Session 3

47th Meeting of IRAC International, Indianapolis, IN, USA

March 27-30st, 2012

Mode of Action WG





Insecticide Resistance Action Committee

Team Members 2011 / 2012

- Nigel Armes BASF
- Shavesh Bhattarai Chemtura
- Georgina Bingham Zinanovic Vestergaard Frandsen
- Dan Cordova DuPont
- Fergus Earley Syngenta
- Peter Luemmen Bayer
- Danny Karmon MAI
- Shigeru Saito Sumitomo
- Ralf Nauen Bayer
- Vincent Salgado BASF Deputy
- Tom Sparks Dow Chair
- Jerry Watson Dow
- Alan Porter (IRAC)



MoA Classification Objectives

Insecticide Resistance Action Committee

■ The IRAC Mode of Action (MoA) classification provides farmers, growers, advisors, extension staff, consultants and crop protection professionals with a guide to the selection of insecticides or acaricides for use in an effective and sustainable insecticide or acaricide resistance management (IRM) strategy.



■ Since 2011

- Brussels (12 participants and several guests)
- Four conference calls

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■ May 20112 (7 participants)
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■ July . 2010 (11 participants)

■ Nov. 2011 (8 participants & 1 guest)

■ Jan. 2012 (10 participants)

- This week face-to-face meeting
 - Session 2A (Indianapolis, March 28th)
- Company participation has been relatively constant for the past 4 years - eight (8) companies
 - BASF, Bayer, Dow, DuPont, Makhteshim-Agan, Sumitomo, Syngenta, Vestergaard Frandsen



Stats for MoA WG - 2011

- MoA Team page = 9484 page views
 - (3rd most popular page 1st = home, 2nd = Resources)
- MoA Classification = 3986 (Most popular download)
- MoA Posters
 - MoA General = 296
 - MoA Leps = 301
 - MoA Sucking Pest = 295
 - MoA Acaricides = 278
 - MoA Mosquito = 337
 - Structures (English) = 618
 - Structures (Chinese) = 62
 - Structures (Portuguese) = 89
 - Structures (Spanish) = 820 (Most popular poster download)
- MoA Booklet = 268



Insecticide Resistance Action Committee

- Updated MoA Scheme
 - Feb. 2012 (version 7.2)
 - addition of new compounds to some groups
 - Group 4C- sulfoxaflor
 - Group 6 lepimectin
 - Group 25 cyflumetofen
 - Group 28 cyantriliprole
 - Group UN pyrifluquinazon
 - Worked with companies to discuss proper placement
 - Updated Group 11 (Bts)
 - In cooperation with Biotech
 - (lots of discussion / versions)
 - other minor revisions of wording

