Control of Ivyleaf Morningglory in GlyTol® Plus LibertyLink® Cotton

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Abstract

While the strengths and weaknesses of glyphosate and glufosinate-ammonium have been well-studied over the past 10 years, questions regarding possible antagonism/synergism when these herbicides are applied in tank mixture or as part of a sequential application must be addressed in order to develop an effective strategy utilizing these herbicides in GlyTol® plus LibertyLink® cotton. Field experiments were conducted from 2008 to 2010 to examine ivyleaf morningglory [*Ipomoea hederacea* (L.) Jacq.] control following tank-mix combinations of glyphosate (Roundup PowerMax) and glufosinate-ammonium (Ignite 280) when holding the rate of Roundup PowerMax at 1X (0.75 lb ae/A or 21 oz/A) and varying the rate of Ignite 280 (1X (0.52 lb ai/A or 29 oz/A), 0.75X, 0.5X, 0.25X, 0X). Applications were made to 2- to 4-inch or 5- to 10-inch ivyleaf morningglory in separate field experiments. A second study examined ivyleaf morningglory control following different proportions of Roundup PowerMax and Ignite 280 (1X + 0X, 0.75X + 0.25X, 0.5X + 0.5X, 0.25X + 0.75X, 0X + 1X) in order to achieve a cumulative rate of 1X. A third study examined ivyleaf morningglory control following a sequential application of Roundup PowerMax followed by (fb) Roundup PowerMax, Roundup PowerMax fb Ignite 280, Ignite 280 fb Roundup PowerMax, or Ignite 280 fb Ignite 280. These sequential applications were made to plots with or without prometryn (Caparol) applied preemergence (PRE). All applications were made using either a tractor-mounted compressed-air sprayer or CO_2-pressurized backpack sprayer calibrated to deliver 10 or 15 GPA at 3 MPH using 110015 or 11002 TT flat fan nozzles. In 2008, Roundup PowerMax or Ignite 280 alone at 1X controlled 2- to 4-inch ivyleaf morningglory 58 and 85%, respectively, 14 days after application (DAA). When these herbicides were applied in tank mixture at their 1X rates, ivyleaf morningglory was controlled 79%. As the tank mix rate of Ignite 280 decreased to 0.75X, 0.5X, or 0.25X, control declined to 70%, 63%, and 52%, respectively. In 2010, Roundup PowerMax or Ignite 280 alone at 1X controlled 2- to 4-inch ivyleaf morningglory 47 and 85%, respectively, 14 DAA. When these herbicides were applied at 1X in tank mixture, ivyleaf morningglory was controlled 78%. As the tank mix rate of Ignite 280 decreased to 0.75X, 0.5X, or 0.25X, control declined to 77%, 73%, and 68%, respectively. Reduced control but similar trends were observed in both years when applications were made to 5- to 10-inch ivyleaf morningglory. In the proportions experiment, the 1X rate of Roundup PowerMax or Ignite controlled 2- to 4-inch ivyleaf morningglory 53 and 98%, and 5- to 10-inch ivyleaf morningglory 53 and 93%, respectively. When these herbicides were applied in tank mixture to 2- to 4-inch ivyleaf morningglory, increasing the rate of Ignite 280 resulted in increased ivyleaf morningglory control. When these tank mix combinations were applied to 5- to 10-inch ivyleaf morningglory, control improved when compared to the 1X rate of Roundup PowerMax applied alone, but control was less effective than the 1X rate of Ignite 280 applied alone. In the sequential applications experiment, Roundup PowerMax fb Roundup PowerMax or Ignite 280 fb Ignite 280 controlled ivyleaf morningglory 72 and 99% without Caparol PRE or 79 and 100% following Caparol PRE. Roundup PowerMax fb Ignite 280 or Ignite 280 fb Roundup PowerMax controlled ivyleaf morningglory 100 and 69% without Caparol and 100 and 82% with Caparol. At a second location where no Caparol was used, Roundup PowerMax fb Roundup PowerMax or Ignite 280 fb Ignite 280 controlled ivyleaf morningglory 75 and 98%. In summary, GlyTol® plus LibertyLink® cotton has shown exceptional tolerance to glyphosate and glufosinate-ammonium. Previous research suggests that tank mix combinations of glyphosate and glufosinate-ammonium may be antagonistic on Palmer amaranth relative to the control obtained from glyphosate applied alone; therefore, sequential applications of glyphosate and glufosinate-ammonium will likely be the recommendation for weed control in this new transgenic cotton system. The sequential herbicide order will likely be dependent on the weed species, weed size, weed density, presence of herbicide resistant weeds, environmental conditions at application, and individual grower production practices. The anticipated launch of GlyTol® plus LibertyLink® in 2011 will be a valuable tool for cotton growers.