant that density could be based purely on the treated inter-row rather then a combination of un-treated crop row and treated inter-row achieved when using the 0.1m^2 quadrat. Ryegrass density was estimated in the wet-sowing treatments on 22 August using only the 0.1m^2 quadrat method.

The trial was harvested on 12 November and grain yield recorded.

Results

It was visually observed that the herbicide treatments reduced the number of ryegrass plants present in the inter-row, but substantial amounts of ryegrass were found in the crop row of herbicide treatments. Consequently, there was no significant effect of any treatment on rye-grass density in either the wet- or dry-sowing treatments when the 0.1m^2 quadrat method was used. However, there was less ryegrass in the inter-row of the herbicide treatments relative to the control (Table 2).

Table 2. Mean ryegrass density within the inter-row of the dry-sown treatment.

Treatment	Ryegrass density plants/m^2
Control	19
Boxer Gold 2.5L/ha	2
TriflurX 1.5L/ha	4
TriflurX 3.0L/ha	1
P-value	**<0.01**
LSD (P=0.05)	**4**

Barley establishment was better in wet sowing conditions across all herbicide treatments (Table 3). There was no effect of herbicide treatment on barley density for either wet- or dry sowing.

Table 3. Mean barley plant density for the wet- and dry-sowings.

Timing	Crop density plants/m^2
Wet	141
Dry	126
P-value	**0.02**
LSD (P=0.05)	**13**

There was no significant effect of either sowing time or herbicide on crop yield. The site mean was 2.6t/ha.

Interpretation

All herbicide treatments exhibited the same level of crop safety with soil moisture conditions at sowing having the greater impact on crop plant density. Barley plant numbers were significantly higher when sown into moist soil compared to dry soil conditions, although both times of sowing achieved adequate plant density (above 120 plants/m^2).

Ryegrass germination across the site was variable but generally low (19 plants/m^2 in the control). No differences in density between herbicide treatments and the control were found when using the 0.1m^2 quadrats, but these assessments included ryegrass present in the crop row, an area unaffected

by incorporated herbicide. When comparing weed density in the inter-row, herbicide treatments did reduce ryegrass density relative to the control.

Increasing the rate of TriflurX from 1.5L/ha to 3.0L/ha did not significantly improve ryegrass control under the low weed pressures present at this site.

There was no difference in yield between wet- and dry-sowing, despite almost one month difference in timing. This is most likely due to timing of the seasonal break (20mm on 17 May) which caused the dry-sowing crop to emerge, and was just prior to the wet-sowing on 20 May. This resulted in the wet- and dry-sowing treatments having similar emergence dates.

Application

Pre-emergent herbicides such as TriflurX and Boxer Gold are important for keeping ryegrass pressure low in-crop. Commercially, TriflurX and Boxer Gold are stable in dry soils. Both herbicides are activated in moist soils and are safe to apply to dry soil if incorporated properly. In practice, increasing the rate of trifluralin in no-till systems from the traditional 1.2L/ha in barley up to 3L/ha has been successful at reducing heavy populations of ryegrass. The increased rate helps to compensate for the reduction in soil incorporation of no-till sowing, compared to incorporation with harrows or a prickle chain in conventional systems.

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