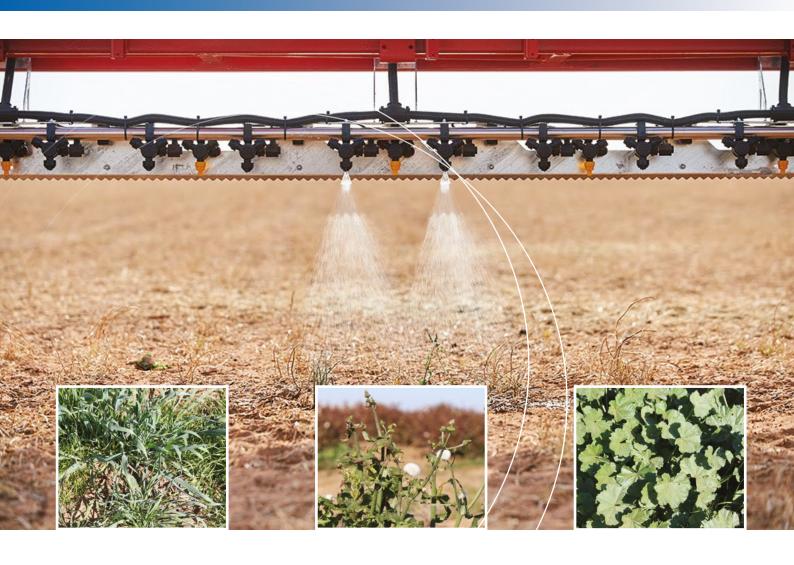
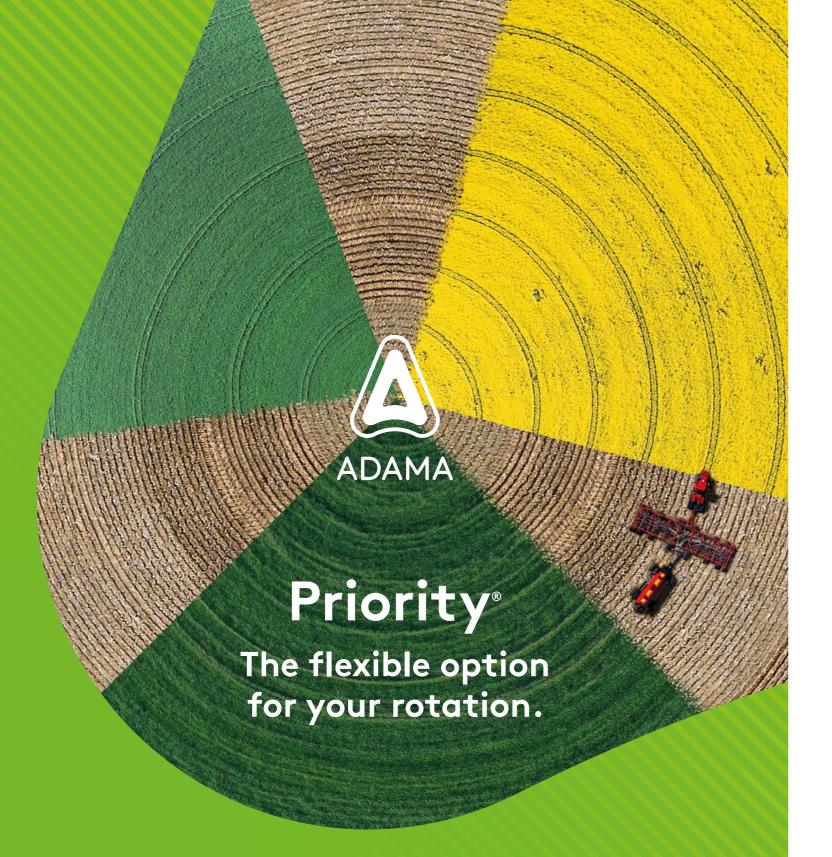
Department of Regional NSW



Weed control in winter crops 2023

NSW DPI MANAGEMENT GUIDE





Priority herbicide from ADAMA is an ideal tank mix partner for the control of broadleaf weeds in winter cereals, established ryegrass pastures and fallow.

- Controls 54 key broadleaf weeds, including volunteer pulses and canola (non-imi varieties), depending on the tank-mix partner
- Apply between three and flag leaf stage (GS13-37)
- Relatively short plant-back intervals
- Apply safely in oats in a range of tank mixtures
- Compatible and concentrated formulation











Department of Primary Industries

Department of Regional NSW



Weed control in winter crops 2023

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Cover photos

Main image: A spray rig in action. Photo: Dave Farmer, Croplands. Inset photos from left: a mix of wild oats and annual ryegrass, milk thistle and marshmallow weed. Photos: Penny Heuston.

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Advertising

If you wish to advertise within this guide and expose your products or services to farmers growing winter crops, please contact Penny Heuston at penny.heuston@dpi.nsw.gov.au or phone 0428 474 845.

Availability

This publication is a companion to the *Winter crop variety sowing guide* (2023). Both are available from your local NSW Department of Primary Industries, Local Land Services, agribusinesses and the NSW DPI website.



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What's new in 2023

Aptitude® Herbicide

Aptitude® (90 g/kg carfentrazone-ethyl + 375g/kg metribuzin) from FMC is a Group 14 + 5 early post-emergence herbicide for the control of certain broadleaf weeds in wheat, barley, oats and triticale. Aptitude® provides rapid burn-down of broadleaf weeds and is a useful rotation tool for areas with multi-herbicide resistance.

Boxer Gold® Herbicide

Boxer Gold® (800 g/L prosulfacarb + 120 g/L s-metolachlor) is a Group 15 pre-emergent herbicide from Syngenta. Boxer Gold® is now registered in barley, chickpea, faba bean, field pea, lentil, lupin, oats, triticale and wheat for the control of annual ryegrass, silver grass and some broadleaf weeds. The recent registration in oats and triticale will provide improved options to control annual grasses.

Callisto® Herbicide

Callisto® (480 g/L mesotrione) is a pre-emergent herbicide from Syngenta. Callisto® is a Group 27 (HPPD) inhibitor that forms a layer in the soil where it is readily absorbed by the roots of emerging broadleaf weeds, disrupting photosynthesis. Callisto® is now registered in barley, oats, triticale and wheat to control a wide range of broadleaf weeds. Callisto® is registered for pre-emergent and split application (post-sowing, pre-emergence) use patterns in knife-point and press-wheel seeding systems. Callisto® provides effective in-crop, residual control to manage multiple broadleaf weed germinations.

Dropzone®

Dropzone® (500 g/L 2,4-D present as the dimethylamine and monomethylamine salts) is a Group 4 knockdown herbicide from Nufarm. Dropzone® is new 2,4-D technology with a range of benefits including spray droplet optimisation, increased speed of action, low odour in a non-volatile formulation. It is also registered for optical spot spraying.

CRUCIAL®

CRUCIAL® (600 g/L glyphosate) is a Group 9 knockdown herbicide from Nufarm. It is a new triple salt and triple surfactant product with a high 600 g/L glyphosate loading. CRUCIAL® has pre-sowing, in-crop, over-the-top (OTT) and pre-harvest registrations. Pre-harvest uses for lupins, mustard, and various oilseeds have been recently added to the label.

Frequency[®] Herbicide

Frequency® (60 g/L topramezone) from BASF is a contact herbicide that provides excellent control of a wide range of broadleaf weeds, including hard-to-kill weeds such as fleabane and wild radish. It also offers suppression of wild oats in winter cereals. It is a new Group 27 chemistry with the flexibility to tailor tank-mix partners to suit the weed spectrum.

Galaxv[®]

Galaxy® (75 g/L pyrasulfotole) from Nufarm is a Group 27 flexible tank mix partner for in-crop weed control. Galaxy's® ideal mix partners include Nufarm bromoxynil 200, MCPA LVE 570, bromoxynil MCPA, Saracen®, and Archer® 750. Galaxy®, in a tank mix, offers control for hard-to-kill weeds such as wild radish, sowthistle and wireweed.

Grindstone®

Grindstone® (240 g/L aminopyralid) from ADAMA is a Group 4 herbicide. Grindstone® can be tank-mixed with various herbicides applied in fallow and postemergent cereals. In the northern cropping zone, Grindstone® can be used as a flexible option for winter and summer broadleaf weed control, including climbing buckwheat and fleabane, with minimal effect on rotation crops.

Liberty® Herbicide

The Australian release of the LibertyLink® canola means Liberty® Herbicide (200 g/L glufosinate-ammonium) from BASF can now be sprayed over crops with this technology to enhance existing annual ryegrass management programs. Liberty® Herbicide introduces an extra mode of action (Group 10) for broadacre cropping.

Mateno® Complete

Mateno® Complete from Bayer (aclonifen 400 g/L + diflufenican 66 g/L + pyroxasulfone 100 g/L) combines 3 active ingredients from 3 chemical groups (32 + 15 + 12), including aclonifen, a new herbicide mode of action for Australia (Group 32). Mateno® Complete is now registered for early post-emergence use in barley, and has an expanded use pattern to include more grass and broadleaf weeds for both wheat and barley. Mateno® Complete can also be used IBS (incorporated by sowing) in both wheat and barley.

Saracen®

Saracen® (50 g/L florasulam) from Nufarm is the first straight florasulam (Group 2) product to be Australian registered. Saracen® is a flexible mixing partner for controlling a variety of broadleaf weeds in barley, wheat, oats, triticale and ryegrass pasture. It has excellent efficacy on volunteer pulses. It is registered for both in crop and fallow situations.

Sierra® Herbicide

Sierra® (160 g/L saflufenacil) is a Group 14 herbicide from ADAMA. It improves knockdown herbicide brownout and weed control before planting annual crops or commencing a fallow. Sierra® is also registered for optical spot-spray in fallow, pre-harvest in winter pulses, and weed management in established lucerne. Sierra® will be commercially available in June.

Terrain® Flow

Terrain® Flow (480 g/L flumioxazin) is a Group 14 flowable herbicide from Nufarm. Terrain® Flow offers residual control of broadleaf weeds and grasses in a range of broadacre crops including wheat, faba bean, lentil, chickpea, field pea and lucerne. The product has label additions for use in lentil, fallow and summer crops.

Valor® EZE

Valor® EZE (480 g/kg flumioxazin) is a Group 14 flowable herbicide from Sumitomo. It can be used as a pre-plant, burndown 'spike' with non-selective knockdown herbicides such as paraquat, glyphosate or diquat/paraquat mixtures. It is registered for this use in many crops, including some cereals and most pulses. It is also registered as a pre-emergent, residual herbicide in wheat (not durum).

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Herbicide mode of action alignment

Source: CropLife Australia

Herbicide mode of action (MoA) classifications have been updated internationally to capture new active constituents and ensure the MoA classification system is globally relevant.

The global MoA classification system is based on numerical codes. This provides infinite capacity to accommodate new herbicide MoA coming to market, unlike the alphabetical codes currently used in Australia.

CropLife Australia is working with key herbicide resistance management experts, advisors and the APVMA to ensure farmers and agronomists are aware of the changes.

Growers should have already started seeing labels with the new classification system, as it was introduced in early 2022. During the transition period, herbicide labels with the alphabetical MoA classifications will still be in the supply chain. The numerical classification system is now live, and all labels should be updated by the end of 2024.

Go to page CropLife Australia https://www.croplife. org.au/resources/ programs/resistancemanagement/

herbicide-moa-

alignment/

Table 1. High resistance risk herbicides.

Chemical family	Active constituent (first registered trade name)				
Group 1 (previously A) inhib	Group 1 (previously A) inhibition of acetyl co-enzyme A carboxylase (ACC'ase inhibitors)				
Aryloxyphenoxy-propionates (FOPs)	Clodinafop (Topik®), cyhalofop (Agixa®*), diclofop (Cheetah® Gold*, Decision®*), fenoxaprop (Cheetah® Gold*), fluazifop (Fusilade®), haloxyfop (Verdict®), propaquizafop (Shogun®), quizalofop (Targa®)				
Cyclohexanediones (DIMs)	Butroxydim (Factor®*), clethodim (Select®), profoxydim (Aura®), sethoxydim (Cheetah® Gold*, Decision®*), tralkoxydim (Achieve®)				
Phenylpyrazoles (DENs)	Pinoxaden (Axial®)				
Group 2 (previously B) inhib	ition of acetolactate synthase (ALS inhibitors), acetohydroxyacid synthase (AHAS)				
Imidazolinones (IMIs)	Imazamox (Intervix®*, Raptor®), imazapic (Flame®, OnDuty®*), imazapyr (Intervix®*, OnDuty®*), imazethapyr (Spinnaker®)				
Pyrimidinyl–thiobenzoates	Bispyribac (Nominee®), pyrithiobac (Staple®)				
Sulfonylureas (SUs)	Azimsulfuron (Gulliver®), bensulfuron (Londax®), chlorsulfuron (Glean®), ethoxysulfuron (Hero®), foramsulfuron (Tribute®), halosulfuron (Sempra®), iodosulfuron (Hussar®), mesosulfuron (Atlantis®), metsulfuron (Ally®, Harmony® M*, Stinger®*, Trounce®*), prosulfuron (Casper®*), rimsulfuron (Titus®), sulfometuron (Oust®), sulfosulfuron (Monza®), thifensulfuron (Harmony® M*), triasulfuron (Triasulfuron 750), tribenuron (Express®), trifloxysulfuron (Envoke®)				
Triazolopyrimidines – type 1	Florasulam (Paradigm®*, Saracen®, Vortex®*), flumetsulam (Broadstrike®)				
Triazolopyrimidines – type 2	Pyroxsulam (Crusader®, Rexade®*)				

Notos

- 1. List of approved active constituents in each 'Group' and, for ease of identification, at the discretion of the Expert Committee on Herbicide Resistance, the trade name of the first registered product or successor.
- 2. Refer to the APVMA website (apvma.gov.au) to obtain a complete list of registered products from the PUBCRIS database.
- * This product contains more than one active constituent.

Table 2. Moderate resistance risk herbicides.

Table 2. Moderate resistan	ice risk herbicides.			
Chemical family	Active constituent (first registered trade name)			
Group 3 (previously D) inhibition of microtubule assembly				
Benzamides	Propyzamide (Effigy®*, Kerb®)			
Benzoic acids	Chlorthal (Dacthal®, Prothal®*)			
Dinitroanilines (DNAs)	Oryzalin (Surflan®), pendimethalin (Stomp®), prodiamine (Barricade®), trifluralin (Triflur X®)			
Pyridines	Dithiopyr (Dimension®)			
Group 4 (previously I) disruptors of plant cell growth (auxin mimics)				
Benzoates	Dicamba (Kamba® 750)			
Phenoxy-carboxylates (phenoxys)	2,4-D (Amicide®, Fallow Boss Tordon®*, Pyresta®*, Vortex®*), 2,4-DB (2,4-DB 500), dichlorprop (Lantana 600®), MCPA (MCPA LVE 570, MCPA amine 750, Kamba M®*, Paragon®*, Precept®*, Quadrant®*, Triathlon®*), MCPB (Thistrol Gold*®)			
Pyridine carboxylates (pyridines)	Aminopyralid (Fallow Boss Tordon®*, Grazon Extra®*, Hotshot®*, Stinger®*, Grindstone®), clopyralid (Lontrel®), florpyrauxifen (Agixa®*), halauxifen (Paradigm®*, Pixxaro®*, Rexade®*), picloram (Fallow Boss Tordon®*, Grazon Extra®*, Tordon®)			
Pyridyloxy-carboxylates	Fluroxypyr (Hotshot®*, Pixxaro®*, Starane®), triclopyr (Garlon®, Grazon Extra®*)			
Quinoline-carboxylates	Quinclorac (Drive®)			
Group 5 (previously C) inhib binders) (PS II Serine 264 inh	ition of photosynthesis at photosystem II – D1 Serine 264 binders (and other non-histidine nibitors)			
Amides	Propanil (Stam®)			
Phenylcarbamates	Phenmedipham (Betanal®)			
Pyridazinones	Chloridazon (Pyramin®)			
Triazines	Ametryn (Gesapax® Combi*), atrazine (Atrazine 900, Gesaprim®, Primextra® Gold*), cyanazine (Bladex®), prometryn (Cotogard®*, Gesagard®), propazine (Agaprop®), simazine (Gesatop®, Simazine 900), terbuthylazine (Palmero TX®*, Terbyne®), terbutryn (Terbutryn 500 SC)			
Triazinones	Amicarbazone (Amitron®*), hexazinone (Velpar® K4*), metribuzin (Aptitude®*, Sencor®)			
Uracils	Bromacil (Hyvar®, Bromacil 800), terbacil (Sinbar®, Trimac Plus®*)			
Ureas	Diuron (Diuron® 900 WG), fluometuron (Cotogard®*, Cotoran®), linuron (Afalon®), methabenzthiazuron (Tribunil®), siduron (Tupersan®), tebuthiuron (Graslan®)			
Group 6 (previously C) inhib inhibitors)	ition of photosynthesis at photosystem II – D1 Histadine 215 binders (PS II Histadine 215			
Benzothiadiazinones	Bentazone (Basagran®)			
Nitriles	Bromoxynil (Buctril®, Flight®*, Quadrant®*, Talinor®*, Triathlon*, Velocity®*), ioxynil (Totril®)			
Group 9 (previously M) inhib	pition of 5-enolpyruvyl shikimate-3 phosphate synthase (EPSP inhibition)			
Glycines	Glyphosate (Weedmaster Duo®, Roundup UltraMAX®)			
Group 10 (previously N) inhi	ibition of glutamine synthetase			
Phosphinic acids	Glufosinate (Basta®, Liberty®)			
Group 12 (previously F) inhi	bition of carotenoid biosynthesis at the phytoene desaturase step (PDS inhibitors)			
N-phenyl heterocycles	Norflurazon (Zoliar®)			
Phenyl-ethers	Diflufenican (Brodal®, Quadrant®*, Triathlon*), picolinafen (Flight®*, Paragon®*, Quadrant®*, Sniper®)			
Group 13 (previously Q) inhibition of deoxy-D-xyulose phosphate synthase (DOXP inhibitors)				
Isoxazolidinones	Bixlozone (Overwatch®), clomazone (Clomazone)			

Chemical family	Active constituent (first registered trade name)			
Group 14 (previously G) inhibition of protoporphyrinogen oxidase (PPO inhibitors)				
Diphenyl ethers	Acifluorfen (Blazer®), fomesafen (Reflex®), oxyfluorfen (Goal®, Oxyfluorfen 240)			
N-phenyloxadiazolones	Oxadiargyl (Oxadiargyl), oxadiazon (Ronstar®)			
N-phenyl-imides	Butafenacil (Butafenacil 200, Resolva®*), flumioxazin (Valor®, Terrain®), saflufenacil (Sharpen®, Voraxor*®), tiafenacil (Terrad'or®), trifludimoxazin (Voraxor*®)			
N-phenyl-triazolinones	Carfentrazone (Affinity®, Aptitude®*, Broadway®)			
Phenylpyrazoles	Pyraflufen (Condor**, Ecopar*, Pyresta**)			
Group 15 (previously J, K) inhibition of very long chain fatty acid synthesis (VLCFA inhibitors)				
α-chloroacetamides	Metazachlor (Butisan®), metolachlor (Boxer Gold®*, Dual Gold®, Primextra® Gold*), propachlor (Ramrod®)			
Benzofurans	Ethofumesate (Tramat®)			
Isoxazolines	Pyroxasulfone (Sakura®)			
Thiocarbamates	EPTC (Eptam®), molinate (Ordram®), pebulate (Pebulate), prosulfocarb (Arcade®, Boxer Gold®*), thiobencarb (Saturn®), tri-allate (Avadex®), vernolate (Vernolate)			
Group 18 (previously R) inhi	bition of dihydropteroate synthase (DHP inhibitors)			
Carbamates	Asulam (Asulox®)			
Group 19 (previously P) inhi	bition of auxin transport (ATIs)			
Aryl-carboxylates	Naptalam (Naptalam)			
Group 22 (previously L) inhi	bition of photosynthesis at photosystem I via electron diversion (PSI electron diversion)			
Pyridiniums	Diquat (Reglone®, Spray Seed®*), paraquat (Alliance®*, Gramoxone®, Spray Seed®*)			
Group 23 (previously E) inhi	bition of microtubule organisation			
Carbamates	Carbetamide (Ultro®), chlorpropham (Chlorpropham®)			
Group 27 (previously H) inhi	bition of 4-hydroxyphenyl-pyruvate dioxygenase (HPPD inhibitors)			
Isoxazoles	Isoxaflutole (Balance®, Palmero TX®*)			
Pyrazoles	Benzofenap (Taipan®), pyrasulfotole (Precept®*, Velocity®*), topramezone (Frequency®)			
Triketones	Bicyclopyrone (Talinor®*), mesotrione (Callisto®)			
Group 29 (previously O) inhi	bition of cellulose biosynthesis			
Alkylazines	Indaziflam (Specticle®)			
Benzamides	Isoxaben (Gallery®)			
Nitriles	Dichlobenil (Casoron®)			
Group 30 (previously T) inhi	bition of fatty acid thioesterase			
Benzyl ether	Cinmethylin (Luximax®), methiozolin (PoaCure Turf®)			
Group 31 (previously Z) inhi	bition of serine-threonine protein phosphatase (STPP inhibitors)			
Unknown	Endothal (Endothal®)			
Group 32 (new active, new group) inhibition of solanesyl diphosphate synthase				
Diphenyl ether	Aclonifen (Mateno® Complete*)			

Chemical family	Active constituent (first registered trade name)			
Group 34 (previously Q) inhibition of lycopene cyclase				
Triazoles	Amitrole (Alliance®*, Amitrole®, Guerilla®*)			
Group 0 (previously Z) herbicides with unknown mode of action				
Acetamides	Napropamide (Devrinol®)			
Arylaminopropionic acids	Flamprop (Flamprop)			
Chlorocarbonic acids	Dalapon (Dalapon®), flupropanate (Frenock®)			
Fatty acids	Pelargonic acid (non-anoic acid; Slasher®)			
Organoarsenicals	DSMA (disodium methylarsonate; Methar®), MSMA (monosodium methylarsonate; Daconate®)			
Phosphorodithioates	Bensulide (Bensulide)			

Notes

- 1. List of approved active constituents in each 'Group' and, for ease of identification, at the discretion of the Expert Committee on Herbicide Resistance, the trade name of the first registered product or successor.
- 2. Refer to the APVMA website (apvma.gov.au) to obtain a complete list of registered products from the PUBCRIS database.

Table 3. Herbicide mode of action classification summary.

Was (letter)	Is (number)
A	1
В	2
C	5, 6
D	3
Е	23
F	12
G	14
Н	27
1	4
J	15
K	15
L	22
М	9
N	10
0	29
P	19
Q	13, 34
R	18
Т	30
Z	0, 31

Source: CropLife Australia.

^{*} This product contains more than one active constituent.







The WeedSmart Big 6 provides practical ways for farmers to fight herbicide resistance.

Herbicide resistance is a growing threat, but there are practice changes you can make to reduce the risk on your farm.

We've weeded out the science into six simple messages which will help arm you in the war against weeds. By farming with diverse tactics, you can keep your herbicides working.

While it might not be possible to adopt all the practices all the time, the Big 6 is an aspirational look at what's possible in weed control. You can use it as a checklist as part of your long-term strategic planning.

Rotate crops and pastures

Crop and pasture rotation is the recipe for diversity

- Use break crops and double break crops, fallow and pasture phases to drive the weed seed bank down.
- In summer cropping systems, use diverse rotations of crops including cereals, pulses, cotton, oilseed crops, millets and fallows.
- Add greater diversity to weed management strategies by adopting herbicide tolerance traits.



Optimise crop growth

- Adopt at least one competitive strategy, but two is better.
- Target higher plant populations using increased seeding rates, weed-free seed tested for germination, vigour and 1,000 seed weight.
- Aim for even seed distribution and establishment.
- Sow competitive crop types and varieties.
- Improve soil health (fertility and structure) and crop nutrition, e.g., soil amelioration (if necessary), no-till, stubble retention, nutrient budgeting.
- Utilise early sowing and adopt East/West sowing if practical.
- Reduce row spacing where possible.



Mix and rotate herbicides

Rotating buys you time, mixing buys you shots

- Rotate between herbicide modes of action.
- Mix different modes of action within the same herbicide mix or in consecutive applications.
- Always use full label rates.
- Incorporate multiple modes of action in a double knock e.g., glyphosate/Group 1/ Group 2 knockdown followed by paraguat and Group 14 and pre-emergent herbicide.
- Test weeds for resistance to know what herbicides will and won't work for you.
- In cotton systems, aim to target both grasses and broadleaf weeds using two non-glyphosate tactics in crop and two non-glyphosate tactics during the summer fallow, and always remove any survivors (2 + 2 & no survivors).

Optimise spray efficacy

Make every droplet count

- To maximise efficacy and reduce spray drift, follow spray application guidelines and ensure the correct speed, nozzles, water volume, boom height, and adjuvants are used. Avoid antagonistic tank mixes.
- Always use the largest spray droplet feasible that gives the highest efficacy and consider water quality.
- Avoid spraying during inversions (particularly from evening through to early morning), in high temperatures, frost and dew conditions, and when the wind speed is below 5km/h or above 20km/h.

Stop weed seed set

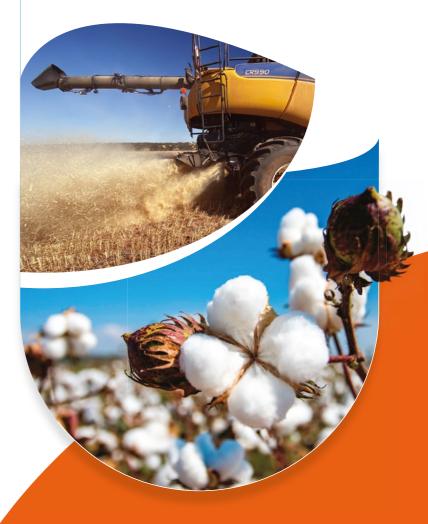
Take no prisoners

- Aim for 100% control of weeds and diligently monitor for survivors in all post weed control inspections.
- Crop top or pre-harvest spray in crops to manage weedy paddocks.
- Consider hay or silage production, brown manure or long fallow in high-pressure situations.
- Use all appropriate strategies in the pasture phase to reduce the weed seed bank prior to cropping phase.
- Consider shielded spraying, optical spot spraying technology, targeted tillage, inter-row cultivation
- Windrow (swath) to collect early shedding weed seed.
- Use two or more different weed control tactics (herbicide or non-herbicide) to control survivors.
- In cotton farming systems, consider late season strategic tillage operations for better overall weed and Helicoverpa pupae control.

Implement harvest weed seed control **Capture weed seed survivors**

Capture weed seed survivors at harvest using weed

- seed impact mills, chaff lining, chaff tramlining/ decking, chaff carts, narrow windrow burning, or bale direct.
- Ensure optimal harvester set-up.







Weed glossary: common and botanical names

amaranth	Amaranthus spp.	melon paddy/prickly	Cucumis myriocarpus
amsinckia	Amsinckia spp.	Mexican poppy	Argemone ochroleuca
annual ground cherry	Physalis angulata	mintweed	Salvia reflexa
annual ryegrass (Wimmera)	Lolium rigidum	mouse-ear chickweed	Cerastium spp.
Australian bindweed	Convolvulus graminetinus	mustards	Sisymbrium spp.
barley grass	Hordeum leporinum	New Zealand spinach	Tetragonia tetragonoides
barnyard grass	Echinochloa crus-galli	Noogoora burr	Xanthium occidentale
Bathurst burr	Xanthium spinosum	nut grass	Cyperus rotundus
bedstraw	Galium tricornutum	oxalis/soursob	Oxalis spp.
bell vine	Ipomoea plebeia	paradoxa grass	Phalaris paradoxa
bifora	Bifora spp.	Paterson's curse	Echium plantagineum
black bindweed/	ыны зрр.	peppercress	Lepidium spp.
climbing buckwheat	Fallopia convolvulus	phalaris (annual)	Phalaris minor; Phalaris paradoxa
blackberry nightshade	Solanum nigrum	phalaris (perennial)	Phalaris aquatica
bladder ketmia	Hibiscus trionum	pigweed	Portulacca oleracea
Boggabri weed	Amaranthus mitchelli	plantain	Plantago spp.
brome grass	Bromus spp.	potato weed/quena	Solanum esuriale
button grass	Dactyloctenium radulans	prickly/wild lettuce	Lactuca spp.
caltrop/cat head	Tribulus terrestris	red root amaranth	Amaranthus retroflexus
•	Phalaris canariensis	rough poppy	Papaver hybridum
canary grass capeweed	Arctotheca calendula	saffron thistle	Carthamus lanatus
charlock	Sinapis arvensis	scotch thistle	Onopordum acanthium
cleavers	Galium aparine	shepherd's purse	Capsella bursa-pastoris
clovers	Trifolium spp.	skeleton weed	Chondrilla juncea
common chickweed	Stellaria media	slender thistle	Carduus pycnocephalus
corn gromwell/sheep weed/	Stellaria media	sorrel	Rumex acetosella
white iron weed	Buglossoides arvense	sowthistle/milk thistle	Sonchus spp.
couch	Cynodon dactylon	spear/black thistle	Cirsium vulgare
cow vine/peach vine	Ipomoea lonchophylla	spiny emex/doublegee	
crassula/stonecrop	Crassula spp.	spurge	Euphorbia spp.
cudweed	Gnaphalium spp.	St Barnaby thistle	Centaurea solstitialis
datura (thornapple)	Datura spp.	star thistle	Centaurea calcitrapa
deadnettle	Lamium amplexicaule	stinging nettle	Urtica spp.
docks	Rumex spp.	stink grass/black grass	Eragrostis cilianensis
false castor oil	Datura stramonium	stinking goosefoot	Chenopodium spp.
fat hen	Chenopodium album	stork's bill/Erodium	Erodium spp.
feathertop Rhodes grass	Chloris virgata	summer grass	Digitaria spp.
fleabane	Conyza spp.	toad rush	Juncus bufonius
fumitory	Fumaria spp.	turnip weed	Rapistrum rugosum
heliotrope (white/common)	Heliotropium europaeum	variegated thistle	Silybum marianum
Hexham scent	Melilotus indicus	vetch	Vicia spp.
Indian hedge mustard	Sisymbrium orientale	Vulpia/silver grass	Vulpia spp.
Johnson grass	Sorghum halepense	wild oats	Avena sterilis sub. ludoviciana
liverseed grass	Urochloa panicoides	wild radish	Raphanus raphanistrum
London rocket	Sisymbrium irio	wild turnip	Brassica tournefortii
marshmallow	Malva parviflora	windmill grass	Chloris truncata
medics	Medicago spp.	winter grass	Poa annua
melon camel/afghan	Citrullus lanatus	wireweed/hogweed	Polygonum aviculare
cion came, aigilan	Citi dilas lariatas	.vii evveed, nogvveed	i olygoriani avicalare



Methods for weed control in winter crops

Effective weed control in winter crops is a vital part of successful and profitable crop production. Yield losses from weeds can vary from almost negligible to complete crop loss.

Weeds reduce crop yields by competing for soil moisture, nutrients, space and light and can carry diseases that infect crops. This competition reduces grain yield and quality, and can impede harvesting.

Some weeds can restrict cropping options as herbicides for control are sometimes limited. Thoroughly investigate which weed species are likely to germinate in a paddock before sowing crops with limited herbicide control options.

Weed control is a numbers game. Growers should aim to reduce weed numbers and keep them low with an ongoing program. The key to successful weed control is an integrated weed management system, combining all the available methods.

Crop rotation: a well-managed rotation in each paddock (alternating pastures, broadleaf and cereal crops) is a useful technique to control weeds. For example, grass weeds are more easily and cheaply controlled with chemicals in broadleaf crops, whereas broadleaf weeds are much easier to control in cereal crops. In parts of northern NSW, alternating summer and winter crops is a time-honoured strategy for weed control. Good crop rotations can substantially reduce the cost of chemical weed control.

Hay-making or silage-making in crops and pastures can effectively reduce the weed burden.

Pasture management techniques such as pasture topping by mowing or using herbicides, spray grazing, strategic heavy grazing or burning can all be part of a weed control program. Cleaning grasses out of legume pastures in winter is a common practice that involves spraying grasses such as barley grass and silver grass to stop seed set, improve nitrogen build-up and reduce root diseases in the subsequent cereal crops.

Good agronomic practices such as using weed-free seed, sowing on time with optimal plant populations and adequate nutrition all contribute to good weed control. Be extremely vigilant with new weed incursions; do not allow them to set seed. Some crops and varieties are more competitive against weeds than others. Early sown varieties with early vigour can compete with emerging weeds more effectively than later sown varieties whose growth habit will be less vigorous due to the cooler conditions.

All weeds growing in a paddock should be controlled before the crop emerges. Large weeds that have not been controlled before sowing can be the most difficult, and often impossible, to manage with in-crop herbicides.

Timely cultivation is a valuable method for killing weeds and preparing seedbeds. Some growers use varying combinations of mechanical and chemical weed control to manage their fallows or stubbles.

Harvest weed-seed management is an integral part of managing herbicideresistant weed populations by reducing weed numbers, whether resistant or not, in the paddock via mechanical not chemical methods. See the Grains Research and Development Corporation website for further information.

In-crop weed control: a wide range of pre-emergent and early post-emergent herbicides is available. Weeds should be removed from crops as early as possible and no later than 6 weeks after sowing to minimise yield losses. Yield responses will depend on weed species, weed and crop densities and seasonal conditions. The growth stages of both weed and crop, as well as the effects of environmental conditions on plant stress and herbicide efficacy, must be considered before spraying. Tolerance to herbicides varies between cereals and between the varieties of each cereal. Read herbicide labels carefully for these details and information on the best conditions for spraying.

Go to page

Grains Research and Development Corporation http:// www.grdc.com.au/



Using herbicides successfully

Annual weeds typically compete with most cereals and broadleaf crops when the crops are in their earlier growth stages, e.g. emergence to tillering in cereals. Weeds should be removed no later than 6 weeks after sowing to minimise losses, however, only rarely are selective herbicides completely non-toxic to the crop. Early post-emergence control nearly always results in higher yields than treatments applied after tillering in cereals or branching in broadleaf crops.

Points to remember for successfully using herbicides:

- This document is a guide; it cannot tell you all the information you need to know.
 Always read and follow all recommendations on the label.
- Plan the operation: check paddock sizes, tank capacities, water availability and supply.
- Read the label: check to make sure the chemical will do the job; note any mixing instructions, especially when tank mixing more than one chemical.
- Conditions inhibiting plant cell growth, e.g. stress from drought, waterlogging, poor nutrition, high or low temperatures, low light intensity and disease or insect attack can inhibit good herbicide uptake and movement.
- · Check boom height with spray pattern operation for full target coverage.
- Check the accuracy of boom width with guidance systems or marking equipment.
- Check wind speed:
- a light breeze helps the herbicide to penetrate crops; the ideal safe wind speed is
 7–10 km/hour.
- do not spray when wind speeds greater than 15–20 km/h; there could be spray drift onto sensitive crops and pastures, roadways, dams, trees, watercourses or public places. Note: all chemicals can drift – see Reducing herbicide spray drift on page 19.
- do not spray in zero wind conditions.
- Select the appropriate nozzle type for the application see Nozzle selection on page 25. Beware of compromising nozzle types when tank mixing herbicides with fungicides or insecticides. Use the coarsest spray quality that will provide efficacy.
- Calculate the amount of herbicide required for each paddock and tank load. Add surfactant where recommended – see Calibrating boom sprays on page 26.
- Use good equipment and check it frequently for performance and output see
 Cleaning and decontaminating boom sprays on page 28.
- Keep a record of each spray operation. It is a legal requirement in NSW and in most other Australian states and territories. Forms are available online from several sources

 see How to complete a Pesticide Application Record Sheet on page 31.
- Use good quality water, preferably rainwater. Bore, hard, dirty or muddy water needs special additives or conditioners to improve results with certain herbicides – see Water quality for herbicide application on page 32.
- Carefully check crop and weed growth stages before deciding upon a specific postemergent herbicide. Use the diagrams in Timing herbicide applications with crop growth stages on page 36.
- Do not spray if rain is imminent or when heavy dew or frost is present see
 Rainfastness stock withholding periods harvest withholding periods on page 46.



Reducing herbicide spray drift

Spray in favourable conditions for increased efficacy. This results in:

- maximum herbicide effectiveness
- reduced damage and/or contamination to off-target crops and areas.

In areas where a range of agricultural enterprises co-exist, conflicts can arise, particularly from herbicide use. All herbicides are capable of drift.

People have a moral and legal responsibility to prevent herbicides from drifting and contaminating or damaging neighbours' crops and sensitive areas.

Some labels now carry spray drift management instructions including buffer zones. Read and follow all label instructions.

Types of spray drift

Sprayed herbicides can drift as droplets, particles or vapours.

Droplet drift is the easiest to control because, under good spraying conditions, droplets are carried downwards by air turbulence and gravity to collect on plant surfaces. Droplet drift is the most common cause of off-target damage from herbicide application. For example, spraying fallows with glyphosate under the wrong conditions often leads to nearby establishing crops being severely damaged.

Particle drift occurs when water and other herbicide carriers evaporate quickly from the droplet, leaving tiny particles of concentrated herbicide. This can happen with any herbicide formulation, not just esters.

Vapour drift is confined to volatile herbicides such as 2,4-D ester. Vapours can arise directly from the spray or evaporation from the herbicide-sprayed surfaces. Using 2,4-D ester in summer can lead to vapour drift damage to highly susceptible crops such as tomatoes, sunflowers, soybeans, cotton and grapevines, and can happen hours after the herbicide has been applied. Even small quantities of drifting herbicide can cause severe damage to highly sensitive plants.

Vapours and tiny particles float in the airstream and are poorly collected on surfaces. They can be carried for many kilometres in thermal updraughts before being deposited.

Minimising spray drift

Before spraying

- If using a broadleaf herbicide, always check for susceptible crops in the area, e.g. broadleaf crops such as grapevines, cotton, oilseeds or pulses.
- Be aware of sensitive areas such as houses, schools and riparian areas.
- · Notify neighbours of your spraying intentions.

During spraying

- Always carefully monitor meteorological conditions and understand their effect on drift hazard.
- Do not spray if conditions are not suitable and stop spraying if conditions change and become unsuitable.
- Under the Records Regulation of the *Pesticides Act* 1999, it is essential that weather and relevant spray details are recorded. Forms are available from the NSW DPI website. Record weather conditions (especially temperature and relative humidity), wind speed and direction, herbicide and water rates, and operating details for each paddock.
- Supervise all spraying, even when a contractor is employed. Provide a map marking the areas to be sprayed, buffers to be observed, sensitive crops and areas.
- Do not plan to spray when the temperature exceeds 28 °C unless you are confident that the weeds are not stressed and the product label supports the intended application.
- Minimise spray release height with the boom at its lowest height to achieve double overlan
- Use the largest droplets that will give adequate spray coverage. Where droplet size is mentioned on the label, follow the label instructions.
- Always use the least-volatile formulation of herbicide available.

Go to pages

GRDC spray drift
resources https://grdc.
com.au/resourcesand-publications/
resources/spraydrift?utm_medium=fb_
curator&utm_
source=search&utm_
campaign=spray-drift

Practical tips for spraying https://grdc. com.au/resourcesand-publications/ all-publications/ factsheets/2014/08/ practical-tips-forspraying

APVMA spray drift management guide https://apvma.gov.au/ node/10796

Weather essentials for herbicide application https://grdc.com. au/resources-and-publications/all-publications/link. aspx/2015/05/weather-essentials-for-pesticide-application

Weatherwise https:// www.weatherzone. com.au/models/ meteogramdrill.jsp

Spraywise www. spraywisedecisions.com.

NSW DPI website https://www.dpi.nsw. gov.au/__data/assets/ pdf_file/0009/186390/ legal-responsibilities-inapplying-pesticides-F.pdf

SOS Macquarie Valley Improving On-Target Pesticide Application, Regional NSW https://sos-nsw.com/

- Maintain a downwind buffer that could be in-crop, e.g. keep a boom width from the downwind edge of the field.
- If sensitive crops are in the area, use the least damaging herbicide.

Factors affecting the risk of herbicide spray drift

The drift hazard, or off-target potential, of a herbicide in a particular situation depends on the following.

Volatility of the formulation applied: volatility refers to the likelihood that the herbicide will evaporate and become a gas.

Proximity of susceptible crops to the herbicide being applied and their growth stage. For example, cotton is most sensitive to Group I herbicides in the seedling stage and remains sensitive during reproductive (squares) initiation.

Method of application and equipment used:

- aerial application releases spray at 3 metres or more above the target and uses relatively low application volumes
- ground rigs have lower release heights and generally higher application volumes, and a range of nozzle types
- misters produce large numbers of very fine droplets that use wind to carry them to their target.

Amount of active ingredient (herbicide) applied: the more herbicide applied per hectare, the greater amount available to drift or volatilise.

Speed = hectares per hour

Product rate = concentration of droplets.

Together (speed \times rate) = the rate of product entering the atmosphere per unit of time.

Efficiency of droplet capture: bare soil does not have anything to catch drifting droplets compared with crops, erect pasture species and standing stubbles.

Conditions before, during and after the application: factors such as applying volatile products onto moist soil surfaces can increase volatilisation rates.

Use a low volatile formulation

Many ester formulations are highly volatile when compared with non-volatile amine, sodium salt and acid formulations. Some low volatile ester formulations could have a proportion of high volatile esters present, so be cautious when using these products.

The compromise between minimising spray drift and achieving ideal coverage

A significant part of minimising spray drift is selecting the right equipment to reduce the number of small droplets produced. However, this in turn can affect target coverage, and possible effectiveness of the herbicide application.

Carefully consider the product's mode of action and label requirements. Where good coverage is required, an increase in total application volume might be required. When increasing water volumes, ensure water quality will not affect efficacy. As the number of smaller droplets decreases, so does the coverage of the spray. The water rate might need to be increased to compensate for coverage.

Reduce spray release height

- Operate the boom at the minimum practical height. Drift potential increases with boom height and with finer spray. Lower heights, however, can lead to more striping as the boom sways and dips below the optimum height.
- 110° nozzles produce a higher percentage of fine droplets than 80° nozzles. However, they allow a lower boom height while maintaining the required double overlap.
- Operate within the nozzle manufacturer's recommended pressure range. Fine
 droplet production that is likely to drift increases as the operating pressure increases.
 Lower volumes such as 30–40 L/ha produce a higher percentage of fine droplets than
 higher spray volumes at the same pressure and nozzle design.

Aerial application should only be used where it is permitted on the product labels of all products in the tank mix. It has an inherently greater risk than ground rig application due to several factors, including lower volume application, small droplet sizes, height of application, and turning and wing-tip vortices. An aircraft should not be used to apply herbicide in areas where highly susceptible crops are growing nearby.

Note on drift

Particle drifts have damaged susceptible crops up to 30 km from the source.

Sensitive crops can be up to 10,000 times more sensitive than the crop being sprayed.

Spray drift management tool

The Australian
Pesticides and
Veterinary Medicines
Authority (APVMA) has
released a modified
version of its Spray
Drift Management Tool
(SDMT) to allow for the
recalculation of buffer
zones for products
authorised under
PER93132.

Weather conditions to be aware of

High temperatures

Do not plan to spray when the temperatures exceed 28 °C, unless you are confident that the weeds are not stressed, and the product label supports the intended application. In summer, updraughts during the heat of the day cause rapidly shifting wind directions, increasing the risk of spray drift.

Humidity

Very low humidity/high Delta T values can adversely affect efficacy. Delta T values above 10 could indicate the potential for plant stress, reducing uptake and translocation, and leading to rapid evaporation of smaller droplets.

High humidity/low Delta T can improve efficacy, especially with aqueous concentrates (water-based products) such as glyphosate and paraquat. However, low Delta T values, (around 2 or lower) increase the survival of small droplets, which increases the risk of off-target damage. Low Delta T values are often associated with inversion conditions.

Wind

- · Avoid spraying under calm conditions.
- The ideal safe wind speed is 7–10 km/hour; leaves and twigs are in constant motion – a light breeze.
- A moderate breeze (11–14 km/h) is suitable for spraying if using low drift nozzles or higher volume applications (80–120 L/ha); small branches move, dust is raised and loose paper moves.

Key points

Where surface temperature inversion conditions exist, it is unsafe for spraying due to the potential for spray drift.

Spray applied at dawn, dusk and during the night is likely to be affected by a surface temperature inversion.

During surface temperature inversions, air near the ground lacks turbulence. This can lead to airborne herbicides remaining at high concentrations in the air at or near the surface.

The direction and distance that herbicides can move in the air close to the ground are very hard to predict when surface inversions exist.

Source: Bureau of Meteorology.

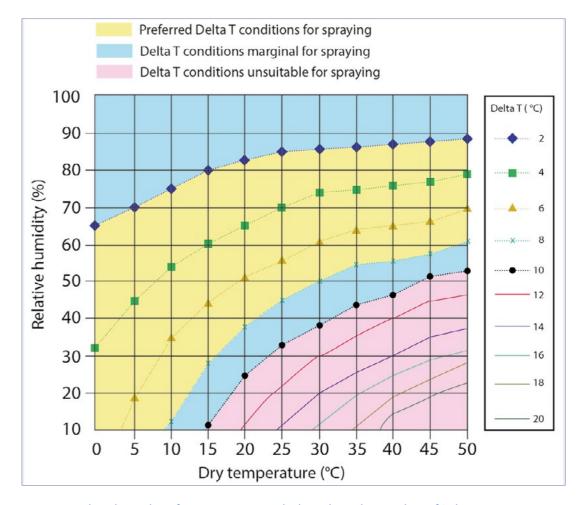


Figure 1. The relationship of air temperature and relative humidity to values of Delta T.

Surface inversions

What are surface inversions?

Surface inversions are layers of the atmosphere at the earth's surface where temperature increases with height. This is the opposite (inverse) of the normal temperature decrease with height.

Hazards of surface inversions

Surface inversions strongly suppress airborne herbicide dispersion and can cause them to:

- remain at high concentrations for long periods over, and close to, the target
- travel close to the surface for many kilometres in light breezes
- move downslope and concentrate in low-lying regions
- be transported, often in unpredictable directions.

Radiation inversions – the most hazardous (created by radiation cooling)

Source: GRDC Surface temperature inversions and spraying.

Radiation inversions can form at any time during the night when wind speed is less than about 11 km/h and cloud cover does not severely restrict surface cooling. In calm and clear sky conditions, they can form just before sunset. Once the sun has set and has stopped heating the ground, heat radiates back into space, causing the ground to cool. In turn, the air in contact with the ground becomes cooler than the air higher in the atmosphere. This generates a surface temperature inversion.

Radiation inversions are the most dangerous for spraying operations as they cause airborne droplets to remain concentrated at a low level for long periods. Winds within the inversion can carry these droplets long distances. On gentle sloping country, concentrated droplets can be transported many kilometres by drainage winds towards the lowest point in the catchment. Under an inversion, where water drains from a property, droplets can move.

How to anticipate and recognise radiation inversions

Continuously check for inversions before and during spraying. If they are present, do not spray. Observe dust habits behind ground rigs and/or use smoke generators to help identify inversion conditions.

In the APVMA's spray drift initiative, labels increasingly include the restraint, 'Do not apply during surface temperature inversion conditions at the application site.' Any restraint is an absolute prohibition. Since surface inversion conditions are prevalent at night, night spraying should be avoided unless the applicator can demonstrate an inversion is not present.

Factors that decrease the potential for inversions include one or more of the following conditions:

- · continuous overcast, low and heavy cloud
- continuous rain
- wind speed remains above 11 km/h for the whole period between sunset and sunrise. Be mindful that established inversions can sometimes still occur with winds above 11 km/h.

Night spraying

Spraying during the night and early morning is common, especially during the warmer summer months, where controlling fallow weeds is an important agronomic practice. The main reason for night spraying is because, in many cases, Delta T conditions less than 8–10 are more common at night or in the early part of the morning, and the risk of physical drift from high wind is lower. The risk of inversions is nearly always greater at night or in the early morning.

Where to find helpful meteorological information

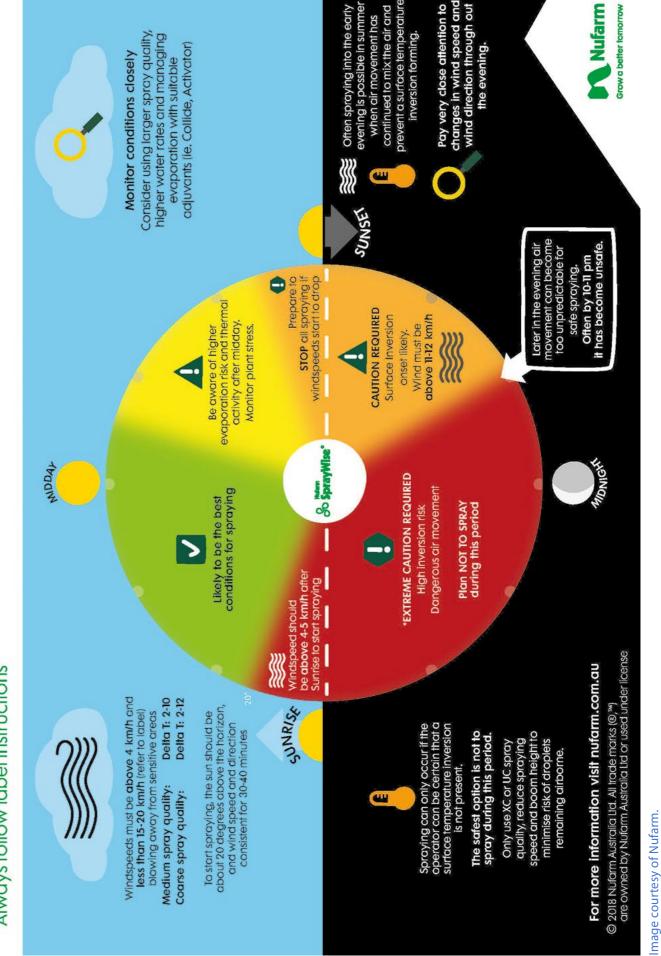
Real time data need to be collected in the paddock at the time of spraying. This can be done with:

- handheld units that measure temperature, Delta T and wind speed
- on-farm weather stations some can be accessed by mobile phone.

GRDC Hazardous surface temperature inversion https://grdc.com. au/resourcesand-publications/ all-publications/ factsheets/2022/

hazardous-inversion

profile for Summer spraying Always follow label instructions 24 Hour risk



WEED CONTROL IN WINTER CROPS 2023 | 23 22 | Penny Heuston and Michael Macpherson

Hourly data

Forecasts are available from several websites for Delta T and wind speed, usually in three-hour blocks.

Hourly data from the Bureau of Meteorology (BOM) weather stations including temperature, Delta T, wind speed and direction are available. These data can help with planning spray activities and are useful for developing an understanding of the daily patterns of meteorological conditions.

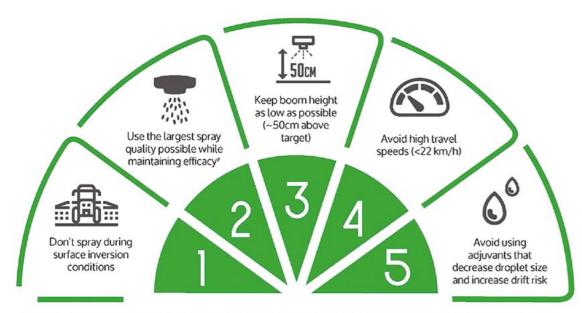
Meteograms

Meteograms are helpful in planning spray programs for periods of lowest drift risk and highest herbicide efficacy.

They can provide forecasts forward for 7 days or more of:

- temperature, rainfall and relative humidity (RH)
- Delta T
- wind speed and direction.

A number of meteograms are mostly available by subscription. Some examples can be found at Weatherwise or Spraywise®.



Observe label directions for minimum and maximum droplet size. Water rates may need to be modified with increased droplet sizes

Figure 2. The five commandments according to 'Save our sprays'. Image courtesy of SOS Macquarie Valley.

Nozzle selection for post-emergent herbicides and fungicides

Overview

Choosing a nozzle for post-emergent herbicide and fungicide application to cereals should primarily focus on reducing the risk of spray drift without compromising efficacy. Spray drift is a significant issue facing the industry, and spray applicators not only have a moral but a legal obligation to adopt best practice management to avoid drift. Late season fungicide and herbicide applications require consideration for coverage and penetration issues that are usually not required for pre-emergent or summer/fallow applications.

Fungi typically target specific plant parts such as stems, leaves, and heads or pods. Droplets must adequately cover these for the fungicide to work, requiring a special approach for nozzle selection. Likewise, some weeds might need to be selectively targeted within the crop canopy, potentially a far trickier proposition than knockdown applications.

For many years these products were typically sprayed using fine droplets because they were assumed to give the best coverage. However, considerable research around the world has demonstrated that a medium quality, directed spray applied at higher water volumes is preferred rather than what might be considered 'normal' application rates.

The problem with fine droplets

In principle, fine droplets should mean greater coverage, that is if they actually land on the target and do not blow away or evaporate. However, small droplets travel slowly and have little momentum, so they are easily displaced by wind and turbulence.

The logic of increasing the spray pressure to force fine droplets into the canopy is not always successful. Small droplet acceleration lasts only milliseconds and has no effect on the overall travel time to the target. Spraying at high pressure not only increases the wear rate of nozzles, it also produces finer sprays with a corresponding increase in drift potential.

When to use coarse droplets

Coarse spray qualities can deliver equivalent or greater amounts of product to the target, but the number and uniformity of the droplets on the target might be less than that of a medium spray quality at equivalent application volumes. Fully translocated products and soil-applied products are better suited to using coarse or larger spray droplet patterns. Where the product labels or the conditions require a larger droplet, increased application volumes might be required for products with modes of action that are contact or limited translocation.

Which nozzle?

GRDC has a chart and guide to help you select the appropriate nozzle for your spray jobs.

Conclusions

- Use high application volumes unless the label specifically recommends otherwise.
- Higher volumes improve both coverage and spray penetration the single most important variable for post-emergent herbicides and fungicides.
- Avoid fine and very fine spray patterns as they can lead to excessive spray drift and evaporation.
- Always select and operate a nozzle around its mid pressure range.
- As always, any application requirements on the product label must be followed.

Guide to nozzles

GRDC guide and chart

https://grdc.com. au/resources-andpublications/grdcupdate-papers/tabcontent/grdc-updatepapers/2007/07/nozzlesdroplet-size-formulationand-spray-drift



Calibrating boom sprays

Boom sprays need to be calibrated regularly to work efficiently and economically. Regular calibration ensures the right amount of chemical will be applied to the target without costly wastage.

The following template will enable you to calculate how much chemical and water to use.

In the template, enter the requested information such as spray tank capacity, chemical rate and ground speed in the space provided in the right column. This information is needed for the calculations. The numbers in the black circles tell you the figures needed to perform the calculations. For example, to work out the water application rate, you need to know the total spray output, the effective spray width and the actual ground speed. The numbers in the formula show you where to get these figures.

General information

Item of equipment to be calibrated.		
Spray tank capacity (litres).	L	6
Area to be sprayed (hectares).	ha	•
Chemical used.		

Recording

3	
What is the minimum water application rate – if any (from the chemical label)?	L/ha
Select the correct chemical application rate from the label.	L/ha
Select an appropriate ground speed.	gear rpm
Record spray operation pressure.	bar or kPa
Record nozzle type and size in the spray unit.	type
Check the rated 'water output' using the manufacturer's nozzle charts.	size
Rated output.	mL/min
Record minimum boom height above target for these nozzles.	mm

Measuring

Record the outp	out from every n	ozzle for 1 minut	e.		Total spray output
1	2	3	4	5	(add all nozzles)
6	7	8			L/min ①
9	10	11	12	13	
14	15	16			
17	18	19	20	21	
22	23	24			
	•		the manufacture puts must be repl		
			s by measuring then two adjacent no	e distance across the ozzles.	2

Calculating

Actual ground speed* $\frac{\text{Distance covered (m)} \times 3.6}{\text{Time taken (seconds)}}$) × 3.6 =km/h
---	---------------

'3.6' in the calculation is a conversion factor to convert metres to kilometres (metres \div 1000) and seconds to hours (seconds \div 3600): distance/1000 \div seconds/3600 = D/1000 \times 3600/S = D/S \times 3600/100 = D/S \times 3.6.

- * To calculate your actual ground speed:
- Measure a set distance, for example 100 metres.
- Make sure that the spraying conditions are like those in the area that you will be spraying.
- Record how long it takes using the appropriate gears and revs.

Now you can calculate the water application rate, how much chemical you will need to mix in each tank and how many tank loads you will need to do the whole job. Follow the steps below:

1. Copy the answers you worked out on the previous page into the boxes below. You will need these numbers to do the calculations on this page. (The numbers in black circles (e.g. 2) tell you the step where the answer is on the previous page.

Total spray output	Effective spray width	Actual ground speed
litres/minute 1	metres 2	km/h ⑤

2. Work out the water application rate by using the numbers you have recorded above. Put these numbers in the correct place in the calculation below.

