

## Controlling seed set of wild radish (*Raphanus raphanistrum* L.) with herbicide application during reproduction

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**Summary** Herbicides applied during the reproductive stages of plant development can be effective in controlling seed production of certain weeds. Preventing or minimising the production of viable seed should be the ultimate aim in any weed management plan.

Using this approach, a number of potential herbicides were tested on wild radish (*Raphanus raphanistrum* L.) as part of a national project on developing and validating best weed management packages for brassicaceous weeds. Wild radish is the most problematic species in cropping systems in Western Australia where it has become even more difficult to control due to increasing levels of herbicide resistance. The need to prevent seed production of wild radish is therefore critical.

Lupins are poor competitors with weeds and to date there is a lack of effective herbicides for controlling wild radish in this crop. Both non-selective and selective herbicides were evaluated for their potential to control seed production of wild radish in lupins.

Results showed that the stage of embryo development in the seed is the most reliable criterion for determining the most effective time to control seed set of wild radish. At the early pre-embryo stage of wild radish, non-selective herbicides paraquat and glyphosate caused considerable damage to the lupin crop but gave excellent control of wild radish seed set. By the time the lupin crop reached physiological maturity, 92% of wild radish seeds in the crop had already reached the embryo stage and the application of non-selective herbicides was no longer effective in controlling wild radish seed set despite the crop safety.

Effective seed set control without any yield loss was obtained with the application of metosulam or triasulfuron. The application of metosulam on its own

or in combination with diflufenican or picolinafen when wild radish was at pre-embryo stage and lupins had stopped flowering gave up to 98% wild radish seed set control with no damage to the lupin crop. In a population of wild radish resistant to metosulam but not to diflufenican and picolinafen, seed set control ranged from 39 to 69% following the application of the mixtures metosulam plus diflufenican and metosulam plus picolinafen.

Triasulfuron when applied with oil on post-embryo wild radish in lupins at 80% leaf drop reduced wild radish seed production by up to 97% with little or no impact on lupin yield but there could be a small reduction in vigour of lupin seed. Triasulfuron was also effective on a wild radish population resistant to metosulam despite both triasulfuron and metosulam being ALS inhibitors (Group B herbicides). This demonstrates the presence of different resistance mechanisms across Group B herbicides.

It is concluded that the difference in maturity between lupin and wild radish is not large enough to create a window of opportunity for paraquat and glyphosate to be applied to the immature wild radish seeds without damaging the crop. The Group B herbicides metosulam and triasulfuron are likely to have a future role in seed set control of wild radish in lupins. However at this stage no selective herbicides are registered for wild radish seed-set control in lupins or any pulse crop.

**Keywords** Seed set, wild radish, herbicide.

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