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IRAC
Insecticide Resistance Action Committee

eConnection

FEATURED IRAC MEMBER:

Steve Skillman (Syngenta) leads the IRAC Sucking Pest WG. One of the team's main projects has been the Myzus persicae resistance monitoring in Southern Europe.

IN THIS ISSUE:

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About This Issue

Welcome to another IRAC eConnection newsletter. As always, we try to bring you interesting and informative articles about the work of IRAC and keep you updated on developing insecticide resistance problems around the world.

In this issue we focus on the ongoing neonicotinoid resistance monitoring of *Myzus persicae* in peach orchards in Southern Europe, with results from samples taken during 2012, along with the latest corresponding IRAC resistance management guidelines. We also report on the IRAC US Symposium at the recent ESA, listing presentations given by speakers. In addition we have a short article describing MoA subgroups with details of how and when they should be used in IRM programs and also some other IRAC news such as further posters published and the new IRAC Philippines group described below.

Remember, if you have any news or resistance topics of interest, please let us know so that we can inform others in the IRAC Network. We hope you enjoy the issue.

New IRAC Philippines Group

IRAC are pleased to announce the formation of a new Country Group, IRAC Philippines which is working in close collaboration with CropLife Philippines.

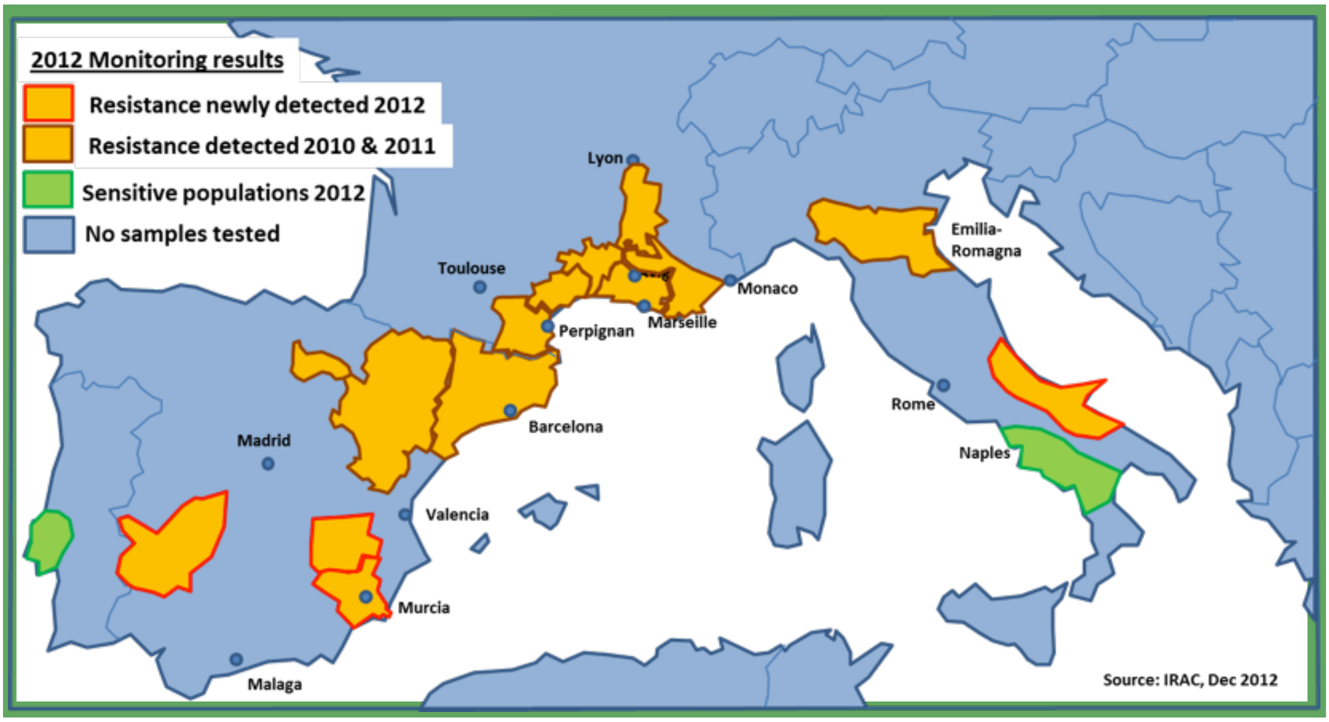
The IRAC team is being led by Florence Vasquez of Bayer CropScience. The team was originally formed to implement insecticide resistance management strategies with the new Diamide chemistry, but it quickly became apparent that to be successful, all companies and all chemistries need to be included when discussing IRM programs. It is hoped that in time other Diamide Country Teams will follow the lead of the Philippines Team.

Myzus persicae neonicotinoid resistance: IRAC Management Guidelines 2013

In March 2012, IRAC issued a 'resistance alert update' to inform of the status of neonicotinoid resistant green peach aphid (*Myzus persicae*) in the peach orchards of southern France and north-eastern Spain and northern Italy. During 2012, further samples of aphids have been collected from these countries in peaches and other *Myzus* host crops to determine their resistance status. The resistance is based on a target-site mutation which strongly affects neonicotinoid efficacy. Individuals of all samples collected were analyzed for the mutation by molecular diagnostics.

The results of the survey confirm the presence of neonicotinoid-resistant aphids in many of the stone fruit orchards of southern France and north east Spain as well in the Emilia-Romagna region of Italy. The samples also revealed resistant populations in southern and western Spain and central and southern Italy for the first time.