Water application rate	①×600 ②×❸) × 60) × (= ()	litres/ha	
'600' in the calculation is a c kilometres to metres (km \times $60 \div 1000/10000 = 60 \div 1/1$	1000), then squ	iare me					
Does this water application	rate meet the	hemic	al label req	uiren	nents?	Yes	□ No
If not, how could you chang	ge this rate to m	neet thi	is requirem	ent?			

3. Now that you know the water application rate you can calculate how much chemical you need to mix in each tank.

Chemical application rate		Spray tank capacity
litres/ha 🍎		litres ⑤
How much chemical to mix in each tank?	$\frac{4 (L/ha) \times 5 (L)}{6 (L/ha)}$	() × () () =litres

4. Finally, you can now work out how many tank loads you will need to do the job.

Spray mix needed for the job	(ha) × (€(L/ha) () × ()	=litres 3
Number of tanks needed	③ (L) () ⑤ (L) ()	=tanks

To crosscheck your calculations: number of tanks \times volume of chemical per tank = area to be sprayed \times chemical rate. Source: SMARTtrain *Calibration and records supplement 2010*.



Cleaning and decontaminating boom sprays

Cleaning and decontaminating spray equipment for herbicide application are essential. Many crops and pastures have been severely damaged or destroyed by failing to ensure that spray equipment was thoroughly cleaned before use.

With the advent of crops such as canola and pulse crops in the rotation, and with more emphasis on legume-based pastures, spray units must be decontaminated to ensure that there is no possibility of crop or pasture damage.

Labels usually detail decontamination and cleaning procedures for each product.

Table 4. Decontaminating boom sprays.		Read the label before using a product.			
Herbicide	Rate of agent/100 L water	Instructions for cleaning and decontamination			
Gundy 240 (imazapic) Intervix® (imazamox) Precept® (MCPA + pyrasulfotole) Roundup Ultra®MAX (glyphosate) Sharpen® (saflufenacil 700) Spinnaker® 700 WG (imazethapyr) Velocity® (pyrasulfotole + bromoxynil)	120 g Nufarm tank and equipment cleaner or 1 L Absolute Boomer®	Rinse thoroughly several times with clean water before use.			
Phenoxy type salt or amine formulations (2,4-D amine, MCPA amine, 2,4-DB, dicamba)	2 L household ammonia or 120 g Nufarm tank and equipment cleaner	Thoroughly agitate and flush a small amount of solution through the system and let it stand in the sprayer overnight. Flush and rinse with clean water several times before use.			
Phenoxy type, ester formulations 2,4-D ester, MCPA ester, Flight® EC (picolinafen + bromoxynil + MCPA), Legacy® MA (diflufenican + MCPA)	125 g powdered detergent or 120 g Nufarm tank and equipment cleaner	Rinse the inside and outside of the tank and flush a small amount through the system for 15–20 minutes. Let it stand for at least 2 hours or preferably overnight. Flush and rinse before use.			
Atrazine, simazine	125 g powdered detergent or 120 g Nufarm tank and equipment cleaner or 1 L Absolute Boomer®	Rinse with clean water before and after using the solution.			
Sulfonylurea herbicides e.g. Associate® (metsulfuron-methyl) Atlantis® OD (metsulfuron-methyl + mefenpyr-diethyl) Chlorsulfuron 750 (chlorsulfuron) Hussar® OD (idolsulfuron-methyl sodium + mefenpyr-diethyl) Stinger® (metsulfuron-methyl + aminophralid)	300 mL fresh household chlorine bleach containing 4% chlorine or 240 g Nufarm tank and equipment cleaner or 1 L Absolute Boomer®	 Drain and flush the tank, hoses and boom with clean water for 10 minutes. Fill the tank with clean water and add the chlorine bleach. Flush the boom and allow to stand for 15 minutes, then drain. Repeat step 2. Nozzles, screens and filters should be removed and cleaned separately. 			
Broadstrike®, ForageMax®, Garlon® 600, Grazon® Extra, Hotshot®, Lontrel® Advanced, Paradigm®, Pixxaro®, Rexade®	500 mL alkali liquid detergent DynamoMatic®, Surf®, Omo® or 1 L Absolute Boomer® or 500 g of the powder equivalent such as Surf®, Omo®	Flush the system, then quarter-fill the tank with water and add the detergent. Start the pump and circulate for at least 15 minutes. Drain the whole system. Remove and clean the filters, screens and nozzles with clean water and allow them to drain.			
Herbicides for grass control in broadleaf crops and pastures such as Verdict® (520 g/L)	500 mL alkali liquid detergent such as Surf®, Omo®, DynamoMatic®, or 500 g of the powder equivalent or 1 L Absolute Boomer®	If broadleaf herbicides, particularly sulfonylureas (such as Chlorsulfuron 750 WG), have been used in the spray equipment at any time before grass herbicides such as Verdict®, particular care should be taken to follow the directions for cleaning and decontamination on the label of the relevant broadleaf herbicide.			
		Before spraying cereals, maize, sorghum or other sensitive crops, wash the tank and rinse after use. Completely drain the tank and wash filters, screens and nozzles. Drain and repeat the procedure twice.			
		To decontaminate, wash and rinse the system as above, quarter-fill the tank, add the detergent and circulate through the system for at least 15 minutes.			
		Drain the whole system. Remove filters, screens and nozzles and clean separately.			
		Finally, flush the system with clean water and allow it to drain.			

Warning: grass control herbicides such as Elantra® Xtreme®, Fusilade® Forte, Select®, Shogun® and Verdict® can be extremely damaging to winter and summer cereals. Likewise, spray tank contamination of small quantities of sulfonylurea herbicides such as Chlorsulfuron 750 WG can be extremely damaging to crops like canola, pulse crops and legume pastures.

Note: the products mentioned in this table are not the only products available for decontamination.

Rinse water should be discharged into a designated disposal area, or if this is unavailable, onto unused land away from surface water, water bodies, gardens, shelter belts and other environmentally sensitive areas.





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Applying herbicides: managing your legal responsibilities

The Pesticides Act

The *Pesticides Act* 1999 is the primary legislative instrument controlling the use of pesticides in NSW and is administered by the Environment Protection Authority (EPA). The underlying principle of the *Pesticides Act* is that pesticides must only be used for the purpose described on the product label and all the instructions on the label must be followed. Consequently, all label directions must be read by, or explained to, the user before each use of the pesticide.

All pesticide users should take reasonable care to protect their own health and the health of others when using a pesticide. They should also make every reasonable attempt to prevent damage occurring from using pesticides, such as off-target drift onto sensitive areas or harm to endangered or protected species.

A Regulation was gazetted in 2017 renewing the requirement for all commercial pesticide users, i.e. all farmers and spray contractors, to keep records of their pesticide application.

Numerous sources and websites, including Croplands, have spray record forms. More information on your spray record responsibilities is available on the Environment Protection Authority website. The EPA also has a spray record form that can be downloaded and used.

Notes on how to fill these forms in, are included in this guide.

The 2017 Regulation requires all commercial pesticide users to be trained in pesticide application. Trained aerial applicators, pest control operators and fumigators are recognised as satisfying the requirements of the Regulation. Apart from these groups, all commercial users must have a prescribed qualification. Only domestic use, such as home gardens, is excluded, provided the pesticide is a specific domestic/home garden product. Covered by the Regulation is pest control by/on:

- · public authorities, e.g. State Rail
- golf courses, sporting fields and bowling greens
- agricultural, horticultural, aquacultural and forestry operations
- businesses, educational institutions, and hospitals.

Growers are recommended to undertake the SMARTtrain course or the standard ChemCert course, both of which cover the higher AQF3 competencies. For growers with literacy and/or numeracy problems, the lower level AQF2 competency will provide a minimum qualification that satisfies the Regulation.

Hazardous chemicals legislation

Many registered pesticides are classified as hazardous chemicals. Even those that are not classified as hazardous pose some risk to the health of those who use them or are exposed to them.

The Work Health and Safety Act 2011 (WHS), and the Hazardous Chemical section of the Work Health and Safety Regulation 2011, detail legal requirements of suppliers, workers and persons conducting businesses or undertakings in the workplace for hazardous chemicals management. The Act and accompanying Regulation are intended to protect workers from both the short- and long-term health effects of exposure to hazardous chemicals and to improve current health and safety practices by:

- providing health and safety information to workers (including a list or register of all hazardous chemicals and an SDS (Safety Data Sheet) for each hazardous chemical)
- consultation with, and training, workers
- minimising the risks from hazardous chemicals exposure
- health surveillance (if warranted by the risk assessment in respect of organophosphates).

Both storage and use are covered by the WHS legislation. Storage limits have changed. Premises storing large quantities require both the storage shed and the entrances to the premises to display placards. If very large quantities are stored (which would be rare onfarm), a manifest, site plan and written emergency plan are required. Consult your local SafeWork NSW office for advice.

Go to web pages:

EPA https://www.epa.nsw. gov.au/your-environment/ pesticides

EPA https://www.epa.nsw. gov.au/your-environment/ pesticides/compulsoryrecord-keeping

Croplands https:// www.croplands.com.au/ Products/Application-Tools/Record-Keeping/ Spraywise-Log-Book#. W77HDHszayo SafeWork NSW's Code of Practice for safely using and storing chemicals (including pesticides and herbicides) in agriculture is an approved industry code of practice and provides practical guidance for farm chemical users to comply with this legislation.

How to complete a Pesticide Application Record Sheet

Property/holding: attaching a property map or line drawing, showing adjoining sensitive areas, with paddocks and other features clearly identified, can be helpful. Fill in the residential address.

Applicator details: the person applying the pesticide must fill in their contact details. If the applicator is not the owner, e.g. a contractor or employee, then the owner's details must also be completed. In the case of a contractor, one copy of the record should be kept by the applicator and another given to the owner.

Sensitive area identification: if there are sensitive areas, either on the property or on land adjoining, these should be identified in advance and marked on the sensitive areas diagram, together with any precautions or special instructions. When using a contractor or giving the job to an employee, this section should be filled in and given to the person doing the application **before** the job starts. The property map with sensitive areas marked should be shown to them, and the job fully discussed.

Paddock identification: identify the paddocks/blocks and order of treatment (if there is more than one) in the 'paddock' row of the form. This should be filled in before starting application, along with the residential address. If using a contractor or employee, this information should also be given to them **before** they start the job. Applicators using GPS could include a GPS reading as well as the paddock number/name.

Crop/animal identification: the left side of the crop/situation section of the table is for crops, pastures and plants (non-crop, e.g. bushland and fallow), the right side for animals. As a minimum, identify the host (crop/situation) and the weed. It would be helpful to provide as much detail about the weed as possible, e.g. 4-leaf. Additional details such as crop variety and growth stage are often important for quality assurance schemes, but could also be necessary to identify the area treated as required by the Regulation.

Product details: transcribe the product name and rate or dose from the label, including all products and additives included in tank mixes. If the use pattern is on a permit, include the permit number, expiry date and label details. A permit rate or dose might vary from the label. Water rate might come from the label, or from your standard practice or calibration. The total litres (L) or kilograms (kg) can be calculated when the application is finished.

Withholding periods (WHP): labels often have a number of different withholding periods. These might be different harvest WHP for different crops, grazing WHP or Export Slaughter Interval (ESI). All WHPs are the minimum number of days after treatment before harvest, grazing or livestock slaughter for export markets can take place

Equipment details: as a minimum, you have to fill in what equipment you used. Specify the setting used for the application, e.g. nozzle type, angle and pressure. With pressure, the reading should be as close to the nozzle as possible. Other details such as the date of calibration and water quality, are useful as a reminder for future use, or as a check on your set-up should you have a treatment failure. Water quality is important for herbicide efficacy. At the most basic level, water quality can be described in terms of its source, e.g. rainwater, dam water, bore water.

Weather: as a minimum, you have to record wind speed and direction. It is better to measure with instruments than estimate. Record any changes during application.

You will need to record weather information for all equipment that distributes pesticide through the air.

Rainfall should be recorded for the 24 hours before and after application, unless a different figure is given in the restraints or critical comments sections of the label. Rainfall before or after application can affect efficacy.

Temperature and relative humidity should also be recorded, particularly if either or both are referred to in the restraints or critical comments sections of the label. Temperature and relative humidity can affect efficacy, increase the risk of off-target drift or could damage the host (e.g. phytotoxicity) or a combination of all three.

You must also record the time when you started, and the time when you finished

Records must be:

- made within 24 hours of application
- written in legible English
- kept for 3 years
- pesticide users must be trained.

Records must include:

- date
- property address
- location and area treated
- name of owner
- owner's contact details: address and phone
- operator's name
- operator's contact details: address and phone
- area sprayed
- crop and pest conditions and density
- equipment type
- nozzle type
- spray system pressure during application
- no-spray zone
- full product name including additives
- chemical rate
- water rate
- total amount of concentrate
- total amount of chemical mix used
- time of spraying
- temperature during the operation
- wind speed and direction during the operation.



Water quality for herbicide application

Good quality water is important when mixing and spraying herbicides. It should be clean and of good irrigation quality. Poor quality water can reduce the effectiveness of some herbicides and damage spray equipment.

Effects of water quality

Water quality depends on the source of the water (rain-fed tank, dam, river, bore or aquifer) and the season (e.g. heavy rain, drought). There are several characteristics of water quality that affect chemical performance.

Dirt: dirty water has very small soil particles (clay and silt) suspended in it. These soil particles can absorb and bind the chemical and reduce its effectiveness. This applies especially to glyphosate, paraguat and diquat.

Dirt can also block nozzles, lines and filters and reduce the sprayer's overall performance and life. As a guide, water is considered dirty when it is difficult to see a 10¢ coin in the bottom of a household bucket of water.

Water hardness: water is termed hard when it has a high percentage of dissolved minerals such as calcium, manganese or magnesium. Hard water will not lather with soap and can cause some chemicals to precipitate. Susceptible chemicals often need to have agents added to overcome this problem.

Formulations of 2,4-DB are particularly sensitive to hard water (>400 ppm $CaCO_3$ equivalent). Other herbicides such as glyphosate, 2,4-D amine, MCPA amine and clopyralid can also be affected.

Hard water can affect chemicals by:

- causing some to precipitate
- affecting the wetting, emulsification and dispersion properties of some surfactants.

Water pH: pH is a measure of acidity and alkalinity that ranges between 1 and 14. A pH of 7 is neutral, less than 7 acid and more than 7 is alkaline. Most natural waters have a pH of 6.5–8.

In alkaline water (pH >8), many chemicals undergo a process called alkaline hydrolysis. This causes the active ingredient to break down into other compounds that can reduce the herbicide's effectiveness over time. This is one reason why spray mixes should not be left in tanks overnight.

Acidic water can also affect the stability and physical properties of some chemical formulations.

Dissolved salts: the total amount of mineral salts dissolved in water is usually measured by the water's electrical conductivity (EC).

The EC of bore and dam water depends largely on the salt levels in the rock and soil that surrounds them. During a drought, water salinity increases.

Very salty water can cause equipment blockages and is more resistant to pH changes.

Organic matter: water containing organic matter, such as leaves or algae, can block nozzles, lines and filters. Algae can also react with some chemicals, reducing their effectiveness.

Temperature: very hot or cold water can affect how some chemicals perform.

Acknowledgement: Extracts from Burfitt T, Hardy S and Somers T. 1996. *Spray Sense Bulletin No.12*. NSW DPI.

Improving water quality

Water needs to be tested to see whether it will affect chemical performance. There are commercial products available to reduce pH (e.g. Hotup®, LI 700 and Primabuff®), soften hard water and clear dirty water. To reduce the effects of very salty water, water from several sources might need to be mixed.

Table 5. Herbicide tolerance to water qualities.

	Water quality						
Product (herbicide)	Muddy	Saline	Hard	Alkaline (pH >8)	Acidic (pH <5)		
2,4-D or MCPA amine	✓	✓	X	NR	_		
2,4-D or MCPA ester	✓	Test	Test	✓	✓		
2,4-DB	_	_	Х	NR	_		
Affinity® Force (carfentrazone-ethyl)	✓	✓	✓	X	NR		
Associate® (metsulfuron- methyl 600)	✓	✓	✓	Marginal	X		
Brodal® Options (diflufenican 500)	_	✓	✓	Х	_		
Chlorsulfuron	✓	✓	✓	Marginal	Х		
Dicamba	✓	✓	NR	NR	_		
Diuron	✓	Test	✓	✓	_		
Diuron + 2,4-D amine	✓	Test	Х	NR	_		
Fusilade® Forte (fluazifop-p-ethyl 128)	✓	✓	✓	NR	X		
Glyphosate	Х	✓	Х	_	✓		
Gramoxone® 360 Pro (paraquat 360)	Х	✓	✓	✓	✓		
Legacy® MA (diflufenican + MCPA)	✓	X	Х	NR	_		
Lontrel® Advanced (clopyralid)	✓	✓	Х	Х	-		
Simazine	✓	Х	✓	NR	_		
Trifluralin	_	✓	✓	✓	✓		
Valor®/Terrain® (flumioxazin)	✓	✓	-	X	✓		
Verdict® (haloxyfop)	✓	✓	✓	NR	✓		

Key

 \checkmark = okay to use, X = do not use.

NR = not recommended, but if there is no other option, do not allow the chemical mixture to sit in the tank for any period. Spray out immediately.

Test = mix herbicides and water in proportion before use; if any instability is observed, do not use.



Using adjuvants, surfactants and oils with herbicides

Herbicides often need help to spread across the leaf and penetrate the leaf surface of target weeds to give the best results. Some herbicides have enough adjuvant and do not need additional surfactants to perform well. However, some do and this is usually detailed on the herbicide label.

An adjuvant is any additive that is intended to improve the effectiveness of the herbicide. There are many products that have been developed to help herbicides to contact the target weed, then remain and penetrate the weed leaf. Always read the herbicide label before opening the container and follow the information printed there.

The Australian Pesticides and Veterinary Medicines Authority (APVMA) classes adjuvants into 2 categories:

- 1. adjuvants that enhance product efficacy
- 2. adjuvants that improve the ease of application.

Adjuvants that enhance product efficacy

Wetters/spreaders enhance adhesion to, and spray droplet spreading on, target surfaces by reducing the surface tension of the herbicide formulation and improving coverage. Examples include:

- non-ionic surfactants non-reactive, i.e. they do not have a negative charge or a positive charge; they remain on the leaf once dry and allow re-wetting after rain, permitting additional herbicide uptake
- anionic surfactants negative charge
- cationic surfactants positive charge
- · amphoteric surfactants
- organo-silicate surfactants
- acidified surfactants.

Stickers increase herbicide adhesion to target surfaces. Examples include:

- latex-based
- · terpene/pinolene
- · pyrrolidone-based.

Penetrants improve active ingredient transfer from the target surface to interior tissues. Examples include:

- mineral oil
- vegetable oil
- · esterified vegetable oil
- · organo-silicate surfactants
- acidified surfactants.

Extenders enhance the amount of time the active ingredient remains toxic by increasing resistance to environmental degradation. Examples include:

- · ammonium sulfate
- menthene-based products.

Humectants increase the density/drying time of an aqueous spray deposit. Examples include:

- glycerol
- · propylene glycol
- · diethyl glycol.

Adjuvants that make application easier

Acidifying/buffering agents adjust the pH of water and minimise herbicide decomposition through alkaline hydrolysis.

Anti-foaming/de-foaming agents reduce or suppress foam formation in the spray tank to prevent overflow.

Factors affecting adjuvant use:

- 1. Crop safety adding an adjuvant can reduce herbicide selectivity and thereby increase crop damage. This is not an issue for fallow and preemergent herbicides.
- 2. Effectiveness or activity

 adjuvants are usually
 added to increase the
 effectiveness of herbicides.
 However, using the wrong
 type or rate can reduce
 effectiveness, such as
 decreasing herbicide
 retention on leaves.
- 3. Water hardness hard water can lead to poor mixing with the chemical. This particularly occurs with emulsifiable concentrates. High levels of calcium and magnesium ions bind with amine formulations causing them to be less soluble and therefore less effective.
- 4. Water temperature low water temperature can lead to gelling in the tank. High concentration herbicides might not mix and surfactants could perform

Compatibility agents allow mixing chemicals by preventing antagonism between different ingredients in the spray solution; for example ammonium sulfate.

Drift control agents alter the viscoelastic properties of the spray solution yielding a coarser spray with greater mean droplet sizes. Examples include:

- polyacrylamides
- · polysaccharides.

Dyes are commonly used for spot- or boom-spraying herbicides to detect missed spots or to avoid duplication.

Water conditioners prevent a reaction between hard water ions in spray solutions and suppress precipitate or salt formation; for example ammonium sulfate.

Tips for tank-mixing herbicides

- Tank-mixing herbicides is a common practice to improve weed control and broaden the target weed spectrum. There could also be some advantages that help to avoid herbicide resistance problems.
- Many tank mixes are included on registered herbicide labels.
- Generally, provided herbicides are registered for a particular use, they might be tank-mixed if they are compatible and label mixing instructions are followed.
- Note that some herbicides, although being physically compatible, can be
 antagonistic to weed control. This information is usually outlined on herbicide
 labels under compatibility. Ratios for tank-mixing, crop safety, herbicide
 efficacy and special use of adjuvants, also need to be considered.
- The order in which herbicides are mixed is also important. The mixing sequence shown in Table 6 is usually followed.

Table 6. The sequence to be used when tank-mixing herbicides.

Step	Activity
1	Fill the spray tank to at least 70% full and run agitation
2	Add water conditioning agents if required (e.g. LI 700, Liase® or Primabuff®)
3	Add water dispersible granules (WG) or dry flowable (DF) products (including those in water-soluble bags first)
4	Add wettable powders (WP)
5	Add flowables or suspension concentrates (e.g. atrazine-simazine liquids)
6	Add emulsifiable concentrates (EC) (e.g. Bromicide® MA, Kamba®, Topik® 240 EC, trifluralin)
7	Add water-soluble concentrates (e.g. glyphosate, Amicide® Advance 700, Gramoxone® 360 Pro, Spray.Seed® 250)
8	Add surfactants and oils (e.g. BS1000°, Hasten°)
9	Add soluble fertilisers

Source: adapted from Anon. 2019. Broadacre tank mix quide, Nufarm Australia Ltd.

Table 7. Some commonly used adjuvants.

Read the label before using a product.	Read the	labe	I before	using	a prod	luct.
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Table 7. Some (commonly used adjuvants.		Read the label before using a produc
Trade name	Constituent	Company	Claim
Mineral oil (MO)			
Ad-Here™	Mineral oil 970 g/L	Victorian Chemical Co.	Adjuvant for Express®, Select®, Sertin®186 EC, Verdict®.
Bonza®	Paraffin oil 471 g/L	Nufarm	Spreading/wetting agent for certain herbicides.
Supercharge® Elite	Paraffin oil 471 g/L	Nufarm	To enhance the wetting, spreading and uptake of systemic herbicides through waxy leaf surfaces.
Mineral oil + sur	factant (MOS)		
Hot-up®	Non-ionic 340 g/L + mineral oil 190 g/L + ammonium sulfate 140 g/L	Victorian Chemical Co.	Wetting, penetrating and reducing antagonism of non-selective herbicides.
Hotwire® Spraying Oil	Paraffinic oil 598 g/L + non-ionic surfactant 210 g/L	Adama	Spreading/wetting agent for many selective herbicides.
Uptake® Spraying Oil	-	Corteva Agriscience	Spreading/wetting agent for many selective herbicides e.g. Topik®, Verdict® 520.
Methylated seed	l oil (MSO)	, -	
Activoil®	Fatty acid esters of canola oil 704 g/L	SST Australia Pty Ltd	Improves penetration. Used with certain post- emergent herbicides.
Adigor™	Methyl esters of canola oil, fatty acids solvent 440 g/L, liquid hydrocarbons 222 g/L	Syngenta	Adjuvant for use with Axial® 100 EC and other selective and non-selective herbicides as per labe directions.
Banjo [®]	Methyl esters of canola oil 725 g/L	Nufarm	Wetting/spreading/penetrating agent for certain post-emergent herbicides.
Hasten®	Fatty acid esters of canola oil 704 g/L + surfactant >15%	Victorian Chemical Co.	Wetting/spreading/penetrating agent for certain post-emergent herbicides.
Supa Stik® Oil	Canola oil 840 g/L	Agrichem	Improves droplet deposition and uptake. Used wiselective and non-selective herbicides.
Non-ionic surfac	tant (NIS)		
Activator®	Non-ionic surfactant 900 g/L	Nufarm	Wetting agent. Used with most selective and non selective herbicides.
Agral® 600	Non-ionic surfactant 600 g/L	Syngenta	Wetting/spreading agent for most selective and non-selective herbicides.
BS1000°/ Deltawet° 1000	Alkoxylated alcohol 1000 g/L	Nufarm/Tasman Chemicals	Wetting/spreading agent for most selective and non-selective herbicides.
Wetspray® 1000	Non-ionic surfactant 1000 g/L	Adama	Wetting/spreading agent for most selective and non-selective herbicides.
Wetter TX®	Non-ionic surfactant 1040 g/L	Nufarm	Used with Roundup® when treating certain grasso
Sticker/surfactar	nt		
Bond® Adjuvant	Synthetic latex 450 g/L + non-ionic surfactant 100 g/L	Nufarm	Used when the addition of a sticker, spreader and deposit agent is required.
Compatability a	gents		
Liase®/Liquid Assist	Ammonium sulfate 417 g/L	Nufarm/Rutec	Minimise antagonism. For use with glyphosate herbicides.
Liquid Boost®	Ammonium sulfate 417 g/L	Rygel Australia	Minimise antagonism. For use with glyphosate herbicides.
Acidifying/buffe	ring agents		
Agri-Buffa®	Phosphate esters 430 g/L + polyalkylene oxide 100 g/L	Agrichem	Wetter, spreader and acidifier; compatible with most herbicides.
LI 700°	Soyal phospholipids 350 g/L + propionic acid 350 g/L	Nufarm	Wetter, spreader and acidifier; compatible with most herbicides except sulfonylureas.
Primabuff®	Onoxynol-9 266.2 g/L + phosphoric acid	Nufarm	Penetrant, buffering, acidifying and compatibility



Timing herbicide applications with crop growth stages

Cereal growth stages – the Zadoks scale

A decimal scale describing cereal crop growth stages is now widely used. This scale, called the Zadoks growth scale, describes the principal growth stages, labelled 0 to 9.

Each primary growth stage is further subdivided into secondary stages. extending the scale from 00 to 99. The first number represents the growth stage and the second the numbers of plant parts, e.g. Z12 indicates a young plant with only 2 leaves fully unfolded, commonly referred to as the 2-leaf stage.

A series of pairs of numbers can be used to further describe the growth stage. For example Z14/21 indicates the main tiller with 4 fully unfolded leaves, commonly referred to as the 4-leaf stage, but this plant has one more tiller. Note that additional tillers are counted separately from the main tiller.

The Zadoks scale is based on the individual plant, not the general appearance of a crop. Therefore, to use the scale, a representative selection of plants should be examined from a paddock.

Growth terms used elsewhere in this guide, extracted from registered labels, and their Zadoks equivalents are:

3-leaf: three fully unfolded leaves on main shoot only, Zadoks 13.

5-leaf: five fully unfolded leaves on main shoot only, Zadoks 15.

Tillering – tiller formation period: plants past seedling stage and before stem elongation, Zadoks 21 to Z29.

Jointing: crop becoming erect or booting up to the stage when the flag leaf is just visible, Zadoks 31 to Z37.

Boot: head plainly felt in stem before head emergence, Zadoks 40 to Z45.

The recommended timing for applying each herbicide is indicated in the chemical control tables in this guide. The terms 'early tillering' and 'late tillering' are not definitive and are commonly used in a very general sense. The number of fully emerged main shoot or stem leaves, together with the number of tillers when there is more than one, is the only accurate measure of the growth stage of a cereal plant.

Principal growth stages

- 0 Germination
- 1 Seedling growth
- 2 Tillering
- 3 Stem elongation
- 4 Booting
- 5 Ear emergence
- 6 Flowering
- 7 Milk development
- 8 Dough development
- 9 Ripening

The main stages of interest to cereal producers applying herbicides are:

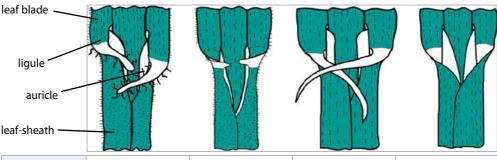
- 1. Seedling growth
- 2. Tillering
- 3. Stem elongation
- 4. Booting

Table 8. Crop growth stages and the Zadoks scale.

Crop growth stage					
2 leaf stage	Start of tillering	Tillering	Fully tillered	Start of jointing	Early to mid booting
Two leaves (L) have unfolded; third leaf present, yet to fully expand.	First tiller (T1) appears from between a lower leaf and the main shoot. Usually 3 or 4 leaves are on the main tiller.	continue forming, usually until there are 5 leaves on the main shoot. Secondary	tillers form after the very young head starts forming in the main tiller. Tillering is completed when the first node is	Jointing or node formation starts at the end of tillering. Small swellings (joints) form at the bottom of the main tiller. Heads continue developing and can be seen by dissecting a stem.	The last leaf to form (the flag leaf) appears on top of the extended stem. The developing head can be felt as a swelling in the stem.
Zadoks scale					
2 leaves unfolded	4 leaves unfolded	5 leaves on main	6 leaves on the main	First node formed	Z40-45.
(Z12).	(Z14).	shoot or stem (Z15).	shoot or stem (Z16).	at base of main tiller	
	Main shoot and	Main shoot and	Main shoot and three	(Z31).	
	1 tiller (Z21).	1 tiller (Z21).	or more tillers and		
			onwards (Z23–30).		

Identifying cereal seedlings

It is extremely important to accurately identify cereal plants before applying a herbicide for weed control. Cereal seedlings are identified by looking at 4 critical characteristics. This involves taking a close look at the junction of the leaf blade and the leaf sheath (a hand lens is useful).



	Wheat and triticale*	Rye	Barley	Oats and wild oats**
Ligule	Medium	Short	Medium	Medium
Auricle	Medium, blunt, hairy	Short, hairless	Long, pointed, hairless	Absent
Leaf blade twist	Clockwise	Clockwise	Clockwise	Anticlockwise
Leaf hairiness	Hairy	Inconsistent	± Hairless	± Hairless

- * Wheat and triticale are difficult to distinguish by vegetative characters. It is possible to distinguish them during early growth by uprooting the seedling and observing the grain shell. Wheat grain shells are pale and oval. Triticale grain shells are darker and longer.
- ** Oats cannot be distinguished from wild oats during vegetative growth.

Figure 3. Identifying cereal seedlings.

Cereal crop growth stages

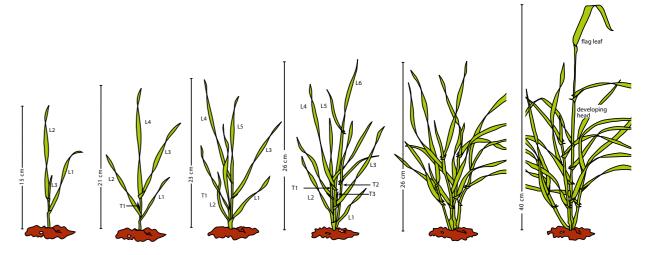


Figure 4. Cereal crop growth stages.

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Table 9. Growth stages for herbicide application.

	Cereal growth stage – Zadoks scale							
	2 leaf	3 leaf	4 leaf	5 leaf-	Mid till	Late till	Full till-	Booting
Product (chemical)	12	13	14	early till 15–21	25	29	jointing 30–36	40-49
2,4-D amine 700	12	13		13 21			30 30	10 15
2,4-D ester								
2,4-DB								
Achieve® WG (tralkoxydim)								
Agtryne® MA (terbutryn + MCPA)								
Aptitude® (metribuzin + carfentrazone-ethyl)								
Arcade® (prosulfocarb)		Whea	t and barle	ev only				
Associate® (metsulfuron-methyl)		VVIICa	T drid barre	Ly Offig				
Atlantis® OD (mesosulfuron-methyl)			Who	at only				
Axial® Xtra (pinoxaden + cloquintocet-mexyl)			VVIIC	at Offig				to Z49
Boxer Gold® (prosulfocarb + S-metolachlor)		Whos	t and barle	l N/ only				10 249
·		vviiea	T and parie	ey offig				
Broadside® (bromoxynil + MCPA + dicamba)								+- 702
Broadstrike® (flumetsulam)								to Z83
Bromicide® (bromoxynil)								
Bronco® MA-X (bromoxynil + MCPA)								
Bromoxynil + diflufenican								
Chlorsulfuron								
Condor® (MCPA + pyraflufen-ethyl)		Lov	v rate only	at 2-leaf st	tage	I		
Decision® (diclofop-methyl + sethoxydim)								
Diuron® 900 WG								
Ecopar® (pyraflufen-ethyl)								
Enforcer® 242 (picloram + MCPA)								
FallowBoss® Tordon® (2,4-D amine + picloram + aminopyralid)								
Flight® EC (picolinafen + bromoxynil + MCPA)								
Frequency® (topramezone + cloquintocet-mexyl)							to Z32	
Hotshot® (aminopyralid + fluroxypyr)							1st node	
Hussar® OD (idosulfuron-methyl + mefenpyr-dimethyl)			See	label				
Igran® Flowable (terbutryn)								
Intercept® (imazamox + imazapyr)		Wh	neat	Wh	eat and ba	ırley	to Z32	
Kamba® (dicamba)								
Kamba® M (MCPA + dicamba)								
Legacy® MA (diflufenican + MCPA)								
Lontrel® Advanced (clopyralid)								
LVE MCPA 570								
Paradigm® (florasulam + halauxifen)			Do n	ot apply af	fter Z39 fo	r oats		
Pixxaro® (fluroxypyr + halauxifen)								
Precept® (MCPA + pyrasulfotole)		Not k	parley		All cereals	;		
Quadrant® (MCPA ester + bromoxynil + diflufenican + picolinafen)						Z28		
Rexade® (pyroxsulam + halauxifen)		Tri	ticale and	wheat only	v (not duru	ım)	to Z31	
Sentry® (imazapic + imazapyr)								
Starane® Advanced (fluroxypyr)							to Z39	
Sulfosulfuron							10 200	
Talinor® (bicyclopyrone + bromoxynil + cloquintocet-mexyl)						to Z32		
Topik® 240 EC (clodinafop-propargyl)						to ESE		
Trezak® (aminopyralid + halauxifen)								
Triathlon® (MCPA + bromoxynil + diflufenican)								
Velocity® (pyrasulfotole + bromoxynil)								
Recommended and preferred timing		n many ce	roal erer -					

Recommended and preferred timing
Less preferred timing

The recommended application timing has been determined after significant research by the marketing company, aiming to minimise crop damage and maximise yield. Pay attention to 2 vital stages of crop development: at 3–5 leaf stage or when tillering starts; and at the start of jointing.

3 leaf (on main stem) stage is before tillering.

5 leaf (on main stem) stage coincides with early tillering.

6–7 leaf (on main stem) stage coincides with mid to fully tillered stage. Jointing or node formation indicates the start of the reproductive phase in the crop, and tillering can be said to be complete, i.e. fully tillered.

Canola crop growth stages

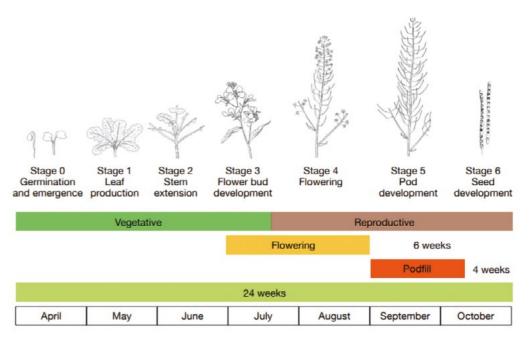
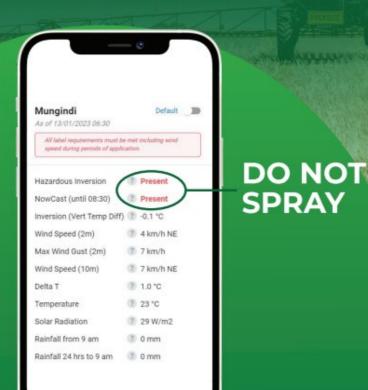


Figure 5. Canola crop growth stages.

Take the guesswork out of inversion weather conditions and use **WAND**



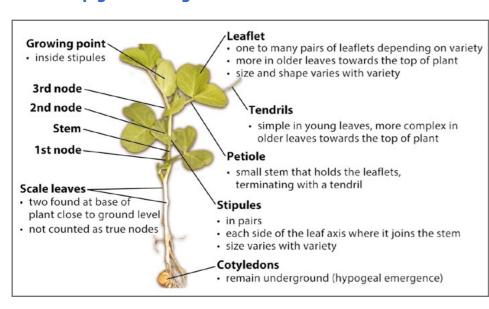
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Pulse crop growth stages



All pulse species have the same basic structure, with a main stem, which can be divided into units known as nodes. Two scale leaves appear first and the nodes, where they occur, are not counted as true nodes. A node is made up of a petiole that has stipules where it joins the stem, and leaflets along its length. In some species it terminates in a simple or more complex tendril.

Figure 6. Field pea – conventional leaf type (*Pisum sativum*) e.g. PBA Percy⁽⁾, Sturt⁽⁾.

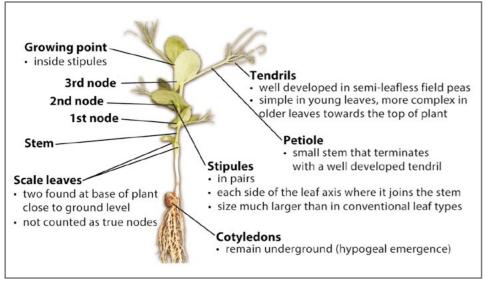


Figure 7. Field pea – semi-leafless leaf type (*Pisum sativum*) e.g. PBA Butler⁽⁾, PBA Oura⁽⁾ PBA Wharton⁽⁾, Morgan⁽⁾.

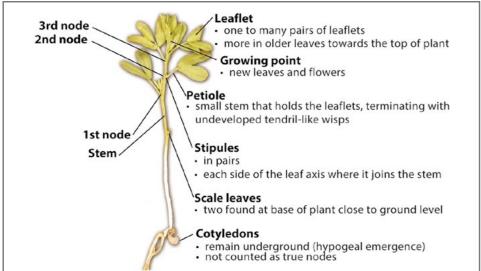


Figure 8. Lentil (*Lens culinaris*).

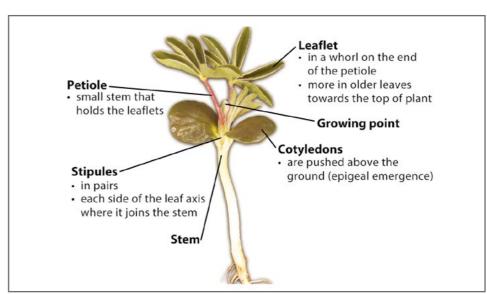


Figure 9. Lupin – albus (*Lupinus albus*, pictured) and narrow-leaf (*L. angustifolius*).

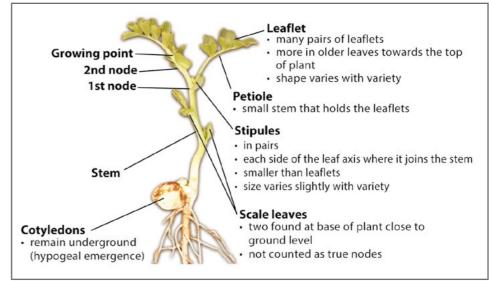


Figure 10. Chickpea (*Cicer arietinum*).

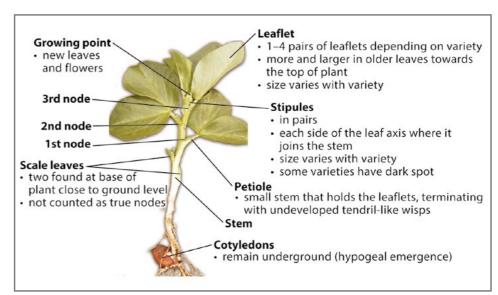


Figure 11. Faba bean (*Vicia faba*).

Herbicides for control and suppression

Table 10. Guidelines for crop rotations – fallow and pre-sowing weed control – page 1 of 2.

Note: example trade names shown. Others may be available at different concentrations. See labels for details.	Herbicide group	Specific details	Rate	Barley	Canola	Canola (Clearfield)	Cereal rye	Chickpea	Cotton	Faba bean	Field pea	Lentil	Linseed	Lucerne	Lupins
			<0.5 L/ha	1d	14d	14d	_	7d	10d	7d	7d	7d	7d	7d	7d
2,4-D amine 700	4		0.5-0.98 L/ha	1d	21d	21d	_	14d	14d	7d	14d	7d	7d	7d	14d
			0.98–1.5 L/ha	3d	28d	28d	-	21d	21d	10d	14d	10d	14d	10d	21d
			<0.51 L/ha	1d	14d	14d	_	7d	10d	7d	7d	7d	7d	7d	7d
2,4-D LV ester 680	4		0.51–1.0 L/ha	1d	21d	21d	-	14d	14d	7d	14d	7d	7d	7d	14d
			1.0–1.6 L/ha	3d	28d	28d	-	21d	21d	10d	14d	10d	14d	10d	21d
Atrazine 900	5		0.65-0.87 kg/ ha	_	-	-	-	-	_	-	✓	-	-	-	✓
Associate® (metsulfuron- methyl 600)	2		5–7 g/ha	6w	9mo	_	6w	9mo	-	9mo	9mo	-	9mo	9mo	9mo
Balance® 750 WG (isoxaflutole 750)	27		100 g/ha	10w	9mo	9m	-	0d	7m	9m	9m	21m	_	9m	_
Basta® (glufosinate- ammonium 200)	10		3.75 L/ha	14d	14d	14d	14d	14d	14d	14d	14d	14d	14d	14d	14d
Dual Gold® (S-metolachlor 960)	15		1–2 L/ha	6mo	6mo	6mo	6mo	6mo	_	6то	6mo	6mo	6mo	6mo	6mo
Express® (tribenuron- methyl 750)	2		15–25 g/ha	3d	-	-	-	-	_	-	-	-	_	-	_
Garlon® (triclopyr 600)	4		80–160 mL/ha	7d	-	-	-	7d	14d	-	-	-	-	-	_
		NNSW	0.2 L/ha	2mo	2mo	2mo	-	4mo	_	4mo	-	-	-	6mo	_
		NNSW	0.3 L/ha	2mo	4mo	4mo	-	6mo	_	4mo	_	-	_	9mo	-
Grazon® Extra (triclopyr 300 + picloram 100 +	4	NNSW	0.4 L/ha	4mo	4mo	4mo	-	6mo	_	6mo	-	-	-	9mo	_
aminopyralid 8)		NNSW	0.6 L/ha	4mo	4mo	4mo	-	6mo	_	6mo	-	-	-	9mo	_
		SNSW	<0.5 L/ha	9mo	9mo	9mo	-	24mo	_	24mo	24mo	-	-	24mo	24mo
Hotshot® (aminopyralid 10	_	NNSW	<0.75 L/ha	4mo	4mo	4mo	-	6mo	9mo	6mo	-	-	-	6mo	_
+ fluroxypyr 140)	4	SNSW	<0.5 L/ha	9mo	9mo	9mo	-	20mo	_	20mo	20mo	-	_	20mo	20mo
Impose® (imazapic 240)	2	NNSW	150–200 mL/ ha	4/15mo	-	_	_	8mo	24mo	8mo	-	-	_	8mo	8mo
			0.135 L/ha	1d	7d	7d	1d	_	7d	_	-	_	_	_	7d
Kamba® 750 (dicamba 750)	4		0.185 L/ha	7d	10d	10d	7d	21d	7d	-	14d	_	_	_	14d
-			0.375 L/ha	14d	14d	14d	14d	28d	14d	_	21d	_	_	_	21d

Key: h = hours, d = days, w = weeks, mo = months, NR = not required, NNSW = northern NSW, SNSW = southern NSW. $\checkmark = registered$ for these crops within a spraying/planting window; refer comments.

Read the label before using a product.

Maize	Medic	Millet	Mungbean	Oats	Pigeon pea	Safflower	Sorghum	Soybean	Sunflower	Triticale	Vetch	Wheat	Comments
_	7d	_	-	3d	_	7d	3d	14d	7d	1d	7d	1d	
-	7d	-	-	3d	-	14d	7d	14d	10d	3d	7d	3d	When applied to dry soils, at least 15 mm of rain must fall before the start of the
-	10d	_	-	7d	_	21d	10d	21d	14d	7d	10d	7d	plant back period.
-	7d	-	-	3d	-	7d	3d	14d	7d	1d	7d	1d	
-	7d	-	-	3d	-	14d	7d	14d	10d	3d	7d	3d	When applied to dry soils, at least 15 mm of rain must fall before the start of the plant back period.
-	10d	-	-	7d	-	21d	10d	21d	14d	7d	10d	7d	ріапі раск репоц.
-	-	-	-	-	_	_	-	_	-	-	_	✓	Apply July–September for a May–June plant. Higher rate for longer fallow.
14mo	9mo	14mo	-	9mo	-	9mo	14mo	14mo	14mo	6w	-	10d	Applies to soil pH 5.6–8.5. For pH >8.6, crop tolerance needs to be field tested before large scale use.
10w	21mo	_	7mo	10w	-	_	7mo	7mo	7mo	_	9mo	10w	Significant rainfall and time are required; refer label.
14d	14d	14d	14d	14d	14d	14d	14d	14d	14d	14d	14d	14d	
-	6mo	6mo	6mo	6mo	6mo	6mo	_	_	_	6mo	6mo	6mo	Non-listed crops have a label use; refer label.
7/21d	-	-	7/21d	3d	-	-	7/21d	7/21d	7/21d	-	_	3d	For listed summer crops, if minimum soil temperatures at planting depth are ≤15 °C for 3 consecutive days, then plant back intervals should be extended to 21 days.
7d	_	_	_	-	_	_	7d	7d	7d	_	_	7d	
-	-	-	-	-	_	_	_	_	-	-	_	2mo	
-	-	_	-	-	_	_	-	_	-	-	_	2mo	Plant backs are for black cracking clays. During drought conditions the plant back
-	-	-	-	-	_	_	_	_	-	-	_	4mo	period might be significantly longer.
-	-	_	-	-	_	_	_	_	_	-	_	4mo	
-	24mo	-	-	-	-	_	_	_	-	-	_	9mo	
_	_	_	5mo	_	-	-	3mo	5mo	5mo	-	_	4mo	Plant backs are for black cracking clays. During drought conditions the plant back
-	20mo	-	-	-	-	-	_	-	-	-	_	9mo	period might be significantly longer.
4/15mo	-	-	4mo	-	-	-	18mo	-	24mo	-	-	4/15mo	Observe 36 months for non-specified crops and 4 months for imidazoline-tolerant cereals. Minimum re-cropping periods are influenced by numerous factors; refer label.
1d	7d	1d	5d	1d	5d	14d	1d	5d	1d	1d	_	1d	·
3d	14d	3d	5d	7d	5d	21d	3d	5d	7d	7d	_	7d	When applied to dry soils, at least 15 mm of rain must fall before the start of the plant back period.
7d	21d	7d	10d	14d	10d	28d	7d	10d	14d	14d	_	14d	prant back period.

Table 10. Guidelines for crop rotations – fallow and pre-sowing weed control – page 2 of 2.

Note: example trade names shown. Others may be available at different concentrations. See labels for details.	Herbicide group	Specific details	Rate	Barley	Canola	Canola (Clearfield)	Cereal rye	Chickpea	Cotton	Faba bean	Field pea	Lentil	Linseed	Lucerne	Lupins
		NNSW	<0.4 L/ha	0d	0d	0d	0d	3mo	3mo	_	_	-	-	9mo	_
		NNSW	40–150 mL/ha	0d	0d	0d	0d	6mo	6mo	-	-	-	_	9mo	_
Lontrel® Advanced		NNSW	>150 mL/ha	0d	0d	0d	0d	-	-	-	-	-	-	-	_
(clopyralid 600)	4	SNSW	<150 mL/ha	0d	0d	0d	0d	9mo	-	9mo	9mo	9mo	-	-	9mo
		SNSW	<150-250 mL/ha	0d	0d	0d	0d	12mo	-	12mo	12mo	12mo	_	-	12mo
		SNSW	>250 mL/ha	0d	0d	0d	0d	24mo	-	24mo	24mo	24mo	_	-	24mo
Palmero® TX (terbuthylazine 750 + isoxaflutole 75)	5 + 27		0.7–1.0 kg/ha	6mo	9mo	9mo	_	0mo	7mo	9mo	9mo	21mo	_	9mo	_
Pixxaro® (fluroxypyr 250 +	4	NNSW	<600 mL/ha	1mo	1mo	1mo	-	7mo	4mo	7mo	-	-	_	-	_
halauxifen 16.25)	4	SNSW	<400 mL/ha	1mo	-	-	_	7mo	-	7mo	7mo	7mo	-	7mo	-
Priority® (florasulam 200)	2		15-25 mL/ha	1w	8mo	8mo	_	8mo	6mo	8mo	8mo	8mo	_	-	8mo
Pyresta® Xtreme (pyraflufen-ethyl 2.1 + 2,4-	14 . 4		250–500 mL/ ha	1d	14d	14d	_	7d	10d	7d	7d	7d	7d	7d	7d
D ester 600)	14 + 4		900 mL/ha	1d	21d	21d	_	14d	14d	7d	14d	7d	7d	7d	14d
Sharpen® (saflufenacil 700)	14		17–34 g/ha	1h	6w	6w	16w	1h	6w	1h	1h	1h	16w	16w	1h
Shogun® (propaquizafop 100)	1		200–300 mL/ ha	28d	-	-	28d	-	-	-	_	-	-	-	_
			0.225 L/ha	7d	-	_	_	7d	14d	_	-	-	_	-	_
Starane® Advanced (fluroxypyr 333)	4		0.45 L/ha	7d	_	_	_	7d	14d	_	_	-	_	-	-
			0.9 L/ha	7d	_	-	_	7d	28d	_	_	-	-	-	-
Striker® (oxyfluorfen 240)	14		75 mL/ha	0d	_	_	_	-	_	_	_	_	_	_	-
Terbyne® Xtreme®	5		0.86 kg/ha	4mo	6mo	6mo	6mo	6mo	0d	6mo	6mo	6mo	6mo	6mo	6mo
(terbuthylazine 875)			1.2 kg/ha	5mo	6mo	6mo	6mo	6mo	0d	6mo	6mo	6mo	6mo	6mo	6mo
Terrad'or® (tiafenacil 700)	14		15–40 g/ha	1h	1w*	1w*	-	1h	6w	1h	1h	1h	-	-	1h
			30 g/ha	1h	5mo	5mo	_	1h	1h	1h	1h	0mo	-	0mo	1h
Valor®/Terrain®	14		120 g/ha	1mo	9mo	9mo	_	0mo	-	0mo	0mo	0mo	-	3mo	1mo
(flumioxazin 500)	' '		180 g/ha	2mo	9mo	9mo	_	0mo	-	0mo	0mo	3mo	_	4mo	2mo
			Up to 280 g/ha	3mo	9mo	9mo	_	1mo	2mo	0mo	1mo	4mo	_	6mo	3mo
Verdict® (haloxyfop 520)	1		150 mL/ha	12w	-	_	12w	-	-	_	_	-	_	-	_
Voraxor® (saflufenacil 250	14		100 mL/ha	1h	6w	6w	4mo	1h	6w	1h	1h	1h	4mo	4mo	1h
+ trifludimoxazin 125)			200–240 mL/ ha	1h	9mo	9mo	_	6mo	3mo	1mo	1mo	3mo	-	-	3mo

Plant back periods are a guide only based on label recommendations. The time indicated between application and safe crop rotation intervals will depend on several factors including rainfall (amount and intensity), soil type (pH, biological activity and organic carbon), soil type variability within a paddock, temperature and herbicide rate. Some crops are more sensitive to various herbicide groups than others. Always take a conservative approach to plant back periods, especially with sensitive or high input crops.

Read the label before using a product.

14d Od 14d 6mo 6mo Od od at least 2 years who	should not be sown for en Lontrel® Advanced ./ha has been used in
14d - - - 0d - - 14d 6mo 6mo 0d - 0d at least 2 years wheat more than 0.15 Least more than 0.15 Le	en Lontrel® Advanced
14d - - - 0d - - 14d 6mo 6mo 0d - 0d at least 2 years wheat more than 0.15 Least 2 years	en Lontrel® Advanced
- - - 0d - - 0d - 0d northern NSW. - 9mo - - 0d - - - 0d 9mo 0d - 12mo - - 0d - - - 0d 12mo 0d	./na nas been used in
- 12mo 0d 0d 12mo 0d	
- 12mo 0d 0d 12mo 0d	
- 24mo 0d 0d 24mo 0d	
6mo 21mo – 7mo 6mo – – 7mo 7mo 7mo – – 6mo Must also meet the requirement; refer	
	black cracking clays.
- 7mo 1mo 1mo 7mo 1mo period might be sig	nditions the plant back gnificantly longer.
4mo 8mo 6mo 5mo 6w 6mo - 4mo 6mo 6mo 1w 8mo 1w Must be used with to partner plant ba	a mix partner; also refer ck.
- 7d 3d - 7d 3d 14d 7d 1d 7d 1d When applied to di	ry soils, at least 15 mm
- 7d 3d - 14d 7d 14d 10d 3d 7d 3d plant back period.	fore the start of the
1h 16w 16w 16w 1h 16w 16w 1d 1d 16w 16w 16w 1h	
7d 7d 7d 7d 7d Do not plant susce	ptible crops, including
7d 7d 7d 7d cotton and pulse of	rops, into irrigated fields ng less than 25% clay
	months of treatment.
Od Od - Od	
6mo 6mo 6mo 3mo 4mo 6mo 6mo 0d 3mo 6mo 6mo 6mo 4mo Both rainfall and tir	me requirements must
6mo 6mo 6mo 4mo 5mo 6mo 6mo 0d 4mo 6mo 6mo 5mo be met; refer label.	
	15–20 g/ha is 1 week is 2 weeks to canola.
1h 0mo - 1h 1h 1h - 1h 1h 1h 1h 1h	
- 3mo 1mo 1mo 1mo 0* *Durum wheat plan	
- 4mo 2mo 2mo 1mo 1mo* 30 g/ha, 1 months for 280 g	or up to 180 g/ha and /ha.
1mo 6mo - 2mo 3mo 1mo - 1mo 0mo 2mo 3mo 2mo 2mo*	
12w - 12w - 12w 12w - 12w	
1h 4mo 4mo 1mo 1h 4mo 4mo 1h 1h 4mo 1h 4mo 1h	
1mo 1h - 9mo 1mo - 6mo 1h - 1h	

 $Key: h = hours, d = days, w = weeks, mo = months, NR = not required, NNSW = northern \, NSW, SNSW = southern \, NSW.$

 $[\]checkmark$ = registered for these crops within a spraying/planting window; refer comments.

Table 11. Rainfastness – stock withholding periods – harvest withholding periods – page 1 of 2.

Rainfastness: the time interval required between herbicide application and rainfall. Avoid applying foliar uptake herbicides when rain is imminent. The table suggests the time needed between spraying and rainfall for each herbicide to be effective.

Incorporation – pre-emergents: rainfast periods typically do not apply to pre-emergents. Pre-emergents typically need some form of incorporation, usually cultivation, incorporation by sowing (IBS) and/or rainfall/irrigation to activate. Notes are provided for each relevant products.

Stock grazing or fodder production withholding periods: this is the period of time you must wait after spraying before allowing stock to graze the area or cut for stock feed to ensure the animal produce is free of herbicide residues. Check the latest MRL data with individual companies for produce to be sold on export markets.

Harvest withholding periods: this is the period of time you must wait after spraying before harvesting grain to ensure that grain is free of herbicide residues.

