IRAC Insecticide Resistance Action Committee

eConnection

Issue 17

September 2008

www.irac-online.org

Introduction

In this issue we focus on insecticide resistance news from workshops each conducted as satellite or follow-up meetings to two acclaimed global conferences held in June and July of 2008. These are the Global Workshop on Stewardship of Neonicotinoid Insecticides held in Honolulu, Hawaii, 5 June 2008, following the 4th Pan Pacific Pesticide Conference, and details from Johann Brits, Chairman of IRAC South Africa of an IRAC exhibition stand, as part of the 23rd International Congress of Entomology, Durban and the follow-up IRAC sponsored Whitefly Workshop held in Tzaneen, South Africa, 12 August 2008. In addition we are pleased to report on two recent IRAC initiatives which are the recently released IRAC guidelines for resistance management of the neonicotinods and an update on the extensively revised IRAC Mode of Action Classification Scheme.

1st Global Workshop on Stewardship of Neonicotinoid Insecticides

Titled "Promoting Sustainability" the workshop was attended by 29 participants evenly divided between the public and private sectors. The idea of such a workshop was developed by Robert Nichols (Cotton Incorporated, USA) and Timothy Dennehy (while at the University of Arizona, Tucson) during Resistance 2007, the most recent of a series of prestigious conferences held at Rothamsted Research in Harpenden, UK, every 4 to 5 years. The main objective of the workshop was to promote sustainability of neonicotinoids, since there was agreement among the participants that we are at a point with the neonicotinoids equivalent to the one we faced with synthetic pyrethroids in the mid-1980s, i.e. resistance threats are growing as a result of greatly increased use of the class, and there are few alternatives available in many systems.

Participants of the 1st Global Neonicotinoid Workshop, Hawaii, July 2008.

First row: R. Nauen, C. McKenzie, D. Schuster, C. Staetz, C. Savinelli, P. Marcon, G. Dively, J. Wise, T. Sparks. Second row: D. Rogers, P. O´Leary, J. Dunley, S. Ludwig, N. Armes, R. Gunning, J. Brits, R. Horowitz. Third row: P. Bielza, R. Steffens, H. Takahashi, C. Omoto, M. Matsumura, K. Gorman. Upper row: I. Denholm, K. Brueggen, B. Nichols, J. Huang. (Photograph by Tim Dennehy)

Working sessions were dedicated to a collective assessment of the situation and the formulation of recommendations in order to sustain neonicotinoid efficacy in agronomic cropping systems. All participants recognized the urgent need to raise public awareness of the role of neonicotinoids for sustainable food supply, and to identify key partners (commodity groups/trade associations, pesticide producers, universities, food industry and governmental institutions) for the implementation and communication of guidelines. This can be done in the European Union (EU) through a collaborative and integrated approach involving IRAC, the regional Resistance Action Groups (RAG´s) and the European and Mediterranean Plant Protection Organization (EPPO). In the U.S. the system is different, but there will be a discussion of what elements of the European model might possibly be utilized. In order to further the objectives of the Workshop and to assess severity of problems and progress with its objectives, the group agreed to convene a 2nd Global Workshop on the Stewardship of Neonicotinoid Insecticides in five years. A more detailed summary of the Workshop will be published in the November issue of *Pest Management Science*.

IRAC S. Africa Exhibiting at the ICE Durban, July 2008

IRAC South Africa exhibited in a stand at the 23rd International Congress of Entomology, Durban, week of the 7th July 2008. The IRAC posters covering IRM in crops, biotechnology and public health and emphasizing the importance of mode of action were well received and the stand was very popular particularly on the first day. Various academic and research institutions expressed a strong interest in being part of the local IRAC network and people were referred to the IRAC website for further details on the IRAC global structure and range of activities and projects undertaken.

Setting up the IRAC S. Africa stand at the ICE, Durban

IRAC S. Africa Whitefly Workshop, August 2008

Participants at the IRAC Whitefly Workshop Tzaneen, South Africa, 12 August , 2008

More than 90 participants from the agrochemical and seed industries, academia, government institutes and growers attended the workshop. Topics covered included whitefly biology, virus transmission, agronomic practices and insecticide resistance, with particular emphasis on issues relating to South Africa's whitefly problems. The aim was to share knowledge and experiences of whitefly pest management in order to develop specific IRM programmes suitable for the South Africa agronomic environment.

In the 80's, only *Bemesia tabaci* was present in South Africa and could be found on tobacco and cotton. The populations were seldom of such importance that chemical control was necessary. But these populations were exposed to OP's, carbamates and pyrethroids over many years, not to control them specifically, but other pest species. The consequence was that *Bemesia* developed resistance to all the older chemical groups in South Africa. Presently, most of the products in these chemical groups only control adults and have no effect on the nymphs at registered rates. Recently, the cotton and tobacco industries have gone into decline and whiteflies are moving into other crops such as tomatoes and cucurbits. Populations have emigrated northwards in South Africa and are slowly making their decent southwards to the Cape region. Both biotypes B and Q are present.

In the late 80's, *Trialeurodes vaporariorum* entered the country and was virtually fully resistant to the older chemical groups. At first the insect was restricted to glasshouses, but it didn't take long before they started to infest field crops.

