

CropLife Australia Herbicide Resistance Management Review Group
Herbicide Mode of Action Groups (valid as at 15 September 2009)

List of approved active constituents in each "Group" and, for ease of identification, the trade name of the first registered product or successor. Refer to the APVMA website (www.apvma.gov.au) to obtain a complete list of registered products from the PUBCRIS database.

The active constituents and some products that were moved to a different group in February 2008 are listed in bold red type.

High Resistance Risk

CHEMICAL FAMILY	ACTIVE CONSTITUENT (FIRST REGISTERED TRADE NAME)
GROUP A	Inhibitors of acetyl coA carboxylase (Inhibitors of fat synthesis/ACC'ase inhibitors)
<i>Aryloxyphenoxypropionates:</i> (Fops):	clodinafop (Topik [®]), cyhalofop (Barnstorm [®]), diclofop (Cheetah [®] Gold, Decision ^{®*} , Hoegrass [®] , Tristar [®] Advance [*]), fenoxaprop (Cheetah [®] Gold, Tristar [®] Advance, Wildcat [®]), fluazifop (Fusilade [®] , Fusion ^{®*}), haloxyfop (Motsa ^{®*} , Verdict [®]), propaquizafop (Correct [®]), quizalofop (Targa [®])
<i>Cyclohexanediones:</i> (Dims):	butoxydim (Falcon [®] , Fusion ^{®*}), clethodim (Motsa ^{®*} , Select [®]), profoxydim (Aura [®]), sethoxydim (Cheetah [®] Gold, Decision ^{®*} , Sertin [®]), tepraloxymid (Aramo [®]), tralkoxydim (Achieve [®])
<i>Phenylpyrazoles:</i> (Dens):	pinoxaden (Axial [®])
GROUP B	Inhibitors of acetolactate synthase (ALS inhibitors)
<i>Sulfonylureas:</i> (SUs):	azimsulfuron (Gulliver [®]), bensulfuron (Londax [®]), chlorsulfuron (Glean [®]), ethoxysulfuron (Hero [®]), halosulfuron (Sempra [®]), iodosulfuron (Hussar [®]), mesosulfuron (Atlantis [®]), metsulfuron (Ally [®] , Harmony [®] M, Trounce ^{®*}), rimsulfuron (Titus [®]), sulfometuron (Oust [®]), sulfosulfuron (Monza [®]), thifensulfuron (Harmony [®] M), triasulfuron, (Logran [®] , Logran [®] B-Power ^{®*}), tribenuron (Express [®]), trifloxysulfuron (Envoke [®] , Krismat ^{®*})
<i>Imidazolinones:</i> (Imis):	imazamox (Raptor [®] , Intervix ^{®*}), imazapic (Flame [®] , Midas [®] , OnDuty [®]), imazapyr (Arsenal Xpress [®] , Midas [®] , OnDuty [®] , Intervix [®] , Lightning [®]), imazethapyr (Spinnaker [®] , Lightning [®])
<i>Triazolopyrimidines:</i> (Sulfonamides):	flumetsulam (Broadstrike [®]), florasulam (Conclude [®] , Torpedo [®] , X-Pand [®]), metosulam (Eclipse [®]), pyroxsulam (Crusader [®])
<i>Pyrimidinylthiobenzoates:</i>	pyrithiobac-Na (Staple [®])

* This product contains more than one active constituent

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Moderate Resistance Risk

CHEMICAL FAMILY	ACTIVE CONSTITUENT (FIRST REGISTERED TRADE NAME)
GROUP C	Inhibitors of photosynthesis at photosystem II (PS II inhibitors)
<i>Triazines:</i>	ametryn (Amigan [®] , Primatol Z [®] , Gesapax [®] Combi*, Krismat [®]), atrazine (Gesaprim [®] , Gesapax [®] Combi*, Primextra [®] Gold*), cyanazine (Bladex [®]), prometryn (Gesagard [®] , Cotogard [®] , Bandit [®]), propazine (Agaprop [®]), simazine (Gesatop [®]), terbutryn (Amigan [®] *, Igran [®] , Agtryne [®] MA*)
<i>Triazinones:</i>	hexazinone (Velpar [®] L, Velpar [®] K4*), metribuzin (Sencor [®])
<i>Uracils:</i>	bromacil (Hyvar [®] , Krovar [®] *), terbacil (Sinbar [®])
<i>Pyridazinones:</i>	chloridazon (Pyramin [®])
<i>Phenylcarbamates:</i>	phenmedipham (Betanal[®])
<i>Ureas:</i>	diuron (Karmex [®] , Krovar [®] *, Velpar [®] K4*), fluometuron (Cotoran [®] , Cotogard [®] , Bandit [®]), linuron (Afalon [®]), methabenzthiazuron (Tribunil [®]), siduron (Tupersan [®]), tebuthiuron (Graslan [®])
<i>Amides:</i>	propanil (Stam [®])
<i>Nitriles:</i>	bromoxynil (Buctril [®] , Buctril [®] MA*, Barrel [®] *, Jaguar [®] *, Velocity [®] *), ioxynil (Totril [®] , Actril DS*)
<i>Benzothiadiazinones:</i>	bentazone (Basagran [®] , Basagran [®] M60*)
GROUP D	Inhibitors of microtubule assembly
<i>Dinitroanilines: (DNAs):</i>	oryzalin (Surflan [®] , Yield [®] *), pendimethalin (Stomp [®]), trifluralin (Treflan [®] , Yield [®] *)
<i>Benzoic acids:</i>	chlorthal (Dacthal [®] , Prothal [®] *)
<i>Benzamides:</i>	propyzamide (Kerb[®])
<i>Pyridines:</i>	dithiopyr (Dimension[®]), thiazopyr (Visor[®])
GROUP E	Inhibitors of mitosis / microtubule organisation
<i>Carbamates:</i>	carbetamide (Carbetamex [®]), chlorpropham (Chlorpropham [®])
GROUP F	Bleachers: Inhibitors of carotenoid biosynthesis at the phytoene desaturase step (PDS inhibitors)
<i>Nicotinanilides:</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 [®])
<i>Oxadiazoles:</i>	oxadiargyl [®] (Raft), oxadiazon (Ronstar [®])
<i>Triazolinones:</i>	carfentrazone (Affinity [®])
<i>Pyrimidindiones:</i>	butafenacil (Logran [®] B-Power [®] *)
<i>Phenylpyrazole:</i>	pyraflufen (Ecopar [®] , Pyresta [®] *)

