

Yellow Rust Control in Winter Wheat

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Introduction

In spring of 2023, a field trial was established to evaluate efficacy of three different fungicides to control yellow rust in winter wheat. Yellow rust is a significant disease that can reduce wheat yields and grain quality if not properly managed. The three fungicides used in this trial are Prosaro Pro (Tebuconazole + fluopyram + prothioconazole), Delaro (prothioconazole + trifloxystrobin), and Tilt (propiconazole) - Delaro is not labeled for use in wheat. Yellow rust prevalence varies from year to year but knowing if there is antagonism between the fungicides and business-as-usual herbicide tank mix is important for producers. Therefore, the objective of this study was to determine (1) crop injury, (2) yellow rust control, and (3) weed control using different fungicide tank mixes.

Methods

The study was established in winter field near Pullman, WA. Treatments were applied when wheat was 3 to 5 tiller and actively growing (Table 1). Treatments were applied with a CO₂ 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 yellow rust control 7, 21, and 29 days after treatment. Plots were harvested with a Wintersteiger small plot combine with a 5-foot header. Data were subject to ANOVA using the Agricultural Research Manager software (Ver. 2023).

Table 1. Treatment application details.

Study Application	
Date	5/15/2023
Application volume (GPA)	15
Timing	Postemergence
Crop Stage	3 to 5 Tiller
Air temperature (°F)	67
Wind velocity (mph, direction)	8, NW
Cloud Cover (%)	10

Results

The field that the trial was located did not have any detectable yellow rust in the 2023 growing season, so control ratings are not presented here. However, there was crop injury from the majority of treatments (Table 2). The treatment with Osprey + Huskie + Brox M had the least injury noted (Table 2). The injury noted was slight yellowing and stunting but the observed injury did result in end of season yield loss, which averaged just under 140 bu/A for most treatments (Table 2). However, treatments that included Tilt had slightly higher yield than other treatments. There was no yellow rust to control in the field and weed control was not different among treatments. Yield was slightly higher with Delaro treatments, but not significantly. The application of herbicides and fungicides in mixture is a common practice. Under adverse conditions, such mixtures can result in significant injury. Ideally, applications of fungicides and herbicides should be separated. If a complex mixture is being considered, choosing the least injurious fungicide partner is advised to minimize potential yield loss.



Nontreated plot (left) compared to treatment that included Osprey XTRA + Huskie + BROX-M + Prosaro Pro. There is slight stunting to the entire plot.

Table 2. Crop injury of winter wheat in response to fungicide tank mixes. The general injury ratings is the percent of the plot affected by the injury. The discoloration and stunting ratings are the severity of the injury within the injured area. Means with the same letters are not significantly different from each other ($\alpha = 0.05$).

Treatment ¹			Discoloration (%)		Injury (% of plot)		Stunting (%)	
	Rate		5/22/2023		6/5/2023		6/5/2023	
Osprey XTRA	4.75	oz/A						
Huskie	13.5	oz/A	25	b	22	b	11	b
BROX-M	16	oz/A						
Osprey XTRA	4.75	oz/A						
Huskie	13.5	oz/A	63	a	57	a	29	a
BROX-M	16	oz/A						
Prosaro Pro	6.75	oz/A						
Osprey XTRA	4.75	oz/A						
Huskie	13.5	oz/A	100	a	65	a	20	ab
BROX-M	16	oz/A						
Tilt	4	oz/A						
Osprey XTRA	4.75	oz/A						
Huskie	13.5	oz/A	63	a	38	ab	10	b
BROX-M	16	oz/A						
Delaro	7.83	oz/A						
Osprey XTRA	4.75	oz/A						
Huskie	13.5	oz/A	83	a	68	a	25	ab
BROX-M	16	oz/A						
Delaro	6.02	oz/A						
Osprey XTRA	4.75	oz/A						
Huskie	13.5	oz/A	98	a	43	a	15	ab
BROX-M	16	oz/A						
Proline Gold	6.84	oz/A						
Osprey XTRA	4.75	oz/A						
Huskie	13.5	oz/A	88	a	65	a	23	ab
BROX-M	16	oz/A						
Proline Gold	5.13	oz/A						

¹All treatments included NIS (0.25% v/v) and UAN (4 pt/A).

Table 3. Crop injury of winter wheat in response to fungicide tank mixes. The general injury ratings is the percent of the plot affected by the injury. The discoloration and stunting ratings are the severity of the injury within the injured area. Means with the same letters are not significantly different from each other (alpha = 0.05).

