

Assessing the Risk of Kerb SC Herbicide Carryover to Winter Wheat Following Use in Spring Canola

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Reporting Period: 2021-2023

Accomplishments:

This study demonstrated that preplant applications of Kerb SC are safe to use in spring canola at the recommended rate of 1.25 pt/a; however, it also demonstrated the high risk of Kerb SC herbicide applied for spring canola to carryover and seriously injure the subsequently planted winter wheat crop. If Kerb SC were to be labeled for use in spring canola in the PNW, the recrop interval prior to planting winter wheat would need to be greater than the current 180 days.

Although Italian ryegrass densities in spring canola were only great enough in 2021 for evaluating control with Kerb SC, we found that the proposed use rate of 1.25 pt/a provided only poor to fair control of Italian ryegrass, whereas the 2x rate of 2.5 pt/a provided fair to excellent control. Unless a higher than proposed use rate of Kerb SC were labeled, we do not see it adding much benefit compared to products like trifluralin (for example, Treflan HFP) or ethalfluralin (for example, Sonalan HFP).

Results:

None of the Kerb SC applications affected canola yield in either year. Kerb SC appears to be safe to use in spring canola. However, winter wheat grain yields were strongly and negatively affected by Kerb SC residues in the soil (Table 1). In 2022, very few wheat plants emerged in plots treated with the 2.5 pt/a rate of Kerb (Figure 1). These plots were not harvested. Plots treated with 1.25 pt/a of Kerb SC yielded about one-fourth of what the nontreated check treatment yielded. It did not matter if the Kerb SC was applied in the fall or the spring. In 2023, wheat yield declines were not as great as in 2022 but were still greater than would be commercially acceptable.

Table 1. Winter wheat grain yield following late fall and late winter applications of Kerb SC prior to spring canola planting in the spring of 2021 and 2022.

Application timing	Herbicide rate pt/a	Grain yield ¹ bu/a	
		2022	2023
---	0	121 a	74 a
Late fall	1.25	32 b	57 b
Late winter	1.25	36 b	44 c
Late fall	2.5	---	40 c
Late winter	2.5	---	13 d

¹ Means, based on six replicates, within a column, followed by the same letter are not significantly different at P = 0.05 as determined by Fisher's protected LSD test, which means that we are not confident that the difference is the result of treatment rather than experimental error or random variation associated with the experiment.

The 2021 growing season was plagued by drought. This likely resulted in limited herbicide degradation and a worst-case scenario for herbicide carryover. The continued dry conditions at winter wheat seeding resulted in a shallow seeding depth, which may have placed the winter

wheat seed in or above the layer of soil containing the herbicide residues. If true, this would have resulted in significantly more crop injury than if the seed had been placed below the soil containing herbicide residues. The 2022 growing season was in many ways the opposite of the 2021 season, but even with an unusually wet summer, Kerb carryover to the following winter wheat crop resulted in unacceptable yield loss.



Figure 1. Winter wheat stand in the spring of 2022 following a late fall 2020 application of 2.5 pt/a of Kerb SC herbicide for the previous spring canola crop.

Publications:

Lyon, D. J., Thorne, M. E., & Wetzel, H. C. (2023) Pronamide Tolerance in Spring Canola and the Following Winter Wheat Crop [Abstract]. ASA, CSSA, SSSA International Annual Meeting, St. Louis, MO. <https://scisoc.confex.com/scisoc/2023am/meetingapp.cgi/Paper/150417>.

We will present the results of our study at the U.S Canola Association meeting, being held jointly with the ASA-CSSA-SSSA annual meeting in St. Louis, MO on October 30 and 31. A study summary will also be published in the 2023 WSU Weed Control Report available on the WSU Wheat and Small Grains website (smallgrains.wsu.edu), and available in January of 2024. We also intend to work with Joan Campbell at the University of Idaho, who conducted a similar study, to prepare a manuscript for submission in 2024 to the scientific journal, *Weed Technology*.