

Weed suppression with canola and pre-emergent herbicides

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Key findings

- In 2017 and 2018, both open pollinated (ATR-Bonito) and hybrid (Hyola559TT and HyTTec Trophy) varieties provided similar crop competition for ryegrass control.
- This season, below average rainfall reduced the efficacy of the pre-emergent herbicides that require rainfall for activation.
- There was no significant effect of herbicide treatment or variety on canola grain yield.

Why do the trial?

The extent of resistance to clethodim in annual ryegrass is increasing, as is the level of resistance in these populations. This requires new tactics for management of annual ryegrass in canola. Pre-emergent herbicides are increasing in importance and new pre-emergent herbicides are now available including Butisan (metazachlor) and Devrinol (napropamide). However, pre-emergent herbicides on their own tend not to control annual ryegrass seed production. Using more competitive canola varieties is one tactic that can be added to pre-emergent herbicides to improve annual ryegrass control.

The trial aimed to evaluate the combination of competition from canola varieties and pre-emergent herbicides on suppression of annual ryegrass.

How was it done?

Plot size	2.0 m x 10.0 m	Fertiliser	DAP (18:20) + 2% Zn @ 100 kg/ha
Seeding date	15 th May 2018		UAN (42:0) @ 95 L/ha on 5 th July
			UAN (42:0) @ 55 L/ha on 2 nd Aug

Two canola varieties, ATR Bonito, an open pollinated variety, and HyTTec Trophy, a hybrid, were sown. Herbicides applied IBS were applied immediately prior to sowing with POST atrazine applied on the 25th of June. Herbicides used on both canola varieties are listed in Table 1.

The trial was established as a randomised complete block design (RCBD) with three replicates. Assessments included ryegrass plant density on 5th July and seed heads on 24th October, and canola grain yield (harvested on 8th November).

Table 1. Herbicide treatments used at Hart in 2018.

Herbicide treatment	Products	Rates
1	Nil	-
2	Propyzamide (900 g/kg) IBS	550 g/ha
3	Butisan IBS	1.8 L/ha
4	Devrinol IBS	2 kg/ha
5	Atrazine IBS + Atrazine POST	1.1 kg/ha + 1.1 kg/ha
6	Propyzamide (900 g/kg) IBS + Atrazine POST	550 g/ha + 1.1 kg/ha
7	Butisan IBS + Atrazine POST	1.8 L/ha + 1.1 kg/ha
8	Devrinol IBS + Atrazine POST	2 kg/ha + 1.1 kg/ha

Results and discussion

Annual ryegrass populations were relatively low in the trial with an average of 49 plants/m² in the nil herbicide treatments (Table 2). The herbicide treatments all significantly reduced annual ryegrass populations compared to the untreated control. There was no effect of variety on annual ryegrass plant density in the trial (Figure 1).

The dry seasonal conditions during 2018 would have reduced the efficacy of the pre-emergent herbicides that require rainfall for activation. Therefore, the more water-soluble products, such as Butisan, often perform better under such circumstances. On the other hand, dry conditions reduce later emerging weeds and extended persistence of pre-emergent herbicides is less useful.



Figure 1. Similar plant vigour in canola varieties HyTTec Trophy and ATR Bonito (nil herbicide applied) at Hart. Image taken on 23rd August, 2018.

For annual ryegrass seed production, measured as heads/m², there was a significant effect of herbicide treatment, but not of variety (Table 2). The low growing season rainfall in 2018 did not allow the HyTTec Trophy to perform as well as it might. Greenseeker NDVI results (data not shown) were similar for both varieties on the 9th of July; HyTTec Trophy 0.36 versus ATR Bonito 0.31. This lack of difference was carried through on the 10th August where HyTTec Trophy 0.65 compared to ATR Bonito 0.61.

Typically, hybrid varieties can reduce annual ryegrass seed set by up to 50% compared with open pollinated varieties; however, this difference is lower where more competitive open pollinated varieties, such as ATR Bonito, are sown. This is consistent with previous research at Hart and Roseworthy (2017), where ATR Bonito provided good early vigour and was equally competitive when compared with Hyola 559TT (hybrid). However, in 2016, Hyola 559TT reduced seed production 50% more than the open pollinated ATR Stingray (early maturing, short height). These studies highlight the variation among TT varieties in their competitive ability with weeds.

Table 2. Annual ryegrass plant and head numbers measured at Hart in 2018.

Herbicide treatment	ATR Bonito	HyTTec Trophy	Average	ATR Bonito	HyTTec Trophy	Average
	ARG July (plants/m ²)			Seed heads October (heads/m ²)		
1	53	44	49	93	72	83
2	16	13	15	24	15	20
3	17	6	12	38	23	30
4	14	11	13	43	28	35
5	24	21	22	18	25	22
6	11	14	13	23	24	24
7	17	14	16	23	32	27
8	22	22	22	45	40	43
Average	22	18		38	32	
Interaction	ns			ns		
Herbicide treatment	P < 0.0001			P = 0.005		
Variety	ns			ns		

Due to dry conditions canola yields were low, averaging 0.6 t/ha across the trial (Table 3). The combination of low weed populations and low growing season rainfall meant that there was no significant effect of herbicide treatment or variety on canola grain yield. Our past trials have indicated that there is often no yield advantage from growing hybrid canola where yields are below 1.5 t/ha, however, there is often a weed control advantage. That weed control advantage is less where there are low weed populations.

Table 3. Yield of ATR Bonito and HyTTec Trophy canola at Hart in 2018.

Herbicide treatment	ATR Bonito	HyTTec Trophy	Average
	Yield (t/ha)		
1	0.37	0.48	0.43
2	0.51	0.61	0.56
3	0.56	0.64	0.60
4	0.56	0.63	0.59
5	0.56	0.69	0.62
6	0.67	0.66	0.66
7	0.59	0.68	0.63
8	0.56	0.67	0.61
Average	0.55	0.63	
Interaction	ns		
Herbicide treatment	ns		
Variety	ns		

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