Report to the Specialty Seed Growers of Western OR (SSGWO)

TITLE: Evaluation of herbicides for control of broadleaf weeds in chicory

PERSONNEL & COOPERATORS:
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Introduction
In the Willamette Valley, many farms rely on grass seed production as a primary source of revenue. Profitable grass seed production requires seed purity. To achieve seed purity, grass weeds in grass seed fields need to be controlled and reducing the grass weed seed bank is essential in producing clean seed lots. Rotating crops from grass to broadleaf crops opens the opportunity to use herbicides not suitable for grass seed production to control grass weeds and reduce the seed bank. This also helps defend against the development of herbicide resistance. However, for a broadleaf crop to be useful in this strategy it must also be profitable. Chicory is a good candidate for this type of rotational strategy, but herbicides registered for use in chicory are very limited making weed control in chicory is extremely difficult. Gowers often face low yield and high cleanout costs due to broadleaf weeds in the crop. Developing herbicides for chicory would help increase the profitability of chicory as a crop in the Willamette Valley.

Procedures
Chicory was planted at the Pratum Co-op research farm September 24, 2024. The trial was a randomized complete block design with four replications. Bentazone, bromoxynil, metribuzin, pyroxasulfone, paraquat, simazine, EPTC, pronamide, flumetsulam, MCPA, and asulam were evaluated in the trial. Treatments were applied by a bicycle wheeled sprayer calibrated to deliver 20 GPA, equipped with Green Leaf AM11003 nozzles. The plots were swathed in two directions using a plot swather with a draper header on August 22, 2025. The plots were combined on August 29, 2025, and harvested seed cleaned on a small Clipper seed cleaner.

Results
Chicory injury, weed control, and chicory seed yield are found in Table 3. The primary weed in this trial was volunteer crimson clover. Volunteer crimson clover was best controlled by pre-emergent simazine or post-emergent metribuzin or paraquat. Simazine and metribuzin were the most injurious herbicides. Plots treated with preemergent simazine yielded significantly more (at p-value 0.05) than the untreated, despite early injury. Yield in plots treated with metribuzin were 27% lower than the untreated (results not significant). Many of

the treatments exhibited significant injury at the last evaluation on May 30, 2025, however, metribuzin was the only herbicide treatment with yield lower than the untreated. Many of the treatments were significantly higher than the untreated. A striking example of this was paraquat. In plots treated with paraquat yield was more than double the untreated. These results indicate that there are several likely herbicide candidates for weed control in chicory. To pursue registration of any of these herbicides additional data would be required.

Table 1. Site and application description.

Crop Description	
Crop	Chicory
Planting Date	9/24/2024
Planting Rate	7.8 lb/a
Soil	

Application Description			
	A	B	C
Date	9/24/2024	1/13/2025	3/7/2025
Start Time	2:00 PM	10:00 AM	7:30 AM
Stop Time	2:45 PM	10:10 AM	9:00 AM
Entry Date	5/28/2025	5/28/2025	5/28/2025
Air Temperature	83 F	37 F	47 F
Relative Humidity	51%	92%	76%
Wind	0 MPH,	0 MPH,	6 MPH, S
Wind max			7 MPH, -
Wet Leaves (Y/N)		Y, yes	Y, yes
Soil Temperature	83 F		44 F
Soil Moisture	Dry	Wet	Moist
Soil Surface	Dusty		
% Cloud Cover	0	100	15
Crop stage	Pre	2-3 leaf	6-8 leaf

Table 2. Experimental herbicide treatments applied to chicory.

