

Effectiveness of glufosinate, dicamba and clethodim on glyphosate-resistant and susceptible populations of five key weeds in Australian cotton systems

Jeff Werth¹, David Thornby², Michelle Keenan¹, James Hereward³, Bhagirath Singh Chauhan⁴

¹Queensland Department Of Agriculture And Fisheries, Toowoomba, Australia,

²Innokas Intellectual Services, Upper Coomera, Australia,

³The University of Queensland, St Lucia, Australia,

⁴Queensland Alliance for Agriculture and Food Innovation, Gatton, Australia

(jeff.werth@daf.qld.gov.au)

Summary Cotton with herbicide resistance to dicamba and glufosinate in addition to glyphosate (XtendFlex™) may soon become commercially available in Australia. These traits will allow two additional modes of action to be applied over-the-top of the cotton crop. We proposed that an effective way to include these herbicides as part of an integrated weed management strategy is to adopt the double knock tactic with glufosinate as the follow-up herbicide in place of paraquat which is commonly used in fallow. In a glasshouse experiment that was repeated, treatments containing glyphosate, dicamba and clethodim (for grasses) and glyphosate mixtures with dicamba or clethodim were applied with the follow-up glufosinate applied at 1, 3, 7 and 10 days after initial applications. These combinations were applied to glyphosate-resistant and -susceptible populations of *Conyza bonariensis*, *Sonchus oleraceus*, *Chloris virgata*, *Chloris truncata* and *Echinochloa colona*. Total control of *Conyza bonariensis* was achieved with dicamba and glyphosate+dicamba followed by glufosinate at all timing intervals. Effective control

of *Sonchus oleraceus* was also achieved dicamba and glyphosate+dicamba followed by glufosinate and all timing intervals. Effective control of *Chloris virgata* was achieved with glyphosate, clethodim or glyphosate+clethodim followed by glufosinate 7 and 10 days later. Control of *Chloris truncata* was inconsistent, with the most effective treatment being glyphosate+clethodim followed by glufosinate 10 days later. *Echinochloa colona* was controlled with all treatments apart from glyphosate alone on the glyphosate-resistant population. This experiment showed no consistent evidence of reduced control of glyphosate-resistant populations with dicamba, clethodim or glufosinate when used alone or in combination compared to glyphosate-susceptible populations for each species. As a result, the addition of dicamba and glufosinate in XtendFlex™ cotton should prove beneficial when used in combination in-crop along with existing weed control tactics.

Keywords Double knock, weed control, integrated weed management