

Metribuzin tolerance in Rydrich MZ winter wheat

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

Metribuzin is a critical component of an integrated herbicide management system for control of troublesome grass weeds in wheat. Over the decades since the registration of metribuzin, farmers in the region have recognized that certain wheat varieties were much less tolerant than others, and in the absence of data, modified their approach to metribuzin use by lowering rates regardless of variety. Lower rates make metribuzin much less effective for annual grass control. Once the Group 2 herbicides, particularly Outlook/Maverick were introduced, metribuzin use declined. To enable farmers to make informed decisions about rate of metribuzin to use, a screening protocol was developed that identified Rydrich MZ as having very high levels of tolerance, and Crecent as having substantially lower levels of tolerance. This study objective was to evaluate metribuzin tolerance in Rydrich MZ winter wheat in comparison to a known susceptible and genetically similar variety, Crescent, in different soil and climate conditions.

Three study sites were identified for these trials: WSU Research Farm near Central Ferry, WA, WSU Wilke Farm near Davenport, WA, and a farm near Ralston, WA. At each application timing (Tables 1 through 5), metribuzin was applied at 3, 5, 9, and 12 oz/A. Preemergence applications of metribuzin were applied prior to planting in the fall at planting – note this application timing is known to be injurious and not labeled. Postemergence applications of metribuzin were applied when wheat had 2 leaves in early spring and when wheat was 3-5 tillers in late spring. Treatments were applied with CO₂-powered backpack sprayer and a 5-foot boom with four Teejet 11002VS nozzles. The sprayer was calibrated to 15 gallons per acre. These studies were conducted in a randomized complete block design with four replications and plots were 8 ft wide by 30 ft long. Emergence of wheat in response increasing doses of metribuzin in the fall was assessed, and injury was also assessed in response to postemergence applications. Yield was assessed by harvesting each plot with a small plot combine.

There was a site by metribuzin rate by application timing interaction, so each site is presented by metribuzin rate and timing. Preemergence applications of metribuzin were the most injurious, but only in four of the five experiments. At Davenport, in 2022 (Figure 1), and Central Ferry in 2023 (Figure 4), yield was not affected by increasing rates of metribuzin applied preemergence, regardless of variety. However, at Davenport in 2024 (Figure 5), preemergence applications affected yield of the Rydrich MZ variety but not Crescent. In Ralston and Central Ferry, in 2022 (Figures 2 and 3), stand loss and thus yield decreased with increasing rates of metribuzin. The use of metribuzin preemergence is not labeled, and these data highlight the reason – there is risk for injury in the form of stand loss likely related to timing of activating rainfall in relationship to germination of wheat and would be very challenging to manage.

Yields in response to metribuzin applied early and late postemergence varied by site and year. At Davenport and Ralston, in 2022, there was no yield reduction in response to increasing doses of metribuzin applied postemergence. At Central Ferry, in 2022, there was no yield response for either variety when metribuzin was applied early postemergence, but Crescent yield declined with increasing metribuzin rate when applied late postemergence. Rydrich MZ yield loss occurred in two treatments (6 and 12 oz/A metribuzin), but yield was similar to the nontreated at 3 and 9 oz/A. At Central Ferry, in 2023, a similar trend was observed, where Crescent yields

declined with increasing rate of metribuzin at the last postemergence timing, while Rydrich MZ yields were similar to the nontreated, regardless of rate or timing. At Davenport, in 2024, Crescent yield did not decline with early or late postemergence applications, but Rydrich MZ yield loss occurred at 3 oz/A when applied at early postemergence timing.

Rydrich MZ tolerance to metribuzin over sites, years, metribuzin rate, and metribuzin application timing has been consistently similar to the nontreated. Yield loss did occur when applied at an off-label application timing, but tolerance was observed when applied postemergence at rates up to 12 oz/A. These trials support the use of the entire rate range of metribuzin on Rydrich MZ, when applied according to product labels for metribuzin.

Table 1. Application details for trial on Wilke Farm Davenport, WA.

	Study Application		
Date	8/31/2021	4/20/2022	5/10/2022
Application volume (GPA)	15	15	15
Timing	Preemergence	Postemergence	Postemergence
Crop Stage	-	2 leaf	3-5 tiller

Table 2. Application details for trial near Ralston, WA.

