COMMON RAGWEED CONTROL WITH SPIN-AID ALONE AND SPIN-AID MIXED WITH STINGER HL IN SUGARBEET

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Summary

1. A one-time Spin-Aid mixed with ethofumesate application does not provide acceptable common ragweed control.
2. A two-time Spin-Aid mixed with ethofumesate application controlled common ragweed better than a one-time Spin-Aid application, but did not consistently deliver greater than 90%, especially after 30 days.
3. Two-times Stinger HL applications mixed with Spin-Aid and ethofumesate may improve tough to control common ragweed populations or slightly larger common ragweed.
4. Two-times Spin-Aid mixed with Stinger HL is an opportunity for broad-spectrum control POST including common lambsquarters and glyphosate resistant kochia.

Introduction

Common ragweed (*Ambrosia artemisiifolia* L.) is a summer annual broadleaf weed that can cause devastating impacts in sugarbeet when left unmanaged (Figure 1). Common ragweed emerges earlier than most other summer annual weeds in eastern North Dakota and Minnesota, conferring an emergence advantage over its competitors including sugarbeet. Common ragweed's aggressive growth habit can reduce crop yield by 38% in corn (*Zea mays* L.) and 95% in soybean [*Glycine max* (L.) Merr.] (Barnes et al. 2018). Common ragweed is a prolific seed producer; a single plant can produce up to 62,000 seeds, and seeds remain viable for 39 years (Baskin and Baskin 1980; Dickerson and Sweet 1971). Common ragweed's propensity to evolve resistance to commonly used herbicides in the cropping sequence further exacerbates control challenges. Further, common ragweed populations have been documented to have evolved resistance to five herbicide sites of action (SOA, WSSA group number) including: photosystem II (PSII, 5), acetolactate synthase inhibitors (ALS, 2), protoporphyrinogen oxidase inhibitors (PPO, 14), 5-enolpyruvoylshikimate 3-phosphate synthase inhibitors (EPSPS, 9), and auxin mimics inhibitors (4) (Heap 2025).

Clopyralid [trade name Stinger, Stinger HL, Clean Slate, Spur (I will refer to it as Stinger HL)] is an auxin mimics (Group 4) herbicide commonly used in sugarbeet in eastern North Dakota and Minnesota. Its broadleaf spectrum is unique from that of other auxin mimics, being especially effective in controlling common ragweed but having less/no activity on other critical broadleaf weed species in sugarbeet including common lambsquarters [*Chenopodium album* L.]) kochia [*Bassica scoparia* (L.) A.J.Scott] and waterhemp [*Amaranthus tuberculatus* (Moq.) J.D. Sauer]. There is evidence of certain common ragweed populations tolerating higher doses of clopyralid. Further, Stinger HL use rates are not according to label; growers familiar with the micro-rate programs historically used less and there are concerns about carryover to drybean (*Phaseolus vulgaris* L.) and corn. Finally, common ragweed less than 2-inch in diameter should be targeted for control. Growers often delay application since glyphosate (trade name Roundup PowerMax3) applied with clopyralid will kill the grass companion crop.

Phenmedipham (trade name Spin-Aid) is a group 5 herbicide marketed by Belchim USA for control of common ragweed, common lambsquarters, and kochia in sugarbeet. Two-times Spin-Aid alone or mixed with Stinger HL potentially could reduce the specter of common ragweed resistance and improve/lengthen common ragweed control in sugarbeet. Phenmedipham mixed with clopyralid also would enable application timing to optimize common ragweed control without damaging companion grass crops. The objectives of this project are a) to determine common ragweed control from 1-time or 2-times Spin-Aid with ethofumesate application; and b) to determine if Spin-Aid mixed with Stinger HL improves common ragweed control from Stinger HL alone under field conditions.

Figure 1. Common ragweed in sugarbeet, Traill County, ND, 2024

Materials and Methods

General. Experiments were conducted near Hillsboro ND and Shelly MN in 2025. The experimental area at each location was prepared for planting by applying the appropriate fertilizer and tillage. Sugarbeet was the previous crop at both locations. Sugarbeet was seeded in 22-inch rows at approximately 63,500 seeds per acre with 4.5 inch spacing between seeds on April 24 at Hillsboro and May 8 at Shelly. We elected to replant the Hillsboro experiments on May 19 due to crusting issues from a significant rain event 4 days after planting. Treatments were applied with a bicycle sprayer in 17 gpa spray solution through 8002 XR flat fan nozzles pressurized with CO2 approximately 40 psi to the center four rows of six row plots 40 feet in length.

Spin-Aid. Common ragweed experiments with one or two-times Spin-Aid mixed with ethofumesate application were conducted near Hillsboro ND and Shelly MN in 2025. Spin-Aid and ethofumesate were mixed with Roundup PowerMax3 with the second application. Treatments are in Table 1.

