Safety and Efficacy of Tolpyralate + Bromoxynil Tank Mix on Spring Wheat

J.E.R. Kalin & I.C. Burke

Tolpyralate is a new active ingredient for wheat. An inhibitor of 4-HPPD, tolpyralate is known to control common broadleaf weeds in the PNW. Like Huskie and Talinor, tolpyralate synergizes with bromoxynil, and will be sold in a product with both active ingredients. Tolpyralate may also have annual grass activity. However, little is known about the activity of tolpyralate on weeds unique to the PNW, like mayweed chamomile. Therefore, the study objective was to evaluate tolpyralate + bromoxynil tank mix for crop safety and efficacy in PNW spring wheat.

The study was established in three spring wheat fields near Pullman, WA, one was on Cook Farm and the other two were at the Palouse Conservation Field Station farm. Treatments were applied when wheat was 3 to 5 tiller and actively growing (Table 1). Treatments were applied with a CO_2 powered backpack sprayer and a 5 ft boom with 3 Teejet 11002VS nozzles with an effective spray pattern of 8 ft and calibrated to deliver 15 gallons per acre (GPA). The study was conducted in a randomized complete block design with 4 replications. Plots were 10 ft wide by 30 ft long. Treatments were assessed for crop response and weed control 7, 14, and 21 days after treatment. Data were subject to ANOVA using the Agricultural Research Manager software (Ver. 8.5).

Table 1*. Treatment application details.*

	Study Application		
Trial	**A**	**B**	**C**
Date	5/31/2023	6/7/2023	5/31/2023
Application volume (GPA)	15	15	15
Timing	Postemergence	Postemergence	Postemergence
Crop Stage	3 to 5 Tiller	3 to 5 Tiller	3 to 5 Tiller
Air temperature (˚F)	52	85	58
Wind velocity (mph, direction)	7, E	5, SE	9, E
Cloud Cover (%)	10	0	10

Results

Tolpyralate did not cause injury in spring wheat. Treatments for trials A and C were applied on the same day, with trial B receiving treatments about a week later. Crop injury was negligible for trial A (Table 2), and was not observed in trial C (Table 6). The slight stunting observed in trial B was transient, under 40%, and was higher in the treatments with Huskie and Talinor (Table 4).

Tolpyralate was effective for broadleaf weed control across the three trials (Tables 3, 5, and 6). The treatment that included WideARmatch had consistently high weed control ratings in each trial. Tolpyralate + bromoxynil at 14 oz/A had better weed control than the 11 oz/A rate. Tolpyralate appears to be safe for use in spring wheat and controls common annual broadleaf weeds in the PNW. Additional research is needed to confirm safety to rotational crops, activity on wild oat, and to evaluate a broader range of herbicides to use in mixture. PNW farmers appear to have a new tool for broadleaf weed management in wheat.

Table 2. Crop injury for trial A (PCFS1) in response to increasing rates of tolpyralate + bromoxynil. Crop injury was present in 2 treatments 7 days after application but was not present in subsequent rating dates. Means with the same letters are not significantly different from each other (alpha = 0.05). Means with no letters are not significantly different from each other (alpha = 0.05).

			Injury (%)		Injury (%)	Injury (%)
Treatment	**Rate**		**7 DAA**		**14 DAA**	**21 DAA**
Tolpyralate + Bromoxynil	11	oz/A	0	a	0	0
MSO	0.5	% v/v				
Tolpyralate + Bromoxynil	14.7	oz/A	3	a	0	0
MSO	0.5	% v/v				
Tolpyralate + Bromoxynil	11	oz/A	0	a	0	0
Embed Extra	8	oz/A				
Tolpyralate + Bromoxynil	11	oz/A	0	a	0	0
WideARmatch	19.4	oz/A				
Tolpyralate + Bromoxynil	11	oz/A	0	a	0	0
Talinor	15	oz/A				
CoAct+	2.75	oz/A				
COC	1	% v/v				
Huskie	15	oz/A	8	b	0	0
NIS	0.5	% v/v				

Table 3. Weed control for trial A (PCFS1) in response to increasing rates tolpyralate + bromoxynil. Common lambsquarters control ranged from 70 to 98%. Tolpyralate + bromoxynil treatments that included Embed Extra or Talinor had the highest weed control ratings. Means with the same letters are not significantly different from each other (alpha = 0.05). Means with no letters are not significantly different from each other (alpha = 0.05).

