

## CropLife Australia Herbicide Resistance Management Review Group

### Herbicide Mode of Action Groups (valid as at 10 June 2016)

List of approved active constituents in each "Group" and, for ease of identification, at the discretion of the Herbicide Resistance Management Review Group the trade name of the first registered product or successor. Refer to the APVMA website ([www.apvma.gov.au](http://www.apvma.gov.au)) to obtain a complete list of registered products from the PUBCRIS database.

## High Resistance Risk

CHEMICAL FAMILY	ACTIVE CONSTITUENT (FIRST REGISTERED TRADE NAME)
<b>GROUP A</b>	<b>Inhibitors of acetyl co-enzyme A carboxylase (Inhibitors of fat synthesis/ACC'ase inhibitors)</b>
<i>Aryloxyphenoxypropionates:</i> (Fops):	clodinafop (Topik <sup>®</sup> ), cyhalofop (Barnstorm <sup>®</sup> ), diclofop (Cheetah <sup>®</sup> Gold <sup>*</sup> , Decision <sup>®*</sup> , Hoegrass <sup>®</sup> ), fenoxaprop (Cheetah <sup>®</sup> Gold <sup>*</sup> , Wildcat <sup>®</sup> ), fluazifop (Fusilade <sup>®</sup> , Fusion <sup>®*</sup> ), haloxyfop (Verdict <sup>®</sup> ), propaquizafop (Shogun <sup>®</sup> ), quizalofop (Targa <sup>®</sup> )
<i>Cyclohexanediones:</i> (Dims):	butoxydim (Falcon <sup>®</sup> , Fusion <sup>®*</sup> ), clethodim (Select <sup>®</sup> ), profoxydim (Aura <sup>®</sup> ), sethoxydim (Cheetah <sup>®</sup> Gold <sup>*</sup> , Decision <sup>®*</sup> ), tralkoxydim (Achieve <sup>®</sup> )
<i>Phenylpyrazoles:</i> (Dens):	pinoxaden (Axial <sup>®</sup> )
<b>GROUP B</b>	<b>Inhibitors of acetolactate synthase (ALS inhibitors), acetohydroxyacid synthase (AHAS)</b>
<i>Imidazolinones:</i> (Imis):	imazamox (Intervix <sup>®*</sup> , Raptor <sup>®</sup> ), imazapic (Bobcat I-Maxx <sup>®*</sup> , Flame <sup>®</sup> , Midas <sup>®*</sup> , OnDuty <sup>®*</sup> ), imazapyr (Arsenal Xpress <sup>®</sup> , Intervix <sup>®*</sup> , Lightning <sup>®*</sup> , Midas <sup>®*</sup> , OnDuty <sup>®*</sup> ), imazethapyr (Lightning <sup>®*</sup> , Spinnaker <sup>®</sup> )
<i>Pyrimidinylthiobenzoates:</i>	bispyribac (Nominee <sup>®</sup> ), pyrithiobac (Staple <sup>®</sup> )
<i>Sulfonylureas:</i> (SUs):	azimsulfuron (Gulliver <sup>®</sup> ), bensulfuron (Londax <sup>®</sup> ), chlorsulfuron (Glean <sup>®</sup> ), ethoxysulfuron (Hero <sup>®</sup> ), foramsulfuron (Tribute <sup>®</sup> ), halosulfuron (Sempra <sup>®</sup> ), iodosulfuron (Hussar <sup>®</sup> ), mesosulfuron (Atlantis <sup>®</sup> ), metsulfuron (Ally <sup>®</sup> , Harmony <sup>®*</sup> M, Stinger <sup>®*</sup> , Trounce <sup>®*</sup> , Ultimate Brushweed <sup>®*</sup> Herbicide), prosulfuron (Casper <sup>®</sup> ), rimsulfuron (Titus <sup>®</sup> ), sulfometuron (Oust <sup>®</sup> , Eucmix Pre Plant <sup>®*</sup> ), sulfosulfuron (Monza <sup>®</sup> ), thifensulfuron (Harmony <sup>®*</sup> M), triasulfuron, (Logran <sup>®</sup> Logran <sup>®</sup> B-Power <sup>®*</sup> ), tribenuron (Express <sup>®</sup> ), trifloxysulfuron (Envoke <sup>®</sup> , Krismat <sup>®*</sup> )
<i>Triazolopyrimidines:</i> (Sulfonamides):	florasulam (Paradigm <sup>®*</sup> , Vortex <sup>®*</sup> , X-Pand <sup>®*</sup> ), flumetsulam (Broadstrike <sup>®</sup> ), metosulam (Eclipse <sup>®</sup> ), pyroxsulam (Crusader <sup>®</sup> )

