

Insecticide Mode of Action Classification: A key to effective insecticide resistance management

The Insect Resistance Action Committee (IRAC) promotes the use of a Mode of Action (MoA) classification of insecticides as the basis for effective and sustainable insecticide resistance management (IRM). Insecticides are allocated to specific groups based on their target site. The IRAC MoA classification list provides a guide to the selection of insecticides in IRM programs.

In practice, alternations, sequences or rotations of compounds from different MoA groups provide sustainable and effective IRM. This ensures that selection from compounds in the same MoA group is minimized. It is generally essential to ensure that successive generations of the pest are not treated with compounds from the same MoA group.

Local expert advice should always be followed with regard to spray windows and timings.

IRAC website: www.irc-online.org

INSECTICIDES

Group	Mode of Action	Insecticide Class	Insecticide Common Name	Original Brand Name
1A	Acetylcholinesterase Inhibitor	Carbamate	Carbaryl	Sevin
1B	Acetylcholinesterase Inhibitor	Organophosphate	Chlorpyrifos Acephate Trichlorfon	Dursban Orthene Dylox
2B	GABA-gated chloride Channel Antagonist	Phenylpyrazole	Fipronil	Maxforce
3	Sodium Channel Modulator	Pyrethroid	Bifenthrin Cyfluthrin Deltamethrin Lambda-cyhalothrin	Talstar Tempo DeltaGard Scimitar
4A	Nicotinic Acetylcholine Receptor Agonist/Antagonist	Neonicotinoid	Imidacloprid Clothianidin Thiamethoxam	Merit Arena Meridian
5	Nicotinic Acetylcholine Receptor Agonist (Allosteric)	Spinosyn	Spinosad	Conserve
6	Chloride Channel Activators	Avermectins	Abamectin	Avid
7B 7C	Juvenile Hormone Mimics	Juvenile Hormone Analogs	Fenoxycarb Pyriproxyfen	Award Distance
11B2	Microbial Disruptor of Insect Midgut Membrane	Microbial	Bacillus Thuringiensis Kurstaki	Dipel
18A	Ecdysone Agonist/Molting Disruptor	Diacythiazine	Halofenozide	Mach 2
20	Mitochondrial Complex III Electron Transport Inhibitor	Hydramethylnon	Hydramethylnon	Amdro
22	Voltage-Dependent Sodium Channel	Oxadiazine	Indoxacarb	Advion, Provaunt
28	Ryanodine receptor modulator	Anthranilic diamide	hlorantraniliprole	Acelepryn

Insecticides



ACELEPRYN *DuPont*

A.I. Chlorantraniliprole

DuPont™ Acelepryn™ insecticide is an entirely new insecticide class with a novel mode of action. Studies prove that it delivers superior results with the lowest application rate (lb ai/acre) ever utilized for white grub control.

D13882998 .5 Gallon
D13684734 25 lb. Bag



BIFENTHRIN *Prokoz*

A.I. Bifenthrin

Bifenthrin multi-insecticide golf course / nursery formulation is effective for controlling many kinds of insects. This product mixes readily with water.

PK10583 T&O, 3/4 Gallon



ALLECTUS G *Bayer Environmental Science*

A.I. Imidacloprid + Bifenthrin

For general insect control in turfgrass areas including athletic fields and park and residential, commercial, industrial, institutional and recreational lawns. Not for use on golf courses or sod farms.

3844017 T&O, 50 lb. Bag
3844068 GC, 50 lb. Bag (RUP)
3847962 GC, 1 Gallon Jug (RUP)



CORETECT™ *Bayer*

A.I. Imidacloprid

CoreTect tablets contain the world's #1 tree and shrub insecticide plus fertilizer, so they protect and nourish. Used during planting or on established plants, CoreTect provides extended insect control through its controlled release technology. Once inside, CoreTect's systemic action makes plants stronger and more resistant to environmental stressors like heat, drought, and poor soil conditions.

