

Evaluation of common buckwheat tolerance to two preemergence herbicides at Hettinger, ND, 2024.

A trial was conducted near Hettinger, ND, to evaluate the effects of two preemergence herbicides, in common buckwheat. As neither of these herbicides are labeled for use in buckwheat, they will only be identified as Herbicide 1 and 2. Buckwheat was planted on June 12, 2024 at a depth of 2 inches using a John Deere no-till drill with 7.5 inch row spacings. Herbicide treatments (Table 1) were applied on June 13, 2024 using a tractor-mounted research plot sprayer (Table 2). In the 10 days after herbicide treatments were applied, 1.16 inches of rainfall occurred. Buckwheat emerged on June 18. Buckwheat was visually evaluated for injury (bleaching or stunting) at 2, 3, and 5 weeks after treatment (WAT) at a rate from 0 to 100%, where 0% is no injury and 100% is complete plant death (Table 1). Stand count was measured two weeks after buckwheat emergence (WAE) by counting all buckwheat plants within two randomly placed 0.5 m² quadrats in each plot. Heights of 10 random buckwheat plants were measured within each plot 5 WAE. Buckwheat was swathed to dry down and then was harvested using a small plot combine on September 12, 2024.

Neither of the two herbicides evaluated caused visual injury exceeding 10% when evaluated 2, 3, and 5 weeks after treatment. The combination of both herbicides at the highest rates (treatment 9) resulted in injury of 11, 23, and 15%, at 2, 3, and 5 WAT, respectively. There was no significant reduction in buckwheat stand count when measured 2 weeks after emergence. Buckwheat height was lowest (69 to 70 cm) 5 WAE with Herbicide 2 alone (both rates) and with the combination of Herbicide 1 and 2, compared with Herbicide 1 applied alone at 1X, 2X, and 3X rates (77, 78, and 73 cm, respectively). However, buckwheat in the untreated control was also similar in height to treatments having the lowest buckwheat height. July and August of 2024 were hot and dry with only 50% of normal rainfall. These hot and dry conditions reduced buckwheat growth and yield potential. Yield of buckwheat was much lower than typical due to these growing conditions and was also quite variable (CV 29). Due to the low yield and variable yield, there were no significant differences in yield when comparing herbicide treatments. While yield differences were not significant, all herbicide treatments resulted in buckwheat yields that were numerically higher than the untreated control. Also, the two treatments where buckwheat height was reduced most (6 and 9) had the highest numerical yield of all treatments.

This trial demonstrates that buckwheat has good tolerance to both herbicides evaluated in this trial at this location, whether applied alone or in combination.

Table 1. The effect of preemergence application of the herbicides Balance Flex (isoxaflutole) and Zidua SC (pyroxasulfone) and their combinations on injury, stand, height, and yield at Hettinger, ND, 2024.

Treatment	Rate	Injury ^a			Stand count ^b	Height ^c	Yield ^d	
		2 WAT	3 WAT	5 WAT				
		%			— #/m ² —	— cm —	— LB/acre —	
1	Untreated	—	0c	0d	0c	211-	72cd	98-
2	Herbicide 1	1X	0c	3cd	0c	190-	77ab	112-
3	Herbicide 1	2X	4bc	7bc	2c	197-	78a	110-
4	Herbicide 1	3X	6b	3cd	1c	185-	73bc	134-
5	Herbicide 2	1X	0c	3cd	0c	191-	69d	126-
6	Herbicide 2	2X	0c	7bc	8b	172-	69d	153-
7	Herbicide 1	1X	1bc	6bc	9b	189-	70cd	136-
	Herbicide 2	1X						
8	Herbicide 1	2X	3bc	11b	5bc	179-	70cd	120-
	Herbicide 2	1X						
9	Herbicide 1	3X	11a	23a	15a	201-	69d	141-
	Herbicide 2	1X						
LSD P=.05			4.5	5.2	5.1	33.0	3.4	53.2
Standard Deviation			3.0	3.5	3.5	22.5	2.2	36.4
CV			110.12	49.87	83.9	11.79	3.1	29.02
Treatment Prob(F)			0.0010	0.0001	0.0001	0.4343	0.0009	0.5297

^a Injury was evaluated visually for symptoms of bleaching and/or stunting at 2, 3, and 5 weeks after treatments were applied (treatments were applied at planting).

^b Buckwheat stand count was measured using two quadrats (0.5 m²) from each plot on July 2, 2024, 2 weeks after buckwheat emergence.

^c Buckwheat height was measured on July 24, 2024, with 10 height measurements recorded from each plot.

^d Buckwheat yield was recorded using a small plot combine, buckwheat was swathed with a small plot swather equipped with a 5-foot header 10 days prior to combining.

Table 2. Application environment and equipment used for herbicide treatment.

Application environment	Application Equipment		
Date	Jun-13-2024	Equipment Type	Tractor-mounted
Start Time	6:39 AM	Operation Pressure	43 PSI
Stop Time	7:00 AM	Nozzle Model	11002
Air Temperature Start, Stop	56, 62 F	Nozzle Type	Drift reduction
% Relative Humidity Start, Stop	54, 56	Nozzle Spacing	20 IN
Wind Velocity+Dir. Start	0 MPH, SW	Boom Length	100 IN
Wind Velocity+Dir. Stop	1.6 MPH, SW	Boom Height	28.0 IN
Wind Velocity+Dir. Max	2.9 MPH, SW	Ground Speed	4.2 MPH
Wet Leaves (Y/N)	N/A	Carrier	WATER
Soil Temperature	50 F	Application Amount	10 GAL/AC
Soil Moisture	Dry	Mix Size	2 L
% Cloud Cover	10	Propellant	CO2