

PRE-HARVEST HERBICIDE USE FACT SHEET

NORTHERN, WESTERN AND SOUTHERN REGIONS

STEWARDSHIP FOR PRE-HARVEST APPLICATION OF HERBICIDES IN WINTER CROPS

The responsibility to avoid herbicide residues in delivered cereal, pulse and oilseed grains sits squarely with grain growers and their advisers.



Diquat is the only herbicide registered for pre-harvest weed control in barley.

KEY POINTS

- Correct usage:** Product labels must be followed and withholding periods adhered to for all herbicides.
- Residues:** Pre-harvest applications to crops increase the risk of detectable herbicide residues in harvested grain, potentially leading to breaches of maximum residue limits (MRLs). MRLs vary according to herbicide, crop and market and these need to be understood.
- Registration:** Diquat, including Reglone®, is the only registered herbicide for pre-harvest weed control in barley. However, growers must be aware that some maltsters have certain restrictions on pre-harvest use of herbicides. Consult with buyers before use. weedmaster®DST® is now registered for pre-harvest use in canola and with higher use rates in wheat. It is the only glyphosate formulation registered for use in canola and for higher use rates in wheat.
- Food safety:** Growers and their advisers need to be aware of the implications of their herbicide applications and the role they play in ensuring food health safety and in protecting the grain industry.
- Be responsible:** Stewardship must be taken seriously by all sections of the grain value chain.

TABLE 1 Registration for pre-harvest herbicide use varies by crop type. Always check product labels before application. See Table 2 for additional details.

	Paraquat	Diquat	Glyphosate
Wheat	×	✓	✓
Barley	×	✓	×
Canola	×	✓	✓
Chickpeas	✓	✓	✓
Lentils	✓	✓	✓
Faba beans	✓	✓	✓
Field peas	✓	✓	✓

✓ = registered for pre-harvest use;
× = not registered for use

Pre-harvest herbicide use

The application of herbicides late in the season to prevent weeds setting seed or to desiccate crops must be carried out with caution and in line with herbicide label recommendations. It is essential to check if these practices are acceptable to buyers, as in some situations markets have extremely low or even zero tolerance to some pesticide and herbicide residues.

There are three reasons to apply non-selective herbicides late in the season:

- to manage late season weeds;
- in-crop spray topping of weeds to prevent seed set; and
- for pre-harvest desiccation of the crop and weeds to accelerate or even-up ripening to assist with harvest.

Some formulations of glyphosate and diquat may be applied by air pre-harvest. DO NOT apply treatments where drift onto sensitive crops and pastures is likely to occur. Paraquat is not registered for aerial application.

Paraquat is not registered for use in cereal or canola crops.



PHOTO: EMMMA LEONARD

Pre-harvest application of herbicides must be done with consideration of the withholding period and approval of grain buyers. Some markets have tolerances lower than the maximum residue limit (MRL).

most effective at ryegrass flowering and when applied at registered rates. However, at ryegrass milk stage, paraquat was much more effective than glyphosate. Applied at registered rates it achieved 64 to 97 per cent control, whereas glyphosate at registered rates ranged from 14 to 74 per cent.

The yield of most pulse crops is not reduced if crop topping is delayed until seeds in the top pods are 75 per cent of their full size. However, given the goal of in-crop spray topping is to achieve effective ryegrass control, growers need to strike a balance between optimal timing for ryegrass control (which is often earlier) and yield loss.

Of all legumes, early maturing peas are most suited to in-crop spray topping. Chickpeas, due to their long flowering and pod period, are the least suitable.

Pre-harvest herbicide use in cereals

The only herbicides which can be used in cereals in Australia very close to harvest are diquat in barley, and registered glyphosate products on wheat with a seven-day withholding period. **weedmaster®DST® is now registered at higher use rates in wheat with a 5-day withholding period. While diquat has some activity on ryegrass, it is more suited to crop desiccation.**

Warning

Grain handlers and marketers regularly conduct surveillance on grain receipts for residues. The National Residue Survey conducts ongoing surveillance of grain.

It is essential that growers seek advice from their grain buyers before using late applications of herbicides. This is especially important for seed that is intended for sprouting.

The malting barley industry is opposed to pre-harvest applications of herbicides to barley that may be sold as malt grade. Contact your buyer prior to any pre-harvest applications to malting grade barley.

