

Inter- and intra-row herbicide application strategies for the control of annual ryegrass (*Lolium rigidum*) in wide-row faba beans (*Vicia faba*)

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Summary Herbicide resistance in annual ryegrass (*Lolium rigidum* Gaud.) is a major issue confronting many growers in the Australian wheat-belt, and has resulted in a re-examination of the way in which weeds are managed in crops. One approach being explored, particularly by growers that have adopted GPS guidance farming, is the cultivation of pulse crops on wide-rows to allow directed spraying of troublesome weeds between the crop rows. Crops such as lupins, chickpeas and faba beans, which have been shown to maintain yield in wide-rows (Felton *et al.* 1996, French and Harries 2006), provide an opportunity to safely apply non-selective herbicides with shields between rows (inter-row), and to utilise more expensive options within the row (intra-row). This could have significant cost benefits to growers via a reduction in the amount of selective herbicides applied.

In 2006, a field experiment was undertaken at Roseworthy, South Australia, to evaluate inter- and intra-row herbicide application strategies for the control of annual ryegrass (ARG) in faba beans grown in wide-rows (54 cm). In the absence of weed control, faba beans grown in wide-rows were unable to compete with ARG (189 plants m⁻²) and produced very little grain yield (154 kg ha⁻¹). The standard farmer practice of applying post-sowing pre-emergent simazine (1.35 kg ha⁻¹) followed by post-emergent clethodim (60 g ha⁻¹) to beans sown in conventional row spacing (18 cm) provided effective control of ARG (84%) and a 4-fold increase in grain yield (681 kg ha⁻¹) relative to the weedy control. However, the same herbicide combination used in wide-rows yielded significantly more grain (1046 kg ha⁻¹) which could have been partly due to much lower ARG density (48 plants m⁻²) than that in the conventional row spacing (139 plants m⁻²).

Large differences in ARG recruitment due to soil disturbance have also been shown in previous research (Chauhan *et al.* 2006). In this study, activity of propyzamide, a group K herbicide, against

ARG was also investigated. Propyzamide (1.0 kg ha⁻¹) applied to beans grown in wide-rows provided effective control of ARG (88%) but its efficacy was slightly lower than the standard practice of simazine-clethodim (97%). Propyzamide in the intra-row used in combination with shielded inter-row applications of glyphosate or paraquat resulted in large reductions in ARG plant and spike density (93–97%) relative to the untreated control.

Further research will be undertaken to integrate early season control strategies with shielded application of herbicides to prevent weed seed production to manage herbicide resistant ARG.

Keywords Annual ryegrass, herbicide strategies, wide-rows, faba beans, weed control.

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