Treatment ¹	Rate		Injury (% of plot)		Stunting (%)	
			6/13/2023		6/13/2023	
Osprey XTRA	4.75	oz/A				
Huskie	13.5	oz/A	22	b	8	b
BROX-M	16	oz/A				
Osprey XTRA	4.75	oz/A				
Huskie	13.5	oz/A	57	a	23	a
BROX-M	16	oz/A				
Prosaro Pro	6.75	oz/A				
Osprey XTRA	4.75	oz/A				
Huskie	13.5	oz/A	93	a	23	a
BROX-M	16	oz/A				
Tilt	4	oz/A				
Osprey XTRA	4.75	oz/A				
Huskie	13.5	oz/A	60	a	21	a
BROX-M	16	oz/A				
Delaro	7.83	oz/A				
Osprey XTRA	4.75	oz/A				
Huskie	13.5	oz/A	82	a	25	a
BROX-M	16	oz/A				
Delaro	6.02	oz/A				
Osprey XTRA	4.75	oz/A				
Huskie	13.5	oz/A	88	a	28	a
BROX-M	16	oz/A				
Proline Gold	6.84	oz/A				
Osprey XTRA	4.75	oz/A				
Huskie	13.5	oz/A	85	a	28	a
BROX-M	16	oz/A				
Proline Gold	5.13	oz/A				

¹All treatments included NIS (0.25% v/v) and UAN (4 pt/A).

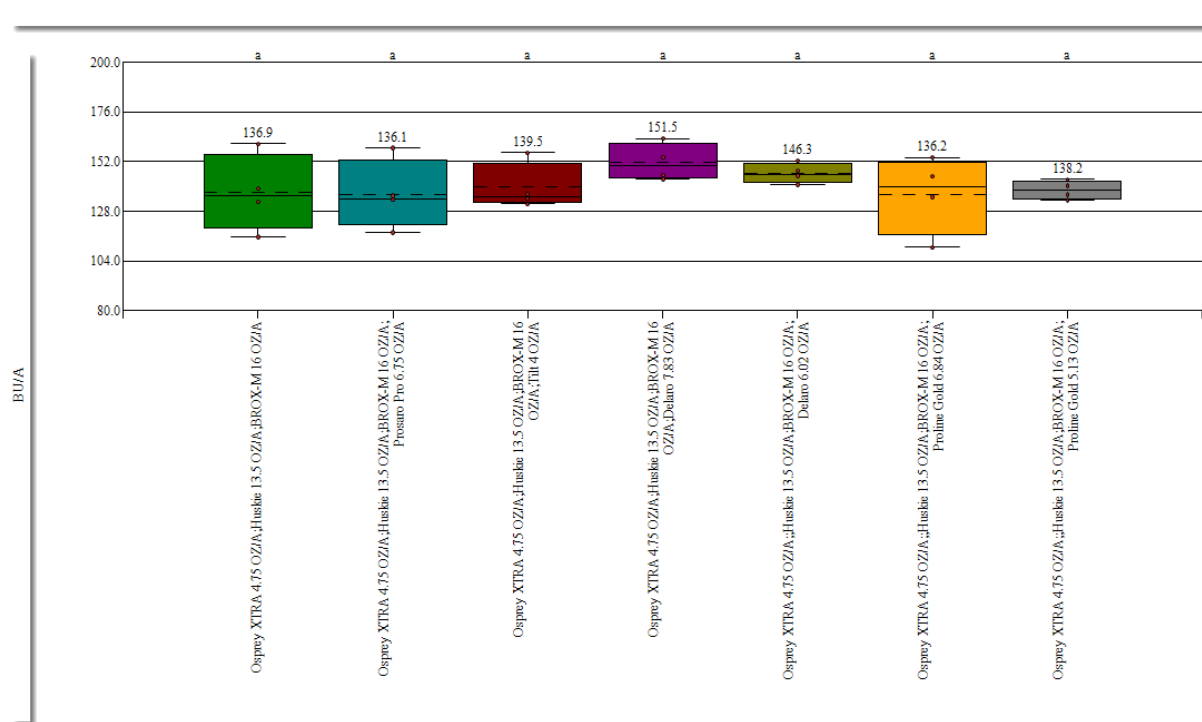


Figure 1. Yield of winter wheat in response to different fungicide tank mixes.

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.