Aphids, Whiteflies, Planthoppers and Leafhoppers - Mode of Action Classification by Target Site



MoA Group	Aphids	Whiteflies	Planthoppers Leafhoppers
1A	X	X	X
1B	X	X	X
2A	X	X	X
2B			X
3A	X	X	X
4A	X	X	X
4C	X	X	X
4D	X	X	X
4E			X
4F			X
7A	X	X	
7C		X	
9B	X	X	X
9D	X	X	X
12A	X	X	
15		X	
16		X	X
21A		X	
22A			X
23	X	X	
28	X	X	X
29	X	X	X
30		X	
32	X	X	
34		X	
36	X	X	X
37			X

Nerve & Muscle Targets

1. Acetylcholinesterase (AChE) inhibitors
   1A: Carbamates
   1B: Organophosphates
2. GABA-gated chloride channel blockers
   2A: Cyclodiene Organochlorines
   2B: Phenylpyrazoles
3. Sodium channel modulators
   3A: Pyrethrins, Pyrethroids
4. Nicotinic acetylcholine receptor (nAChR) competitive modulators
   4A: Neonicotinoids
   4C: Sulfoximines
   4D: Butenolides
   4E: Mesoionics
   4F: Pyridylidenes

9. Chordotonal organ TRPV channel modulators
   9B: Pyridine azomethine derivatives
   9D: Pyropenes

22. Voltage-dependent sodium channel blockers
   22A: Oxadiazines

28. Ryanodine receptor modulators
   Diamides (Cyantraniliprole)

29. Chordotonal organ nicotinamidase inhibitors
   Flonicamid

30. GABA-gated chloride channel allosteric modulators
   Isoxazolines

32. Nicotinic acetylcholine receptor (nAChR) allosteric modulators Site II
   GS-omega/kappa HXTX-HV1a Peptide

36. Chordotonal modulators – undefined target site
   Pyridazine pyrazolecarboxamides

37. Vesicular acetylcholine transporter (VAChT) inhibitor
   Oxazosulfyl

Respiration Targets

12. Inhibitors of mitochondrial ATP synthesis
   12A: Difenthiuron

21. Mitochondrial complex I electron transport inhibitors
   21A: METI acaracides and insecticides (Pyridaben, Tolfenpyrad)

34. Mitochondrial complex III electron transport inhibitors – Qi site
   Flometoquin

Growth & Development Targets

7. Juvenile hormone receptor modulators
   7A: Kinoprene
   7C: Pyriproxyfen

15. Inhibitors of chitin biosynthesis, affecting CHS1
   Benzoylureas

16. Inhibitors of chitin biosynthesis, type 1
   Buprofezin

23. Inhibitors of acetyl-CoA carboxylase
   Tetronic & Tetramic acid derivatives

The table lists the main mode of action groups for the control of aphids, whiteflies and hoppers. However, the availability may differ regionally due to registration status.

IRAC
Insecticide Resistance Action Committee

Mode of Action: A key to effective insecticide resistance management

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Scan the QR Code for further information on the IRAC Mode of Action Classification Scheme and how to use it with sequences and alternations for effective IRM strategies.