INSECTICIDE MODE OF ACTION TABLE

Main mode of Action Group Primary Site of Action	**Chemical sub-group of Exemplifying Active Constituent**	**Active Constituents**
1* Acetylcholinesterase (AChE) inhibitors Nerve action	**1A** Carbamates*	Bendiocarb, Carbaryl, Carbofuran, Carbosulfan, Methiocarb, Methomyl, Oxamyl, Pirimicarb, Propoxur, Thiodicarb
	1B Organophosphates*	Acephate, Azamethiphos, Azinphos methyl, Cadusafos, Chlorfenvinphos, Chlorpyrifos, Chlorpyrifos-methyl, Diazinon, Dichlorvos, Dimethoate, Ethion, Fenamiphos, Fenitrothion, Fenthion, Malathion, Methidathion, Mevinphos, Omethoate, Phorate, Phosmet, Pirimiphos-methyl, Profenofos, Prothiofos, Temephos, Terbufos, Trichlorfon
2 GABA-gated chloride channel blockers Nerve action	**2A** Cyclodiene organochlorines	*No registered active constituents.*
	2B Phenylpyrazoles (Fiproles)	Fipronil
3 Sodium channel modulators Nerve action	**3A** Pyrethroids Pyrethrins	Allethrin, Alpha-cypermethrin, Beta-cyfluthrin, Bifenthrin, Bioallethrin, Bioresmethrin, Cyfluthrin, Cypermethrin, Cyphenothrin, Deltamethrin, Esbiothrin, Esfenvalerate, Fenvalerate, Flumethrin, Gamma-cyhalothrin, Imiprothrin, Lambda-cyhalothrin, Permethrin, Prallethrin, Pyrethrins, Tau-fluvalinate, Tetramethrin, Transfluthrin, Zeta-cypermethrin
	3B	
4 Nicotinic acetylcholine receptor (nAChR) competitive modulators Nerve action	**4A** Neonicotinoids	Acetamiprid, Clothianidin, Dinotefuran, Imidacloprid, Thiacloprid, Thiamethoxam
	4B Nicotine	*No registered active constituents in Australia.*
	4C Sulfoximine	Sulfoxaflor
	4D Butenolides	Flupyradifurone
5	Spinosyns	Spinosad

Main mode of Action Group Primary Site of Action	Chemical sub-group of Exemplifying Active Constituent	Active Constituents
Nicotinic Acetylcholine receptor (nAChR) allosteric modulators – Site I Nerve action		Spinetoram
6 **Glutamate-gated Chloride (GluCl) channel allosteric modulators** Nerve action	Avermectins Milbemycins	Abamectin Emamectin benzoate Milbemectin
7 **Juvenile hormone mimics** Growth regulation	**7A** Juvenile hormone analogues	Methoprene
	7B Fenoxycarb	Fenoxycarb
	7C Pyriproxyfen	Pyriproxyfen
8 **Miscellaneous non-specific (multi-site) inhibitors**	**8A** Alkyl halides	Methyl bromide
	8B Chloropicrin	Chloropicrin
	8C Fluorides	Sulfuryl fluoride
9 **Chordotonal organ TRPV channel modulators** Nerve action	**9B** Pyridine azomethine derivatives	Pymetrozine
	9D Pyropenes	Afidopyropen
10 **Mite growth inhibitors affecting CHS1** Growth regulation	**10A** Clofentezine Hexythiazox	Clofentezine Hexythiazox
	10B Etoxazole	Etoxazole
11 **Microbial disrupters of insect midgut membranes** (includes transgenic crops expressing *Bacillus thuringiensis* toxins)	**11A** *Bacillus thuringiensis* and the insecticidal proteins they produce	*Bacillus thuringiensis* subsp. *israelensis* *B. thuringiensis* subsp. *aizawai* *B. thuringiensis* subsp. *kurstaki* *B. thuringiensis* subsp. *tenebrionis* *B. thuringiensis* crop proteins: Cry1Ac Cry2Ab Cry1F Vip3A
	11B *Bacillus sphaericus* and the insecticidal proteins they produce	*Bacillus sphaericus*
12 **Inhibitors of mitochondrial ATP synthase** Energy metabolism	**12A** Diafenthiuron	Diafenthiuron
	12B Organotin miticides	Fenbutatin oxide
	12C Propargite	Propargite
	12D Tetradifon	Tetradifon