	Study Application		
Date	10/6/2021	4/13/2022	5/4/2022
Application volume (GPA)	15	15	15
Timing	Preemergence	Postemergence	Postemergence
Crop Stage	-	2 leaf	3-5 tiller

Table 3. Application details for trial near Central Ferry, WA, in 2022

	Study Application		
Date	9/28/2021	3/12/2022	5/4/2022
Application volume (GPA)	15	15	15
Timing	Preemergence	Postemergence	Postemergence
Crop Stage	-	2 leaf	3-5 tiller

Table 4. Application details for trial near Central Ferry, WA, in 2023.

Study Application			
Date	10/17/2022	3/22/2023	4/28/2023
Application volume (GPA)	15	15	15
Timing	Preemergence	Postemergence	Postemergence
Crop Stage	-	2 leaf	3-5 tiller

Table 5. Application details for trial near Davenport, WA, in 2024.

Study Application			
Date	9/19/2023	4/12/2024	5/9/2024
Application volume (GPA)	15	15	15
Timing	Preemergence	Postemergence	Postemergence
Crop Stage	-	2 leaf	3-5 tiller

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.

Figure 1. Response of Crescent and Rydlich MZ to increasing doses of metribuzin applied preemergence (Timing A), early postemergence (Timing B), and late postemergence (Timing C) in Davenport, in 2022.