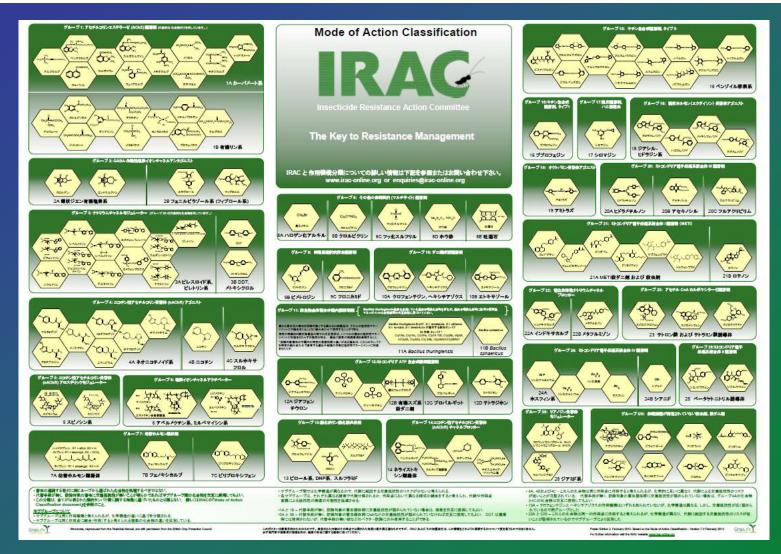
6.2. Classification Table

Main Group and Primary Site of Action	Chemical Sub-group or exemplifying Active Ingredient	Active Ingredients
1* Acetylcholinesterase (AChE) inhibitors Nerve action (Strong evidence that	1A Carbamales	Alanycarb, Aldicarb, Bendiocarb, Benfuracarb, Bufocarboxim, Bufoxycarboxim, Carboxyl, Carbofuran, Carbosyllian, Ethiofenach, Fenobucarb, Formetanate, Furathiocarb, Isoprocarb, Methiocarb, Methomyl, Metolcarb, Oxamyl, Pirimicarb, Propoxur, Thiodicarb, Thiofanox, Tritazamate, Trimethacarb, XMC, Xylylcarb
cation at this protein is responsible for insecticidal effects} Please see footnotes for further information on the use of compounds between sub-groups	1B Organophosphales	Acephate, Azamethiphos, Azinphos-ethyl, Azinphos- methyl, Cadusafos, Chlorethoxyfos, Chlorrenvinphos, Chlormephos, Chloryfrios, Chloryfrios-methyl, Coumaphos, Cyanophos, Demeton-S-methyl, Diazlinon, Dichlorvos/ DDVP, Dicrolophos, Dimethoate, Dimethylinphos, Disultoton, EPN, Ethion, Ethoprophos, Famphur, Fenamiphos, Fenltrotholn, Fenthion, Fosthiazate, Heptenophos, Imicyafos, Isofenphos, Isopropyl O- (methoxyaminothio-phosphoryl) sailcylate, Isoxathion, Malathion, Mecarbam, Methamidophos, Methidathion, Mevinphos, Monocrotophos, Naled, Omethoate, Oxydemeton-methyl, Parathion, Parathion-methyl, Phosphamidon, Phoxim, Pirimiphos-methyl, Profenofos, Propetalmphos, Profilorios, Pyraciotos, Pyridaphenthion, Quinaiphos, Sulfotep, Tebupirimfos, Temephos, Terbufos, Tetrachiorvinphos, Thiometori, Triazophos, Trichlorfon, Vamidothion, Triazophos, Trichlorfon, Vamidothion, Triazophos, Trichlorfon, Vamidothion, Triazophos, Trichlorfon, Vamidothion,
2 GABA-gated chloride channel antagonists Nerve action	2A Cyclodiene organochiorines	Chlordane, Endosulfan
{Strong evidence that action at this protein is responsible for insecticidal effects}	2B Phenylpyrazoles (Fiproles)	Ethiprole, Fipronii
3* Sodium channel modulators Nerve action (Strong evidence that action at this protein is responsible for insecticidal effects)* - Please see footnotes for further information on the use of compounds between sub-groups	3A Pyrethroids Pyrethrins	Acrinathrin, Aliethrin, d-cis-trans Aliethrin, d-trans Allethrin, Bilenthrin, Bioaliethrin, Bioaliethrin S- oyciopentenyi Isomer , Bioresmethrin, Cyalothrin, Cyfuthrin, beta-Cyfuthrin, Cyhalothrin, fambda- Cyhalothrin, gamma-Cyhalothrin, Cypermethrin, ajpha-Cypermethrin, beta-Cypermethrin, theta- oypermethrin, zeta-Cypermethrin, Cyphenothrin, (1R) trans-Isomers], Deltamethrin, Empenthrin (EZ)- (1R)- Isomers], Esfenvalierale, Elotenprox, Fenpropathrin, Fenvalerale, Flucythrinate, Flumethrin, fau- Fluvalinate, Halfenprox, Imiprothrin, Kadethrin, Permethrin, Phenothrin (1R)-trans-Isomers), Prallethrin, Pyrethrins (pyrethrum), Resmethrin, Ilfa-Isomers), Tralomethrin, Transfethrin, Ilfa-Isomers), Tralomethrin, Transfethrin
	3B DDT Methoxychior	DDT Methoxychior