\* This product contains more than one active constituent

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CropLife Australia Limited

Locked Bag 4396, Kingston ACT 2604

Phone: 02 62732733 Email: [info@croplife.org.au](mailto:info@croplife.org.au) Website: [www.croplife.org.au](http://www.croplife.org.au)

## Moderate Resistance Risk

CHEMICAL FAMILY	ACTIVE CONSTITUENT (FIRST REGISTERED TRADE NAME)
<b>GROUP C</b>	<b>Inhibitors of photosynthesis at photosystem II (PS II inhibitors)</b>
<i>Amides:</i>	propanil (Stam <sup>®</sup> )
<i>Benzothiadiazinones:</i>	bentazone (Basagran <sup>®</sup> , Basagran <sup>®</sup> M60*, Multiweed <sup>®*</sup> )
<i>Nitriles:</i>	bromoxynil (Barrel <sup>®*</sup> , Buctril <sup>®</sup> , Buctril <sup>®</sup> MA*, Eliminar C <sup>®*</sup> , Flight <sup>®*</sup> , Jaguar <sup>®*</sup> , Triathlon <sup>®*</sup> , Velocity <sup>®*</sup> ), ioxynil (Actril DS*, Totril <sup>®</sup> ),
<i>Phenylcarbamates:</i>	phenmedipham (Betanal <sup>®</sup> )
<i>Pyridazinones:</i>	chloridazon (Pyramin <sup>®</sup> )
<i>Triazines:</i>	ametryn (Amigan <sup>®*</sup> , Gesapax <sup>®</sup> Combi*, Krismat <sup>®</sup> , Primatol Z <sup>®</sup> ), atrazine (Gesapax <sup>®</sup> Combi*, Gesaprim <sup>®</sup> , Primextra <sup>®</sup> Gold*), cyanazine (Bladex <sup>®</sup> ), prometryn (Bandit <sup>®*</sup> , Cotogard <sup>®*</sup> , Gesagard <sup>®</sup> ), propazine (Agaprop <sup>®</sup> ), simazine (Gesatop <sup>®</sup> ), terbuthylazine (terbyne <sup>®</sup> ), terbutryn (Agtryne <sup>®</sup> MA*, Amigan <sup>®*</sup> , Igran <sup>®</sup> )
<i>Triazinones:</i>	hexazinone (Bobcat I-Maxx <sup>®*</sup> , Velpar <sup>®</sup> K4*, Velpar <sup>®</sup> L), metribuzin (Aptitude <sup>®*</sup> , Sencor <sup>®</sup> )
<i>Uracils:</i>	bromacil (Hyvar <sup>®</sup> , Krovar <sup>®*</sup> ), terbacil (Eucmix Pre Plant <sup>®*</sup> , Sinbar <sup>®</sup> )
<i>Ureas:</i>	diuron (Karmex <sup>®</sup> , Krovar <sup>®*</sup> , Velpar <sup>®</sup> K4*), fluometuron (Bandit <sup>®*</sup> , Cotogard <sup>®*</sup> , Cotoran <sup>®</sup> ), linuron (Afalon <sup>®</sup> ), methabenzthiazuron (Tribunil <sup>®</sup> ), siduron (Tupersan <sup>®</sup> ), tebuthiuron (Graslan <sup>®</sup> )
<b>GROUP D</b>	<b>Inhibitors of microtubule assembly</b>
<i>Benzamides:</i>	propyzamide (Kerb <sup>®</sup> )
<i>Benzoic acids:</i>	chlorthal (Dacthal <sup>®</sup> , Prothal <sup>®*</sup> )
<i>Dinitroanilines: (DNAs):</i>	oryzalin (Rout <sup>®*</sup> , Surflan <sup>®</sup> ), pendimethalin (Stomp <sup>®</sup> ), prodiamine (Barricade <sup>®</sup> ), trifluralin (Jetti Duo <sup>®*</sup> , Treflan <sup>®</sup> )
<i>Pyridines:</i>	dithiopyr (Dimension <sup>®</sup> )
<b>GROUP E</b>	<b>Inhibitors of mitosis / microtubule polymerisation</b>
<i>Carbamates:</i>	carbetamide (Carbetamex <sup>®</sup> ), chlorpropham (Chlorpropham <sup>®</sup> )
<b>GROUP F</b>	<b>Bleachers: Inhibitors of carotenoid biosynthesis at the phytoene desaturase step (PDS inhibitors)</b>
<i>Pyridazinones:</i>	norflurazon (Solicam <sup>®</sup> )
<i>Pyridinecarboxamide:</i>	diflufenican (Brodal <sup>®</sup> , Spearhead <sup>®*</sup> , Jaguar <sup>®*</sup> , Tigrex <sup>®*</sup> , Triathlon <sup>®*</sup> , Yates Pathweeder <sup>®*</sup> ), picolinafen (Eliminar C <sup>®*</sup> , Flight <sup>®*</sup> , Paragon <sup>®*</sup> , Sniper <sup>®</sup> )
<b>GROUP G</b>	<b>Inhibitors of protoporphyrinogen oxidase (PPOs)</b>
<i>Diphenylethers:</i>	acifluorfen (Blazer <sup>®</sup> ), oxyfluorfen (Goal <sup>®</sup> , Rout <sup>®*</sup> , Yates Pathweeder <sup>®*</sup> )
<i>N-phenylphthalimides:</i>	flumioxazin (Valor <sup>®</sup> )
<i>Oxadiazoles:</i>	oxadiargyl <sup>®</sup> (Raft), oxadiazon (Ronstar <sup>®</sup> )
<i>Phenylpyrazole:</i>	pyraflufen (Ecopar <sup>®</sup> , Pyresta <sup>®*</sup> )
<i>Pyrimidindiones:</i>	butafenacil (Logran <sup>®</sup> B-Power <sup>®*</sup> , Resolva <sup>®*</sup> ), saflufenacil (Sharpen <sup>®</sup> )
<i>Triazolinones:</i>	carfentrazone (Affinity <sup>®</sup> , Aptitude <sup>®*</sup> , Broadway <sup>®*</sup> )