Even though diquat is registered for use on malting barley varieties, different maltsters have different policies on the acceptability of diquat. Growers are

encouraged to check with their barley buyer prior to applying diquat to their malting barley crop.

Pre-harvest herbicide use in canola

Diquat is registered for over-the-top pre-harvest applications in direct headed canola. **weedmaster®DST® is now registered for use under-the-cutter-bar spraying during windrowing or swathing operations of canola and for use over the top to standing canola prior to direct heading or harvest.**

The herbicide facts

Tables 1 and 2 provide details on registered product options for late season weed control and desiccation in a variety of broadacre crops.

The table also highlights where certain products are not registered for particular uses. In these cases, the use of such products may be illegal, and may result in growers and their advisers exposed to the risk that their grain contains residues above the relevant MRL.

Paraquat and Spray.Seed® (paraquat/diquat) are not registered for pre-harvest application in cereal or oilseed crops and should not be used under any circumstances including in-crop spray topping, pre-harvest canola desiccation or under-the-cutter-bar spraying during swathing or windrowing canola. These uses are illegal.

Spray.Seed® is not registered for pre-harvest use in pulse crops.

Wheat: Glyphosate and diquat are registered.

Barley: The only product registered for pre-harvest applications in barley is diquat. Paraquat and glyphosate are not registered for pre-harvest application in barley in Australia and the malting barley industry has concerns over the potential use of these products and their effect on grain viability and residues.

Canola: Diquat and weedmaster®DST® are registered for use in canola.

Pulses: Glyphosate, diquat and paraquat are registered for late season uses in many pulse crops (Table 2). Pulse registrations and withholding periods vary between product labels.

Given the late timing of these applications, there is an increased risk that such uses may result in detectable residues in harvested crops, potentially leading to breaches of MRLs, or impacting on grain germination and seed quality.

In-crop spray topping with paraquat or glyphosate in pulse crops and pastures is an effective strategy for controlling a range of annual grasses. It should be used as a tool with other integrated weed management (IWM) techniques such as cutting crops for hay, breakcrops and green and brown manuring. Timing of application and rates of product are crucial to maintaining crop yield while reducing ryegrass seeds.

Pulse spray topping

GRDC-funded trials in the 1990s on in-crop spray topping of peas, lupins, chickpeas, vetch and beans established that an application of glyphosate or paraquat was

TABLE 2 Product registrations for pre-harvest weed control and desiccation VARY by crop type. Always check product labels (NOTE: Paraquat/diquat products, for example Spray.Seed® are not registered for pre-harvest weed control or desiccation).