Herbicide	Rainfastness - hours	Incorporation – pre-emergents	Stock withholding period – days/weeks	Harvest withholding period – days/weeks
2,4-D amine or ester	6	-	7 d	NR
2,4-DB 500	4	-	7 d	Not stated.
Achieve® WG (tralkoxydim 400)	0.5	_	14 d	NR
Affinity® Force (carfentrazone 240)	6	_	14 d	NR
Agtryne® MA (terbutryn 275 + MCPA 160)	6	_	7 d	NR
Aptitude® (metribuzin 375 + carfentrazone-ethyl 90)	1	_	14 d	NR
Arcade® (prosulfocarb 800)	NA	IBS and rain or irrigation to wet soil within 10 days.	10 w	NR
Associate® (metsulfuron- methyl 600)	2	_	NR	Cereal NR Chickpea 7 d.
Atlantis® OD (mesosulfuron- methyl 30)	8	-	4 w	8 w
Atrazine 900	6-foliar	20–30 mm rain or irrigation within 10 days.	TT canola (pre-em) 15 w; (post-em) 6 w. Other 28 d.	NR
Avadex® Xtra (tri-allate 500)	NA	Incorporation by cultivation or IBS is required. Rain will not incorporate. Refer label.	Canola, cereals, mustards 12 w. Linseed, pulses, safflower 13 w. Additional 28 day slaughter interval.	NR
Axial® Xtra (pinoxaden 50 + cloquintocet-mexyl 12.5)	0.5	-	21 d	NR
Balance® 750 WG (isoxaflutole 750)	NA	15–30 mm rain or irrigation. UV stable.	Chickpea 6 w. Fallow 8 w.	NR
Basta® (glufosinate- ammonium 200)	6	_	Post-fallow application 8 w.	NR
Bladex® (cyanazine 900)	8	-	Do not graze treated immature crops or cut for stock feed.	NR
Boxer Gold® (prosulfocarb 800 + S-metolachlor 120)	NA	IBS and rain or irrigation to wet soil within 10 days.	10 w	NR
Broadside® (bromoxynil 140 + MCPA 280 + dicamba 40)	3	_	8 w	NR
Broadstrike® (flumetsulam 800)	4	-	Cereals, pulses 4 w. Maize 14 d.	Cereals 4 w. Pulses NR
Brodal® Options (diflufenican 500)	4	-	14 d	NR
Bromicide® (bromoxynil 200)	3	_	8 w	NR
Bromoxynil 250 + diflufenican 25	4	-	8 w	NR
Bronco® MA-X (bromoxynil 280 + MCPA 280)	3	-	8 w	NR
Callisto® (mesotrione 480)	NA	Knife-point press-wheel incorporation by seeding within 3 days.	10 w	NR
Cheetah® Gold (fenoxaprop-p- ethyl 13.6 + diclofop-methyl + sethoxydim 20)	4	-	7 w	NR

Read the label before using a product.

Herbicide	Rainfastness – hours	Incorporation – pre-emergents	Stock withholding period – days/weeks	Harvest withholding period – days/weeks
Chlorsulfuron 750	4	_	NR	NR
Condor® (MCPA 375 + pyraflufenethyl 10)	6	_	14 d	NR
CRUCIAL® (glyphosate 600)	1	_	Barley, canola, linseed, lupin 7 d. Wheat 5 d.	Barley, sorghum, pulses 7 d. Wheat, canola 5 d. Linseed 10 d. Other NR.
Decision® (diclofop-methyl 200 + sethoxydim 20)	2	_	7 w	NR
Devrinol-C® (napropamide 500)	NA	Mechanical incorporation within 2 hours.	12 w	NR
Diclofop-methyl 375	2	_	7 w	NR
Diuron® 900	NA	Rain or irrigation to wet soil within 3–4 days.	Pulses 35 d. Other NR.	NR
Dual Gold® (S-metolachlor 960)	NA	Rain or irrigation to wet soil to 30–40 mm within 10 days.	Canola 10 w. Cereals 8 w. Sorghum 4 w.	NR
Ecopar® (pyraflufen-ethyl 20)	6	_	14 d	NR
Elantra® Xtreme® (quizalofop-p- ethyl 200)	3	_	Canola, pulses 4 w.	Lupin 6 w. Field pea 9 w. Canola 11 w. Other pulses 12 w.
Enforcer® 242 (picloram 26 + MCPA 420)	4	_	7 d	NR
Express® (tribenuron-methyl 750)	2	-	NR	NR
Factor® WG (butroxydim 250)	0.5	_	14 d	NR
FallowBoss® Tordon® (2,4-D amine 300 + picloram 75 + aminopyralid 7.5)	4	_	28 d. Refer label.	NR
Flight® EC (picolinafen 35 + bromoxynil 210 + MCPA 350)	4	_	8 w	NR
ForageMax® (halauxifen 100 + aminopyralid 50)	3	_	2 w	NR
Foxtrot® (fenoxyprop-p-ethyl 69 + cloquintocet-mexyl 34.5)	4	_	3 w	10 w
Frequency® (topramezone 60 + cloquintocet-mexyl 60)	2	_	6 w	NR
Fusilade® Forte (fluazifop-p-ethyl 128)	1	-	Linseed, canola, medic and vetch 21 d. Pulse 7 w. Lucerne 6 w. Refer label.	Canola, linseed, lupin, pigeon pea, soybean 17 w. Faba bean 5 w. Chickpea, field pea 7 w.
Garlon® (triclopyr 600)	1	_	NR	NR
Gramoxone® 360 Pro (paraquat 360)	1	_	Stock 1 d. Horses 7 d.	Pulses 7 d.
Grazon® Extra (triclopyr 300 + picloram 100 + aminopyralid 8)	1	_	Domestic grazing NR. ESI 3 d. EGI 42 d. Refer label.	NR
Grindstone® (aminopyralid 240)	1	-	Dictated by mix partner; refer label.	Dictated by mix partner; refer label.
Guerrilla® (paraquat 300 + amitrole 12)	1	-	Stock 1 d. Horses 7 d. Remove stock 3 days before slaughter.	NR
Hammer® (carfentrazone ethyl 400)	1	_	NR	NR
Hotshot® (aminopyralid 10 + fluroxypyr 140)	1	-	Domestic grazing 7 d. ESI 3 d. EGI 42 d. Refer label.	NR
Hussar® (idosulfuron-methyl 100 + mefenpyr-dimethyl 300)	8	_	4 w	NR
Igran® Flowable (terbutryn 500)	6		7 d	Field pea 4 w.
Impose® (imazapic 240)	NA	Rain or irrigation to wet soil to 50 mm.	4 w	NR

Table 11. Rainfastness – stock withholding periods – harvest withholding periods – page 2 of 2.

Herbicide	Rainfastness - hours	Incorporation – pre-emergents	Stock withholding period – days/weeks	Harvest withholding period – days/weeks
Intercept® (imazamox 33 + imazapyr 15)	2	-	IMI barley, faba bean, field pea, wheat 4 w. CL canola 5 w.	NR
Kamba® 750 (dicamba 750)	4	_	7 d	7 d
Kamba® M (MCPA 340 + dicamba 80)	4	_	7 d	7 d
Legacy® MA (diflufenican 25 + MCPA 250)	4	_	7 d. Refer to label for grazing precautions.	NR
Lontrel® Advanced (clopyralid 600)	3	_	Canola, cereals 7 d.	Cereals 10 w. Canola NR.
Luximax® (cinmethylin 750)	NA	10 mm rain or irrigation within 7–10 days; IBS within 3 days.	7 w	NR
Mateno® Complete (aclonifen 400 + pyroxasulfone 100 + diflufenican 66)	NA	IBS incorporation and rain within 7–10 days. Do not use with discs for barley.	6 w	NR
MCPA amine and ester	6	_	7 d	NR
Outlook® (dimethenamid-p 720)	NA	IBS and rain within 7 days.	Chickpea, field pea, lupin 15 w.	NR
Overwatch® (bixlozone 400)	NA	Requires moisture to activate.	8 w	NR
Palmero® TX (terbuthylazine 750 + isoxaflutole 75)	NA	20–30 mm rain within 3 weeks.	Chickpea 6 w. Fallow 8 w.	NR
Paradigm® (florasulam 200 + halauxifen 200)	3	_	2 w	NR
Pixxaro® (fluroxypyr 250 + halauxifen 16.25)	1	_	14 d	NR
Precept® (MCPA 125 + pyrasulfotole 25)	2	_	4 w	NR
Priority® (florasulam 200)	Refer mix partner	_	Dictated by mix partner; refer label.	Dictated by mix partner; refer label.
Prometryn 900	NA	20–30 mm rain or irrigation within 2–3 weeks.	Chickpea 9 w. Other NR.	NR
Pyresta® Xtreme (pyraflufen-ethyl 2.1 + 2,4-D ester 600)	6	_	7 d	NR
Quadrant® (MCPA ester 250 + bromoxynil 240 + diflufenican 20 + picolinafen 10)	4	_	8 w	NR
Raptor® (imazamox 700)	2	-	Lucerne, pasture legumes 7 d. Soybean 4 w. Field pea 6 w.	NR
Reflex® (fomesafen 240)	NA	Requires rain after application for activation.	12 w	NR
Reglone® (diquat 200)	0.5	_	1 d	Canola, pigeon pea, soybean 4 d. Chickpea, faba bean, lentil 2 d. Other NR.
Rexade® (pyroxsulam 150 + halauxifen 50)	6	_	4 w	NR
Rifle® 440 (pendimethalin 440)	NA	24 h incorporation by cultivation. Rain after application assists.	Not stated.	NR
Roundup Ready® PL (glyphosate 540)	2	_	Canola 7 or 14 d. Refer label.	Pulses, wheat 7 d. Other NR.
Roundup UltraMAX® (glyphosate 570)	1	_	Hay, silage 2 d. Wheat 5 d. Barley 7 d. Other NR	Wheat 5 d. Barley, pulses 7 d. Other NR.
Rustler® (propyzamide 500)	NA	Requires 15–25 mm after application.	Canola, winter pulses 12 w. Other 25 d.	
Sakura® (pyroxasulfone 850)	NA	IBS and rain or irrigation within 10 days.	Triticale, wheat 6 w. Pulses 8 w.	NR
Sencor® (metribuzin 480)	NA	Soil moisture before and follow-up rain or irrigation.	14 d	NR

Read the label before using a product.

Herbicide	Rainfastness - hours	Incorporation – pre-emergents	Stock withholding period – days/weeks	Harvest withholding period – days/weeks
Sentry® (imazapic 525 + imazapyr 175)	NA	IBS and 15–20 mm rain within 2 weeks.	Barley, canola 6 w. Wheat 4 w. Oats 8 w.	NR
Sharpen® (saflufenacil 700)	1	-	Pulses 7 d. Lucerne 4 w. Cereals, fallow 14 d.	Pulses 7 d. Cereals, other NR.
Shogun® (propaquizafop 100)	1	_	Legume pasture, lucerne, vetch 3 d. Fallow 2 w.	Canola, linseed 16 w. Faba bean 7 w. Lupin 15 w. Chickpea, field pea, lentil 12 w.
Simazine 900	NA	10–30 mm of rain or irrigation.	Chickpea 9 w. Faba bean 8 w. Canola 15 w.	NR
Sledge® (pyraflufen-ethyl 25)	2	_	7 d	Pulse 7d, other NR.
Spinnaker® (imazethapyr 700)	2	_	14 d	NR
Spray.Seed® (paraquat 135 + diquat 115)	0.5	_	1 d	NR
Starane® Advanced (fluroxypyr 333)	1	_	7 d	NR
Status® (clethodim 240)	1	-	All pasture 14 d. Canola, pulses 21 d.	NR
Striker® (oxyfluorfen 240)	NA	-	Do not graze treated weeds.	NR
Sulfosulfuron 750	Rain might impede	-	NR	NR
Falinor® (bromoxynil 175 + bicyclopyrone 37.5 + cloquintocet-mexyl 9.4)	2	_	8 w	NR
Tenet® (metazachlor 500)	NA	IBS with knife-point press- wheel and rain within 7–10 days.	13 w	NR
Terbyne® Xtreme® (terbuthylazine 875)	NA	20–30 mm rain or irrigation within 2–3 weeks.	Canola, fallow, pulses 6 w. Cereals 8 w. Lucerne 4 w.	NR
Ferrad'or® (tiafenacil 700)	1 foliar	IBS with knife-point press- wheel for residual use.	Crops 8 w. Fallow Do not allow stock to graze treated weeds.	NR
Topik® (clodinafop-propargyl 240 + cloquintocet-mexyl 60)	2	_	4 w	NR
rezac® (aminopyralid 25 + nalauxifen 30 + cloquintocet- mexyl 30)	1	-	Cereals 14 d. Pastures 28 d. ESI 3 d. Refer label.	NR
Friasulfuron 750	6 foliar	Rain within 7–10 days assists with residual uses.	Pre-emergent 7 w. Post- emergent 14 d.	NR
Triathlon® (MCPA 250 + promoxynil 150 + diflufenican 25)	4	_	8 w	NR
FriflurX® (trifluralin 480)	NA	Incorporation by cultivation or IBS is required. Rain will not incorporate.	NR	NR
Ultro® (carbentamide 900)	NA	15–25 mm rain or irrigation within 2–3 weeks.	12 w	NR
/alor®/Terrain® (flumioxazin 500)	1 foliar	15–25 mm rain or irrigation within 3 weeks.	Cereal 6 w, pulses 12 w.	NR
/elocity® (pyrasulfotole 37.5 + promoxynil 210)	2	_	6 w	NR
/erdict® (haloxyfop 520)	1	-	Clover, medic 7 d. Lucerne 21 d. Oilseeds, pulses 28 d.	NR
/oraxor® (saflufenacil 250 + rifludimoxazin 125)	1	Soil moisture pre and follow-up rain or irrigation.	Cereals 6 w. Fallow 5 w +	NR
Weedmaster® DST® glyphosate 470)	6	_	Barley, canola 7 d. Wheat 5 d. Hay/silage 1 d. Other NR.	Canola, wheat 5 d. Barley

Key: d = days, w = weeks, NR = not required when used as directed, IBS = incorporated by sowing, IMI = imidazoline tolerant, CL = Clearfield; EGI = export grazing interval, ESI = export slaughter interval, NA = not applicable.

Table 12. Herbicides for fallow commencement and/or maintenance – grass weed control.

For spraying before sowing the crop (0–3 days), refer to plant back periods.

1 of spraying before		J	1- (, -,, -			p							
Note: example trade names shown. Others may be available at different concentrations. See labels for details.	Herbicide group	Unit of use	Boom water rate (L/ha)	Wheat plant back	Annual phalaris	Annual ryegrass	Barley grass	Barnyard grass	Blowaway grass	Brome grass	Button grass	Cereals – volunteer	Couch	Feathertop Rhodes grass	Johnson grass
Atrazine 900	5	kg/ha	55	_					(0.65–0.8	7				
Balance® 750 WG (isoxaflutole 750)	27	g/ha	>50	10w + 100 mm	_	_	_	100 (S)	_	_	_	_	_	100	_
Dual Gold® (S-metolachlor 960)	15	L/ha	>60	6mo	_	_	_	1.0-2.0	_	_	_	_	_	1.0-2.0	_
Gramoxone® 360 Pro (paraquat 360)	22	L/ha	100- 200	1h	0.835- 1.67	0.835- 1.67	0.835- 1.67	0.835– 1.67	_	0.835- 1.67	-	0.835- 1.67	_	_	_
Guerrilla® (paraquat 300 + amitrole 12)	22 + 34	L/ha	50- 200	1h	_	0.75- 1.5	0.75- 1.5	0.75- 1.5	-	0.75- 1.5	_	0.75- 1.5	_	_	_
Impose® (imazapic 240)	2	L/ha	>50	15/4 mo*	_	_	_	0.15- 0.2	0.15- 0.2	_	0.15- 0.2	_	_	_	_
Palmero® TX (terbuthylazine 750 + isoxaflutole 75)	5 + 27	kg/ha	50	6mo + 100 mm	1.0 (S)	1.0 (S)	_	1.0	_	_	_	_	_	1.0	_
Pyresta® Xtreme (pyraflufen- ethyl 2.1 + 2,4-D ester 600)	14 + 4	L/ha	60– 150	1–3d	_	0.5	0.5	_	_	0.25- 0.5	-	0.5	_	_	_
Shogun® (propaquizafop 100)	1	L/ha	50- 150	28d	-	-	_	-	-	_	-	-	-	0.5	-
Spray.Seed® (paraquat 135 + diquat 115)	22	L/ha	50- 200	1h	_	1–3.2	1-3.2	0.8–2.4	_	1–3.2	_	1-3.2	_	_	0.8-2.4
Terrad'or® (tiafenacil 700)	14	g/ha	>80	1h	15*	40*	40 or 15*	40*	-	15*	-	15–20*	_	-	_
Valor®/Terrain® (flumioxazin 500)	14	g/ha	80- 200	1–2mo	_	_	210- 280	_	_	_	_	_	_	210- 280	_
Verdict® (haloxyfop 520)	1	mL/ha	50- 150	12w	_	_	_	150	_	_	150	_	_	150	
Voraxor® (saflufenacil 250 + trifludimoxazin 125)	14	L/ha	80- 250	1h	_	0.1	0.1	-	-	0.1	_	_	_	_	-
Weedmaster® DST® (glyphosate 470)	9	L/ha	80	6h	0.96-7	1.15–7	0.77-7	1.53–7	0.77-7	0.96-7	0.77-7	0.77-7	2.3-7	0.77-7	4.6-7
Roundup UltraMAX® (glyphosate 570)	9	L/ha	80 max	1h	0.625- 0.95	0.95- 1.25	0.625- 0.95	0.625– 1.3	_	0.95- 1.25	0.625- 1.3	0.625- 0.95	1.2–1.9	_	1.2–1.9
CRUCIAL® (glyphosate 600)	9	L/ha	80	6h	0.75– 5.5	0.9–5.5	0.6–5.5	1.2–5.5	0.6–5.5	0.75- 5.5	0.6–5.5	0.6–5.5	1.8–5.5	0.6–5.5	3.6-5.5

Key: h = hours, d = days, mo = months, fb = followed by, IMI = imidazoline tolerant varieties, NR = not required, S = suppression.

Adjuvant key: MO = mineral oil, MOS = mineral oil plus surfactant, MSO = methylated seed oil, NIS = non-ionic surfactant.

NIS products might indicate a specific concentration (i.e. NIS 1000); refer to adjuvant chart for example products.

Read the label before using a product.

Liverseed grass	Native millet	Nut grass	Perennial – phalaris	Sorghum – volunteer	Spiny burr grass	Stink grass/black grass	Summer grass	Vulpia/silver grass	Wild oats	Windmill grass	Winter grass	Yorkshire fog	Comments
					(0.65–0.8	7						Before lupins, peas or wheat only. Apply late July–mid September for May–June sowing.
-	_	_	_	-	-	_	-	_	_	_	-	-	Pre-emergent product. Add a knockdown herbicide if germinated weeds are present.
1.0-2.0	_	_	_	_	-	1.0-2.0	1.0-2.0	_	_	_	_	_	Pre-emergent only; add a knockdown mix partner if required.
0.835- 1.67	_	_	_	-	0.835– 1.67	0.835– 1.67	0.835– 1.67	0.835- 1.67	0.42- 1.4	_	0.835– 1.67	_	Must add an adjuvant.
0.75- 1.5	_	_	_	-	0.75- 1.5	0.75- 1.5	0.75– 1.5	0.75– 1.5	0.75– 1.5	_	0.75– 1.5	_	Add NIS when dilution in tank is below 400 mL/100 L water. Not otherwise required.
0.15- 0.2	_	-	_	-	-	0.15- 0.2	-	_	-	_	_	-	Northern NSW only. Adjuvant NR. *Plant back: W 15 m + 500 mm, IMI W 4 m + 200 mm.
_	_	_	_	-	-	_	-	_	1.0 (S)	_	-	_	Pre-emergent only; add a knockdown mix partner if required.
-	_	_	_	_	-	_	_	0.5	0.5	_	_	_	Add glyphosate.
-	-	-	-	-	-	-	-	-	-	-	-	-	Young, active weeds only. Must be followed with a paraquat double knock in 7–14 days. Adjuvant MSO 0.5%.
0.8-2.4	_	_	_	0.8-1.2	-	0.8-2.4	0.8-2.4	1–3.2	1–3.2	_	_	-	Add NIS for Vulpia.
_	_	_	_	-	-	_	_	30*	20*	_	20*	_	*Requires glyphosate as a mix partner for control. Adjuvant: MSO 1%.
_	_	_	_	-	-	_	210– 280	_	_	_	_	_	Pre-emergent control and some knockdown activity. Add a knockdown partner.
150	_	_	_	_	-	150	150	_	_	150	_	_	Adjuvant MOS 0.5%. A double knock of paraquat must be applied within 7–14 days.
-	-	-	-	-	-	-	-	0.1	0.1	-	-	-	Add glyphosate or paraquat. Can reduce glyphosate efficacy on grasses; increase glyphosate rate to compensate. Adjuvant MSO 1%.
0.77-7	0.77-7	0.77-7	1.15–7	0.77-7	1.53–7	0.77-7	0.77-7	1.15–7	0.77-7	0.77-7	0.96-7	1.15–7	
0.625- 1.3	0.625– 1.3	1.9 fb 1.9	1.2–1.9	0.425- 1.3	-	0.425– 1.3	-	0.95– 1.25	0.625- 0.95	-	0.95– 1.25	1.2–1.9	Rates and adjuvants vary with weed size and location.
0.6–5.5	0.6–5.5	1.8 fb 1.8	0.9–5.5	0.6–5.5	1.2–5.5	0.6–5.5	0.6–5.5	0.9–5.5	0.6-5.5	0.6-5.5	0.75– 5.5	0.9–5.5	

Table 13. Herbicides for fallow commencement and/or maintenance – broadleaf weed control – page 1 of 6.

Note: example trade names shown. Others may be available at different concentrations. See labels for details.	Herbicide group	Units of use	Boom water rate (L/ha)	Wheat plant back	African turnip weed	Amaranthus	Amsinckia	Black bindweed	Blackberry nightshade	Bladder ketmia	Boggabri weed	Burrs – Bathurst	Burrs – Noogoora	Caltrop/yellow vine	Canola – volunteer
2,4-D amine 700 Drift restrictions apply	4	L/ha	50- 250	1–7d	-	0.75- 1.15	0.98	0.98	0.515- 0.745	0.745– 1.15	0.5- 0.98	0.515- 1.5	0.745- 1.15	0.28- 1.5	0.88- 1.25
2,4-D LV ester 680 Drift restrictions apply	4	L/ha	30- 100	1–7d	-	0.8	_	-	_	_	-	0.8	0.8	0.62- 0.8	0.9–1.3
Colex-D® (2,4-D choline 456) Reduced drift option	4	L/ha	70- 100	1–7d	-	1.14– 1.77	1.14– 1.77	0.43- 1.25	0.79- 1.14	1.14– 1.77	-	0.79– 1.14	1.14– 1.77	0.43- 1.25	1.35- 1.84
Dropzone® (2,4-D amine 500) Reduced drift option	4	L/ha	70- 250	1–7d	-	0.7	1.37	1.37	0.7	1.0	-	0.7–1.0	1.0	0.4–1.0	1.2
Associate® (metsulfuron-methyl 600)	2	g/ha	>50	10d	-	-	5 or 7	5–7	_	-	-	-	-	_	5 or 7
Atrazine 900	5	kg/ha	55	-					().65–0.8	7				
Balance® 750 WG (isoxaflutole 750)	27	g/ha	>50	10w + 100 mm	-	_	-	_	-	-	-	_	-	-	_
Basta® (glufosinate- ammonium 200)	10	L/ha	100	14d	-	3.75	-	-	_	3.75	-	_	3.75 (S)	3.75	-
Bromicide® (bromoxynil 200)	6	L/ha	>50	Not stated	-	_	-	1.5 or 1–1.5*	_	-	-	_	_	_	-
Express® (tribenuron-methyl 750)	2	g/ha	>50	3d	-	25	-	25*	_	-	25	_	-	25	_
FallowBoss® Tordon® (2,4-D amine 300 + picloram 75 + aminopyralid 7.5)	4	L/ha	50- 100	4mo	-	-	-	-	-	-	-	-	-	-	_
Garlon® (triclopyr 600)	4	mL/ ha	>50	7d	-	_	-	-	_	_	_	_	_	_	_
Gramoxone® 360 Pro (paraquat 360)	22	L/ha	100- 200	1 h					0	.835–1.6	57				
Grazon® Extra (triclopyr 300 + picloram 100 + aminopyralid 8)	4	L/ha	70	2–4mo	-	-	-	-	0.2-0.4 (S)	-	-	-	-	_	_
Grindstone® (aminopyralid 240)	4	mL/ ha	50- 100	4mo	16 or 24	-	_	16 or 24	7–15* (S)	-	_	-	-	-	-
Guerrilla® (paraquat 300 + amitrole 12)	22 + 37	L/ha	100- 200	1h		1				0.75–1.5					
Hammer® (carfentrazone- ethyl 400)	14	mL/ ha	50- 150	1h	-	_	_	_	_	_	_	_	_	_	_
Hotshot® (aminopyralid 10 + fluroxypyr 140)	4	L/ha	>80	4mo	-	_	_	0.5	_	_	_	_	-	_	-
Impose® (imazapic 240)	2	L/ha	>50	15/4 mo*	-	0.15- 0.2	-	-	-	-	0.15- 0.2	-	-	0.15- 0.2	-
W 1 8750/11 1 750		1.7	. 50		_	0.105- 0.16	_	0.105- 0.16	-	_	_	_	0.105- 0.16	0.105- 0.16	-
Kamba® 750 (dicamba 750)	4	L/ha	>50	1–14d	-	0.215- 0.375	-	0.185	0.215- 0.375	-	-	0.215- 0.375	0.215- 0.375	0.215– 0.375	-

Read the label before using a product.

Capeweed	Charlock	Chickpea – volunteer	Chickweed	Chicory	Clover	Corn gromwell	Cow vine/peach vine	Datura (thornapple)	Deadnettle	Docks	Erodium (stork's bill)	Faba bean volunteer	Fat hen	Field pea – volunteer	Comments
0.98- 1.5	0.39– 1.25	-	-	-	0.515– 1.1	-	_	0.515- 0.745	-	0.39– 1.25	0.515- 0.745	-	0.5–1.5	0.39– 0.515	Adding glyphosate is recommended in most situations,
0.53- 0.8	0.41	_	-	-	0.62- 0.8	8.0	-	0.41- 0.8	0.8	_	0.8	-	0.41- 0.8	_	and many factors influence rate and adjuvant selection; refer
_	0.6- 0.79	-	-	-	0.79– 1.14	-	-	0.79– 1.14	-	0.6- 0.79	0.79– 1.14	-	1.14– 1.77	0.6- 0.79	label. The benefits of low drift products can be negated with the wrong
1.37	0.55- 0.7	_	_	-	_	0.7- 1.5	1.0	_	-	0.55– 1.37	0.7– 1.75	-	1.0	0.55	mix partner; refer label.
5 or 7	5	5	5	-	5	-	_	_	5	5 or 7	_	-	_	7	Add glyphosate; refer label. Plant back is influenced by soil pH. Adjuvant: NIS 1000 0.1%.
							0.65-0.	.87							Before lupins, peas or wheat only. Apply late July–mid September for May–June sowing.
_	-	-	-	-	_	-	-	-	-	_	-	-	_	-	Pre-emergent product. Add a knockdown herbicide if germinated weeds are present.
_	-	-	-	-	_	-	3.75	_	-	_	_	-	_	-	Warm, humid conditions provide best results.
_	-	-	-	-	_	-	1.5 or 2.1	-	-	_	-	-	-	-	*Add glyphosate. Rate is influenced by weed size; refer label.
_	-	_	-	-	-	-	_	20*	25*	_	-	-	_	_	*Add glyphosate; refer label. Adjuvant: NIS 1000 0.1%.
_	-	_	-	-	-	-	-	-	-	_	-	_	_	-	Add glyphosate.
_	-	_	-	-	-	-	_	-	-	-	-	-	_	-	Add adjuvant: MOS 0.5%. Do not use oils if mixing with glyphosate.
							0.835–1	.67							Must add an adjuvant.
_	-	_	-	-	-	-	0.2-0.4	_	-	_	_	-	_	_	Add glyphosate. Adjuvant: refer to glyphosate label.
-	-	16 or 24	-	16 or 24	16 or 24	-	7–15*	-	16 or 24	16 or 24	-	16 or 24	_	_	Northern NSW only. Add metsulfuron-methyl 600 and glyphosate. *Add picloram + triclopyr product. Refer label.
							0.75–1	.5		1					Add NIS when dilution in tank is below 400 mL/100 L water. Not otherwise required.
15–45	-	_	15–45	-	_	-	_	-	_	_	15–45	_	_	_	Always add a knockdown herbicide. Adjuvant: MOS 0.5%.
-	-	-	-	-	-	-	-	-	-	_	-	-	-	-	Northern NSW only. Add glyphosate. Adjuvant: refer to glyphosate label.
-	-	_	-	-	-	-	0.15- 0.2	_	-	-	_	-	_	_	Northern NSW only. Adjuvant: NR. *Plant back: W 15 m + 500 mm, IMI W 4 m + 200 mm.
0.105- 0.16	-	_	-	-	-	-	-	0.105- 0.16	-	0.105- 0.16	-	-	-	0.105– 0.16	Pre-cultivation. Add glyphosate.
_	-	_	-	-	0.135*	-	_	0.215– 0.375	-	0.185– 0.375	-	_	0.185– 0.375	-	No till. *Add glyphosate. ^Add 2,4-D amine.

Table 13. Herbicides for fallow commencement and/or maintenance – broadleaf weed control – page 2 of 6.

Note: example trade names shown. Others may be available at different concentrations. See labels for details.	Herbicide group	Units of use	Boom water rate (L/ha)	Wheat plant back	African turnip weed	Amaranthus	Amsinckia	Black bindweed	Blackberry nightshade	Bladder ketmia	Boggabri weed	Burrs – Bathurst	Burrs – Noogoora	Caltrop/yellow vine	Canola – volunteer
Palmero® TX (terbuthylazine 750 + isoxaflutole 75)	5 + 27	kg/ha	>50	6mo + 100mm	_	1.0	_	_	_	1.0 (S)	-	_	_	1.0	-
Pixxaro® (fluroxypyr 250 + halauxifen 16.25)	4	L/ha	>80	1mo	_	_	_	_	_	_	-	0.4	0.4	_	_
Priority® (florasulam 200)	2	mL/ ha	80- 100	1w	-	25	-	20	-	15	-	20	20	15–25	-
Pyresta® Xtreme (pyraflufenethyl 2.1 + 2,4-D ester 600)	14 + 4	L/ha	60– 150	1–3d	-	-	0.25- 0.5	-	-	-	-	0.5- 0.9*	-	0.5- 0.9*	-
Sharpen® (saflufenacil 700)	14	g/ha	80- 250	1h	-	17–26	-	17–26	17–26	17–26	-	_	-	17–26	17–26
Sledge® (pyraflufen-ethyl 25)	14	mL/ ha	80– 150	1h	_	50- 100	_	_	_	_	_	_	_	50- 100	50- 100
Spray.Seed® (paraquat 135 + diquat 115)	22	L/ha	50- 200	1h	0.8- 2.4*	_	_	0.8-2.4	0.8-2.4	1.6-2.4	0.8–1.2	1.6-2.4	0.8-2.4	0.8-2.4	-
Starane® Advanced (fluroxypyr 333)	4	L/ha	>50	7d	_	_	_	0.3- 0.45	_	0.3	_	0.45	0.45	0.3	_
Striker® (oxyfluorfen 240)	14	mL/ ha	30- 200	24h	75. Enh								osate pr produc		Striker®
Terbyne® Xtreme® (terbuthylazine 875)	5	kg/ha	>50	4mo	0.86- 1.2	_	_	_	_	_	_	_	_	_	_
Terrad'or® (tiafenacil 700)	14	g/ha	50- 150	1h	_	15*	_	_	_	20	_	_	_	20*	20 or 15*
Valor®/Terrain®			80-		_	30	_	30	_	30	_	_	30	30	30
(flumioxazin 500)	14	g/ha	200	1–2mo	_	210– 280	_	_	_	210– 280	_	_	_	210– 280	-
Voraxor® (saflufenacil 250 + trifludimoxazin 125)	14	L/ha	80- 250	1 h	-	0.1	0.1	0.1	0.1	-	-	-	-	0.1	0.1
Weedmaster® DST® (glyphosate 470)	9	L/ha	80	6h	0.77-7	0.77-7	0.96-7	1.28-7	1.4-7	1.15–7	0.77-7	1.15–7	1.15–7	0.77-7	1.4–7
Roundup UltraMAX® (glyphosate 570)	9	L/ha	80 max	1h	0.425– 1.3	_	0.625- 0.96	1.2–1.9	_	0.625– 1.3	0.425- 1.3	0.625- 1.9	0.625- 1.3	0.425– 1.3	-
CRUCIAL® (glyphosate 600)	9	L/ha	80	6h	0.6-5.5	0.6–5.5	_	1–5.5	1.1–5.5	0.9–5.5	0.6-5.5	0.9–5.5	0.9–5.5	0.6-5.5	1.1-5.5

For pre-sowing of crops in a seedbed salvage situation (0–3 d pre-sowing), refer to plant backs.

Key: h = hours, d = days, mo = months, fb = followed by, IMI = imidazoline tolerant varieties, NR = not required, (S) = suppression only. Adjuvant key: MO = mineral oil, MOS = mineral oil plus surfactant, MSO = methylated seed oil, NIS = non-ionic surfactant.

Read the label before using a product.

Capeweed	Charlock	Chickpea – volunteer	Chickweed	Chicory	Clover	Corn gromwell	Cow vine/peach vine	Datura (thornapple)	Deadnettle	Docks	Erodium (stork's bill)	Faba bean volunteer	Fat hen	Field pea – volunteer	Comments
0.7–1.0	-	-	-	_	-	0.7- 1.0	-	-	0.7–1.0	-	-	-	-	-	Pre-emergent only; add a knockdown mix partner if required.
-	-	0.4	-	-	-	-	-	-	0.3	-	-	-	-	-	Add glyphosate. Adjuvant: refer to glyphosate label.
-	-	-	_	-	-	_	15	15–20	-	_	-	-	-	_	Requires tank mixing with fluroxypyr and/or glyphosate.
0.25- 0.5	-	0.9*	0.25- 0.5	-	-	_	_	-	0.25- 0.5	0.5^	0.25- 0.5	-	_	_	*Southern NSW only. ^Curled dock only. Add glyphosate.
17–26	-	17–26	_	_	-	_	_	-	_	_	26-34	-	17–26	17–26	Adjuvant: MSO 1%. Adding paraquat or glyphosate will broaden the spectrum.
50- 100	-	_	-	_	_	-	-	-	50- 100	_	50– 100	-	50- 100	_	Always add a knockdown herbicide; refer label. Adjuvant: MSO.
1.2-3.2	1.2- 3.2	-	-	_	-	-	0.8-2.4		0.8–2.4	_	1.2–3.2	0.8– 1.2^#	0.8-2.4	0.8- 1.2^#	*Add 2,4-D amine. ^Add metsulfuron-methyl 600 at 5 g/ha. #Add dicamba. Add glyphosate.
-	-	-	-	-	-	-	0.3	0.3- 0.45	-	_	-	-	-	_	*Add metsulfuron-methyl 600 at 5 g/ha.
75. Enha	ances b	orowno	ut whe	n used	in comb weed lis						er® is re	gistere	d for use	on any	Add glyphosate.
-	-	_	-	_	-	0.86- 1.2	-	-	0.86- 1.2	_	-	-	_	_	Pre-emergent only; add a knockdown mix partner if required.
40 or 15*	-	-	-	-	-	-	20 or 15*	-	-	_	15*	20 or 15*	20 or 15*	20*	*Add glyphosate; refer label.
30	-	-	_	-	-	_	30	-	30	-	30	-	-	_	Must add a knockdown herbicide partner. Adjuvant: MSO 0.5%.
-	-	_	_	_	_	_	210- 280	-	_	_	-	-	_	_	Pre-emergent control and some knockdown activity. Add a knockdown partner.
0.1	-	0.1	-	-	-	-	0.1	-	-	-	0.1	0.1	0.1	0.1	Add glyphosate or paraquat. Can reduce glyphosate efficacy on grasses; increase glyphosate rate to compensate. Adjuvant: MSO 1%.
0.96-7	1.4–7	0.77– 7	1.53– 7	0.77– 7	1.15–7	0.77- 7	1.4–7	1.15–7	0.77–7	0.77–7	1.15–7	2.3–7	1.4–7	1.4–7	*Add 2,4-D amine. Many factors influence rate; refer label.
0.32- 1.25	-	_	_	_	_	-	_	0.625– 1.3	0.425– 1.3	0.625- 1.9	1.2–1.9	_	_	0.32- 0.95	*Add triclopyr. Many factors influence rate; refer label.
0.75- 5.5	1.1- 5.5	0.6– 5.5	1.2- 5.5	0.6- 5.5	0.9–5.5	0.6- 5.5	1.1–5.5	0.9–5.5	0.6–5.5	0.6–5.5	0.9–5.5	1.8- 5.5	1.1–5.5	1.1–5.5	*Add 2,4-D amine. Many factors influence rate; refer label.

Table 13. Herbicides for fallow commencement and/or maintenance – broadleaf weed control – page 3 of 6.

Note: example trade names shown. Others may be available at different concentrations. See labels for details.	Herbicide group	Units of use	Boom water rate (L/ha)	Wheat plant back	Fleabane	Fumitory	Ground cherry – annual	Heliotrope – white	Hexham scent	Hoary cress	Horehound	Lucerne (established)	Lupin – volunteer	Marshmallow	Medic	Melon – camel
2,4-D amine 700 Drift restrictions apply	4	L/ha	50– 250	1–7d	0.65– 1.1	0.28- 1.5	0.745– 1.15	0.98	0.98– 1.5	0.8– 1.5	1.25- 1.5	_	0.39– 1.5	0.515– 0.745	0.39– 0.515	0.5– 1.5
2,4-D LV ester 680 Drift restrictions apply	4	L/ha	30– 100	1–7d	_	0.8	_	-	0.8	0.8	_	_	0.41- 0.8	-	_	0.41- 0.8
Colex-D® (2,4-D choline 456) Reduced drift option	4	L/ha	70– 100	1–7d	1–1.69	0.43- 1.25	_	-	-	-	0.79– 1.14	_	0.6– 0.79	0.79– 1.14	0.6- 0.79	1.14– 1.77
Dropzone® (2,4-D amine 500) Reduced drift option	4	L/ha	70– 250	1–7d	2.1	0.4– 2.1	-	1.37	0.7– 1.37	1.1	_	_	0.55–1	0.7	0.55	1.0
Associate® (metsulfuron-methyl 600)	2	g/ha	>50	10d	_	5	_	-	_	_	_	_	5	-	5	_
Atrazine 900	5	kg/ ha	55	-						0.65-	-0.87					
Balance® 750 WG (isoxaflutole 750)	27	g/ha	>50	10w + 100mm	100	_	_	-	_	_	_	_	_	-	_	_
Basta® (glufosinate- ammonium 200)	10	L/ha	100	14d	3.75	_	_	-	_	_	_	_	_	-	_	_
Bromicide® (bromoxynil 200)	6	L/ha	>50	Not stated	-	_	-	-	_	_	_	_	_	-	_	_
Express® (tribenuron-methyl 750)	2	g/ha	>50	3d	-	_	_	-	_	_	_	_	_	-	30	-
FallowBoss® Tordon® (2,4-D amine 300 + picloram 75 + aminopyralid 7.5)	4	L/ha	50- 100	4mo	0.7	_	-	-	_	_	_	_	_	-	_	-
Garlon® (triclopyr 600)	4	mL/ ha	>50	7d	-	_	_	-	_	_	_	_	_	-	_	120- 160
Gramoxone® 360 Pro (paraquat 360)	22	L/ha	100- 200	1h						0.835	-1.67					
Grazon® Extra (triclopyr 300 + picloram 100 + aminopyralid 8)	4	L/ha	70	2-4mo	-	_	_	-	_	_	_	0.3- 0.5	_	-	_	0.2- 0.4
Grindstone® (aminopyralid 240)	4	mL/ ha	50- 100	4mo	-	-	-	-	-	-	-	-	_	-	16 or 24	7–15*
Guerrilla® (paraquat 300 + amitrole 12)	22 + 37	L/ha	100- 200	1h	1.7–2			0.75	-1.5			-		0.75	i–1.5	
Hammer® (carfentrazone- ethyl 400)	14	mL/ ha	50- 150	1h	_	_	_	-	_	_	_	_	_	15–45	_	_
Hotshot® (aminopyralid 10 + fluroxypyr 140)	4	L/ha	>80	4mo	-	_	_	_	_	_	-	-	_	-	_	_
Impose® (imazapic 240)	2	L/ha	>50	15/4mo*	-	_	_	_	_	_	_	_	_	-	_	_
V		1.4	. 50	1 1 2 1	_	_	_	_	_	_	_	_	_	_	0.105- 0.16	_
Kamba® 750 (dicamba 750)	4	L/ha	>50	1–14d	-	-	-	-	0.185	0.185^	0.215- 0.375	-	_	-	-	-

Read the label before using a product.

Melon – paddy	Mexican poppy	Mintweed	Mustards	New Zealand spinach	Parthenium weed	Paterson's curse	Peppercress	Pigweed	Plantain	Potato weed	Prickly lettuce	Comments
0.5–1.5	0.745-	0.8-0.9	0.2-	0.28-	_	0.39-	_	_	_	0.5-	0.39-	
0.5-1.5	1.25	0.0-0.9	1.25	1.5	_	1.5		_	_	1.15	0.745	
0.41- 0.8	0.8	0.8	0.41- 0.8	0.8	_	0.8	-	_	_	_	_	Adding glyphosate is recommended in most situations, and many factors influence rate and adjuvant selection; refer label.
1.14– 1.77	1.14- 1.77	_	0.43- 1.25	0.43- 1.25	_	0.6- 0.79	-	_	_	_	0.6- 0.79	The benefits of low drift products can be negated with the wrong mix partner; refer label.
1.0	1–1.75	1.12	0.28- 1.37	0.4– 1.37	_	0.55- 1.37	-	_	_	_	0.55	
-	_	_	5	_	_	5 or 7	-	_	_	_	5	Add glyphosate; refer label. Plant back is influenced by soil pH. Adjuvant: NIS 1000 0.1%.
					0.65	-0.87						Before lupins, peas or wheat only. Apply late July–mid September for May–June sowing.
_	_	_	_	_	_	-	-	_	_	_	_	Pre-emergent product. Add a knockdown herbicide if germinated weeds are present.
3.75	_	-	-	_	-	-	-	3.75	-	_	_	Warm, humid conditions provide best results.
_	-	-	-	-	-	-	-	-	-	_	_	*Add glyphosate. Rate is influenced by weed size; refer label.
_	_	15*	-	20	-	-	-	20*	-	_	20* or 30	*Add glyphosate; refer label. Adjuvant: NIS 1000 0.1%.
_	-	-	-	_	-	-	-	-	-	-	-	Add glyphosate.
80- 160	-	-	-	-	-	-	-	-	-	_	_	Add adjuvant: MOS 0.5%. Do not use oils if mixing with glyphosate.
					0.835	5–1.67						Must add an adjuvant.
0.2-0.4	_	_	_	_	_	_	-	_	_	_	_	Add glyphosate. Adjuvant: refer to glyphosate label.
7–15*	_	_	16 or 24	16 or 24	16 or 24	-	-	16 or 24	_	_	16 or 24	Northern NSW only. Add metsulfuron-methyl 600 and glyphosate. *Add picloram + triclopyr product; refer label.
		,			0.75	5–1.5						Add NIS when dilution in tank is below 400 mL/100 L water. Not otherwise required.
-	_	_	_	_	_	15–45	-	_	_	_	_	Always add a knockdown herbicide. Adjuvant: MOS 0.5%
_	_	_	_	_	-	-	-	0.5	-	_	_	Northern NSW only. Add glyphosate. Adjuvant: refer to glyphosate label.
_	_	0.15- 0.2	_	_	_	-	-	0.15- 0.2	_	-	_	Northern NSW only. Adjuvant: NR. *Plant back: W 15 m + 500 mm; IMI W 4 m + 200 mm.
_	_	0.105- 0.16	0.105- 0.16	-	_	0.105- 0.16	-	_	-	_	0.105- 0.16	Pre-cultivation. Add glyphosate.
-	_	0.215- 0.375	-	0.185	-	-	-	-	-	-	-	No till. *Add glyphosate. ^Add 2,4-D amine.

Table 13. Herbicides for fallow commencement and/or maintenance – broadleaf weed control – page 4 of 6.

Note: example trade names shown. Others may be available at different concentrations. See labels for details.	Herbicide group	Units of use	Boom water rate (L/ha)	Wheat plant back	Fleabane	Fumitory	Ground cherry – annual	Heliotrope – white	Hexham scent	Hoary cress	Horehound	Lucerne (established)	Lupin – volunteer	Marshmallow	Medic	Melon – camel
Palmero® TX (terbuthylazine 750 + isoxaflutole 75)	5 + 27	kg/ ha	>50	6mo + 100mm	0.7– 1.0	1.0	-	-	-	_	-	_	_	1.0	1.0	_
Pixxaro® (fluroxypyr 250 + halauxifen 16.25)	4	L/ha	>80	1mo	_	_	0.4	-	-	-	-	_	_	0.3	_	-
Priority® (florasulam 200)	2	mL/ ha	80– 100	1w	_	_	-	-	-	_	-	_	_	25	_	-
Pyresta® Xtreme (pyraflufenethyl 2.1 + 2,4-D ester 600)	14 + 4	L/ha	60– 150	1–3d	_	_	-	-	-	-	-	_	_	0.5- 0.9	0.25- 0.5	0.5- 0.9*
Sharpen® (saflufenacil 700)	14	g/ha	80– 250	1h	_	_	_	17–26	-	-	-	_	_	17–26	17–26	-
Sledge® (pyraflufen-ethyl 25)	14	mL/ ha	80– 150	1h	_	_	-	50- 100	-	-	-	-	_	50- 100	_	80– 160
Spray.Seed® (paraquat 135 + diquat 115)	22	L/ha	50- 200	1h	0.8- 2.4	0.8- 2.4	1.2- 1.6	-	0.8– 3.2*	_	1.2- 3.2	_	0.8– 1.2^#	1.2- 1.8	0.8– 3.2^#	_
Starane® Advanced (fluroxypyr 333)	4	L/ha	>50	7d	_	_	0.45	-	-	-	-	_	_	0.3 or 0.6	_	_
Striker® (oxyfluorfen 240)	14	mL/ ha	30– 200	24h	75. En					n comb weed lis						iker® is
Terbyne® Xtreme® (terbuthylazine 875)	5	kg/ ha	>50	4mo	0.86– 1.2	-	-	-	-	-	-	_	_	_	-	-
Terrad'or® (tiafenacil 700)	14	g/ha	50– 150	1h	_	30 or 15*	-	40 or 15*	-	-	-	-	30 or 20*	20 or 15*	15*	-
Valor®/Terrain®	14	g/ha	80-	1–2mo	_	_	_	-	-	-	-	_	_	30	30	_
(flumioxazin 500)	14	g/Ha	200	1-21110	210– 280	_	_	-	-	-	-	_	_	_	_	_
Voraxor® (saflufenacil 250 + trifludimoxazin 125)	14	L/ha	80– 250	1 h	0.1	_	-	0.1	-	-	-	-	0.1	0.1	0.1	_
Weedmaster® DST® (glyphosate 470)	9	L/ha	80	6h	1.4- 2.3*	0.96–7	1.53–7	0.77–7	1.4–7	1.15–7	1.4–7	_	0.96–7	1.4–7	0.96–7	1.15–7
Roundup UltraMAX® (glyphosate 570)	9	L/ha	80 max	1h	_	0.32- 0.95	0.625- 1.3	-	_	1.2- 1.9	-	-	0.32- 0.95	_	_	0.625- 1.3
CRUCIAL® (glyphosate 600)	9	L/ha	80	6h	1.1- 1.8*	0.75- 5.5	1.2- 5.5	0.6– 5.5	1.1– 5.5	0.9– 5.5	1.1– 5.5	-	0.75– 5.5	1.1– 5.5	0.75- 5.5	0.9– 5.5

For pre-sowing of crops in a seedbed salvage situation (0–3 d pre-sowing), refer to plant backs.

 $Key: h = hours, d = days, mo = months, fb = followed \ by, IMI = imidazoline \ tolerant \ varieties, NR = not \ required, (S) = suppression \ only.$

Adjuvant key: MO = mineral oil, MOS = mineral oil plus surfactant, MSO = methylated seed oil, NIS = non-ionic surfactant.

NIS products might indicate a specific concentration (i.e. NIS 1000). Refer to adjuvant chart for example products.

Read the label before using a product.

Melon – paddy	Mexican poppy	Mintweed	Mustards	New Zealand spinach	Parthenium weed	Paterson's curse	Peppercress	Pigweed	Plantain	Potato weed	Prickly lettuce	Comments
_	_	0.7–1.0	0.7–1.0	-	-	-	-	0.7–1.0	-	-	0.7–1.0	Pre-emergent only; add a knockdown mix partner if required.
-	0.3	_	-	_	_	-	-	0.3	_	-	_	Add glyphosate. Adjuvant: refer to glyphosate label.
-	_	-	-	-	-	-	-	15–20	-	-	-	Requires tank mixing with fluroxypyr and/or glyphosate.
0.5- 0.9*	_	_	0.5	_	-	0.25- 0.5	-	0.5- 0.9*	_	-	-	*Southern NSW only. ^Curled dock only. Add glyphosate.
_	_	-	-	_	-	17–26	-	-	_	-	17–26	Adjuvant: MSO 1%. Adding paraquat or glyphosate will broaden the spectrum.
80– 160	_	-	-	-	-	-	-	-	-	-	50- 100	Always add a knockdown herbicide; refer label. Adjuvant: MSO.
0.8-2.4	0.8-2.4	0.8-2.4	0.8-3.2	0.8-2.4	0.8-2.4	_	0.8-2.4	0.8-2.4	_	-	0.8-2.4	*Add 2,4-D amine. ^Add metsulfuron-methyl 600 at 5 g/ha. #Add dicamba.
_	_	_	-	_	-	-	_	0.225- 0.45	-	-	0.6	Add glyphosate. *Add metsulfuron-methyl 600 at 5 g/ha.
75.		es brown egistere									er® is	Add glyphosate.
_	_	0.86- 1.2	-	_	_	_	_	-	_	-	0.86– 1.2	Pre-emergent only; add a knockdown mix partner if required.
_	_	_	-	_	_	-	_	20*	_	-	15*	*Add glyphosate; refer label.
_	-	-	-	-	-	-	-	30	-	-	-	Must add a knockdown herbicide partner. Adjuvant: MSO 0.5%.
_	-	-	-	-	-	-	-	210– 280	-	-	-	Pre-emergent control and some knockdown activity. Add a knockdown partner.
-	-	-	0.1	-	-	0.1	-	-	-	-	0.1	Add glyphosate or paraquat. Can reduce glyphosate efficacy on grasses; increase glyphosate rate to compensate. Adjuvant: MSO 1%.
1.15–7	0.77-7	0.77-7	1.15–7	0.77-7	0.77-7	1.15–7	0.77–7	0.77–7	1.15–7	1.4–7	1.4–7	*Add 2,4-D amine. Many factors influence rate; refer label.
0.61– 1.25	0.625- 1.3	0.425- 1.3	0.95- 1.25	0.625- 1.3	_	0.625- 1.25	_	0.425- 1.3	1.2–1.9	-	0.625– 1.3	*Add triclopyr. Many factors influence rate; refer label.
0.9–5.5	0.6–5.5	0.6-5.5	0.9–5.5	0.6-5.5	0.6-5.5	0.9–5.5	0.6-5.5	0.6–5.5	1.15–7	1.1–5.5	1.1–5.5	*Add 2,4-D amine. Many factors influence rate; refer label.

Table 13. Herbicides for fallow commencement and/or maintenance – broadleaf weed control – page 5 of 6.

Note: example trade names shown. Others may be available at different concentrations. See labels for details.	Herbicide group	Units of use	Boom water rate (L/ha)	Wheat plant back	Radish – wild	Rough poppy	Saffron thistle	Salt bush	Scotch thistle	Shepherd's purse	Skeleton weed	Slender thistle	Sorrel	Soursob
2,4-D amine 700 Drift restrictions apply	4	L/ha	50- 250	1–7d	0.28- 1.5	0.98	0.39– 1.5	_	_	0.515- 1.5	0.515- 1.5	0.715– 1.5	0.515- 1.5	-
2,4-D LV ester 680 Drift restrictions apply	4	L/ha	30– 100	1–7d	0.41- 0.8	0.41- 0.8	0.41- 0.8	_	_	0.8	0.8	0.8	_	-
Colex–D (2,4-D choline 456) Reduced drift option	4	L/ha	70- 100	1–7d	0.43- 1.25	-	0.6- 0.79	_	_	0.79- 1.14	0.79– 1.14 (S)	_	0.79– 1.14	-
Dropzone® (2,4-D amine 500) Reduced drift option	4	L/ha	70- 250	1–7d	0.4- 0.66	0.7	0.55- 0.7	_	_	0.7	0.7- 1.37	0.65	0.7– 1.75	_
Associate® (metsulfuron- methyl 600)	2	g/ha	>50	10d	5 or 7	5	5	_	_	5	7 (S)	5	5	5
Atrazine 900	5	kg/ha	55	-					0.65	-0.87				
Balance® (isoxaflutole 750)	27	g/ha	>50	10w + 100mm	-	-	-	_	-	_	_	_	-	-
Basta® (glufosinate- ammonium 200)	10	L/ha	100	14d	-	-	_	_	_	_	_	_	_	-
Bromicide® (bromoxynil 200)	6	L/ha	>50	Not stated	-	-	-	-	_	-	_	-	-	-
Express® (tribenuron- methyl 750)	2	g/ha	>50	3d	-	-	_	_	_	_	_	_	_	-
FallowBoss® Tordon® (2,4-D amine 300 + picloram 75 + aminopyralid 7.5)	4	L/ha	50- 100	4mo	-	-	-	_	_	_	_	-	_	-
Garlon® (triclopyr 600)	4	mL/ha	>50	7d	-	-	_	_	_	_	_	_	-	-
Gramoxone® 360 Pro (paraquat 360)	22	L/ha	100- 200	1h					0.835	-1.67	1			
Grazon® Extra (triclopyr 300 + picloram 100 + aminopyralid 8)	4	L/ha	70	2–4mo	-	-	_	_	_	_	_	_	-	-
Grindstone® (aminopyralid 240)	4	mL/ha	50– 100	4mo	-	-	16 or 24	_	_	_	_	_	_	_
Guerrilla® (paraquat 300 + amitrole 12)	22 + 37	L/ha	100- 200	1h	0.75- 1.5	0.75- 1.5	0.75- 1.5	0.75– 1.5	0.75- 1.5	0.75- 1.5	0.75– 1.5	0.75- 1.5	0.75- 1.5	0.75- 1.5
Hammer® (carfentrazone- ethyl 400)	14	mL/ha	50– 150	1h	15–45	-	_	_	_	_	_	_	-	-
Hotshot® (aminopyralid 10 + fluroxypyr 140)	4	L/ha	>80	4mo	-	_	-	_	_	_	_	-	-	-
Impose® (imazapic 240)	2	L/ha	>50	15/4mo*	-	-	-	-	_	-	_	-	-	-
V 1 0 770 (1 770)	_				-	-	-	_	_	_	_	_	0.105- 0.16	-
Kamba® 750 (dicamba 750)	4	L/ha	>50	1–14d	-	-	0.185^	_	0.185	_	_	-	0.185^	-

Read the label before using a product.

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Sowthistle	Spear thistle	Spiny emex	Spurge	Stagger weed	Star thistle	Stinging nettle	Sub clover	Sunflower	Turnip weed	Variegated thistle	Vetch	Wild turnip	Wireweed/ hogweed	Comments
0.28– 1.5	0.39– 1.45	1–1.25	_	_	_	_	_	0.39– 1.25	0.28- 0.98	0.39– 1.5	0.515– 1.25	0.2– 1.25	0.515– 1.25	Adding glyphosate is recommended in most situations
_	_	_	_	_	0.8	_	_	0.41- 0.8	0.41- 0.8	0.41- 0.8	_	0.41- 0.8	0.8	and many factors influence rate and adjuvant selection; refer label.
0.43- 1.25	0.6- 0.79	_	_	_	_	_	0.79– 1.14	0.6– 0.79	0.43- 1.25	0.6- 0.79	0.79– 1.14	0.43- 1.25	0.79– 1.14	The benefits of low drift products can be negated with
0.4– 1.75	0.55- 0.65	1.37	_	_	_	_	_	0.55- 0.7	0.4– 0.65	0.55- 0.65	0.7– 1.37	0.4	0.7– 1.75	the wrong mix partner; refer label.
5	-	5 or 7	-	5	_	_	5	7	5	5	_	5	5 or 7	Add glyphosate. Plant back is influenced by soil pH; refer label. Adjuvant: NIS 1000 0.1%.
						0.65-	-0.87	'		'				Before lupins, peas or wheat only. Apply late July–mid September for May–June sowing.
100	-	_	-	_	_	_	_	_	_	-	_	_	_	Pre-emergent product. Add a knockdown herbicide if germinated weeds are present.
3.75	_	_	_	_	_	_	_	_	_	_	_	_	_	Warm, humid conditions provide best results.
-	_	-	-	_	_	_	_	_	_	-	_	_	_	*Add glyphosate; rate is influenced by weed size; refer label.
25	-	-	-	-	-	-	-	-	20	-	-	-	_	*Add glyphosate; refer label. Adjuvant: NIS 1000 0.1%.
_	_	_	_	_	_	_	_	_	_	_	_	_	_	Add glyphosate.
-	-	-	-	-	-	-	-	-	-	-	-	-	-	Add adjuvant: MOS 0.5%. Do not use oils if mixing with glyphosate.
						0.835	-1.67							Must add an adjuvant.
0.2-0.4	-	-	-	_	-	-	_	_	_	-	-	_	_	Add glyphosate. Adjuvant: refer to glyphosate label.
7–15*	-	16 or 24	-	_	-	-	_	16 or 24	16 or 24	16 or 24	-	16 or 24	16 or 24	Northern NSW only. Add metsulfuron-methyl 600 and glyphosate. *Add picloram + triclopyr product; refer label.
0.75- 1.5	0.75– 1.5	0.75- 1.5	0.75- 1.5	0.75- 1.5	0.75- 1.5	0.75– 1.5	0.75– 1.5	0.75– 1.5	0.75- 1.5	0.75- 1.5	0.75– 1.5	0.75– 1.5	0.75- 1.5	Add NIS when dilution in tank is below 400 mL/100L water. Not otherwise required.
_	-	15–45	-	-	-	-	15–45	-	_	-	-	-	_	Always add a knockdown herbicide. Adjuvant: MOS 0.5%.
_	-	-	-	_	_	_	_	-	_	-	_	-	_	Northern NSW only. Add glyphosate. Adjuvant: refer to glyphosate label.
-	-	-	-	-	-	-	-	-	-	-	-	-	_	Northern NSW only. Adjuvant: NR. *Plant back: W 15 m + 500 mm, IMI W 4 m + 200 mm.
0.105- 0.16	-	-	-	_	_	_	_	_	0.105- 0.16	0.105- 0.16	_	_	0.105- 0.16	Pre-cultivation. Add glyphosate.
-	0.215- 0.375	0.185- 0.375	-	_	0.215- 0.375	-	0.135*	0.185 – 0.375	-	0.185	0.185	-	0.185	No till. *Add glyphosate. ^Add 2,4-D amine.

