

## Herbicide Mode of Action Table

### High resistance risk

Chemical family	Active constituent (first registered trade name)
<b>GROUP 1</b>	
<b>Inhibition of acetyl co-enzyme A carboxylase (ACC'ase inhibitors)</b>	
Aryloxyphenoxy-propionates (FOPs)	clodinafop (Topik®), cyhalofop (Agixa®*, Barnstorm®), diclofop (Cheetah® Gold* Decision®*, Hoegrass®), fenoxaprop (Cheetah®, Gold*, Wildcat®), 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®)
<b>GROUP 2</b>	
<b>Inhibition of acetolactate synthase (ALS inhibitors), acetohydroxyacid synthase (AHAS)</b>	
Imidazolinones (IMIs)	imazamox (Intervix®*, Raptor®), imazapic (Bobcat I-Maxx®*, Flame®, Midas®*, OnDuty®*), imazapyr (Arsenal Xpress®*, Intervix®*, Lightning®*, Midas®* OnDuty®*), imazethapyr (Lightning®*, Spinnaker®)
Pyrimidinyl-thio-benzoates	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®*, Ultimate Brushweed®* Herbicide), prosulfuron (Casper®*), rimsulfuron (Titus®), sulfometuron (Oust®, Eucmix Pre Plant®*, Trimac Plus®*), sulfosulfuron (Monza®),

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	thifensulfuron (Harmony®* M), triasulfuron (Logran®, Logran® B-Power®*), tribenuron (Express®), trifloxysulfuron (Envoke®, Krismat®*)
Triazolopyrimidines-Type 1	florasulam (Crest®*, Gangster®*, Paradigm®*, Vortex®*, X-Pand®*), flumetsulam (Broadstrike®, Thistrol® Gold*), metosulam (Eclipse®)
Triazolopyrimidines-Type 2	pyroxsulam (Crusader® Rexade®*)

\* This product contains more than one active constituent

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## Moderate resistance risk

Chemical family	Active constituent (first registered trade name)
<b>GROUP 3</b>	
<b>Inhibition of microtubule assembly</b>	
Benzamides	propyzamide (Effigy®*, Kerb®)
Benzoic acids	chlorthal (Dacthal®, Prothal®*)
Dinitroanilines: (DNAs)	oryzalin (Rout®*, Surflan®), pendimethalin (Freehand®*, Stomp®), prodiamine (Barricade®), trifluralin (Bolta Duo®*, Jetti Duo®*, Treflan®)
Pyridines	dithiopyr (Dimension®)

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Chemical family	Active constituent (first registered trade name)
<b>GROUP 4</b>	
<b>Disruptors of plant cell growth (Auxin mimics)</b>	
Benzoates	dicamba (Banvel®, Banvel M®*, Barrel®*, Casper®*, Lawnweeder plus®*, Lawn weedkiller*, Mecoban®, Methar Tri-Kombi®*, Nuturf Millennium®*, Sandoban®*)
Phenoxy-carboxylates (Phenoxys)	2,4-D (Actril DS®*, Amicide®, Fallow Boss Tordon®*, Methar Tri-Kombi®*, Pyresta®*, Vortex®*), 2,4-DB (Trifolamine®), dichlorprop (Lantana 600®), MCPA (Agtryne® MA*, Banvel M®*, Barrel®*, Basagran® M60*, Buctril® MA*, Buffalo Pro Weedkiller®*, Condor®*, Flight®*, Lawnweeder plus®*, Lawn Weedkiller*, Midas®*, Paragon®*, Precept®*, Quadrant®*, Silverado®*, Spearhead®*, Thistrol Gold®*, Tigrex®*, Tordon 242®*, Triathlon®*), MCPB (Legumine®, Thistrol Gold®*), mecoprop (Mecoban®, Mecopropamine®, Methar Tri-Kombi®, Multiweed®*)
Pyridine carboxylates (Pyridines)	aminopyralid (Fallow Boss Tordon®*, ForageMax®*, Grazon Extra®*, Hotshot®*, Stinger®*, Vigilant II®*), clopyralid (Lontrel®, Nuturf Millennium®*, Spearhead®*, Trimac Plus®*, Velmac Plus®*), florpiauxifen (Agixa®*, Ubeniq®), halauxifen (ForageMax®*, Paradigm®*, Pixxaro®*, Rexade®*), picloram (Fallow Boss Tordon®*, Grazon Extra®*, Tordon®, Tordon 242®*, Tordon Regrowth Master®*, Trinoc®*, Vigilant II®*),
Quinoline-carboxylates	quinclorac (Drive®)
Pyridyloxy-carboxylates	fluroxypyr (Crest®*, Hotshot®*, Pixxaro®*, Starane®), triclopyr (Garlon®, Grazon Extra®*, Tordon Regrowth Master®*, Tough Roundup® Weedkiller*, Ultimate Brushweed®* Herbicide)

