

Crops(s) **Turf**

Insect(s)/Mite(s) **Various**

Guidelines:

The Modes of Action (groups) and registered miticide and insecticides in turf are listed below.

Miticides:

Group*	Chemical sub-group	Example chemical	Product type
3A	Pyrethroids	beta-cyfluthrin bifenthrin	Miticide/Insecticide
6	Avermectins	abamectin	Miticide
10A	Clofentezine	clofentezine	Miticide
10B	Etoxazole	etoxazole	Miticide
12A	Diafenthiuron	diafenthiuron	Miticide

Insecticides:

Group*	Chemical sub-group	Example chemical	Product type
1A	Carbamates	bendiocarb	Insecticide
1B	Organophosphates	diazinon maldison (malathion) trichlorfon	Insecticide
4A	Neonicotinoids	clothianidin imidacloprid thiamethoxam	Insecticide
2B	Phenylpyrazoles (Fiproles)	fipronil	Insecticide
15	Benzoylureas	novaluron	Insecticide
7C	Pyriproxyfen	pyriproxyfen	Insecticide
11A	<i>Bacillus thuringiensis</i> and the insecticidal proteins they produce	<i>Bacillus thuringiensis</i>	Insecticide
20A	Hydramethylnon	hydramethylnon	Insecticide
22A	Oxadiazines	indoxacarb	Insecticide
22B	Semicarbazones	metaflumizone	Insecticide
28	Diamides	chlorantraniliprole cyantraniliprole tetraniliprole	Insecticide

* Refer CropLife Australia Insecticide Resistance Management Review Group Mode of Action Classification for Insecticides.

Please note:

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1. Monitor regularly for insect/mite activity. Where relevant consider the use of light, insect traps or other monitoring tools, including flushing with pyrethrum, soap, or salt solutions.
2. Use insecticides when insect populations reach accepted threshold levels.
3. For certain insect pests, preventative applications may be required to avoid the buildup of insect populations.
4. Always read and follow product labels and use the full recommended label rates of application. Some products place a limit on the number of times they can be applied per season/year and when they can be applied.
5. Ensure the spray equipment is properly calibrated and achieving good coverage with appropriately sized spray droplets.
6. **Do not** apply if heavy rains or storms that are likely to cause runoff are forecast. Read individual labels for additional advice.
7. **Rotate** between registered insecticides that have different modes of action.
8. Where possible **avoid applying consecutive applications** of insecticides that have the same mode of action within and between seasons or exceed the recommended maximum number of applications in a season/year.
9. Time the applications to the most susceptible life stage of the target pest.
10. **Do not** re-treat a spray failure with a product from the same mode of action group.
11. Avoid using insecticide tank-mixes where both active ingredients control the same insect pests as this strategy is generally not considered best-practice for resistance management.

Mite – additional information

1. Monitor mite activity and treat infestations as soon as detected i.e. spray earlier rather than later. Seek advice on local threshold levels.
2. Avoid sequential applications of products from any one mode of action group.
3. Preferably products with the same Mode of Action should not be used more than twice during the main growing season.

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Notes:

1. Refer to The CropLife Australia Expert committee on Insecticide Resistance Mode of Action Classification for Insecticides.
2. There is known cross-resistance between some chemical groups e.g. **Groups 1A** and **1B**.
3. Seek advice from the manufacturers and/or government advisory services to determine local resistance levels for specific mode of action **Groups**.
4. **Do not** exceed the maximum number of applications permitted on the insecticide/miticide label.
5. When using insecticides to control other pests, consider the chemical group in relation to contributing to resistance development of other insect/mite pests.
6. When using insecticides to control pests, consider the effect on beneficial insects and the potential to flare insect/mite populations.

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