Crop	Paraquat	Diquat	Glyphosate
Wheat	<p>Paraquat is not registered for:</p> <ul style="list-style-type: none"> - in-crop spray topping; - pre-harvest crop desiccation; - pre-harvest weed control. <p>DO NOT USE PARAQUAT PRODUCTS FOR THESE USE PATTERNS</p> <p>These use patterns are unregistered.</p>	<p>Pre-harvest weed control (all states): Spray as soon as the crop is mature and ready for harvesting. Under wet spring conditions crops can periodically become infested with weeds which seriously interfere with harvest operations. Diquat will control these weeds allowing for efficient harvest.</p> <p>WHP: NOT required when used as directed.</p>	<p>Not all glyphosate formulations are registered for this use</p> <p>Apply to mature crop from late dough stage (28 per cent moisture) onwards. The higher rate will be required when crops are heavy and leaf shading effects may occur.</p> <p>DO NOT use on crops intended for seed or sprouting.</p> <p>Where wheat is grown in rotation with any herbicide-tolerant crop, management should be consistent with implementation of any management plan for herbicide-tolerant crops.</p> <p>WHP: DO NOT harvest within 7 days of application.</p> <p>Only weedmaster®DST® can now be applied at higher use rates in wheat with a 5-day harvest withholding period.</p>
Barley	<p>Paraquat is not registered for:</p> <ul style="list-style-type: none"> - in-crop spray topping; - pre-harvest crop desiccation; - pre-harvest weed control. <p>DO NOT USE PARAQUAT PRODUCTS FOR THESE USE PATTERNS</p> <p>These use patterns are unregistered.</p>	<p>Winter cereals – pre-harvest weed control (all states): Spray as soon as the crop is mature and ready for harvesting. Under wet spring conditions crops can periodically become infested with weeds which seriously interfere with harvest operations. Diquat will control these weeds allowing for efficient harvest.</p> <p>WHP: NOT required when used as directed.</p>	<p>Glyphosate is not registered for:</p> <ul style="list-style-type: none"> - in-crop spray topping; - pre-harvest crop desiccation; - pre-harvest weed control. <p>DO NOT USE GLYPHOSATE PRODUCTS FOR THESE USE PATTERNS</p> <p>These use patterns are unregistered.</p>
Canola	<p>Paraquat is not registered for:</p> <ul style="list-style-type: none"> - in-crop spray topping; - pre-harvest crop desiccation; - under-the-cutter-bar spraying during swathing or windrowing activities; - pre-harvest weed control; - spraying over the top of swaths or windrows <p>DO NOT USE PARAQUAT PRODUCTS FOR THESE USE PATTERNS</p> <p>These use patterns are unregistered.</p>	<p>Pre-harvest crop desiccation (all states): Spray when 70 per cent of the pods are yellow and the seeds are brown or bluish and pliable. Canola ripens unevenly and is prone to pod shatter and seed loss. Direct harvest four to seven days after spraying.</p> <p>WHP: DO NOT harvest for at least 4 days after application.</p>	<p>Only weedmaster®DST® is registered for pre-harvest use in canola.</p> <p>Apply to mature standing crop from early senescence (minimum of 20% seed colour change to a dark brown/black colour from within the crop) prior to windrowing or direct harvest. Use the higher when crops or weeds are dense and/or where faster desiccation is required.</p> <p>DO NOT use on crops intended for seed DO NOT harvest for 5 days after application to standing crops DO NOT overspray windrows DO NOT apply to standing crops and again at the time of windrowing</p> <p>Refer to the complete weedmaster®DST® label and critical comments section.</p>
Chickpeas Faba beans Field peas Lentils Pigeon peas+ Lupins@ Vetch# Adzuki beans^ Cowpeas^ Mungbeans~ Soybeans~	<p>Spray topping to reduce seed set – annual ryegrass (NSW, Victoria, SA, WA, ACT only).</p> <p>Chickpeas/Faba beans/Field peas/Lentils/Lupins/Vetch: Spray the crop when the ryegrass is at the optimum stage, that is when the last ryegrass seed heads at the bottom of the plant have emerged and the majority are at or just past flowering (with anthers present or glumes open) but before haying off is evident – usually October to November.</p> <p>Use of the higher rate in these crops is usually more reliable and gives a greater reduction in seed set.</p> <p>Reduction in crop yield may occur especially if the crop is less advanced relative to the ryegrass; that is, if crops have a majority of green immature pods. The higher rate may also increase any yield reduction. In practice crop losses in excess of 25 per cent may occur.</p> <p>WHP: DO NOT harvest for 7 days after application.</p>	<p>Pre-harvest crop desiccation (all states):</p> <p>Dry beans/Dry peas/Pigeon peas/Lentils/Chickpeas/Faba beans/Lupins/Soybeans/Mungbeans: Spray as soon as the crop has reached full maturity. Helps overcome slow and uneven ripening and weed problems at harvest.</p> <p>WHP: NOT required for dry beans, dry peas, mungbeans when used as directed.</p> <p>Lentils/Chickpeas/Faba beans: DO NOT harvest for 2 days after application.</p> <p>Pigeon peas, Soybeans: DO NOT harvest for 4 days after application.</p>	<p>Not all glyphosate formulations are registered for these uses.</p> <p>Field peas/Faba beans: Pre-harvest application to reduce viable seed set of annual ryegrass.</p> <p>Adzuki beans*/Chickpeas*/Cowpeas*/Faba beans*/Field peas*/Lentils*/Mungbeans*/Soybeans*: Pre-harvest application to desiccate a crop as a harvest aid and weed control – annual weeds.</p> <p>Chickpeas*: Glyphosate + metsulfuron tank mix for pre-harvest application as harvest aid and weed control – annual weeds.</p> <p>WHP: DO NOT harvest within 7 days of application.</p> <p>Refer to label for specific timings.</p> <p><i>*Application to crops intended for seed production or for sprouting may reduce germination percentage to commercially unacceptable levels.</i></p>

FREQUENTLY ASKED QUESTIONS

If I can't effectively control ryegrass in cereals – particularly barley – by in-crop spray topping, what are the other options?

