Factors Affecting Glyphosate Efficacy of Horseweed (Conyza *canadensis*) and Hairy Fleabane (Conyza *bonariensis*)

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Abstract:

Horseweed (Conyza *canadensis*) and hairy fleabane (Conyza *bonariensis*) are troublesome weeds in many agricultural settings. Herbicides applied postemergence are often ineffective due to its woody-like stalks and lack of leaf surface area. Previous research has indicated that fall applications of postemergence herbicides provide the best control. In this study Roundup WeatherMAX® (glyphosate) was evaluated for controlling hairy fleabane at four growth stages and four rates. Horseweed was evaluated at three different growth stages and three application rates. Trials were conducted in 2006 at the CSU-Fresno Farm and in 2007 at commercial peach and plum orchards located in south Fresno and central Tulare counties. In conjunction with rate and growth factors, a nozzle and spray volume study was conducted for each species to compare efficacy of glyphosate. Glyphosate was applied at a single rate of 1.0 lbai acre^{-1}, targeting a single growth stage (bolting >6 inches) and applied at three spray volumes (10, 20 and 30 gpa). Three nozzle types were evaluated: TwinJets (TJ60-8001 and TJ60-8003) and XR TeeJets (11001, 11002 and 11003) from Spraying Systems, Inc., and Air-Bubble Jets (11001, 11002 and 11003) from Billericay Farm Systems. Hairy fleabane and horseweed control was evaluated visually for all experiments. Glyphosate applied at 0.5. 1.0, 1.5 and 2.0 lbai acre^{-1} provided similar control of hairy fleabane at the early and late rosette stages. Hairy fleabane control decreased significantly after bolting, especially at the lower rates (0.5 and 1.0 lbai acre^{-1}). Control measures are best applied at the early growth stages for horseweed. Horseweed control by glyphosate decreased significantly as growth increased from early rosette to bolting >6 inches. Glyphosate applied in low spray volumes (10 gpa) provided greater control of horseweed and hairy fleabane as compared to higher spray volumes (20 and 30 gpa). Comparison of nozzle types suggested that control of horseweed and hair fleabane was superior using TwinJet nozzles at low spray volumes (10 gpa).

Key Words: AMS, Ammonium Sulfate, carrier, Conyza *bonariensis, Conyza canadensis,* glyphosate, hairy fleabane, horseweed, lbs ai acre^{-1} (pounds active ingredient per acre), marestail, replicate, Roundup WeatherMAX, Touchdown.

Spatial Pattern of Glyphosate Resistance in Ryegrass in Yolo County

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Abstract

In 1996, approximately 20 years after the introduction of the herbicide glyphosate, the first glyphosate-resistant weed, rigid ryegrass, was identified in Australia. Today, glyphosate-resistant weed populations have been identified in 12 species and 11 countries. The proliferation of glyphosate-resistant weeds is impacting both agriculture and the environment by increasing the concentration and number of herbicides required to control weeds. Preventing both the evolution of new glyphosate-resistant weed populations and preventing the spread of currently resistant populations is now an important task for weed scientists. Annual ryegrasses (both rigid and Italian) are the most notorious glyphosate-resistant weeds with populations on 5 continents evolving glyphosate resistance. The first ryegrass population with glyphosate resistance in North America was identified in 1998 in an almond orchard near Chico CA. Today, many weedy ryegrass populations throughout the Central Valley are reported to contain glyphosate-resistant plants. Identifying which populations are most resistant relative to land and weed management practices may help farmers and managers design control strategies for resistant weeds and prevent further evolution and spread of glyphosate resistance. We worked on identifying which environments have the highest concentration of herbicide resistant individuals. In the summer of 2006, we surveyed weedy ryegrass populations within Yolo County for glyphosate resistance. We found, unsurprisingly, that ryegrass populations in environments with glyphosate application had higher frequencies of glyphosate-resistant individuals. We also found that in those environments where glyphosate was applied, roadsides had populations with higher frequencies of glyphosate-resistant individuals than agricultural fields. We also found that populations in fields adjacent to roads had higher frequencies of resistant individuals than their more secluded counterparts. Our results suggest that roadsides in Yolo County may often be reservoirs of glyphosate-resistant ryegrass. Thus, controlling glyphosate-resistant ryegrass populations along public roads may limit the spread of glyphosate resistance in agricultural fields.