

OPTIMAL ACTIVATOR ADJUVANTS FOR GLYPHOSATE TANK-MIXTURES IN SOYBEAN. David K. Powell, Bryan G. Young, Douglas J. Maxwell, and Gordon K. Roskamp, Graduate Research Assistant, Professor, Southern Illinois University, Carbondale, IL 62901, Principal Research Specialist, University of Illinois, Urbana, IL 61801, and Professor, Western Illinois University, Macomb, IL 61455.

Field studies were conducted in a total of eight locations in Illinois over 2008 and 2009 to determine the role of adjuvants in tank-mixtures of broadleaf herbicides with glyphosate. Field locations included a site with glyphosate-resistant common waterhemp and two sites with PPO-resistant common waterhemp. Common waterhemp susceptible to glyphosate and PPO-inhibiting herbicides was evaluated at a total of five sites. Glyphosate was formulated the potassium salt with a full surfactant load and was applied alone (860 g ae/ha) and in combination with lactofen (105 and 210 g ai/ha) or fomesafen (165 and 330 g ai/ha). The five adjuvants evaluated included: no additional adjuvant; nonionic surfactant (NIS) at 0.5% v/v; crop oil concentrate (COC) at 1.0% v/v; petroleum oil-based high surfactant oil concentrate (PO-HSOC) at 0.5% v/v; and seed oil-based high surfactant oil concentrate (SO-HSOC) at 0.5% v/v.

Soybean injury at 7 DAT was influenced by the interactions of the tank-mix herbicide with adjuvant or with herbicide rate. The addition of any adjuvant with lactofen increased soybean injury up to 30% compared with no adjuvant (23%); whereas only the addition of NIS and SO-HSOC increased soybean injury from fomesafen to a maximum of 19%. The increase in soybean injury was 5% or less from applying the higher rates of lactofen and fomesafen compared with the lower herbicide rates. At 14 and 28 DAT soybean injury had dissipated to 10 and 4% or less, respectively, with the injury related mostly to the herbicide and application rate and relatively less association with adjuvant. Control of glyphosate-susceptible and PPO-resistant common waterhemp was 96% or greater at 14 DAT for all herbicide and adjuvant combinations which suggests a significant tendency for glyphosate to be antagonized by lactofen, fomesafen, or the adjuvants was not evident in these trials. Control of glyphosate-resistant waterhemp was 67% with glyphosate applied alone at 14 DAT. The addition of lactofen, fomesafen, or various adjuvants to glyphosate did not result in any statistical increase in control of glyphosate-resistant waterhemp.

This research demonstrates that combining glyphosate with other herbicides or adjuvants for improved control of herbicide-resistant and -susceptible common waterhemp may not provide a large impact on overall control. Furthermore, this may suggest that postemergence tank-mixtures with glyphosate should not be the primary practice implemented in herbicide-resistant weed management strategies for common waterhemp in lieu of more effective options such as residual herbicides.