- ▶ Windrowing barley to control ryegrass has been partially successful with up to 60 per cent ryegrass control when carried out when the barley is at firm dough stage (kernel no longer splitting when pinched, but leaving an indent). However, windrowing usually results in some yield loss against the standing crop due to pick-up inefficiency.
- ▶ Herbicides of alternative modes of action should be considered as part of IWM strategies, particularly the use of herbicides incorporated by sowing (IBS).
- ▶ Baling the crop is a means to recover some of the costs, particularly when demand for hay is high. This can be complemented with a pre-harvest / prior to cutting application of weedmaster®DST® – to stop crop regrowth, improve seed-set control and weed control / regrowth.
- ▶ Spray fallowing of areas with the heaviest infestation is another option.
- ▶ Using harvest weed seed control – such as chaff carts, Harrington seed destructor, narrow windrow burning, bale direct and chaff decks. Growers may need to investigate the use of contractors or hire of machinery for this exercise.
- ▶ Well managed burning of concentrated windrows containing seed.
- ▶ Growing a pulse or canola crop the following year to provide further options.

If existing registered products are not suitable yet other unregistered products may be, why is registration not forthcoming?

The industry is conducting research as to whether other products are suitable for late season herbicide use in cereals and oilseeds ensuring weed efficacy and crop safety, and grain quality is safe from herbicide residues.

What is an MRL?

In Australia, the Australian Pesticides and Veterinary Medicines Authority (APVMA) sets maximum residue limits (MRL) for agricultural and veterinary chemicals in agricultural produce, particularly produce entering the food chain. These MRLs are set at levels which are not likely to be exceeded if the agricultural or veterinary chemicals are used in accordance with a proved label instruction. At the time that the MRLs are set, the APVMA undertakes a dietary exposure evaluation to ensure that the levels do not pose an undue hazard to human health. Therefore, keeping an accurate spray diary and adhering to recommended application timing and spray intervals as per the label is crucial. Note that overseas MRLs are set by the relevant country and may differ from Australian MRLs.

Can I obtain a minor use permit for products for pre-harvest herbicide use?

No. Registration requires full approval by the APVMA through the normal registration process for label use.

What are responsibilities from agronomists in providing advice on late season herbicide use?

This depends on where you are located. Some states have provision to share the liability with the farmer. The agronomist providing advice assumes liability for any advice given. Growers, under state laws, also assume liability as they are the actual user.

USEFUL RESOURCES

Information about MRLs and permitted use can be found at:

www.pestgenie.com.au and
www.apvma.gov.au

Syngenta Australia Customer Service

1800 067 108

Bayer Customer Service

1800 636 001

Nufarm Customer Service

1800 997 678

www.nufarm.com.au

Dow AgroSciences Customer Service

1800 700 096

Spraywise

www.spraywisedecisions.com.au

Syngenta's Agri-CAST Spray Window Forecasting Tool

<http://www3.syngenta.com>

Vendor declarations

www.graintrade.org.au/contracts

This Fact Sheet has been endorsed and distributed at the request of Grain Producers Australia.

DISCLAIMER

Any recommendations, suggestions or opinions contained in this publication do not necessarily represent the policy or views of the Grains Research and Development Corporation.

No person should act on the basis of the contents of this publication without first obtaining specific, independent professional advice.

The Corporation and contributors to this Fact Sheet may identify products by proprietary or trade names to help readers identify particular types of products.

We do not endorse or recommend the products of any manufacturer referred to. Other products may perform as well as or better than those specifically referred to.

The GRDC will not be liable for any loss, damage, cost or expense incurred or arising by reason of any person using or relying on the information in this publication.

CAUTION: RESEARCH ON UNREGISTERED AGRICULTURAL CHEMICAL USE

Any research with unregistered agricultural chemicals or of unregistered products reported in this document does not constitute a recommendation for that particular use by the authors or the authors' organisations.

All agricultural chemical applications must accord with the currently registered label for that particular agricultural chemical, crop, pest and region.

Copyright © All material published in this Fact Sheet is copyright protected and may not be reproduced in any form without written permission from the GRDC.