- Updated MoA Structure Poster (New v7.2)
 - minor revisions of some wording Clean-up of some structures
 - Revised color scheme
 - Newest additions / changes
 - Addition of sulfoxaflor 4C
 - Updated Group 11
- Next version when needed
- MoA Structure Poster Translations (update to 7.2)
 - Portuguese update in progress
 - Japanese New completed
 - Spanish Updated
 - Chinese update in progress
 - French New in progress
 - Other languages as needed





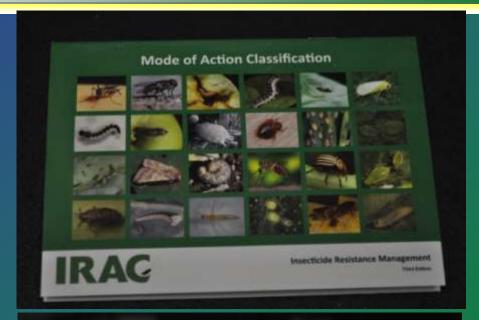


- Pest Group MoA Posters
- Updates completed
 - Lepidoptera
 - Sucking Insects
 - Mites
 - Mosquitoes
 - General MoA poster
- Next versions
 - Resistance Mechanisms
 - Updates on current posters as needed





- MoA Booklet 3rd edition just completed
 - pocket sized
 - Updated information
 - MoA classification
 - aspects from Pest group MoA posters
 - alphabetical listing of ai's with MoA classification
 - 2011/12 >4500 copies distributed
 - A Spanish version being considered



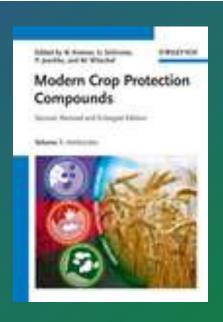
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Insecticide Resistance Action Committee

Book chapter – Published Jan. 2012

Nauen R. Elbert A. McCaffery A. Slater R. Sparks TC. 2012. IRAC, insecticide resistance and mode of action classification of insecticides. In. Modern Crop Protection Compounds. Vol. 3, 2nd ed. (W. Kramer, U. Schirmer, P. Jeschke, M. Witschel, eds.), Wiley-VCH, New York, pp. 935-955.



Materials / presentations on IRAC MoA & MoA Scheme

- IRM Training Sessions Philippines 2011
- Resistance 2011, Rothamsted
- EPPO Morocco 2011
- Entomological Society of America Reno NV, Nov. 2011
 Oral Presentation T. Sparks
- Japanese Society of Applied Entomology and Zoology 2012



Goals & SMART Objectives

(for 2012/13)

Goals	Objectives	Timeline
Continue to review and update the MOA scheme as required.	Update as needed the current Version 7.2 to include any changes and / or new actives.	1Q 2012 √
Develop new versions of the MOA Structure Poster as needed	 Using the new version of the scheme (V7.2) update the MOA Structure poster Work with the C&E WG to print copies (v7.2) for distribution 	1Q 2012 √ 1Q 2012 √
Continue to review & update MoA Booklet	Update MoA booklet (3 ^{nr} ed)	1Q 2012 √
Develop non English versions of the MOA Structure Poster – with C&E WG	Develop / update other language versions of the MoA Structure poster	1Q-2Q 2012
Update other MOA posters	 Work with C&E Team to incorporate any updates from new versions of the MoA Scheme into Pest MOA posters Update General MoA Poster 	1Q 2012 √ 2Q 2012 √
Develop MoA Diagrams.	 Provide MoA diagrams for the different broad MoAs (IGR, vs. neural, vs. respiration) for use in MoA publications and presentations – based on UNL output 	4Q 2012



Goals & SMART Objectives

(for 2012/13)

Goals	Objectives	Timeline
Develop MoA WG presentation	Develop a general MoA oral presentation that can be used at scientific meetings – dependent on UNL output	4Q 2012
MoA page – IRAC	Update e-classification on IRAC website	2Q 2012
Website	Update MoA WG page – more interactive	3Q 2012
Develop Resistance mechanisms Poster	Develop a general poster on mechanisms of insecticide resistance	4Q 2012
Provide additional	Listing of target-site mutations	3Q 2012
information on topics important to IRM	Listing of key references for each MoA group	3Q 2012