

APPLICATION FACTORS ALTER SPRAY QUALITY AND GLYPHOSATE EFFICACY ON TWO AMARANTHUS SPECIES. Sean D. Nettleton and Bryan G. Young, Graduate Research Assistant and Associate Professor, Southern Illinois University, Carbondale, IL 62901.

Inconsistent common waterhemp control with glyphosate has been observed in commercial applications. The extent of variable weed control attributed to the various application methods used by applicators is unknown. Two field research studies were conducted at Ina and Carbondale, IL in 2005 to determine the influence of application method on control of two *Amaranthus* species. The first study investigated the interaction of four carrier volumes and four application travel speeds with two spray nozzle types to determine the effects on glyphosate efficacy. At both locations, common waterhemp and Palmer amaranth control was greatest at 28 days after treatment (DAT) with XR Teejet nozzles at 47 L/ha and decreased as carrier volume increased, although spray coverage was greatest at 187 L/ha. This suggests that the concentration of glyphosate in the spray solution may be more important than spray coverage for control of both species. Control of common waterhemp at 28 DAT fluctuated by up to 33% for all carrier volume and travel speed combinations at both locations with AI nozzles at 28 DAT. Travel speed did influence the trends observed for common waterhemp control at different carrier volumes, however these differences were not consistent across locations.

The second study was designed to determine if application method would influence the time of day affect for glyphosate applications. Glyphosate was applied at two carrier volumes and with two nozzle types at three times of day. Control of common waterhemp and Palmer amaranth at 14 DAT was lower when glyphosate was applied in 47 L/ha of carrier at 7:00am compared with 1:00pm. The reduction in glyphosate efficacy at 7:00am was not observed when applied in 187 L/ha. However, control of Palmer amaranth at 28 DAT was reduced at the 7:00pm application with XR nozzles at 187 L/ha. Logically, spray coverage and droplet density were greatest with applications at 187 L/ha. At Ina, 28 DAT, increased spray coverage may have allowed for improved control of common waterhemp and Palmer amaranth with XR and AI nozzles for the 7:00am applications, whereas common waterhemp control was possibly not influenced by spray coverage with XR nozzles at the 1:00pm applications. This suggests that spray quality is less important with applications during the middle of the day.