

Replacement pages and notification of updated text for *Integrated weed management in Australian cropping systems*

The two enclosed double-sided pages update *Table HR13 Herbicides classified according to primary mode-of-action (MOA) group*, pages 25–27, and should replace the existing pages in the *Integrated weed management in Australian cropping systems* manual. The changes are based on a revision of MOA groups by CropLife Australia and are current as of February 2008.

Please note that, as a result of this revision, the following changes also apply within the text of the manual:

Location, page no.	Existing text	Updated text
SECTION 2		
p. 12	Groups A and B are high risk; Groups C, D, E, F and G are moderate risk; and Groups I, J, K, L, M and N are low risk.	Groups A and B are high risk while the remainder are moderate risk.
	Within a herbicide MOA group there may be two or more subgroups. With the exception of Groups F and K, the subgroups are different chemical classes that inhibit the same enzyme. Group F contains chemicals that inhibit one of three different enzymes involved in carotenoid biosynthesis, and Group K contains all those herbicides that do not fit elsewhere.	Within a herbicide MOA group there may be two or more subgroups. Subgroups are usually based on the different chemical classes that inhibit the same enzyme. Group Z contains those herbicides that do not fit elsewhere.
p.14 – Table HR3	Herbicide resistance risk: Low	Herbicide resistance risk: Medium
p.15 – Table HR4	MOA Group: E	MOA Group: J
p.17 – Table HR5, under Annual ryegrass	F	Q
p. 17 – Table HR5, under Barnyard grass	<i>Echinochloa crus galli</i> (incorrectly applied in original version)	<i>Echinochloa colona</i> Populations of <i>Echinochloa colona</i> have developed resistance to Group M – glycines (glyphosate) in NSW
p. 17 – Table HR5, under Giant Parramatta grass	<i>Sporobolus indicus</i> (outdated name)	<i>Sporobolus fertilis</i>
p.17 – Table HR5, under Wild oat	K – aminopropionates	Z – arylaminopropionic acids
p. 18 – Table HR6, under Indian hedge mustard		Populations of Indian hedge mustard have developed resistance to Group I – phenoxies (2,4-D) in South Australia
p.23 – Table HR12, under Barnyard grass	E	J
p.24 – Table HR12, under Wild oat	E K – amides	J D – benzamides
p.24 – Table HR12, under Wireweed	F	Q
SECTION 4		
p. 86	K (eg flamprop)	Z (eg flamprop)
p. 104	Mataven® 90 (flamprop-M-methyl) has a Group K MOA Flamprop (Group K) resistance has been recorded in wild oats in Canada	Mataven® 90 (flamprop-M-methyl) has a Group Z MOA Flamprop (Group Z) resistance has been recorded in wild oats in Canada
SECTION 6		
p. 184 – Table W12.1, under Tactic 2.2c	Group B and K herbicides more effective than Group C or D	Group B and Z herbicides more effective than Group C or D
p. 199	Group K (flamprop methyl)	Group Z (flamprop methyl)
p. 200	Groups A, B and K; or Groups A, B and E	Groups A, B and Z; or Groups A, B and J

