REVISITING ANTOR FOR WATERHEMP CONTROL

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Summary

1. Sugarbeet injury was negligible from Antor at 3 and 6 quart per acre.
2. Antor at 6 qt/A provided waterhemp control greater than Antor at 3 qt/A.
3. We observed similar waterhemp control from Antor at 6 qt/A and Nortron (ethofumesate) at 6 pt/A.

Introduction

I have made it a point during my tenure to evaluate every possible active for efficacy on waterhemp [*Amaranthus tuberculatus* (Moq.) J.D. Sauer]. Glyphosate resistant waterhemp was identified by sugarbeet growers attending the 2025 grower seminars as the most troublesome weed for control in sugarbeet production weed control in Minnesota and North Dakota; reported on 451,888 acres or 71% of acreage according to 2025 survey. Further, waterhemp was identified as most troublesome weed at every grower seminar, seminars ranging from Willmar in west central Minnesota to Grafton in the northern Red River Valley.

Antor® herbicide, active ingredient diethatyl-ethyl was a α-chloroacetamide class herbicide which inhibits very long-chain fatty acid synthesis (VLCFA) in susceptible plants. Antor was developed by NOR-AM Chemical Company for control of annual grasses and selective broadleaf weeds in a number of crops including sugarbeet. Antor was approved for use in sugarbeet in February 1982, but its registration was cancelled in April 1993. Antor was used for redroot pigweed (*Amaranthus retroflexus* L.) control in sugarbeet at 6 quarts per acre. Like ethofumesate, Antor often was incorporated for best weed control results since it required 1-inch of rainfall for activation. Registration was discontinued due to environmental concerns over its substantial use-rate.

Recently, there has been conversations about Antor as weed control in sugarbeet becomes more challenging due to wide-spread herbicide resistance. Antor had a reputation for controlling pigweed and many wondered about its activity on waterhemp. We were able to source Antor from an unopened container located in Idaho in 2025. The objectives of this experiment were to evaluate Antor for control of waterhemp in sugarbeet.

Materials and Methods

An experiment was conducted near the American Crystal Sugar Technical Center, Moorhead, MN. Wheat stubble was tilled with a chisel plow in fall 2024 and with a Kongskilde S-tyne field cultivator with rolling baskets in spring of 2025 to prepare the seedbed. The experimental area was fertilized according to soil test before secondary tillage. Preplant herbicide treatments were applied using a bicycle wheel plot sprayer with a shielded boom to reduce particle drift and calibrated to deliver 17 GPA through 8002XR nozzles (XR TeeJet® Flat Fan Spray Tips, TeeJet® Technologies, Glendale Heights, IL) spaced 20 inch apart and pressurized with CO2 at 40 psi. Herbicide treatments (Table 1) were immediately incorporated using the same Kongskilde S-tyne cultivator preset to incorporate treatments 1-inch into the soil (tillage equipment set 2-inches deep) and operated parallel to sugarbeet rows.

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

Trt Num	PPI Herbicide[a]	Postemergence Herbicide	Rate	Sugarbeet stage
			(fl oz, pt, or qt/A)	(lvs)
1	Antor		3 qt	PPI
2	Antor		6 qt	PPI
3	Nortron		3p	PPI
4	Nortron		6p	PPI
5	Eptam		3.5p	PPI
6		PowerMax3 + etho / PowerMax3 + etho	25 + 6 / 25 + 6	2 / 6

[a]Roundup PowerMax3 mixed with ethofumesate at 25 + 6 fl oz/A with NIS and Amsol liquid AMS at 0.25% and 2.5% v/v 2-times POST following PPI treatments.

Sugarbeet were planted in rows spaced 22 inch apart and 1.25 inch deep at approximately 63,500 seed per acre. Visible sugarbeet growth reduction injury was evaluated using a 0 to 99% scale (0 is no visible injury and 99 is complete loss of plant / stand) and visible waterhemp control using a 0 to 99 scale (0 is no injury and 99 is complete control). Evaluations were approximately 28, 35, and 42, 49 and 56 days (+/- 3 days) after sugarbeet plant. 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 at the alpha = 0.1 level.

Results

Sugarbeet injury was negligible 30 and 44 days after planting (DAP) (Table 2). Sugarbeet injury was greatest from Eptam at 3.5 pt/A and Nortron at 3 pt/A, 30 DAP. Sugarbeet injury averaged across treatments ranged from 75% to 47%, 30 to 51 DAP. Waterhemp control tended to be best with Eptam at 3.5 pt/A fb 2-times Roundup PowerMax3 mixed with ethofumesate at 25 + 6 fl oz/A (Table 2, Figure). Antor at 6 qt/A provided waterhemp control greater than Antor at 3 qt/A. Ethofumesate (Nortron) at 6 pt/A tended to provide waterhemp control greater than ethofumesate at 3 pt/A. We observed similar control from Antor at 6 qt/A and ethofumesate at 6 pt/A.