Table 13. Herbicides for fallow commencement and/or maintenance – broadleaf weed control – page 6 of 6.

Note: example trade names shown. Others may be available at different concentrations. See labels for details.	Herbicide group	Units of use	Boom water rate (L/ha)	Wheat plant back	Radish – wild	Rough poppy	Saffron thistle	Salt bush	Scotch thistle	Shepherd's purse	Skeleton weed	Slender thistle	Sorrel	Soursob
Palmero® TX (terbuthylazine 750 + isoxaflutole 75)	5 + 27	kg/ha	>50	6m + 100mm	1.0	_	_	_	_	0.7–1.0	_	_	_	-
Pixxaro® (fluroxypyr 250 + halauxifen 16.25)	4	L/ha	>80	1m	_	-	-	_	_	_	_	_	-	-
Priority® (florasulam 200)	2	mL/ha	80– 100	1w	_	-	-	_	_	_	_	-	-	-
Pyresta® Xtreme (pyraflufenethyl 2.1 + 2,4-D ester 600)	14 + 4	L/ha	60– 150	1–3d	0.25- 0.5	_	_	_	_	_	_	_	_	-
Sharpen® (saflufenacil 700)	14	g/ha	80- 250	1h	26-34	_	_	_	_	26-34	_	17–26	_	-
Sledge® (pyraflufen-ethyl 25)	14	mL/ha	80– 150	1h	50- 100	_	_	_	_	_	_	_	-	-
Spray.Seed® (paraquat 135 + diquat 115)	22	L/ha	50- 200	1h	0.8-3.2	0.8-3.2	0.8-3.2	_	_	0.8-3.2	_	_	_	-
Starane® Advanced (fluroxypyr 333)	4	L/ha	>50	7d	_	-	_	_	_	_	_	_	_	-
Striker® (oxyfluorfen 240)	14	mL/ha	30- 200	24h								h glypho partner		
Terbyne® Xtreme® (terbuthylazine 875)	5	kg/ha	>50	4m	0.86- 1.2	_	_	_	_	0.86- 1.2	_	_	_	-
Terrad'or® (tiafenacil 700)	14	g/ha	50- 150	1h	20 or 15*	-	15*	-	-	_	_	_	40 or 15*	-
Valor®/Terrain® (flumioxazin 500)	14	g/ha	80- 200	1–2m	30	-	-	-	-	30	-	_	-	-
Voraxor® (saflufenacil 250 + trifludimoxazin 125)	14	L/ha	80- 250	1h	0.1	-	_	_	_	0.1	_	0.1	-	_
Weedmaster® DST® (glyphosate 470)	9	L/ha	80	6h	1.15–7	0.77-7	1.15–7	1.15–7	0.77-7	1.4–7	1.15–7	0.77-7	1.15–7	1.15-7
Roundup UltraMAX® (glyphosate 570)	9	L/ha	80 max	1h	0.95- 1.25	_	0.625- 1.25	_	0.625- 1.25	_	0.95- 1.9	_	0.95- 1.9	0.95- 1.25
CRUCIAL® (glyphosate 600)	9	L/ha	80	6h	0.9–5.5	0.6–5.5	0.9–5.5	0.9–5.5	0.6–5.5	1.1–5.5	0.9–5.5	0.6–5.5	0.9–5.5	0.9–5.5

For pre-sowing of crops in a seedbed salvage situation (0–3 d pre-sowing), refer to plant backs.

 $Key: h = hours, d = days, mo = months, fb = followed \ by, IMI = imidazoline \ tolerant \ varieties, NR = not \ required, (S) = suppression \ only.$

 $Adjuvant\ key:\ MO=mineral\ oil,\ MOS=mineral\ oil\ plus\ surfactant,\ MSO=methylated\ seed\ oil,\ NIS=non-ionic\ surfactant.$

NIS products might indicate a specific concentration (i.e. NIS 1000). Refer to adjuvant chart for example products.

Read the label before using a product.

				y a pro										
Sowthistle	Spear thistle	Spiny emex	Spurge	Stagger weed	Star thistle	Stinging nettle	Sub clover	Sunflower	Turnip weed	Variegated thistle	Vetch	Wild turnip	Wireweed/ hogweed	Comments
0.7–1.0	-	1.0 (S)	-	-	-	-	-	-	0.7–1.0	-	-	0.7–1.0	0.7–1.0	Pre-emergent only; add a knockdown mix partner if required.
0.3	_	_	-	_	-	_	_	_	_	_	_	_	-	Add glyphosate. Adjuvant: refer to glyphosate label.
25	_	15–25	-	_	-	_		25	_	_	_	_	15	Requires tank mixing with fluroxypyr and/or glyphosate.
0.5	-	-	-	-	-	-	0.5	-	0.25- 0.5	-	-	0.25- 0.5	-	*Southern NSW only. ^Curled dock only. Add glyphosate
17–26	-	17–26	-	-	-	17–26	-	-	17–26	-	-	17–26	26-34	broaden the spectrum.
50- 100	-	-	-	-	-	-	50– 100	-	-	-	_	_	50– 100	Always add a knockdown herbicide; refer label. Adjuvant: MSO.
-	_	0.8-3.2	-	_	_	0.8-3.2	0.8– 3.2^#	0.8– 2.4*	0.8-3.2	0.8-2.4	0.8-3.2	0.8-3.2	0.8-3.2	*Add 2,4-D amine. ^Add metsulfuron-methyl 600 at 5 g/ha. #Add dicamba
0.6	-	0.3* or 0.9	-	_	-	_	-	0.6	_	_	_	_		Add glyphosate. *Add metsulfuron-methyl 600 at 5 g/ha.
75. Enh	nances b	rownou	t when (used in o	combina eed liste	ation wit d on the	h glyph partner	osate pr produc	oducts. t label.	Striker®	is regist	ered for	use on	Add glyphosate.
0.86- 1.2	-	-	-	-	-	-	-	-	-	-	_	0.86– 1.2	0.86- 1.2	Pre-emergent only; add a knockdown mix partner if required.
20	_	15*	-	_	-	_	20 or 15*	-	_	-	15*	30 or 15*	_	*Add glyphosate; refer label.
30	-	30	-	-	-	-	30	30	30	-	30	-	30	Must add a knockdown herbicide partner. Adjuvant: MSO 0.5%.
210– 280	_	-	-	_	-	_	-	_	_	-	_	_	_	Pre-emergent control and some knockdown activity. Add a knockdown partner.
0.1	_	0.1	-	-	-	0.1	-	-	0.1	-	_	0.1	0.1	Add glyphosate or paraquat; refer label for rates. Can reduce glyphosate efficacy on grasses; increase glyphosate rate to compensate. Adjuvant: MSO 1%.
0.77-7	1.15–7	0.77-7	0.77–7	0.77–7	0.77–7	0.77–7	1.15–7	0.77–7	1.15–7	0.96–7	1.4–7	1.15–7	1.15–7	*Add 2,4-D amine. Many factors influence rate; refer label.
0.425- 1.3	0.625– 1.25	0.32- 0.625	-	-	-	-	0.95– 1.9	-	0.625– 1.3	0.625– 1.25	-	0.625– 1.25	0.625– 1.3	*Add triclopyr. Many factors influence rate selection; refer label.
0.6-5.5	0.9–5.5	0.6–5.5	0.6–5.5	0.6–5.5	0.6–5.5	0.6–5.5	0.9–5.5	0.6–5.5	0.9–5.5	0.75- 5.5	1.1–5.5	0.9–5.5	0.9–5.5	*Add 2,4-D amine. Many factors influence rate selection; refer label.

NOTES

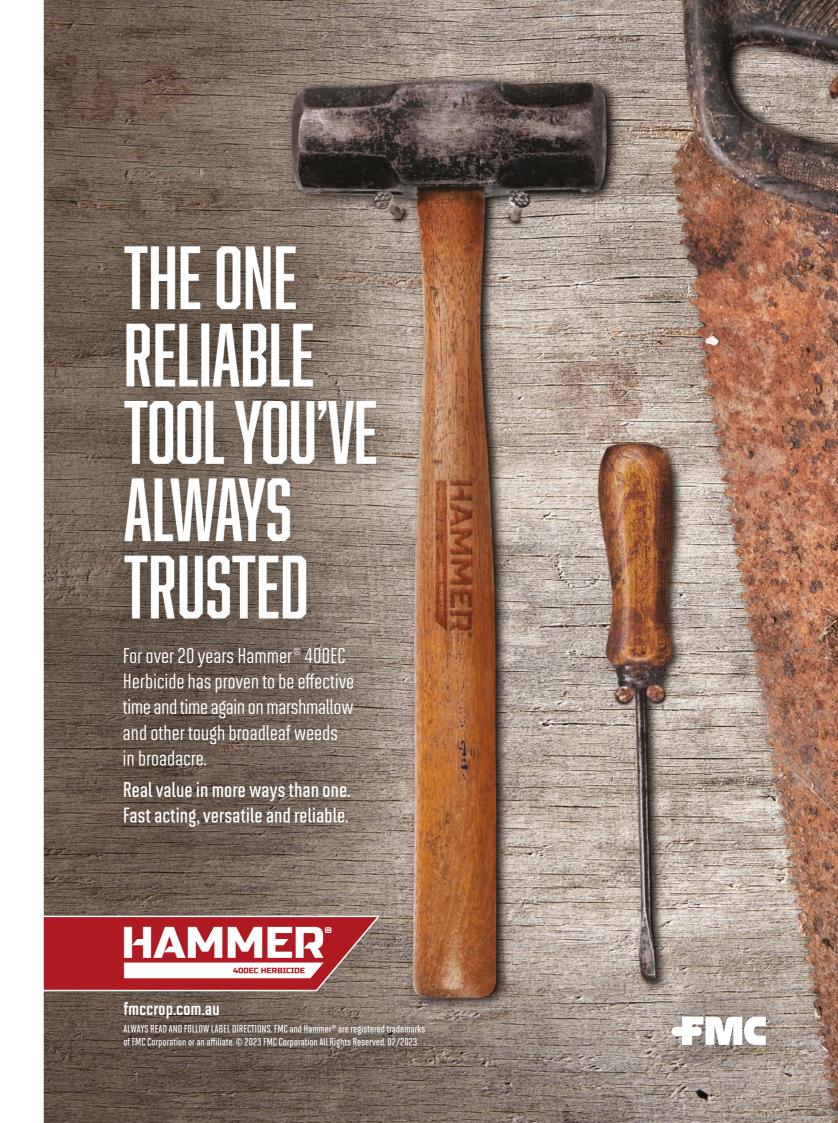


Table 14. Herbicides for pre-sowing knockdown (0–3 days pre-sowing) – page 1 of 2.

Note: example trade names shown. Others may be available at different concentrations. See labels for details.	Herbicide group	Crop type	Unit of use	Boom water rate (L/ha)	Wheat plant back	Annual phalaris	Annual ryegrass	Barley grass	Brome grass	Vulpia/silver grass	Wildoats	Amsinckia	Bedstraw	Black bindweed	Capeweed
Express® (tribenuron- methyl 750)	2	Wheat, barley, oats	g/ha	>50	3d							-	_	25*	-
Gramoxone® 360 Pro (paraquat 360)	22	All crops	L/ha	100- 200	1h		0	.835–1.6	57		0.42- 1.4		0.8	35–1.4	
Guerrilla® (paraquat 300 + amitrole 12)	22 + 37	All crops	L/ha	100- 200	1h			0.75–1.5	5		0.375		0.7	75–1.5	
Hammer® (carfentrazone- ethyl 400)	14	All crops	mL/ha	50– 150	0h							_	_	_	15–45
Kamba® 750 (dicamba 750) Pre-cultivation	4	All	L/ha	>50	1–14d							_	_	0.105- 0.16	0.105- 0.16
Kamba® 750 (dicamba 750) No till	4	crops	L/IIa	<i>></i> 30	1-14u							_	_	0.185	-
Priority® (florasulam 200)	2	Wheat, barley	mL/ha	80– 100	1w							_	_	20	_
Pyresta® Xtreme (pyraflufenethyl 2.1 + 2,4-D ester 600)	14 + 4	All crops	L/ha	60– 150	1–3d	_	0.5	0.5	0.25- 0.5	0.5	0.5	0.25- 0.5	_	_	0.25-0.5
Sharpen® (saflufenacil 700)	14	Cereal, pulses	g/ha	80– 250	1h							_	_	17–26	17–26
Sledge® (pyraflufenethyl 25)	14	Winter cereal	mL/ha	80– 150 L	1h							_	_	_	50–100
Spray.Seed® (paraquat 135 + diquat 115)	22	All crops	L/ha	50- 200	1h	_	1-3.2	1-3.2	1–3.2	1–3.2	1–3.2	_	_	0.8-2.4	1.2-3.2
Striker® (oxyfluorfen 240)	14	All crops	mL/ha	30- 200	24h							use glypho registe	d in con osate pr ered for I on the	nbinatio oducts. : use on a	out when on with Striker® is any weed product
Terrad'or® (tiafenacil 700)	14	All	g/ha	50– 150	1h	15*	40*	40 or 15*	15*	30*	20*	_	_	_	40 or 15*
Terrain® (flumioxazin 500)	14	Cereal, pulses	g/ha	80– 200	1–2mo							_	_	30	30
Voraxor® (saflufenacil 250 + trifludimoxazin 125)	14	Wheat, barley, (oats- fodder)	L/ha	80– 250	1h	-	0.1	0.1	0.1	0.1	0.1	0.1	-	0.1	0.1
Weedmaster® DST® (glyphosate 470)	9	All crops	L/ha	80	6h	0.96–7	1.15–7	0.77-7	0.96–7	1.15–7	0.77-7	0.96-7	_	1.28–7	0.96–7
Roundup UltraMAX® (glyphosate 570)	9	All crops	L/ha	80 max	1h	0.625- 0.95	0.95- 1.25	0.625- 0.95	0.95– 1.25	0.95- 1.25	0.625- 0.95	0.625- 0.96	-	1.2–1.9	0.32-1.25
CRUCIAL® (glyphosate 600)	9	All crops	L/ha	80	6h	0.75– 5.5	0.9–5.5	0.6–5.5	0.75– 5.5	0.9–5.5	0.6–5.5	_	_	1–5.5	0.75-5.5

Read the label before using a product.

Charlock	Chickpea – volunteer	Corn gromwell	Deadnettle	Docks	Erodium (stork's bill)	Faba bean volunteer	Field pea – volunteer	Fleabane	Fumitory	Lupin – volunteer	Marshmallow	Medic	Comments
-	_	_	25*	_	-	-	_	-	_	_	-	30	*Add glyphosate; refer label. Adjuvant: NIS 1000 0.1%.
					C).835–1.	4						Must add an adjuvant.
			0.75	i–1.5				1.7–2		0.75	5–1.5		Add NIS when dilution in tank is below 400 mL/100 L water. Not otherwise required.
-	_	_	_	_	15–45	_	_	_	_	_	15–45	_	Always add a knockdown herbicide. Adjuvant: MOS 0.5%.
-	_	-	-	0.105- 0.16	-	-	0.105– 0.16	-	-	-	_	0.105- 0.16	Add glyphosate.
-	_	_	_	0.185- 0.375	-	-	_	_	_	-	_	_	*Add glyphosate. ^Add 2,4-D amine.
-	-	-	-	-	-	-	-	_	_	-	25	_	Requires tank mixing with fluroxypyr and/or glyphosate.
-	0.9*	_	0.25- 0.5	0.5^	0.25- 0.5	-	_	-	_	_	0.5-0.9	0.25- 0.5	*Southern NSW only. ^Curled dock only. Add glyphosate.
-	17–26	_	-	_	26-34	-	17–26	-	_	-	17–26	17–26	Adjuvant: MSO 1%. Adding paraquat or glyphosate will broaden the spectrum.
-	-	_	50- 100	_	50- 100	-	_	-	_	_	50- 100	_	Always add a knockdown herbicide; refer label. Adjuvant: MSO 0.5%.
1.2–3.2	-	-	0.8-2.4	-	1.2-3.2	0.8– 1.2^#	0.8– 1.2^#	0.8-2.4	0.8-2.4	0.8– 1.2^#	1.2–1.8	0.8– 3.2^#	*Add 2,4-D amine. ^Add metsulfuron-methyl 600 at 5 g/ha. #Add dicamba.
75. Enh	ances b	rownou			ombina ed listed					Striker®	is regist	ered for	Add glyphosate.
-	_	_	_	_	15*	20 or 15*	20*	_	30 or 15*	30 or 20*	20 or 15*	15*	*Add glyphosate; refer label.
-	_	_	30	_	30	-	_	-	_	-	30	30	Must add a knockdown herbicide partner. Adjuvant: MSO 0.5%.
-	0.1	-	-	-	0.1	0.1	0.1	0.1	-	0.1	0.1	0.1	Add glyphosate or paraquat. Can reduce glyphosate efficacy on grasses; increase glyphosate rate to compensate. Adjuvant: MSO 1%.
1.4–7	0.77-7	0.77-7	0.77-7	0.77-7	1.15–7	2.3–7	1.4–7	_	0.96–7	0.96–7	1.4–7	0.96–7	
-	_	_	0.425- 1.3	0.625- 1.9	1.2–1.9	-	0.32- 0.95	_	0.32- 0.95	0.32- 0.95	_	_	Many factors influence rate; refer label.
1.1–5.5	0.6-5.5	0.6–5.5	0.6–5.5	0.6–5.5	0.9–5.5	1.8–5.5	1.1–5.5	_	0.75– 5.5	0.75- 5.5	1.1–5.5	0.75– 5.5	

Table 14. Herbicides for pre-sowing knockdown (0–3 days pre-sowing) – page 2 of 2.

Note: example trade names shown. Others may be available at different concentrations. See labels for details.	Herbicide group	Crop type	Unit of use	Boom water rate (L/ha)	Wheat plant back	Mexican poppy	Mintweed	Mustards	New Zealand spinach	Paterson's curse	Peppercress	Prickly lettuce	Radish – wild	Rough poppy	Saffron thistle
Express® (tribenuron-methyl 750)	2	Wheat, barley, oats	g/ha	>50	3d	_	15*	_	20	_	_	20* or 30	_	_	_
Gramoxone® 360 Pro (paraquat 360)	22	All crops	L/ha	100- 200	1h			0.835-1.4							
Guerrilla® (paraquat 300 + amitrole 12)	22 + 37	All crops	L/ha	100- 200	1h		0.75–1.5								
Hammer® (carfentrazone- ethyl 400)	14	All crops	mL/ha	50- 150	0h	_	_	_	_	15–45	_	_	15–45	_	_
Kamba® 750 (dicamba 750) Pre-cultivation	4	All	L/ha	>50	1–14d	_	0.105- 0.16	0.105- 0.16	_	0.105- 0.16	_	0.105- 0.16	_	_	_
Kamba® 750 (dicamba 750) No till	4	crops	L/na			_	0.215- 0.375	_	0.185	_	_	_	_	_	0.185^
Priority® (florasulam 200)	2	Wheat, barley	mL/ha	80– 100	1w	-	_	-	_	_	-	_	-	-	_
Pyresta® Xtreme (pyraflufenethyl 2.1 + 2,4-D ester 600)	14 + 4	All crops	L/ha	60- 150	1–3d	-	_	0.5	_	0.25- 0.5	_	_	0.25- 0.5	-	_
Sharpen® (saflufenacil 700)	14	Cereal, pulses	g/ha	80- 250	1h	-	-	-	_	17–26	-	17–26	26–34	-	_
Sledge® (pyraflufen-ethyl 25)	14	Winter cereal	mL/ha	80– 150	1h	-	_	_	_	_	_	50- 100	50- 100	_	_
Spray.Seed® (paraquat 135 + diquat 115)	22	All crops	L/ha	50- 200	1h	0.8–2.4	0.8–2.4	0.8-3.2	0.8-2.4	_	0.8–2.4	0.8-2.4	0.8-3.2	0.8-3.2	0.8–3.2
Striker® (oxyfluorfen 240)	14	All crops	mL/ha	30- 200	24h	75. Enhances brownout when used in combination with glyphosate product Striker® is registered for use on any weed listed on the partner product la									
Terrad'or® (tiafenacil 700)	14	All crops	g/ha	50- 150	1h	-	_	_	_	_	_	15*	20 or 15*	_	15*
Terrain® (flumioxazin 500)	14	Cereal, pulses	g/ha	80– 200	1–2mo	-	_	-	_	30	-	-	30	_	_
Voraxor® (saflufenacil 250 + trifludimoxazin 125)	14	Wheat, barley, (oats- fodder)	L/ha	80– 250	1h	-	-	0.1	-	0.1	-	0.1	0.1	-	_
Weedmaster® DST® (glyphosate 470)	9	All crops	L/ha	80	6h	0.77-7	0.77-7	1.15–7	0.77-7	1.15–7	0.77-7	1.4-7	1.15–7	0.77-7	1.15–7
Roundup UltraMAX® (glyphosate 570)	9	All crops	L/ha	80 max	1h	0.625– 1.3	0.425- 1.3	0.95– 1.25	0.625- 1.3	0.625- 1.25	_	0.625- 1.3	0.95- 1.25	_	0.625- 1.25
CRUCIAL® (glyphosate 600)	9	All crops	L/ha	80	6h	0.6–5.5	0.6–5.5	0.9–5.5	0.6–5.5	0.9–5.5	0.6–5.5	1.1–5.5	0.9–5.5	0.6–5.5	0.9–5.5

Key: h = hours, d = days, mo = months, fb = followed by, IMI = imidazoline tolerant varieties, NR = not required, (S) = suppression only. Adjuvant key: MO = mineral oil, MOS = mineral oil plus surfactant, MSO = methylated seed oil, NIS = non-ionic surfactant.

Read the label before using a product.

Shepherd's purse	Skeleton weed	Slender thistle	Sorrel	Soursob	Sowthistle	Spear thistle	Spiny emex	Toad rush	Turnip weed	Variegated thistle	Vetch	Wild turnip	Wireweed/hogweed	Comments	
-	-	_	_	-	25	-	-	-	20	-	-	-	-	*Add glyphosate; refer label. Adjuvant: NIS 1000 0.1%.	
0.835–1.4										Must add an adjuvant.					
0.75–1.5												Add NIS when dilution in tank is below 400 mL/100 L water. Not otherwise required.			
-	-	_	_	-	_	-	15–45	-	-	-	_	-	-	Always add a knockdown herbicide. Adjuvant: MOS 0.5%.	
-	-	_	0.105- 0.16	-	0.105- 0.16	-	-	-	0.105- 0.16	0.105- 0.16	_	-	0.105- 0.16	Add glyphosate.	
-	-	_	0.185^	-	_	0.215- 0.375	0.185- 0.375	-	-	0.185	0.185	-	0.185	*Add glyphosate. ^Add 2,4-D amine.	
-	-	-	_	-	25	-	15–25	-	-	_	-	-	15	Requires tank mixing with fluroxypyr and/or glyphosate.	
-	-	_	_	-	0.5	_	-	-	0.25- 0.5	_	_	0.25- 0.5	-	*Southern NSW only. ^Curled dock only. Add glyphosate.	
26-34	-	17–26	_	-	17–26	_	17–26	-	17–26	_	_	17–26	26-34	Adjuvant: MSO 1%. Adding paraquat or glyphosate will broaden the spectrum.	
-	-	_	_	-	50- 100	_	-	-	-	-	_	-	50- 100	Always add a knockdown herbicide; refer label. Adjuvant: MSO 1%.	
0.8–3.2	-	_	_	-	-	-	0.8-3.2	-	0.8-3.2	0.8-2.4	0.8-3.2	0.8–3.2	0.8–3.2	*Add 2,4-D amine. ^Add metsulfuron-methyl 600 at 5 g/ha. #Add dicamba.	
75. Enh	ances b	rownou	t when	used in a	combina eed liste	ation wit d on the	h glypho partner	osate p produc	roducts. ct label.	Striker®	is regist	ered for	use on	Add glyphosate.	
-	-	_	40 or 15*	-	20	-	15*	-	-	-	15*	30 or 15*	-	*Add glyphosate; refer label.	
30	-	_	_	_	30	_	30	-	30	_	30	-	30	Must add a knockdown herbicide partner. Adjuvant: MSO 0.5%.	
0.1	-	0.1	-	-	0.1	-	0.1	-	0.1	-	-	0.1	0.1	Add glyphosate or paraquat. Can reduce glyphosate efficacy on grasses; increase glyphosate rate to compensate. Adjuvant: MSO 1%.	
1.4–7	1.15–7	0.77-7	1.15–7	1.15–7	0.77–7	1.15–7	0.77-7	-	1.15–7	0.96–7	1.4–7	1.15–7	1.15–7		
-	0.95- 1.9	_	0.95– 1.9	0.95– 1.25	0.425– 1.3	0.625– 1.25	0.32- 0.625	-	0.625– 1.3	0.625– 1.25	_	0.625– 1.25	0.625– 1.3	Many factors influence rate; refer label.	
1.1–5.5	0.9–5.5	0.6-5.5	0.9–5.5	0.9–5.5	0.6-5.5	0.9–5.5	0.6-5.5	-	0.9–5.5	0.75- 5.5	1.1–5.5	0.9–5.5	0.9–5.5		

NIS products might indicate a specific concentration (i.e. NIS 1000). Refer to adjuvant chart for example products.

Table 15. Herbicides for pre-emergent and post-sowing, pre-emergent grass control in cereals.

Note: example trade names shown. Others may be available at different concentrations. See labels for details.	Herbicide group		Crop type	Unit of use	Boom water rate (L/ha)	Annual phalaris	Annual ryegrass	
Arcade® (prosulfocarb 800)	15 IBS		W, B	L/ha	>50	_	2.5 (S) 3.0	
A @ V(/ () /	15	DCLIDC	W, B, T	1.4	50	1.6-2.4*	3.2 or 1.6–2.4*	
Avadex® Xtra (tri-allate 500)	15	PSI IBS	W	L/ha	50	3.2*	3.2*	
Boxer Gold® (prosulfocarb 800 +	15	IBS	W, T, O	L/ha	>50	-	2.5	
S-metolachlor 120)		IBS fb PSPE	W, B			_	1.75 fb 0.75 or 2.5–3.0 (S)	
Callisto® (mesotrione 480)	27	IBS	Winter cereals	mL/ha	>50	-	-	
Chlorsulfuron 750 g/kg	2	PSI IBS	W, T	g/ha	>30	20*	15 or 20	
Dual Gold® (S-metolachlor 960)	15	IBS PSPE	В, О	L/ha	>60	-	0.375-0.5 (S)	
Luximax® (cinmethylin 750)	30	IBS	W (not durum)	L/ha	70–150	-	0.5	
Mateno® Complete (aclonifen 400 + pyroxasulfone 100 + diflufenican 66)	32 + 15 + 12	IBS	W (not durum)	L/ha	70–100	1.0	0.75–1.0	
			В			_	0.75	
Overwatch® (bixlozone 400)	13	IBS	W, B	L/ha	60–100	1.25 (S)	1.25	
Rifle® 440 (pendimethalin 440)	3	PSI	W, B	L/ha	50–200	-	0.9 or 1.4 1.35	
Sakura® (pyroxasulfone 850)	15	IBS	W (not durum), T	g/ha	50–100	118	118	
Sentry® (imazapic 525 + imazapyr 175)	2	IBS	IMI (W, B, O^)	g/ha	70	40-50 (S)	40-50 (S)	
Sulfosulfuron 750	2	PSI IBS	W,T	g/ha	40–100	25*	25*	
Terbyne® Xtreme® (terbuthylazine 875)	5	IBS	W, B , O (all not irrigated)	kg/ha	>50	-	-	
Triasulfuron 750	2	IBS	W	g/ha	50–100	35	35 or 10–15*	
TriflurX® (trifluralin 480)	3	PSI IBS	W, B, T W, B, T, (O max 2 L/ha)	L/ha	70–450	0.8	0.8	
Valor®/Terrain® (flumioxazin 500)	14	IBS	W (not durum)	g/ha	80	120*	120*	
Voraxor® (saflufenacil 250 + trifludimoxazin 125)	14	IBS	Winter cereal (O – hay or fodder only)	mL/ha	80–250	-	200* or 240^ (S)	

Plant backs: in a failed crop/re-sowing situation, plant backs apply. Refer to the plant back table and the label.

Crop key: B = barley, O = oats, T = triticale, W = wheat, IMI = imidazolinone-tolerant, (S) = suppression.

 $Incorporation \ key: PSI = pre-sowing \ incorporated, IBS = incorporated \ by \ sowing, PSPE = post-sowing, pre-emergent, fb = followed \ by.$

Read the label before using a product.

Barley grass	Brome grass	Perennial – phalaris	Vulpia/silver grass	Wild oats	Winter grass	Comments
_	_	_	_	_	_	
1.6-2.4* (S)	1.6-2.4* (S)	1.6-2.4*	1.6-2.4*	1.6	1.6-2.4*	
3.2* (S)	3.2* (S)	3.2*	3.2*	3.2* (S)	3.2*	*Add trifluralin 1.5–2 L/ha; refer label.
2.5 (S)	_	_	2.5	-	_	Can be applied split or as a single higher rate. Adding trifluralin can increase weed spectrum; refer label.
1.75 fb 0.75 (S)	_	_	1.75 fb 0.75	_	_	Can be applied split or as a single higher rate.
-	-	_	-	-	_	
20*	20 (S)	_	-	-	-	*Add trifluralin. Rate is influenced by soil type and pH; refer label.
_	-	_	-	-	_	
0.5	0.5 (S)	-	-	0.5 (S)	-	Incorporate within 3 days.
0.75–1.0	1.0 (S)	_	0.75–1.0	1.0 (S)	-	There are many considerations for effective control and crop safety; refer label.
0.75	-	-	0.75	-	-	Phytotoxicity considerations; refer label. Do not use on irrigated barley.
1.25 (S)	1.25 (S)	-	1.25	1.25 (S)	-	Do not sow barley with disc seeders.
-	-	-	-	0.9 or 1.4	_	Incorporation method influences rate; refer label.
_	_	_	-	1.35 (S)	_	
118	118 (S)	_	118	118 (S)	_	
40–50	40–50	40-50 (S)	-	40-50 (S)	_	*Imidazolinone-tolerant varieties only. ^Grain export restrictions apply; refer label.
25 (S) or *	25 (S)	-	-	25*^	-	*Add trifluralin. ^Add tri-allate.
-	-	-	-	-	-	Low rate on light and/or high pH soils. Refer label for other crop safety considerations.
-	-	_	-	-	-	*Add trifluralin.
-	-	-	-	-	-	
1.5–3	1.5–3	-	1.5–3	1.5–3	1.5–3	Rates vary depending on mix partner; refer label. Do not add tri-allate on oats.
120 (S)*	120 (S)*	_	120*	120*	120*	*Add trifluralin 2 L/ha and tri-allate at 3.2 L/ha.
_	-	_	-	-	_	*Apply 0–7 days before sowing. ^Apply 7–21 days before sowing.

NOTES



Table 16. Herbicides for pre-emergent and post-sowing, pre-emergent broadleaf control in cereals – page 1 of 2.

Note: example trade names shown. Others may be available at different concentrations. See labels for details.	Herbicide group	Incorporation	Crop type	Unit of use	Boom water rate (L/ha)	Amsinckia	Bedstraw	Bifora	Black bindweed	Caltrop	Canola – volunteer	Capeweed	Cleavers
Arcade® (prosulfocarb 800)	15	IBS	W, B	L/ha	>50	_	_	-	_	_	-	_	-
Avadex® Xtra (tri- allate 500)	15	PSI IBS	W, B, T	L/ha	50	1.6- 2.4* (S)	-	-	_	1.6– 2.4*	-	-	-
			W			3.2	-	-	-	3.2 (S)	-	-	-
Boxer Gold®	15	IBS	Winter cereals	I /ha	. 50	-	_	-	_	_	-	-	-
(prosulfocarb 800 + S-metolachlor 120)	15	IBS fb PSPE	W, B	L/ha	>50	_	_	-	_	_	_	-	-
Callisto® (mesotrione 480)	27	IBS	Winter cereals	mL/ ha	>50	-	100- 200	-	_	-	100– 150 (S) or 200	100- 200	100- 200
Chlorsulfuron 750 g/kg	2	PSI IBS	W, T	g/ha	>30	15	_	-	_	_	-	20	_
Dual Gold [®] (S-metolachlor 960)	15	IBS PSPE	Winter cereals	L/ha	>60	-	-	-	_	_	-	-	-
Luximax [®] (cinmethylin 750)	30	IBS	W (not durum)	L/ha	70- 150	-	-	-	-	-	-	-	-
Mateno® Complete (aclonifen 400 + pyroxasulfone 100 +	32 + 15 +	IBS	W (not durum)	L/ha	70- 100	-	-	-	_	_	-	1.0 (S)	-
diflufenican 66)	12		В		100	_	_	-	_	_	-	_	_
Overwatch® (bixlozone 400)	13	IBS	W, B	L/ha	60- 100	-	1.25 (S)	1.25	-	_	-	1.25 (S)	1.25 (S)
Rifle® 440		PSI			50-	-	-	-	-	_	-	-	-
(pendimethalin 440)	3	IBS	W, B	L/ha	200	-	-	-	-	-	-	-	-
Sakura® (pyroxasulfone 850)	15	IBS	W (not durum), T	g/ha	50- 100	_	-	-	_	-	-	-	-
Sentry® (imazapic 525 + imazapyr 175)	2	IBS	IMI (W, B, O^)	g/ha	70	-	_	_	40–50	_	40-50 (S)*	40-50 (S)	_
Sulfosulfuron 750	2	PSI IBS	W, T	g/ha	40- 100	-	_	_	-	_	-	-	-
Terbyne® Xtreme® (terbuthylazine 875)	5	IBS	W, B, O (not irrigated)	kg/ha	>50	-	-	-	-	-	-	-	_
Triasulfuron 750	2	IBS	W	g/ha	50- 100	30	-	-	30	-	-	35	-
		PSI	W, B, T			-	-	-	-	-	-	-	-
TriflurX® (trifluralin 480)	3	IBS	W, B, T, (O max 2 L/ha)	L/ha	70– 450	1.5–3.0	-	-	_	1.5–3.0	-	-	-
Valor®/Terrain® (flumioxazin 500)	14	IBS	W (not durum)	g/ha	80	120 (S)*	120 (S)*	-	120 (S)	120 (S)*	120 (S)	120 (S)	-
Voraxor® (saflufenacil 250 + trifludimoxazin 125)	14	IBS	Winter cereal (O – hay or fodder only)	g/ha	80- 250	-	200* or 240^	-	200* or 240^	_	-	200* or 240^	_

Plant backs: in a failed crop/re-sowing situation, plant backs apply. Refer to the plant back table and the label.

Crop key: B = barley, O = oats, T = triticale, W = wheat, IMI = imidazolinone-tolerant, fb = followed by.

Incorporation key: IBS = incorporated by sowing, PSI = pre-sowing incorporated, PSPE = post-sowing, pre-emergent.

Read the label before using a product.

Common chickweed	Corn gromwell	Crassula	Deadnettle	Dock	Erodium (stork's bill)	Faba bean – volunteer	Field pea – volunteer	Fleabane	Fumitory	Indian hedge mustard	Lupin – volunteer	Mexican poppy	Comments
_	_	-	-	-	-	-	-	-	_	-	-	_	
_	1.6– 2.4*	-	1.6- 2.4* (S)	-	-	-	-	-	1.6– 2.4*	-	-	-	*Add trifluralin 2 L/ha.
-	3.2	-	3.2 (S)	-	-	-	-	-	3.2 (S)	-	_	_	
-	-	2.5	-	-	-	-	-	-	-	-	-	-	
-	_	1.75 fb 0.75	-	-	-	-	-	-	_	-	-	_	
200 (S)	_	-	-	-	-	100- 200	100- 200	100- 200	200 (S)	-	100- 200 (S)	_	
-	20	-	15 or 20	20	-	-	-	-	15 or 20	-	_	-	*Add trifluralin. Rate is influenced by soil type and pH; refer label.
_	-	-	-	-	-	-	-	-	-	-	-	-	
-	_	-	-	-	-	-	-	-	_	-	_	_	Incorporate within 3 days.
-	_	_	1.0 (S)	-	-	-	-	-	1.0 (S)	-	-	_	There are many considerations for effective control and crop safety; refer label.
-	_	-	-	-	-	-	-	-	-	-	-	-	Phytotoxicity considerations; refer label. Do not use on irrigated barley.
_	_	-	-	-	-	-	-	-	-	-	_	-	Do not sow barley with disc seeders.
-	-	-	-	-	-	-	_	-	-	-	-	-	Incorporation method influences rate; refer label.
-	-	-	-	-	-	-	-	-	_	-	-	-	
_	_	_	_	-	_	-	-	-	_	_	_	_	
-	-	-	-	-	40–50 (S)	-	-	-	40–50 (S)	-	-	_	*Imidazolinone-tolerant varieties only. ^Grain export restrictions apply; refer label.
-	_	-	-	-	-	-	-	-	25*	-	_	_	*Add trifluralin.
_	0.86- 1.2	-	0.86- 1.2	-	-	-	-	-	-	-	-	_	Low rate on lighter and/or high pH soils. Refer label for other crop safety considerations.
-	30 or 10–15*	-	30 or 10–15*	-	-	-	-	-	30 or 10–15*	-	-	35 (S)	*Add trifluralin.
-	-	-	-	-	-	-	-	-	-	-	-	-	
_	1.5–3.0	_	1.5–3.0	-	-	-	_	-	1.5-3.0	_	-	-	Rates vary depending on mix partner; refer label. Do not add tri-allate on oats.
120 (S)	120*	120 (S)	120 (S)*	-	-	-	-	-	120*	120 (S)	-	_	*Add trifluralin 2 L/ha and tri-allate at 3.2 L/ha.
_	_	-	200* or 240^	-	-	-	-	200* or 240^	200* or 240^	200* or 240^	-	_	*Apply 0–7 days before sowing. ^Apply 7–21 days before sowing.

Table 16. Herbicides for pre-emergent and post-sowing, pre-emergent broadleaf control in cereals – page 2 of 2.

Tuble 10. Herbiciaes for p		5	, , , , ,	, 1	5						13-	_ 0		
Note: example trade names shown. Others may be available at different concentrations. See labels for details.	Herbicide group	Incorporation	Crop type	Unit of use	Boom water rate (L/ha)	Mintweed	Mustards	New Zealand spinach	Paterson's curse	Prickly lettuce	Rough poppy	Shepherd's purse	Slender celery	Soursob
Arcade® (prosulfocarb 800)	15	IBS	W, B	L/ha	>50	-	-	-	-	-	-	-	_	-
Avadex® Xtra (tri-allate 500)	15	PSI IBS	W, B, T	L/ha	50	_	-	-	-	-	1.6- 2.4*	-	-	-
			W			-	-	-	-	-	3.2	-	-	-
Boxer Gold® (prosulfocarb 800 +	15	IBS	Winter cereals			_	-	-	_	-	_	-	-	-
S-metolachlor 120)	13	IBS fb PSPE	W, B	L/ha	>50	_	-	-	_	-	-	-	-	_
Callisto® (mesotrione 480)	27	IBS	Winter cereals	mL/ ha	>50	_	-	-	100- 200 (S)	100- 200	100- 200 (S)	100- 200	-	-
Chlorsulfuron 750 g/kg	2	PSI IBS	W, T	g/ha	>30	20	15	-	15	-	15 or 20	15 or 20	20	15
Dual Gold® (S-metolachlor 960)	15	IBS PSPE	Winter cereals	L/ha	>60	-	-	-	-	_	_	-	_	_
Luximax® (cinmethylin 750)	30	IBS	W (not durum)	L/ha	70- 150	_	-	-	_	_	_	-	-	_
Mateno® Complete (aclonifen 400 +	32 + 15 +	IBS	W (not durum)	L/ha	70-	_	0.75 (S)	-	-	-	-	-	-	-
pyroxasulfone 100 + diflufenican 66)	12		В		100	_	0.75 (S)	-	-	-	_	-	-	-
Overwatch® (bixlozone 400)	13	IBS	W, B	L/ha	60- 100	_	-	-	_	1.25 (S)	_	-	-	_
Rifle® 440		PSI) A/ B		50-	-	-	-	_	_	_	-	-	_
(pendimethalin 440)	3	IBS	W, B	L/ha	200	_	-	-	_	_	_	-	_	_
Sakura® (pyroxasulfone 850)	15	IBS	W (not durum), T	g/ha	50- 100	-	-	-	_	_	_	-	_	_
Sentry® (imazapic 525 + imazapyr 175)	2	IBS	IMI (W, B, O^)	g/ha	70	_	40-50	_	40-50 (S)	_	-	-	_	_
Sulfosulfuron 750	2	PSI IBS	W, T	g/ha	40- 100	_	-	_	-	_	_	-	-	_
Terbyne® Xtreme® (terbuthylazine 875)	5	IBS	W, B, O (not irrigated)	kg/ha		0.86- 1.2	0.86-	-	_	0.86-	_	0.86- 1.2	-	_
Triasulfuron 750	2	IBS	W	g/ha	50- 100	-	30 or 10- 15*	-	30	30 or 10– 15*	30	30	-	_
TriflurX® (trifluralin 480)	3	PSI	W, B, T W, B, T, (O	L/ha	70- 450	_	-	-	-	-	_	-	-	_
Valor®/Torrain®		IBS	max 2 L/ha)		.50	-	-	120	_	120	1.5–3	-	_	_
Valor®/Terrain® (flumioxazin 500)	14	IBS	W (not durum)	g/ha	80	-	-	120 (S)	-	120 (S)	120*	-	-	_
Voraxor® (saflufenacil 250 + trifludimoxazin 125)	14	IBS	Winter cereal (O – hay or fodder only)	g/ha	80– 250	_	200* or 240^	-	-	200* or 240^	-	200* or 240^	-	-

Plant backs: in a failed crop/re-sowing situation, plant backs apply. Refer to the plant back table and the label.

Crop key: W = wheat, T = triticale, O = oats, B = Barley, IMI = imidazolinone-tolerant, (S) = suppression.

Incorporation key: IBS = incorporated by sowing, PSI = pre-sowing incorporated, PSPE = post-sowing, pre-emergent.

Read the label before using a product.

Sowthistle	Spiny emex	Stinging nettle	Sub clover	Thistle – saffron	Thistle – spear	Thistle – variegated	Toad rush	Turnip weed	Vetch	Wild radish	Wild turnip	Wireweed	Comments
_	-	-	-	_	-	-	-	_	-	-	-	_	
-	1.6- 2.4* (S)	-	_	_	-	-	-	-	-	_	_	1.6- 2.4*	*Add trifluralin 2 L/ha.
_	3.2 (S)	-	_	_	-	_	-	_	_	-	_	3.2	
-	-	_	_	-	-	-	2.5	-	_	-	-	-	
-	-	-	-	_	_	-	1.25- 2.5	-	_	-	-	-	
100- 200	100– 150 (S) or 200	-	100- 200	_	-	-	_	-	100- 200	100- 200	100- 200	100- 200 (S)	
-	20	-	-	20 (S)	-	-	-	-	-	-	15	15 or 20	*Add trifluralin. Rate is influenced by soil type and pH; refer label.
_	-	-	_	_	-	_	0.15- 0.25	_	_	-	_	_	
-	-	-	_	_	-	-	0.5	-	_	-	-	-	Incorporate within 3 days.
-	-	-	_	_	_	_	0.75- 1.0	-	_	_	_	_	There are many considerations for effective control and crop safety; refer label.
-	-	_	-	_	_	_	0.75	-	_	_	_	_	Phytotoxicity considerations; refer label. Do not use on irrigated barley.
1.25	-	-	-	-	-	-	_	-	-	1.25 (S)	-	1.25	Do not sow barley with disc seeders.
-	-	-	-	-	_	-	_	-	-	-	-	0.9 or 1.4	Incorporation method influences rate; refer label.
-	-	-	_	_	_	_	-	_	_	_	-	1.35	
-	-	-	_	-	-	_	118	-	-	-	-	-	
-	-	-	-	_	-	_	-	_	-	40-50	-	40–50	*Imidazolinone-tolerant varieties only. ^Grain export restrictions apply; refer label.
_	-	-	_	-	-	-	-	-	-	-	25	25*	*Add trifluralin.
0.86- 1.2	-	-	_	_	_	_	0.86– 1.2	0.86- 1.2	_	-	0.86- 1.2	0.86- 1.2	Low rate on light and/or high pH soils. Refer label for other crop safety considerations.
30	35	-	-	-	-	30 (S)	-	30	-	35 (S)	30 or 10– 15*	35 or 10– 15*	*Add trifluralin.
-	-	-	-	-	-	-	-	-	-	-	-	0.8	
-	1.5- 3.0	-	_	_	_	_	-	-	-	_	-	1.5- 3.0	Rates vary depending on mix partner; refer label. Do not add tri-allate on oats.
120 (S)	120 (S)*	-	_	-	-	_	120 (S)	_	-	120 (S)	-	120*	*Add trifluralin 2 L/ha and tri-allate at 3.2 L/ha.
200* or 240^	-	_	_	_	200* or 240^	-	-	200* or 240^	-	200* or 240^	200* or 240^	200* or 240^	*Apply 0–7 days before sowing. ^Apply 7–21 days before sowing.

Table 17. Herbicides for weed control in wheat and barley – early post-emergence – page 1 of 2.

Note: example trade names shown. Others may be available at different concentrations. See labels for details.	Herbicide group	Crop growth (Zadoks)	Unit of use	Boom water rate (L/ha)	Annual phalaris	Annual ryegrass	Barley grass	Brome grass	Vulpia/silver grass	Wild oats	Amsinckia	Bedstraw	Black bindweed	Canola – volunteer	Capeweed	Charlock	Chickpea – volunteer
Grass control products not rely on these products	Hig ucts	h levels o as your o	f herb nly ma	icide re inagen	esistano nent to	e to Gi ol.	roups 1	and 2 s	electiv	e herbi	cides a	are cor	nmon i	in mos	t grass	weed	s. Do
Achieve® WG (tralkoxydim 400)	1	12–22	g/ha	50– 150	380- 500 (S)	380- 500	_	_	-	300- 500							
Arcade® (prosulfocarb 800)	15	11–25	L/ha	>70	_	3.0 (S)	_	_	-	_							
Atlantis® OD (mesosulfuron-methyl 30) Wheat only	2	>13	mL/ ha	50-80	330	330 (S)	330 (S)	330 (S)	-	330							
Axial® Xtra (pinoxaden 50 + cloquintocet-mexyl 12.5)	1	12–49	L/ha	50– 100	0.4–0.5	(S)	-	-	-	0.3-0.4							
Boxer Gold® (prosulfocarb 800 + S-metolachlor 120)	15	00–25	L/ha	>50	_	2.5- 3.0 (S)	_	_	-	-							
Cheetah® Gold (fenoxaprop-p-ethyl 13.6 + diclofop-methyl + sethoxydim 20)	1	12–22	L/ha	50– 150	1.0 (S)	1.0	_	_	-	1.0							
Decision® (diclofop- methyl 200 + sethoxydim 20)	1	12–21	L/ha	50– 150	_	1.0	_	-	-	-							
Diclofop-methyl 375	1	W 12-21 B 15-21	L/ha	80	_	1.0	_	_	-	1.5–2							
Foxtrot® (fenoxyprop-p- ethyl 69 + cloquintocet- mexyl 34.5)	1	W 12-21 B 15-21	L/ha	80	0.635- 0.8	_	-	-	-	0.475- 0.635							
Topik® (clodinafop- propargyl 240 + cloquintocet-mexyl 60)	1	12–24	L/ha	50- 100	85– 160	160- 210	_	-	-	65– 125							
Grass and broadleaf co	ntro	l product	S														
Chlorsulfuron 750	2	W 00, B >12	g/ha	>30	_	15–25	_	-	-	_	15	_	20	_	_	15	_
Hussar® (idosulfuron- methyl 100 + mefenpyr- dimethyl 300)	2	13–25	mL/ ha	50-80	75– 100 (S)	75– 100 (S)	_	-	-	75– 100 (S)	-	100 (S)	75 (S)	_	-	75	-
Intercept® (imazamox 33 + imazapyr 15)	2	W 13-31 B15-31*	L/ha	>70	-	0.6- 0.75 (S)	0.375- 0.75	0.375- 0.75	0.6- 0.75 (S)	0.375- 0.75	-	0.6- 0.75 (S)	_	_	_	-	-
Mateno® Complete (aclonifen 400 + pyroxasulfone 100 +	32 + 15	Wheat 11–23 (not durum)	L/ha	70- 100	-	0.75– 1.0	1.0 (S)	-	0.75- 1.0	-	-	_	-	0.75 (S) or 1.0	1.0	-	-
diflufenican 66)	+ 12	Barley 13–23		100	_	0.75	_	_	0.75	-	-	_	_	0.75 (S)	_	_	_
Rexade® (pyroxsulam 150 + halauxifen 50) Wheat only	2 + 4	13–31	g/ha	80– 100	100	100 (S)	100 (S)	100	100 (S)	100	-	100	100*	100	100*	-	100
Sentry® (imazapic 525 + imazapyr 175)	2	W 14–37*	g/ha	>70	40	40 (S)	40	40	40 (S)	40	40	40	40	40	40	-	_
Sulfosulfuron 750 Wheat only	2	11– 15/22	g/ha	40– 100	-	_	25 (S)	20 or 25 (S)	25	25 (S)	25	_	_	20	-	-	-

Cleavers	Corn gromwell	Deadnettle	Dock	Erodium (stork's bill)	Faba bean – volunteer	Field pea – volunteer	Fleabane	Fumitory	Lentil – volunteer	Lupin – volunteer	Marshmallow	Comments
Ensure		ve an I\	VM pla	n in pla	ce. It is	recomn	nended	to get	your w	eeds tes	sted fo	r resistance – consult your advisor for localised
												Rate is influenced by crop and weed size at application. Adjuvant: MOS 1%.
												Adjuvant: NIS 0.25% or MSO 1%.
												Adjuvant: MOS 0.5% or MSO 1%.
												Adjuvant: MOS 0.5% or MO, MSO 1%.
												Adjuvant: MSO, MO, MOS 0.5%.
-	20	15 or 20	-	-	-	-	-	20	-	-	-	Rate, plant backs and crop safety are heavily influenced by soil pH; refer label.
-	75 (S)	75	-	-	-	75 (S)	-	75	-	75	-	Do not apply to barley unless no other weed control option is viable; refer label. Adjuvant: NIS 1000 0.25%.
_	-	-	-	-	-	-	-	0.6- 0.75	-	-	0.6- 0.75	*Clearfield Plus wheat and CL barley only. Add MCPA LVE or clopyralid to enhance control. Adjuvant: MSO 0.5%.
_	_	1.0	_	-	-	-	-	1.0	-	-	-	There are many considerations for effective control and crop safety; refer label.
_	_	_	_	_	_	_	_	-	_	_	-	Phytotoxicity considerations; refer label. Do not use on irrigated barley.
_	-	100	-	-	100	100	100* (S)	100	100	100 (S)	100* (S)	*Requires mix partner; refer label. Adjuvant: always use NIS 1000 0.25%.
_	40	40	-	40 (S)	-	40 (S)	-	40	-	-	-	*Single gene IMI wheat only. Add MCPA LVE to enhance control. Adjuvant: MSO 0.5%.
_	_	-	_	-	-	20	-	-	-	-	_	Adjuvant: MSO 1–2%. Rate, plant backs and crop safety are heavily influenced by soil pH; refer label.

Table 17. Herbicides for weed control in wheat and barley – early post-emergence – page 2 of 2.

Note: example trade names shown. Others may be available at different concentrations. See labels for details.	Herbicide group	Crop growth (Zadoks)	Unit of use	Boom water rate (L/ha)	Medics	Mexican poppy	Mintweed	Mustards	New Zealand spinach	Paterson's curse	Peppercress	Prickly lettuce	Rough poppy	Shepherd's purse	Skeleton weed
Grass and broadleaf contro	l pro	ducts													
Chlorsulfuron 750	2	W 00, B >12	g/ha	>30	-	-	20	15	-	15	-	-	20	20	-
Hussar® (idosulfuron- methyl 100 + mefenpyr- dimethyl 300)	2	13–25	mL/ha	50-80	100	-	_	75	-	100	-	_	-	75	-
Intercept® (imazamox 33 + imazapyr 15)	2	W 13-31 B15-31*	L/ha	>70	_	_	_	0.375- 0.75	_	-	_	_	_	_	-
Mateno® Complete (aclonifen 400 +	32 + 15	Wheat 11–23 (not durum)	L/ha	70-	-	-	-	0.75	-	-	-	0.75- 1.0	-	_	-
pyroxasulfone 100 + diflufenican 66)	+ 12	Barley 13–23	2,710	100	-	_	_	0.75	-	_	-	0.75	_	_	-
Rexade® (pyroxsulam 150 + halauxifen 50) Wheat only	2 + 4	13–31	g/ha	80- 100	100	-	_	100*	-	-	-	100*	-	-	-
Sentry® (imazapic 525 + imazapyr 175)	2	W 14-37*	g/ha	>70	40 (S)	_	40 (S)	20-40	-	40	-	40 (S)	-	20-40	-
Sulfosulfuron 750 Wheat only	2	11–15/22	g/ha	40- 100	-	_	_	25 (S)	_	_	_	_	_	_	_

Key: IMI = imidazoline tolerant varieties, NR = not required, (S) = suppression only.

Adjuvant key: MO = mineral oil, MOS = mineral oil plus surfactant, MSO = methylated seed oil, NIS = non-ionic surfactant.

NIS products might indicate a specific concentration (i.e. NIS 1000); refer to adjuvant chart for example products.

Read the label before using a product.

Sorrel	Soursob	Sowthistle	Spiny emex	Thistle – saffron	Thistle – slender	Thistle – spear/ black	Thistle – variegated	Toad rush	Vetch	Wild radish	Wild turnip	Wireweed	Comments
-	20	_	_	-	-	_	_	_	_	15 or 20	15	20	Rate, plant backs and crop safety are heavily influenced by soil pH; refer label.
_	-	100 (S)	100	-	-	-	-	75 (S)	75 (S)	100	75	75	Do not apply to barley unless no other weed control option is viable; refer label. Adjuvant: NIS 1000 0.25%.
-	_	_	0.6- 0.75 (S)	-	-	-	-	_	_	0.375- 0.75	0.375- 0.75	_	*Clearfield Plus wheat and CL barley only. Add MCPA LVE or clopyralid to enhance control. Adjuvant: MSO 0.5%.
-	_	1.0	1.0 (S)	-	-	_	_	0.75- 1.0	-	1.0	-	0.75 (S)	There are many considerations for effective control and crop safety; refer label.
_	_	_	_	-	-	_	_	0.75	_	_	_	0.75 (S)	Phytotoxicity considerations; refer label. Do not use on irrigated barley.
_	-	100*	100*	_	-	_	_	_	100 (S)	100*	100	100	*Requires mix partner; refer label. Adjuvant: always use NIS 1000 0.25%.
_	_	40 (S)	40	40 (S)	-	40	40	-	40 (S)	20-40	40	40	*Single gene IMI wheat only. Add MCPA LVE to enhance control. Adjuvant: MSO 0.5%.
_	-	-	_	_	-	_	_	_	_	20	20	-	Adjuvant: MSO 1–2%. Rate, plant backs and crop safety are heavily influenced by soil pH; refer label.

Table 18. Herbicides for broadleaf weed control in wheat and barley – early post-emergence – page 1 of 4.

