

# Serdc GROWNOTES™



# OATS SECTION 6 WEED CONTROL

COST OF WEEDS TO AUSTRALIAN AGRICULTURE | WEED MANAGEMENT IN OATS | INTEGRATED WEED MANAGEMENT

Cost of weeds to Australian agriculture

Weed control is essential if crops are to make full use of summer rainfall, and in order to prevent weed seeds from contaminating the grain sample at harvest. Weed

management should be planned well before planting and options considered such as

cause issues at sowing time, restricting access for planting rigs (especially vinetype weeds such as melons, caltrop or wireweed, which wrap around tines)

prevent some crops being grown where in-crop herbicide options are limited (i.e.

carry disease including leaf diseases such as rust and septoria leaf blotch and root

increase moisture levels of the grain sample (green weeds)

Weeds cost Australian agriculture an estimated \$2.5–\$4.5 billion per annum. For winter cropping systems alone, the cost is \$1.3 billion, equivalent to ~20% of the gross value of the Australian wheat crop. Consequently, any practice that can reduce the weed burden is likely to generate substantial economic benefits to growers and the grains



### SECTION 6 Weed control

chemical and non-chemical control.<sup>2</sup>

rob the soil of nutrients

cause problems at harvest

contaminate the sample

broadleaf crops)can be toxic to stock

host insects

6.2

Weed control is important, because weeds:

rob the soil of valuable stored moisture

diseases including nemotades and take all

Weed management in oats

Oats compete better than barley, wheat, canola and pulses when sown at

and weed density, and time of emergence of the crop relative to the weed.

GRDC (2014) Integrated weed management hub. GRDC, www.grdc.com.au/weedlinks

density may improve competitiveness and ultimately impact on yield.

recommended seeding rates because of their greater tillering ability. If given the right start, an oat crop has the necessary vigour to compete against weeds. Increasing crop

Weed competition can be affected by crop species, crop variety, weed species, crop

to actually cut hay as per the rotation, as harvesting grain instead can result in huge weed increases the following season. But effective weed management for hay crops is also essential, as weed contamination is directly related to quality. Weeds can cause

Cutting hay is a common method used for reducing the weed seedbank-it is important

DAF Qld (2012) Wheat – planting information. Department of Agriculture and Fisheries Queensland, <u>http://www.daff.gld.gov.au/plants/field-crops-and-pastures/broadacre-field-crops/wheat/planting-information</u>

6.1

industry. 1

5

6

7

- 3
- 9
- 10
- 11

#### 12

13

14

15

16



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18

1

17

Table of Contents



Feedback

A

6

7

9

10

11

12

13

4

15

16

17



## DAF Qld (2012) Disease management and weed control,

https://www.daf.qld. gov.au/plants/fieldcrops-and-pastures/ broadacre-field-crops/ oats/diseases-andweeds

DAFWA (2015) Oats: weeds and integrated weed management,

https://www.agric. wa.gov.au/oats/oatsweeds-and-integratedweed-management

#### NSW DPI (2015) Weed

control in winter crops, http://www.dpi.nsw. gov.au/\_data/assets/ pdf\_file/0019/123157/ weed-control-in-wintercrops-2015.pdf\_

Weeds Australia: Weed identifiction tool, WA, <u>http://www.weeds.org.</u> <u>au/wamap.htm</u> downgrading or rejection of export hay as there is a weed contamination limit of 5%. There is also a nil tolerance to annual ryegrass toxicity (ARGT) and prickly weeds such as doublegee. <sup>3</sup>

Caution is needed when spraying oats, as it has a much lower tolerance of 2,4-D and MCPA sprays than the other cereals. <sup>4</sup> Chemical control should be timely with respect to both weed size and development of the crop.

#### 6.3 Integrated weed management

Preventing weeds from entering or establishing in a paddock is the best method of weed management, especially when combined with physical, agronomic and chemical options. Some of the non-chemical options available in integrated weed management (IWM) are to:

- use weed-free seed
  - clean machinery when moving between paddocks and other areas on farms
- tarp loads when moving grain
- control weeds along roadsides at the edge of paddocks
- eradicate small patches of new invading weeds
- consider weeds when importing hay
- don't import grain or products that may contain certain herbicide-resistant weed seeds
- for crop and pasture rotations use species with different competitive abilities, sowing dates and harvesting techniques such as swathing
- increase seeding rates to maximise crop-weed competition and yield without reducing grain size
- sow cereals in an east–west direction
- implement tickle cultivation to stimulate germination of ryegrass and other weeds prior to seeding
- graze sheep or cattle <sup>5</sup>
- introduce harvest weeds seed management strategies (e.g. chaff carts, windrow burning)

#### 6.3.1 Reducing glyphosate resistance

Glyphosate is a key herbicide in Australia's farming system and responsible use is required to prolong its effective life.

IWM should be applied by growers to sustain glyphosate and reduce the incidence of resistance in weeds, particularly ryegrass.

A double-knockdown technique will minimise the risk of resistance developing. Double knockdown is the sequential use of glyphosate followed by a mixture of paraquat + diquat.