			Common Lambsquarters Control (%)		Common Lambsquarters Control (%)	Common Lambsquarters Control (%)
Treatment	**Rate**		**7 DAA**		**14 DAA**	**21 DAA**
Tolpyralate + Bromoxynil	11	oz/A	88	ab	88	95
MSO	0.5	% v/v				
Tolpyralate + Bromoxynil	14.7	oz/A	95	a	83	93
MSO	0.5	% v/v				
Tolpyralate + Bromoxynil	11	oz/A	98	a	98	90
Embed Extra	8	oz/A				
Tolpyralate + Bromoxynil	11	oz/A	90	ab	83	95
WideARmatch	19.4	oz/A				
Tolpyralate + Bromoxynil	11	oz/A	98	a	93	95
Talinor	15	oz/A				
CoAct+	2.75	oz/A				
COC	1	% v/v				
Huskie	15	oz/A	68	b	98	88
NIS	0.5	% v/v				

Table 4. Crop injury for trial B (PCFS2) in response to increasing rates of tolpyralate + bromoxynil. Crop injury was relatively high in this trial compared to the other trials. This could be due to the late treatment application when temperature and relative humidity were higher (table 1). Means with no letters are not significantly different from each other (alpha = 0.05).

			Injury (%)	Injury (%)	Injury (%)
Treatment	**Rate**		**7 DAA**	**14 DAA**	**21 DAA**
Tolpyralate + Bromoxynil	11	oz/A	0	13	10
MSO	0.5	% v/v			
Tolpyralate + Bromoxynil	14.7	oz/A	0	10	10
MSO	0.5	% v/v			
Tolpyralate + Bromoxynil	11	oz/A	0	13	8
Embed Extra	8	oz/A			
Tolpyralate + Bromoxynil	11	oz/A	0	18	15
WideARmatch	19.4	oz/A			
Tolpyralate + Bromoxynil	11	oz/A	0	40	30
Talinor	15	oz/A			
CoAct+	2.75	oz/A			
COC	1	% v/v			
Huskie	15	oz/A	0	43	78
NIS	0.5	% v/v			

Table 5. Weed control for trial B (PCFS2) in response to increasing rates of tolpyralate + bromoxynil. Mayweed chamomile control was between 65-95%, a wider range compared to the other two trials. Means with no letters are not significantly different from each other (alpha = 0.05).

			Mayweed Chamomile Control (%)	Mayweed Chamomile Control (%)	Mayweed Chamomile Control (%)
Treatment	**Rate**		**7 DAA**	**14 DAA**	**21 DAA**
Tolpyralate + Bromoxynil	11	oz/A	70	63	73
MSO	0.5	% v/v			
Tolpyralate + Bromoxynil	14.7	oz/A	80	73	88
MSO	0.5	% v/v			
Tolpyralate + Bromoxynil	11	oz/A	70	70	83
Embed Extra	8	oz/A			
Tolpyralate + Bromoxynil	11	oz/A	92	88	67
WideARmatch	19.4	oz/A			
Tolpyralate + Bromoxynil	11	oz/A	90	85	95
Talinor	15	oz/A			
CoAct+	2.75	oz/A			
COC	1	% v/v			
Huskie	15	oz/A	72	95	78
NIS	0.5	% v/v			

Table 6. Weed control for trial C (Cook) in response to increasing rates of tolpyralate + bromoxynil. Mayweed chamomile control was greater than 85% on any given rating date or treatment. Means with no letters are not significantly different from each other (alpha = 0.05).

			Mayweed Chamomile Control (%)	Mayweed Chamomile Control (%)	Mayweed Chamomile Control (%)
Treatment	**Rate**		**7 DAA**	**14 DAA**	**21 DAA**
Tolpyralate + Bromoxynil	11	oz/A	100	95	88
MSO	0.5	% v/v			
Tolpyralate + Bromoxynil	14.7	oz/A	100	98	95
MSO	0.5	% v/v			
Tolpyralate + Bromoxynil	11	oz/A	95	90	88
Embed Extra	8	oz/A			
Tolpyralate + Bromoxynil	11	oz/A	98	98	93
WideARmatch	19.4	oz/A			
Tolpyralate + Bromoxynil	11	oz/A	95	95	90
Talinor	15	oz/A			
CoAct+	2.75	oz/A			
COC	1	% v/v			
Huskie	15	oz/A	98	90	83
NIS	0.5	% v/v			

Off-label or Experimental-Use Disclaimer

Some of the pesticides discussed in this presentation were tested under an experimental use permit granted by WSDA. Application of a pesticide to a crop or site that is not on the label is a violation of pesticide law and may subject the applicator to civil penalties up to $7,500. In addition, such an application may also result in illegal residues that could subject the crop to seizure or embargo action by WSDA and/or the U.S. Food and Drug Administration. It is your responsibility to check the label before using the product to ensure lawful use and obtain all necessary permits in advance.