Name	Formulation					Application	
Treatment	Conc	Type	Description	Rate		Code	Description
untreated							
pyroxasulfone	4.17	SC	Zidua	3	oz/a	A	Pre
simazine	4	L	Simazine 4L	2	qt/a	A	Pre
flumetsulam	0.8	WDG	Python	0.66	oz/a	A	Pre
pyroxasulfone	4.17	SC	Zidua	3	oz/a	B	2 leaf
flumetsulam	0.8	WDG	Python	1.33	oz/a	C	4-8 leaf
+ NIS	100	L		0.25	% v/v	C	4-8 leaf
bentazon	4	EC	Basagran	2	pt/a	C	4-8 leaf
+ COC	100	L		1	% v/v	C	4-8 leaf
+ UAN	32	L		1	qt/a	C	4-8 leaf
bromoxynil	2	EC	Brox 2EC	1	pt/a	C	4-8 leaf
+ NIS	100	L		0.25	% v/v	C	4-8 leaf
metribuzin	75	DF	Metricor	1	lb/a	C	4-8 leaf
+ NIS	100	L		0.25	% v/v	C	4-8 leaf
paraquat	3	SL	Gramoxone	1.3	pt/a	C	4-8 leaf
+ NIS	100	L		0.25	% v/v	C	4-8 leaf
EPTC	7	L	Eptam	3	pt/a	C	4-8 leaf
pronamide	3.3	SC	Kerb	5	pt/a	C	4-8 leaf
MCPA	4	EC	MCP Amine 4	0.5	pt/a	C	4-8 leaf
+ NIS	100	L		0.25	% v/v	C	4-8 leaf
asulam	3.34	L	Asulox	3	pt/a	C	4-8 leaf
+ NIS	100	L		0.25	% v/v	C	4-8 leaf

Table 3. Weed control, injury, and crop safety with experimental herbicides applied to chicory grown for seed.

Treatment	Rate		App Code	Chicory Injury 1/8/2025		Chicory Injury 3/6/2025		Shepherd's purse Control 3/6/2025		Crimson clover Control 3/6/2025		Chicory Injury 3/14/2025		Chicory Injury 5/30/2025		Crimson clover Control 5/30/2025		Chicory Yield 8/29/2025	
				%														lb/a	
untreated				0	c	0	c	0	d	0	c	0	f	0	d	0	d	404	fg
pyroxasulfone	3	oz/a	A	48	b	40	b	63	bc	25	b	28	b	5	d	10	d	501	def
simazine	2	qt/a	A	91	a	99	a	99	a	96	a	98	a	43	bc	78	b	702	b
flumetsulam	0.66	oz/a	A	43	b	40	b	78	b	30	b	23	bc	0	d	0	d	572	b-e
pyroxasulfone	3	oz/a	B	-		15	c	48	c	20	bc	8	def	0	d	0	d	511	def
flumetsulam	1.33	oz/a	C	-		-		-		-		10	c-f	0	d	0	d	614	bcd
+ NIS	0.25	% v/v	C	-		-		-		-									
bentazon	2	pt/a	C	-		-		-		-		21	bcd	45	bc	0	d	447	ef
+ COC	1	% v/v	C	-		-		-		-									
+ UAN	1	qt/a	C	-		-		-		-									
bromoxynil	1	pt/a	C	-		-		-		-		19	b-e	38	c	0	d	524	c-f
+ NIS	0.25	% v/v	C	-		-		-		-									
metribuzin	1	lb/a	C	-		-		-		-		18	b-e	99	a	100	a	294	g
+ NIS	0.25	% v/v	C	-		-		-		-									
paraquat	1.3	pt/a	C	-		-		-		-		96	a	61	b	91	ab	915	a
+ NIS	0.25	% v/v	C	-		-		-		-									
EPTC	3	pt/a	C	-		-		-		-		0	f	0	d	10	d	495	def
pronamide	5	pt/a	C	-		-		-		-		5	ef	3	d	0	d	578	b-e
MCPA	0.5	pt/a	C	-		-		-		-		15	b-e	50	bc	0	d	497	def
+ NIS	0.25	% v/v	C	-		-		-		-									
asulam	3	pt/a	C	-		-		-		-		0	f	8	d	40	c	664	bc
+ NIS	0.25	% v/v	C	-		-		-		-									
LSD P=0.05				16.2		18.4		21.1		23.9		15.0		20.3		21.6		150.4	
Standard Deviation				10.2		12.0		13.7		15.5		10.5		14.2		15.1		105.2	
CV				22.4		30.9		23.9		45.5		43.1		56.7		64.4		19.1	