



Photo: Andrew Storrie, Agronomo Consulting



## Wild radish (*Raphanus raphanistrum*)

### Key facts

- Wild radish is highly competitive in annual cropping systems, has complex dormancy mechanisms and produces masses of seed of notable longevity.
- Wild radish has known resistance to groups B, C, F, I and M herbicides and many populations have multiple resistance to several of these groups.
- Strict farm hygiene will prevent wild radish spread.
- It takes at least six years to reduce the wild radish seedbank to manageable levels in problem paddocks.

**Wild radish (*Raphanus raphanistrum*) is one of the most competitive weeds in low-rainfall cropping systems across southern Australia. Crop yield losses of up to 90 per cent have been seen in wheat, canola and lupins and seeds from later-germinating weeds can contaminate grain at harvest. Wild radish also has allelopathic activity and can host a range of crop insect pests (e.g. aphids) and diseases (e.g. beet western yellows virus).**

**Wild radish is a prolific seed producer** — producing up to 45,000 seed/m<sup>2</sup>. Although this highly-competitive weed can germinate year round, most plants emerge during autumn and winter. Wild radish grows on most soil types, although it thrives on slightly acidic sandy soils. This could explain why it is not as widespread in low-rainfall areas of south-eastern Australia (predominately alkaline soils) when compared with Western Australia.

A complex seed dormancy pattern is one of the most significant attributes allowing wild radish to be a highly successful weed in annual cropping systems. Some of wild radish's seed dormancy mechanisms include:

- seed dormancy at maturity, with up to 70 per cent of seed remaining dormant until the following season (about 18 months later)
- higher dormancy of seeds within the pod compared with those exposed to the environment

- seeds produced from early-emerging wild radish plants have higher levels of dormancy compared with seeds produced by later-emerging plants
- seed dormancy in plants with yellow flowers is lower than radish plants with purple and white flowers
- seed dormancy in plants growing in cooler/longer-season environments is greater than those in warmer/shorter-season environments
- increased dormancy at depth — seeds remain more dormant if buried deeper than 40mm below the soil surface.

Together with dormancy, the ability of wild radish to develop resistance to herbicides makes control difficult. Wild radish has known resistance to groups B, C, F, I and M herbicides and many populations have multiple resistance to several of these groups. Most of these resistant populations have been found in WA, but some are now being detected in SA and Victoria.



**PREVIOUS PAGE (TOP):** A complex seed dormancy mechanism allows wild radish to stagger germination throughout the growing season.

**PREVIOUS PAGE (BOTTOM):** Wild radish is a prolific seed producer.

**LEFT:** Wild radish seedlings can easily be confused with other weed species.

**Photos:** Andrew Storrie, Agronomo Consulting.

**Table 11. Expected results of various wild radish control strategies**

Control strategy	Control of wild radish weed seeds or plants (%)	
	Most likely	Range
<b>Non-chemical</b>		
Weed-free crop seed	95	90–100
Stubble burning (>4t/ha stubble load)	70	20–90
Hay production	80	70–95
Grazing	70	50–80
Seed collection at harvest	75	65–85
<b>Chemical</b>		
Knockdown before sowing	80	70–90
Selective post-emergent herbicides	90	50–99
Herbicide-tolerant canola (groups B and C)	90	50–99
Pasture spray-topping	80	70–95
Crop-topping	80	70–95
Chemical fallow	85	75–95

Source: IWM Hub GRDC, expert opinion and grower experience

### Control options for wild radish

Increasing levels of herbicide resistance present a challenge for controlling wild radish in problem paddocks, but by adopting an integrated weed management (IWM) strategy, which combines both chemical and non-chemical control methods (see Table 11) will mean control is still possible.

Correct identification of wild radish seedlings is important for effective control as they can easily be confused with wild turnip (*Brassica tournefortii*), turnip weed (*Rapistrum rugosum*), charlock (*Sinapis arvensis*), garden radish (*Raphanus sativus*) and capeweed (*Arctotheca calendula*).

Meticulous farm hygiene can play a key role in controlling wild radish. Contaminated crop and pasture seed, hay, livestock, vehicles and machinery have contributed to the spread and increased prevalence of wild radish across cropping districts of southern Australia. To limit wild radish infestation always use weed-free crop seed and fodder, and clean equipment used in paddocks containing wild radish thoroughly before moving to a new paddock or property.

Imidazolinone (group B)-tolerant and triazine (group C)-tolerant canola varieties provide effective early control of wild radish, but do not control later-emerging populations. Collecting (and subsequently destroying) weed seeds at harvest needs to be used in conjunction with herbicide-tolerant canola varieties to control wild radish.

## Non-chemical control options

### ■ Weed-free crop seed

Sowing weed-free seed is essential to manage wild radish. Do not keep seed from paddocks containing wild radish for re-sowing.

### ■ Hay production

Cutting crops or pastures for hay before wild radish sets seed is an effective control strategy for wild radish if followed by herbicides or grazing after baling to control weed regrowth. Early hay cutting may be required to ensure early seed formation hasn't commenced (21 days after first flower).

### ■ Harvest weed seed management

Collecting weed seed at harvest varies in its rate of success due to the ability of wild radish to shed a portion of its seed at plant maturity. This approach is worthwhile in early-harvested crops. Most captured seed can be destroyed by burning (narrow windrow, chaff pile) or a seed destruction device (e.g. Harrington Seed Destructor).

## Non-chemical control

At present, the range of selective post-emergent herbicide options in cereals in SA is adequate because of the relatively low level of herbicide resistance compared with WA. For effective control in cereals, spray wild radish twice to combat its staggered germination pattern. Spraying two populations of small plants (2–6 leaf stage) during the season and using a combination of at least two herbicide groups (B, C, F, G, H, I) with each application is the best strategy and will prolong the effective life of these herbicides. Conversely, only spraying a mixed population of smaller (2–6 leaf stage) and larger plants (>6 leaf stage up to flowering) once with a single herbicide group is likely to result in poor control and will lead to rapid development of herbicide resistance.

Selective post-emergent options to control wild radish in pulse crops and legume pastures are limited compared with the options for other broadleaf weeds. Grazing in combination with pasture spray-topping is effective in legume pastures, and crop-topping followed by collecting seed at harvest will provide effective control in pulse crops.

## Further information

- Integrated Weed Management Hub wild radish profile: <https://grdc.com.au/Resources/IWMhub/Section-8-Profiles-of-common-weeds-of-cropping/Wild-radish>
- Wild Radish Management And Strategies To Address Herbicide Resistance GRDC fact sheet: <https://grdc.com.au/Resources/Factsheets/2014/07/Wild-radish>