Table HR13 Herbicides classified according to primary mode-of-action (MOA) group

Herbicide subgroup	Herbicide active ingredient	Example products
Group A – Inhibitors of acetyl coA carboxylase (Inhibitors of fat synthesis/ACC'ase inhibitors)		
<i>Aryloxyphenoxypropionates – 'fops'</i>	clodinafop cyhalofop diclofop fenoxaprop fluazifop haloxyfop propaquizafop quizalofop	Topik® Barnstorm® Cheetah® Gold*, Decision®*, Hoegrass®, Tristar® Advance* Cheetah® Gold*, Tristar® Advance*, Wildcat® Fusilade®, Fusion®* Motsa®*, Verdict® Correct® Targa®
<i>Cyclohexanediones – 'dims'</i>	butroxydim clethodim sethoxydim tepraloxymid tralkoxydim	Factor®, Fusion®* Motsa®*, Select® Cheetah® Gold*, Decision®*, Sertin® Aramo® Achieve®
<i>'Fops' + 'dims'</i>	fluazifop+butroxydim haloxyfop+clethodim diclofop-fenoxaprop+sethoxydim diclofop-methyl+sethoxydim	Fusion® Motsa® Cheetah® Gold* Decision®
<i>Phenylpyrazoles – 'dens'</i>	pinoxaden	Axial®
Group B – Inhibitors of acetolactate synthase (ALS inhibitors)		
<i>Sulfonylureas – 'SUs'</i>	azimsulfuron bensulfuron chlorsulfuron ethametsulfuron halosulfuron iodosulfuron mesosulfuron metsulfuron rimsulfuron sulfometuron sulfosulfuron thifensulfuron triasulfuron tribenuron trifloxysulfuron	Gulliver® Londax® Glean® Bounty®* Sempra® Hussar® Atlantis® Ally®, Harmony®* M, Crossbow®*, Trounce®* Titus® Oust® Monza® Harmony®* M Logran®, Logran® B-Power* Express® Envoke®, Krismat®*
<i>Imidazolinones – 'Imis'</i>	imazamox imazapic imazapyr imazethapyr	Raptor®, Intervix®* Flame®, Midas®*, OnDuty®* Arsenal®, Midas®*, OnDuty®*, Intervix®*, Lightning®* Spinnaker®, Lightning®*
<i>Triazolopyrimidines – Sulfonamides</i>	flumetsulam metosulam florasulam pyroxulam	Broadstrike® Eclipse® Torpedo®*, X-Pand®* Crusader®
<i>Pyrimidinylthiobenzoates</i>	pyrithiobac-Na	Staple®
Group C – Inhibitors of photosynthesis at photosystem II (PS II inhibitors)		
<i>Triazines</i>	ametryn atrazine cyanazine prometryn simazine terbutryn	Primatol® Z, Gesapax® Combi*, Krismat® Gesaprim®, Gesapax® Combi*, Primextra® Gold* Bladex® Gesagard®, Cotogard®*, Bandit®* Gesatop® Igran®, Agtryne® MA*
<i>Triazinones</i>	hexazinone metribuzin	Velpar® L, Velpar® K4* Sencor®

Herbicide subgroup	Herbicide active ingredient	Example products
<i>Ureas</i>	diuron	Karmex [®] , Krovar ^{®*} , Velpar [®] K4*
	fluometuron	Cotoran [®] , Cotogard ^{®*} , Bandit ^{®*}
	linuron	Afalon [®]
	methabenzthiazuron	Tribunil [®]
	siduron	Tupersan [®]
	tebuthiuron	Graslan [®]
<i>Nitriles</i>	bromoxynil	Buctril [®] , Buctril [®] MA*, Barrel ^{®*} , Jaguar ^{®*}
	ioxynil	Totril [®] , Actril DS*
<i>Phenylcarbamates</i>	phenmedipham	Betanal [®]
<i>Pyridazinones</i>	chloridazon	Pyramin [®]
<i>Amides</i>	propanil	Stam [®]
<i>Benzothiadiazinones</i>	bentazone	Basagran [®] , Basagran [®] M60*
<i>Uracils</i>	bromacil	Hyvar [®] , Krovar ^{®*}
	terbacil	Sinbar [®]
Group D – Inhibitors of microtubule assembly		
<i>Dinitroanilines – DNAs</i>	oryzalin	Surflan [®] , Yield ^{®*}
	pendimethalin	Stomp [®]
	trifluralin	Treflan [®] , Yield ^{®*}
<i>Benzoic acids</i>	chlorthal-dimethyl	Dacthal [®] , Prothal ^{®*}
<i>Benzamides</i>	propyzamide	Kerb [®]
Group E – Inhibitors of mitosis / microtubule organisation		
<i>Carbamates</i>	chlorpropham	Chlorpropham [®]
Group F – Bleachers: Inhibitors of carotenoid biosynthesis at the phytoene desaturase step (PDS inhibitors)		
<i>Nicotinilides</i>	diflufenican	Brodal [®] , Jaguar ^{®*} , Tigrex ^{®*} , Chipco Spearhead ^{®*}
<i>Picolinamides</i>	picolinafen	Paragon ^{®*} , Sniper [®]
<i>Pyridazinones</i>	norflurazon	Solicam [®]
Group G – Inhibitors of protoporphyrinogen oxidase (PPOs)		
<i>Diphenylethers</i>	acifluorfen	Blazer [®]
	oxyfluorfen	Goal [®]
<i>N-phenylphthalimides</i>	flumioxazin	Pledge [®]
	flumiclorac	Resource [®]
<i>Oxadiazoles</i>	oxadiazon	Ronstar [®]
<i>Phenylpyrazoles</i>	pyraflufen	Ecopar [®]
<i>Pyrimidindiones</i>	butafenacil	Logran [®] B-Power*
<i>Triazolinones</i>	carfentrazone	Affinity [®]
Group H – Bleachers: Inhibitors of 4-hydroxyphenyl-pyruvate dioxygenase (HPPDs)		
<i>Isoxazoles</i>	isoxaflutole	Balance [®]
<i>Pyrazoles</i>	benzofenap	Taipan [®] , Viper [®]
	pyrasulfotole	Precept ^{®*}
Group I – Disrupters of plant cell growth		
<i>Phenoxyacetic acids – Phenoxy</i>	2,4-D	Amicide [®] , Actril DS ^{®*}
	2,4-DB	Trifolamine [®]
	MCPA	MCPA, Buctril [®] MA*, Banvel M ^{®*} , Midas ^{®*} , Paragon ^{®*} , Tigrex ^{®*} , Barrel ^{®*} , Tordon [®] 242*, Basagran [®] M60*, Chipco Spearhead ^{®*} , Agtryne [®] MA*
	mecoprop	Mecopropamine [®] , Mecoban [®] , Methar [®] , Tri-Kombi ^{®*}
<i>Benzoic acids</i>	dicamba	Banvel [®] , Banvel [®] M*, Barrel ^{®*} , Mecoban [®] Methar Tri-Kombi ^{®*}