79283261 Bottle (250 tablets)



ARENA 50 WDG + .25G *Valent*

A.I. Clothianidin

Arena® Insecticide is the only preventative and curative grub control product proven to provide maximum application timing flexibility.

66330-40 50 WDG, 40 oz. Bottle
61427.190 .25G, 25 lb. Bag



DUOCIDE DG PRO *The Andersons*

A.I. Bifenthrin + Carbaryl

For control of selected surface and subsurface pests on any turfgrass site including golf courses and sod farms and control of pests in and around flower beds, ornamental plantings and around buildings.

AGCDGDU4 40 lb. Bag, Golf (RUP)
APTDGDUH 40 lb. Bag, Landscape



AZATROL® *PBI Gordon*

A.I. Azadirachtin

A botanical product for control of insects on indoor and outdoor ornamental shrubs, flowers, trees, vegetables and plants. Azatrol is a unique insecticide formulation containing azadirachtin that is very effective on white flies, leafrollers, aphids, mites and many other insects.

6611076 1 Gallon



DYLOX 420 SL *Bayer Environmental Science*

A.I. Trichlorfon

Dylox 420 SL is a new liquid formula for turf and ornamentals. Dylox 420 SL is registered for use on turf (all species, landscape and recreational area sites), flowers, shrubs and trees.

79105568 2.5 Gallon

Insecticides

Reinders



DYLOX 6.2% *Bayer Environmental Science*
A.I. Trichlorfon
 Dylox 6.2 is a fast-acting granular curative product for grub control. Applications of Dylox in most areas should be made after August 15 or whenever grubs are found. Dylox works within 24 hours, which makes it an ideal choice for curative treatment. Dylox also controls mole crickets, sod webworms and cutworms. Dylox works immediately after irrigation or rainfall.
210371 30 lb. Bag



MERIDIAN *Syngenta*
A.I. Thiamethoxam
 Meridian™ insecticide provides turf managers with an unprecedented degree of control and application flexibility in managing a broad spectrum of grubs and insects on their turf.
23418 .33G, 40 lb. Bag
35036 25 WG, 4 x 17 oz. Case
37504 25 WG, 4 x 102 oz. Case



FLORAMITE SC *OHP*
A.I. Bifenazate
 Floramite® SC has a unique mode of action as a member of the Carbazates class of chemistry. Floramite SC is a fast-acting, broad-spectrum miticide. Floramite SC is effective on a wide range of mites and all life stages of Tetranychid spider mites.
19-0063 1 Quart



MERIT G *Bayer Environmental Science*
A.I. Imidacloprid
 Merit is a broad-spectrum, systemic granular insecticide that is effective at low use rates on turfgrass and ornamentals. The active ingredient in Merit provides strong residual activity and superior biological performance. Its low use rate helps reduce risk to applicators and non-target organisms. Merit will provide residual soil insect control 4 months or longer in turf under normal conditions.
216541 0.5 G, 30 lb. Bag, Turf
217190 2.5 G, 4 lb. Jug, Landscape



FORBID 4F MITICIDE *Bayer*
A.I. Spiromesifen
 Forbid is a new class of miticide with a totally new MOA (mode of action). Forbid is translaminar – it moves from the top of the leaf to the bottom straight through the leaf, it kills all life stages from egg to adult, and has no known resistance. Forbid gives a long residual of 4-8 weeks, and with a “Caution” rating is a safer product for applicators.
3944704-8oz 8 oz. Bottle



MERIT 75 WSP *Bayer Environmental Science*
A.I. Imidacloprid
 Merit 75WSP is a systemic insecticide that is effective at low rates. The active ingredient in Merit provides strong residual activity and superior biological performance. The wettable powder in water-soluble packets make mixing simple and package disposal easy.
216512 4 x 4 x 1.6 oz.
79229356 Mini Drum (110 x 1.6 oz.)



