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Evaluations of the Enlist E3 and Roundup Ready 2 XtendFlex Soybean Systems

Dr. Travis Legleiter, Extension Weed Control Specialist for Grain Crops at the University of Kentucky Research and Education Center in Princeton, conducts hundreds of replicated herbicide research trials annually. The following explains trials funded by the Kentucky Soybean Promotion Board evaluating XtendFlex and Enlist E3 traited soybeans.

The Roundup Ready 2 XtendFlex and Enlist E3 soybean systems are the dominant herbicide resistant soybean platforms in Kentucky. The heavy use of the systems and heavy reliance on the growth regulators (dicamba and 2,4-D) have created scenarios of potential resistance selection. Resistance to 2,4-D, dicamba, and glufosinate has been confirmed in neighboring states.

Research was initiated in 2023 and 2024 with two trials being established at the University of Kentucky Research and Education Center in Princeton, KY each year. One trial was placed on a field with a known population of waterhemp and a mixture of annual grass species. The second trial was established on a field with a mixture of annual and perennial weeds common to Kentucky, including: giant ragweed, smooth pigweed, prickly sides, morningglory species, broadleaf signalgrass, crabgrass, and johnsongrass. Trials were designed as split blocks with two blocks: Roundup Ready 2 XtendFlex soybean and Enlist E3 soybean.

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Herbicide treatments consist of either herbicide related to the soybean trait package, traditional soybean herbicides, or a mixture of the two.

All treatments will be replicated four times. Plots were established on April 12, 2023, and April 15, 2024, with a burndown application of 40 fl oz Roundup PowerMax 3 plus 1 fl oz Sharpen plus 8 oz Canopy. Soybean were planted on April 13, 2023, and April 16, 2024. Early post applications were applied when weed species reached an average of two to four inches in height, with the late post occurring to either two-to-four-inch weeds or before June 30, whichever occurred first.

Waterhemp control ranged from 93 to 100 percent in 2023 and 84 to 100 percent control in 2024 in treatments that received either Enlist One or Xtendimax early postemergence, followed by Liberty. The treatment receiving an application of Liberty early postemergence followed by Liberty late postemergence resulted in 94 to 100 percent control of waterhemp in 2023 and 95 to 99 percent control of waterhemp in 2024, 21 days after the late postemergence application.

Treatments that exclude Enlist One and Xtendimax resulted in significantly lower waterhemp control at 21 days after postemergence application, especially in 2023. Prefix plus Select Max followed by Liberty resulted in 58 to 80 percent control in 2023. In 2024, these treatments performed better with the Liberty cleaning up the plots with 100 percent control 21 days after the late application of Liberty.

Prefix plus Select Max followed by Cobra and Assure II resulted in the lowest control at 0 to 10 percent in 2023 and 45 to 65% in 2024. These results highlight the utility and value of

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glufosinate, 2,4-D, and dicamba (no longer approved for post soybean planting) application in the Enlist and RR2XtendFlex soybean systems for controlling weed species such as waterhemp.

In the second trial location, giant ragweed was the predominant weed species in both years, with a mixture of annual morningglory species, smooth pigweed, and giant foxtail also present in 2023 and morningglory and smooth pigweed present in 2024. In contrast to the waterhemp trial, all treatments resulted in acceptable control of all weed species present. Giant ragweed control was 94 to 100 percent in 2023 and 90 to 99 percent in 2024 across all treatments 21 days after the late postemergence applications. Morningglory, smooth pigweed, and giant foxtail control was 100 percent across all treatments at the 21 days after late postemergence evaluation timing in 2023. Similarly in 2024, Morningglory and smooth pigweed control was 98 to 100 percent across all treatments at 21 days after the late postemergence application.

Results from these studies highlight the inclusion of glufosinate in all postemergence herbicide applications or the inclusion of Enlist One in the early postemergence application with 84 percent or greater waterhemp control. In contrast, treatments lacking Enlist One, Xtendimax, or two passes of glufosinate resulted in unacceptable control of waterhemp. This highlights the need for the Enlist and XtendFlex soybean systems to allow for continued successful control of species such as waterhemp.

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