

Low versus high volume application of imazethapyr to pitted morningglory, *Ipomoea lacunosa*.

G.D. Wills, J.E. Hanks and W. Womble.

Delta Research and Extension Center, USDA, ARS, Application Technology Research Unit, Stoneville, MS 38776, and Benoit MS 38725, U.S.A., respectively.

Abstract

Studies were conducted at Stoneville, Mississippi, USA, to determine the effect of high carrier volume (HCV) (94 L ha⁻¹) compared to low carrier volume (LCV) (3.5 L ha⁻¹), water compared to oil as a carrier, and the addition of adjuvants on the phytotoxicity of imazethapyr to pitted morningglory (*Ipomoea lacunosa* L.). Morningglory was grown in the greenhouse in 10 cm diameter plastic pots containing silt loam soil to a height of 30 to 40 cm with 6 to 7 true leaves. The herbicide mixtures were applied broadcast over-the-top on a 50 cm wide band using a mechanical spray table. HCV treatments were applied only in water using an 8001 flat fan spray tip and 370 KPa air pressure. LCV treatments were applied both in water and in oil using a ceramic piston pump (Fluid Metering Inc., Oyster Bay, NY, 11771, USA) and dispersing through a Beta T Mizer spray tip with 83 Kpa air pressure. The water carrier was applied as a mixture of water and 1.25% (v/v) crop oil concentrate (83% paraffinic oil and 17% nonionic surfactant). The oil carrier was applied as a mixture of 79% paraffinic oil and 21% nonionic surfactant (v/v). Imazethapyr was applied in each treatment at 0.07 kg ha⁻¹. The additives included the organosilicones, Silwet L-77 and Silwet L-7500 (polyalkyleneoxide modified heptamethyltrisiloxane water dispersible surfactant and organomodified polydimethylsiloxane water insoluble surfactant, respectively, Union Carbide Chemicals and Plastics Co., Danburg, CT, 06817-0001 USA) each applied at 0.7% v/v and ammonium sulfate applied at 0.1 Molar concentration. Visual phytotoxicity ratings were made at 4 weeks after treatment whereby 0 = no control and 100% = kill of shoots as compared to untreated plants.

Imazethapyr without additives controlled pitted morningglory more when applied at HCV in water (84%) than at LCV in water (59%) or at LCV in oil (71%). When applied at HCV in water, the addition of ammonium sulfate alone increased control to 93% and when combined with either Silwet L-77 or Silwet L-7500 increased control to 96%. When applied at LCV in water, control was increased to 66 and 77% with the addition of Silwet L-77 and Silwet L-7500, respectively. The addition of Silwet L-77 plus ammonium sulfate increased control to 86% and the addition of the combination of Silwet L-77, Silwet L-7500, and ammonium sulfate increased control to 91%. The addition of ammonium sulfate alone did not increase control (59%). When applied at LCV in paraffinic oil, the addition of either ammonium sulfate or Silwet L-77 resulted in 78% control. The addition of Silwet L-77 plus ammonium sulfate or the addition of Silwet L-7500 alone increased control to 86%. Silwet L-7500 plus ammonium sulfate added to imazethapyr gave 91% control.

In this study there was consistently greater control of pitted morningglory when imazethapyr was applied with the addition of either Silwet L-77 or Silwet L-7500 plus ammonium sulfate than with imazethapyr applied alone or separately with Silwet L-77, Silwet L-7500 or ammonium sulfate. Phytotoxicity with imazethapyr applications in LCV oil or water were comparable to that of HCV water with each, no adjuvant, the organosilicone surfactants, or the combination of these with ammonium sulfate.