MACE Resistance Group 1: Acetylcholinesterase (AChE) inhibitors Key to Targeted Group 2: GABA-gated chloride Physiology channel antagonists 2A Cyclodiene Organochlorines Respiration 2B Phenylpyrazoles (Fiproles) Organophosphate Group 3: Sodium channel modulators (Only representative actives of group 3A are shown) wingo, ഗാ Moore Pyrethroids Pyrethrins 3B DDT, Spruzit Methoxychlor Group 4: Nicotinic acetylcholine receptor (nAChR) competitive modulators Gazelle 4D Butenolides 4F Pyridylidenes \Diamond Group 5: Nicotinic Group 6: Glutamate-gated chloride channel (GluCI) acetylcholine recepto (nAChR) allosteric 5 Spinosyns 6 Avermectins & Milbemycins Group 7: Juvenile hormone droprene R1 = ethyl, R2 = H receptor modulators 7A Juvenile 7B 7C analogues oprene R1 = propargyl, R2 = H Fenoxycarl Group 8: Miscellaneous non-specific (multi-site) Na2B4O7-10H2O 8A Alky 8D Borates Tartar emetic CI₃C-NO; 8C 8F Methyl isothiocyanate Chloropicrin Fluorides generators Use of Groups: Use of Sub-Groups: Sub-groups represent distinct structural classes which are believed to have the same mode of action. Alternations, sequences or rotations of compounds between MoA groups reduce selection for target site resistance.

Applications are arranged into MoA spray windows defined by crop growth stage and pest biology. Several sprays of a compound may be possible within each spray window, but successive generations of a pest should not be treated with

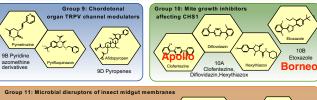
compounds from the same MoA group. Local expert advice on spray windows and timings should always be followed. Groups in the classification whose members do not act at a common target site are exempt from the proscription against rotation within the group (Group 8, 13 and all UN groups: UN, UNB, UNE, UNF, UNM, UNP & UNV).

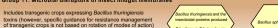
· Sub-groups provide differentiation between compounds that may bind at the same target site but are structurally different enough that risk of metabolic cross-resistance is lower than for close

chemical analogs. Cross-resistance potential between sub-groups is higher than between groups, so rotation between sub-groups should be considered only when there are no alternatives, and only if crossresistance does not exist, following consultation with local expert advice. These exceptions are not sustainable, and alternative options should be sought.

Insecticide Resistance Action Committee

Mode of Action Classification



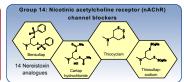


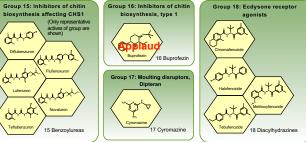
Rotation between certain specific B.t. microbial products may provide resistance management benefits for some pests. Consult product-specific recommendations.



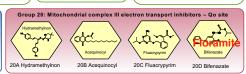




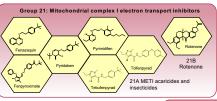


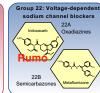


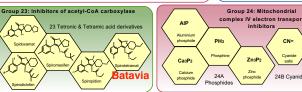


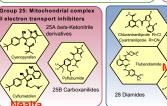


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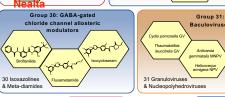


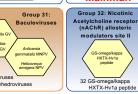




CN-

24B Cyanides



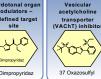




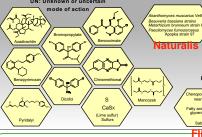




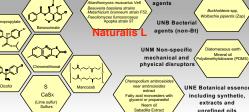




Group 37:







 Sub-group 3B: DDT is no longer used in agriculture and therefore this is only applicable for the control of insect vectors of human disease, such as mosquitoes, because of a lack of alternatives.
Sub-group10A: Hexythiazox is grouped with Clofentezine because they exhibit cross-resistance even though they are structurally distinct. Diffovidazin has been added to this group because it is a close analogue of Clofentezine and is expected to have the same mode of action. Group 20: While there is strong evidence that Bifenazzate acts on the Qosite of Mitochondrial Complex III

and some Bifenazate resistance mutations confer cross-resistance to Acequinocyl, the sites of action of Fluacrypyrim and Hydramethylnon have not been determined. Groups 26 & 27 are unassigned

In some cases, only representative actives are shown.

Because of documented cross-resistance between Dicofol, Bromopropylate and Abamectin, these active ingredients should not be rotated after each other in an IRM program

