

CropLife Australia Herbicide Resistance Management Review Group

Herbicide Mode of Action Groups (valid as at 25 June 2015)

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.

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 [®]), fenoxaprop (Cheetah [®] Gold ⁺ , Wildcat [®]), fluazifop (Fusilade [®] , Fusion ^{®*}), haloxyfop (Verdict [®]), propaquizafop (Shogun [®]), quizalofop (Targa [®])
<i>Cyclohexanediones:</i> (Dims):	butoxydim (Falcon [®] , Fusion ^{®*}), clethodim (Select [®]), profoxydim (Aura [®]), sethoxydim (Cheetah [®] Gold ⁺ , Decision ^{®*}), tepraloxydim (Aramo [®]), tralkoxydim (Achieve [®])
<i>Phenylpyrazoles:</i> (Dens):	pinoxaden (Axial [®])
GROUP B	Inhibitors of acetolactate synthase (ALS inhibitors)
<i>Imidazolinones:</i> (Imis):	imazamox (Intervix ^{®*} , Raptor [®]), imazapic (Bobcat I-Maxx ^{®*} , Flame [®] , Midas [®] , OnDuty [®]), imazapyr (Arsenal Xpress ^{®*} , Intervix ^{®*} , Lightning ^{®*} , Midas ^{®*} , OnDuty [®]), imazethapyr (Lightning ^{®*} , Spinnaker [®])
<i>Pyrimidinylthiobenzoates:</i>	bispyribac (Nominee [®]), pyrithiobac (Staple [®])
<i>Sulfonylureas:</i> (SUs):	azimsulfuron (Gulliver [®]), bensulfuron (Londax [®]), chlorsulfuron (Glean [®]), ethoxysulfuron (Hero [®]), foramsulfuron (Tribute [®]), halosulfuron (Sempra [®]), iodosulfuron (Hussar [®]), mesosulfuron (Atlantis [®]), metsulfuron (Ally [®] , Harmony ^{®*} M, Stinger ^{®*} , Trounce ^{®*} , Ultimate Brushweed ^{®*} Herbicide), prosulfuron (Casper ^{®*}), rimsulfuron (Titus [®]), sulfometuron (Oust [®]), sulfosulfuron (Monza [®]), thifensulfuron (Harmony ^{®*} M), triasulfuron (Logran [®] , Logran [®] B-Power ^{®*}), tribenuron (Express [®]), trifloxysulfuron (Envoke [®] , Krismat ^{®*})
<i>Triazolopyrimidines:</i> (Sulfonamides):	florasulam (Conclude ^{®*} , Paradigm ^{®*} , Torpedo ^{®*} , X-Pand ^{®*}), flumetsulam (Broadstrike [®]), metosulam (Eclipse [®]), pyroxulam (Crusader [®])

* This product contains more than one active constituent

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CropLife Australia Limited

Locked Bag 916, Canberra ACT 2601

Phone: 02 6230 6399 Email: info@croplife.org.au Fax: 02 6230 6355 Website: www.croplife.org.au