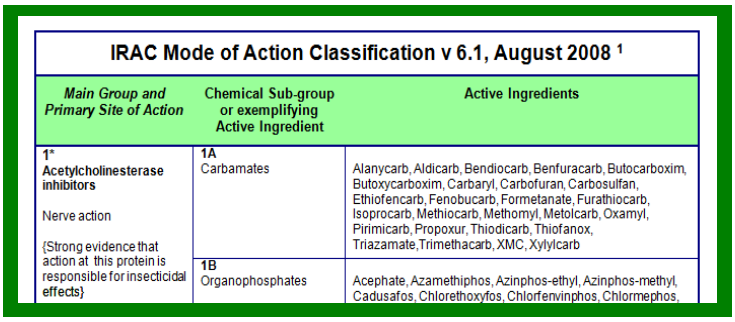
Whiteflies as such were accepted by South African farmers as yet another pest to add to the control list, but all that changed in 1998, when Tomato Curly Stunt Virus (ToCSV) was first reported in Malelane in South Africa. It was established that *Bemisia* biotype B was the vector. But worse was still to come. In November 2005, Tomato Yellow Leaf Curl Virus (TYLCV) was identified in the Mooketsi Valley, a major tomato production area in South Africa. Again *Bemisia* was the vector, but this time carried by biotype Q. The virus has since then spread to almost all the areas where the pest is found and has caused crop losses of up to 100%.

Because of resistance to the older insecticides the only effective products available to farmers are the neonicotinoids (acetamiprid, imidacloprid and thiamethoxam), juvenile hormone mimics (pyriproxyfen) and the chitin inhibitors (buprofezin). The workshop was deemed a great success in defining the requirements for whitefly IRM in South Africa. Hard work still lies ahead in finalizing and implementing the guidelines at the extension and grower levels.

Neonicotinoid IRM Guidelines Updated

Led by Jonathan Henen (Makteshim Agan), the Neonicotinoid Working Group redesigned the guidelines for resistance management of neonicotinoid insecticides. They are based on guidelines originally published and updated by Elbert, et al. in 1996 and 2005. Representatives of all the IRAC member companies who have this mode of action in their portfolio and are members of the Working Group contributed to the new guidelines which can be found on the crop projects page of the IRAC website www.irac-online.org/Crop_Protection/Projects.asp

IRAC Mode of Action Classification Revised - Version 6.1



IRAC Mode of Action Classification v 6.1, August 2008 [1]

Main Group and Primary Site of Action	Chemical Sub-group or exemplifying Active Ingredient	Active Ingredients
1* Acetylcholinesterase inhibitors Nerve action {Strong evidence that action at this protein is responsible for insecticidal effects}	**1A** Carbamates	Alanycarb, Aldicarb, Bendiocarb, Benfuracarb, Butocarboxim, Butoxycarboxim, Carbaryl, Carbofuran, Carbosulfan, Ethiofencarb, Fenobucarb, Formetanate, Furathiocarb, Isoprocarb, Methiocarb, Methomyl, Metolcarb, Oxamyl, Pirimicarb, Propoxur, Thiodicarb, Thiofanox, Triazamate, Trimethacarb, XMC, Xylylcarb
	1B Organophosphates	Acephate, Azamethiphos, Azinphos-ethyl, Azinphos-methyl, Cadusafos, Chlorethoxyfos, Chlorfenvinphos, Chlormephos,

The IRAC Mode of Action Classification Scheme is considered the definitive reference for insecticide classification and their modes of action. However, given the recent appearance of new insecticides and information, it is important that the MoA Scheme be periodically revised to reflect as far as possible the current state of knowledge. To this end the IRAC MoA Team has in recent months spent time discussing and refining the MoA Classification Scheme. The initial result (issued in June) was Version 6.0. Following the issue of version 6.0, the MoA Team identified a number of needed refinements which are now incorporated into version 6.1. Although many aspects of the Scheme (both 6.0 and 6.1) remain unchanged from the earlier version, a variety of new actives such as chlorantraniliprole, metaflumizone, spinetoram and spirotetramat, have been added along with refinements to wording and in some cases groupings. All of these changes are reflected in Version 6.1 which is now completed and is available on the IRAC website. The MoA Team is currently working on updating the MoA structure poster to bring it in line with version 6.1 of the MoA Scheme and hope to have this completed within the next few weeks.

Conferences & Symposia 2008/2009

- 1st All African Congress on Biotechnology, Nairobi, Kenya, September 22-26th, 2008
- ENDURE Intl. Conference 2008, Diversifying Crop Protection, Montpellier, France, October 13-15th, 2008
- 3rd European Whitefly Symposium, Almeria, Spain October 20-24th, 2008
- NPMA, PestWorld, Washington DC, USA, October 22-25th, 2008
- VII IOBC International Conference: Integrated Fruit Production, Avignon, France, October 27-30th 2008
- Entomological Society of America, Annual Meeting, Reno. NV, USA, November 16-19th, 2008
- NPMA, PestWorld, Las Vegas, USA, October 26-29th, 2009
- 5th International Bemisia Workshop, Guangzhou, China, November 9-12th, 2009
- Entomological Society of America, Annual Meeting, Indianapolis, USA, December 13-17th, 2009

Links to the conference websites can be found on the Events Page of the IRAC website www.irac-online.org/Events.asp

The eConnection is prepared and supported by the 13 member companies of the IRAC Executive

Bayer CropScience · NIHON NOHYAKU CO.,LTD. · Chemtura · Nufarm · MAKHTESHIM AGAN · DUPONT · syngenta · BASF The Chemical Company · FMC · MONSANTO imagine · CHEMINOVA · Dow AgroSciences · SUMITOMO CHEMICAL