Note: example trade names shown. Others may be available at different concentrations. See labels for details.	Herbicide group	Crop growth (Zadoks)	Unit of use	Boom water rate (L/ha)	Amsinckia	Bedstraw	Black bindweed	Canola – volunteer	Capeweed	Charlock	Chickpea – volunteer	Cleavers	Corn gromwell	Deadnettle
Affinity® Force (carfentrazone 240)	14	>13	mL/ha	50– 150	-	-	85	85– 100	85	_	-	85– 100*	85- 100	_
Agtryne® MA (terbutryn 275 + MCPA 160)	4+5	13–15	L/ha	50– 100	1.0	-	-	-	1.0	1.0	-	-	1.0	1.5
Aptitude® (metribuzin 375 + carfentrazone-ethyl 90)	5 + 14	13–25	g/ha	50- 150	-	200	-	-	200	-	-	-	-	_
Associate® (metsulfuron- methyl 600)	2	13–37	g/ha	>50	5 or 7	_	-	-	_	5	5	_	-	5
Broadside® (bromoxynil 140 + MCPA 280 + dicamba 40)	6+4	13–30*	L/ha	>50	0.75– 1.0	-	1.0- 1.4	1.4	0.75- 1.0	-	-	-	1.0- 1.4	-
Broadstrike® (flumetsulam 800)	2	W 13-31, B 21-31	g/ha	50- 150	25	25	-	25	25*	25	-	-	-	25 (S)*
Bromicide®		12–31	1 /1	50-	-	_	0.9– 1.2	-	-	_	-	-	-	0.9– 1.2
(bromoxynil 200)	6	13–30	L/ha	200	1.4	2.1	2.1	-	1.4	1.4	-	-	1.4	-
Bromoxynil 250 + diflufenican 25	6+12	12–29	L/ha	50- 100	0.75	1.0 (S)	0.5- 1.0	0.5- 0.75	0.5– 1.0	0.5- 0.75	-	-	0.5- 0.75	0.5- 0.75
Bronco® MA-X (bromoxynil 280 + MCPA 280)	6+4	13–30	L/ha	50- 200	1.0- 1.43	-	1.0- 1.43	-	1.0- 1.43	1.0- 1.43	-	0.54	1.0- 1.43	_
Buttress® (2,4-DB 500)	4	15–33	L/ha	>80	_	_	-	-	2.1- 3.2	2.1- 3.2	-	_	-	-
Condor® (MCPA 375 + pyraflufen-ethyl 10)	4+14	12–29	L/ha	80- 150	-	0.8- 1.6	-	0.8- 1.6	0.8- 1.6	-	-	-	-	-
Diuron® 900	5	12–22	kg/ha	40-70	0.5	-	-	-	0.5	0.5	-	-	-	0.5
Ecopar® (pyraflufen- ethyl 20)	14	12–29	L/ha	70– 150	-	0.4- 0.8	-	0.4- 0.8	0.4- 0.8	-	0.4*	-	-	0.4*
Enforcer® 242 (picloram 26 + MCPA 420)	4	22–30	L/ha	>50	_	_	1.0	-	_	-	-	_	_	-
FallowBoss® Tordon® (2,4-D amine 300 + picloram 75 + aminopyralid 7.5)	4	14–31	L/ha	50- 100	-	-	0.3	-	-	-	-	-	-	-
Flight® EC (picolinafen 35 + bromoxynil 210 + MCPA 350)	6 + 12 + 4	13–28	L/ha	50- 150	_	_	-	0.36	0.36- 0.72	0.36- 0.72	-	_	0.72	0.72 (S)
Frequency® (topramezone 60 + cloquintocet-mexyl 60)	27	12–32	mL/ha	80– 150	_	_	200	-	200	200	-	-	-	200
Grindstone® (aminopyralid 240)	4	13–31	mL/ha	50- 100	_	-	20-32	-	-	-	20	-	-	16–32
Hotshot® (aminopyralid 10 + fluroxypyr 140) Northern NSW only	4	13–31	L/ha	>80	_	_	0.5- 0.75	_	_	_	0.75	_	_	0.5- 0.75*
Igran® Flowable (terbutryn 500)	5	13–21	L/ha	50- 100	0.55- 0.85	_	0.44*	-	0.55- 0.85	0.55- 0.85*	-	-	0.55- 0.85	0.44- 0.6*

Dock	Erodium (stork's bill)	Faba bean – volunteer	Field pea – volunteer	Fleabane	Fumitory	Lentil – volunteer	Lupin – volunteer	Marshmallow	Medics	Mexican poppy	Comments
-	85- 100	85*	85*	_	85	85*	85*	65– 100	-	_	Add minimum of 330 mL/ha MCPA 750. *Add dicamba.
-	-	_	_	_	1.0	-	-	-	-	-	
_	_	-	_	-	200	-	-	200	-	-	MCPA amine can be added for improved control. Do not use MCPA LVE or any other ester formulations; refer label.
5 or 7	-	_	7	_	5	-	5	_	5	-	Tank mix partners will broaden the weed spectrum; refer label.
0.75- 1.0	_	_	_	_	1.0-1.4	-	_	_	-	_	*Rate increases with crop growth; refer label.
_	_	_	_	_	-	-	25	15/25*	-	-	*Apply with a partner herbicide; refer label. Adjuvant: W MOS 0.5% or NIS 0.2%, B NIS 0.2%.
_	-	-	_	0.9–1.2	0.9–1.2	-	-	-	-	-	Add fluroxypyr; refer label. Add Frequency® and MSO 1%; refer label.
_	_	_	_	_	2.1	-	_	_	-	1.4	Add 2,4-D amine or MCPA LVE; refer label.
_	0.5- 0.75 (S)	_	0.75 (S)	_	0.75 (S)	-	0.5–1.0 (S)	_	-	_	*Add MCPA LVE. Can cause transient yellowing.
-	_	_	_	-	1.0- 1.43	-	-	_	-	1.0- 1.43	Application rate increases with crop growth and weed size; refer label. Do not spray if temperature is >20 °C.
2.1–3.2	_	_	_	_	2.1–3.2	-	_	2.1–3.2	-	2.1–3.2	
_	0.8–1.6	_	_	_	_	-	0.8–1.6	0.8–1.6	-	_	Adjuvant: NIS 0.1%; some phytotoxicity might occur.
_	_	_	_	_	-	-	_	_	-	_	
_	0.4-0.8	0.4*	_	-	0.4*	-	0.4-0.8	_	0.4*	_	400 mL/ha is the maximum rate at Z12. Always add MCPA amine 750. *Add 5 g/ha metsulfuron-methyl 600.
_	_	_	_	_	_	-	_	_	-	_	
0.3	_	-	_	0.3	-	-	-	-	-	-	Northern NSW only. *Add 2,4-D amine. Adjuvant: NIS 1000.
_	_	_	_	-	0.54- 0.72 (S)	-	0.72 (S)	_	-	-	Rates increase with weed size and crop growth stage; refer label.
_	_	_	_	200	200	-	_	_	-	_	Must be used with bromoxynil or MCPA LVE. Adjuvant: MSO 1%.
16 or 22	_	16-32	32	32	-	-	-	-	16	-	Northern NSW only. Must have a mix partner. Crop growth stage and rate are determined by mix partner; refer label.
_	_	20	20	_	_	-	20	_	-	-	Southern NSW only. Add fluroxypyr; refer label.
_	_	0.75	0.75	0.75*	_	_	_	_	_	_	*Add a mix partner; refer label.
-	_	0.44*	0.44*	-	0.55- 0.85	-	_	-	0.44*	0.44- 0.6*	*Add Triasulfuron 750. ^Add MCPA or 2,4-D.

Table 18. Herbicides for broadleaf weed control in wheat and barley – early post-emergence – page 2 of 4.

Note: example trade names shown. Others may be available at different concentrations. See labels for details.	Herbicide group	Crop growth (Zadoks)	Unit of use	Boom water rate (L/ha)	Amsinckia	Bedstraw	Black bindweed	Canola – volunteer	Capeweed	Charlock	Chickpea – volunteer	Cleavers	Corn gromwell	Deadnettle
Kamba® 750 (dicamba 750)	4	15–30	mL/ha	>50	-	_	185	-	105* or 185^	105* or 185^	_	-	-	-
Kamba® M (MCPA 340 + dicamba 80)	4	21–30	L/ha	>50	-	-	1.7	-	1.0- 1.7	1.0- 1.7	-	-	-	-
Legacy® MA (diflufenican 25 + MCPA 250)	4+12	13–30	L/ha	>50	-	_	_	0.5	0.5- 1.0	0.5- 1.0	-	-	1.0	1.0
Lontrel® Advanced (clopyralid 600)	4	13–30	mL/ha	50- 100	-	-	-	-	50- 150	-	50	-	-	-
MCDA : 750		12–14		30-	0.33	_	_	_	0.33	0.33	_	-	0.33	0.33
MCPA amine 750	4	15–37	L/ha	120	_	_	0.97– 1.35	0.66- 0.96	1.45	0.66	_	-	_	1.45
MCPA LVE 570	4	13–32	L/ha	30– 120	_	_	_	1.3	1.49	0.44- 1.4	_	-	_	0.44- 0.6*
Paradigm® (florasulam 200	2+4	13–37	/b-a	80-	_	25*	-	25*	25*(S)	-	25*	-	-	25
+ halauxifen 200)	2+4	31–43* or 31–49	g/ha	100	-	_	_	-	-	-	25 or 25*	-	_	25
Pixxaro® (fluroxypyr 250 + halauxifen 16.25)	4	13–39	L/ha	>80	-	0.4	0.4– 0.6	_	-	_	0.4	-	_	0.2- 0.3
Precept® (MCPA 125 + pyrasulfotole 25)	4 + 27	W 13-31 B 15-31	L/ha	50- 100	1.5- 2.0	1.5- 2.0	_	1.0- 2.0	1.0*	_	1.0*	-	1.0- 2.0	1.5- 2.0
Quadrant® (MCPA ester 250 + bromoxynil 240 + diflufenican 20 + picolinafen 10)	4+6+ 12	13–28	L/ha	50– 100	0.8- 1.0	0.8- 1.0	1.0- 1.2	0.6	0.6- 1.2	0.6- 1.2	_	0.8- 1.0	0.8- 1.0	0.8- 1.0
Sencor® (metribuzin 480) Barley only	5	B 13-8 weeks	L/ha	50- 100	-	_	-	-	-	-	_	-	-	-
Starane® Advanced (fluroxypyr 333)	4	13–39	L/ha	>50	_	0.3	0.3 (S) or * or 0.45	_	_	_	_	0.6	_	0.9 or 0.3*
Talinor® (bromoxynil 175 + bicyclopyrone 37.5 + cloquintocet-mexyl 9.4)	6 + 27	12–32	L/ha	75- 150	_	0.75- 1.0 (S)	0.5- 1.0	0.5- 1.0	0.5- 1.0	0.5- 1.0	0.5- 0.75	-	0.5- 0.75	0.5- 0.75
Trezac® (aminopyralid 25 + halauxifen 30 + cloquintocet-mexyl 30)	4	13–31	mL/ha	>80	_	200*	200*	_	_	_	200	-	_	200
Triasulfuron 750	2	13–22	g/ha	30- 100	_	_	10^	_	_	_	_	-	_	10- 13^
Triathlon® (MCPA 250 + bromoxynil 150 + diflufenican 25)	4 + 6 + 12	13–30	L/ha	50- 100	_	_	_	0.5	0.5–1	_	_	-	1.0	1.0
Velocity® (pyrasulfotole 37.5 + bromoxynil 210)	27 + 6	12–31	L/ha	50- 150	0.6- 1.0	0.67- 1.0	0.5– 1.0	0.5- 1.0	0.5- 1.0	_	0.5- 1.0 (S)	-	0.5- 1.0	0.5- 1.0

 $\label{eq:Key:IMI} \textit{Key: IMI} = imidazoline \ tolerant \ varieties, \ NR = not \ required, \ (S) = suppression \ only.$

Adjuvant key: MO = mineral oil, MOS = mineral oil plus surfactant, MSO = methylated seed oil, NIS = non-ionic surfactant. NIS products might indicate a specific concentration (i.e. NIS 1000); refer to adjuvant chart for example products.

Read the label before using a product.

Dock	Erodium (stork's bill)	Faba bean – volunteer	Field pea – volunteer	Fleabane	Fumitory	Lentil – volunteer	Lupin – volunteer	Marshmallow	Medics	Mexican poppy	Comments
185 or 105*	-	-	-	-	-	-	-	-	_	-	*Add MCPA amine. ^Add MCPA or 2,4-D amine.
1.0–1.7	-	-	-	-	_	_	_	_	_	_	
1.0 (S)	1.0 (S)	-	-	-	0.75	-	1.0 (S)	-	_	_	Application rate increases with crop growth and weed size; refer label. Add MCPA for radish control.
_	-	50	40-50	-	-	-	50	-	50	-	Rates and timing are determined by weed size and mix partner. There are many mix partners; refer label.
_	0.33	-	-	-	-	-	0.46	-	_	_	Use the low rate and add Diuron® 900 for control of small weeds.
-	-	-	-	-	0.93	-	_	-	_	_	Application rate increases with crop growth and weed size; refer label.
_	-	-	-	-	0.44- 0.6* or 0.965	-	_	-	_	_	Add mix partner; refer label. Application rate increases with crop growth and weed size; refer label.
-	-	25*	25*	25*	25	25*	25*	25	25*	25	*Add MCPA LVE. Rate of mix partner changes with crop growth stage; refer label. Adjuvant; refer label.
_	-	-	-	-	25	-	_	25	-	25	*Add 0.8–1.2 L/ha 2,4-D amine 720. Adjuvant: W, T = MOS 0.5%, B = NIS 0.2%.
_	-	-	-	0.3	0.3	_	_	0.3	0.3	0.2-0.3	Adjuvant: MOS 0.5%.
_	-	1.0*	1.0-2.0 or 1.0*	-	1.0-2.0	1.0*	1.0-2.0	-	2.0 or 1.0*	_	*Add clopyralid for control. Adjuvant: AMS, MSO 0.5–1%, MOS 0.5–0.75%.
1.0 (S)	-	-	-	-	0.8–1.2	-	1.0 (S)	1.0 (S)	-	0.8–1.0	Rate is dictated by weed size; refer label. Transient yellowing might occur. Temperature >20 °C can increase effects.
-	-	-	-	-	_	_	_	_	_	_	
_	-	-	-	-	-	-	0.9	-	-	-	*Add metsulfuron-methyl (not durum). Adjuvant: weed specific; refer label.
-	0.75- 1.0	0.5- 0.75	0.5- 0.75	0.75- 1.0 (S)	0.5- 0.75	0.5- 0.75	0.5- 0.75	-	0.5- 0.75	_	Do not mix with UAN or AMS fertilisers. Adjuvant: MSO 0.5%.
_	-	200	200	200	200	-	-	200*	200	200	*Add fluroxypyr. ^Add fluroxypyr + MCPA LVE. Adjuvant: MOS 0.5%.
_	-	10^	10^	-	-	-	-	-	10^	10- 13^	*Add MO 1%. ^Add terbutryn.
1.0 (S)	1.0 (S)	-	_	-	0.75	-	1.0 (S)	1.0 (S)	_	_	Transient yellowing might occur.
_	-	0.5–1.0	0.5 (S) 0.67- 1.0	-	0.5–1.0	0.5–1.0 (S)	0.5–1.0	-	0.5 (S) 0.67- 1.0	-	Add LVE MCPA for control; refer label.

Read the	label	before	using	a product.

Note: example trade names shown. Others may be available at different concentrations. See labels for details.	Herbicide group	Crop growth (Zadoks)	Unit of use	Boom water rate (L/ha)	Mintweed	Mustards	New Zealand spinach	Paterson's curse	Peppercress	Prickly lettuce	Rough poppy	Shepherd's purse	Skeleton weed	Sorrel
Affinity® Force (carfentrazone 240)	14	>13	mL/ha	50–150	_	85– 100	-	65– 100	_	85	85	85	_	_
Agtryne® MA (terbutryn 275 + MCPA 160)	4+5	13–15	L/ha	50–100	-	1.0–1.5	-	1.0	-	-	1.0	_	-	_
Aptitude® (metribuzin 375 + carfentrazone-ethyl 90)	5 + 14	13–25	g/ha	50-150	-	200	_	-	-	200	-	200	-	_
Associate® (metsulfuron- methyl 600)	2	13–37	g/ha	>50	-	5	_	5 or 7	-	-	5	5	7 (S)	5
Broadside® (bromoxynil 140 + MCPA 280 + dicamba 40)	6+4	13–30*	L/ha	>50	-	0.75– 1.0	-	-	-	-	-	_	_	-
Broadstrike® (flumetsulam 800)	2	W 13-31, B 21-31	g/ha	50–150	-	25	-	25 (S) or 25*	25 (S) or 25*	-	-	25	_	-
Bromicide®		12–31		50.000	-	-	-	-	-	-	-	0.9– 1.2	-	-
(bromoxynil 200)	6	13–30	L/ha	50–200	1.4	1.4	-	1.4– 2.1	1.4	-	1.4	1.4– 2.1	-	2.1
Bromoxynil 250 + diflufenican 25	6 + 12	12–29	L/ha	50–100	1.0 (S)	0.5–1.0	-	0.5- 0.75	1.1	1.0 (S)	0.5- 0.75	1.0	1.0 (S)	1.0 (S)
Bronco® MA-X (bromoxynil 280 + MCPA 280)	6+4	13–30	L/ha	50-200	1.0- 1.43	1.0- 1.43	-	1.0- 1.43	1.0- 1.43	-	1.0- 1.43	1.0- 1.43	-	-
Buttress® (2,4-DB 500)	4	15–33	L/ha	>80	-	2.1–3.2	-	2.1- 3.2	-	2.1- 3.2	-	2.1- 3.2	_	-
Condor® (MCPA 375 + pyraflufen-ethyl 10)	4+14	12–29	L/ha	80–150	-	0.8–1.6	-	-	-	0.8- 1.6	-	-	-	-
Diuron® 900	5	12–22	kg/ha	40-70	-	0.5	-	-	-	-	-	_	_	-
Ecopar® (pyraflufen- ethyl 20)	14	12–29	L/ha	70–150	-	0.4-0.8	-	0.4*	-	0.4- 0.8	-	-	-	0.4*
Enforcer® 242 (picloram 26 + MCPA 420)	4	22–30	L/ha	>50	_	1.0	1.0 (S)	-	_	-	-	_	1.0	-
FallowBoss® Tordon® (2,4-D amine 300 + picloram 75 + aminopyralid 7.5)	4	14–31	L/ha	50–100	0.3*	0.3*	0.3	-	-	-	-	_	-	-
Flight® EC (picolinafen 35 + bromoxynil 210 + MCPA 350)	6 + 12 + 4	13–28	L/ha	50–150	-	0.36- 0.72	-	-	-	0.3- 0.72	-	0.36- 0.72	-	-
Frequency® (topramezone 60 + cloquintocet-mexyl 60)	27	12–32	mL/ha	80–150	_	-	-	_	_	-	-	200	_	-
Grindstone®	_				-	16	22	-	-	16–32	-	-	-	-
(aminopyralid 240)	4	13–31	mL/ha	50–100	-	_	-	-	-	-	-	-	-	_
Hotshot® (aminopyralid 10 + fluroxypyr 140) Northern NSW only	4	13–31	L/ha	>80	-	-	-	_	_	0.75	-	_	_	-
Igran® Flowable (terbutryn 500) 86 Penny Heuston and Micha	5	13–21	L/ha	50–100	_	0.33- 0.44* or 0.55- 0.85^	-	0.55- 0.85	_	-	-	0.44*	_	-

Re	ead the	label b	erore u	ising a	produc	τ.						
Soursob	Sowthistle	Spiny emex	Thistle – saffron	Thistle – slender	Thistle – spear/ black	Thistle – variegated	Toad rush	Vetch	Wild radish	Wild turnip	Wireweed	Comments
_	85	85	-	_	_	-	85– 100	85*	100	85	85	Add minimum of 330 mL/ha MCPA 750. *Add dicamba.
_	-	1.5	1.5	_	_	_	1.5	_	_	1.0	1.5	
_	_	_	_	_	_	-	200	_	200	200	_	MCPA amine can be added for improved control. Do not use MCPA LVE or any other ester formulations; refer label.
5	5	5 or 7	_	_	_	-	-	-	_	5	5 or 7	Tank mix partners will broaden the weed spectrum; refer label.
_	-	0.75– 1.0	-	_	_	_	-	-	0.75- 1.0	-	0.75– 1.0	*Rate increases with crop growth; refer label.
_	-	25*	_	_	_	-	-	_	15* or 25 (S)	15–25	-	*Apply with a partner herbicide; refer label. Adjuvant: W MOS 0.5% or NIS 0.2%, B NIS 0.2%.
_	0.9–1.2	_	_	_	_	-	-	0.9–1.2	0.9–1.2	0.9–1.2	0.9–1.2	Add fluroxypyr; refer label. Add Frequency® and MSO 1%; refer label.
_	-	1.4	1.4	1.4	_	1.4–2.1	-	_	1.4	1.4	1.4	Add 2,4-D amine or MCPA LVE; refer label.
_	1.0 (S)	0.5- 0.75	1.00	_	_	1.00	1.0 (S)	1.0 (S)	0.5–1.0 or 0.5*	0.5- 0.75	1.00	*Add MCPA LVE. Can cause transient yellowing.
_	1.0–1.5	1.0- 1.43	1.0- 1.43	1.0- 1.43	-	1.0- 1.43	-	-	1.0- 1.43	1.0- 1.43	1.0- 1.43	Application rate increases with crop growth and weed size; refer label. Do not spray if temperature is >20 °C.
_	2.1-3.2	2.1–3.2	2.1–3.2	2.1–3.2	2.1–3.2	2.1–3.2	_	_	_	2.1–3.2	2.1–3.2	
-	-	_	_	_	_	-	-	_	0.8–1.6	0.8–1.6	_	Adjuvant: NIS 0.1%; some phytotoxicity might occur.
_	-	0.5	0.5	_	_	_	-	_	0.5	0.5	-	
0.4*	0.4*	0.4*	-	-	-	-	-	-	0.3-0.8	0.4–0.8	0.4*	400 mL/ha is the maximum rate at Z12. Always add MCPA amine 750. *Add 5 g/ha metsulfuron-methyl 600.
_	1.0	1.0	1.0	-	-	1.0	-	-	1.0	1.0	1.0 (S)	
_	0.3	0.3	0.3	_	_	0.3*	-	_	0.3*	0.3*	0.3* (S)	Northern NSW only. *Add 2,4-D amine. Adjuvant: NIS 1000.
_	0.72 (S)	0.72 (S)	0.72	_	_	_	0.72	-	0.36- 0.72	0.36- 0.72	_	Rates increase with weed size and crop growth stage; refer label.
_	200	_	_	_	_	_	-	200	200	200	200	Must be used with bromoxynil or MCPA LVE. Adjuvant: MSO 1%.
_	20–32	16-32	16	_	_	16–32	-	32	_	16	16–32	Northern NSW only. Must have a mix partner. Crop growth stage and rate are determined by mix partner; refer label.
_	_	_	_	_	_	-	-	20	_	_	_	Southern NSW only. Add fluroxypyr; refer label.
_	0.5- 0.75*	0.5- 0.75*	_	-	_	0.5– 0.75*	-	0.75	_	_	0.5- 0.75*	*Add a mix partner; refer label.
-	0.5- 0.75*	0.55- 0.85*	_	_	_	_	0.55- 0.85	0.6*	0.44- 0.6*	0.33- 0.44* or 0.55- 0.85^	_	*Add Triasulfuron 750. ^Add MCPA or 2,4-D.

Table 18. Herbicides for broadleaf weed control in wheat and barley – early post-emergence – page 4 of 4.

	<u>d</u> r			ate				Se				ırse	_	
Note: example trade names shown. Others may be available at different concentrations. See labels for details.	Herbicide group	Crop growth (Zadoks)	Unit of use	Boom water rate (L/ha)	Mintweed	Mustards	New Zealand spinach	Paterson's curse	Peppercress	Prickly lettuce	Rough poppy	Shepherd's purse	Skeleton weed	Sorrel
Kamba® 750 (dicamba 750)	4	15–30	mL/ha	>50	185*	105* or 185^	185	-	_	_	_	_	-	1.0
Kamba® M (MCPA 340 + dicamba 80)	4	21–30	L/ha	>50	1.7	1.0–1.7	1.7	-	-	-	-	_	-	1.0- 1.7
Legacy® MA (diflufenican 25 + MCPA 250)	4+12	13–30	L/ha	>50	_	0.5–1.0	-	1.0 (S)	1.0 (S)	0.5- 1.0	1.0 (S)	0.5- 1.0	1.0 (S)	-
Lontrel® Advanced (clopyralid 600)	4	13–30	mL/ha	50–100	_	-	-	-	-	50-75	_	_	250	-
	_	12–14			_	0.33- 0.46	-	-	-	_	_	_	-	-
MCPA amine 750	4	15–37	L/ha	30–120	1.35	0.66	-	0.66- 0.96	_	_	0.46- 0.96	_	0.96- 1.35	-
MCPA LVE 570	4	13–32	L/ha	30–120	_	0.49- 0.88	-	1.49	-	-	-	0.44- 0.6*	0.965– 1.4	-
Paradigm® (florasulam 200 + halauxifen 200)	2+4	13–37	g/ha	80-100	_	25*	-	-	-	25*	_	25*	_	-
+ Halduxileti 200)		31–43* or 31–49			_	_	-	-	_	_	_	_	_	-
Pixxaro® (fluroxypyr 250 + halauxifen 16.25)	4	13–39	L/ha	>80	_	_	-	_	_	0.4	_	_	_	-
Precept® (MCPA 125 + pyrasulfotole 25)	4 + 27	W 13-31, B 15-31	L/ha	50–100	-	1.0-2.0	-	1.0- 2.0	-	1.0- 2.0	_	_	-	-
Quadrant® (MCPA ester 250 + bromoxynil 240 + diflufenican 20 + picolinafen 10)	4+6+ 12	13–28	L/ha	50–100	0.8- 1.0	0.6–1.2	-	0.8- 1.2	1.2	0.6- 1.2	0.8- 1.2	0.6- 1.2	1.0 (S)	0.8-
Sencor® (metribuzin 480) Barley only	5	B 13-8 weeks	L/ha	50–100	_	_	-	-	_	_	_	_	_	-
Starane® Advanced (fluroxypyr 333)	4	13–39	L/ha	>50	_	0.3- 0.9*	-	_	_	0.3	_	0.3- 0.9*	_	-
Talinor® (bromoxynil 175 + bicyclopyrone 37.5 + cloquintocet-mexyl 9.4)	6 + 27	12–32	L/ha	75–150	_	0.5–1.0	-	0.5- 0.75	_	0.5- 0.75	_	0.5- 0.75	_	-
Trezac® (aminopyralid 25 + halauxifen 30 + cloquintocet-mexyl 30)	4	13–31	mL/ha	>80	-	-	-	-	-	200*	_	_	-	-
Triasulfuron 750	2	13–22	g/ha	30–100	-	6.5- 10^	-	-	_	_	-	10^	-	-
Triathlon® (MCPA 250 + bromoxynil 150 + diflufenican 25)	4+6+ 12	13–30	L/ha	50–100	_	0.5–1	-	1.0 (S)	1.0 (S)	0.5- 1.0	1.0 (S)	0.5- 1.0	1.0 (S)	-
Velocity® (pyrasulfotole 37.5 + bromoxynil 210)	27 + 6	12–31	L/ha	50–150	_	0.5–1.0	-	0.5– 1.0	_	0.5– 1.0	_	0.5- 1.0	_	-

Key: IMI = imidazoline tolerant varieties, NR = not required, (S) = suppression only.

Adjuvant key: MO = mineral oil, MOS = mineral oil plus surfactant, MSO = methylated seed oil, NIS = non-ionic surfactant.

NIS products might indicate a specific concentration (i.e. NIS 1000); refer to adjuvant chart for example products.

Read the label before using a product.

Soursob	Sowthistle	Spiny emex	Thistle – saffron	Thistle – slender	Thistle – spear/ black	Thistle – variegated	Toad rush	Vetch	Wild radish	Wild turnip	Wireweed	Comments
_	_	185 or 105*	185^	-	-	-	_	185 or 105*	105*	185^ or105*	185 or 105*	*Add MCPA amine. ^Add MCPA or 2,4-D amine.
_	-	1.0–1.7	1.7	-	-	1.7	_	1.0–1.7	1.0–1.7	1.0–1.7	1.0–1.7	
-	1.0 (S)	1.0 (S)	1.0	-	-	1.0 (S)	1.0	1.0 (S)	0.5–1.0	0.5–1.0	0.75 (S)	Application rate increases with crop growth and weed size; refer label. Add MCPA for radish control.
-	50	-	25	25	25	25	-	40-50	_	-	_	Rates and timing are determined by weed size and mix partner. There are many mix partners; refer label.
_	_	0.33	-	-	-	-	_	_	0.33- 0.46	0.33- 0.46	_	Use the low rate and add Diuron® 900 for control of small weeds.
-	-	-	0.66- 1.35	0.66– 1.35	0.96- 1.35	0.66- 1.35	_	-	0.66	0.66	-	Application rate increases with crop growth and weed size; refer label.
-	0.44- 0.6*	-	0.965– 1.7	1.8	1.31– 1.84	0.74- 0.96	-	-		0.44- 0.6* or 0.615- 0.965	0.44- 0.6*	Add mix partner; refer label. Application rate increases with crop growth and weed size; refer label.
_	25*	25*	-	-	-	-	25 (S)	25*	25*	25*	_	*Add MCPA LVE. Rate of mix partner changes with crop growth stage; refer label. Adjuvant; refer label.
_	-	_	-	_	-	-	25 (S)	_	25 or 25*	-	-	*Add 0.8–1.2 L/ha 2,4-D amine 720. Adjuvant: W, T = MOS 0.5%, B = NIS 0.2%.
_	0.4	_	-	-	-	-	_	_	_	_	_	Adjuvant: MOS 0.5%.
_	1.0-2.0	1.5-2.0 (S)	-	-	-	-	_	1.0*	1.0-2.0	1.0-2.0	1.0-2.0	*Add clopyralid for control. Adjuvant: AMS, MSO 0.5–1%, MOS 0.5–0.75%.
_	1.2	0.8–1.2	0.8–1.0	0.8–1.0	-	1.2	0.8–1.0	1.0 (S)	0.6–1.2	0.6–1.2	0.8–1.2	Rate is dictated by weed size; refer label. Transient yellowing might occur. Temperatures >20 °C can increase effects.
-	_	_	-	-	-	-	0.15	_	_	_	_	
_	0.6	0.9 or 0.3*	-	-	-	-	_	_	0.3- 0.9*	0.3- 0.9*	0.3*	*Add metsulfuron-methyl (not durum). Adjuvant: weed specific; refer label.
_	0.5- 0.75	0.5–1.0	0.75– 1.0	-	-	-	_	0.5- 0.75	0.5–1.2	0.5–1.0	0.5–1.0	Do not mix with UAN or AMS fertilisers. Adjuvant: MSO 0.5%.
-	200^	200^	-	-	-	200^	-	200	-	-	-	*Add fluroxypyr. ^Add fluroxypyr + MCPA LVE. Adjuvant: MOS 0.5%.
-	-	-	-	-	-	-	-	-	10–15* or^	6.5^	-	*Add MO 1%. ^Add terbutryn.
-	1.0 (S)	1.0 (S)	1.0	-	-	1.0 (S)	1.0	1.0 (S)	0.5–1.0	0.5–1.0	(5)	Transient yellowing might occur.
_	0.5–1.0	0.5–1.0	0.67- 1.0	_	-	-	_	0.5-1.0 (S)	0.5–1.0	0.5–1.0	0.5 (S) 0.67– 1.0	Add LVE MCPA for control; refer label.

NOTES



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Paradigm® Arylex® active Herbicide delivers a low dose, wide **spectrum** solution for the control of broadleaf weeds.

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Table 19. Herbicides for weed control for wheat and barley – late post-emergence – page 1 of 2.

Note: example trade names shown. Others may be available at different concentrations. See labels for details.	Herbicide group	Crop growth (Zadoks)	Unit of use	Boom water rate (L/ha)	Annual phalaris	Annual ryegrass	Barley grass	Brome grass	Vulpia/silver grass	Wild oats	Amsinckia	Bedstraw	Black bindweed	Canola – volunteer	Capeweed
Grass control products. High not rely on these products as y					ce to Gr	oups 1	and 2 s	elective	herbio	ides are	comm	on in n	nost gra	ss wee	ds. Do
Axial® Xtra (pinoxaden 50 + cloquintocet-mexyl 12.5)	1	12–49	L/ha	50- 100	0.4-0.5	0.5-0.6 (S)	-	_	_	0.3-0.4					
Topik® (clodinafop-propargyl 240 + cloquintocet-mexyl 60) Wheat only	1	12–37	mL/ha	50– 110	85– 160	160- 210	-	_	_	65- 125					
Grass and broadleaf control	produ	cts													
Sentry® (imazapic 525 + imazapyr 175) Wheat only*	2	14–37	g/ha	>70	40	40 (S)	40	40	40 (S)	40	40	40	40	40	40
Broadleaf control products	'				'			,							
2,4-D amine 700 g/L	4	31–43	L/ha	50- 250							0.98	_	0.98	-	0.98- 1.5
2,4-D LV ester 680	4	31–37	L/ha	30– 100							-	_	-	-	0.53- 0.8
Affinity® Force (carfentrazone 240)	14	>13	mL/ha	50– 150							-	_	85	85- 100	85
Broadstrike® (flumetsulam 800)	2	61–83	g/ha	50– 150							25	25	-	25	25*
Lontrel® Advanced (clopyralid 600)	4	13–45	L/ha	50- 100							-	-	-	-	-
MCPA amine 750	4	15–37	L/ha	30– 120							-	_	0.97- 1.35	0.66- 0.96	1.45
MCPA LVE 570	4	15–39	L/ha	30- 120							-	_	_	1.3	1.49
Paradigm® (florasulam 200 +	2+4	13–37 31–43*	g/ha	80-							-	25*	-	25*	25*(S)
halauxifen 200)		or 31–49	_	100							-	_	_	-	_
Pixxaro® (fluroxypyr 250 + halauxifen 6.25)	4	13–39	L/ha	>80							-	0.4	0.4-0.6	-	-

Key: IMI = imidazoline tolerant varieties, NR = not required, (S) = suppression only.

 $Adjuvant\ key:\ MO=mineral\ oil,\ MOS=mineral\ oil\ plus\ surfactant,\ MSO=methylated\ seed\ oil,\ NIS=non-ionic\ surfactant.$

NIS products might indicate a specific concentration (i.e. NIS 1000); refer to adjuvant chart for example products.

Read the label before using a product.

Charlock	Chickpea – volunteer	Cleavers	Corn gromwell	Deadnettle	Dock	Erodium (stork's bill)	Faba bean – volunteer	Field pea – volunteer	Fleabane	Fumitory	Lentil – volunteer	Lupin – volunteer	Marshmallow	Comments
Ensure	you hav	e an IWI	M plan i	n place. I	lt is reco	mmend	ed to ge	et your v	veeds te	ested for	resistar	nce – cor	nsult yo	ur advisor for localised information.
														Adjuvant: MSO, MO, MOS 0.5%.
_	_	-	40	40	-	40 (S)	-	40 (S)	-	40	_	_	_	*Single gene IMI wheat only. Add MCPA LVE to enhance control. Adjuvant: MSO 0.5%.
0.5- 1.25	_	_	-	_	0.98– 1.25	1.25	-	_	1.5	0.5–1.5	-	0.715– 1.5	-	
0.41	_	_	0.8	0.8	-	0.8	_	_	-	0.8	-	0.41- 0.8	_	
_	_	85- 100*	85– 100	_	-	85– 100	85*	85*	-	85	85*	85*	65– 100	Add minimum of 330 mL/ha MCPA 750. *Add dicamba.
25	-	-	_	25 (S)*	-	-	-	-	-	-	-	25	15/25*	*Apply with a partner herbicide; refer label. Adjuvant: W MOS 0.5% or NIS 0.2%, B NIS 0.2%.
_	_	_	_	_	_	_	_	_	-	_	-	_	_	Add MCPA LVE.
0.66	_	-	_	1.45	-	_	-	-	-	0.93	-	-	_	Application rate increases with crop growth and weed size; refer label.
0.44- 1.4	_	_	_	0.44- 0.6*	-	_	-	_	_	0.44– 0.6* or 0.965	-	_	_	*Add Frequency®. Application rate increases with crop growth and weed size; refer label.
-	25*	-	_	25	-	-	25*	25*	25*	25	25*	25*	25	*Add MCPA LVE. Rate of mix partner changes with crop growth stage; refer label.
-	25 or 25*	-	_	25	-	-	-	-	-	25	-	-	25	*Add 0.8–1.2 L/ha 2,4-D amine 720. Adjuvant: W, T = MOS 0.5%, B = NIS 0.2%.
-	0.4	-	-	0.2-0.3	-	-	-	-	0.3	0.3	-	-	0.3	Adjuvant: MOS 0.5%.

Table 19. Herbicides for weed control for wheat and barley – late post-emergence – page 2 of 2.

Note: example trade names shown. Others may be available at different concentrations. See labels for details.	Herbicide group	Crop growth (Zadoks)	Unit of use	Boom water rate (L/ha)	Medics	Mexican poppy	Mintweed	Mustards	New Zealand spinach	Paterson's curse	Peppercress	Prickly lettuce	Rough poppy	Shepherd's purse
Grass and broadleaf control	produ	ıcts												
Sentry® (imazapic 525 + imazapyr 175) Wheat only*	2	14–37	g/ha	>70	40 (S)	_	40 (S)	20-40	-	40	_	40 (S)	_	20–40
Broadleaf control products														
2,4-D amine 700 g/L	4	31–43	L/ha	50- 250	_	1.25	0.8-0.9	0.5- 1.25	0.98- 1.5	-	-	-	0.98	0.98- 1.5
2,4-D LV ester 680	4	31–37	L/ha	30- 100	_	0.8	0.8	0.41- 0.8	0.8	0.8	_	-	0.8	0.8
Affinity® Force (carfentrazone 240)	14	>13	mL/ ha	50- 150	_	-	-	85- 100	-	65– 100	-	85	85	85
Broadstrike® (flumetsulam 800)	2	61–83	g/ha	50- 150	_	_	-	25	-	25 (S) or 25*	25 (S) or 25*	-	_	25
Lontrel® Advanced (clopyralid 600)	4	13–45	L/ha	50- 100	_	_	_	-	-	_	_	75	_	-
MCPA amine 750	4	15–37	L/ha	30– 120	_	-	1.35	0.66	-	0.66- 0.96	_	-	0.46- 0.96	-
MCPA LVE 570	4	15–39	L/ha	30- 120	_	_	_	0.49- 0.88	-	1.49	_	-	_	0.44- 0.6*
Paradigm® (florasulam 200 +		13–37	,	80-	25*	25	-	25*	-	_	_	25*	_	25*
halauxifen 200)	2+4	31–43* or 31–49	g/ha	100	_	25	_	_	_	_	_	_	_	-
Pixxaro® (fluroxypyr 250 + halauxifen 6.25)	4	13–39	L/ha	>80	0.3	0.2-0.3	_	_	-	_	_	0.4	_	-

 $\label{eq:Key:IMI} \textit{Key: IMI} = \textit{imidazoline tolerant varieties}, \textit{NR} = \textit{not required}, \textit{(S)} = \textit{suppression only}.$

 $Adjuvant\ key:\ MO=mineral\ oil,\ MOS=mineral\ oil\ plus\ surfactant,\ MSO=methylated\ seed\ oil,\ NIS=non-ionic\ surfactant.$ NIS products might indicate a specific concentration (i.e. NIS 1000); refer to adjuvant chart for example products.

Read the label before using a product.

Skeleton weed	Sorrel	Sowthistle	Spiny emex	Thistle – saffron	Thistle – slender	Thistle – spear/ black	Thistle – variegated	Toad rush	Vetch	Wild radish	Wild turnip	Wireweed	Comments
-	-	40 (S)	40	40 (S)	-	40	40	-	40 (S)	20–40	40	40	*Single gene IMI wheat only. Add MCPA LVE to enhance control. Adjuvant: MSO 0.5%.
0.98– 1.5	1.25– 1.5	1.25- 1.5	1.25	0.5–1.5	0.715– 1.5	0.5- 1.45	0.5–1.5	-	0.98– 1.25	0.715– 1.5	0.5– 1.25	1.25	
0.8	_	-	-	0.41- 0.8	0.8	0.8	0.8	-	_	0.41- 0.8	0.41- 0.8	0.8	
_	-	85	85	_	-	-	-	85– 100	85*	100	85	85	Add minimum of 330 mL/ha MCPA 750. *Add dicamba.
-	-	-	25*	-	-	-	-	-	_	15* or 25 (S)	15–25	-	*Apply with a partner herbicide; refer label. Adjuvant: W MOS 0.5% or NIS 0.2%, B NIS 0.2%.
-	-	-	-	25	25	25	25	-	40	_	-	-	Add MCPA LVE.
0.96– 1.35	_	-	-	0.66- 1.35	0.66- 1.35	0.96- 1.35	0.66– 1.35	-	_	0.66	0.66	-	Application rate increases with crop growth and weed size; refer label.
0.965– 1.4	_	0.44- 0.6*	-	0.965– 1.7	1.8	-	0.74- 0.96	-	_	0.44- 0.6* or 0.965- 1.4	0.44– 0.6* or 0.615– 0.965	0.44- 0.66*	*Add Frequency®. Application rate increases with crop growth and weed size; refer label.
-	-	25*	25*	_	-	-	-	25 (S)	25*	25*	25*	_	*Add MCPA LVE. Rate of mix partner changes with crop growth stage; refer label.
-	-	-	-	-	-	-	-	25 (S)	-	25 or 25*	-	_	*Add 0.8–1.2 L/ha 2,4-D amine 720. Adjuvant: W, T = MOS 0.5%, B = NIS 0.2%.
_	_	0.4	-	_	-	-	_	-	_	_	_	_	Adjuvant: MOS 0.5%.

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Table 20. Herbicides for weed control for oats – early post-emergence – page 1 of 4.

Note: example trade names shown. Others may be available at different concentrations. See labels for details.	Herbicide group	Crop growth (Zadoks)	Unit of use	Boom water rate (L/ha)	Annual ryegrass	Amsinckia	Bedstraw	Black bindweed	Canola – volunteer	Capeweed	Charlock	Chickpea – volunteer	Cleavers	Corn gromwell
Grass and broadleaf contro	l prod	ucts												
Chlorsulfuron 750	2	12-23	g/ha	>30	15–25	15	_	20	_	_	15	-	_	20
Broadleaf control products														
Affinity® Force (carfentrazone 240)	14	>13	mL/ha	50–150		_	_	85	85–100	85	-	-	85– 100*	85–100
Agtryne® MA (terbutryn 275 + MCPA 160)	4+5	13–15	L/ha	50–100		1.0	_	_	_	1.0	1.0	-	-	1.0
Aptitude® (metribuzin 375 + carfentrazone-ethyl 90)	5 + 14	13–25	g/ha	50–150		_	200	_	_	200	-	-	_	_
Broadside® (bromoxynil 140 + MCPA 280 + dicamba 40)	6+4	13–30*	L/ha	>50		0.75- 1.0	-	1.0–1.4	1.4	0.75- 1.0	-	-	-	1.0-1.4
Broadstrike® (flumetsulam 800)	2	21–31	g/ha	50–150		25	25	_	25	25*	25	-	_	_
Bromicide® (bromoxynil 200)	6	13–30	L/ha	50-200		1.4	2.1	2.1	-	1.4	1.4	-	_	1.4
Bronco® MA-X (bromoxynil 280 + MCPA 280)	6+4	13–30	L/ha	50-200		1.0- 1.43	-	1.0- 1.43	-	1.0- 1.43	1.0- 1.43	-	0.54	1.0- 1.43
Buttress® (2,4-DB 500)	4	15–33	L/ha	>80		_	_	_	_	2.1–3.2	2.1–3.2	-	_	_
Condor® (MCPA 375 + pyraflufen-ethyl 10)	4	4+14	L/ha	12–29		_	0.8–1.6	_	0.8–1.6	0.8–1.6	-	-	_	_
Diuron® 900	5	12–22	kg/ha	40–70		0.5	_	_	_	0.5	0.5	-	_	_
Ecopar® (pyraflufen-ethyl 20)	14	12–29	L/ha	70–150		_	0.4-0.8	_	0.4-0.8	0.4-0.8	-	-	-	-
Enforcer® 242 (picloram 26 + MCPA 420)	4	22–30	L/ha	>50		_	_	1.0	_	_	-	-	-	-
FallowBoss® Tordon® (2,4-D amine 300 + picloram 75 + aminopyralid 7.5)	4	14–31	L/ha	50–100		_	-	0.3	_	_	-	-	_	-
Flight® EC (picolinafen 35 + bromoxynil 210 + MCPA 350)	6+ 12 +4	13–28	L/ha	50–150		-	-	-	0.36	0.36- 0.72	0.36- 0.72	-	-	0.72
Grindstone®	A	12.24	ma 1 /1	FO 100		_	-	20-32	_	_	-	32	_	-
(aminopyralid 240)	4	13–31	mL/ha	50–100		_	_	_	_	_	_	-	_	_
Hotshot® (aminopyralid 10 + fluroxypyr 140) Northern NSW only	4	13–31	L/ha	>80		_	_	0.5- 0.75	_	_	-	0.75	_	-

Deadnettle	Dock	Erodium (stork's bill)	Faba bean – volunteer	Field pea – volunteer	Fleabane	Fumitory	Lentil – volunteer	Lupin – volunteer	Marshmallow	Medics	Mexican poppy	Mintweed	Comments
15 or 20	_	-	_	_	_	20	-	_	-	-	-	20	Rate, plant backs and crop safety are heavily influenced by soil pH; refer label.
-	_	85–100	85*	85*	_	85	85*	85*	65–100	_	-	_	Add minimum of 330 mL/ha MCPA 750. *Add dicamba.
1.5	_	_	-	-	-	1.0	-	_	-	-	-	-	Not suitable for some varieties; refer label.
-	-	-	-	_	_	200	-	-	200	-	-	-	MCPA amine can be added for improved control. Do not use MCPA LVE or any other ester formulations; refer label.
-	0.75- 1.0	-	-	-	_	1.0–1.4	-	_	-	-	-	-	*Rate increases with crop growth; refer label.
25 (S)*	-	-	-	-	-	-	-	25	15/25*	-	-	-	*Apply with a partner herbicide; refer label. Adjuvant: NIS 0.2%. Transient yellowing can occur.
_	_	_	-	_	_	2.1	-	_	-	-	1.4	1.4	Add 2,4-D amine or MCPA LVE; refer label.
_	_	-	-	-	_	1.0- 1.43	-	_	-	-	1.0- 1.43	1.0- 1.43	Application rate increases with crop growth and weed size; refer label. Do not spray if temperature is >20 °C.
-	2.1–3.2	_	-	_	_	2.1-3.2	-	_	2.1–3.2	-	2.1-3.2	-	
_	_	0.8–1.6	_	_	_	-	_	0.8–1.6	0.8–1.6	-	-	-	Adjuvant: NIS 0.1%; some phytotoxicity might occur.
0.5	_	_	-	_	_	_	-	_	-	-	_	-	
-	_	0.4-0.8	-	_	_	_	_	0.4-0.8	-	_	-	_	400 mL/ha is the maximum rate at Z12. Add MCPA amine 750.
_	_	-	-	-	-	-	-	_	-	-	-	-	
_	0.3	_	_	_	0.3	_	_	_	-	_	-	0.3*	Northern NSW only. *Add 2,4-D amine. Adjuvant: NIS 1000.
0.72 (S)	_	-	-	_	_	0.54- 0.72 (S)	-	0.72 (S)	-	-	-	-	Rates increase with weed size and crop growth stage; refer label.
_	-	-	32	32	32	-	-	-	-	-	-	-	Northern NSW only. Must have a mix partner. Crop growth stage and rate are determined by mix partner; refer label.
-	_	_	20	20	_	_	-	20	_	-	_	-	Southern NSW only. Add fluroxypyr; refer label.
_	_	-	0.75	0.75	0.75*	-	-	_	-	-	-	-	*Add a mix partner; refer label. Add MCPA LVE; refer label.

Table 20. Herbicides for weed control for oats – early post-emergence – page 2 of 4.

Note: example trade names shown. Others may be available at different concentrations. See labels for details.	Herbicide group	Crop growth (Zadoks)	Unit of use	Boom water rate (L/ha)	Annual ryegrass	Amsinckia	Bedstraw	Black bindweed	Canola – volunteer	Capeweed	Charlock	Chickpea – volunteer	Cleavers	Corn gromwell
Igran® Flowable (terbutryn 500)	5	13–21	L/ha	50–100		0.55- 0.85	_	0.44*	_	0.55- 0.85	0.55– 0.85*	-	_	0.55- 0.85
Kamba® 750 (dicamba 750)	4	15–30	mL/ha	>50		_	-	185	-	105* or 185^	105* or 185^	-	_	_
Kamba® M (MCPA 340 + dicamba 80)	4	21–30	L/ha	>50		_	_	1.7	_	1.0–1.7	1.0–1.7	-	_	_
Legacy® MA (diflufenican 25 + MCPA 250)	4 + 12	13–30	L/ha	>50		_	-	-	0.5	0.5–1.0	0.5–1.0	-	-	1.0
Lontrel® Advanced (clopyralid 600)	4	13–30	mL/ha	50–100		_	_	_	_	50–150	-	50	_	_
MCPA amine 750	4	12–39	L/ha	30–120		_	_	0.97- 1.35	0.6- 0.96	1.45	0.6	-	_	_
MCPA LVE 570	4	13–37	L/ha	30–120		_	-	-	1.3	_	0.44– 1.4	-	_	_
Paradigm® (florasulam 200 + halauxifen 200)	2+4	13–39	g/ha	80–100		_	25*	-	25*	25*(S)	-	25*	_	_
Pixxaro® (fluroxypyr 250 + halauxifen 16.25)	4	13–39	L/ha	>80		_	0.4	0.4-0.6	-	_	-	0.4	_	_
Precept® (MCPA 125 + pyrasulfotole 25)	4 + 27	13–31	L/ha	50–100		1.5–2.0	1.5-2.0	_	1.0-2.0	1.0*	-	1.0*	_	1.0-2.0
Quadrant® (MCPA ester 250 + bromoxynil 240 + diflufenican 20 + picolinafen 10)	4+6 +12	13-28	L/ha	50–100		0.8–1.0	0.8–1.0	1.0-1.2	0.6	0.6–1.2	0.6-1.2	-	0.8–1.0	0.8-1.0
Starane® Advanced (fluroxypyr 333)	4	13–39	L/ha	>50		_	0.3	0.3 (S) or * or 0.45	-	-	-	-	0.6	-
Trezac® (aminopyralid 25 + halauxifen 30 + cloquintocet-mexyl 30)	4	13–31	L/ha	>80		-	200*	200*	-	-	-	200	-	-
Triasulfuron 750	2	13–22	g/ha	30–100		_	-	10^	-	-	-	-	_	_
Triathlon® (MCPA 250 + bromoxynil 150 + diflufenican 25)	4 + 6 + 12	13–30	L/ha	50–100		_	-	_	0.5	0.5–1.0	_	-	0.5–1.0	1.0

Deadnettle	Dock	Erodium (stork's bill)	Faba bean – volunteer	Field pea – volunteer	Fleabane	Fumitory	Lentil – volunteer	Lupin – volunteer	Marshmallow	Medics	Mexican poppy	Mintweed	Comments
0.44- 0.6*	-	-	0.44*	0.44*	-	0.55- 0.85	-	-	-	0.44*	0.44- 0.6*	-	Not suitable for some varieties; refer label. *Add Triasulfuron 750. ^Add MCPA or 2,4-D amine.
-	185 or 105*	-	-	-	-	-	-	-	-	_	_	185*	*Add MCPA amine. ^Add MCPA or 2,4-D amine.
-	1.0–1.7	-	-	-	-	-	-	_	-	_	_	1.7	
1.0	1.0 (S)	1.0 (S)	-	-	_	0.75	-	1.0 (S)	-	_	_	-	Application rate increases with crop growth and weed size; refer label. Add MCPA for radish control.
-	_	-	50	40-50	-	-	-	50	-	50	_	-	Rates and timing are determined by weed size and mix partner. There are many mix partners; refer label.
1.45	_	-	-	-	_	0.93	-	-	-	_	_	1.35	Application rate increases with crop growth and weed size; refer label.
-	_	-	-	-	-	0.965	-	_	-	_	_	-	Application rate increases with crop growth and weed size; refer label.
26	_	-	25*	25*	25*	25	25*	25*	25	25*	26	-	*Add MCPA LVE. Rate of mix partner changes with crop growth stage; refer label. Adjuvant; refer label.
0.2-0.3	_	-	-	-	0.3	0.3	-	-	0.3	0.3	0.2-0.3	-	Adjuvant: MOS 0.5%.
1.5–2.0	_	-	1.0*	1.0-2.0 or 1.0*	-	1.0-2.0	1.0*	1.0-2.0	-	2.0 or 1.0*	_	-	*Add clopyralid for control. Adjuvant: AMS, MSO 0.5–1%, MOS 0.5–0.75%.
0.8–1.0	1.0 (S)	-	-	_	-	0.8–1.2	-	1.0 (S)	1.0 (S)	_	0.8–1.0	0.8–1.0	Rate is dictated by weed size; refer label. Transient yellowing might occur. Temperature >20 °C can increase effects.
0.9	_	-	-	_	_	-	-	0.9	-	_	_	-	Adjuvant: weed specific; refer label. *Add Logran.
200	_	-	200	200	200	200	-	-	200*	200	200	-	*Add fluroxypyr. ^Add fluroxypyr + MCPA LVE. Adjuvant: MOS 0.5%.
10–13^	-	-	10^	10^	-	-	-	-	-	10^	10–13^	-	*Add MO 1%. ^Add terbutryn.
1.0	1.0 (S)	1.0 (S)	-	-	-	0.75	-	1.0 (S)	1.0 (S)	_	_	-	Transient yellowing might occur.

 $\label{eq:Key:IMI} \textit{Key: IMI} = \textit{imidazoline tolerant varieties}, \textit{NR} = \textit{not required}, \textit{(S)} = \textit{suppression only}.$

 $Adjuvant\ key:\ MO=mineral\ oil,\ MOS=mineral\ oil\ plus\ surfactant,\ MSO=methylated\ seed\ oil,\ NIS=non-ionic\ surfactant.$

NIS products might indicate a specific concentration (i.e. NIS 1000); refer to adjuvant chart for example products.

Table 20. Herbicides for weed control for oats – early post-emergence – page 3 of 4.

