



IRAC Mode of Action Classification v5.1, September 2005 - Ag Uses

Main Group - Primary Site of Action

Chemical Subgroup or exemplifying Active Ingredient

Active Ingredient	Product Name	Registrant
Group 1 - Acetylcholine esterase inhibitors		
1A - Carbamates		
Aldicarb	Temik®, Bolster™	Bayer CropScience, Amvac
Carbaryl	Sevin®	Bayer CropScience, Drexel, Gowan, UAP-Loveland, Wilbur-Ellis
Carbofuran	Furadan®	FMC
Formetanate	Carzol® SP	Gowan
Methiocarb	Mesuro®	Gowan
Methomyl	Lannate®	DuPont
Oxamyl	Vydate®	DuPont
Pirimicarb	Pirimor®	Syngenta
Thiodicarb	Larvin®	Bayer CropScience
1B - Organophosphates		
Acephate	Orthene®	Cheminova, Micro Flo, TENKOZ, United Phosphorus, Valent
Azinphos-methyl	Guthion®	Bayer CropScience, Micro Flo
Chlorpyrifos	Govern™, Lock-On®, Lorsban®, Nufos®, Warhawk™, Whirlwind™, Yuma™	Dow AgroSciences, Makhteshim Agan NA, Agrilience, Drexel, Gowan, Helena, TENKOZ, UAP-Loveland
Diazinon	Diazinon	Drexel, Gowan, Helena, Makhteshim Agan NA, Micro Flo, UAP-Loveland, Wilber-Ellis
Dimethoate	Dimethoate	Agrilience, Britz, Drexel, Gowan, Helena, Micro Flo, UAP-Loveland
Disulfoton	Di-syston	Bayer CropScience
Ethoprophos	Mocap®	Bayer CropScience
Fenamiphos	Nemacur®	Bayer CropScience
Fosthiazate	Nemathorin®	ISK
Malathion	Fyfanon®, Malathion	Agrilience, Cheminova, Gowan, Helena, Micro Flo, UAP-Loveland
Methamidophos	Monitor®	Bayer CropScience
Methidathion	Supracide®	Gowan
Methyl parathion	Pennac-M®	Cerexagri
Naled	Dibrom®	Amvac
Oxydemeton-methyl	MSR® Spray Concentrate	Gowan
Phorate	Phorate, Thimet®	Agrilience, Micro Flo, UAP-Loveland, Amvac
Phosmet	Imidan®	Gowan
Pirimiphos-methyl	Actellic®	Agrilience
Profenofos	Curacron®	Syngenta
Tebupirimfos	Aztec®, Defcon™	Bayer CropScience, Amvac
Terbufos	Counter®	BASF
Group 2 - GABA-gated chloride channel antagonists		
2A - Cyclodiene organochlorines		
Endosulfan	Thionex®	Drexel, Makhteshim Agan NA
2B - Phenylpyrazoles (Fiproles)		
Fipronil	Regent®	BASF

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Group 3 - Sodium channel modulators

Pyrethroids		
beta-cyfluthrin	Baythroid® XL	Bayer CropScience
Bifenthrin	Annex™, Bifenture, Brigade®, Capture®, Discipline™, Double Threat™	Amvac, FMC, Helena, TENKOZ, United Phosphorus
Cyfluthrin	Aztec®, Baythroid®, Renounce®, Leverage®	Bayer CropScience
lambda-cyhalothrin	Karate® Zeon, Mystic™ Z, Silencer™, Taiga™ Z, Warrior® Zeon	Agrilience, Helena, Makhteshim, Syngenta
gamma-cyhalothrin	Proaxis™, Prolex™	TENKOZ, UAP-Loveland
Cypermethrin	Ammo®, Battery™, Up-cyde™	Agrilience, Helena, TENKOZ, UAP-Loveland, United Phosphorus
zeta-Cypermethrin	Mustang®, Mustang® Max	FMC
Deltamethrin	Battalion™, Decis®	Arysta, Bayer CropScience
Esfenvalerate	Asana® XL	DuPont
Fenpropathrin	Danitol®	Valent
tau-Fluvalinate	Mavrik®	Wellmark
Permethrin	Ambush®, Arctic™, Perm-up, Pounce®	Agrilience, Amvac, FMC, Gowan, Helena, Micro Flo, TENKOZ, UAP-Loveland, United Phosphorus
Tefluthrin	Force®	Syngenta

