



Northern NY Agricultural Development Program Final Report

Herbicide Programs for Glyphosate-Resistant Horseweed (a.k.a. Marestalk) Control in Soybeans

Project Leader:

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Cooperating Producer(s):

- Soybean grower, Watertown, NY

Background:

Glyphosate-resistant (GR) soybeans made postemergence weed control relatively easy with a single application. The use of postemergence (POST) glyphosate in GR soybeans has been the primary weed control program used by many Northern New York (NNY) soybean growers. While this system seemed to simplify weed management, relying on total postemergence programs can be difficult to manage if not properly implemented. In 2019, glyphosate-resistant horseweed, also known as marestalk, was discovered on several farms in NNY. In 2020, uncontrolled resistant marestalk contributed to significant yield losses on some farms in the region.

Herbicide screening trials of marestalk grown from seeds collected from multiple NNY soybean fields suggest that the horseweed populations are resistant to both Group 9 (glyphosate, i.e., Roundup) and Group 2 (ALS herbicides, i.e., Classic, FirstRate) herbicide sites of action. A single POST glyphosate application will no longer control

resistant horseweed; therefore, growers will now have to use an effective soil residual herbicide with the preplant burndown program or apply separately just prior to planting.

There are preemergence (PRE) residual herbicides with different sites of action than glyphosate (Group 9) that have the potential to help manage glyphosate-resistant horseweed in soybeans. Auxin-resistant soybeans, such as Xtend and Enlist E3 seed technologies, allow for POST applications of specific dicamba and 2,4-D herbicides for the control of emerged broadleaf weeds, including horseweed, in soybeans.

The spread of multiple resistant marestalk moving across the state, including in Northern New York, is forcing many growers to change their current herbicide programs. This has led to a renewed interest in and need to use soil-residual herbicides for improved soybean weed control. NNYADP-funded trials in 2021 and 2022 provided the opportunity to evaluate 13 different herbicide programs, including one untreated check plot, for marestalk management in soybean crops.

Methods:

A replicated herbicide trial was conducted on a farm growing soybeans near Watertown, New York, in Jefferson County. This trial included one untreated plot and 12 different herbicide programs consisting of preemergence (PRE) herbicide used alone and in tank mixes. The marestalk population at this site had been previously (2019) confirmed to be resistant to both Group 9 (i.e. glyphosate, Roundup) and Group 2 (i.e. Classic, FirstRate) herbicides.

The soybeans were planted on May 24, 2022. The PRE herbicide treatments were applied on May 25, 2022, and visual marestalk control ratings were done 35 days after application (DAA).

Results:

Weed control ratings were taken 35 days after application of the PRE treatments applied on May 25, 2022. Our control ratings 35 days after PRE treatments application (DAA) for marestalk were greater than 90% control in eight of the treatments: 1) Sharpen + Tricor DF (100% control), 2) Tricor DF applied at 10.6 oz per acre (100% control), 3) Tricor DF applied at 5 oz per acre (98.25% control), 4) Trivence WDG (99.75%), 5) Boundary 7.8 EC (99.5% control), 6) Valor SX applied at 2 oz. + Tricor DF applied at 5 oz. (98.75% control), 7) Valor SX applied at 3 oz. + Tricor DF applied at 5 oz. per acre (99.75% control), 8) Valor SX applied at 3 oz. per acre (94.75% control) see Table 1.

At 35 DAA, two treatments provided between 80% and 90% control of marestalk, Sharpen (81% control) and Valor SX applied at 2 oz. per acre (87% control) (Table 1).

The Group 2, single active-ingredient herbicide treatments, Classic and FirstRate, provided only 65% and 70% control respectively. This level of control was an unexpected outcome because a population of marestalk on this farm had previously been confirmed resistant to the Group 2 herbicides shown in Table 1.

The 2022 trial location received 1.46” precipitation within 7 days after the PRE treatments were applied. This would have provided sufficient rainfall to activate the soil-applied preemergence herbicides in the trial.

Table 1. Rating of Preemergence Herbicides Applied for Marestalk Management in Soybean, 2022 trial, Jefferson County, NY, NNYADP-funded Programs for Glyphosate-Resistant Horseweed Control in Soybeans project

Herbicide	Rate	% Control ¹ 35 DAA ²	% Control ¹ 35 DAA ²	% Control ¹ 35 DAA ²
	Amt/A	2020 ^{3^}	2021 ^{3^}	2022 ^{3^}
Classic	1 oz	28.75b	5e	65c
Sharpen	1 oz	99.75a	62.5ab	81abc
Sharpen	1 oz	98.75a	91.75a	100a
Tricor	6 oz			
Trivence WDG	6 oz	97.5a	40bcd	99.75a
FirstRate	.75 oz	32.5b	10de	70bc
Boundary 7.8EC	2.1 pt	100a	60ab	99.5a
Valor SX	2 oz	21.25b	18.75cde	87abc
Valor SX	2oz	100a	63.75ab	98.75a
Tricor DF	5 oz			
Valor SX	3 oz	----	----	94.75ab
Valor SX	3 oz	----	----	99.75a
Tricor DF	5 oz			
Tricor DF	5 oz	100a	68.75ab	98.25a
Tricor DF	10.6 oz	100a	82.5a	100a

¹Visual control rating, means followed by the same letter are not significantly different

²Days After Application treatment evaluation

³Calendar year of trial

[^]2020 Jefferson County farm, 2021 St. Lawrence County farm, 2022 Jefferson County farm

Conclusion:

This data from a well-informed development and evaluation of several herbicide testing or programs will help NNY soybean growers make informed decisions about their weed control systems for specifically controlling marestalk (and indirectly helps inform decision making re: other herbicide-resistant weed species). Varying weed control programs with residual herbicides that use different modes of action can preserve the effectiveness of new seed traits, as well as the new herbicide products designed to work with them.

Outreach:

The results from this on-farm research have been disseminated to crop growers, crop consultants, agribusinesses in Northern New York, and other areas across the state through newsletters and local crop grower meetings hosted by Cornell Cooperative Extension and agribusinesses, and at the 2023 Crop Congresses in northern New York.

For More Information:

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