

INTERACTIONS OF GLYPHOSATE AND SAFLUFENACIL ON GLYPHOSATE-SUSCEPTIBLE AND GLYPHOSATE-RESISTANT HORSEWEED POPULATIONS.

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Saflufenacil is a developmental herbicide with both foliar and residual control for use in several crop sites including soybean. Early research has documented that saflufenacil has significant foliar activity on horseweed which continues to be a management problem for growers in areas with populations of glyphosate-resistant horseweed. To further understand the utility of saflufenacil in burndown applications, greenhouse studies were conducted to evaluate the interaction between saflufenacil and glyphosate on two horseweed populations: a glyphosate-susceptible and a glyphosate-resistant population. A dose response of saflufenacil comprised of six rates (0, 0.10, 0.31, 0.93, 2.78, and 25 g ai/ha) was applied with three levels of glyphosate (0, 0.083, and 2.25 kg ae/ha). Preliminary tests indicated 0.083 kg/ha of glyphosate on susceptible populations and 2.25 kg/ha of glyphosate on resistant populations were sub-lethal doses appropriate for characterizing an interaction when tank-mixed with saflufenacil. The formulation of glyphosate used in this research did not include an activator adjuvant. Herbicide treatments were repeated with non-ionic surfactant (NIS) at 0.5% v/v and crop oil concentrate (COC) at 1% v/v. Visual evaluations of control were performed at 3, 7, 14, and 21 days after treatment (DAT) and plant shoots were harvested at 21 DAT for dry weight determination.

At 3 DAT horseweed treated with saflufenacil alone was necrotic, with the lower rates showing necrotic speckling and the higher rates resulting in near complete necrosis, regardless of horseweed population or adjuvant system. Treatments of glyphosate alone showed no symptoms. Tank-mixtures of the two herbicides resulted in more severe necrosis than saflufenacil applied alone. At 21 DAT horseweed was completely controlled by 2.78 g/ha of saflufenacil and 0.10 and 0.31 g/ha reduced horseweed dry weight up to 40%. The addition of COC to saflufenacil alone was more beneficial to controlling glyphosate-resistant horseweed than was the addition of NIS. Glyphosate applied at 0.083 kg/ha reduced the dry weight of the susceptible horseweed population by less than 30%, and had no effect on the resistant horseweed population. The susceptible horseweed population was completely controlled by glyphosate at 2.25 kg/ha, while, dry weight of the resistant horseweed population was reduced up to 70%. Adjuvant had no effect on the efficacy of glyphosate. The addition of glyphosate to saflufenacil at 0.10 and 0.31 g/ha with either adjuvant increased herbicide efficacy for both horseweed populations compared with either glyphosate or saflufenacil applied alone. The increased herbicide efficacy for the tank-mixture was not evident for saflufenacil at rates greater than 0.93 g/ha. The level of control observed from saflufenacil at the higher rates was almost complete for horseweed and likely did not allow for an increase to be detected for the tank-mix combinations. At no instance was antagonism observed for these herbicide combinations. This research demonstrates that glyphosate can enhance the activity of saflufenacil on both glyphosate-susceptible and -resistant horseweed.