Pyrethrins (pyrethrum)

Pyrethrins (pyrethrum)	Pyganic®	MGK
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Group 4 - Nicotinic Acetylcholine receptor agonists / antagonists

4A - Neonicotinoids

Acetamiprid	Assail®, Intruder™	Cerexagri, DuPont, Nisso
Clothianidin	Belay™, Clutch™, Poncho®	Arysta, Bayer CropScience
Dinotefuran	Venom™	Valent
Imidacloprid	Admire®, Admire® Pro, Alias™, Couraze™, Gaucho®, Imidacloprid 4F, Macho™, Pasada™, Provado®, Trimax™, Leverage®	Albaugh, Bayer CropScience, Cheminova, Makhteshim Agan NA
Thiacloprid	Calypso™	Bayer CropScience
Thiamethoxam	Actara®, Centric®, Cruiser®, Platinum®, T-Moxx™	Syngenta

4B - Nicotine

4C - Bensultap, Cartap hydrochloride, Nereistoxin analogues

Group 5 - Nicotinic Acetylcholine receptor agonists (allosteric) (not group 4)

Spinosyns

Spinosad	Double Threat™, Entrust®, SpinTor®, Success®, Tracer®	Dow AgroSciences, FMC
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Group 6 - Chloride channel activators

Avermectins, Milbemycins

Abamectin	ABBA™, Agri-Mek®, Zephyr®, Avicta®	Makhteshim Agan NA, Syngenta
Emamectin benzoate	Denim™, Proclaim®	Syngenta
Milbemectin		

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Group 7 - Juvenile hormone mimics		
7A - Juvenile hormone analogues		
Kinoprene	Enstar®	Wellmark
Methoprene	Apex®, Diacon®, Extinguish®	Wellmark
7B - Fenoxycarb		
Fenoxycarb	Award®	Syngenta
7C - Pyriproxyfen		
Pyriproxyfen	Esteem®, Knack®, Seize®	Valent
Group 8 - Compounds of unknown or non-specific mode of action (fumigants)		
8A - Alkyl halides		
Methyl bromide	Brom-o-Gas, Haltox, Terr-o-Gas	
8B - Chloropicrin		
Chloropicrin	Pic-clor, Telone®	Dow AgroSciences, TRICAL
Group 9 - Compounds of unknown or non-specific mode of action (selective feeding blockers)		
9A - Cryolite		
Cryolite	Kryocide®	Cerexagri, Gowan
9B - Pymetrozine		
Pymetrozine	Fulfill®	Syngenta
9C - Flonicamid		
Flonicamid	Beleaf™, Carbine™	ISK, FMC
Group 10 - Compounds of unknown or non-specific mode of action (mite growth inhibitors)		
10A - Clofentezine		
Clofentezine	Apollo®	Makhteshim Agan NA
Hexythiazox	Hexygon®, Onager®, Savey®	Gowan
10B - Etoxazole		
Etoxazole	Zeal™	Valent
Group 11 - Microbial disruptors of insect midgut membranes (includes transgenic crops expressing Bacillus)		
11A1 - B.t. subsp. israelensis		
<i>Bacillus thuringiensis</i> subsp. <i>israelensis</i>	Gnatrol®	Valent
11A2 - B. sphaericus		
<i>Bacillus sphaericus</i>		
11B1 - B.t. subsp. aizawai		
<i>Bacillus thuringiensis</i> subsp. <i>aizawai</i>	Agree®, XenTari®	Certis, Valent
11B2 - B.t. subsp. kurstaki		
<i>Bacillus thuringiensis</i> subsp. <i>kurstaki</i>	Crymax®, Biobit®, Deliver®, Dipel®, Javelin®, Lepinox®	Certis, Valent, Wilbur-Ellis
11C - B.t. subsp. tenebrionis		
<i>Bacillus thuringiensis</i> subsp. <i>tenebrionis</i>	Novodor®	Valent