Sugarbeet growth reduction injury and common ragweed control was evaluated approximately 7, 21 and 28 days after the repeat Spin-Aid mixed with ethofumesate application (DAAC) using a 0 to 99% scale (0% denoting no sugarbeet injury or common ragweed control and 99% denoting complete loss of sugarbeet stature/stand or common ragweed control). All evaluations were a visible estimate of injury or control in the four treated rows compared to the adjacent, two-row, untreated strip. Experimental design was randomized complete block (RCBD) with four replications. Data were analyzed as a RCBD with the ANOVA procedure of ARM, version 2025.5 software package.

Spin-Aid and Stinger HL alone and Spin-Aid mixed with Stinger HL. Common ragweed experiments with one or two-times Spin-Aid with ethofumesate alone or mixed with Stinger HL application were conducted near Hillsboro ND and Shelly MN in 2025. Treatments are in Table 2.

Sugarbeet growth reduction injury and common ragweed control was evaluated approximately 7, 14, 21 and 28 days after the second POST application (DAAC) using a 0 to 99% scale (0% denoting no sugarbeet injury or common ragweed control and 99% denoting complete loss of sugarbeet stature/stand or common ragweed control). This report contains evaluations approximately 7 and 21 DAAC. All evaluations were a visible estimate of injury or

Table 1. Herbicide treatments, herbicide rates and application timing.

Num	Herbicide treatment[a,b]	Rate	Sugarbeet stage
		(fl oz)	(lf stage)
1	Spin-Aid + ethofumesate	16 + 4	2
2	Spin-Aid + ethofumesate	24 + 4	2
3	Spin-Aid + ethofumesate	32 + 4	2
4	Spin-Aid + ethofumesate	40 + 4	2
5	SA + etho / SA + etho + RUPM3	20 + 4 / 28 + 4 + 25	2 / 5-7d
6	SA + etho / SA + etho + RUPM3	28 + 4 / 32 + 4 + 25	2 / 5-7d
7	SA + etho / SA + etho + RUPM3	32 + 4 / 40 + 4 + 25	2 / 5-7d
8	Etho / SA + etho	6 / 28 + 4	PRE / 2
9	Etho / SA + etho / SA + etho + RUPM3	6 / 28 + 4 / 32 + 4 + 25	PRE / 2 / 5-7d

[a]Mix Spin-Aid and ethofumesate with HSMOC at 1 pt/A. Roundup PowerMax3, Spin-Aid and ethofumesate with HSMOC at 1 pt/A and Amsol liquid AMS at 2.5% v/v
[a]abbreviations: SA=Spin-Aid; etho=ethofumesate; RUPM3=Roundup PowerMax3

control in the four treated rows compared to the adjacent, two-row, untreated strip. Experimental design was randomized complete block (RCBD) with four replications. Data were analyzed as a RCBD with the ANOVA procedure of ARM, version 2025.5 software package.

Table 2. Herbicide treatments, herbicide rates and application timing.

Num	Postemergence Herbicide[a,b,c]	Rate	Sugarbeet stage	Common ragweed stage
		(fl oz/A)	(lf stage)	(lf stage or inch)
1	Spin-Aid	28	2-4 lf	2 in
2	Spin-Aid / Spin-Aid	28 / 32	2-4 lf / 5-7 d	2 in / 5-7 day
3	Stinger HL	1.8	2-4 lf	2 in
4	Stinger HL / Stinger HL	1.8 / 1.8	2-4 lf / 5-7 d	2 in / 5-7 day
5	Spin-Aid + Stinger HL	28 + 1.8	2-4 lf	2 in
6	Spin-Aid + Stinger HL / SA + SHL	28 + 1.8 / 28 + 1.8	2-4 lf / 5-7 d	2 in / 5-7 day
7	Spin-Aid + Stinger HL + RUPM3	28 + 1.8 + 25	2-4 lf	2 in
8	SA + SHL / SA + SHL +RUPM3	28 + 1.8 / 28 + 1.8 + 25	2-4 lf / 5-7 day	2 in / 5-7 day
9	Etho / SA + Stinger HL	6 / 28 + 1.8	PRE/ 2-4 lf	PRE/ 2 in

[a]Ethofumesate at 4 fl oz/A mixed with Spin-Aid
[b]Spin-Aid mixed with ethofumesate, Stinger HL or Spin-Aid plus Stinger HL with HSMOC at 1 pt/A. Spin-Aid + Stinger HL + PowerMax3 with HSMOC and Amsol liquid AMS at 1 pt/A + 2.5% v/v
[c]abbreviations: SA=Spin-Aid; SHL=Stinger HL; RUPM3=Roundup PowerMax3

Results

Spin-Aid. Sugarbeet injury was negligible at both the Hillsboro and Shelly experiments (data not presented). However, visible growth reduction injury tended to be greater from 2-times Spin-Aid mixed with ethofumesate application as compared to a single dose at Shelly. A derecho with wind speeds estimated between 60 to over 100 mph for a 2 to 3-hour period on June 20, 2025 compromised sugarbeet injury evaluation at Hillsboro.