Table 2. Percent visible sugarbeet injury and waterhemp control in response to herbicide treatment, Moorhead, MN, 2025.[a]

PPI Herbicide[a]	Postemergence Herbicide	Rate	Percent Sugarbeet Injury		Percent Waterhemp Control			
		(fl oz, pt, or qt/A)	30 DAP	44 DAP	30 DAP	37 DAP	44 DAP	51 DAP
Antor		3 qt	0 b	0 b	65 c	51 c	43 d	18 cd
Antor		6 qt	0 b	0 b	78 b	76 ab	70 ab	69 b
Nortron		3p	13 a	0 b	69 c	65 b	50 cd	33 c
Nortron		6p	3 b	3 b	80 b	75 ab	63 bc	60 b
Eptam		3.5p	15 a	10 a	89 a	83 a	81 a	89 a
	PowerMax3 + etho / PowerMax3 + etho	25 + 6 / 25 + 6	0 b	0 b	68 c	29 d	39 d	10 d
P-Value			0.0045	0.0652	0.0010	0.0001	0.0007	0.0001

[a]Sugarbeet injury or waterhemp control followed by the same alphabetical letter indicates non-statistical differences between treatments at the 0.10 alpha level

[b]Roundup PowerMax3 mixed with ethofumesate at 25 + 6 fl oz/A with NIS and Amsol liquid AMS at 0.25% and 2.5% v/v 2-times POST at the 2- and 6-lf stage.

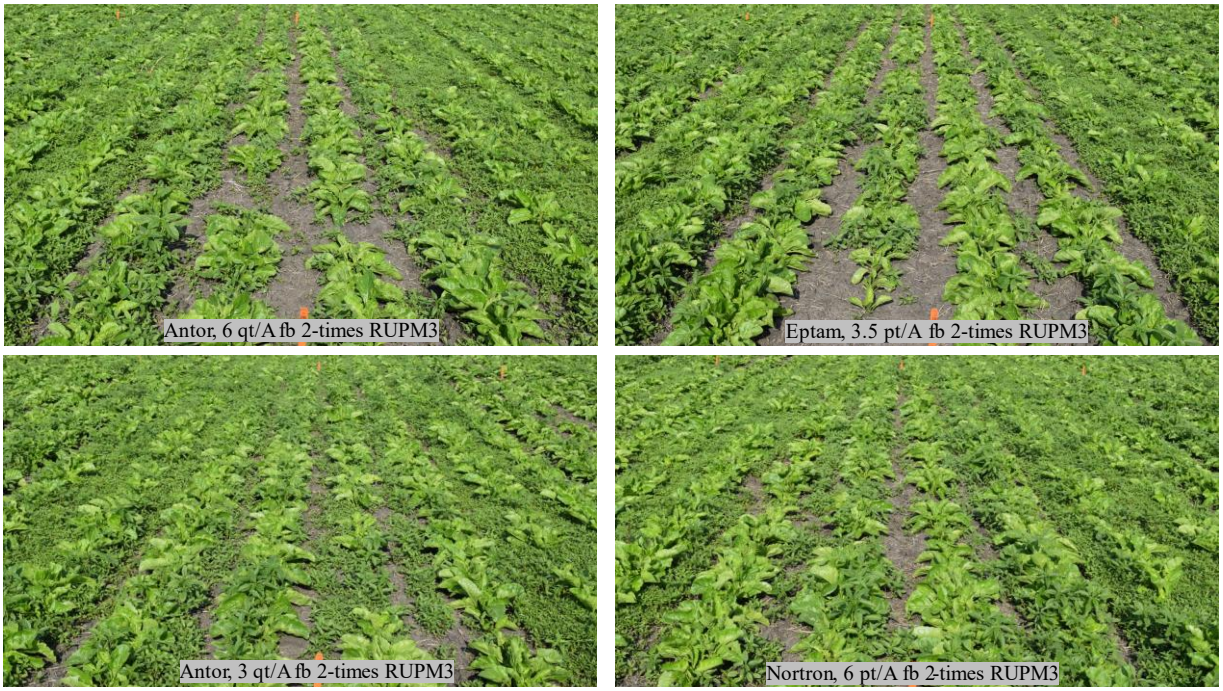

Figure. Waterhemp control 44 days after planting, Moorhead, MN, 2025.

Discussion
Antor was approved in sugarbeet at up to 1.5 gallon per acre (6 qt/A) for control of redroot pigweed in sugarbeet. The spectrum of grass and broadleaf control from Antor is relatively narrow in sugarbeet in MN and ND. According to the 1987 Sugarbeet Production Guide published by the Cooperative Extension Service, North Dakota State University and the University of Minnesota, Antor provides good to excellent control of redroot pigweed and fair to good control of black nightshade. Control of other broadleaves was no greater than poor. Antor provided broad spectrum grass control, providing fair to good control of barnyardgrass, foxtail species and wild oat.

Ethofumesate provided waterhemp control similar to Antor. Unfortunately, the use rate combined with control of waterhemp similar to ethofumeate and lack of spectrum prevents us from becoming excited about Antor for weed control in sugarbeet in MN and ND.

Acknowledgements
Special thanks to Mr. Clark Alder, Sales Manager, KWS Seeds, Middleton, ID for sourcing Antor from a storage unit out back. Evaluating waterhemp control from Antor was on my 'bucket list' and provides personal gratification since it connects my waterhemp control program to Dr. Dexter's program for redroot pigweed control. I feel I can rest easy now.