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Group 12 - Inhibitors of oxidative phosphorylation, disruptors of ATP formation (inhibitors of ATP synthase)		
12A - Diafenthiuron		
12B - Organotin miticides		
Azocyclotin		
Cyhexatin		
Fenbutatin-oxide	Vendex®	DuPont, Griffin
12C - Propargite		
Propargite	Comite®, Omite®	Chemtura
Group 13 - Uncouplers of oxidative phosphorylation via disruption of proton gradient		
Chlorfenapyr		
DNOC		
Group 14 - vacant		
Group 15 - Inhibitors of chitin biosynthesis, type 0, Lepidopteran		
Benzoylureas		
Diflubenzuron	Dimilin®, Micromite®	Chemtura
Novaluron	Rimon®	Chemtura, Makhteshim Agan NA
Group 16 - Inhibitors of chitin biosynthesis, type 1, Homopteran		
Buprofezin		
Buprofezin	Applaud®, Courier®	Nichino
Group 17 - Molting disruptor, Dipteran		
Cyromazine		
Cyromazine	Trigard®	Syngenta
Group 18 - Ecdysone agonists / molting disruptors		
18A - Diacylhydrazines		
Methoxyfenozide	Intrepid®	Dow AgroSciences
Tebufenozide	Confirm®, Mimic®	Dow AgroSciences
18B - Azadirachtin		
Azadirachtin	Aza-direct™, Ecozin®, Neemix®	Amtvac, Certis, Gowan, PBI Gordon
Group 19 - Octopaminergic agonists		
Amitraz		
Group 20 - Mitochondrial complex III electron transport inhibitors (Coupling site II)		
20A - Hydramethylnon		
Hydramethylnon	Amdro® Pro	BASF, Wilbur-Ellis
20B - Acequinocyl		
Acequinocyl	Kanemite™	Arysta
20C - Fluacrypyrim		
Fluacrypyrim		
Group 21 - Mitochondrial complex I electron transport inhibitors		
METI acaricides		
Fenpyroximate	Fujimite®	Nichino
Pyridaben	Nexter®, Pyramite™	BASF, Wilbur-Ellis
Rotenone		



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Group 22 - Voltage-dependent sodium channel blockers		
Indoxacarb		
Indoxacarb	Avaunt®, Steward®	DuPont
Group 23 - Inhibitors of lipid synthesis		
Tetronic acid derivatives		
Spirodiclofen	Envidor®	Bayer CropScience
Spiromesifen	Oberon®	Bayer CropScience
Group 24 - Mitochondrial complex IV electron transport inhibitors		
24A - Aluminum phosphide		
24B - Cyanide		
24C - Phosphine		
Group 25 - Neuronal inhibitors (unknown mode of action)		
Bifenazate		
Bifenazate	Acramite®	Chemtura
Group 26 - Aconitase inhibitors		
Fluoroacetate		
Group 27 - Synergists		
27A - P450-dependent monooxygenase inhibitors		
Piperonyl butoxide	Exponent™	MGK
27B - Esterase inhibitors		
Group 28 - Ryanodine receptor modulators		
Flubendiamide		
un - Compounds with unknown mode of action		
una - Benzoximate		
unb - Chinomethionat		
unc - Dicofol		
Dicofol	Dicofol, Kelthane®	Dow AgroSciences, Gowan, Makhteshim Agan NA
und - Pyridalyl		
Pyridalyl		
ns - Miscellaneous non-specific (multi-site) inhibitors		
nsa - Borax		
nsb - Tartar emetic		
Tartar emetic		