Moderate Resistance Risk

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

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Moderate Resistance Risk

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GROUP H	Bleachers: Inhibitors of 4-hydroxyphenyl-pyruvate dioxygenase (HPPDs)
<i>Isoxazoles:</i>	isoxaflutole (Balance [®])
<i>Pyrazoles:</i>	benzofenap (Taipan [®]), pyrasulfotole (Precept ^{®*} , Velocity ^{®*})
GROUP I	Disruptors of plant cell growth (Synthetic Auxins)
<i>Arylpicolinate:</i>	halauxifen (ForageMax ^{®*} , Paradigm ^{®*})
<i>Benzoic acids:</i>	dicamba (Banvel [®] , Banvel M ^{®*} , Barrel ^{®*} , Casper ^{®*} , Mecoban [®] , Methar Tri-Kombi ^{®*})
<i>Phenoxyacetic acids:</i> (<i>Phenoxy</i>):	2,4-D (Actril DS ^{®*} , Amicide [®] , Fallow Boss Tordon ^{®*} , Methar Tri-Kombi ^{®*} , Pyresta ^{®*}), 2,4-DB (Trifolamine [®]), dichlorprop (Lantana 600 [®]), MCPA (Agtryne [®] MA [*] , Banvel M ^{®*} , Barrel ^{®*} , Basagran [®] M60 [*] , Buctril [®] MA [*] , Chipco Spearhead ^{®*} , Conclude ^{®*} , Flight ^{®*} , MCPA, Midas ^{®*} , Multiweed ^{®*} , Paragon ^{®*} , Precept ^{®*} , Tigrex ^{®*} , Tordon 242 ^{®*} , Triathlon ^{®*}), MCPB (Legumine [®]), mecoprop (Mecoban [®] , Mecopropamine [®] , Methar Tri-Kombi ^{®*} , Multiweed ^{®*})
<i>Pyridine carboxylic acids:</i> (<i>Pyridines</i>):	aminopyralid (Fallow Boss Tordon ^{®*} , ForageMax ^{®*} , Grazon Extra ^{®*} , Hotshot ^{®*} , Stinger ^{®*} , Vigilant II ^{®*}), clopyralid (Chipco Spearhead ^{®*} , Lontrel [®] , Torpedo ^{®*}), fluroxypyr (Hotshot ^{®*} , Starane [®]), picloram (Fallow Boss Tordon ^{®*} , Grazon Extra ^{®*} , Tordon [®] , Tordon 242 ^{®*} , Tordon Regrowth Master ^{®*} , Trinoc ^{®*} , Vigilant II ^{®*}), triclopyr (Garlon [®] , Grazon Extra ^{®*} , Tordon Regrowth Master ^{®*} , Tough Roundup Weedkiller ^{®*} , Ultimate Brushweed ^{®*} Herbicide)
<i>Quinoline carboxylic acids:</i>	quinclorac (Drive [®])
GROUP J	Inhibitors of fat synthesis (Not ACCase inhibitors)
<i>Benzofurans:</i>	ethofumesate (Tramat [®])
<i>Chlorocarbonic acids:</i>	2,2-DPA (Dalapon [®]), flupropanate (Frenock [®])
<i>Phosphorodithioates:</i>	bensulide (Prefar [®])
<i>Thiocarbamates:</i>	EPTC (Eptam [®]), molinate (Ordram [®]), pebulate (Tillam [®]), prosulfocarb (Boxer [®] Gold [*]), thiobencarb (Saturn [®]), triallate (Avadex [®]), vernolate (Vernam [®])
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, Outlook [®]), metolachlor (Boxer [®] Gold [*] , Dual [®] Gold, Primextra [®] Gold [*]), propachlor (Prothal ^{®*} , Ramrod [®])
<i>Isoxazoline:</i>	Pyroxasulfone (Sakura [®])
GROUP L	Inhibitors of photosynthesis at photosystem I (PSI inhibitors)
<i>Bipyridyls:</i>	diquat (Reglone [®] , Spray Seed ^{®*}), paraquat (Alliance ^{®*} , Gramoxone [®] , Spray Seed ^{®*})
GROUP M	Inhibitors of EPSP synthase
<i>Glycines:</i>	glyphosate (Arsenal Xpress ^{®*} , Broadway ^{®*} , Illico ^{®*} , Resolva ^{®*} , Roundup [®] , Tough Roundup [®] Weedkiller [*] , Trounce ^{®*} , Yates Pathweeder ^{®*})

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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>Benzamides:</i>	isoxaben (Gallery [®] , X-Pand [®])
<i>Nitriles:</i>	dichlobenil (Casoron [®])
GROUP P	Inhibitors of auxin transport
<i>Phthalamates:</i>	naptalam (Alanap-L [®])
GROUP Q	Bleachers: Inhibitors of carotenoid biosynthesis unknown target
<i>Isoxazolidinones:</i>	clomazone (Command [®])
<i>Triazoles:</i>	amitrole (Alliance ^{®*} , Amitrole [®] , Illico ^{®*})
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 [®] , Trinoc ^{®*}), MSMA (Daconate [®])

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