Herbicide subgroup	Herbicide active ingredient	Example products
<i>Pyridine carboxylic Acids – Pyridines</i>	aminopyralid clopyralid fluroxypyr picloram triclopyr	Hotshot®* Lontrel®, Torpedo®*, Chipco Spearhead®* Starane®, Hotshot®* Tordon®, Tordon® 242*, Crossbow®*, Grazon®* Garlon®, Grazon®*
<i>Quinoline carboxylic acids</i>	quinclorac	Drive®
Group J – Inhibitors of fat synthesis (not ACCase inhibitors)		
<i>Chloroacetic acids</i>	2,2-DPA flupropanate	Dalapon® Frenock®
<i>Thiocarbamates</i>	EPTC molinate pebulate prosulfocarb thiobencarb triallate	Eptam® Ordram® Tillam® Boxer® Gold* Saturn® Avadex®
<i>Phosphorodithioates</i>	bensulide	Prefar®
<i>Benzofurans</i>	ethofumesate	Tramat®
Group K – Inhibitors of cell division / Inhibitors of very long chain fatty acids (VLCFA inhibitors)		
<i>Acetamides</i>	napropamide	Devrinol®
<i>Chloroacetamides</i>	metolachlor propachlor	Dual® Gold, Primextra® Gold*, Boxer® Gold* Ramrod®, Prothal®*
Group L – Inhibitors of photosynthesis at photosystem I (PSI inhibitors)		
<i>Bipyridils</i>	diquat paraquat	Reglone®, Spray Seed®* Gramoxone®, Spray Seed®*
Group M – Inhibitors of EPSP synthase		
<i>Glycines</i>	glyphosate	Roundup®, Trounce®*, Illico®*
Group N – Inhibitors of glutamine synthetase		
<i>Phosphinic acids</i>	glufosinate	Basta®, Liberty®
Group O – Inhibitors of cell wall (cellulose) synthesis		
<i>Nitriles</i>	dichlobenil	Casoron®
<i>Benzamides</i>	isoxaben	Gallery®, X-Pand®*
Group P – Inhibitors of auxin transport		
<i>Phthalamates</i>	naptalam	Alanap-L®
Group Q – Bleachers: Inhibitors of carotenoid biosynthesis unknown target		
<i>Triazoles</i>	amitrole	Amitrole® T, Illico®*
<i>Isoxazolidinones</i>	clomazone	Command®, Viper®
Group R – Inhibitors of dihydropteroate synthase (DHP inhibitors)		
<i>Carbamates</i>	asulam	Asulox®
Group Z – Herbicides with unknown and probably diverse sites of action		
<i>Arylamino propionic acids</i>	flamprop	Mataven® L
<i>Dicarboxylic acids</i>	endothal	Endothal®
<i>Organoarsenicals</i>	DSMA (disodium methylarsonate) MSMA	Methar® Daconate®

Note: This table is based on the revised mode of action groups from CropLife Australia as at 28 February 2008. The use of brand, trade and proprietary names is solely for the purpose of assisting users in identifying products. It does not imply a preferred recommendation. Alternative products containing the same active ingredient may perform similarly to those products specified.

* This product contains more than one active constituent

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Further reading

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