We observed much greater common ragweed emergence at Hillsboro than Shelly. Average common ragweed control across treatments 26 DAAC was 31% at Hillsboro and 69% at Shelly. One-time Spin-Aid mixed with ethofumesate application did not provide acceptable common ragweed control (Table 3). Common ragweed was less than 2-inch in diameter at Hillsboro and Shelly at application. Spin-Aid with ethofumesate at 32 and 40 fl oz per acre provided better control than Spin-Aid mixed with ethofumesate at 16 or 24 fl oz per acre at Shelly. We didn't observe a response to Spin-Aid mixed with ethofumesate rate at Hillsboro, presumably because of the strong common ragweed pressure and the continued emergence during the course of the experiment.

Two-times Spin-Aid mixed with ethofumesate, the second application with Roundup PowerMax3 improved common ragweed control at Hillsboro and Shelly (Table 2). We didn't observe a response to rate with the 2-times

Table 3. Visible percent common ragweed control in response to herbicide treatment, 8 to 12 and 26 days after the 2-times Spin-Aid plus ethofumesate treatment, Hillsboro, ND and Shelly, MN, 2025.[a]

Herbicide treatment[b]	Rate	Hillsboro, ND		Shelly, MN	
	(fl oz)	12 DAAC	26 DAAC	8 DAAC	26 DAAC
Spin-Aid + ethofumesate	16 + 4	10 d	10 cd	61 d	31 e
Spin-Aid + ethofumesate	24 + 4	21 cd	3 d	54 d	39 e
Spin-Aid + ethofumesate	32 + 4	28 c	15 bc	74 c	55 d
Spin-Aid + ethofumesate	40 + 4	29 c	25 b	74 c	50 d
SA + etho / SA + etho + RUPM3	20 + 4 / 28 + 4 + 25	79 a	71 a	94 a	84 b
SA + etho / SA + etho + RUPM3	28 + 4 / 32 + 4 + 25	78 a	66 a	95 a	87 ab
SA + etho / SA + etho + RUPM3	32 + 4 / 40 + 4 + 25	79 a	70 a	97 a	93 ab
Etho / SA + etho	6 / 28 + 4	46 b	18 bc	82 b	66 c
Etho / SA + etho / SA + etho + RUPM3	6 / 28 + 4 / 32 + 4 + 25	79 a	68 a	97 a	97 a
LSD (0.10)		16	12	9	11

[a]Common ragweed control followed by the same alphabetical letter indicates non-statistical differences between treatments at the 0.10 alpha level

[b]Spin-Aid and ethofumesate plus HSMOC at 1 pt/A. Spin-Aid and ethofumesate mixed with Roundup PowerMax3, Spin-Aid, and ethofumesate plus HSMOC at 1 pt/A and Amsol liquid AMS at 2.5% v/v.

Spin-Aid mixed with ethofumesate applications at either the Hillsboro or Shelly experiments. Ethofumesate PRE followed by 1-time Spin-Aid mixed with ethofumesate application improved common ragweed control as compared to Spin-Aid mixed with ethofumesate alone. However, ethofumesate PRE followed by 2-times Spin-Aid mixed with ethofumesate application delivered similar common ragweed control.

Spin-Aid and Stinger HL alone and Spin-Aid mixed with Stinger HL. We observed sugarbeet injury 8 and 20 DAAC at Shelly (data not presented). Five plots (out of 8 total) from 2-times Spin-Aid plus Stinger HL treatments (two separate treatments) scored 30% or greater sugarbeet injury. Three plots from a third 2-times Stinger HL treatment scored 30% or greater sugarbeet injury. Sugarbeet injury was not collected at Hillsboro. A derecho with wind speeds estimated between 60 to over 100 mph for a 2 to 3-hour period on June 20, 2025 compromised sugarbeet injury evaluation at Hillsboro.

Common ragweed infestation was heavy at Hillsboro and were continuing to emerge during the experiment. We may have waited a little too long with application as the largest common ragweed were 4-inch in diameter. Common ragweed density was moderate at Shelly and were approaching 3-inch in diameter. We targeted slightly larger than normal common ragweed since the experiment were mixtures of two products applied 1- and 2-times.