Note: example trade names shown. Others may be available at different concentrations. See labels for details.	Herbicide group	Crop growth (Zadoks)	Unit of use	Boom water rate (L/ha)	Mustards	New Zealand spinach	Paterson's curse	Peppercress	Prickly lettuce	Rough poppy	Shepherd's purse	Skeleton weed	Sorrel
Grass and broadleaf control p	produ	cts											
Chlorsulfuron 750	2	12-23	g/ha	>30	15	-	15	-	-	20	20	-	-
Broadleaf control products													
Affinity® Force (carfentrazone 240)	14	>13	mL/ha	50–150	85–100	-	65–100	-	85	85	85	-	-
Agtryne® MA (terbutryn 275 + MCPA 160)	4 + 5	13–15	L/ha	50–100	1.0–1.5	-	1.0	-	_	1.0	_	-	-
Aptitude® (metribuzin 375 + carfentrazone-ethyl 90)	5 + 14	13–25	g/ha	50–150	200	-	_	-	200	-	200	-	-
Broadside® (bromoxynil 140 + MCPA 280 + dicamba 40)	6+4	13–30*	L/ha	>50	0.75– 1.0	-	-	-	_	-	_	-	-
Broadstrike® (flumetsulam 800)	2	21–31	g/ha	50–150	25	-	25 (S) or*	25 or 25*	_	-	25	-	-
Bromicide® (bromoxynil 200)	6	13–30	L/ha	50–200	1.4	-	1.4–2.1	1.4	_	1.4	1.4-2.1	-	2.1
Bronco® MA-X (bromoxynil 280 + MCPA 280)	6+4	13–30	L/ha	50–200	1.0- 1.43	-	1.0- 1.43	1.0- 1.43	_	1.0- 1.43	1.0- 1.43	-	-
Buttress® (2,4-DB 500)	4	15–33	L/ha	>80	2.1-3.2	-	2.1-3.2	-	2.1-3.2	-	2.1-3.2	-	-
Condor® (MCPA 375 + pyraflufen-ethyl 10)	4	4+14	12–29	L/ha	0.8–1.6	-	-	-	0.8–1.6	-	_	-	-
Diuron® 900	5	12-22	40-70	kg/ha	0.5	-	-	-	_	-	_	-	-
Ecopar® (pyraflufen-ethyl 20)	14	12–29	L/ha	70–150	0.4-0.8	-	_	-	0.4-0.8	-	_	-	-
Enforcer® 242 (picloram 26 + MCPA 420)	4	22–30	L/ha	>50	1.0	1.0 (S)	-	_	-	-	-	1.0	-
FallowBoss® Tordon® (2,4-D amine 300 + picloram 75 + aminopyralid 7.5)	4	14–31	L/ha	50–100	0.3*	0.3	_	-	-	-	_	-	-
Flight® EC (picolinafen 35 + bromoxynil 210 + MCPA 350)	6+ 12 +4	13–28	L/ha	50–150	0.36- 0.72	-	_	-	0.3- 0.72	-	0.36- 0.72	-	-
Grindstone®	4	12 21	mal /l	E0 100	-	-	-	-	32	-	-	-	-
(aminopyralid 240)	4	13–31	mL/ha	50–100	-	-	-	-	_	-	-	-	-
Hotshot® (aminopyralid 10 + fluroxypyr 140) Northern NSW only	4	13–31	L/ha	>80	-	-	-	-	0.75	-	-	-	-

Soursob	Sowthistle	Spiny emex	Thistle – saffron	Thistle – slender	Thistle – spear/black	Thistle – variegated	Toad rush	Vetch	Wild radish	Wild turnip	Wireweed	Comments
												Rate, plant backs and crop safety are
20	_	_	-	-	-	_	-	-	15 or 20	15	20	heavily influenced by soil pH; refer label.
-	85	85	-	-	-	-	85–100	85*	100	85	85	Add minimum of 330 mL/ha MCPA 750. *Add dicamba.
_	-	1.5	1.5	-	_	_	1.5	-	_	1.0	1.5	Not suitable for some varieties; refer label.
-	_	-	-	-	-	-	200	-	200	200	-	MCPA amine can be added for improved control. Do not use MCPA LVE or any other ester formulations; refer label.
_	_	0.75– 1.0	-	-	_	_	-	-	0.75– 1.0	_	0.75– 1.0	*Rate increases with crop growth; refer label.
-	-	25*	-	-	-	-	-	-	15* or 25 (S)	15–25	-	*Apply with a partner herbicide; refer label. Adjuvant: NIS 0.2%. Transient yellowing can occur.
_	-	1.4	1.4	1.4	_	1.4–2.1	-	-	1.4	1.4	1.4	Add 2,4-D amine or MCPA LVE; refer label.
-	1.0–1.5	1.0- 1.43	1.0- 1.43	1.0- 1.43	-	1.0- 1.43	-	-	1.0- 1.43	1.0- 1.43	1.0- 1.43	Application rate increases with crop growth and weed size; refer label. Do not spray if temperature is >20 °C.
_	2.1-3.2	2.1-3.2	2.1-3.2	2.1-3.2	2.1–3.2	2.1–3.2	-	-	_	2.1–3.2	2.1–3.2	
_	_	_	-	-	_	_	-	-	0.8–1.6	0.8–1.6	-	Adjuvant: NIS 0.1%; some phytotoxicity might occur.
_	_	0.5	0.5	-	_	_	-	-	0.5	0.5	-	
_	_	_	-	-	_	_	-		0.3	0.4-0.8	_	400 mL/ha is the maximum rate at Z12. Add MCPA amine 750.
_	1.0	1.0	1.0	-	_	1.0	-	-	1.0	1.0	1.0 (S)	
-	0.3	0.3	0.3	-	-	0.3*	-	-	0.3*	0.3*	0.3* (S)	Northern NSW only. *Add 2,4-D amine. Adjuvant: NIS 1000.
_	0.72 (S)	0.72 (S)	0.72	-	_	_	0.72	-	0.36– 0.72	0.36- 0.72	-	Rates increase with weed size and crop growth stage; refer label.
-	20–32	20-32	-	-	-	-	-	32	-	-	-	Northern NSW only. Must have a mix partner. Crop growth stage and rate are determined by mix partner; refer label.
_	_	_	-	-	_	_	-	20	_	_	-	Southern NSW only. Add fluroxypyr; refer label.
-	0.5- 0.75*	0.5- 0.75*	-	-	-	0.5- 0.75*	-	0.75	-	-	-	*Add a mix partner; refer label. Add MCPA LVE; refer label.

Table 20. Herbicides for weed control for oats – early post-emergence – page 4 of 4.

Note: example trade names shown. Others may be available at different concentrations. See labels for details.	Herbicide group	Crop growth (Zadoks)	Unit of use	Boom water rate (L/ha)	Mustards	New Zealand spinach	Paterson's curse	Peppercress	Prickly lettuce	Rough poppy	Shepherd's purse	Skeleton weed	Sorrel
lgran® Flowable (terbutryn 500)	5	13–21	L/ha	50–100	0.33- 0.44* or 0.55- 0.85^	-	0.55- 0.85	_	_	_	0.44*	-	-
Kamba® 750 (dicamba 750)	4	15–30	mL/ha	>50	105* or 185^	185	-	_	_	_	-	-	185^
Kamba® M (MCPA 340 + dicamba 80)	4	21–30	L/ha	>50	1.0-1.7	1.7	_	_	_	-	-	-	1.0-1.7
Legacy® MA (diflufenican 25 + MCPA 250)	4 + 12	13–30	L/ha	>50	0.5–1.0	-	1.0 (S)	1.0 (S)	0.5–1.0	1.0 (S)	0.5-1.0	1.0 (S)	_
Lontrel® Advanced (clopyralid 600)	4	13–30	mL/ha	50–100	-	-	-	-	50-75*	-	-	250*	-
MCPA amine 750	4	12–39	L/ha	30–120	0.6	-	0.6- 0.96	_	_	0.46- 0.96	-	0.96- 1.35	_
MCPA LVE 570	4	13–37	L/ha	30–120	0.49- 0.88	-	_	_	_	_	-	0.965- 1.4	-
Paradigm® (florasulam 200 + halauxifen 200)	2+4	13–39	g/ha	80–100	25*	-	-	-	25*	-	25*	-	_
Pixxaro® (fluroxypyr 250 + halauxifen 16.25)	4	13–39	L/ha	>80	-	-	-	_	0.4	-	-	-	_
Precept® (MCPA 125 + pyrasulfotole 25)	4 + 27	13–31	L/ha	50–100	1.0-2.0	-	1.0-2.0	_	1.0-2.0	-	-	-	_
Quadrant® (MCPA ester 250 + bromoxynil 240 + diflufenican 20 + picolinafen 10)	4 + 6 + 12	13–28	L/ha	50–100	0.6–1.2	-	0.8–1.2	1.2	0.6–1.2	0.8–1.2	0.6–1.2	1.0 (S)	0.8–1.0
Starane® Advanced (fluroxypyr 333)	4	13–39	L/ha	>50	-	_	_	_	0.3	-	-	_	_
Trezac® (aminopyralid 25 + halauxifen 30 + cloquintocet-mexyl 30)	4	13–31	L/ha	>80	-	-	-	_	200*	-	-	-	-
Triasulfuron 750	2	13-22	g/ha	30–100	6.5– 10^	-	_	_	_	_	10^	-	-
Triathlon® (MCPA 250 + bromoxynil 150 + diflufenican 25)	4 + 6 + 12	13–30	L/ha	50–100	0.5–1.0	-	1.0 (S)	1.0 (S)	0.5–1.0	1.0 (S)	0.5–1.0	1.0 (S)	-

Key: IMI = imidazoline tolerant varieties, NR = not required, (S) = suppression only.

Adjuvant key: MO = mineral oil, MOS = mineral oil plus surfactant, MSO = methylated seed oil, NIS = non-ionic surfactant.

NIS products might indicate a specific concentration (i.e. NIS 1000); refer to adjuvant chart for example products.

Read the label before using a product.

Soursob	Sowthistle	Spiny emex	Thistle – saffron	Thistle – slender	Thistle – spear/black	Thistle – variegated	Toad rush	Vetch	Wild radish	Wild turnip	Wireweed	Comments
_	_	0.55- 0.85*	-	_	-	-	0.55- 0.85	0.6*	0.44- 0.6*	0.33- 0.44* or 0.55- 0.85^	_	Not suitable for some varieties; refer label. *Add Triasulfuron 750. ^Add MCPA or 2,4-D.
_	_	185 or 105*	185^	-	-	-	_	185 or 105*	105*	185^ or105*	185 or 105*	*Add MCPA amine. ^Add MCPA or 2,4-D amine.
_	_	1.0–1.7	1.7	-	-	1.7	-	1.0–1.7	1.0–1.7	1.0–1.7	1.0–1.7	
_	1.0 (S)	1.0 (S)	1.0	-	-	1.0 (S)	1.0	1.0 (S)	0.5–1.0	0.5–1.0	0.75 (S)	Application rate increases with crop growth and weed size; refer label. Add MCPA for radish control.
_	50	-	25*	25*	25*	25*	-	40-50	_	_	-	Rates and timing are determined by weed size and mix partner. *There are many mix partners; refer label.
_	_	-	0.6- 1.35	0.6- 1.35	0.96- 1.35	0.6- 1.35	-	-	0.6	0.6	_	Application rate increases with crop growth and weed size; refer label.
_	_	-	0.95- 1.4	-	-	0.74- 0.96	-	-	0.965– 1.4	0.615- 0.965	-	Application rate increases with crop growth and weed size; refer label.
-	25*	25*	-	-	-	-	25 (S)	25*	25*	25*	-	*Add MCPA LVE. Rate of mix partner changes with crop growth stage; refer label. Adjuvant; refer label.
_	0.4	-	_	-	-	-	_	-	_	_	_	Adjuvant: MOS 0.5%.
_	1.0-2.0	1.5-2.0 (S)	_	-	-	-	-	1.0*	1.0-2.0	1.0-2.0	1.0-2.0	*Add clopyralid for control. Adjuvant: AMS, MSO 0.5–1%, MOS 0.5–0.75%.
-	1.2	0.8-1.2	0.8-1.0	0.8-1.0	-	1.2	0.8–1.0	1.0 (S)	0.6-1.2	0.6-1.2	0.8-1.2	Rate is dictated by weed size; refer label. Transient yellowing might occur. Temperature >20 °C can increase effects.
_	0.6	0.9	_	-	-	-	_	-	_	_	_	Adjuvant: weed specific; refer label.
-	200^	200^	-	-	-	200^	-	200	-	-	-	*Add fluroxypyr. ^Add fluroxypyr + MCPA LVE. Adjuvant: MOS 0.5%.
-	-	-	-	-	-	-	_	-	10–15* or^	6.5^	_	*Add MO 1%. ^Add terbutryn.
_	1.0 (S)	1.0 (S)	1.0	-	-	1.0 (S)	1.0	1.0 (S)	0.5–1.0	0.5–1.0	0.75 (S)	Transient yellowing might occur.

Table 21. Herbicides for weed control for oats – late post-emergence – page 1 of 2.

Note: example trade names shown. Others may be available at different concentrations. See labels for details.	Herbicide group	Crop growth (Zadoks)	Unit of use	Boom water rate (L/ha)	Amsinckia	Bedstraw	Black bindweed	Canola – volunteer	Capeweed	Charlock	Chickpea – volunteer	Cleavers	Corn gromwell	Deadnettle	Dock	Erodium (stork's bill)	Faba bean – volunteer	Field pea – volunteer	Fleabane	Fumitory
Broadleaf control p	orodi	ucts																		
2,4-D amine 700	4	30–37	L/ha	50- 250	0.98	-	0.98	-	0.98– 1.15	0.5- 1.15	-	-	-	_	0.98- 1.15	1.15	-	-	1.15	0.5– 1.15
Affinity® Force (carfentrazone 240)	14	>13	mL/ha	50- 150	-	-	85	85– 100	85	-	-	85- 100*	85– 100	-	-	85– 100	85*	85*	-	85
Broadstrike® (flumetsulam 800)	2	61–83	g/ha	50- 150	25	25	_	25	25*	25	-	-	_	25 (S)*	-	-	-	-	_	-
Lontrel® Advanced (clopyralid 600)	4	13–45	L/ha	50- 100	-	-	-	-	_	-	-	-	-	-	-	-	-	-	-	_
MCPA amine 750	4	30–37	L/ha	30- 120	_	-	0.97– 1.35	0.66– 0.96	1.45	0.66	-	-	-	1.45	-	-	-	-	-	0.93
MCPA LVE 570	4	15–37	L/ha	30- 120	_	-	_	1.3	-	0.44– 1.4	-	-	-	0.44- 0.6*	-	-	-	-	-	0.44- 0.6* or 0.965
Paradigm® (florasulam 200 + halauxifen 200)	2 + 4	13–39	g/ha	80- 100	_	25*	_	25*	25*(S)	-	25*	-	-	25	-	-	25*	25*	25*	25
Pixxaro® (fluroxypyr 250 + halauxifen 16.25)	4	13–39	L/ha	>80	-	0.4	0.4- 0.6	-	-	-	0.4	-	-	0.2- 0.3	-	-	-	-	0.3	0.3

 $\label{eq:Key:IMI} \textit{Key: IMI} = \textit{imidazoline tolerant varieties}, \ \textit{NR} = \textit{not required}, \ \textit{(S)} = \textit{suppression only}.$

Adjuvant key: MO = mineral oil, MOS = mineral oil plus surfactant, MSO = methylated seed oil, NIS = non-ionic surfactant.

NIS products might indicate a specific concentration (i.e. NIS 1000); refer to adjuvant chart for example products.

Read the label before using a product.

Lentil – volunteer	Lupin – volunteer	Marshmallow	Medics	Mexican poppy	Mintweed	Mustards	New Zealand spinach	Paterson's curse	Peppercress	Prickly lettuce	Rough poppy	Shepherd's purse	Skeleton weed	Sorrel	Sowthistle	Spiny emex	Comments
											I						
_	0.715- 1.15	_	-	1.15	0.8- 0.9	0.5– 1.15	0.98- 1.15	_	-	-	0.98	0.98– 1.15	0.98- 1.15	1.15	1.15	1.15	
85*	85*	65– 100	-	_	-	85- 100	-	65– 100	-	85	85	85	-	-	85	85	Add minimum of 330 mL/ha MCPA 750. *Add dicamba.
-	25	15/25*	-	-	-	25	-	25 (S) or*	25 (S) or*	-	-	25	-	-	-	25*	*Apply with a partner herbicide; refer label. Adjuvant: MOS 0.5% or NIS 0.2%, NIS 0.2%.
-	-	-	-	-	-	-	-	-	-	75	_	_	-	-	-	_	Add MCPA LVE.
-	-	-	-	-	1.35	0.66	-	0.66- 0.96	-	-	0.46- 0.96	-	0.96- 1.35	-	-	-	Application rate increases with crop growth and weed size; refer label.
_	-	-	-	_	-	0.49- 0.88	-	-	-	-	_	0.44- 0.6*	0.965– 1.4	-	0.44- 0.6*	_	Application rate increases with crop growth and weed size; refer label.
25*	25*	25	25*	25	-	25*	-	-	-	25*	-	25*	-	-	25*	25*	*Add MCPA LVE. Rate of mix partner changes with crop growth stage; refer label.
_	-	0.3	0.3	0.2- 0.3	-	_	-	-	-	0.4	_	_	-	-	0.4	_	Adjuvant: MOS 0.5%.

Table 21. Herbicides for weed control for oats – late post-emergence – page 2 of 2. Read the label before using a product.

Note: example trade names shown. Others may be available at different concentrations. See labels for details.	Herbicide group	Crop growth (Zadoks)	Unit of use	Boom water rate (L/ha)	Thistle – saffron	Thistle – slender	Thistle – spear/ black	Thistle –variegated	Toad rush	Vetch	Wild radish	Wild turnip	Wireweed	Comments
Broadleaf control p	rodu	ucts												
2,4-D amine 700	4	30–37	L/ha	50– 250	0.5– 1.15	0.715– 1.15	0.5– 1.15	0.5– 1.15	_	0.98– 1.15	0.715– 1.15	0.5– 1.15	-	
Affinity® Force (carfentrazone 240)	14	>13	mL/ha	50- 150	_	_	_	_	85– 100	85*	100	85	85	Add minimum of 330 mL/ha MCPA 750. *Add dicamba.
Broadstrike® (flumetsulam 800)	2	61–83	g/ha	50- 150	_	-	_	_	_	_	15* or 25 (S)	15–25	-	*Apply with a partner herbicide; refer label. Adjuvant: W MOS 0.5% or NIS 0.2%, B NIS 0.2%.
Lontrel® Advanced (clopyralid 600)	4	13–45	L/ha	50- 100	25	25	25	25	_	40	_	-	-	Add MCPA LVE.
MCPA amine 750	4	30–37	L/ha	30– 120	0.6– 1.35	0.6- 1.35	0.96– 1.35	0.6- 1.35	_	_	0.6	0.6	-	Application rate increases with crop growth and weed size; refer label.
MCPA LVE 570	4	15–37	L/ha	30- 120	0.965– 1.4	_	_	0.74– 0.96	_	_	0.965– 1.4	0.615- 0.965	-	Application rate increases with crop growth and weed size; refer label.
Paradigm® (florasulam 200 + halauxifen 200)	2 + 4	13–39	g/ha	80– 100	_	-	_	_	26 (S)	25*	25*	25*	-	*Add MCPA LVE. Rate of mix partner changes with crop growth stage; refer label.
Pixxaro® (fluroxypyr 250 + halauxifen 16.25)	4	13–39	L/ha	>80	_	_	_	_	_	_	_	-	-	Adjuvant: MOS 0.5%.

Key: IMI = imidazoline tolerant varieties, NR = not required, (S) = suppression only.

Adjuvant key: MO = mineral oil, MOS = mineral oil plus surfactant, MSO = methylated seed oil, NIS = non-ionic surfactant. NIS products might indicate a specific concentration (i.e. NIS 1000); refer to adjuvant chart for example products.







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Table 22. Herbicides for weed control for cereal rye and triticale – early post-emergence – page 1 of 4.

Note: example trade names shown. Others may be available at different concentrations. See labels for details.	Herbicide group	Crop growth (Zadoks)	Unit of use	Boom water rate (L/ha)	Annual phalaris	Annual ryegrass	Barley grass	Brome grass	Vulpia/silver grass	Wild oats	Amsinckia	Bedstraw	Black bindweed	Canola – volunteer	Capeweed	Charlock
Grass control products. H not rely on these produc							os 1 and	d 2 sele	ctive h	erbicid	es are o	commo	n in mo	ost gras	ss weed	ls. Do
Achieve® WG (tralkoxydim 400)	1	12–22	g/ha	50- 150	380- 500 (S)	380- 500	-	-	_	300- 500						
Diclofop-methyl 375	1	12–21	L/ha	80	_	1.0	_	_	_	1.5–2						
Foxtrot® (fenoxyprop-p- ethyl 69 + cloquintocet- mexyl 34.5)	1	12-24	L/ha	50- 100	0.635- 0.8	-	_	_	-	0.475- 0.635						
Grass and broadleaf conti	rol pro	ducts														
Chlorsulfuron 750	2	T: 00, CR:>12	g/ha	>30	_	15-25	-	-	_	-	15	_	20	-	_	15
Rexade® (pyroxsulam 150 + halauxifen 50) Triticale only		13–31	g/ha	80- 100	100	100 (S)	100 (S)	100	100 (S)	100	-	100	100*	100	100*	_
Sulfosulfuron 750	2	11– 15/22	g/ha	40– 100	-	-	25 (S)	20 or 25 (S)	25	25 (S)	25	_	-	20	-	_
Broadleaf control product	ts															
Affinity® Force (carfentrazone 240)	14	>13	mL/ha	50- 150							-	_	85	85- 100	85	_
Associate® (metsulfuron- methyl 600)	2	13–37	g/ha	>50							5 or 7	_	-	-	_	5
Broadside® (bromoxynil 140 + MCPA 280 + dicamba 40)	6+4	13–30*	L/ha	>50							0.75- 1.0	_	1–1.4	1.4	0.75- 1.0	_
Bromicide® (bromoxynil 200)	6	13–30	L/ha	50- 200							1.4	2.1	2.1	-	1.4	1.4
Bromoxynil 250 + diflufenican 25	6 + 12	12-29	L/ha	50- 100							0.75	1.0 (S)	0.5- 1.0	0.5– 0.75	0.5- 1.0	0.5- 0.75
Bronco® MA-X (bromoxynil 280 + MCPA 280)	6+4	13–30	L/ha	50- 200							1.0- 1.43	_	1.0- 1.43	-	1.0- 1.43	1.0- 1.43
Buttress® (2,4-DB 500)	4	15–33	L/ha	>80							_	_	-	_	2.1– 3.2	2.1- 3.2
Ecopar® (pyraflufen- ethyl 20)	14	12–29	L/ha	70– 150							_	0.4- 0.8	-	0.4– 0.8	0.4- 0.8	_
Enforcer® 242 (picloram 26 + MCPA 420) Triticale only	4	22–30	L/ha	>50							-	_	1.0	-	_	_
FallowBoss® Tordon® (2,4-D amine 300 + picloram 75 + aminopyralid 7.5)	4	14–31	L/ha	50- 100							_	_	0.3	-	-	_
Flight® EC (picolinafen 35 + bromoxynil 210 + MCPA 350)	6 + 12 + 4	13–28	L/ha	50- 150							-	_	-	0.36	0.36- 0.72	0.36- 0.72
Grindstone® (aminopyralid 240)	4	13–31	mL/ha	50- 100							_	_	20-32	-	_	_
											_	-	-	_	-	_

		=										
Chickpea – volunteer	Cleavers	Corn gromwell	Deadnettle	Dock	Erodium (stork's bill)	Faba bean – volunteer	Field pea – volunteer	Fleabane	Fumitory	Lentil – volunteer	Lupin – volunteer	Comments
Ensure y nforma		e an IWN	И plan ir	n place. I	t is reco	mmend	ed to ge	t your w	eeds tes	ted for	resistan	ce – consult your advisor for localised
												Rate is influenced by crop and weed size a application. Adjuvant: MOS 1%.
												Do not spray if temperature is >25 °C. Adjuvant: NIS 0.25%.
												Rate is influenced by crop and weed size a application.
-	-	20	15 or 20	_	-	-	_	_	20	-	_	Rate, plant backs and crop safety are heavily influenced by soil pH; refer label.
100	-	_	100	_	-	100	100	100* (S)	100	100	100 (S)	*Requires mix partner; refer label. Adjuvant: always use NIS 1000 0.25%.
-	-	_	_	_	-	-	20	-	-	-	_	Rate, plant backs and crop safety are heavily influenced by soil pH; refer label. Adjuvant MSO 1–2%.
-	85– 100*	85–100	_	_	85–100	85*	85*	_	85	85*	85*	Add minimum of 330 mL/ha MCPA 750. *Add dicamba.
5	-	_	5	5 or 7	-	-	7	-	5	-	5	Tank mix partners will broaden the weed spectrum; refer label.
-	-	1–1.4	_	0.75– 1.0	-	-	-	-	1–1.4	-	_	*Rate increases with crop growth; refer label.
-	-	1.4	_	-	-	-	-	-	2.1	-	-	Add 2,4-D amine or MCPA LVE; refer label
-	-	0.5- 0.75	0.5– 0.75	_	0.5- 0.75 (S)	-	0.75 (S)	-	0.75 (S)	-	0.5–1.0 (S)	*Add MCPA LVE. Can cause transient yellowing.
-	0.54	1.0- 1.43	_	_	-	-	_	-	1.0- 1.43	-	_	Application rate increases with crop growth and weed size; refer label. Do not spray if temperature is >20 °C.
-	-	_	_	2.1–3.2	-	-	_	-	2.1–3.2	-	-	
0.4*	-	-	0.4*	_	0.4-0.8	0.4*	_	-	0.4*	-	0.4-0.8	400 mL/ha is the maximum rate at Z12. Always add MCPA amine 750. *Add 5 g/ha metsulfuron-methyl 600.
-	_	_	_	_	-	_	_	-	-	-	_	
-	-	_	_	0.3	-	-	_	0.3	-	-	-	Northern NSW only. Adjuvant: NIS 1000. *Add 2,4-D amine.
-	-	0.72	0.72 (S)	_	-	-	_	-	0.54- 0.72 (S)	-	0.72 (S)	Rates increase with weed size and crop growth stage; refer label.
16–32	-	_	16-32	16 or 22	-	16-32	32	32	-	-	-	Northern NSW only. Must have a mix partner. Crop growth stage and rate are determined by mix partner; refer label.
-	-	_	_	_	-	20	20	-	-	-	20	Southern NSW only. Add fluroxypyr; refer label.

Table 22. Herbicides for weed control for cereal rye and triticale – early post-emergence – page 2 of 4.

	0					10										
Note: example trade names shown. Others may be available at different concentrations. See labels for details.	Herbicide group	Crop growth (Zadoks)	Unit of use	Boom water rate (L/ha)	Annual phalaris	Annual ryegrass	Barley grass	Brome grass	Vulpia/silver grass	Wild oats	Amsinckia	Bedstraw	Black bindweed	Canola – volunteer	Capeweed	Charlock
Hotshot® (aminopyralid 10 + fluroxypyr 140) Triticale only	4	13–31	L/ha	>80							_	_	0.5- 0.75	_	_	-
Igran® Flowable (terbutryn 500) Triticale only	5	13–21	L/ha	50- 100							0.55- 0.85	-	0.44*	-	0.55- 0.85	0.55- 0.85*
Kamba® 750 (dicamba 750)	4	15–30	mL/ha	>50							-	_	185	_	105* or 185^	105* or 185^
Kamba® M (MCPA 340 + dicamba 80)	4	21–30	L/ha	>50							-	-	1.7	-	1.0- 1.7	1.0- 1.7
Legacy® MA (diflufenican 25 + MCPA 250)	4 + 12	13–30	L/ha	>50							-	-	-	0.5	0.5- 1.0	0.5- 1.0
Lontrel® Advanced (clopyralid 600) Triticale only	4	13–30	mL/ha	50- 100							-	_	-	-	50- 150	-
MCPA amine 750	4	12–14	L/ha	30-							0.33	_	-	_	0.33	0.33
MCFA diffille 750	4	15–37	L/IIa	120							_	_	0.97– 1.35	0.66- 0.96	1.45	0.66
MCPA LVE 570	4	13–37	L/ha	30- 120							-	_	-	1.3	1.49	0.44– 1.4
Paradigm® (florasulam 200 + halauxifen 200)	2 . 4	13–37	a /h a	80-							_	25*	-	25*	25*(S)	-
Triticale only	2+4	31–43* or 31–49	g/ha	100							_	_	_	_	_	-
Pixxaro® (fluroxypyr 250 + halauxifen 16.25) Triticale only	4	13–39	L/ha	>80							_	0.4	0.4– 0.6	_	-	-
Precept® (MCPA 125 + pyrasulfotole 25)	4 + 27	13–31	L/ha	50- 100							1.5- 2.0	1.5- 2.0	-	1.0- 2.0	1.0*	_
Quadrant® (MCPA ester 250 + bromoxynil 240 + diflufenican 20 + picolinafen 10)	4+6 +12	13–28	L/ha	50- 100							0.8- 1.0	0.8- 1.0	1.0– 1.2	0.6	0.6– 1.2	0.6- 1.2
Starane® Advanced (fluroxypyr 333) Triticale only	4	13–39	L/ha	>50							_	0.3	0.3 (S) or * or 0.45	_	_	-
Trezac® (aminopyralid 25 + halauxifen 30 + cloquintocet-mexyl 30) Triticale only	4	13–31	mL/ha	>80							-	200*	200*	-	_	_
Triasulfuron 750 Triticale only	2	13–22	g/ha	30- 100							-	-	10^	-	-	_
Triathlon® (MCPA 250 + bromoxynil 150 + diflufenican 25)	4+6 +12	13–30	L/ha	50- 100							-	_	_	0.5	0.5- 1.0	0.5- 1.0
Velocity® (pyrasulfotole 37.5 + bromoxynil 210)	27 + 6	12–31	L/ha	50- 150							0.6- 1.0	0.67– 1.0	0.5– 1.0	0.5– 1.0	0.5– 1.0	-

Key: IMI = imidazoline tolerant varieties, NR = not required, (S) = suppression only, CR = cereal rye, T = triticale.

Adjuvant key: MO = mineral oil, MOS = mineral oil plus surfactant, MSO = methylated seed oil, NIS = non-ionic surfactant.

NIS products might indicate a specific concentration (i.e. NIS 1000); refer to adjuvant chart for example products.

Read the label before using a product.

Chickpea – volunteer	Cleavers	Corn gromwell	Deadnettle	Dock	Erodium (stork's bill)	Faba bean – volunteer	Field pea – volunteer	Fleabane	Fumitory	Lentil – volunteer	Lupin – volunteer	Comments
0.75	_	_	0.5- 0.75*	-	-	0.75	0.75	0.75*	_	_	_	*Add a mix partner; refer label.
-	_	0.55- 0.85	0.44- 0.6*	_	_	0.44*	0.44*	_	0.55- 0.85	_	_	*Add Triasulfuron 750. ^Add MCPA or 2,4-D.
-	_	_	_	185 or 105*	-	_	_	_	_	_	_	*Add MCPA amine. ^Add MCPA or 2,4-D amine.
-	_	_	_	1.0-1.7	-	_	-	_	_	_	_	
_	-	1.0	1.0	1.0 (S)	1.0 (S)	-	-	-	0.75	-	1.0 (S)	Application rate increases with crop growth and weed size; refer label. Add MCPA for radish control.
50	_	_	_	-	-	50	40–50	-	_	_	50	Rates and timing are determined by weed size and mix partner. There are many mix partners; refer label.
_	_	0.33	0.33	_	0.33	_	_	_	_	_	0.46	Use the low rate and add Diuron® 900 for control of small weeds.
_	_	_	1.45	_	-	_	_	_	0.93	_	_	Application rate increases with crop growth and weed size; refer label.
-	_	-	-	-	-	-	-	-	0.965	_	_	Application rate increases with crop growth and weed size; refer label.
25*	_	_	25	_	-	25*	25*	25*	25	25*	25*	*Add MCPA LVE. Rate of mix partner changes with crop growth stage; refer label. Adjuvant: refer label.
25 or 25*	_	_	25	_	_	_	_	-	25	_	_	*Add 0.8–1.2 L/ha 2,4-D amine 720. Adjuvant: refer label.
0.4	_	_	0.2-0.3	_	-	_	_	0.3	0.3	_	_	Adjuvant: MOS 0.5%.
1.0*	_	1.0-2.0	1.5-2.0	-	-	1.0*	1.0-2.0 or 1.0*	_	1.0-2.0	1.0*	1.0-2.0	*Add clopyralid for control. Adjuvant: AMS, MSO 0.5–1%, MOS 0.5–0.75%.
-	0.8–1.0	0.8–1.0	0.8–1.0	1.0 (S)	-	_	-	-	0.8–1.2	_	1.0 (S)	Rate is dictated by weed size; refer label. Transient yellowing might occur. Temperature >20 °C can increase effects.
-	0.6	_	0.9 or 0.3*	-	-	_	-	-	_	_	0.9	*Add mix partner. Adjuvant: weed specific; refer label.
200	_	-	200	-	-	200	200	200	200	_	-	*Add fluroxypyr. ^Add fluroxypyr + MCPA LVE. Adjuvant: MOS 0.5%.
-	-	-	10–13	-	-	10	10	-	-	-	-	Add terbutryn.
-	_	1.0	1.0	1.0 (S)	1.0 (S)	-	-	-	0.75	_	1.0 (S)	Transient yellowing might occur.
0.5–1.0 (S)	-	0.5–1.0	0.5–1.0	-	-	0.5–1.0	0.5 (S) 0.67- 1.0	-	0.5–1.0	0.5–1.0 (S)	0.5–1.0	Add LVE MCPA for control; refer label.

Table 22. Herbicides for weed control for cereal rye and triticale – early post-emergence – page 3 of 4.

Note: example trade names shown. Others may be available at different concentrations. See labels for details.	Herbicide group	Crop growth (Zadoks)	Unit of use	Boom water rate (L/ha)	Marshmallow	Medics	Mexican poppy	Mintweed	Mustards	New Zealand spinach	Paterson's curse	Peppercress	Prickly lettuce	Rough poppy	Shepherd's purse
Grass and broadleaf contr	ol pro	ducts													
Chlorsulfuron 750	2	T: 00, CR:>12	g/ha	>30	-	-	-	20	15	-	15	-	-	20	20
Rexade® (pyroxsulam 150 + halauxifen 50) Triticale only	2+4	13–31	g/ha	80– 100	100* (S)	100	_	_	100*	_	_	_	100*	_	-
Sulfosulfuron 750	2	11–15/22	g/ha	40– 100	_	-	_	_	25 (S)	_	-	-	-	-	-
Broadleaf control product	s														
Affinity® Force (carfentrazone 240)	14	>13	mL/ha	50- 150	65- 100	-	-	-	85- 100	-	65- 100	-	85	85	85
Associate® (metsulfuron-methyl 600)	2	13–37	g/ha	>50	-	5	-	-	5	-	5 or 7	_	-	5	5
Broadside® (bromoxynil 140 + MCPA 280 + dicamba 40)	6+4	13–30*	L/ha	>50	_	_	_	_	0.75- 1.0	_	_	_	_	_	-
Bromicide® (bromoxynil 200)	6	13–30	L/ha	50- 200	-	-	1.4	1.4	1.4	-	1.4–2.1	1.4	-	1.4	1.4-2.1
Bromoxynil 250 + diflufenican 25	6+ 12	12–29	L/ha	50– 100	-	-	_	1.0 (S)	0.5–1.0	_	0.5- 0.75	1.1	1.0 (S)	0.5- 0.75	1.0
Bronco® MA-X (bromoxynil 280 + MCPA 280)	6+4	13–30	L/ha	50- 200	_	_	1.0- 1.43	1.0- 1.43	1.0- 1.43	-	1.0- 1.43	1.0- 1.43	_	1.0- 1.43	1.0- 1.43
Buttress® (2,4-DB 500)	4	15–33	L/ha	>80	2.1-3.2	-	2.1-3.2	-	2.1-3.2	-	2.1-3.2	-	2.1-3.2	-	2.1-3.2
Ecopar® (pyraflufenethyl 20)	14	12–29	L/ha	70- 150	_	0.4*	_	_	0.4-0.8	-	0.4*	_	0.4-0.8	-	-
Enforcer® 242 (picloram 26 + MCPA 420) Triticale only	4	22–30	L/ha	>50	-	-	_	-	1.0	1.0 (S)	-	-	-	-	-
FallowBoss® Tordon® (2,4-D amine 300 + picloram 75 + aminopyralid 7.5)	4	14–31	L/ha	50– 100	-	-	_	0.3*	0.3*	0.3	-	-	-	-	-
Flight® EC (picolinafen 35 + bromoxynil 210 + MCPA 350)	6+ 12 +4	13–28	L/ha	50- 150	-	-	-	-	0.36- 0.72	-	-	-	0.3- 0.72	-	0.36- 0.72
Grindstone® (aminopyralid 240)	4	13–31	mL/ha	50- 100	_	16	_	-	16	22	-	-	16–32	_	-
(a.i.iiiopytuliu 270)				100	_	-	_	_	_	_	_	-	_	-	_
Hotshot® (aminopyralid 10 + fluroxypyr 140) Triticale only	4	13–31	L/ha	>80	_	-	_	_	_	-	_	-	0.75	-	-

Skeleton weed	Sorrel	Soursob	Sowthistle	Spiny emex	Thistle – saffron	Thistle – slender	Thistle – spear/ black	Thistle – variegated	Toad rush	Vetch	Wild radish	Wild turnip	Wireweed	Comments
											15 or			Rate, plant backs and crop safety
_	_	20	-	_	_	_	-	_	_	_	20	15	20	are heavily influenced by soil pH; refer label. *Requires mix partner; refer label.
_	_	_	100*	100*	_	_	_	_	-	100 (S)	100*	100	100	Adjuvant: always use NIS 1000 0.25%.
-	-	-	-	-	-	-	-	_	-	_	20	20	-	Rate, plant backs and crop safety are heavily influenced by soil pH; refer label. Adjuvant MSO 1–2%.
-	-	-	85	85	-	_	-	-	85– 100	85*	100	85	85	Add minimum of 330 mL/ha MCPA 750. *Add dicamba.
7 (S)	5	5	5	5 or 7	_	_	-	_	-	_	_	5	5 or 7	Tank mix partners will broaden the weed spectrum; refer label.
_	_	_	-	0.75- 1.0	_	_	-	_	-	_	0.75- 1.0	_	0.75– 1.0	*Rate increases with crop growth; refer label.
_	2.1	-	_	1.4	1.4	1.4	-	1.4–2.1	-	_	1.4	1.4	1.4	Add 2,4-D amine or MCPA LVE; refer label.
1.0 (S)	1.0 (S)	-	1.0 (S)	0.5- 0.75	1.0	-	-	1.0	1.0 (S)	1.0 (S)	0.5–1.0 or 0.5*	0.5- 0.75	1.0	*Add MCPA LVE. Can cause transient yellowing.
-	-	-	1.0–1.5	1.0- 1.43	1.0–1.43	1.0- 1.43	-	1.0- 1.43	-	-	1.0- 1.43	1.0- 1.43	1.0- 1.43	Application rate increases with crop growth and weed size; refer label. Do not spray if temperature is >20 °C.
_	_	_	2.1-3.2	2.1–3.2	2.1-3.2	2.1–3.2	2.1–3.2	2.1–3.2	-	_		2.1–3.2	2.1–3.2	
-	0.4*	0.4*	0.4*	0.4*	-	-	-	-	-	-	0.3-0.8	0.4-0.8	0.4*	400 mL/ha is the maximum rate at Z12. Always add MCPA amine 750. *Add 5 g/ha metsulfuronmethyl 600.
1.0	_	_	1.0	1.0	1.0	_	-	1.0	-	_	1.0	1.0	1.0 (S)	
_	-	_	0.3	0.3	0.3	_	-	0.3*	-	_	0.3*	0.3*	0.3* (S)	Northern NSW only.*Add 2,4-D amine. Adjuvant: NIS 1000.
_	-	_	0.72 (S)	0.72 (S)	0.72	_	-	-	0.72	_	0.36- 0.72	0.36- 0.72	-	Rates increase with weed size and crop growth stage; refer label.
-	-	-	20-32	16-32	16	-	-	16-32	-	32	-	16	16–32	Northern NSW only. Must have a mix partner. Crop growth stage and rate are determined by mix partner; refer label.
_	-	-	-	-	_	-	-	-	-	20	-	-	-	Southern NSW only. Add fluroxypyr; refer label.
-	-	-	0.5- 0.75*	0.5- 0.75*	_	-	-	0.5- 0.75*	-	0.75	-	-	0.5– 0.75*	*Add a mix partner; refer label.

Table 22. Herbicides for weed control for cereal rye and triticale – early post-emergence – page 4 of 4.

	1														
Note: example trade names shown. Others may be available at different concentrations. See labels for details.	Herbicide group	Crop growth (Zadoks)	Unit of use	Boom water rate (L/ha)	Marshmallow	Medics	Mexican poppy	Mintweed	Mustards	New Zealand spinach	Paterson's curse	Peppercress	Prickly lettuce	Rough poppy	Shepherd's purse
Igran® Flowable (terbutryn 500) Triticale only	5	13–21	L/ha	50- 100	-	0.44*	0.44- 0.6*	-	0.33- 0.44* or 0.55- 0.85^	-	0.55- 0.85	_	-	-	0.44*
Kamba® 750 (dicamba 750)	4	15–30	mL/ha	>50	_	_	_	185*	105* or 185^	185	_	_	_	-	_
Kamba® M (MCPA 340 + dicamba 80)	4	21–30	L/ha	>50	-	-	-	1.7	1.0–1.7	1.7	-	-	-	-	_
Legacy® MA (diflufenican 25 + MCPA 250)	4 + 12	13–30	L/ha	>50	-	_	-	-	0.5–1.0	-	1.0 (S)	1.0 (S)	0.5–1.0	1.0 (S)	0.5–1.0
Lontrel® Advanced (clopyralid 600) Triticale only	4	13–30	mL/ha	50- 100	_	50*	_	-	_	-	_	_	50-75*	-	-
MCPA amine 750	4	12–14	L/ha	30-	_	_	-	_	0.33- 0.46	-	_	_	_	-	-
MCPA amine 750	4	15–37	L/na	120	_	_	-	1.35	0.66	-	0.66- 0.96	-	_	0.46- 0.96	_
MCPA LVE 570	4	13–37	L/ha	30– 120	-	_	-	-	0.49- 0.88	-	1.49	-	_	-	_
Paradigm® (florasulam 200 + halauxifen 200)	2+4	13–37	g/ha	80-	25	25*	25	_	25*	_	_	_	25*	-	25*
Triticale only		31–43* or 31 – 49	g/ila	100	25	_	25	_	-	-	_	_	_	-	-
Pixxaro® (fluroxypyr 250 + halauxifen 16.25) Triticale only	4	13–39	L/ha	>80	0.3	0.3	0.2-0.3	-	-	-	_	-	0.4	-	-
Precept® (MCPA 125 + pyrasulfotole 25)	4 + 27	13–31	L/ha	50- 100	_	2.0 or 1.0*	_	_	1.0-2.0	-	1.0-2.0	_	1.0-2.0	-	-
Quadrant® (MCPA ester 250 + Bromoxynil 240 + diflufenican 20 + picolinafen 10)	4+6 +12	13–28	L/ha	50- 100	1.0 (S)	_	0.8–1.0	0.8–1.0	0.6–1.2	_	0.8–1.2	1.2	0.6–1.2	0.8- 1.2	0.6-1.2
Starane® Advanced (fluroxypyr 333) Triticale only	4	13–39	L/ha	>50	_	_	_	_	0.3- 0.9*	-	_	_	0.3-0.6	-	0.3- 0.9*
Trezac® (aminopyralid 25 + halauxifen 30 + cloquintocet-mexyl 30) Triticale only	4	13–31	mL/ha	>80	200*	200	200	_	-	-	_	_	200*	-	-
Triasulfuron 750 Triticale only	2	13–22	g/ha	30- 100	-	10	10–13	_	6.5–10	-	-	_	-	-	10
Triathlon® (MCPA 250 + bromoxynil 150 + diflufenican 25)	4 + 6 + 12	13–30	L/ha	50- 100	1.0 (S)	_	_	_	0.5–1.0	-	1.0 (S)	1.0 (S)	0.5–1.0	1.0 (S)	0.5-1.0
Velocity® (pyrasulfotole 37.5 + bromoxynil 210)	27 + 6	12–31	L/ha	50- 150	-	0.5 (S) 0.67- 1.0	-	_	0.5–1.0	-	0.5–1.0	_	0.5–1.0	-	0.5-1.0

Key: IMI = imidazoline tolerant varieties, NR = not required, (S) = suppression only.

Adjuvant key: AMS = liquid ammonium sulfate, MO = mineral oil, MOS = mineral oil plus surfactant, MSO = methylated seed oil, NIS = non-ionic surfactant.

Read the label before using a product.

					produc									
Skeleton weed	Sorrel	Soursob	Sowthistle	Spiny emex	Thistle – saffron	Thistle – slender	Thistle – spear/ black	Thistle – variegated	Toad rush	Vetch	Wild radish	Wild turnip	Wireweed	Comments
-	-	-	-	0.55- 0.85*	-	-	-	-	0.55- 0.85	0.6*	0.44- 0.6*	0.33- 0.44* or 0.55- 0.85^	_	*Add Triasulfuron 750. ^Add MCPA or 2,4-D.
_	1.0	-	-	185 or 105*	185^	-	-	-	-	185 or 105*	105*	185^ or105*	185 or 105*	*Add MCPA amine. ^Add MCPA or 2,4-D amine.
_	1.0–1.7	-	_	1.0–1.7	1.7	-	-	1.7	_	1.0–1.7	1.0–1.7	1.0–1.7	1.0–1.7	
1.0 (S)	-	-	1.0 (S)	1.0 (S)	1.0	-	-	1.0 (S)	1.0	1.0 (S)	0.5–1.0	0.5–1.0	0.75 (S)	Application rate increases with crop growth and weed size; refer label. Add MCPA for radish control.
250*	-	-	50*	-	25*	25*	25*	25*	-	40–50*	-	-	-	Rates and timing are determined by weed size and mix partner. *There are many mix partners; refer label.
_	-	-	_	0.33	-	-	-	-	-	_	0.33- 0.46	0.33- 0.46	_	Use the low rate and add Diuron® 900 for control of small weeds.
0.96– 1.35	-	-	-	-	0.66– 1.35	0.66- 1.35	0.96– 1.35	0.66- 1.35	-	-	0.66	0.66	-	Application rate increases with crop growth and weed size; refer label.
0.965- 1.4	-	-	-	-	0.965– 1.7	1.8	-	0.74– 0.96	-	-	0.965– 1.4	0.615– 0.965	-	Application rate increases with crop growth and weed size; refer label.
-	-	-	25*	25*	-	-	-	-	25 (S)	25*	25*	25*	-	*Add MCPA LVE. Rate of mix partner changes with crop growth stage; refer label. Adjuvant: refer label.
_	-	-	_	-	_	-	-	-	25 (S)	_	25 or 25*	-	_	*Add 0.8–1.2 L/ha 2,4-D amine 720. Adjuvant: refer label.
_	-	-	0.4	-	_	-	-	-	-	_	-	-	_	Adjuvant: MOS 0.5%.
_	-	-	1.0-2.0	1.5-2.0 (S)	_	-	-	_	-	1.0*	1.0-2.0	1.0–2.0	1.0–2.0	*Add clopyralid for control. Adjuvant: AMS, MSO 0.5–1%, MOS 0.5–0.75%.
1.0 (S)	0.8–1.0	-	1.2	0.8–1.2	0.8–1.0	0.8–1.0	-	1.2	0.8–1.0	1.0 (S)	0.6–1.2	0.6–1.2	0.8–1.2	Rate is dictated by weed size; refer label. Transient yellowing might occur. Temperature >20 °C can increase effects.
_	-	-	0.6	0.9 or 0.3*	-	-	-	-	-	_	0.3- 0.9*	0.3- 0.9*	0.3*	Add partner; refer label. Adjuvant: weed specific; refer label.
-	-	-	200^	200^	-	-	-	200^	-	200	-	-	-	*Add fluroxypyr. ^Add fluroxypyr + MCPA LVE. Adjuvant: MOS 0.5%.
_	-	-	-	-	-	-	-	-	-	_	6.5–13	6.5	_	Add terbutryn.
1.0 (S)	-	-	1.0 (S)	1.0 (S)	1.0	-	-	1.0 (S)	1.0	1.0 (S)	0.5–1	0.5–1	0.75 (S)	Transient yellowing might occur.
-	-	-	0.5–1.0	0.5–1.0	0.67-1.0	-	-	-	-	0.5–1.0 (S)	0.5–1.0	0.5–1.0	0.5 (S) 0.67- 1.0	Add LVE MCPA for control; refer label.

NIS products might indicate a specific concentration (i.e. NIS 1000); refer to adjuvant chart for example products.

Table 23. Herbicides for weed control for cereal rye and triticale – late post-emergence – page 1 of 2.

Note: example trade names shown. Others may be available at different concentrations. See labels for details.	Herbicide group	Crop growth (Zadoks)	Unit of use	Boom water rate (L/ha)	Amsinckia	Bedstraw	Black bindweed	Canola – volunteer	Capeweed	Charlock	Chickpea – volunteer	Cleavers	Corn gromwell
2,4-D amine 700 g/L	4	31–43	L/ha	50-250	0.98	-	0.98	-	0.98– 1.5	0.5– 1.25	_	-	-
2,4-D LV ester 680	4	31–37	L/ha	30–100	-	-	-	-	0.53- 0.8	0.41	_	-	0.8
Affinity® Force (carfentrazone 240)	14	>13	mL/ha	50–150	-	-	85	85– 100	85	-	-	85– 100*	85– 100
Broadstrike® (flumetsulam 800)	2	61–83	g/ha	50–150	25	25	-	25	25*	25	-	-	-
Lontrel® Advanced (clopyralid 600) Triticale only	4	13–45	L/ha	50–100	-	-	-	-	_	-	_	-	-
MCPA amine 750 Triticale only	4	15–37	L/ha	30–120	-	-	0.97– 1.35	0.66- 0.96	1.45	0.66	_	-	-
MCPA LVE 570	4	15–39	L/ha	30–120	_	-	_	1.3	1.49	0.44- 1.4	_	-	_
Paradigm® (florasulam 200		13–37			-	25*	_	25*	25*(S)	_	25*	-	_
+ halauxifen 200) Triticale only	2+4	31–43* or 31–49	g/ha	80–100	-	-	-	-	_	-	25 or 25*	-	-
Pixxaro® (fluroxypyr 250 + halauxifen 16.25) Triticale only	4	13–39	L/ha	>80	-	0.4	0.4–0.6	-	_	-	0.4	-	-

 $\label{eq:Key:IMI} \textit{Key: IMI} = \textit{imidazoline tolerant varieties}, \textit{NR} = \textit{not required}, \textit{(S)} = \textit{suppression only}.$

Adjuvant key: MO = mineral oil, MOS = mineral oil plus surfactant, MSO = methylated seed oil, NIS = non-ionic surfactant. NIS products might indicate a specific concentration (i.e. NIS 1000); refer to adjuvant chart for example products.

Read the label before using a product.

Deadnettle	Dock	Erodium (stork's bill)	Faba bean – volunteer	Field pea – volunteer	Fleabane	Fumitory	Lentil – volunteer	Lupin – volunteer	Marshmallow	Medics	Mexican poppy	Comments
-	0.98- 1.25	1.25	-	_	1.5	0.5–1.5	-	0.715– 1.5	_	_	1.25	
0.8	_	0.8	_	_	_	0.8	-	0.41- 0.8	_	_	0.8	
-	-	85- 100	85*	85*	-	85	85*	85*	65– 100	_	-	Add minimum of 330 mL/ha MCPA 750. *Add dicamba.
25 (S)*	_	_	-	_	_	_	-	25	15/25*	_	-	*Apply with a partner herbicide; refer label. Adjuvant: MOS 0.5% or NIS 0.2%, NIS 0.2%.
-	_	_	-	_	_	_	-	_	_	_	_	Add MCPA LVE.
1.45	_	_	_	_	_	0.93	-	_	_	_	_	Application rate increases with crop growth and weed size; refer label.
0.44- 0.66*	_	_	_	_	_	0.44- 0.66* or 0.965	-	_	_	_	_	*Add Frequency®. Application rate increases with crop growth and weed size; refer label.
25	-	-	25*	25*	25*	25	25*	25*	25	25*	25	*Add MCPA LVE. Rate of mix partner changes with crop growth stage; refer label. Adjuvant: refer label.
25	_	-	_	-	_	25	_	_	25	_	25	*Add 0.8–1.2 L/ha 2,4-D amine 720. Adjuvant: refer label.
0.2-0.3	_	_	_	_	0.3	0.3	-	_	0.3	0.3	0.2-0.3	Adjuvant: MOS 0.5%.

Table 23. Herbicides for weed control for cereal rye and triticale – late post-emergence – page 2 of 2.

Tuble 25. Herbicides for			,					3	15-19-1			
Note: example trade names shown. Others may be available at different concentrations. See labels for details.	Herbicide group	Crop growth (Zadoks)	Unit of use	Boom water rate (L/ha)	Mintweed	Mustards	New Zealand spinach	Paterson's curse	Peppercress	Prickly lettuce	Rough poppy	Shepherd's purse
2,4-D amine 700 g/L	4	31–43	L/ha	50–250	0.8-0.9	0.5- 1.25	0.98– 1.5	_	-	-	0.98	0.98– 1.5
2,4-D LV ester 680	4	31–37	L/ha	30–100	0.8	0.41- 0.8	0.8	0.8	-	-	0.8	0.8
Affinity® Force (carfentrazone 240)	14	>13	mL/ha	50–150	-	85–100	-	65–100	-	85	85	85
Broadstrike® (flumetsulam 800)	2	61–83	g/ha	50–150	-	25	-	25 (S) or 25*	25 (S) or 25*	-	_	25
Lontrel® Advanced (clopyralid 600) Triticale only	4	13–45	L/ha	50–100	_	_	_	_	-	75	_	-
MCPA amine 750 Triticale only	4	15–37	L/ha	30–120	1.35	0.66	-	0.66- 0.96	-	-	0.46- 0.96	-
MCPA LVE 570	4	15–39	L/ha	30–120	-	0.49– 0.88	-	1.49	-	-	-	0.44- 0.66*
Paradigm® (florasulam 200 + halauxifen 200)	2+4	13–37	g/ha	80–100	-	25*	-	_	-	25*	_	25*
Triticale only	2 7 4	31–43* or 31–49	y/iid	50-100	_	-	-	-	-	-	_	-
Pixxaro® (fluroxypyr 250 + halauxifen 16.25) Triticale only	4	13–39	L/ha	>80	-	_	_	_	-	0.4	_	-

Key: IMI = imidazoline tolerant varieties, NR = not required, (S) = suppression only.

Adjuvant key: MO = mineral oil, MOS = mineral oil plus surfactant, MSO = methylated seed oil, NIS = non-ionic surfactant. NIS products might indicate a specific concentration (i.e. NIS 1000); refer to adjuvant chart for example products.

Read the label before using a product.

Skeleton weed	Sorrel	Sowthistle	Spiny emex	Thistle – saffron	Thistle – slender	Thistle – spear/black	Thistle – variegated	Toad rush	Vetch	Wild radish	Wild turnip	Wireweed	Comments
0.98– 1.5	1.25– 1.5	1.25– 1.5	1.25	0.5–1.5	0.715– 1.5	0.5– 1.45	0.5–1.5	-	0.98– 1.25	0.715– 1.5	0.5– 1.25	1.25	
0.8	-	_	_	0.41- 0.8	0.8	0.8	0.8	-	-	0.41- 0.8	0.41- 0.8	0.8	
-	-	85	85	_	-	-	_	85– 100	85*	100	85	85	Add minimum of 330 mL/ha MCPA 750. *Add dicamba.
_	-	-	25*	-	-	-	-	-	-	15* or 25 (S)	15–25	-	*Apply with a partner herbicide; refer label. Adjuvant: MOS 0.5% or NIS 0.2%, NIS 0.2%.
_	-	-	_	25	25	25	25	-	40	_	-	-	Add MCPA LVE.
0.96- 1.35	_	_	_	0.66- 1.35	0.66- 1.35	0.96- 1.35	0.66- 1.35	_	-	0.66	0.66	-	Application rate increases with crop growth and weed size; refer label.
0.965– 1.4	-	0.44- 0.66*	-	0.965– 1.7	1.8	-	0.74- 0.96	-	-	0.44- 0.66* or 0.965- 1.4	0.44- 0.66* or 0.615- 0.965	0.44- 0.66*	*Add Frequency*. Application rate increases with crop growth and weed size; refer label.
_	-	25*	25*	_	-	-	-	25 (S)	25*	25*	25*	-	*Add MCPA LVE. Rate of mix partner changes with crop growth stage; refer label. Adjuvant: refer label.
_	-	_	_	_	-	_	_	25 (S)	_	25 or 25*	-	-	*Add 0.8–1.2 L/ha 2,4-D amine 720. Adjuvant: refer label.
_	-	0.4	_	_	-	-	-	-	-	_	-	-	Adjuvant: MOS 0.5%.

Table 24. Herbicides for weed control for canola – pre-emergence.

Tubic 24. Herbiciaes id						ic cii	5											
Note: example trade names shown. Others may be available at different concentrations. See labels for details.	Herbicide group	Incorporation type	Unit of use	Boom water rate (L/ha)	Annual phalaris	Annual ryegrass	Barley grass	Brome grass	Vulpia/silver grass	Wild oats	Amsinckia	Bedstraw	Black bindweed	Capeweed	Charlock	Cleavers	Corn gromwell	Deadnettle
Imidazoline tolerant (C	L) caı	nola va	rieties	only														
Sentry® (imazapic 525 + imazapyr 175)	2	IBS	g/ha	70	40- 50 (S)	40- 50 (S)	40- 50	40- 50	_	40- 50 (S)	_	_	40- 50	40- 50 (S)	-	-	_	_
Triazine-tolerant (TT) ca	anola	variet	ies onl	y														
Atrazine 900	5	PSI, IBS, PSPE	kg/ha	55	_	1.1- 2.2 (S)	1.1- 2.2 (S)	1.1- 2.2 (S)	1.1- 2.2	1.1- 2.2 (S)	-	-	_	1.1- 2.2	1.1- 2.2	-	1.1- 2.2	_
Simazine 900	5	PSI, IBS, PSPE	kg/ha	50- 200	-	1.1- 2.2 (S)	1.1- 2.2 (S)	1.1- 2.2 (S)	1.1- 2.2	1.1- 2.2 (S)	_	-	_	1.1- 2.2	1.1- 2.2	-	1.1- 2.2	-
Terbyne® Xtreme® (terbuthylazine 875)	5	IBS, PSPE	kg/ha	>50	0.86- 1.2 (S)	0.86- 1.2 (S)	-	-	0.86- 1.2 (S)	0.86- 1.2 (S)	-	-	-	-	-	-	0.86- 1.2	0.86- 1.2
All canola varieties																		
Avadex® Xtra (tri- allate 500)	15	PSI, IBS	L/ha	50	1.6- 2.4*	3.2 or 1.6– 2.4*	1.6- 2.4* (S)	1.6- 2.4* (S)	1.6- 2.4*	1.6	1.6- 2.4* (S)	_	_	_		-	1.6– 2.4*	1.6- 2.4* (S)
Devrinol-C® (napropamide 500)	0	IBS	kg/ha	Not stated	-	1.75– 2.25	-	-	-	_	-	-	-	-	-	-	-	-
Dual Gold® (S-metolachlor 960)	15	IBS PSPE	L/ha	>60	-	_	-	-	-	_	-	-	-	-	-	-	_	-
Overwatch® (bixlozone 400)	13	IBS	L/ha	60– 100	1.25 (S)	1.25	1.25 (S)	1.25 (S)	1.25	1.25 (S)	-	1.25 (S)	-	1.25 (S)	-	1.25 (S)	_	-
Rifle® 440 (pendimethalin 440)	3	IBS	L/ha	50- 200	-	1.5- 2.25	-	-	1.5- 2.25 (S)	1.5- 2.25 (S)	_	-	_	-	-	-	-	-
Rustler® (propyzamide 500)	3	IBS	L/ha	Not stated	1.0	1.0	1.0	1.0	1.0	1.0	-	-	_	-	-	-	_	-
Tenet® (metazachlor 500)	15	IBS	L/ha	80- 250	-	1.5- 1.8	1.8	1.8	-	1.8	-	-	_	1.8	-	-	_	1.8
TriflurX® (trifluralin 480)	3	PSI, IBS	L/ha	70- 450	1.7	1.7	-	-	-	_	-	-	-	_	-	-	-	-

Incorporation key: IBS = incorporated by sowing, PSI = pre-sowing incorporated, PSPE = post-sowing, pre-emergent.