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## Moderate Resistance Risk

CHEMICAL FAMILY	ACTIVE CONSTITUENT (FIRST REGISTERED TRADE NAME)
<b>GROUP H</b>	<b>Bleachers: Inhibitors of 4-hydroxyphenyl-pyruvate dioxygenase (HPPDs)</b>
<i>Isoxazoles:</i>	isoxaflutole (Balance <sup>®</sup> )
<i>Pyrazoles:</i>	benzofenap (Taipan <sup>®</sup> ), pyrasulfotole (Precept <sup>®*</sup> , Velocity <sup>®*</sup> )
<b>GROUP I</b>	<b>Disruptors of plant cell growth (Synthetic Auxins)</b>
<i>Arylpicolinate:</i>	halauxifen (ForageMax <sup>®*</sup> , Paradigm <sup>®*</sup> )
<i>Benzoic acids:</i>	dicamba (Banvel <sup>®</sup> , Banvel M <sup>®*</sup> , Barrel <sup>®*</sup> , Casper <sup>®*</sup> , Mecoban <sup>®</sup> , Methar Tri-Kombi <sup>®*</sup> )
<i>Phenoxyacetic acids:</i> ( <i>Phenoxy</i> ):	2,4-D (Actril DS <sup>®*</sup> , Amicide <sup>®</sup> , Fallow Boss Tordon <sup>®*</sup> , Methar Tri-Kombi <sup>®*</sup> , Pyresta <sup>®*</sup> , Vortex <sup>®*</sup> ), 2,4-DB (Trifolamine <sup>®</sup> ), dichlorprop (Lantana 600 <sup>®</sup> ), MCPA (Agtryne <sup>®</sup> MA*, Banvel M <sup>®*</sup> , Barrel <sup>®*</sup> , Basagran <sup>®</sup> M60*, Bucril <sup>®</sup> MA*, Spearhead <sup>®*</sup> , Flight <sup>®*</sup> , MCPA, Midas <sup>®*</sup> , Multiweed <sup>®*</sup> , Paragon <sup>®*</sup> , Precept <sup>®*</sup> , Tigrex <sup>®*</sup> , Tordon 242 <sup>®*</sup> , Triathlon <sup>®*</sup> ), MCPB (Legumine <sup>®</sup> ), mecoprop (Mecoban <sup>®</sup> , Mecopropamine <sup>®</sup> , Methar Tri-Kombi <sup>®*</sup> , Multiweed <sup>®*</sup> )
<i>Pyridine carboxylic acids:</i> ( <i>Pyridines</i> ):	aminopyralid (Fallow Boss Tordon <sup>®*</sup> , ForageMax <sup>®*</sup> , Grazon Extra <sup>®*</sup> , Hotshot <sup>®*</sup> , Stinger <sup>®*</sup> , Vigilant II <sup>®*</sup> ), clopyralid (Spearhead <sup>®*</sup> , Lontrel <sup>®</sup> ), fluroxypyr (Hotshot <sup>®*</sup> , Starane <sup>®</sup> ), picloram (Fallow Boss Tordon <sup>®*</sup> , Grazon Extra <sup>®*</sup> , Tordon <sup>®</sup> , Tordon 242 <sup>®*</sup> , Tordon Regrowth Master <sup>®*</sup> , Trinoc <sup>®*</sup> , Vigilant II <sup>®*</sup> ), triclopyr (Garlon <sup>®</sup> , Grazon Extra <sup>®*</sup> , Tordon Regrowth Master <sup>®*</sup> , Tough Roundup <sup>®</sup> Weedkiller*, Ultimate Brushweed <sup>®*</sup> Herbicide)
<i>Quinoline carboxylic acids:</i>	quinclorac (Drive <sup>®</sup> )
<b>GROUP J</b>	<b>Inhibitors of lipid synthesis (Not ACCase inhibitors)</b>
<i>Benzofurans:</i>	ethofumesate (Tramat <sup>®</sup> )
<i>Chlorocarbonic acids:</i>	2,2-DPA (Dalapon <sup>®</sup> ), flupropanate (Frenock <sup>®</sup> )
<i>Phosphorodithioates:</i>	bensulide (Prefar <sup>®</sup> )
<i>Thiocarbamates:</i>	EPTC (Eptam <sup>®</sup> ), molinate (Ordram <sup>®</sup> ), pebulate (Tillam <sup>®</sup> ), prosulfocarb (Boxer <sup>®</sup> Gold*), thiobencarb (Saturn <sup>®</sup> ), triallate (Avadex <sup>®</sup> , Jetti Duo <sup>®*</sup> ), vernolate (Vernam <sup>®</sup> )
<b>GROUP K</b>	<b>Inhibitors of cell division / Inhibitors of very long chain fatty acids (VLCFA inhibitors)</b>
<i>Acetamides:</i>	napropamide (Devrinol <sup>®</sup> )
<i>Chloroacetamides:</i>	dimethenamid (Frontier <sup>®</sup> -P, Outlook <sup>®</sup> ), metolachlor (Boxer <sup>®</sup> Gold*, Dual <sup>®</sup> Gold, Primextra <sup>®</sup> Gold*), propachlor (Prothal <sup>®*</sup> , Ramrod <sup>®</sup> )
<i>Isoxazoline:</i>	Pyroxasulfone (Sakura <sup>®</sup> )
<b>GROUP L</b>	<b>Inhibitors of photosynthesis at photosystem I via electron diversion (PSI inhibitors)</b>
<i>Bipyridyls:</i>	diquat (Reglone <sup>®</sup> , Spray Seed <sup>®*</sup> ), paraquat (Alliance <sup>®*</sup> , Gramoxone <sup>®</sup> , Spray Seed <sup>®*</sup> )