Two-time Spin-Aid mixed with ethofumesate improved common ragweed control as compared to 1-time Spin-Aid with ethofumesate application at Shell and Hillsboro. However, we did not realize effective common ragweed control (greater than 90% control) in either experiment. Two-times Stinger HL application provided 91% control 20 DAAC at Shelly.

Mixing Spin-Aid with ethofumesate and Stinger HL did not improve common ragweed as compared to Stinger HL alone with either experiment. However, mixing Roundup PowerMax3 with Stinger HL, Spin-Aid and ethofumesate improved common ragweed control at Hillsboro. Common ragweed control was best with 2-times Spin-Aid mixed with ethofumesate and Stinger HL. Mixing Stinger HL with Spin-Aid and ethofumesate improved common ragweed control as compared to 2-times Spin-Aid with ethofumesate or Stinger HL alone at Hillsboro. At Shelly, 2-times Spin-Aid with ethofumesate and Stinger HL controlled common ragweed similarly to 2-times Stinger HL alone. Mixing Roundup PowerMax3 with 2-times Stinger HL and Spin-Aid with ethofumesate did not further improve common ragweed control at either location.

We observed benefit from ethofumesate PRE for common ragweed control at Hillsboro where we observed continuous common ragweed emergence during the experiment.

Table 4. Visible percent common ragweed control in response to herbicide treatment, 6 to 8 and 20 days after Spin-Aid, Stinger Hl and Spin-Aid plus Stinger HL treatment, Hillsboro, ND and Shelly, MN, 2025.[a]

Herbicide treatment[b,c]	Rate	Hillsboro, ND		Shelly, MN	
	(fl oz)	6 DAAC	20 DAAC	8 DAAC	20 DAAC
Spin-Aid	28	28 g	5 f	71 c	46 d
Spin-Aid / Spin-Aid	28 / 32	66 b	43 e	87 b	78 c
Stinger HL	1.8	40 ef	65 c	80 bc	79 c
Stinger HL / Stinger HL	1.8 / 1.8	50 de	74 b	88 b	91 ab
Spin-Aid + Stinger HL	28 + 1.8	38 fg	44 e	83 b	84 bc
Spin-Aid + Stinger HL / SA + SHL	28 + 1.8 / 28 + 1.8	83 a	89 a	90 a	98 a
Spin-Aid + Stinger HL + RUPM3	28 + 1.8 + 25	64 bc	65 c	86 b	79 c
SA + SHL / SA + SHL + RUPM3	28 + 1.8 / 28 + 1.8 + 25	80 a	88 a	99 a	98 a
Etho / SA + Stinger HL	6 / 28 + 1.8	55 cd	56 d	86 b	83 bc
LSD (0.10)		11	8	10	11

[a]Common ragweed control followed by the same alphabetical letter indicates non-statistical differences between treatments at the 0.10 alpha level

[b]ethofumesate at 4 fl oz per acre was mixed with Spin-Aid

[c]Spin-Aid with ethofumesate plus HSMOC at 1 pt/A. Stinger HL plus HSMOC at 1 pt/A. Spin-Aid and ethofumesate mixed with Stinger HL plus HSMOC at 1 pt/A. Stinger HL or Spin-Aid and Stinger HL mixed with Roundup PowerMax3 plus HSMOC at 1pt/A and Amsol liquid AMS at 2.5% v/v.

Discussion

Our locations were complimentary. Our Hillsboro experiment was a commercial sugarbeet field in 2024. The common ragweed infestation was so strong that our grower cooperator elected not to harvest the field. Our Hillsboro experiments had a heavy common ragweed population with continuous common ragweed emergence in May and June. Our Shelly location was sugarbeet in 2024 and was a moderate common ragweed population with generally one late May emergence flush.

Spin-Aid mixed with ethofumesate must be a 2-times application for common ragweed control. Our research suggests Spin-Aid at 28 fl oz per acre followed by Spin-Aid at 32 fl oz per with the second application. A Spin-Aid tolerance and yield experiment conducted in 2024 (Peters and Aberle, Sgbt Res and Ext Rept., 55:25-32) indicated acceptable sugarbeet vegetative and yield tolerance with these treatments. However, the lack of consistency is concerning and is consistent with experiments conducted in 2024.

Mixing Stinger HL with Spin-Aid and ethofumesate does not replace a second application. These data were not conclusive as to if 2-times Stinger HL with Spin-Aid and ethofumesate provides common ragweed control greater than Stinger HL alone. We observed improved control at Hillsboro with a heavy common ragweed population but similar control at Shelly with a moderate common ragweed population. Spin-Aid with ethofumesate mixed with Stinger HL clearly is a strategy to use when one wishes to forgo glyphosate application and delay the termination of grassy companion crops. Mixing Stinger HL and Spin-Aid is also a chance to control other broadleaf weeds including common lambsquarters and glyphosate resistant kochia.

Literature Cited

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