

# Developing strategies to mitigate and manage resistance to key herbicides: A project overview

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**Summary** The objective of this project is to provide new knowledge on regionally effective strategies for the management of herbicide resistance, particularly to the pre-emergent herbicides, glyphosate and the imidazolinone herbicides, in key grain cropping weeds. With new pre-emergent herbicides arriving, for some of which there is existing resistance, it is important to understand the patterns of pre-emergent herbicide resistance that occur in annual ryegrass to develop strategies to delay resistance. This includes understanding the genetic relationship of resistance to existing herbicides and new modes of action. In addition, field trials have been established in Western and Southern Australia to investigate management of resistance to pre-emergent herbicides in annual ryegrass to Groups 15, 3, 13 and 30 herbicides. The increasing number of imidazolinone-tolerant crops being grown in rotations has increased the risk of resistant weeds evolving. In some species, such as annual ryegrass,

resistance has evolved quickly, while in other species, such as brome grass, only a few cases of resistance have occurred. Research is being conducted to determine whether ploidy, and how much ploidy, plays a role in selection for resistance to imidazolinone herbicides. Glyphosate resistance continues to evolve in both summer and winter weeds, and several different mechanisms of resistance have been identified in Australia. Glyphosate resistance in a number of different species is being investigated to gain a better understanding of the extent and variation of different resistance mechanisms present in individual weed species. Field trials have been established to investigate which management strategies may be most effective for different species and different resistance mechanisms.

**Keywords** Resistance mechanisms, resistance management, glyphosate, pre-emergent herbicides, imidazolinone herbicides