

## Italian ryegrass control with Liberty® Ultra and Sonalan® HFP in spring canola

Mark Thorne and Drew Lyon

Glufosinate is a Group 10 herbicide and is an alternative to Group 9 glyphosate for the control of Italian ryegrass in spring canola. Glyphosate is currently being used for Italian ryegrass control in glyphosate-resistant spring canola, and its extensive use increases the likelihood of developing glyphosate resistant Italian ryegrass. Sonalan® HFP (ethalfluralin) is a Group 3 herbicide that inhibits cell division in plant roots and shoots but must be incorporated in the soil prior to seed germination to be effective. The glufosinate mode of action differs from the mode of action for glyphosate by inhibiting glutamine synthetase, an enzyme involved in the synthesis of the amino acid, glutamine. Inhibition of glutamine synthetase quickly results in a toxic buildup of ammonia in plant cells that destroys cell membranes. Glufosinate is commercially available in several products; however, older glufosinate products contain two glufosinate molecular isomers, but only one isomer has herbicidal activity. Liberty Ultra is a new glufosinate product that consists of only the active isomer. Furthermore, the labeled rate for Liberty Ultra applications in spring canola crops has recently been increased from 19 to 23 oz/A.



**Figure 1.** Left - canola with just an early postemergence application of Liberty Ultra. Middle - canola treated with an early and late postemergence application of Liberty Ultra. Right - canola treated with an early application of Roundup PowerMAX at 44 oz/A.

LibertyLink® spring canola is resistant to glufosinate because of a gene that codes for an enzyme that converts glufosinate to a non-toxic metabolite in the plant. Glufosinate-resistant canola was first developed in 1995. Glufosinate-resistant canola provides an herbicide option for Italian ryegrass control that can help delay the development of glyphosate-resistant Italian ryegrass.

We compared herbicide treatments for Italian ryegrass control in spring canola at the WSU Cook Agronomy Farm (Figure 1). The study site produced chickpeas in 2024, and the residue was left in place through the winter. On April 18, 2024, liquid fertilizer, 110-20-0-25-0.3-0.3 N-P-K-S-

Zn-B lb/A was stream-jet applied and then cultivated to incorporate the fertilizer. On April 22, Sonalan HFP was applied at 24 and 32 oz/A preplant and incorporated (PPI) twice at 90° at a depth of 2-3 inches with a field cultivator and attached tine harrow. Spring canola cultivar 'InVigor® LibertyLink/TruFlex® LR354PC, which has resistance to both glufosinate and glyphosate, was seeded on April 25 with a direct-seed drill with double-disc openers on 10-inch spacing. The seeding rate was 12 seeds per ft<sup>2</sup> at 0.75 to 1.0 inch deep. Early postemergence (EPOST) applications were applied on May 21 (see Table 1 for rates) when the canola had 2-4 leaves. The Italian ryegrass had 1-4 leaves and averaged 20 plants yd<sup>-2</sup> in the nontreated check plots. Late postemergence (LPOST) treatments were applied on June 4 when the canola had 3-7 leaves. The Italian ryegrass plants were tillered and 4-12 inches high

All herbicides were applied with a 10-ft hand-held spray boom with six TeeJet® AIXR110015 nozzles on 20-inch spacing and pressurized with a CO<sub>2</sub> backpack. Spray output was 15 gpa at 40 psi with a ground speed of 3 mph. All Liberty Ultra applications included ammonium sulfate (AMS) at 3 or 5 lb dry granules/A, and all Roundup PowerMAX® (glyphosate) applications, unless applied with Liberty Ultra, included AMS at 2.6 lb dry granules/A. Italian ryegrass control was rated visually on May 21, 30 days after PPI applications, June 4, 15 days after EPOST applications, and June 17, 14 days after LPSOT applications, as a percent of the nontreated checks. Canola was harvested with a plot combine, and samples were bagged and weighed to calculate plot yield.