Best practices for double knockdown include:

- glyphosate followed by paraquat + diquat, providing better ryegrass, capeweed and radish control than the reverse
- spraying the first herbicide at the 2–6 leaf stage of ryegrass, resulting in the best control
- <sup>3</sup> DAFWA (2015) Oats: weeds and integrated weed management, <u>https://www.agric.wa.gov.au/oats/oats-weeds-and-integrated-weed-management</u>
- <sup>4</sup> DAF Qld (2012) Disease management and weed control, <u>https://www.daf.qld.gov.au/plants/field-crops-and-pastures/broadacre-field-crops/oats/diseases-and-weeds</u>
- <sup>5</sup> DAFWA (2015) Oats: weeds and integrated weed management, <u>https://www.agric.wa.gov.au/oats/oats-weeds-and-integrated-weed-management</u>



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18

2



Feedback

6

9

10

11

12

13

4

15

16

17

- ensuring the interval between knockdowns is at least 1 day when using the glyphosate followed by paraquat + diquat but a 2–10 day interval, which is more effective, if seasonal conditions permit
- allowing a longer interval before the second spray to ensure plants emerging after the first knockdown are killed <sup>6</sup>

An interval of 7-10 days is better and use full herbicide label rates with both applications.

Agronomist's view

#### 6.3.2 Protecting herbicides

Rapid expansion of herbicide resistance and the lack of new modes of action (MOA) require that non-herbicide tactics must be a significant component of any farming system and weed management strategy.

Inclusion of non-herbicide tactics is critical to prolong the effective life of remaining herbicides, as well as for new products and MOA.

Effective herbicides are key components of profitable cropping systems. Protecting their efficacy directly contributes to the future sustainability and profitability of cropping systems.

The last significant new herbicide MOA released in Australia was Group H chemistry, first launched in Australia in 2001. Prior to that, the most recent new MOA was Group B chemistry, when chlorsulfuron was commercialised in Australia in 1982.

Successful weed management requires a paddock-by-paddock approach. Weeds present and weed-bank status, soil types in relation to herbicide used, and cropping and pasture plans are critical parts of the picture. Knowledge of paddock history and of how much the summer and winter weeds have been subjected to selection for resistance (and to which herbicide MOAs) can also assist.

When resistance has been identified, knowledge of which herbicides still work becomes critical.

The following five-point plan will assist in developing a management plan for each paddock:

- 1. Review past actions and history.
- 2. Assess current weed status.
- 3. Identify weed-management opportunities.
- 4. Match opportunities and weeds with suitably effective management tactics.
- 5. Combine ideas into a management plan. Use of a rotational plan can assist. 7

#### 6.3.3 Broad-leaved weeds

The range of broad-leaved weeds found in crops is generally larger than in grasses; however, a few, such as capeweed, doublegee and wild radish, are widespread. Others, such as soursob, sorrel, dock, fumitory, self-sown legumes and wire weed are of significant local importance.

Capeweed (along with wild radish) is the most common broad-leaved weed given its widespread occurrence in pastures. It is cost-effectively controlled by a wide range of products.

- DAFWA (2015) Oats: weeds and integrated weed management, <a href="https://www.agric.wa.gov.au/oats/oats-weeds-and-integrated-weed-management?page=0%2C1">https://www.agric.wa.gov.au/oats/oats-weeds-and-integrated-weed-management?page=0%2C1</a>
- 7 DAFWA (2015) Oats: weeds and integrated weed management, <u>https://www.agric.wa.gov.au/oats/oatsweeds-and-integrated-weed-management</u>



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18

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Feedback

1

>

3

6

}

9

10

11

12

13

14

15

16

17

18

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#### 6.3.4 Grass weeds

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germination and dormancy make their control difficult.

Annual ryegrass and wild oats are two of the most competitive weeds of cereal crops. The conditions of cereal cropping favour their germination and vigorous growth, which, when combined with their high seed populations from preceding crops or pasture, can often lead to very large reductions in potential yield. Both species exhibit staggered germination, which often leads to poor control.

Doublegee infestation is generally on a lesser scale but dormancy and staggered germination pose problems with regard to optimum timing of herbicides. Seed production can begin at relatively early growth stages (four leaves), especially on stressed or later emerging plants. If the aim of control is to reduce seed production, delays in application to ensure adequate emergence may be counterproductive. Wild radish is among the most widespread weeds of cereal crops. Staggered

Where these weeds emerge after seeding and before crop emergence, a knockdown treatment can be used to burn off the small grass seedlings, but it is important to ensure that no crop emergence has occurred. Do not use glyphosate-based knockdowns in this way. These grasses are often a problem in emerging crops after early seeding.

Control options include:

- delayed seeding
- shallow cultivation-tickle

#### 6.3.5 Annual ryegrass toxicity

Annual ryegrass toxicity (ARGT) is a disease of grazing livestock that results from the ingestion of annual ryegrass seed heads that have been infected by the toxinforming bacteria *Rathayibacter toxicus*. The bacteria adhere to seed-gall nematodes (*Anguina funesta*) in the soil and enter the plants, with the nematodes, as they attempt to complete their life cycle. Bacteria colonise the galls, displacing the nematodes, and toxicity develops as the plants hay off.

There is a zero tolerance to ARGT in export hay. In Western Australia the considered safe level of ARGT in feed is 200–300 galls/kg of grain and hay. The requirement for export hay is less than 1 gall/kg.

Conditions that favour the development of ARGT are:

- paddocks with moderate to high frequency of cropping
- high density of ryegrass
- short growing seasons
- spread of contaminated materials from ARGT areas
- late hay cutting

Export hay is often grown to aid in ryegrass control, but all export hay is tested for ARGT prior to processing. To ensure the continued acceptance of WA hay into export markets it is critical that supplies remain ARGT-free. Deformed heads, bacterial galls and sometimes slime can be detected in the field but lab tests are recommended to determine the levels present.

#### 6.3.6 Harvest weed-seed control

Controlling weed seeds at harvest is emerging as the key to managing the increasing levels of herbicide resistance, which is putting Australia's no-till farming system at risk.

For information on harvest weed-seed control and its application for the western grains region, see <u>GrowNotes Oats West Section 12. Harvest</u>.

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