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Chemical family	Active constituent (first registered trade name)
<b>GROUP 5</b> <b>Inhibition of photosynthesis at photosystem II - D1 Serine 264 binders (and other non-histidine binders) (PS II Serine 264 inhibitors)</b>	
Amides	propanil (Stam®)
Phenylcarbamates	phenmedipham (Betanal®)
Pyridazinones	chloridazon (Pyramin®)
Triazines	ametryn (Amigan®*, Gesapax® Combi*, Krismat®, Primatol Z®), atrazine (Gesapax® Combi*, Gesaprim®, Primextra® Gold*), cyanazine (Bladex®), prometryn (Bandit®*, Cotogard®*, Gesagard®), propazine (Agaprop®), simazine (Bunnings RTU Path Weeder®*, Gesatop®, Bantox®*, Yates Once A Year Path Weeder®*), terbuthylazine (Effigy®*, Firestorm®*, Palmero TX®*, Terbyne®), terbutryn (Agtryne® MA*, Amigan®*, Igran®)
Triazinones	amicarbazone (Amitron®*) hexazinone (Bobcat I-Maxx®*, Velmac Plus®*, Velpar® K4*, Velpar® L), metribuzin (Aptitude®*, Sencor®)
Uracils	bromacil (Hyvar®, Krovar®*), terbacil (Eucmix Pre Plant®*, Sinbar®, Trimac Plus®*)
Ureas	diuron (Karmex®, Krovar®*, Velpar® K4*), fluometuron (Bandit®*, Cotogard®*, Cotoran®), linuron (Afolon®), methabenzthiazuron (Tribunil®), siduron (Tupersan®), tebuthiuron (Graslan®)

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<b>GROUP 6</b> <b>Inhibition of photosynthesis at photosystem II - D1 Histidine 215 binders</b> <b>(PS II Histidine 215 inhibitors)</b>	
Benzothiadiazinones	bentazone (Basagran®, Basagran® M60*, Lawnweeder Plus®*)
Nitriles	bromoxynil (Barrel®*, Buctril®, Buctril® MA*, Buffalo Pro Weedkiller®*, Eliminar C®*, Flight®*, Jaguar®*, Quadrant®*, Talinor®*, Triathlon®*, Velocity®*), ioxynil (Actril® DS*, Totril®)
<b>GROUP 9</b> <b>Inhibition of 5-enolpyruvyl shikimate-3 phosphate synthase (EPSP inhibition)</b>	
Glycines	glyphosate (Arsenal Xpress®*, Bantox*, Broadway®*, Firestorm®*, Illico®*, Resolva®*, Roundup®, Sandoban®*, Tough Roundup® Weedkiller*, Trounce®*, Yates Pathweeder®*)
<b>GROUP 10</b> <b>Inhibition of glutamine synthetase</b>	
Phosphinic acids	glufosinate (Basta®, Liberty®)
<b>GROUP 12</b> <b>Inhibition of carotenoid biosynthesis at the phytoene desaturase step (PDS inhibitors)</b>	
N-Phenyl heterocycles	norflurazon (Solicam®)
Phenyl-ethers	diflufenican (Brodal®, Gangster®*, Jaguar®*, Quadrant®*, Spearhead®*, Tigrex®*, Triathlon®*, Yates Pathweeder®*), picolinafen (Eliminar C®*, Flight®*, Paragon®*, Quadrant®*, Sniper®)