Italian ryegrass control from Sonalan HFP applications average  $\geq 93\%$  by May 21, 30 days after treatment (DAT) when the canola had three leaves and the EPOST treatments were applied (Table 1). Overall density in this trial was low and averaged 20 plants/yd<sup>2</sup>. The PPI treatments were effective early leaving few plants for the EPOST applications to control. However, Italian ryegrass control declined in plots treated with Sonalan HFP to 45 and 58% with the 24 and 32 oz/A rates, respectively, by June 17, 57 DAT. The decline in control may have been due to poor activation from lack of adequate rainfall following application. Sonalan HFP followed by PowerMAX controlled 100% of Italian ryegrass compared with only 67% when Sonalan HFP was followed by Liberty Ultra.

Liberty Ultra applied EPOST resulted in Italian ryegrass control 76 to 88% by June 4, 15 DAT, and then declined to 62% if no LPOST treatment was applied (Table 1). Where Liberty Ultra was re-applied LPOST, control by June 17, was 95% if AMS was included at 3 lb/A, and 99% if AMS was included at 5 lb/A; however, there was no statistical difference in control between the AMS rates. If Liberty Ultra was followed by PowerMAX, control was only 79%, whereas if PowerMAX EPOST was followed by Liberty Ultra, control was 100% by June 17. It is unclear why the PowerMAX application following Liberty Ultra was not effective. When PowerMAX was applied EPOST, all Italian ryegrass was controlled leaving little or no plants left when the LPOST Liberty Ultra treatment was applied. Applying PowerMAX first and then Liberty Ultra if needed may be the preferred treatment. Both the tank mix treatment of Liberty Ultra with PowerMAX and PowerMAX alone resulted in 100% control June 4, 15 DAT. Liberty Ultra is an effective option for controlling Italian ryegrass in Liberty Link Spring canola; however, it may need to be re-applied if plants recover from the first application or there are new flushes. Glyphosate resistance was not observed in our trial, therefore, Roundup PowerMAX was very effective in controlling Italian ryegrass. Sonalan HFP was effective early, but control did not

persist as there was inadequate rainfall for good soil activation. Other weeds in this trial included common lambsquarters, which was easily controlled (>90%) with all treatments.

In this trial, Italian ryegrass density was inadequate to reduce yield and there was no apparent yield reduction from the glyphosate applications, therefore, no differences between treatments were found (Table 1). Yields ranged from 1470 to 1870 lb/A, which were lower than yields in 2024, but not unexpected given that the region was experiencing a drought. However, there were observable effects of the treatments on canola growth as stunting and thinning were observed in treatments with PowerMAX and with Sonalan HFP; however, these symptoms did not result in any statistically significant yield loss.

**Table 1.** Control of Italian ryegrass in spring canola and canola injury and yield with Liberty Ultra, Roundup PowerMAX, and Sonalan HFP herbicides.

Treatment*	Treatment applications			-- Visual control ratings --			Canola Injury	Canola Yield
	PPI	EPOST	LPOST	--- Italian ryegrass ---				
	4/22	5/21	6/4	5/21	6/4	6/17	7/17	8/14
				--- Percent of nontreated check** ---				- lb/A** -
Nontreated check		---	---	0	0	0	0	1660 a
LU (3)		23		---	83 cd	62 c	0 c	1670 a
LU (3)		23	23	---	76 d	96 ab	0 c	1870 a
LU (5)		23	23	---	88 bc	99 a	0 c	1620 a
LU (3) fb PM (2.6)		23	22	---	85 bcd	79 bc	0 c	1660 a
PM (2.6) fb LU (3)		44	23	---	100 a	100 a	20 ab	1630 a
LU + PM (3)		23 + 44		---	100 a	100 a	12 b	1690 a
PM (2.6)		44		---	100 a	100 a	16 b	1470 a
Sonalan HFP	24			97 a	87 bcd	45 c	12 b	1580 a
Sonalan HFP	32			97 a	89 bc	58 c	13 b	1630 a
Sonalan HFP fb LU (3)	24	23		93 a	93 b	67 c	10 b	1690 a
Sonalan HFP fb PM (2.6)	24	44		96 a	100 a	100 a	32 a	1750 a

\*LU= Liberty Ultra (glufosinate); PM=Roundup PowerMAX (glyphosate). Numbers in parenthesis are lb/A of ammonium sulfate added to the herbicide. fb=followed by.

\*\*Means in each column followed by the same letter are not significantly different (P≤0.05).