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Moderate Resistance Risk

CHEMICAL FAMILY	ACTIVE CONSTITUENT (FIRST REGISTERED TRADE NAME)
GROUP H	Bleachers: Inhibitors of 4-hydroxyphenyl-pyruvate dioxygenase (HPPDs)
<i>Pyrazoles:</i>	benzofenap (Taipan[®], Viper[®]) , pyrasulfotole (Precept ^{®*} , Velocity ^{®*})
<i>Isoxazoles:</i>	isoxaflutole (Balance[®])
GROUP I	Disruptors of plant cell growth
<i>Phenoxy-carboxylic acids:</i> (<i>Phenoxy</i> s):	2,4-D (Amicide [®] , Actril DS ^{®*} , Pyresta^{®*}), 2,4-DB (Trifolamine [®]), dichlorprop (Lantana 600 [®]), MCPA (MCPA, Buctril [®] MA*, Banvel M [®] , Conclude [®] , Midas ^{®*} , Paragon ^{®*} , Tigrex ^{®*} , Barrel ^{®*} , Tordon 242 ^{®*} , Basagran [®] M60*, Chipco Spearhead ^{®*} , Agtryne [®] MA*, Precept ^{®*}), MCPB (Legumine [®]), mecoprop (Mecopropamine [®] , Mecoban [®] , Methar Tri-Kombi ^{®*})
<i>Benzoic acids:</i>	dicamba (Banvel [®] , Banvel M [®] , Barrel ^{®*} , Mecoban [®] Methar Tri-Kombi ^{®*})
<i>Pyridine carboxylic acids:</i> (<i>Pyridines</i>):	aminopyralid (Hotshot ^{®*} , Grazon Extra ^{®*}), clopyralid (Lontrel [®] , Torpedo [®] , Chipco Spearhead ^{®*}), fluroxypyr (Starane [®] , Hotshot ^{®*}), picloram (Tordon [®] , Tordon 242 ^{®*} , Grazon [®] , Grazon Extra ^{®*}), triclopyr (Garlon [®] , Grazon [®] , Grazon Extra ^{®*})
<i>Quinoline carboxylic acids:</i>	quinclorac (Drive [®])
GROUP J	Inhibitors of fat synthesis (Not ACCase inhibitors)
<i>Chlorocarboxylic acids:</i>	2,2-DPA (Dalapon [®]), flupropanate (Frenock [®])
<i>Thiocarbamates:</i>	EPTC (Eptam[®]) , molinate (Ordram[®]) , pebulate (Tillam[®]) , prosulfocarb (Boxer [®] Gold*), thiobencarb (Saturn[®]) , triallate (Avadex[®]) , vernolate (Vernam[®])
<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>	dimethenamid (Frontier [®] -P), metolachlor (Boxer [®] Gold*, Dual [®] Gold, Primextra [®] Gold*), propachlor (Ramrod [®] , Prothal ^{®*})
GROUP L	Inhibitors of photosynthesis at photosystem I (PSI inhibitors)
<i>Bipyridyls:</i>	diquat (Reglone [®] , Spray Seed ^{®*}), paraquat (Gramoxone [®] , Spray Seed ^{®*} , Alliance ^{®*})
GROUP M	Inhibitors of EPSP synthase
<i>Glycines:</i>	glyphosate (Roundup [®] , Trounce ^{®*} , Illico ^{®*} , Arsenal Xpress ^{®*})

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Moderate Resistance Risk

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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[®], Illico^{®*}, Alliance^{®*})
<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) (Methar[®]), MSMA (Daconate[®])

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