Main mode of Action Group Primary Site of Action	Chemical sub-group of Exemplifying Active Constituent	Active Constituents
13 **Uncoupler of oxidative phosphorylation via disruption of the proton gradient** Energy metabolism	Pyrroles	Chlorfenapyr
14 **Nicotinic acetylcholine receptor (nAChR) channel blockers** Nerve action	Nereistoxin analogues	*No registered active constituents in Australia.*
15 **Inhibitors of chitin biosynthesis affecting CHS1** Growth regulation	Benzoylureas	Bistrifluron Chlorfluazuron Diflubenzuron Flufenoxuron Hexaflumuron Lufenuron Novaluron Triflumuron
16 **Inhibitors of chitin biosynthesis, type 1** Growth regulation	Buprofezin	Buprofezin
17 **Moulting disrupter, Dipteran** Growth regulation	Cyromazine	Cyromazine
18 **Ecdysone receptor agonists** Growth regulation	Diacylhydrazines	Methoxyfenozide Tebufenozide
19 **Octopamine receptor agonists** Nerve action	Amitraz	Amitraz
20 **Mitochondrial complex III electron transport inhibitors** **Qo site** Energy metabolism	**20A** Hydramethylnon	Hydramethylnon
	20B Acequinocyl	Acequinocyl
	20C	*No registered active constituents in Australia.*
	20D Bifenazate	Bifenazate
21 **Mitochondrial complex I electron transport inhibitors** Energy metabolism	**21A** METI acaricides and insecticides	Fenpyroximate Pyridaben Tebufenpyrad
	21B Rotenone	Rotenone (Derris)
22 **Voltage-dependent sodium channel blockers** Nerve action	**22A** Oxadiazines	Indoxacarb
	22B Semicarbazones	Metaflumizone
23 **Inhibitors of acetyl-CoA carboxylase** Lipid synthesis, growth regulation	Tetronic and Tetramic acid derivatives	Spirotetramat Spiromesifen

Main mode of Action Group Primary Site of Action	Chemical sub-group of Exemplifying Active Constituent	Active Constituents
24 **Mitochondrial complex IV electron transport inhibitors** Energy metabolism	**24A** Phosphides	Phosphine Aluminium phosphide Magnesium phosphide
	24B Cyanides	*No registered active constituents in Australia.*
25 **Mitochondrial complex II electron transport inhibitors** Energy metabolism	**25A** Beta-ketonitrile derivatives	Cyflumetofen
	25B Carboxanilides	*No registered active constituents in Australia.*
28 **Ryanodine receptor modulators** Nerve and muscle action	Diamides	Chlorantraniliprole Cyantraniliprole Cyclaniliprole Flubendiamide Tetraniliprole
29 **Chordotonal organ nicotinamidase inhibitors** Nerve action	Flonicamid	Flonicamid
30 **GABA-gated chloride channel allosteric modulators** Nerve action	Meta-diamides Isoxazolines	Broflanilide Isocycloseram
31 **Baculoviruses** Host-specific occluded pathogenic viruses (Midgut epithelial columnar cell membrane target site – undefined)	Granuloviruses (GVs)	*Cydia pomonella* granulosis virus strain V22
	Nucleopolyhedroviruses (NPVs)	Polyhedral occlusion bodies of the NPV of *Helicoverpa zea or H. armigera*
32 **Nicotinic acetylcholine receptor (nAChR) allosteric modulators - Site II** Nerve action	GS-omega/kappa HXTX-Hv1a peptide	*No registered active constituents in Australia.*
33 **Calcium-activated potassium channel (KCA2) modulators** Nerve action	Acynonapyr	*No registered active constituents in Australia.*
34 **Mitochondrial Complex III transport inhibitors – Qi site** Energy metabolism	Flometoquin	*No registered active constituents in Australia.*
36 **Chordotonal organ modulators – undefined target site** Nerve action	Pyridazine pyrazolecarboxamides	Dimpropyridaz
UN	Azadirachtin	Azadirachtin
	Clitoria ternatea extract	*Clitoria ternatea* extract
	Dicofol	Dicofol

Main mode of Action Group Primary Site of Action	Chemical sub-group of Exemplifying Active Constituent	Active Constituents
Compounds of unknown or uncertain mode of action (MoA)[2]	Lime sulphur	Lime sulphur
	Sulphur	Sulphur
UNE **(Botanical essence including extracts and unrefined oils)**	Garlic extract and garlic oil Botanical oils	Garlic extract and garlic oil Orange oil Tea tree oil Eucalyptus oil Emulsifiable botanical oil
UNF **Fungal agents of unknown or uncertain mode of action (MoA)** (Target protein responsible for biological activity is unknown, or uncharacterized)		*Beauveria bassiana* strains
UNM Non-specific mechanical and physical disruptors		Diatomaceous earth Calcined kaolin Mineral oil Paraffinic oils Petroleum oil

**All members of the class may not be cross resistant.*

[2] *A compound with an unknown or controversial mode of action or an unknown mode of toxicity will be held in Group UN until evidence becomes available to enable that compound to be assigned to a more appropriate mode of action group.*