

Understanding the mechanisms of triallate resistance in annual ryegrass

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Summary Annual ryegrass (*Lolium rigidum* Gaudin.) is a major weed in Australian cropping systems and has developed resistance to all post-emergent herbicides registered for use in cereals. This has increased the importance of pre-emergent herbicides for control of annual ryegrass in cereal cropping systems. In 2014, two populations from South Australia and one from New South Wales were reported as having survived triallate application (a Group J mode of action herbicide).

Seed samples from these three populations were confirmed as having triallate resistance and also cross-resistance to prosulfocarb, another Group J herbicide. These cross-resistant populations were, however, mostly controlled by the addition of S-metalochlor

(Group K) to prosulfocarb. Pyroxasulfone, an alternative pre-emergent herbicide from Group K also controlled the resistant populations.

The failure of Group J chemistry to control annual ryegrass in a cereal cropping system places pressure on Group K chemistry, which is the only alternative pre-emergent herbicide providing effective control in the field. Understanding the basis of resistance to group J herbicides and the number of genes involved will help with developing alternative strategies that growers can use to effectively control ryegrass in their fields and manage existing resistant populations.

Keywords Triallate, prosulfocarb, pyroxasulfone, Group J, Group K, annual ryegrass, resistant, cross-resistant, pre-emergent, gene.