INSECTICIDE III DG PRO *The Andersons*
A.I. Chlorpyrifos
 Andersons Insecticide III is a granular insecticide that controls chinch bugs, sod webworms, flea beetles (in dichondras), cutworms and other surface insects.
 Pulp carrier. Small particle.
AGC8222-1 28.1 lb. Bag



PROSECT .15G DG PRO *The Andersons*
A.I. Bifenthrin
 For use to control Ants (including Imported Fire Ants), mole crickets and other insect pests on lawns in landscaped areas and perimeters around residential, institutional, public, commercial and industrial buildings, parks, recreational areas, golf courses, sod farms and athletic fields.
AGCDGBF5 50 lb. Bag

Insecticides



PROVAUNT *DuPont*

A.I. Indoxacarb

Provaunt® insecticide is a water dispersible granular that may be applied as a foliar or broadcast spray to control lepidopterous larvae and certain other pests on landscape and recreational (including golf course) turfgrass and landscape ornamentals. Nonrup - cutworm control for golf course greens.

D12762606 10 oz. Bottle



TEMPO SC ULTRA *Bayer Environmental Science*

A.I. B-Cyfluthrin

Tempo SC Ultra WSP is a broad spectrum control of crawling, flying, and wood-infesting insect pests on indoor & outdoor surfaces, as well as insect pests of trees, landscape ornamentals and residential and commercial lawns.

4196332 1 Bottle 240 ml



SAFARI 20SG *Valent*

A.I. Dinotefuran

Safari™ 20 SG Insecticide can be applied as a foliar spray or broadcast spray for insect control in ornamental plants in commercial or residential landscapes, greenhouses & nurseries.

69712.430 3 lb. Bottle



TENGARD SFR *UPI*

A.I. Permethrin

For use as an insecticide on ornamentals grown in greenhouse and interiorscapes, for perimeter insect control on lawns, ornamental trees and shrubs around residential, institutional, public, commercial and industrial buildings, parks, recreational areas and athletic fields.

SFR125 1.25 Gallon Jug
SFR55 55 Gallon Drum



SCIMITAR CS & GC *Syngenta*

A.I. Lambda-cyhalothrin

Controls insect pests on ornamentals and lawns in landscaped areas around residential, institutional, public, commercial, and industrial buildings, parks, recreational areas and athletic fields.

73419 1 Quart, Golf (RUP)
73420 1 Pint, Landscape



ZENITH *Bayer/Prokoz*

A.I. Imidacloprid

Zenith Insecticide is a broad spectrum, systemic insecticide that is effective at extremely low use rates. Zenith delivers outstanding control of a variety of turf and ornamental insects. It has an active ingredient that provides strong residual activity and superior biological performance. Even soil application to shrubs and trees provides long-lasting control of labeled insect pests.

79404506 75WSP, Case (4 x 4 x 1.6 oz.)
4321312 2F, 40 oz. Bottle
03843894 .5G, 30 lb. Bag



SEVIN SL *Bayer/Prokoz*

A.I. Carbaryl

SEVIN® brand 4F carbaryl insecticide sets the standard for broad-spectrum control in the food crop, grain crop, forestry, home-use pesticide and tobacco markets. It offers a host of advantages over other insecticides, ease of application, short PHI, no phytotoxicity, and 12-hour re-entry. Plus, Sevin is one of the most environmentally responsible pesticides you can use.

25872 2.5 Gallon



ZYLAM™ *PBI Gordon*

A.I. Dinotefuran

Zylam™ 10SL Systemic Turf Insecticide is a liquid formulation of dinotefuran, a third generation neonicotinoid insecticide. It is the product of choice when you need "muscle in your tank" for outstanding control of tough turfgrass pests including both root- and leaf-feeding insects on your most troublesome turf areas.

7321186 1 quart



TALSTAR EZ *FMC*

A.I. Bifenthrin

Talstar EZ is a highly effective insecticide that provides long-lasting control of the most problematic surface-feeding pests, like billbugs, chinch bugs, fleas, ticks, mites and all species of lawn ants. And with its low application rate, Talstar EZ is a cost-effective pest solution when you need it most.

10056780 25 lb. Bag