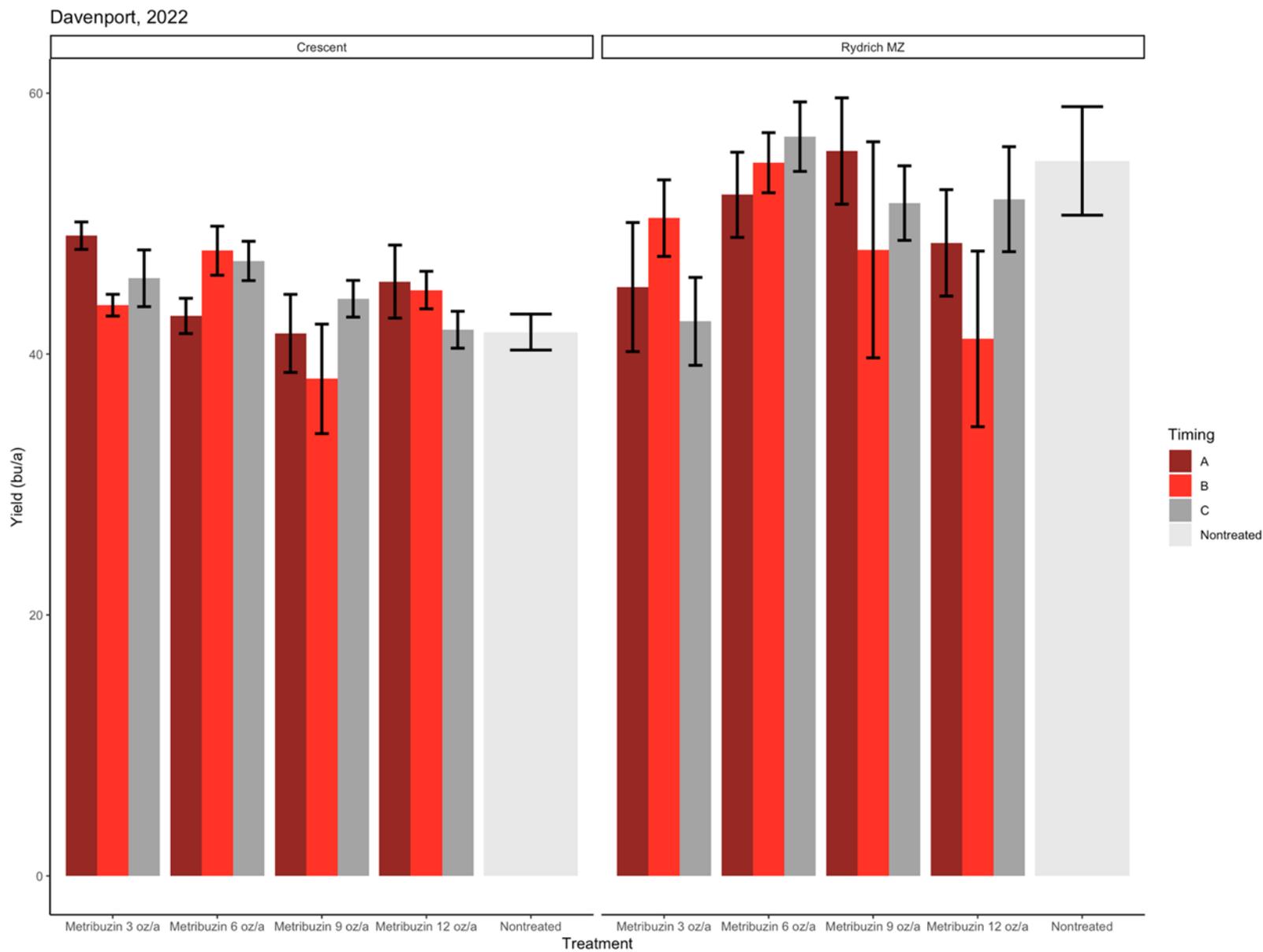


Figure 2. Response of Crescent and Rydlich MZ to increasing doses of metribuzin applied preemergence (Timing A), early postemergence (Timing B), and late postemergence (Timing C) in Ralston, in 2022.

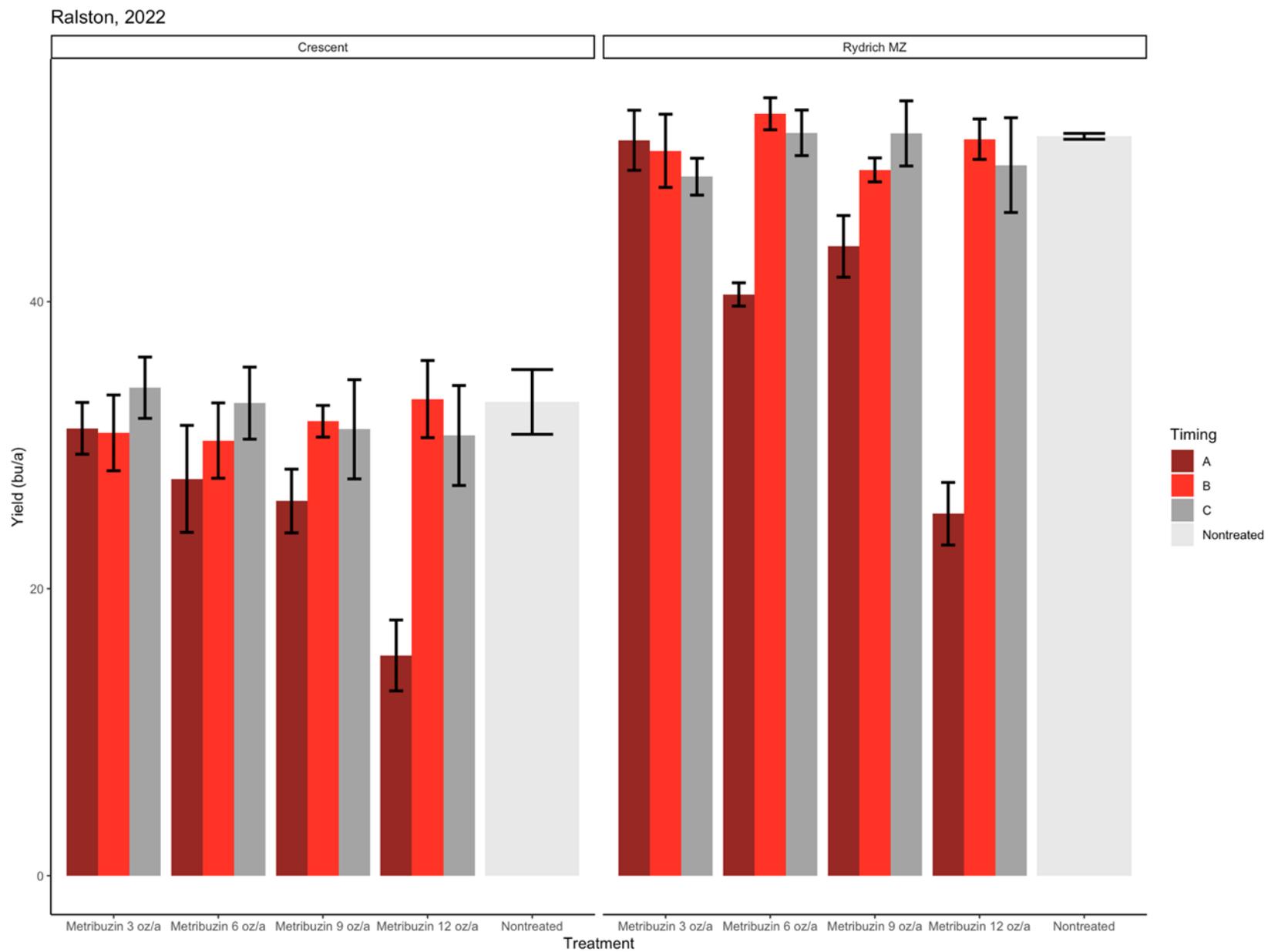


Figure 3. Response of Crescent and Rydrich MZ to increasing doses of metribuzin applied preemergence (Timing A), early postemergence (Timing B), and late postemergence (Timing C) in Central Ferry, in 2022.