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## Moderate Resistance Risk

CHEMICAL FAMILY	ACTIVE CONSTITUENT (FIRST REGISTERED TRADE NAME)
<b>GROUP M</b>	<b>Inhibitors of 5-enolpyruvyl shikimate-3 phosphate (EPSP) synthase</b>
<i>Glycines:</i>	glyphosate (Arsenal Xpress <sup>®</sup> , Broadway <sup>®</sup> , Illico <sup>®</sup> , Resolva <sup>®</sup> , Roundup <sup>®</sup> , Tough Roundup <sup>®</sup> Weedkiller*, Trounce <sup>®</sup> , Yates Pathweeder <sup>®</sup> *)
<b>GROUP N</b>	<b>Inhibitors of glutamine synthetase</b>
<i>Phosphinic acids:</i>	glufosinate (Basta <sup>®</sup> , Liberty <sup>®</sup> )
<b>GROUP O</b>	<b>Inhibitors of cell wall (cellulose) synthesis</b>
<i>Alkylazines:</i>	indaziflam (Specticle <sup>®</sup> )
<i>Benzamides:</i>	isoxaben (Gallery <sup>®</sup> , X-Pand <sup>®</sup> )
<i>Nitriles:</i>	dichlobenil (Casoron <sup>®</sup> )
<b>GROUP P</b>	<b>Inhibitors of auxin transport</b>
<i>Phthalamates:</i>	naptalam (Alanap-L <sup>®</sup> )
<b>GROUP Q</b>	<b>Bleachers: Inhibitors of carotenoid biosynthesis unknown target</b>
<i>Isoxazolidinones:</i>	clomazone (Command <sup>®</sup> )
<i>Triazoles:</i>	amitrole (Alliance <sup>®</sup> *, Amitrole <sup>®</sup> , Illico <sup>®</sup> *)
<b>GROUP R</b>	<b>Inhibitors of dihydropteroate synthase (DHP inhibitors)</b>
<i>Carbamates:</i>	asulam (Asulox <sup>®</sup> )
<b>GROUP Z</b>	<b>Herbicides with unknown and probably diverse sites of action</b>
<i>Arylamino propionic acids:</i>	flamprop (Mataven L <sup>®</sup> )
<i>Dicarboxylic acids:</i>	endothal (Endothal <sup>®</sup> )
<i>Organoarsenicals:</i>	DSMA (disodium methylarsonate) (Methar <sup>®</sup> , Trinoc <sup>®</sup> *), MSMA (monosodium methylarsonate) (Daconate <sup>®</sup> )

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