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Chemical family	Active constituent (first registered trade name)
<b>GROUP 13</b>	
<b>Inhibition of deoxy-D-xyulose phosphate synthase (DOXP inhibitors)</b>	
Isoxazolidinones	bixlozone (Overwatch®), clomazone (Altiplano®*, Command®)
<b>GROUP 14</b>	
<b>Inhibition of protoporphyrinogen oxidase (PPO inhibitors)</b>	
Diphenyl ethers	acifluorfen (Blazer®), fomesafen (Reflex®), oxyfluorfen (Goal®, Rout®, Yates Pathweeder®)
N-Phenyl-oxadiazolones	oxadiargyl (Raft®), oxadiazon (Ronstar®)
Phenylpyrazoles	pyraflufen (Condor®*, Ecopar®, Pyresta®*)
N-Phenyl-imides	butafenacil (B-Power®*, Logran® B-Power®*, Resolva®*), flumioxazin (Valor®, Terrain®), saflufenacil (Sharpen®, Voraxor®*), tiafenacil (Terrad'Or®), trifludimoxazin (Voraxor®*)
N-Phenyl-triazolinones	carfentrazone (Affinity®, Aptitude®*, Broadway®, Buffalo Pro Weedkiller®*, Silverado®*)
<b>GROUP 15</b>	
<b>Inhibition of very long chain fatty acid synthesis (VLCFA inhibitors)</b>	
α-Chloroacetamides	dimethenamid (Freehand®, Frontier®-P, Outlook®), metazachlor (Butisan®), metolachlor (Boxer® Gold®, Dual® Gold, Primextra® Gold*), propachlor (Prothal®*, Ramrod®)
Benzofurans	ethofumesate (Tramat®)
Isoxazolines	pyroxasulfone (Sakura®)
Thiocarbamates	EPTC (Eptam®), molinate (Ordram®), pebulate (Tillam®), prosulfocarb (Arcade®, Bolta Duo®*, Boxer® Gold®, Diablo Duo®*), thiobencarb (Saturn®), tri-allate (Avadex®, Diablo Duo®*, Jeti Duo®*), vernolate (Vernam®)

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Chemical family	Active constituent (first registered trade name)
<b>GROUP 18</b> <b>Inhibition of dihydropteroate synthase (DHP inhibitors)</b>	
Carbamates	asulam (Asulox®)
<b>GROUP 19</b> <b>Inhibition of auxin transport (ATIs)</b>	
Aryl-carboxylates	naptalam (Alanap-L®)
<b>GROUP 22</b> <b>Inhibition of photosynthesis at photosystem I via electron diversion (PSI electron diversion)</b>	
Pyridiniums	diquat (Reglone®, Spray Seed®*), paraquat (Alliance®*, Gramoxone®, Spray Seed®*)
<b>GROUP 23</b> <b>Inhibition of microtubule organisation</b>	
Carbamates	carbetamide (Carbetamex®), chlorpropham (Chlorpropham®)
<b>GROUP 27</b> <b>Inhibition of 4-hydroxyphenyl-pyruvate dioxygenase (HPPD inhibitors)</b>	
Isoxazoles	isoxaflutole (Balance® Palmero TX®*)
Pyrazoles	benzofenap (Taipan®), pyrasulfotole (Precept®*, Velocity®*) topramezone (Frequency®)
Triketones	bicyclopiron (Talinor®*), mesotrione (Callisto®)
<b>GROUP 29</b> <b>Inhibition of cellulose biosynthesis</b>	
Alkylazines	indaziflam (Specticle®)
Benzamides	isoxaben (Gallery®, X-Pand®*)
Nitriles	dichlobenil (Casoron®)

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<b>GROUP 30</b> <b>Inhibition of fatty acid thioesterase</b>	
Benzyl ether	cinmethylin (Luximax®), methiozolin (PoaCure Turf®)
<b>GROUP 31</b> <b>Inhibition of serine-threonine protein phosphatase (STPP inhibitors)</b>	
Unknown	endothal (Endothal®)
<b>GROUP 34</b> <b>Inhibition of lycopene cyclase</b>	
Triazoles	amitrole (Alliance®*, Amitrole®, Brunnings RTU Pathweeder®*, Illico®*, Firestorm®*, Yates Onceyear Pathweeder®*)
<b>GROUP 0</b> <b>Herbicides with unknown mode of action</b>	
Arylamino propionic acids	flamprop (Mataven® L)
Acetamides	napropamide (Altiplano®*, Devrinol®)
Organoarsenicals	DSMA (disodium methylarsonate) (Methar®, Trinoc®*), MSMA (monosodium methylarsonate) (Daconate®)
Fatty acids	Pelargonic acid (Nonanoic acid) (Slasher®)
Chlorocarbonic acids	dalapon (Dalapon®, Yates Onceyear Pathweeder®*, flupropanate (Frenock®)
Phosphorodithioates	bensulide (Prefar®)

\* This product contains more than one active constituent

## Notes:

1. 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.
2. 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.

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