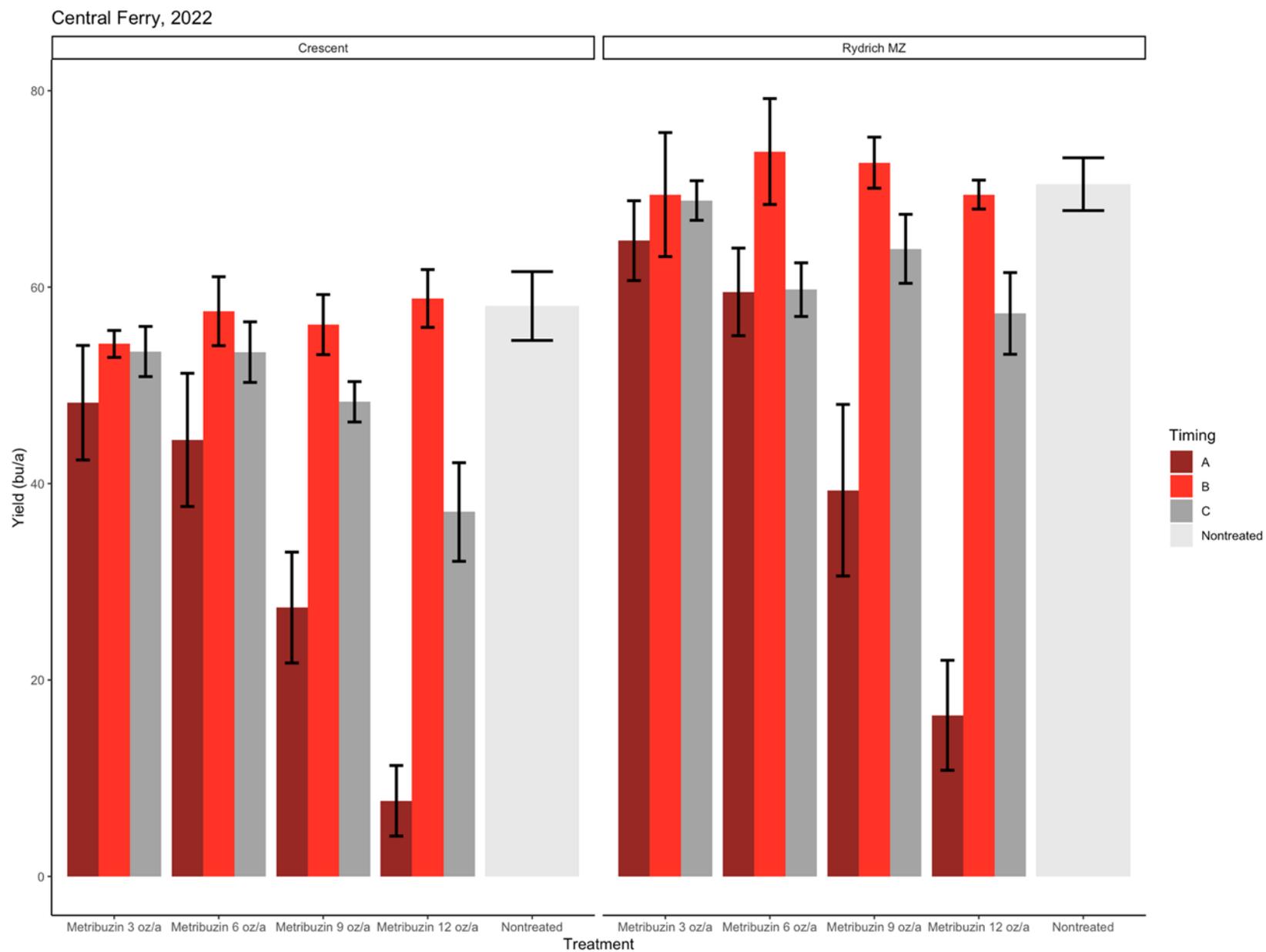


Figure 4. Response of Crescent and Rydlich MZ to increasing doses of metribuzin applied preemergence (Timing A), early postemergence (Timing B), and late postemergence (Timing C) in Central Ferry, in 2023.

