

GLYPHOSATE RESISTANCE IN *LOLIUM RIGIDUM*: SELECTION, MECHANISMS AND INHERITANCE. Christopher Preston and Angela Wakelin, Senior Lecturer and Postdoctoral Fellow School of Agriculture, Food & Wine, University of Adelaide, PMB 1, Glen Osmond SA 5064, Australia

Glyphosate resistance first evolved in the grass weed *Lolium rigidum* in Australia in 1996. Since then a further 55 known sites containing glyphosate resistant *L. rigidum* have been discovered in Australia. These are spread across the country occurring in 4 of the 5 states in which *L. rigidum* is naturalised. Resistance has occurred in a variety of situations including, zero-till cereal cropping, orchards, vineyards, fence lines and irrigation channels. All sites had received intensive use of glyphosate, often for 10 years or more, little or no tillage and no other effective herbicides. Resistance has occurred on sites where glyphosate has been used several times per year as well as ones where it has been used only once per year. Resistance has been selected by single annual applications of less than 500 g a.e. ha<sup>-1</sup> as well as by multiple annual applications of over 1000 a.e. ha<sup>-1</sup>. Two mechanisms of resistance have been identified, a modified target site providing about 4-fold resistance and an altered pattern of translocation providing about 10-fold resistance. The translocation resistance mechanism is found much more commonly in resistant populations than is the target site. A single, partially dominant gene appears to endow resistance in each case. At this stage, there is no obvious relationship between the number of applications of glyphosate or the rate used on the resistance mechanism that is selected.