Read the label before using a product.

Erodium (stork's bill)	Fleabane	Fumitory	Medics	Mintweed	Mustards	Paterson's curse	Prickly lettuce	Rough poppy	Shepherd's purse	Sowthistle	Spiny emex	Toad rush	Wild radish	Wild turnip	Wireweed	Comments
40- 50 (S)	-	40– 50 (S)	40 or 55 (S)	_	40– 50	40- 50 (S)	-	-	_	_	-	-	40-50	-	40- 50	
-	-	1.1- 2.2	_	_	1.1- 2.2	1.1- 2.2	-	-	1.1- 2.2	_	1.1–2.2	-	1.1-2.2 (S)	1.1- 2.2	_	Do not exceed a total of 3 kg of active ingredient per year.
-	-	1.1- 2.2	_	_	1.1– 2.2	1.1– 2.2	-	-	1.1– 2.2	_	1.1-2.2	-	1.1-2.2 (S)	1.1– 2.2	_	Do not exceed a total of 3 kg of active ingredient per year.
-	-	-	0.86- 1.2	0.86- 1.2	0.86– 1.2	-	0.86- 1.2	-	0.86- 1.2	0.86- 1.2	0.86- 1.2 (S)	0.86- 1.2	0.86- 1.2 (S)	0.86- 1.2	0.86- 1.2	Low rate on lighter soils. Do not exceed 1.2 kg/ha per crop.
-	-	1.6- 2.4*	-	-	-	-	-	1.6- 2.4*	-	_	1.6- 2.4* (S)	-	_	-	1.6- 2.4*	*Add trifluralin 1.5–2.0 L/ha.
-	-	-	-	-	-	-	-	-	-	1.75– 2.25	-	-	-	-	_	Must be incorporated within 4 hours.
-	-	-	_	_	_	-	-	-	_	_	-	0.15- 0.25	-	-	_	
-	-	_	_	_	_	_	1.25 (S)	-	_	1.25	_	-	1.25 (S)	-	1.25	Sow at 15 mm.
-	-	-	-	-	_	-	-	-	-	-	_	-	-	-	1.5- 2.25	
-	-	-	_	_	_	_	-	-	_	_	_	-	-	-	_	
1.8	1.8	-	-	-	-	-	-	-	1.8	1.8	-	1.8	-	-	1.8	Refer to label for soil type and rate interaction. 1 L/ha can be used if mixed with a triazine partner (TT canola only).
-	-	-	_	-	_	-	-	-	-	_	_	-	_	-	1.7	

Table 25. Herbicides for weed control in canola – post-emergence – page 1 of 2.

Note: example trade names shown. Others may be available at different concentrations. See labels for details.	Herbicide group	Apply at crop growth stage	Unit of use	Boom water rate (L/ha)	Annual phalaris	Annual ryegrass	Barley grass	Brome grass	Vulpia/silver grass	Wild oats	Amsinckia	Bedstraw
Imidazoline tolerant (CL) cano	la vari											
Intercept® (imazamox 33 + imazapyr 15)	2	2–6-leaf	L/ha	>70	-	0.6- 0.75 (S)	0.6– 0.75	0.6- 0.75	0.6- 0.75 (S)	0.6- 0.75	-	0.6- 0.75 (S)
Sentry® (imazapic 525 + imazapyr 175)	2	2–6-leaf	g/ha	70	40 or 55	40 or 55 (S)	40 or 55	40 or 55	40 or 55 (S)	40 or 55	40 or 55	40 or 55
Glufosinate-ammonium tolera	nt (Lik	erty Link) ca	nola var	ieties on	ly							
Liberty® (glufosinate- ammonium 200)	10	2-leaf to early stem elongation	L/ha	80–100	-	2 fb 2 or 3 fb 3	1.5 fb 1.5	1.5 fb 1.5	1.5 fb 1.5	1.5 fb 1.5	1.5 fb 1.5	_
Triazine-tolerant (TT) canola va	arietie	s only										
Atrazine 900	5	After 2–3- leaf	kg/ha	110	0.555- 1.1	-	-	_	_	-	-	-
Terbyne® Xtreme® (terbuthylazine 875)	5	Early post- emergent	kg/ha	>50	0.66- 1.2 (S)	-	-	-	0.66- 1.2 (S)	-	-	-
All canola varieties									1			
Diclofop-methyl 375	1	Not stated	L/ha	80	-	1.0	-	-	_	1.5–2		
Elantra® Xtreme® (quizalofop-pethyl 200)	1	Not stated	mL/ha	>50	-	150– 190	125	150– 190	_	65 or 125		
Factor® WG (butroxydim 250)	1	4-leaf to stem elongation	g/ha	50–100	80*	80*	80*	80*	_	80*		
ForageMax® (halauxifen 100 + aminopyralid 50)	4	4–8-leaf	mL/ha	80-200	-	-	-	_	_	-	-	-
Fusilade® Forte (fluazifop-p- ethyl 128)	1	Not after 6-leaf	L/ha	50–100	0.41	0.41	0.41	_	-	0.41		
Lontrel® Advanced (clopyralid 600)	4	2–8-leaf	mL/ha	50–100	_	-	_	_	_	-	-	-
Shogun® (propaquizafop 100)	1	Not stated	L/ha	50–150	-	0.45	0.2*	0.3*	_	0.25*		
Status® (clethodim 240)	1	Before stem elongation	L/ha	50–150	0.15- 0.5	0.15- 0.5	0.175- 0.5	0.175- 0.5	0.25- 0.5	0.175- 0.5		
Verdict® (haloxyfop 520) Do not use on canola destined for export	1	2–6-leaf before stem elongation	mL/ha	50–150	75–100	75–100	50-75	50-75	_	37.5– 100		

Black bindweed	Canola – volunteer	Capeweed	Chickpea – volunteer	Corn gromwell	Deadnettle	Erodium (stork's bill)	Faba bean – volunteer	Field pea – volunteer	Fumitory	Lentil – volunteer	Comments
_	_	0.3- 0.5^	_	-	-	_	-	0.3- 0.5^	-	_	^Add clopyralid; refer label for rates. Adjuvant: MSO 0.5%.
40 or 55	40 or 55 (not CL)	-	-	40 or 55	40 or 55	40 or 55 (S)	-	-	40 or 55	_	Can be mixed with clopyralid and clethodim; refer label. Adjuvant: MSO 0.5%.
_	_	1.5 fb 1.5	1.5 fb 1.5	1.5 fb 1.5	-	_	-	1.5 fb 1.5	1.5 fb 1.5	1.5 fb 1.5	Two applications are required 7–14 days apart. Mild, humid conditions are best. Reduced control can occur at <10 °C.
-	-	-	-	-	-	_	-	-	-	-	Do not exceed 3 kg active ingredient per year. Adjuvant: MSO or MOS 0.5–1%.
-	_	-	_	_	0.66– 1.2	_	_	_	-	_	Adjuvant: MSO 1%.
											Do not spray if temperature is >25 °C. Adjuvant: NIS 0.25%.
											Adjuvant: MSO 1% or NIS 0.2%.
											Must be combined with clethodim or a FOP herbicide; refer label. Adjuvant: MSO 0.5%.
-	-	100	100	-	75	-	100	100	75	100	Adjuvant: MOS 1%.
-	-	150	125	-	-	-	125	75	-	125	
											*Add NIS 0.2% or MSO 0.5%.
											Adjuvant: MSO 1% or MOS 0.5–1%.
											Application rate determined by weed size, adjuvant type and mix partner; refer label. Adjuvant: MSO or MOS.

Table 25. Herbicides for weed control in canola – post-emergence – page 2 of 2.

Note: example trade names shown. Others may be available at different concentrations. See labels for details.	Herbicide group	Apply at crop growth stage	Unit of use	Boom water rate (L/ha)	Lupin – volunteer	Marshmallow	Medics	Mexican poppy	Mustards	Paterson's curse	Prickly lettuce
Imidazoline tolerant (CL) canol	la varie	eties only									
Intercept® (imazamox 33 + imazapyr 15)	2	2–6-leaf	L/ha	>70	0.3- 0.75^	0.6- 0.75	-	-	0.3- 0.75	-	-
Sentry® (imazapic 525 + imazapyr 175)	2	2–6-leaf	g/ha	70	-	_	40 or 55 (S)	-	20, 40 or 55	40 or 55	-
Glufosinate-ammonium tolera	nt (Lib	erty Link) cand	ola varie	ties only							
Liberty® (glufosinate- ammonium 200)	10	2-leaf to early stem elongation	L/ha	80–100	1.5 fb 1.5	-	1.5 fb 1.5	-	_	-	1.5 fb 1.5
Triazine-tolerant (TT) canola va	arietie	only									
Atrazine 900	5	After 2–3-leaf	kg/ha	110	-	-	-	-	0.555- 1.1	_	-
Terbyne® Xtreme® (terbuthylazine 875)	5	Early post- emergent	kg/ha	>50	-	_	-	-	-	-	-
All canola varieties											
Diclofop-methyl 375	1	Up to harvest WHP	L/ha	80							
Elantra® Xtreme® (quizalofop-p-ethyl 200)	1	Up to harvest WHP	mL/ha	>50							
Factor® WG (butroxydim 250)	1	4-leaf to start of stem elongation	g/ha	50–100							
ForageMax® (halauxifen 100 + aminopyralid 50)	4	4–8-leaf	mL/ha	80-200	100	100	100	75	-	_	100
Fusilade® Forte (fluazifop-p- ethyl 128)	1	Not after 6-leaf	L/ha	50–100							
Lontrel® Advanced (clopyralid 600)	4	2–8-leaf	mL/ha	50–100	125	-	75	-	-	-	-
Shogun® (propaquizafop 100)	1	Up to harvest WHP	L/ha	50–150							
Status® (clethodim 240)	1	Before stem elongation	L/ha	50–150							
Verdict® (haloxyfop 520) Do not use on canola destined for export	1	2–6-leaf before stem elongation	mL/ha	50–150							

Shepherd's purse	Skeleton weed	Sowthistle	Spiny emex	Thistle – saffron	Thistle – spear/ black	Toad rush	Vetch	Wild radish	Wild turnip	Wireweed	Comments
_	_	_	0.6- 0.75 (S)	-	_	_	_	0.3- 0.75	0.3- 0.75	-	^Add clopyralid; refer label for rates. Adjuvant: MSO 0.5%.
20, 40 or 55	_	_	40 or 55	-	_	40 or 55	40 or 55 (S)	20, 40 or 55	20, 40 or 55	40 or 55	Can be mixed with clopyralid and clethodim; refer label. Adjuvant: MSO 0.5%.
-	-	_	1.5 fb 1.5	-	-	1.5 fb 1.5	1.5 fb 1.5	3 fb 3 (S)	-	1.5 fb 1.5	Two applications are required 7–14 days apart. Mild, humid conditions are best. Reduced control can occur at <10 °C.
-	_	_	_	-	_	_	_	.0555– 1.1	.0555– 1.1	-	Do not exceed 3 kg active ingredient per year. Adjuvant: MSO or MOS 0.5–1%.
_	_	_	0.66– 1.2 (S)	-	_	_	_	0.66– 1.2	_	-	Adjuvant: MSO 1%.
											Do not spray if temperature is >25 °C. Adjuvant: NIS 0.25%.
											Adjuvant: MSO 1% or NIS 0.2%.
											Must be combined with clethodim or a FOP herbicide; refer label. Adjuvant: MSO 0.5%.
100	_	100	-	-	100	_	100	_	-	-	Adjuvant: MOS 1%.
-	150	-	-	150	150	_	50	_	-	-	
											*Add NIS 0.2% or MSO 0.5%.
											Adjuvant: MSO 1% or MOS 0.5–1%.
											Application rate determined by weed size, adjuvant type and mix partner; refer label. Adjuvant: MSO or MOS.

Table 26. Herbicides for weed control in glyphosate-tolerant (RR) canola varieties only – post-emergence.

Note: example trade names shown. Others may be available at different concentrations. See	Herbicide group	Apply at crop growth stage	Unit of use	Boom water rate (L/ha)	Annual phalaris	Annual ryegrass	Barley grass	Brome grass	Wild oats	Capeweed	Chickpea – volunteer	Field pea – volunteer	Lentil – volunteer	Lupin – volunteer	Mustards	Paterson's curse	Thistle – saffron	Thistle – spear/black	Thistle – variegated	Wild radish	Wild turnip	
labels for details.	Her	App	Uni	Вос	Anr	Anı	Bar	Bro	W	Сар	Chi	Fiel	Len	Lup	M	Pat	Thi	Thi	Thi	N.	N.	Comments
Roundup Ready® cano	la vai																					
CRUCIAL® (glyphosate 600)		1.0												Maximum of 2 applications. Minimum of 14								
Roundup Ready® PL (glyphosate 540)	9	e to 6-lea	L/	50- 80									1.15									days between applications. Do not use as
Roundup Ready® with PLANTSHIELD® (glyphosate 690)	9	Emergence to 6-leaf	ha	50- 80									0.9									the only method of weed control if glyphosate-
Weedmaster® DST® (glyphosate 470)		Ш		80									1.3									resistant weeds are suspected or present.
TruFlex® canola varieti	es or	ıly																				
CRUCIAL® (glyphosate 600)		/er													2–3 applications. Minimum of 14							
Roundup Ready® PL (glyphosate 540)	9	Emergence to 1st flower	L/	50- 80								1.1	5–1.	67								days between applications. Do not use as
Roundup Ready® with PLANTSHIELD® (glyphosate 690)	9	ergence 1	ha	50- 80								0	.9–1.	3								the only method of weed control if glyphosate- resistant weeds
Weedmaster® DST® (glyphosate 470)		Em		80								1	.3–1.	9								are suspected or present.

Table 27. Herbicides for weed control for safflower.

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Table 27. Herbick		or week	u comerc)					110	aa tiic	idoci	001010	asing	a product.
Note: example trade names shown. Others may be available at different concentrations. See specific labels for details.	Herbicide group	Incorporation	Growth stage	Unit of use	Boom water rate (L/ha)	Annual phalaris	Annual ryegrass	Barley grass	Brome grass	Vulpia/silver grass	Wild oats	Fumitory	Wireweed	Comments
Pre-emergent weed c	ontr	ol												
Avadex® Xtra (tri- allate 500)	15	PSI	-	L/ha	50	_	_	_	_	_	1.6	_	_	
Rifle® 440 (pendimethalin 440)	3	PSI, IBS	-	L/ha	50- 200	_	1.5– 2.25	-	-	1.5- 2.25 (S)	1.5– 2.25 (S)	-	1.5- 2.25	Low rates for lighter soils.
TriflurX® (trifluralin 480)	3	PSI, IBS	-	L/ha	70– 450	1.2- 1.7	1.2- 1.7	_	_	_	1.2– 1.7	1.2- 1.7	1.2- 1.7	Rate determined by soil type; refer label.
Post-emergent weed	cont	trol												
Diclofop-methyl 375	1	Not stated	2 to 4-leaf	L/ha	80	_	1.0	_	_	_	1.5–2			Do not spray if temperature is >25 °C. Adjuvant: NIS 0.25%.
Shogun® (propaquizafop 100)	1	Not stated	3-leaf to early tiller	L/ha	50– 150	_	0.45	0.2*	0.3*	_	0.25*			*Add NIS 0.2% or MSO 0.5%.

Incorporation key: IBS = incorporated by sowing, PSI = pre-sowing incorporated, PSPE = post-sowing, pre-emergent.

Adjuvant key: MO = mineral oil, MOS = mineral oil plus surfactant, MSO = methylated seed oil, NIS = non-ionic surfactant.

NIS products might indicate a specific concentration (i.e. NIS 1000); refer to adjuvant chart for example products.

Table 28. Herbicides for weed control for linseed.

Note: example trade names shown. Others may be available at different concentrations. See labels for details.	Herbicide group	Incorporation/ growth stage	Unit of use	Boom water rate (L/ha)	Annual phalaris	Annual ryegrass	Barley grass	Brome grass	Wild oats	Amsinckia	Bedstraw	Black bindweed	Canola – volunteer	Capeweed	Charlock	Cleavers	Corn gromwell	Fumitory
Pre-emergent wee	ed co	ntrol																
Avadex® Xtra (tri- allate 500)	15	PSI, IBS	L/ha	50	_	_	_	_	1.6	-	_	_	_	_	_	-	-	-
TriflurX® (trifluralin 480)	3	PSI, IBS	L/ha	70- 450	1.2- 1.7	1.2- 1.7	-	_	_	-	_	_	-	_	_	_	-	1.2- 1.7
Post-emergent we most grass weeds											ıps 1 a	nd 2 s	electiv	e herb	icides	are co	mmor	n in
Diclofop- methyl 375	1	Not stated	L/ha	80	_	1.0	_	_	1.5–2									
Factor® WG (butroxydim 250)	1	Up to flowering	g/ha	50- 100	80- 180*	80– 180	80- 180	80- 180*	80– 180									
Fusilade® Forte (fluazifop-p- ethyl 128)	1	Not stated	L/ha	50- 100	0.41	0.41	0.41	_	0.41									
Shogun® (propaquizafop 100)	1	Not stated	L/ha	50- 150	_	0.45	0.2*	0.3*	0.25*									
Verdict® (haloxyfop 520)	1	From 2-leaf to bud development	mL/ ha	50- 150	75– 100	75– 100	50- 75	50- 75	37.5– 100									
Post-emergent we	eed c	ontrol – broad	dleaf w	veeds			•				1							
Bromicide® (bromoxynil 200)	6	Crop 50–150 mm tall	L/ha	50- 200						1.4– 2.1	1.4– 2.1	1.4– 2.1	_	1.4– 2.1	_	_	1.4– 2.1	2.1
Bronco® MA-X (bromoxynil 280 + MCPA 280)	6+ 4	Crop 50–150 mm tall	L/ha	50- 200						1.0- 1.43	_	1.0- 1.43	_	1.0- 1.43	1.0- 1.43	0.54– 1.5	1.0- 1.43	1.0- 1.43
Enforcer® 242 (picloram 26 + MCPA 420)	4	Crop 80–200 mm tall	L/ha	>50						-	_	0.67- 0.84	_	_	_	-	-	-
MCPA amine 750	4	Crop 100–150 mm tall	L/ha	>70						-	-	-	0.66- 0.73	-	0.66	-	-	-

Incorporation key: IBS = incorporated by sowing, PSI = pre-sowing incorporated, PSPE = post-sowing, pre-emergent.

Adjuvant key: MO = mineral oil, MOS = mineral oil plus surfactant, MSO = methylated seed oil, NIS = non-ionic surfactant.

NIS products might indicate a specific concentration (i.e. NIS 1000); refer to adjuvant chart for example products.

Read the label before using a product.

Mexican poppy	Mintweed	Mustards	New Zealand spinach	Paterson's curse	Peppercress	Rough poppy	Shepherd's purse	Skeleton weed	Sorrel	Sowthistle	Spiny emex	Thistle – saffron	Thistle – slender	Thistle – variegated	Wild radish	Wild turnip	Wireweed	Comments
-	_	_	_	_	-	_	-	_	-	_	_	_	_	_	_	_	_	
-	_	_	_	-	-	-	_	-	-	_	_	_	_	_	_	_	1.2- 1.7	Rate determined by soil type; refer label.
Ensur			an IW	'M plai	n in p	lace. It	is rec	omme	ended	l to ge	et you	r weed	ds test	ed for	resist	ance	– con:	sult your advisor for localised
																		Do not spray if temperature is >25 °C. Adjuvant: NIS 0.25%.
																		*Must be combined with clethodim or a FOP herbicide; refer label. Adjuvant: MSO 0.5%.
																		*Add NIS 0.2% or MSO 0.5%.
																		Application rate determined by weed size, adjuvant type and mix partner; refer label. Adjuvant: MSO or MOS.
2.1	_	2.1	_	2.1	1.4	_	1.4– 2.1	_	2.1	2.1	2.1	1.4- 2.1	_	1.4– 2.1	2.1	2.1	2.1	Do not spray if temperature is >20 °C.
1.0- 1.43	1.0- 1.43	1.0- 1.43	_	1.0- 1.43	1.0- 1.43	1.0- 1.43	1.0- 1.43	-	-	1.0- 1.5	1.0- 1.43	1.0- 1.43	1.0- 1.43	1.0- 1.43	1.0- 1.43	1.0- 1.43		Application rate increases with crop growth and weed size; refer label. Do not spray if temperature is >20 °C.
_	_	0.67- 0.84	0.67- 0.84 (S)	_	_	_	-	0.67- 0.84	-	_	0.67- 0.84	0.67- 0.84	_	0.67- 0.84	0.67- 0.84	0.67- 0.84	0.84	Application rate increases with crop growth and weed size; refer label.
-	_	0.66	_	0.66- 0.73	-	0.46- 0.73	-	-	-	_	_	0.66– 0.73		0.66- 0.73	0.66	0.66	_	Application rate increases with crop growth and weed size; refer label.

Table 29. Herbicides for grass weed control for chickpea – pre-emergence. Read the label before using a product.

Note: example trade names shown. Others may be available at different concentrations. See labels for details.	Herbicide group	Incorporation/growth stage	Unit of use	Boom water rate (L/ha)	Annual phalaris	Annual ryegrass	Barley grass	Brome grass	Vulpia/silver grass	Wildoats	Comments
Avadex® Xtra (tri- allate 500)	15	PSI	L/ha	30- 100	_	_	_	_	_	1.6	
Balance® 750 WG (isoxaflutole 750)	27	PSPE	g/ha	>50	_	_	_	_	100*	_	*Add simazine. Do not use on light or gravelly soils.
Bladex® (cyanazine 900)	5	PSI, IBS, PSPE	kg/ha	80- 200	_	1.7 or 2.2	1.7 or 2.2 (S)	1.7 or 2.2 (S)	_	-	Add trifluralin for improved ryegrass control. Low rate for lighter soils.
Boxer Gold® (prosulfocarb 800 + S-metolachlor 120)	15	IBS	L/ha	>50	_	2.5	_	_	2.5	-	
Outlook® (dimethenamid-p 720)	15	IBS	L/ha	70- 120	-	1.0	-	-	-	-	Will only provide suppression in high populations.
Palmero® TX	5+	IBS	l //	. 50	1.0 (S)	1.0 (S)	_	_	_	1.0 (S)	Sow 50 mm deep.
(terbuthylazine 750 + isoxaflutole 75)	27	PSPE	kg/ha	>50	1.0 (S)	1.0 (S)	_	_	_	1.0 (S)	
Prometryn 900	5	PSPE	kg/ha	50- 100	0.83 (S)	-	-	-	_	-	Add 0.83 kg/ha simazine.
Rifle® 440 (pendimethalin 440)	3	IBS	L/ha	50- 200	_	1.5- 2.25	-	_	1.5- 2.25 (S)	1.5- 2.25 (S)	
Rustler® (propyzamide 500)	3	IBS	L/ha	Not stated	1–2	1–2	1–2	1–2	1–2	1–2	
Sakura® (pyroxasulfone 850)	15	IBS	g/ha	50- 100	118	118	118	118 (S)	118	118 (S)	
Sencor® (metribuzin 480)	5	PSPE	L/ha	50- 100	_	0.28- 0.58 (S)	_	_	_	-	Rate influenced by soil type. Do not apply to sandy soils. Plant 50 mm deep.
Simazine 900	5	PSI, IBS, PSPE	kg/ha	50- 100	0.8–1.1 ^ (S)	0.8– 1.1*	0.8- 1.1*	0.8- 1.1* (S)	_	0.8- 1.1* (S)	*Add 0.8 L/ha trifluralin. ^Add 0.83 kg/ha prometryn.
Terbyne® Xtreme®	_	IBS		. =-	0.86- 1.2 (S)	0.86– 1.2 (S)	_	-	0.86- 1.2 (S)	0.86– 1.2 (S)	Low rate for lighter soils. Sow 30 mm, preferably 50 mm, deep. Do not use >0.86 kg/ha if soil pH >8.
(terbuthylazine 875)	5	PSPE	kg/ha	>50	0.6- 0.86 (S)	0.6- 0.86 (S)	_	_	0.6- 0.86 (S)	0.6- 0.86 (S)	·
TriflurX® (trifluralin 480)	3	PSI, IBS	L/ha	70- 450		1.2–1.7	-	-	-	-	Rate influenced by soil type; refer label.
Ultro® (carbentamide 900)	23	IBS, PSPE	kg/ha	50- 150	_	1.1.0 (S)	1.1.0 (S)	1.1.0 (S)	-	-	Apply in a tank mix to improve control. Sow 30–50 mm deep.

Incorporation key: IBS = incorporated by sowing, PSI = pre-sowing incorporated, PSPE = post-sowing, pre-emergent. NIS products might indicate a specific concentration (i.e. NIS 1000); refer to adjuvant chart for example products.





RESIDUAL AND BURNDOWN CONTROL WITH FLEXIBILITY

- IBS application prior to Wheat*, Chickpeas, Faba beans, Lentils and Field peas as well as post-emergence in Lucerne and prior to summer crops.
- Pre-emergence activity against difficult to control grass and broadleaf weeds.
- Flexibility in crop rotations with short re-cropping intervals.
- Group 14 PPO mode of action with no known resistance.
- Enhanced burndown on emerged weeds.
- Long term residual control on fence-lines and channel banks.







^{*} Excluding Durum varieties.

Table 30. Herbicides for broadleaf weed control for chickpea – pre-emergence.

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Note: example trade names shown. Others may be available at different concentrations. See labels for details.	Herbicide group	Incorporation/growth stage	Unit of use	Boom water rate (L/ha)	Amsinckia	Bedstraw	Black bindweed	Canola – volunteer	Capeweed	Charlock	Corn gromwell	Deadnettle	Dock	Erodium (stork's bill)	Fleabane	Fumitory	Marshmallow	Medics
Balance® 750 WG (isoxaflutole 750)	27	PSPE	g/ha	>50	_	_	_	_	100	_	_	100*	_	_	_	_	-	100
Bladex® (cyanazine 900)	5	PSI, IBS, PSPE	kg/ha	80- 200	_	_	_	_	1.7 or 2.2	_	_	1.7 or 2.2	_	_	_	1.7 or 2.2 (S)	_	-
Boxer Gold® (prosulfocarb 800 + S-metolachlor 120)	15	IBS	L/ha	>50	-	-	-	_	_	_	-	-	_	_	_	-	-	-
	F	IBS	1 (1	40.70	_	-	_	_	0.83- 1.1	_	_	-	_	0.83- 1.1	_	_	-	-
Diuron® 900	5	PSPE	kg/na	40–70	-	-	-	_	0.55- 0.83	_	_	-	_	0.55- 0.83	_	_	-	-
Palmero® TX (terbuthylazine	5+	IBS	lea (h.a.	. 50	_	-	_	_	1.0	_	1.0	-	_	_	1.0	1.0 (S)	_	-
750 + isoxaflutole 75)	27	PSPE	kg/ha	>50	_	-	_	_	1.0	_	0.7- 1.0	0.7- 1.0	_	_	1.0	1.0	1.0	1.0
Prometryn 900	5	PSPE	kg/ha	50- 100	-	-	0.83 (S)	_	_	_	_	0.83	_	_	_	_	-	-
Reflex® (fomesafen	14	IBS	L/ha	>50	_	-	_	_	0.75- 1.5 (S)	_	_	-	_	_	0.75- 1.5 (S)	0.75- 1.5 (S)	_	_
240)		PSPE			_	-	-	-	0.9– 1.25 (S)	-	_	0.9– 1.25	_	_	0.5- 1.25 (S)	0.5- 0.9 (S) - 1.25	_	-
Rifle® 440 (pendimethalin 440)	3	IBS	L/ha	50- 200	_	-	_	_	_	_	_	_	_	_	_	_	_	_
Sakura® (pyroxasulfone 850)	15	IBS	g/ha	50- 100	_	_	_	_	_	_	_	_	_	_	_	_	-	-
Sencor® (metribuzin 480)	5	PSPE	L/ha	50- 100	0.28- 0.58	-	-	-	0.28- 0.58	0.28- 0.58	0.28- 0.58	0.28- 0.58	0.28- 0.58	0.28- 0.58	-	0.28- 0.58	-	-
Simazine 900	5	PSI, IBS, PSPE	kg/ha	50- 100	_	-	0.8- 1.1^ (S)	0.8– 1.1* (not TT)	0.8– 1.1*	_	0.8– 1.1*	0.8- 1.1^	_	_	_	0.8- 1.1*	_	-
Terbyne® Xtreme®	_	IBS	les #	. 50	_	-	-	_	-	_	0.86- 1.2	0.86- 1.2	-	_	-	_	-	0.86- 1.2
(terbuthylazine 875)	5	PSPE	kg/ha	>50	_	_	_	_	_	_	0.6- 0.86	0.6- 0.86	_	_	_	-	-	0.6- 0.86
TriflurX® (trifluralin 480)	3	PSI, IBS	L/ha	70- 450	_	-	_	_	_	_	_	-	_	_	_	1.2- 1.7 (S)	-	-
Valor®/Terrain® (flumioxazin 500)	14	IBS	g/ha	>80	_	180 (S)	180 (S)	180 (S)	180 (S)	_	_	_	_	_	180 (S)	180 (S)	-	_

Incorporation key: IBS = incorporated by sowing, PSI = pre-sowing incorporated, PSPE = post-sowing, pre-emergent. NIS products might indicate a specific concentration (i.e. NIS 1000); refer to adjuvant chart for example products.

Read the label before using a product.

Mintweed	Mustards	New Zealand spinach	Prickly lettuce	Rough poppy	Shepherd's purse	Sorrel	Sowthistle	Spiny emex	Thistle – saffron	Thistle – spear/black	Toad rush	Wild radish	Wild turnip	Wireweed	Comments
_	100	-	100	_	_	_	100	100*(S)	100*(S)	100*	_	100	100	100* (S)	*Add simazine. Do not use on light or gravelly soils.
-	1.7 or 2.2	-	1.7 or 2.2	1.7 or 2.2	-	-	1.7 or 2.2	1.7 or 2.2	-	-	_	1.7 or 2.2 (S)	1.7 or 2.2	1.7 or 2.2 (S)	Add trifluralin for improved ryegrass control. Low rate for lighter soils.
_	-	-	-	_	_	_	_	-	-	-	2.5	_	_	_	
_	-	-	_	_	_	_	_	0.83- 1.1	-	_	0.83- 1.1	0.83- 1.1	0.83- 1.1	_	Lower rate for lighter soils.
-	-	-	-	_	-	-	-	0.55- 0.83	-	-	0.55- 0.83	0.55- 0.83	_	_	
-	-	-	-	_	-	_	_	1.0 (S)	-	-	_	_	0.55- 0.84	_	Sow 50 mm deep.
0.7– 1.0	0.7- 1.0	-	0.7- 1.0	-	0.7- 1.0	-	0.7- 1.0	1.0 (S)	_	-	0.7- 1.0	1.0	0.7- 1.0	0.7–1.0	
_	0.83	-	0.83	_	0.83	_	0.83	_	_	-	_	_	0.83	0.83	Add 0.83 kg/ha simazine.
-	0.5- 0.75 (S) - 1.5	-	0.5- 0.75 (S) - 1.5	_	_	_	0.5- 0.75 (S) - 1.5	0.75- 1.5 (S)	_	-	0.75- 1.5 (S)	0.5- 0.75 (S) - 1.5	0.5- 0.75 (S) - 1.5	_	Low rates generally provide suppression and shorter residual.
_	0.5- 0.9 (S) - 1.25	-	0.5- 1.25	_	-	_	0.5– 1.25	0.9– 1.25 (S)	-	-	0.9- 1.25 (S)		0.5- 0.9 (S) - 1.25	0.5-0.9 (S) - 1.25	
_	-	-	-	-	-	-	-	-	-	-	_	_	_	1.5- 2.25	
_	-	-	-	_	_	_	_	_	_	-	118	_	_	_	
-	0.28- 0.58	-	_	0.28- 0.58	0.28- 0.58	0.28- 0.58	0.28- 0.58	0.28- 0.58	-	-	0.28- 0.58	0.28- 0.58	0.28- 0.58	0.28- 0.58	Rate influenced by soil type. Do not apply to sandy soils. Plant 50 mm deep.
-	0.8- 1.1*	-	0.8- 1.1 or^	0.8- 1.1*	0.8- 1.1^	-	0.8- 1.1 or^	-	_	-	-	-	0.8- 1.1* or^	0.8- 1.1* or^	*Add 0.8 L/ha trifluralin. ^Add 0.83 kg/ha prometryn.
0.86– 1.2	0.86- 1.2	-	0.86- 1.2	-	0.86- 1.2	-	0.86- 1.2	0.86- 1.2 (S)	-	-	0.86- 1.2	0.86- 1.2 (S)	0.86- 1.2	0.86- 1.2	Low rate for lighter soils. Sow 30 mm, preferably 50 mm, deep. Do not use >0.86 kg/ha if soil pH >8.
0.6- 0.86	0.6- 0.86	-	0.6- 0.86	-	0.6- 0.86	-	0.6- 0.86	0.6- 0.86 (S)	-	-	0.6- 0.86	0.6- 0.86 (S)	0.6- 0.86	0.6- 0.86	
_	_	-	_	_	_	_	_	_	_	_	_	_	_	1.2–1.7	Rate influenced by soil type; refer label.
_	-	180 (S)	180 (S)	180 (S)	_	_	180 (S)	-	-	-	180 (S)	180 (S)	_	180 (S)	Avoid light soil types as crop damage might occur.

Table 31. Herbicides for grass and broadleaf weed control for chickpea – post-emergence. Read the label before using a product.

Note: example trade names shown. Others may be available at different concentrations. See labels for details.	Herbicide group	Incorporation/growth stage	Unit of use	Boom water rate (L/ha)	Annual phalaris	Annual ryegrass	Barley grass	Brome grass	Vulpia/silver grass	Wild oats	Amsinckia	Bedstraw	Canola – volunteer	Charlock	Lupin – volunteer	Marshmallow	Mustards	Shepherd's purse	Wild radish	Wild turnip	Comments
Broadstrike® (flumetsulam 800)	2	4–6 branches	g/ha	50- 150	-	-	-	-	_	-				2	5				25 (S)	25	Crop discolouration, stunting and/or delayed flowering can occur. Do not tank mix or add adjuvants.
Elantra® Xtreme® (quizalofop-p-ethyl 200)	1	Not stated	mL/ ha	>50	-	150– 190	125	150– 190	_	65 or 125											Adjuvant: MSO 1% or NIS 0.2%.
Factor® WG (butroxydim 250)	1	Not stated	g/ha	50- 100	80- 180*	80- 180	80– 180	80– 180*	_	80– 180											*Must be combined with clethodim or a FOP herbicide; refer label. Adjuvant: MSO 0.5%.
Fusilade® Forte (fluazifop-p- ethyl 128)	1	Not stated	L/ha	50- 100	-	_	-	0.5	_	_											
Shogun® (propaquizafop 100)	1	Not stated	L/ha	50- 150	-	0.45	0.2*	0.3*	_	0.25*											*Add NIS 0.2% or MSO 0.5%.
Status® (clethodim 240)	1	Not after full flower	L/ha	50- 150	0.15– 0.5	0.15– 0.5	0.175- 0.5	0.175- 0.5	0.25- 0.5	0.175- 0.5											Adjuvant: MSO 1% or MOS 0.5–1%.
Verdict® (haloxyfop 520)	1	2-leaf – bud formation	mL/ ha	50- 150	75– 100	75– 100	50-75	50-75	_	37.5– 100											Application rate determined by weed size, adjuvant type and mix partner; refer label. Adjuvant: MSO or MOS.

NIS products might indicate a specific concentration (i.e. NIS 1000); refer to adjuvant chart for example products.

Adjuvant key: MO = mineral oil, MOS = mineral oil plus surfactant, MSO = methylated seed oil, NIS = non-ionic surfactant.



Farming is uncertain enough without adding propyzamide to your list of doubts. Rustler® Selective Herbicide is formulated to an exceptionally high quality standard for unquestionable consistency. That's why it stands out as the propyzamide herbicide trusted by more farmers to perform better during mixing and application. Which makes Rustler® the reliable choice because if you're banking on a cleaner, healthier harvest, a tank full of trouble during planting is the last thing you need. For more information visit www.rustlerherbicide.com.au







Table 32. Herbicides for grass and broadleaf weed control for field pea – pre-emergence.

Note: example trade names shown. Others may be available at different concentrations. See labels for details.	Herbicide group	Incorporation/ growth stage	Unit of use	Boom water rate (L/ha)	Annual phalaris	Annual ryegrass	Barley grass	Brome grass	Vulpia/silver grass	Wild oats	Amsinckia	Bedstraw	Black bindweed	Canola – volunteer	Capeweed	Charlock	Cleavers	Corn gromwell	Deadnettle	Dock
Avadex® Xtra (tri- allate 500)	15	PSI	L/ha	30- 100	-	_	_	_	_	1.6	_	-	-	_	_	_	_	_	_	-
Bladex®	5	PSI, IBS	kg/	80-	-	1.7 or 2.2	1.7 or 2.2 (S)	1.7 or 2.2 (S)	-	-	_	-	-	-	1.7 or 2.2	_	-	-	1.7 or 2.2	-
(cyanazine 900)	J	PSPE	ha	200	-	1.1 or 1.7	1.1 or 1.7 (S)	1.1 or 1.7 (S)	_	_	_	-	-	_	1.1 or 1.7	_	_	_	1.1 or 1.7	_
Boxer Gold® (prosulfocarb 800 + S-metolachlor 120)	15	IBS	L/ha	>50	-	2.5	_	_	2.5	_	-	-	-	-	_	_	_	_	_	-
Diuron® 900	_	IBS	kg/	40-	-	_	_	_	_	_	_	-	-	-	0.83- 1.1	_	_	_	_	_
Didion 900	5	PSPE	ha	70	-	_	_	_	_	_	_	-	-	-	0.55- 0.83	_	_	_	_	-
Overwatch® (bixlozone 400)	13	IBS	L/ha	60– 100	1.25 (S)	1.25	1.25 (S)	1.25 (S)	1.25	1.25 (S)	_	1.25 (S)	-	-	1.25 (S)	_	1.25 (S)	_	_	_
Reflex®	1.4	IBS	1. /1	. 50	-	-	_	_	_	_	_	-	-	_	0.75– 1.5 (S)	_	_	_	_	-
(fomesafen 240)	14	PSPE	L/ha	>50	-	-	-	_	_	_	-	-	-	-	0.9– 1.25 (S)	_	_	-	0.9– 1.25	-
Sakura® (pyroxasulfone 850)	15	IBS	g/ha	50- 100	118	118	118	118 (S)	118	118 (S)	-	-	-	-	_	_	_	_	_	_
Sencor® (metribuzin 480)	5	PSPE– 3 node	L/ha	50- 100	-	0.28- 0.73 (S)	_	_	_	-	0.28- 0.73	-	-	-	0.28- 0.73	0.28- 0.73	_	0.28- 0.73	0.28- 0.73	0.28- 0.73
Spinnaker® (imazethapyr 700)	2	PSPE	g/ha	50- 100	-	70	70	_	_	70	70– 100	-	-	-	70– 100	_	_	_	70	-
Terbyne® Xtreme® (terbuthylazine	5	IBS	kg/	>50	0.86- 1.2 (S)	0.86- 1.2 (S)	_	_	0.86- 1.2 (S)	0.86- 1.2 (S)	-	-	-	_	_	_	_	0.86- 1.2	0.86- 1.2	_
875)	J	PSPE	ha	/30	0.6- 0.86 (S)	0.6- 0.86 (S)	-	_	0.6- 0.86 (S)	0.6- 0.86 (S)	-	-	-	-	-	-	_	0.6- 0.86	0.6- 0.86	-
TriflurX® (trifluralin 480)	3	PSI, IBS	L/ha	70– 450	1.2- 1.7	1.2– 1.7	_	_	_	-	_	-	-	-	-	-	_	-	_	-
Ultro® (carbentamide 900)	23	IBS	kg/ ha	50- 150	-	1.1– 1.7	1.1– 1.7	1.1– 1.7	-	_	_	-	-	-	-	_	_	-	_	-
Valor®/Terrain® (flumioxazin 500)	14	IBS	g/ha		-	-	-	_	_	-	_	180 (S)	180 (S)	180 (S)	180 (S)	_	_	-	_	-

Incorporation key: IBS = incorporated by sowing, PSI = pre-sowing incorporated, PSPE = post-sowing, pre-emergent. NIS products might indicate a specific concentration (i.e. NIS 1000); refer to adjuvant chart for example products.

Read the label before using a product.

Erodium (stork's bill)	Fleabane	Fumitory	Medics	Mintweed	Mustards	New Zealand spinach	Paterson's curse	Prickly lettuce	Rough poppy	Shepherd's purse	Sorrel	Sowthistle	Spiny emex	Toad rush	Wild radish	Wild turnip	Wireweed	Comments
_	_	_	_	_	_	_	-	_	_	_	_	_	_	-	_	_	_	
-	_	1.7 or 2.2 (S)	-	-	1.7 or 2.2	-	-	1.7 or 2.2	1.7 or 2.2	_	-	1.7 or 2.2	1.7 or 2.2	-	1.7 or 2.2 (S)	1.7 or 2.2	1.7 or 2.2 (S)	Add trifluralin for improved ryegrass control. Low rate for lighter soils.
_	-	1.1 or 1.7 (S)	-	-	1.1 or 1.7	-	-	1.1 or 1.7	1.1 or 1.7	-	-	1.1 or 1.7	1.1 or 1.7	-	1.1 or 1.7 (S)	1.1 or 1.7	1.1 or 1.7 (S)	_
_	_	_	_	_	_	_	-	_	-	_	_	-	_	2.5	_	-	_	
0.83- 1.1	-	_	-	-	-	-	-	-	-	-	-	-	0.83- 1.1	0.83- 1.1	0.83- 1.1	0.83– 1.1	-	Lower rate for lighter soils.
0.55- 0.83	-	_	_	_	-	-	-	_	-	-	-	-	0.55– 0.83	0.55- 0.83	0.55- 0.83	0.55– 0.83	-	
_	_	_	_	_	_	-	-	1.25 (S)	-	_	-	1.25	-	-	1.25 (S)	-	1.25	Sow at 30 mm.
-	0.75- 1.5 (S)	1.5 (S)	_	_	0.5- 0.75 (S) - 1.5	-	-	0.5- 0.75 (S) - 1.5	-	_	_	0.5- 0.75 (S) - 1.5	0.75- 1.5 (S)	0.75- 1.5 (S)	0.5- 0.75 (S) - 1.5	0.5- 0.75 (S) - 1.5	_	Low rates generally provide suppression and shorter residual.
_	0.5- 1.25 (S)	0.5- 0.9 (S) - 1.25	_	-	0.5- 0.9 (S) - 1.25	-	-	0.5- 1.25	-	-	-	0.5- 1.25	0.9– 1.25 (S)	0.9– 1.25 (S)	0.5- 0.9 (S) - 1.25	0.5- 0.9 (S) - 1.25	0.5- 0.9 (S) - 1.25	
_	_	_	_	_	_	_	-	_	_	_	_	_	_	118	_	_	_	
0.28- 0.73	_	0.28- 0.73	_	_	0.28- 0.73	_	-	_	0.28– 0.73	0.28- 0.73	0.28- 0.73	0.28– 0.73	0.28- 0.73	0.28– 0.73	0.28- 0.73	0.28– 0.73	0.28- 0.73	Rate influenced by soil type. There are extensive crop safety considerations, including variety; refer label.
_	_	_	_	_	70	_	70	70– 100	_	70	_	_	70	70	70	70	70	Some weeds might not be completely controlled, but growth will be suppressed.
-	-	_	0.86– 1.2	0.86– 1.2	0.86– 1.2	-	-	0.86– 1.2		0.86– 1.2	-	0.86– 1.2	0.86- 1.2 (S)	0.86– 1.2	0.86- 1.2 (S)	0.86– 1.2	0.86– 1.2	Low rate for lighter soils. Sow 30 mm, preferably 50 mm, deep. Do not use >0.86 kg/ha if soil pH >8.
_	_	_	0.6- 0.86	0.6- 0.86	0.6- 0.86	_	-	0.6- 0.86		0.6- 0.86	_	0.6- 0.86	0.6- 0.86 (S)	0.6- 0.86	0.6- 0.86 (S)	0.6- 0.86	0.6- 0.86	
_	_	1.2- 1.7 (S)	-	-	-	-	-	_	-	_	-	_	-	-	-	-	1.2- 1.7	Rate influenced by soil type; refer label.
_	_	_	-	_	_	-	-	_	-	_	_	_	-	-	_	-	_	Apply in a tank mix to improve control.
_	180 (S)	180 (S)	-	_	-	180 (S)	-	180 (S)	180 (S)	-	-	180 (S)	-	180 (S)	180 (S)	-	180 (S)	Avoid light soil types as crop damage might occur.

Table 33. Herbicides for grass and broadleaf weed control for field pea – post-emergence.

Note: example trade names shown. Others may be available at different concentrations. See labels for details.	Herbicide group	Incorporation/ growth stage	Unit of use	Boom water rate (L/ha)	Annual phalaris	Annual ryegrass	Barley grass	Brome grass	Vulpia/silver grass	Wild oats	Amsinckia	Bedstraw	Canola – volunteer	Capeweed	Charlock	Corn gromwell	Deadnettle
Bladex® (cyanazine 900)	5	2nd node – first flower	kg/ha	80- 200	-	0.85 or 1.1	0.85- 1.1.0 (S)	0.85- 1.1.0 (S)	-	_	-	_	_	0.85 or 1.1	_	-	0.85 or 1.1
Broadstrike® (flumetsulam 800)	2	2–6 node	g/ha	50- 150	-	_	-	-	-	_	25	25	25	_	25	-	-
Brodal® Options (diflufenican 500)	12	3rd node – flowering	mL/ ha	50- 100	-	-	-	-	-	_	200 (S)	-	-	200 (S)	125- 150* or 200	200 (S)	200
Diclofop-methyl 375	1	Not stated	L/ha	80	-	1.0	_	_	_	1.5–2							
Elantra® Xtreme® (quizalofop-p- ethyl 200)	1	Not stated	mL/ ha	>50	-	150- 190	125	150– 190	-	65 or 125							
Factor® WG (butroxydim 250)	1	Up to flowering	g/ha	50- 100	80- 180*	80– 180	80– 180	80– 180*	_	80– 180							
Fusilade® Forte (fluazifop-p-ethyl 128)	1	Not stated	L/ha	50- 100	-	-	_	0.5	-	_							
Intercept® (imazamox 33 + imazapyr 15) IMI tolerant varieties only	2	3–6 node	L/ha	>70	-	0.6- 0.75 (S)	0.375- 0.75	0.375- 0.75	0.6- 0.75 (S)	0.375- 0.75	-	0.6- 0.75 (S)	-	-	0.6- 0.75	-	-
MCPA amine 750	4	3rd node – flowering	L/ha	30- 120	-	_	_	_	-	_	-	_	_	_	80 or 100	-	-
Raptor® (imazamox 700)	2	Not after 4th node	g/ha	>50	-	_	45	45	-	45	-	45 (S)	-	-	-	-	45
Sencor® (metribuzin 480)	5	PSPE – 3 node	L/ha	50- 100	_	0.28- 0.73 (S)	_	_	-	_	0.28- 0.73	_	_	0.28- 0.73	0.28- 0.73	0.28- 0.73	0.28- 0.73
Shogun® (propaquizafop 100)	1	Not stated	L/ha	50- 150	-	0.45	0.2*	0.3*	-	0.25*							
Spinnaker® (imazethapyr 700)	2	Post emergence	g/ha	50- 100	-	_	_	_	-	_	-	-	-	-	-	-	70
Status® (clethodim 240)	1	Up to 7 node/ early branching	L/ha	50- 150	0.15– 0.5	0.15- 0.5	0.175- 0.5	0.175- 0.5	0.25- 0.5	0.175- 0.5							
Verdict® (haloxyfop 520)	1	2-leaf – before flowering	mL/ ha	50- 150	75– 100	75– 100	50–75	50-75	-	37.5- 100							

Adjuvant key: MO = mineral oil, MOS = mineral oil plus surfactant, MSO = methylated seed oil, NIS = non-ionic surfactant. NIS products might indicate a specific concentration (i.e. NIS 1000); refer to adjuvant chart for example products.

Read the label before using a product.

					Jing u p													
Dock	Erodium (stork's bill)	Fumitory	Lupin – volunteer	Marshmallow	Mustards	Paterson's curse	Prickly lettuce	Rough poppy	Shepherd's purse	Skeleton weed	Sorrel	Sowthistle	Spiny emex	Toad rush	Wild radish	Wild turnip	Wireweed	Comments
_	_	0.85- 1.1.0 (S)	-	_	0.85 or 1.1	-	0.85 or 1.1	0.85 or 1.1	-	-	_	0.85 or 1.1	0.85 or 1.1	_	0.85- 1.1.0 (S)	0.85 or 1.1	0.85- 1.1.0 (S)	Do not apply to Wirrega variety. High rate for high weed pressure.
-	-	-	25	25	25	-	-	-	25	-	_	-	-	-	25 (S)	25	-	Crop discolouration, stunting and/or delayed flowering can occur. Do not tank mix or add adjuvants.
_	_	_	_	200 (S)	150– 200	200 (S)	125- 150* or 200	200 (S)	200 (S)	200 (S)	200 (S)	_	_	200 (S)	200	150– 200	200 (S)	*Can add MCPA amine to assist control; refer label. Also has residual activity.
																		Do not spray if temperature is >25 °C. Adjuvant: NIS 0.25%.
																		Adjuvant: MSO 1% or NIS 0.2%.
																		*Must be combined with clethodim or a FOP herbicide; refer label. Adjuvant: MSO 0.5%.
_	_	0.6– 0.75	-	0.6- 0.75	0.375- 0.75	-	-	-	-	-	_	-	0.6- 0.75 (S)	_	0.3- 0.75	0.3- 0.75	_	Adjuvant: MSO 0.5%.
_	_	_	_	_	_	-	80 or 100	-	-	-	_	_	_	_	_	_	_	Add diflufenican; refer label. Application rate increases with weed size.
-	45	-	45	_	45	-	-	-	45 (S)	-	_	-	45 (S)	-	45 (S)	45	45 (S)	Adjuvant: NIS 1000 0.2%. There are extensive crop safety considerations; refer label.
0.28- 0.73	0.28– 0.73	0.28- 0.73	-	_	0.28- 0.73	-	-	0.28– 0.73	0.28- 0.73	-	0.28– 0.73	0.28– 0.73	0.28– 0.73	0.28– 0.73	0.28- 0.73	0.28– 0.73	0.28– 0.73	Rate influenced by soil type. There are extensive crop safety considerations, including variety; refer label.
																		*Add NIS 0.2% or MSO 0.5%.
_	_	-	-	_	70	-	-	-	-	-	_	-	-	70	-	_	70	Add NIS 0.2%.
																		Adjuvant: MSO 1% or MOS 0.5–1%.
																		Application rate determined by weed size, adjuvant type and mix partner; refer label. Adjuvant: MSO or MOS.

Table 34. Herbicides for weed control for lupin – pre-emergence.

Table 54. Herbicides for We		1	'	•		I		I	I	I			
Note: example trade names shown. Others may be available at different concentrations. See labels for details.	Herbicide group	Incorporation/growth stage	Unit of use	Boom water rate (L/ha)	Annual phalaris	Annual ryegrass	Barley grass	Brome grass	Vulpia/silver grass	Wild oats	Capeweed	Corn gromwell	Deadnettle
Avadex® Xtra (tri-allate 500)	15	PSI	L/ha	30–100	-	_	_	_	_	1.6	-	-	_
Boxer Gold® (prosulfocarb 800 + S-metolachlor 120)	15	IBS	L/ha	>50	-	2.5	_	_	2.5	_	-	-	_
Outlook® (dimethenamid-p 720)	15	IBS	L/ha	70–120	-	1.0	_	_	_	_	-	-	_
Reflex® (fomesafen 240)	14	IBS		. 50	-	_	_	_	_	_	0.75- 1.5 (S)	-	_
Narrow-leaf lupin only	14	PSPE	L/ha	>50	-	_	_	_	_	_	0.9– 1.25 (S)	-	0.9– 1.25
Rifle® 440 (pendimethalin 440)	3	IBS	L/ha	50–200	-	1.5– 2.25	_	-	1.5– 2.25 (S)	1.5– 2.25 (S)	-	-	-
Rustler® (propyzamide 500)	3	IBS	L/ha	Not stated	1.0-2.0	1.0-2.0	1.0-2.0	1.0-2.0	1.0-2.0	1.0-2.0	-	-	_
Sakura® (pyroxasulfone 850)	15	IBS	g/ha	50–100	118	118	118	118 (S)	118	118 (S)	-	-	_
Simazine 900	5	PSPE	kg/ha	50–100	-	0.8- 2.2*	0.8- 2.2*	0.8-2.2 (S)*	-	0.8-2.2 (S)*	0.8- 2.2*	0.8- 2.2*	_
Terbyne® Xtreme®	_	IBS	l /l	. 50	0.86- 1.2 (S)	0.86- 1.2 (S)	_	_	0.86- 1.2 (S)	0.86- 1.2 (S)	-	0.86- 1.2	0.86- 1.2
(terbuthylazine 875)	5	PSPE	kg/ha	>50	0.6- 0.86 (S)	0.6- 0.86 (S)	_	_	0.6- 0.86 (S)	0.6- 0.86 (S)	-	0.6- 0.86	0.6- 0.86
TriflurX® (trifluralin 480)	3	PSI, IBS	L/ha	70–450	1.2–1.7	1.2–1.7	_	_	_	_	-	-	_
Ultro® (carbentamide 900)	23	IBS	kg/ha	50–150	-	1.1–2.3	1.1–2.3	1.1–2.3	-	-	-	-	_

Incorporation key: IBS = incorporated by sowing, PSI = pre-sowing incorporated, PSPE = post-sowing, pre-emergent.

Adjuvant key: MO = mineral oil, MOS = mineral oil plus surfactant, MSO = methylated seed oil, NIS = non-ionic surfactant.

NIS products might indicate a specific concentration (i.e. NIS 1000); refer to adjuvant chart for example products.

Read the label before using a product.

Fleabane	Fumitory	Medics	Mintweed	Mustards	Prickly lettuce	Shepherd's purse	Sowthistle	Spiny emex	Toad rush	Wild radish	Wild turnip	Wireweed	Comments
_	-	-	_	-	-	-	_	-	-	-	-	-	
-	-	-	_	_	-	-	_	_	2.5	_	-	-	
-	-	-	_	-	-	-	_	-	-	-	-	-	Will only provide suppression in high populations.
0.75- 1.5 (S)	0.75– 1.5 (S)	-	_	0.5- 0.75 (S) - 1.5	0.5- 0.75 (S) - 1.5	-	0.5- 0.75 (S) - 1.5	0.75- 1.5 (S)	0.75– 1.5 (S)	0.5- 0.75 (S) - 1.5	0.5- 0.75 (S) - 1.5	-	Low rates generally provide suppression and shorter residual.
0.5– 1.25 (S)	0.5-0.9 (S) - 1.25	-	-	0.5-0.9 (S) - 1.25	0.5- 1.25	-	0.5– 1.25	0.9– 1.25 (S)	0.9– 1.25 (S)	0.5-0.9 (S) - 1.25	0.5-0.9 (S) - 1.25	0.5-0.9 (S) - 1.25	
-	-	-	_	_	-	-	-	-	-	_	-	1.5– 2.25	
-	-	-	_	-	-	-	_	-	-	-	-	-	
-	-	-	_	-	-	-	-	-	118	-	-	-	
-	0.8- 2.2*	-	_	0.8- 2.2*	-	-	_	-	-	_	0.8- 2.2*	0.8- 2.2*	*0.8–1.1 kg/ha on light soil, 1.3–2.2 kg/ha on heavy soils; refer label.
_	-	0.86- 1.2	0.86– 1.2	0.86- 1.2	0.86– 1.2	0.86- 1.2	0.86- 1.2	0.86- 1.2 (S)	0.86- 1.2	0.86- 1.2 (S)	0.86– 1.2	0.86- 1.2	Low rate for lighter soils. Sow 30 mm, preferably 50 mm, deep. Do not use >0.86 kg/ha if soil pH >8.
_	-	0.6– 0.86	0.6- 0.86	0.6- 0.86	0.6- 0.86	0.6– 0.86	0.6- 0.86	0.6- 0.86 (S)	0.6– 0.86	0.6- 0.86 (S)	0.6– 0.86	0.6– 0.86	
_	1.2–1.7 (S)	-	_	-	-	-	-	-	-	_	-	1.2–1.7	Rate influenced by soil type; refer label.
-	-	-	_	_	-	-	_	_	_	_	-	-	Apply in a tank mix to improve control.