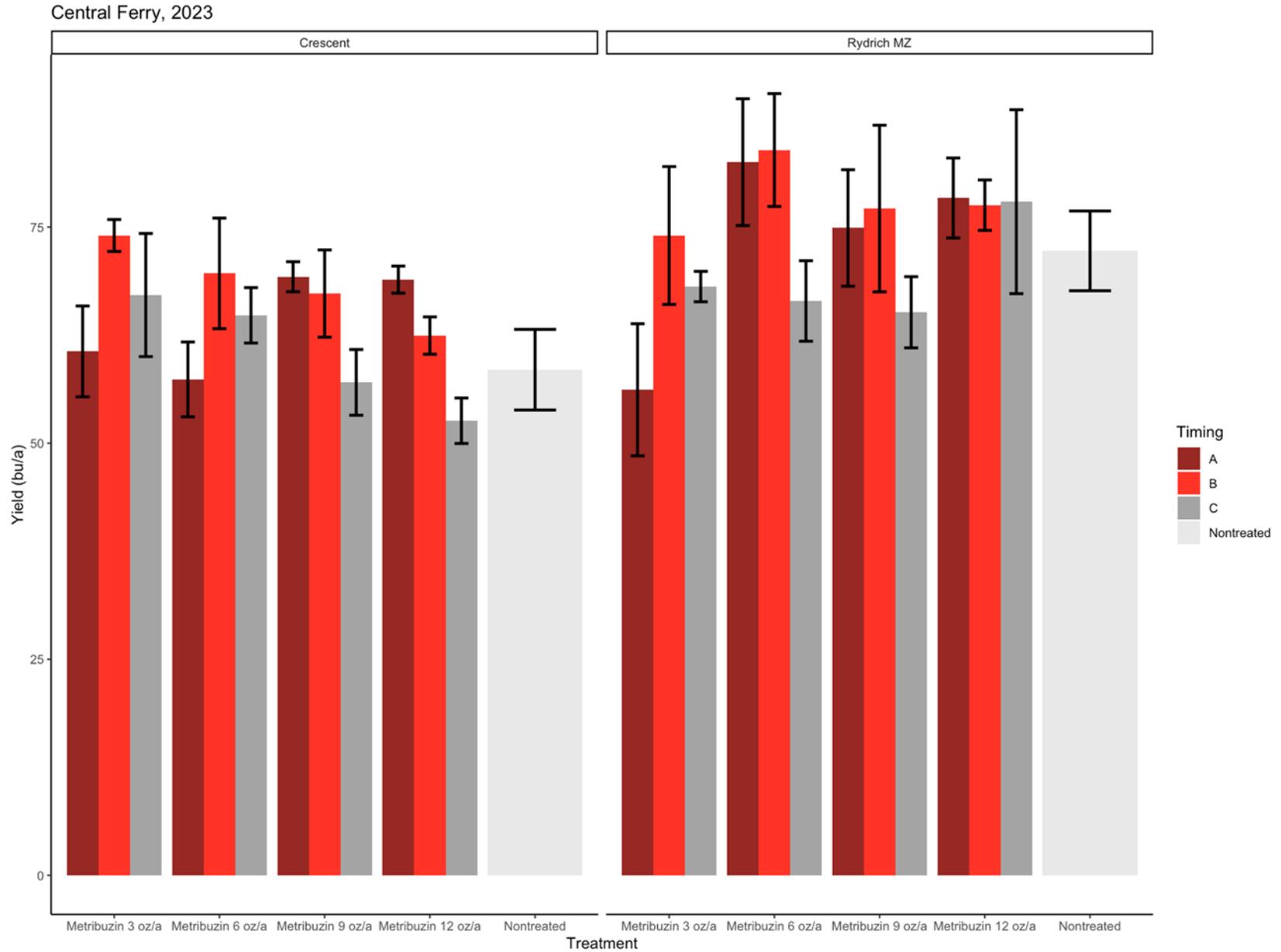


Figure 5. Response of Crescent and Rydrich MZ to increasing doses of metribuzin applied preemergence (Timing A), early postemergence (Timing B), and late postemergence (Timing C) in Davenport, in 2024.