Table 35. Herbicides for weed control for lupin – post-emergence.

Note: example trade names shown. Others may be available at different concentrations. See labels for details.	Herbicide group	Incorporation/growth stage	Unit of use	Boom water rate (L/ha)	Annual phalaris	Annual ryegrass	Barley grass	Brome grass	Vulpia/silver grass	Wild oats	Amsinckia	Capeweed	Charlock	Corn gromwell
Brodal® Options (diflufenican 500)	12	2-leaf– primary budding	mL/ha	50- 100	-	-	-	-	-	-	200 (S)	200 (S)	200	200 (S)
Diclofop-methyl 375	1	Not stated	L/ha	80	_	1.0	_	_	_	1.5–2.0				
Elantra® Xtreme® (quizalofop-p-ethyl 200)	1	Not stated	mL/ha	>50	-	150– 190	125	150– 190	-	65 or 125				
Factor® WG (butroxydim 250)	1	Not stated	g/ha	50- 100	80- 180*	80– 180	80– 180	80– 180*	-	80- 180				
Fusilade® Forte (fluazifop- p-ethyl 128)	1	Not stated	L/ha	>50	0.4 or 0.82	0.4 or 0.82	0.4 or 0.82	0.4 or 0.82	-	0.4 or 0.82				
Shogun® (propaquizafop 100)	1	Not stated	L/ha	50- 150	_	0.45	0.2*	0.3*	_	0.25*				
Status® (clethodim 240)	1	Up to 80% flower	L/ha	50- 150	0.15- 0.5	0.15- 0.5	0.175– 0.5	0.175- 0.5	0.25- 0.5	0.175– 0.5				
Verdict® (haloxyfop 520)	1	2-leaf – before flowering	mL/ha	50- 150	75– 100	75– 100	50-75	50-75	-	37.5- 100				

Adjuvant key: MO = mineral oil, MOS = mineral oil plus surfactant, MSO = methylated seed oil, NIS = non-ionic surfactant. NIS products might indicate a specific concentration (i.e. NIS 1000); refer to adjuvant chart for example products.

Read the label before using a product.

Deadnettle	Marshmallow	Mustards	Paterson's curse	Prickly lettuce	Rough poppy	Shepherd's purse	Skeleton weed	Sorrel	Toad rush	Wild radish	Wild turnip	Wireweed	Comments
200	200 (S)	150- 200	200 (S)	200	200 (S)	200 (S)	200 (S)	200 (S)	200 (S)	200	150– 200	200 (S)	Also has residual activity.
													Do not spray if temperature is >25 °C. Adjuvant: NIS 0.25%.
													Adjuvant: MSO 1% or NIS 0.2%.
													*Must be combined with clethodim or a FOP herbicide; refer label. Adjuvant: MSO 0.5%.
													Low rate for 2–5-leaf weeds, high rate for 5-leaf to early tillering weeds.
													*Add NIS 0.2% or MSO 0.5%.
													Adjuvant: MSO 1% or MOS 0.5–1%.
													Application rate determined by weed size, adjuvant type and mix partner; refer label. Adjuvant: MSO or MOS.

Table 36. Herbicides for weed control for faba bean and lentil – pre-emergence – page 1 of 2.

Note: example trade names shown. Others may be available at different concentrations. See labels for details.	Herbicide group	Incorporation/ growth stage	Unit of use	Boom water rate (L/ha)	Annual phalaris	Annual ryegrass	Barley grass	Brome grass	Vulpia/silver grass	Wild oats	Amsinckia	Bedstraw	Black bindweed	Canola – volunteer	Capeweed	Charlock	Cleavers
Avadex® Xtra (tri- allate 500) Faba bean only	15	PSI	L/ha	30- 100	_	_	-	_	_	1.6	_	-	-	_	_	_	-
Bladex® (cyanazine 900)	5	PSI, IBS, PSPE	kg/ ha	80- 200		1.7 or 2.2	1.7 or 2.2 (S)	1.7 or 2.2 (S)	_	-	-	-		_	1.7 or 2.2	_	_
Boxer Gold® (prosulfocarb 800 + S-metolachlor 120)	15	IBS	L/ha	>50	_	2.5	-	-	2.5	_	_	_	_	_	_	_	-
Diuron® 900	5	IBS	kg/	40-70	_	-	-	-	-	-	-	_	-	-	0.83- 1.1	-	-
Diaron 300		PSPE	ha	40 70	_	_	-	_	_	_	_	-	_	_	0.55- 0.83	_	_
Overwatch® (bixlozone 400) Faba bean only	13	IBS	L/ha	60- 100	1.25 (S)	1.25	1.25 (S)	1.25 (S)	1.25	1.25 (S)	_	1.25 (S)	_	_	1.25 (S)		1.25 (S)
Reflex® (fomesafen 240) Faba bean only	14	IBS	L/ha	>50	-	-	-	-	-	-	-	-	-	-	0.75- 1.5 (S)	-	-
aba bean only		PSPE			_	_	-	_	_	_	-	-	_	_	0.9– 1.25 (S)	_	-
Reflex® (fomesafen 240) Lentil only	14	IBS	L/ha	>50	_	_	-	_	_	_	_	-	_	_	0.75- 1.0 (S)	_	_
Rifle® 440 (pendimethalin 440)	3	IBS	L/ha	50- 200	-	1.5- 2.25	-	-	1.5- 2.25 (S)	1.5- 2.25 (S)	-	-	_	-	-	-	-
Rustler® (propyzamide 500)	3	IBS	L/ha	Not stated	1.0- 2.0	1.0- 2.0	1.0- 2.0	1.0- 2.0	1.0- 2.0	1.0- 2.0	-	-	_	_	_	_	-
Sakura® (pyroxasulfone 850) Lentil only	15	IBS	g/ha	50- 100	118	118	118	118 (S)	118	118 (S)	_	-	_	_	_	_	-
Sencor® (metribuzin 480) Faba bean only	5	PSPE	L/ha	50- 100	_	0.28- 0.58 (S)	-	_	_	_	0.28- 0.58	-	_	_	0.28- 0.58	0.28- 0.58	_
Simazine 900	5	IBS, PSPE	kg/ ha	50– 100	0.5 or 0.8*	1.0 or 1.4	1.0 or 1.4	1.0 or 1.4	_	0.8- 2.2 (S)*	_	-	_	0.5 or 0.8*	1.0 or 1.4	_	_
Spinnaker® (imazethapyr 700) Faba bean only	2	PSPE	g/ha	50- 100	_	70	70	_	_	70	70– 100	_	_	_	70– 100	_	_
Terbyne® Xtreme®	_	IBS	kg/	. 50	0.86- 1.2 (S)	0.86- 1.2 (S)	-	_	0.86- 1.2 (S)	0.86- 1.2 (S)	_	-	_	_	_	_	_
(terbuthylazine 875)	5	PSPE Faba bean only	ha	>50	0.6- 0.86 (S)	0.6- 0.86 (S)	-	-	0.6- 0.86 (S)	0.6- 0.86 (S)	-	-	-	-	-	-	-
TriflurX® (trifluralin 480) Lentil only	3	PSI	L/ha	70– 450	0.8– 1.2	0.8– 1.2	-	-	_	0.8- 1.2	-	-	-	-	-	-	-
Ultro® (carbentamide 900)	23	IBS	kg/ ha	50- 150	_	1.1- 1.7	1.1- 1.7	1.1- 1.7	_	_	-	_	_	_	_	-	-
Valor®/Terrain®	1.4	IBS Faba bean	/l		_	_	-	_	_	_	-	180 (S)	180 (S)	180 (S)	180 (S)	-	-
(flumioxazin 500)	14	IBS Lentil	g/ha	>80	_	_	-	_	_	_	_	120 (S)	120 (S)	120 (S)	120 (S)	-	_

Corn	Deadnettle	Dock	Erodium (stork's bill)	Fleabane	Fumitory	Medics	Mintweed	Mustards	New Zealand spinach	Paterson's curse	Prickly lettuce	Rough poppy	Shepherd's purse	Sorrel	Soursob	Comments
_	_	_	_	_	_	_	_	_	-	_	_	_	_	_	_	
_	1.7 or 2.2	-	-	-	1.7 or 2.2 (S)	-	-	1.7 or 2.2	-	-	1.7 or 2.2	1.7 or 2.2	-	-	-	Add trifluralin for improved ryegrass control. Low rate for lighter soils.
_	_	_	_	_	_	_	_	_	-	-	_	_	_	_	_	
_	_	-	0.83- 1.1	_	_	_	-	-	-	-	_	_	_	_	_	Lower rate for lighter soils.
-	_	_	0.55- 0.83	-	-	_	-	-	-	-	-	_	-	_	-	
-	_	_	_	_	_	_	_	-	-	-	1.25 (S)	_	_	_	_	Sow at 30 mm.
-	-	-	_	0.75- 1.5 (S)	0.75- 1.5 (S)	_	-	0.5- 0.75 (S) - 1.5	-	-	0.5- 0.75 (S) - 1.5	-	-	-	-	Low rates generally provide suppression and shorter residual.
-	0.9– 1.25	-	-	0.5- 1.25 (S)	0.5- 0.9 (S) - 1.25	-	-	0.5- 0.9 (S) - 1.25	-	-	0.5- 1.25	-	-	-	-	
-	0.75- 1.0 (S)	-	_	0.75- 1.0 (S)	0.75- 1.0 (S)	-	-	0.5- 0.75 (S) - 1.0	-	-	0.5- 0.75 (S) - 1.0	-	-	-	-	Low rates generally provide suppression and shorter residual. Can cause transient phytotoxicity.
-	_	_	_	_	_	_	_	_	-	-	_	_	_	_	_	
-	_	-	_	_	-	_	-	-	-	-	-	_	-	_	_	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
0.28- 0.58	0.28- 0.58	0.28- 0.58	0.28- 0.58	_	0.28- 0.58	_	_	0.28- 0.58	_	-	_	0.28- 0.58	0.28- 0.58	0.28- 0.58	_	Rate influenced by soil type. Do not apply to sandy soils. Plant 50 mm deep.
1.0 or 1.4	1.0 or 1.4	_	_	_	1.0 or 1.4	1.0 or 1.4	_	0.5 or 0.8*	-	-	_	_	_	_	0.5 or 0.8*	*Add 0.83 L/ha trifluralin 480. Low rate on lighter soils; refer label.
-	70	-	_	_	-	_	-	70	-	70	70– 100	_	70	-	-	Some weeds might not be completely controlled, but growth will be suppressed.
0.86- 1.2	0.86- 1.2	_	-	_	_	0.86- 1.2	0.86- 1.2	0.86- 1.2	-	-	0.86- 1.2	_	0.86– 1.2	-	-	Low rate for lighter soils. Sow 30 mm, preferably 50 mm, deep. Do not use >0.86 kg/ha if soil pH >8.
0.6- 0.86	0.6- 0.86	_	_	_	_	0.6- 0.86	0.6- 0.86	0.6- 0.86	-	-	0.6- 0.86	_	0.6- 0.86	_	_	
-	_	-	_	_	_	_	-	-	-	-	-	_	_	_	-	Rate influenced by soil type; refer label. Apply 1–4 weeks before sowing and incorporate by cultivation.
-	_	_	_	_	-	_	_	-	-	-	_	_	_	_	_	Apply in a tank mix to improve control.
-	_	-	_	180 (S)	180 (S)	_	_	_	180 (S)	-	180 (S)	180 (S)	_	_	_	Avoid light soil types as crop damage might occur.
_	_	-	-	120 (S)	120 (S)	-	-	-	120 (S)	-	120 (S)	120 (S)	_	-	_	Lentil: avoid rolling.

Table 36. Herbicides for weed control for faba bean and lentil – pre-emergence – page 2 of 2. Read the label before using a product.

N												
Note: example trade names	9			ate			L C					
shown. Others	Herbicide group	Incorporation/ growth stage		water rate		×	Thistle – saffron		_			
may be available	e 9	ati	Unit of use	ate	Sowthistle	Spiny emex	· sa	-F	Wild radish	Wildturnip	be	
at different	ci	P S ch	J L	×	his	e /	<u>6</u>	Ë	rad	Ē	Ve	
concentrations. See	rbi	orl W	ij	om ha)	ķ	Ē	ist	Toad rush	<u> </u>	<u> </u>	Wireweed	
labels for details.	F	lnc gre	٦ ا	Boom (L/ha)	So	Sp	두	မိ	Ĭ	Ĭ	Š	Comments
Avadex® Xtra (tri-				30-								
allate 500) Faba bean	15	PSI	L/ha	100	_	_	_	-	_	-	_	
only				100								
Bladex®	_	PSI,	kg/	80-	1.7 or	1.7 or			1.7 or	1.7 or	1.7 or	Add trifluralin for improved ryegrass
(cyanazine 900)	5	IBS, PSPE	ha	200	2.2	2.2	_	-	2.2 (S)	2.2	2.2 (S)	control. Low rate for lighter soils.
Boxer Gold®		PSPE										_
(prosulfocarb 800 +	15	IBS	L/ha	>50	_	_	_	2.5	_	_	_	
S-metolachlor 120)			_,	'								
,						0.83-		0.83-	0.83-	0.83-		
		IBS	ka/		-	1.1	-	1.1	1.1	1.1	-	Lower rate for lighter soils.
Diuron® 900	5		kg/ ha	40-70		0.55		0.55	0.55	0.55		
		PSPE	'''		_	0.55- 0.83	_	0.55- 0.83	0.55- 0.83	0.55- 0.83	_	
Overnuet -l- ®						0.03		0.03	0.03	0.03		
Overwatch® (bixlozone 400) Faba	13	IBS	L/ha	60-	1.25				1 2F (C)		1.25	Sow at 30 mm.
bean only	13	IBS	L/na	100	1.25	_	_	_	1.25 (S)	_	1.25	Sow at 30 mm.
Scall Oilly					0.5-				0.5-	0.5-		
		IBS			0.75 (S)	0.75-	_	0.75-		0.75 (S)	_	Low rates generally provide
Reflex® (fomesafen	14		L/ha	>50	- 1.5	1.5 (S)		1.5 (S)	- 1.5	- 1.5		suppression and shorter residual.
240) Faba bean only	14		L/IIa	>30	0.5-	0.9-		0.9-		0.5-0.9		
		PSPE			1.25	1.25 (S)	-	1.25 (S)	(S) –	(S) –	(S) –	
						(0)			1.25 0.5-	1.25 0.5-	1.25 0.5-	Lave natas mananalle muse da
Reflex® (fomesafen	14	IBS	L/ha	>50	0.5- 0.75 (S)	0.75-	_	0.75-		0.5- 0.75 (S)		Low rates generally provide suppression and shorter residual. Can
240) Lentil only	14	103	L/IIa	/30	- 1.0	1.0 (S)	_	1.0 (S)	- 1.0	- 1.0	- 1.0	cause transient phytotoxicity.
Rifle® 440				50-	1.0				1.0	1.0	1.5-	cause transient phytotoxicity.
(pendimethalin 440)	3	IBS	L/ha	200	_	_	_	-	_	-	2.25	
											2.23	
Rustler®	3	IBS	L/ha	Not	_	_	_	_	_	_	_	
(propyzamide 500)				stated								
Sakura®	1.5	IDC	/1	50-				110				
(pyroxasulfone 850)	15	IBS	g/ha	100	_	_	_	118	_	_	_	
Lentil only Sencor®												Rate influenced by soil type. Do not
(metribuzin 480)	5	PSPE	L/ha	50-	0.28-	0.28-	_	0.28-	0.28-	0.28-	0.28-	apply to sandy soils. Plant 50 mm
Faba bean only				100	0.58	0.58		0.58	0.58	0.58	0.58	deep.
c: : 000	_	IBS,	kg/	50-			0.5 or				0.5 or	*Add 0.83 L/ha trifluralin 480.
Simazine 900	5	PSPE	ha	100	_	_	0.8*	_	_	-	0.8*	Low rate for lighter soils; refer label.
Spinnaker®				F.C.								Some weeds might not be completely
(imazethapyr 700)	2	PSPE	g/ha	50-	_	70	_	70	70	70	70	controlled, but growth will be
Faba bean only				100								suppressed.
					0.86-	0.86-		0.86-	0.86-	0.86-	0.86-	Low rate for lighter soils. Sow 30 mm,
		IBS			1.2	1.2 (S)	-	1.2	1.2 (S)	1.2	1.2	preferably 50 mm, deep. Do not use
Terbyne® Xtreme®	5	PSPE	kg/	>50		. (-)			()			>0.86 kg/ha if soil pH >8.
(terbuthylazine 875))	Faba	ha	>50	0.6-	0.6-		0.6-	0.6-	0.6-	0.6-	
		bean			0.86	0.86 (S)	_	0.86	0.86 (S)	0.86	0.86	
		only			3.50	3.30 (3)		3.00	3.30 (3)	3.00	3.00	
TriflurX®				70-								Rate influenced by soil type; refer
(trifluralin 480)	3	PSI	L/ha	450	_	_	-	-	-	-	0.8-1.2	label. Apply 1–4 weeks before sowing
Lentil only												and incorporate by cultivation.
Ultro® (carbentamide	23	IBS	kg/	50-	_	_	_	_	_	_	_	Apply in a tank mix to improve
900)	23	כטו	ha	150	_	_	_	_	_	_	_	control.
		IBS										
Valor®/Terrain®		Faba			180 (S)	_	_	180 (S)	180 (S)	_	180 (S)	Avoid light soil types as crop damage
(flumioxazin 500)	14	bean	g/ha	>80								might occur.
Faba bean only		IBS			120 (S)	_	_	120 (5)	120 (S)	_	120 (S)	Lentil: avoid rolling.
		Lentil			120(3)	_	_	120 (3)	120 (3)	_	120 (3)	

Incorporation key: IBS = incorporated by sowing, PSI = pre-sowing incorporated, PSPE = post-sowing, pre-emergent. NIS products might indicate a specific concentration (i.e. NIS 1000); refer to adjuvant chart for example products.

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Table 37. Herbicides for weed control for faba bean and lentil – post-emergence.

Note: example trade names shown. Others may be available at different concentrations. See labels for details.	Herbicide group	Incorporation/growth stage	Unit of use	Boom water rate (L/ha)	Annual phalaris	Annual ryegrass	Barley grass	Brome grass	Vulpia/silver grass	Wild oats	Amsinckia	Bedstraw	Canola – volunteer	Capeweed	Charlock	Corn gromwell
Broadstrike® (flumetsulam 800)	2	4–8-leaf	g/ha	50- 150	_	_	_	_	_	_	25	25	25	_	25	-
Brodal® Options (diflufenican 500)	12	2-leaf – primary budding	mL/ha	50- 100	_	_	_	-	_	-	200 (S)	_	_	200 (S)	200	200 (S)
Elantra® Xtreme® (quizalofop-p- ethyl 200)	1	Not stated	mL/ha	>50	-	150- 190	125	150- 190	-	65 or 125						
Factor® WG (butroxydim 250)	1	Up to flowering	g/ha	50- 100	80– 180*	80- 180	80– 180	80- 180*	_	80– 180						
Fusilade® Forte (fluazifop-p-ethyl 128) Faba bean only	1	Not stated	L/ha	50- 150	0.41	0.41	0.41	-	_	0.41						
Intercept® (imazamox 33 + imazapyr 15) IMI tolerant varieties only	2	Fb: BBCH 13–18 Le: 3–6 node	L/ha	>70	_	0.6- 0.75 (S)	0.375- 0.75	0.375- 0.75	0.6- 0.75 (S)	0.375- 0.75	-	0.6- 0.75 (S)	-	-	0.6- 0.75	-
Shogun® (propaquizafop 100)	1	Not stated	L/ha	50- 150	_	0.45	0.2*	0.3*	_	0.25*						
Status® (clethodim 240)	1	Fb: to full flower Le: up to 7 node/ early branching	L/ha	50- 150	0.15- 0.5	0.15- 0.5	0.175- 0.5	0.175– 0.5	0.25- 0.5	0.175- 0.5						
Verdict® (haloxyfop 520)	1	2-leaf – before flowering	mL/ha	50- 150	75– 100	75– 100	50-75	50-75	_	37.5- 100						

Fb = faba been, Le = lentil.

Adjuvant key: MO = mineral oil, MOS = mineral oil plus surfactant, MSO = methylated seed oil, NIS = non-ionic surfactant. NIS products might indicate a specific concentration (i.e. NIS 1000); refer to adjuvant chart for example products.

Read the label before using a product.

Deadnettle	Fumitory	Lupin – volunteer	Marshmallow	Mustards	Paterson's curse	Prickly lettuce	Rough poppy	Shepherd's purse	Skeleton weed	Sorrel	Spiny emex	Toad rush	Wild radish	Wild turnip	Wireweed	Comments
-	-	25	25	25	-	-	-	25	-	-	-	-	25 (S)	25	-	Crop discolouration, stunting and/or delayed flowering can occur. Adjuvant: MOS 0.5% or NIS 0.2%.
200	-	-	200 (S)	150– 200	200 (S)	200	200 (S)	200 (S)	200 (S)	200 (S)	-	200 (S)	200	150– 200	200 (S)	Also has residual activity.
																Adjuvant: MSO 1% or NIS 0.2%.
																*Must be combined with clethodim or a FOP herbicide; refer label. Adjuvant: MSO 0.5%.
_	0.6- 0.75	-	0.6- 0.75	0.375- 0.75	-	-	-	-	-	-	0.6- 0.75 (S)	-	0.375- 0.75	0.3- 0.75	-	Adjuvant: MSO 0.5%.
																*Add NIS 0.2% or MSO 0.5%.
																Adjuvant: MSO 1% or MOS 0.5–1%.
																Application rate determined by weed size, adjuvant type and mix partner; refer label. Adjuvant: MSO or MOS.

Pre-harvest desiccation or salvage spraying of winter crops

Pre-harvest desiccation or salvage spraying is required in some years to dry down weeds and assist with the timely harvesting of winter crops. Situations do arise due to late establishing weeds combined with wet and prolonged springs or harvest periods, where salvage spraying might be necessary.

Weeds such as bindweed, fat hen, melons, New Zealand spinach, prickly lettuce, skeleton weed and sowthistle can interfere with harvesting, while weed seeds from black/field bindweed, Mexican poppy, rough poppy and saffron thistle can contaminate grain.

Table 38. Herbicides for harvest aid or salvage spraying.

Note: example trade names shown. Others may be available at different concentrations. See labels for details.	Use	Rate	Barley	Canola	Chickpea	Faba bean	Field pea
2,4-D amine 700	Harvest aid/salvage spray	L/ha	1.1–1.5	-	-	_	_
2,4-D LV ester 680	Harvest aid/salvage spray	L/ha	1.7	_	_	_	_
Dropzone® (2,4-D amine 500)	Harvest aid/salvage spray	L/ha	1.5–2.1	_	_	_	-
Gramoxone® 360 Pro (paraquat 360)	In-crop spray-topping	mL/ha	_	_	280 or 560	280 or 560	280 or 560
Reglone® (diquat 200)	Pre-harvest crop desiccation	L/ha	_	1.5–3.0	2.0-3.0	2.0-3.0	2.0-3.0
negione (aiquat 200)	Pre-harvest weed control	L/ha	1.0-3.0	_	_	_	-
Sharpen® (saflufenacil 700)	Harvest aid/weed control	g/ha	34	-	34*	34*	34*
Sledge® (pyraflufen-ethyl 25)	Harvest aid/prevent weed seed set	mL/ha	200	_	200	200	200
Not all glyphosate products are re	gistered for this use; refer	to the labe	l of the spe	cific produ	ct you inter	d to use.	
CRUCIAL® (glyphosate 600)	Harvest aid/weed control and regrowth	L/ha	1.54	1.1–3.2	0.6–1.6 or 0.45–0.95*	0.6–1.6	0.6–1.6
Roundup UltraMAX® (glyphosate 570)	Harvest aid/weed control and regrowth	L/ha	1.65	1.2–3.4	0.645-1.7	0.3–1.7	0.3–1.7
Weedmaster® DST® (glyphosate 470)	Harvest aid/weed control and regrowth	L/ha	1.9	1.4–4.1	0.77–2.1 or 0.58–2.1*	0.77-2.1	0.77-2.1

Key: d = days, w = weeks, mo = months, NR = not required.

Adjuvant key: MO = mineral oil, MOS = mineral oil plus surfactant, MSO = methylated seed oil, NIS = non-ionic surfactant.

NIS products might indicate a specific concentration (i.e. NIS 1000); refer to adjuvant chart for example products.

Warning: when spraying, use extreme caution and consider the possibility of spray drift onto susceptible plants e.g. cotton, canola, lucerne, grapevines, horticultural crops, and kurrajong trees.

Application timing often depends on crop type and situation. These can also vary between one product and another. Refer to the product label for specific guidance.

Read the label before using a product.

Lentil	Linseed	Lupin	Oats	Wheat	Harvest WHP	Application	Comments
-	-	-	1.1–1.5	1.1–1.5	NR	Ground/aerial	Significant buffer zone considerations; refer label. Beware of sensitive crops nearby.
-	-	_	1.7	1.7	NR	Ground/aerial	Significant buffer zone considerations; refer label. Beware of sensitive crops nearby.
-	-	_	1.5–2.1	1.5–2.1	NR	Ground/aerial	Reduced buffer zones; refer label.
280 or 560	-	280 or 560	-	_	7 d	Ground	Must add an adjuvant.
2.0-3.0	2.0-3.0	2.0-3.0	-	-	Chickpea, faba bean, lentil 2 d. Canola 4 d. Other NR.	Ground/aerial	Use higher rate for dense or weedy crops. Requires an adjuvant; add NIS 600 at 200 mL/100 L or NIS 1000
-	-	_	1.0-3.0	2 or 3	NR	Ground/aerial	at 160 mL/100 L unless otherwise stated.
34*	-	34*	-	34	Pulses 7 d. Cereals NR.	Refer label	*Add glyphosate or paraquat. Must add MSO 1% for all uses. Requires good coverage. Might affect lentil and triticale germination. Do not use on lentil or triticale seed crops.
200	-	200	-	200	-	_	Can be added to glyphosate or paraquat for pulses.
0.6-1.6	-	0.6–1.6	1.1–3.2 (hay/ silage)	1.1–3.2	Refer to label.	Ground/aerial	*Add 5 g/ha metsulfuron-methyl 600 for chickpea. Do not use on crops intended for seed or sprouting. Do not use on malting barley.
0.645-1.7	-	-	-	0.85-3.4	Wheat 5 d. Barley, legumes 7 d. Other NR.	Ground/aerial	Do not use on crops intended for seed or sprouting. Do not use on malting barley.
0.77-2.1	-	0.77-2.1	1.4–4.1 (hay/ silage)	1.4–4.1	Refer to label	Ground/aerial	*Add 5 g/ha metsulfuron-methyl 600 for chickpea. Do not use on crops intended for seed or sprouting. Do not use on malting barley.

Foliar fungicides for winter crops

Table 39. Foliar fungicides for winter cereals.

Note: example trade names shown.		WHP (w W = w B = ba	heat		ald	st		ę:	
Others may be available at different concentrations. See labels for details.	Crop	Grazing	Harvest	Cost/L	Barley scald	Crown rust	Leaf rust	Net blotch	
Accolade®	Wheat			\$36.19	-	-	160-320 mL* or 320-640 mL^	_	
(azoxystrobin 250)	Barley	3	6	(Accolade only, not partners)	160 mL* or 320–640 mL^	-	320-640 mL^	320-640 mL^	
Amistar® Xtra	Wheat				-	_	400-800 mL	_	
(azoxystrobin 200 + cyproconazole 80)	Barley	3	6	\$42.18	-	-	200-800 mL	200-800 mL	
Aviator® Xpro®	Wheat	4	ND	¢67.04	-	-	_	_	
(prothioconazole 150 + bixafen 75)	Barley	4	NR	\$67.04	300–500 mL	-	400–500 mL	300–500 mL	
Cogito®	Wheat				-	-	125-250 mL	_	
(propiconazole 250 +	Barley	2	5	\$29.19	250 mL	-	125-250 mL	125-250 mL	
tebuconazole 250)	Oats				-	125-250 mL	_	_	
Elatus® Ace (propiconazole 250 +	Wheat	10 days	NR	\$42.03	_	_	500 mL	_	
benzovindiflupyr 40)	Barley	10 days	INIX	342.03	500 mL	_	500 mL	500 mL	
Impact® Endure	Wheat	7	7	\$25.77	_	_	125-250 mL	_	
(flutriafol 500)	Barley	,	,	\$25.77	_	_	_	-	
Opera®	Wheat	3 + ESI	NR		-	_	500–1000 mL	-	
(pyraclostrobin 85 +	Barley			\$37.83	500 mL	_	500 mL	500–1000 mL	
epoxiconazole 62.5)	Oats				-	_	_	-	
Opus®	Wheat	6 + ESI	6 \$30.46	-	_	500 mL	-		
(epoxiconazole 125)	Barley	O I ESI		\$30.40	250 mL	_	250-500 mL	250-500 mL	
Prosaro®	Wheat					-	_	150-300 mL	-
(prothioconazole 210 +	Barley	2	5	\$95.64	150–300 mL	_	150-300 mL	150–300 mL	
tebuconazole 210)	Oats				_	_	300 mL	_	
	Wheat				_	_	420-840 mL	-	
Radial® (azoxystrobin 75 + epoxiconazole 75)	Barley	3 + ESI	NR	\$46.82	420-840 mL	_	420-840 mL	420-840 mL	
,	Oats				_	_	_	_	
T	Wheat				-	-	1–2 L or 0.5 L + MSO 1%	_	
Tazer® Xpert (azoxystrobin 80 + epoxiconazole 31.25)	Barley	3	NR	\$31.04	1-2 L	-	1–2 L or 0.5–1 L + MSO 1%	1–2 L or 0.5–1 L + MSO 1%	
Epoxicoria2016 31.23)	Oats				-	_	_	_	
	Wheat				-	_	145-290 mL	_	
Tebuconazole 430	Barley	2	5	\$21.19	145 mL	-	_	-	
	Oats				-	145-290 mL	_	_	
	Wheat				-	_	75–250 mL	-	
Tilt® 500 (propiconazole 500)	Barley	1	4	\$41.13	250 mL	-	125-250 mL	125–250 mL	
(propicoriazoie 300)	Oats				-	125-250 mL	_	-	
Triadimaton 500	Wheat	Do not	Α	¢22.06	-	-	125–250 g	-	
Triadimefon 500	Barley	use	4	\$32.06	-	_	_	_	
Veritas® Opti	Wheat		_	i	-	-	170-340 mL	_	
(tebuconazole 370 + azoxystrobin 222)	Barley	3 + ESI	6	\$72.80	170 mL	_	170-340 mL	170-340 mL	

Key: ESI = Export slaughter interval, NR = not required when used as directed.

 $Adjuvant\ key:\ MO=mineral\ oil,\ MOS=mineral\ oil\ plus\ surfactant,\ MSO=methylated\ seed\ oil,\ NIS=non-ionic\ surfactant.$

Read the label before using a product.

	Del before using	a product.					
Powdery mildew	Septoria nodorum blotch	Septoria tritici blotch	Stem rust	Stripe rust	Yellow spot	Aerial application	Comments
160–320 mL* or 320–640 mL^ 160–320 mL*	160–320 mL* or 320–640 mL^	160-320 mL*	160-320 mL*	160–320 mL* or 320–640 mL^	160-320 mL*	Yes	*Add tebuconazole. ^Add epoxiconazole.
or 320–640 mL^	-	-	-	-	-		Add epoxicoliazoie.
400-800 mL	-	_	400-800 mL	400–800 mL	400-800 mL	-	
400–800 mL	-	-	-	-	-	Yes	Adjuvant: barley MSO at 2% improves control at lower rate.
300-500 mL	300–500 mL	300-500 mL	_	300–500 mL	300-500 mL	Yes	
300-500 mL	_	_	-	_	_	163	
125-250 mL	125–250 mL	125-250 mL	125-250 mL	125–250 mL	125-250 mL		
125-250 mL	-	_	_	_	_	Yes	
_	-	125-250 mL	250 mL	-	-		
500 mL	500 mL	500 mL	500 mL	500 mL	500 mL	No	
500 mL	-	-	-	-	-	INO	
_	125-250 mL	125-250 mL	_	125–250 mL	_	Voc	Adjuvant: NIS 0.2%.
125-250 mL	-	-	_	_	-	Yes	Aujuvant: Ni3 0.2%.
500 mL	500 mL	-	500 mL	500 mL	-		
500–1000 mL	-	-	_	_	-	Yes	Adjuvant: NIS.
_	-	500 mL	_	_	-		
250 mL	250–500 mL	-	_	250–500 mL	_	Yes	Adjuvant: NIS 0.2% can
250 mL	-	-	_	_	-	res	assist.
150-300 mL	150–300 mL	-	150-300 mL	150–300 mL	150-300 mL		
150-300 mL	-	-	_	_	-	Yes	Adjuvant required for some diseases; refer label.
_	150–300 mL	-	300 mL	_	-		
420-840 mL	420-840 mL	420-840 mL	420-840 mL	420–840 mL	420-840 mL		Adjuvant: MSO 1% can assist
420-840 mL	-	-	_	_	-	Yes	with some diseases; refer
_	_	420 mL	420 mL	_	_		label.
1–2 L	1–2 L	1 L or 0.5 L + MSO 1%	1–2 L or 0.5 L + MSO 1%	1–2 L or 0.5 L + MSO 1%	1–2 L		Adjuvant: MSO 1% can assist
1–2 L or 0.5–1 L + MSO 1%	-	-	1–2 L or 0.5 L + MSO 1%	_	_	Yes	with some diseases at low
	-	0.5–1 L	1 L or 0.5 + MSO 1%	-	-		rates.
_	145-290 mL	290 mL	145-290 mL	145-290 mL	145-290 mL		Adiment MCO 10/
145-290 mL	-	_	-	-	_	Yes	Adjuvant: MSO 1% can assist; refer label.
_	-	-	145-290 mL	-	-		
75–250 mL	75–250 mL	125-250 mL	250 mL	125-250 mL	125-250 mL		
_	-	-	_	-	_	Yes	Adjuvant: not required.
75–250 mL	-	125–250 mL	250 mL	-	-		
_	-	125–250 g (SNSW)	_	125-250 g	-	Yes	Adjuvant: not required.
250 g	-	-	-	-	_		
-	170-340 mL	170-340 mL	170-340 mL	170-340 mL	170-340 mL	Voc	Apply up to twice per season
170-340 mL	-	-	-	-	-	168	for the low rate, once for the high rate.

NIS products might indicate a specific concentration (i.e. NIS 1000); refer to adjuvant chart for example products.

Table 40. Foliar fungicides for canola and pulses.

	W	HP				
Note: example trade names shown. Others may be available at different concentrations. See labels for details.	Grazing	Harvest	Rate/ha	Anthracnose	Ascochyta	Black spot
Aviator® Xpro® (prothioconazole 150 + bixafen 75)	All: 4 w	All: 4 w	L/ha	_	0.4–0.6 chickpea, faba bean, lentil	0.6 field pea
Bravo® Weather Stik (chlorothalonil 720)	All: 14 d	All: 14 d	L/ha	_	1.0–2.0 chickpea, lentil	-
Dithane® Rainshield® NeoTec® (mancozeb 750)	All: 14 d	All: 4 w	kg/ha	1.0-2.2 lupin	1.0–2.2 chickpea, faba bean, field pea, lentil	1.0–2.2 field pea
Echo® 900 Fungicide (chlorothalonil 900)	All: 14 d	All: 14 d	L/ha	_	0.8–1.6 chickpea, lentil	-
Miravis® Star (fludioxonil 150 + pydiflumetofen 100)	All: NR	All: 6 w	L/ha	_	0.25–0.5 pulses	
Nosclex® 800 (procimidone 800)	Canola: NR Lentil: 21 d	Canola: 9 w Faba bean: – Lentil: 21d	L/ha	-	-	-
Orius® (tebuconazole 430)	Field pea: 3d Faba bean: 21 d	Field pea: 3d Faba bean: 14 d	mL/ha	-	-	-
Prosaro® (prothioconazole 210 + tebuconazole 210)	All: NR	All: 14 d	mL/ha	-	-	-
Rovral® Liquid (iprodione 250)	6 w	6 w	L/ha	_	_	-
Spin Flo® (carbendazim 500)	All: 28 d	All: 28 d	mL/ha	_	-	-
Veritas® Opti (tebuconazole 370 + azoxystrobin 222)	Canola: NR Pulses: 4 w	Canola: 14 d Pulses: 4 w	L/ha	_	0.4–0.54 chickpea, faba bean, lentil	0.4–0.54 field pea

Key: h = hours, d = days, w = weeks, NR = not required when used as directed, IMI = imidazolinone-tolerant. NIS products might indicate a specific concentration (i.e. NIS 1000); refer to adjuvant chart for example products.

Read the label before using a product.

Blackleg	Botrytis	Cercospora	Powdery mildew	Rust	Sclerotinia
0.55–0.65 canola	0.6 faba bean; 0.4–0.6 lentil	0.4–0.6 faba bean	0.65 canola	0.6 faba bean	0.55–0.8 canola
-	1.4–2.3 faba bean, 1.0–2.0 lentil	-	-	1.4–2.3 faba bean	-
-	1.0–2.2 chickpea, field pea, faba bean, lupin, lentil	1.0–2.2 faba bean	-	1.0–2.2 faba bean, field pea, lentil	-
-	1.2–1.9 faba bean, 0.8–1.6 lentil	-	-	1.2–1.9 faba bean	-
0.9–1.0 canola	0.75–1.0 pulses	0.75–1.0 faba bean	-	-	0.75–1.0 canola, pulses
-	0.3 lentil	-	-	-	0.6 canola
-	-	145 faba bean (add NIS)	145 field pea	145 faba bean (add NIS)	-
375–450 canola	-	-	-	-	375–450 canola
-	-	-	-	-	2.0 canola
-	500 chickpea, faba bean	-	-	-	-
0.54 canola	0.4–0.54 chickpea, field pea, faba bean, lupin, lentil	0.16 faba bean	-	0.16 faba bean	0.54 canola

Retail prices of chemicals used on winter crops

Table 41. Retail prices of chemicals used on winter crops – page 1 of 2.

Product name	Active ingredient	Company	Price*/L or kg (Ex GST)	Commonly used rate	Cost/ha
Achieve®	Tralkoxydim 400 g/kg	Nufarm	\$68.00	0.4 kg	\$27.20
Agtryne® MA	Terbutryn 275 g/L + MCPA 160 g/L	Nufarm	\$18.70	1.0 L	\$18.70
Alliance®	Paraquat 125 g/L + amitrole 250 g/L	Nufarm	\$16.38	2.0 L	\$32.76
Amicide® Advance 700	2,4-D amine 700 g/L	Nufarm	\$8.29	0.8 L	\$6.63
Arcade [®]	Prosulfocarb 800 g/L	Syngenta	\$9.87	3.0 L	\$29.61
Associate®	Metsulfuron-methyl 600 g/kg	Nufarm	\$52.20	5 g	\$0.26
Atlantis® OD	Mesosulfuron-methyl 30 g/L	Bayer CropScience	\$95.06	0.33 L	\$31.37
Atrazine 900 WG	Atrazine 900 g/kg	Titan	\$12.35	1.1 kg	\$13.59
Avadex® Xtra	Tri-allate 500 g/L	Nufarm	\$13.00	1.6 L	\$20.80
Axial® Xtra	Pinoxaden 100 g/L + cloquintocet-mexyl 25 g/L	Syngenta	\$84.40	0.2 L	\$16.88
Balance® 750 WG	Isoxaflutole 750 g/kg	Bayer CropScience	\$142.50	0.1 kg	\$14.25
Basta®	Glufosinate-ammonium 200 g/L	BASF	\$20.40	3.75 L	\$76.50
Bladex®	Cyanazine 900 g/kg	Agnova	\$51.29	1.5 L	\$76.94
Boxer Gold®	Prosulfocarb 800 g/L + S-metolachlor 120 g/L	Syngenta	\$10.60	2.5 L	\$26.50
Broadside®	MCPA 280 g/L + bromoxynil 140 g/L + dicamba 40 g/L	Nufarm	\$28.40	0.75 L	\$21.30
Broadstrike®	Flumetsulam 800 g/kg	Corteva Agriscience	\$414.00	25 g	\$10.35
Brodal® Options	Diflufenican 500 g/L	Bayer CropScience	\$54.95	0.15 L	\$8.24
Bromicide® 200	Bromoxynil 200 g/L	Nufarm	\$15.00	1.4 L	\$21.00
Bromoxynil MA	Bromoxynil 200 g/L + MCPA 200 g/L	Various	\$16.00	1.4 L	\$22.40
Bronco® MA-X	Bromoxynil 280 g/L + MCPA 280 g/L	Adama Australia	\$23.40	1.0 L	\$23.40
Butisan®	Metazachlor 500 g/L	BASF	\$25.36	1.8 L	\$45.65
Buttress®	2,4-DB 500 g/L	Nufarm	\$21.65	2.1 L	\$45.47
Callisto®	Mesotrione 480 g/L	Syngenta	\$78.78	0.2 L	\$15.76
Cheetah® Gold	Diclofop-methyl 200 g/L + sethoxydim 20 g/L + fenoxaprop-p-ethyl 13.6 g/L	Sipcam	\$22.88	1.0 L	\$22.88
Chlorsulfuron 750 WG		FMC	\$104.80	20 g	\$2.10
Colex-D®	2,4-D choline 456 g/L	Corteva Agriscience	\$14.00	1.14 L	\$15.96
Condor®	MCPA 375 + pyraflufen-ethyl 10 g/L	Sipcam	\$20.79	1.0 L	\$20.79
Countdown®	Prosulfocarb 800 g/L	Adama Australia	\$10.45	2.5 L	\$26.13
CRUCIAL®	Glyphosate 600 g/L	Nufarm	\$9.70	1.2 L	\$11.64
Decision®	Diclofop-methyl 200 g/L + sethoxydim 20 g/L	Sipcam	\$24.30	1.0 L	\$24.30
Devrinol-C®	Napropamide 500 g/kg	UPL	\$45.80	1.75 kg	\$80.15
Diclofop-methyl 375	Diclofop-methyl 375 g/L	FMC	\$17.16	1.5 L	\$25.74
Diflufenican +	Diflufenican 25 g/L + bromoxynil 250 g/L	Nufarm	\$16.90	0.75 L	\$13.24
bromoxynil Diflufenican + MCPA	Diflufenican 25 g/L + MCPA 250 g/L	Bayer CropScience	\$13.21	0.5 L	\$6.61

Read the label before using a product.

Product name	Active ingredient	Company	Price*/L or kg (Ex GST)	Commonly used rate	Cost/ha
Diuron® 900 WDG	Diuron 900 g/kg	Adama Australia	\$18.90	0.5 kg	\$9.45
Dropzone®	2,4-D amine 500 g/L	Nufarm	\$10.20	1.37 L	\$13.97
Dual Gold®	S-metolachlor 960 g/L	Syngenta	\$22.70	0.2 L	\$4.54
Ecopar®	Pyraflufen-ethyl 20 g/L	Sipcam	\$48.93	0.4 L	\$19.57
Elantra® Xtreme®	Quizalofop-p-ethyl 200 g/L	Sipcam	\$24.06	0.25 L	\$6.02
Enforcer® 242	Picloram 26 g/L + MCPA 420 g/L	Nufarm	\$11.00	1.0 L	\$11.00
Estercide® Xtra 680	2,4-D 680g/L present as the 2-ethylhexyl ester g/L	Nufarm	\$9.88	0.8 L	\$7.90
Factor® WG	Butroxydim 250 g/kg	Nufarm	\$157.70	130 g	\$20.50
FallowBoss® Tordon®	Picloram + 2,4-D g/L	Corteva Agriscience	\$15.60	0.3 L	\$4.68
Flight® EC	Picolinafen 35 g/L + bromoxynil 210 g/L + MCPA 350 g/L	Nufarm	\$36.00	0.41 L	\$14.76
ForageMax®	Halauxifen 100 g/L + aminopyralid 50 g/L	Corteva Agriscience	\$368.50	100 mL	\$36.85
Foxtrot®	Fenoxaprop-p-ethyl 69g/L + cloquintocet-mexyl 34.5 g/L	FMC	\$44.90	635 mL	\$28.51
Frequency®	Topramezone 60 g/L + cloquintocet-mexyl 60 g/L	BASF	\$69.00	0.2 L	\$13.80
Fusilade® Forte	Fluazifop-p 212 g/L	Syngenta	\$86.00	0.12 L	\$10.32
Garlon® 600	Triclopyr 600 g/L	Corteva Agriscience	\$26.63	0.12 L	\$3.20
GoalTender®	Oxyfluorfen 480 g/L	Corteva Agriscience	\$21.38	0.0375 L	\$0.80
Gramoxone® 360 Pro	Paraquat 360 g/L	Syngenta	\$9.75	1.0 L	\$9.75
Grazon® Extra	Triclopyr 300 g/L + picloram 100 g/L + aminopyralid 8 g/L	Corteva Agriscience	\$37.40	0.3 L	\$11.22
Grindstone®	Aminopyralid 240 g/L	Adama Australia	\$215.90	22 mL	\$4.75
Guerrilla®	Paraquat 300 + amitrole 12 g/L	Imtrade	\$10.00	1.0 L	\$10.00
Gundy 240	Imazapic 240 g/L	Kenso	\$29.33	0.175 L	\$4.60
Hammer® 400 EC	Carfentrazone-ethyl 400 g/L	FMC	\$207.00	0.050 L	\$10.35
Hotshot®	Aminopyralid 10 g/L + fluroxypyr 140 g/L	Corteva Agriscience	\$22.50	0.5 L	\$11.25
Hussar® OD	lodosulfuron-methyl-sodium 100 g/L	Bayer CropScience	\$360.50	0.1 L	\$36.05
Igran® 500 Flowable	Terbutryn 500 g/L	Nufarm	\$17.20	0.85 L	\$14.62
Impose®	Imazapic 240 g/L	Adama Australia	\$30.20	0.3 L	\$9.06
Intercept®	Imazamox 33 + imazapyr 15 g/L	Nufarm	\$33.38	0.6 L	\$20.03
Intervix®	lmazamox 33 g/L + imazapyr 15 g/L	BASF	\$34.57	0.5 L	\$172.85
Kamba® 750	Dicamba 750 g/L	Nufarm	\$30.90	0.18 L	\$5.56
Kamba® M	MCPA 340 g/L + dicamba 80 g/L	Nufarm	\$22.86	1.0 L	\$22.86
Legacy® MA	MCPA 250 + diflufenican 25 g/L	Adama Australia	\$12.39	0.75 L	\$9.29
Liberty®	Glufosinate-ammonium 200 g/L	BASF	\$20.63	1.5 L	\$30.95
Lontrel® Advanced	Clopyralid 600 g/kg	Corteva Agriscience	\$71.00	0.15 L	\$10.65
Luximax®	Cinmethylin 750 g/L	BASF	\$92.37	0.5 L	\$46.19

Table 41. Retail prices of chemicals used on winter crops – page 2 of 2.

Product name	Active ingredient	Company	Price*/L or kg (Ex GST)	Commonly used rate	Cost/ha
LV Ester 680	2,4-D LV ester 680 g/L	Crop Care	\$10.40	0.8 L	\$8.32
Mateno® Complete	Aclonifen 400 + pyroxasulfone 100 + diflufenican 66 q/L	Bayer CropScience	\$61.20	0.75 L	\$45.90
MCPA 750	MCPA 750 g/L	Titan	\$13.45	0.46 L	\$6.20
MCPA LVE	MCPA 570 g/L	Various	\$12.11	0.7 L	\$8.48
Outlook®	Dimethenamid-p 720 g/L	BASF	\$63.53	1.0 L	\$63.53
Overwatch®	Bixlozone 400 g/L	FMC	\$34.81	1.25 L	\$43.51
Palmero® TX	Terbuthylazine 750 + isoxaflutole 75 g/L	Adama Australia	\$50.63	1.0 kg	\$50.63
Paradigm®	Halauxifen-methyl 200 g/kg + florasulam 200 g/kg	Corteva Agriscience	\$613.00	25 g	\$15.33
Pendimethalin® 440 EC	Pendimethalin 440 g/L	FMC	\$12.91	1.4 L	\$18.07
Pixxaro®	Fluroxypyr 250 g/L + halauxifen 16.25 g/L	Corteva Agriscience	\$48.00	0.3 L	\$14.40
Precept®	Pyrasulfotole 50 g/L + MCPA 125 g/L	Bayer CropScience	\$20.23	0.5 L	\$10.12
Priority®	Florasulam 200 g/L	Adama Australia	\$220.00	0.02 L	\$4.40
Pyresta® Xtreme	Pyraflufen-ethyl 2.1 g/L + 2,4-D LV ester 600 g/L	Sipcam	\$21.63	0.5 L	\$10.82
Quadrant®	MCPA ester 250 + bromoxonil 240 + diflufenican 20 + picolinafen 10 g/L	Adama Australia	\$23.53	1.0 L	\$23.53
Raptor®	Imazamox 700 g/kg	BASF	\$525.00	45 g	\$23.63
Reflex®	Fomesafen 240 g/L	Syngenta	\$19.50	0.75 L	\$14.63
Reglone®	Diquat 200 g/L	Syngenta	\$13.92	2.0 L	\$27.84
Rexade®	Pyroxsulam 150 g/kg + halauxifen 50 g/kg	Corteva Agriscience	\$371.15	100 g	\$37.12
Roundup Ready® PL	Glyphosate 540 g/L	Bayer CropScience	\$8.30	1.15 L	\$9.55
Roundup UltraMAX®	Glyphosate 570 g/L	Bayer CropScience	\$8.69	1.0 L	\$2.17
Rustler®	Propyzamide 500 g/L	FMC	\$39.94	1.0 L	\$39.94
Sakura® 850 WG	Pyroxasulfone 850 g/kg	Bayer CropScience	\$375.01	118 g	\$44.25
Sencor® 480	Metribuzin 750 g/kg	Bayer CropScience	\$61.25	0.28 kg	\$17.15
Sentry®	lmazapic 525 g/kg + imazapyr 175 g/kg	Nufarm	\$225.00	40 g	\$9.00
Sharpen® WG	Saflufenacil 700 g/kg	BASF	\$530.90	17 g	\$9.03
Shogun®	Propaquizafop 100 g/L	Adama Australia	\$34.00	0.3 L	\$10.20
Simanex® 900 WG	Simazine 900 g/kg	Various	\$13.37	1.1 kg	\$14.71
Sledge®	Pyraflufen-ethyl 25 g/L	Sipcam	\$84.54	0.1 L	\$8.45
Spinnaker® 700 WDG	lmazethapyr 700 g/kg	BASF	\$108.00	70 g	\$7.56
Spray.Seed® 250	Paraquat 135 g/L + diquat 115 g/L	Syngenta	\$12.93	1.6 L	\$20.69
Starane® Advanced	Fluroxypyr 333 g/L	Corteva Agriscience	\$35.60	0.45 L	\$16.02
Status®	Clethodim 240 g/L	Sumitomo Chemical	\$13.75	0.3 L	\$4.13
Striker®	Oxyfluorfen 240 g/L	Nufarm	\$2,330.00	75 mL	\$174.75
Sulfosulfuron 750	Sulfosulfuron 750 g/kg	Genfarm	\$263.00	25 g	\$6.58

Product name	Active ingredient	Company	Price*/L or kg (Ex GST)	Commonly used rate	Cost/ha
Talinor®	Bicyclopyrone + bromoxynil + cloquintoced- mexyl g/L	Syngenta	\$31.50	0.5 L	\$15.75
Tenet®	Metazachlor 500 g/L	Adama Australia	\$46.20	1.0 kg	\$46.20
Terbyne® Xtreme® 875 WG	Terbuthylazine 875 g/kg	Sipcam	\$16.54	1.2 kg	\$19.85
Terrad'or®	Tiafenacil 700 g/kg	Nufarm	\$346.40	40 g	\$13.86
Terrain®	Flumioxazin 500 g/kg	Nufarm	\$158.00	30 g	\$4.74
Topik® 240 EC	Cloquintocet-mexyl 60 g/L + clodinafop-propargyl 240 g/L	Syngenta	\$34.56	85 mL	\$2.94
Trezac [®]	Aminopyralid 25 g/L + halauxifen 30 g/L + cloquintocet mexyl 30 g/L	Corteva Agriscience	\$69.70	0.2 L	\$13.94
Triasulfuron 750	Triasulfuron 750 g/kg	Genfarm	\$186.00	35 g	\$6.51
Triathlon®	MCPA 250 g/L + bromoxynil 150 g/L + diflufenican 25 g/L	Adama Australia	\$18.78	750 mL	\$14.09
Tribenron	Tribenuron-methyl 750 g/L	Titan	\$160.00	25 g	\$4.00
TriflurX®	Trifluralin 480 g/L	Nufarm	\$8.40	0.8 L	\$6.72
Ultro®	Carbentamide 900 g/kg	Adama Australia	\$41.88	1.1 kg	\$46.07
Velocity®	Pyrasulfotole 37.5 g/L + bromoxynil 210 g/L	Bayer CropScience	\$39.00	0.5 L	\$19.50
Verdict® 520	Haloxyfop-r 520 g/L	Corteva Agriscience	\$48.40	0.05 L	\$2.42
Voraxor®	Salflufenacil 250 g/L + trifludimoxazin 125 g/L	BASF	\$175.50	0.2 L	\$35.10
Weedmaster® DST®	Glyphosate (present as the potassium and mono- ammonium salts) 470 g/L	Nufarm	\$8.44	1.5 L	\$12.66

^{*}Prices are an average retail (excluding GST) guide only. They were correct on 26 May 2023 but will vary according to location, availability and quantity purchased.

Table 42. Retail prices of adjuvants used on winter crops.

Product name	Chemical type	Company	Price*/L or kg (Ex GST)	Commonly used rate/ ha**	Cost (\$/ha)
Agral 600®	Wetting agent	Syngenta	\$12.20	0.2 L	\$1.22
BS1000®	Wetting agent	Nufarm	\$7.88	0.25 L	\$0.99
Hasten®	Crop oil + surfactant	Vic Chemical Co	\$6.80	1.0 L	\$3.40
LI 700°	Surfactant/penetrant	Nufarm	\$7.00	0.25 L	\$0.88
Liase®	Ammonium sulfate	Nufarm	\$3.10	2.0 L	\$1.55
Titan Paraffinic oil	Paraffinic oil	Titan	\$6.59	1.0 L	\$3.30
Uptake® spraying oil	Crop oil + surfactants	Corteva Agriscience	\$7.80	0.5 L	\$3.90
Wetter TX®	Surfactant	Nufarm	\$14.13	0.2 L	\$1.41

^{*}Prices are an average retail (excluding GST) guide only. They were correct on 26 May 2023 but will vary according to location, availability and quantity purchased.

^{**}Price based on 50 L/ha water rate.



Seasonal ConditionsMonitoring Program



State Seasonal Update: Conditions & Outlook

The **State Seasonal Update** is produced monthly and is the official point of reference of seasonal conditions across NSW for producers, government, stakeholders and the public.

Combined Drought Indicator: Latest NSW Drought Maps

Is an interactive tool that provides a snapshot of current seasonal conditions for NSW, factoring in rainfall, soil moisture and pasture/crop growth indices.





Seasonal Conditions Information Portal

Uses a technology that allows fast, stable transfer of data and information direct from the EDIS system to your computer. The portal contains several downloadable features from the **NSW Combined Drought Indicator**.

Farm Tracker Mobile Application

Farm Tracker is a tool you can use to record seasonal conditions. You can:

- 1. Complete a simple crop, pasture or animal survey
- 2. Keep and manage a photo diary of your farm
- 3. Monitor the same paddock over many years





Have your say

Complete this survey and tell us what is important to you as DPI continues to improve our Seasonal Conditions monitoring program. Eg. improved local accuracy of data and climate networks, better ways of communicating, or strengthening linkages to drought management and relief measures.

Department of Primary Industries

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Discover the AXIAL® XTRA benefits.

Local trial results show that the optimised adjuvant package included in every drum of AXIAL® XTRA delivers improved activity on grass weeds, faster brownout and better compatibility, all without compromising crop safety.















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