Map of the region showing areas where target site resistance to neonicotinoids was detected in *Myzus persicae* collected from stone fruit orchards from 2010 to 2012.



IRAC have worked with local agricultural ministry officials, and entomological experts from Spain, France, Italy and the UK, to provide the following advice for the 2013 season in stone fruits, notably peaches:

Where no loss of performance to neonicotinoids has been experienced, it is recommended to use a maximum of one neonicotinoid application per crop cycle against *Myzus persicae* to minimise the further spread and intensification of the resistance and maintain effectiveness of the neonicotinoids. Depending on crop and country and local guidelines, this single spray may be pre-flowering or post-flowering , but not during flowering, to fit with local IPM recommendations .

It is recommended that growers that have experienced a decline in activity to neonicotinoids in past seasons do not continue to use this group of insecticides as a preventative measure to halt the spread of resistance, and use insecticides with other modes of action to control *Myzus persicae**. It is recommended that control of pre-flowering pests in these regions is managed with mineral oils combined with or without insecticides of a different mode of action (note that pyrethroids in some areas are also affected by resistance).

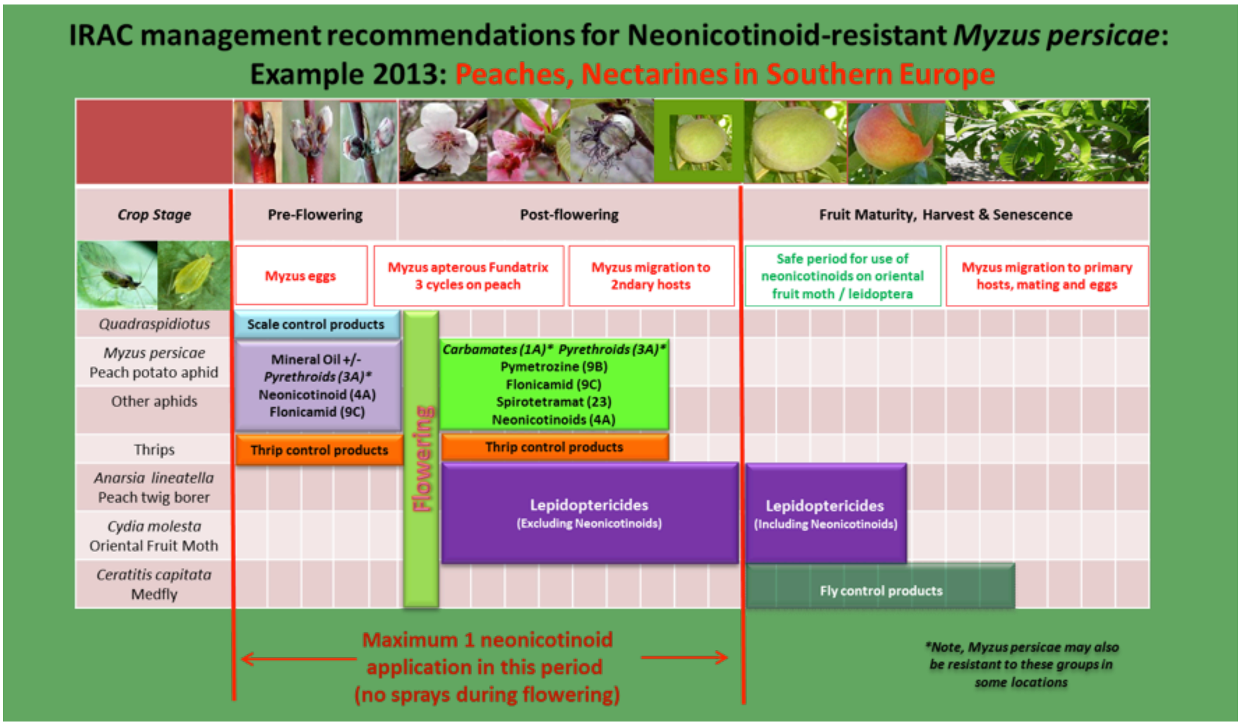
Myzus persicae neonicotinoid resistance: IRAC Management Guidelines 2013 (Contd.)

As an alternative it is recommended to use other aphicides, according to local registrations, with a different mode of action not affected by resistance**; such as IRAC MoA groups 1A, 3A, 9B, 9C, 23 as well as mineral oil. IRAC also recommends the use of any other IPM measures locally recommended.

*Consult local advisors for advice on which aphicides are affected by resistance in your locality.
** See IRAC guidelines on *Myzus persicae* resistance management on the IRAC website

Acknowledgements: Many thanks to representatives of Rothamsted Research International, Università Cattolica del Sacro Cuore - Piacenza Campus, Italy, University of Cartagena, Spain, Chamber of Agriculture in Catalunya and Aragon in Spain) and the IRAC Spain Sucking Pest Working Group for inputs into these IRM recommendations.

Example of IRM-based programs to limit spread of target site Neonicotinoid resistance in *Myzus persicae:*



New French version of the IRAC Mini-Vector Manual

French is spoken by an estimated 115 million people across 31 African countries. Many of these countries have endemic malaria and undertake mosquito vector control as part of their malaria control programmes. Like the rest of the world, these countries also face the challenge of insecticide resistant mosquitoes.

To support vector control programme managers and practitioners, the IRAC Public Health team updated their publication "Prevention and Management of Insecticide Resistance in Vectors of Public Health Importance" in 2011. This manual aims to provide the Vector Control programme manager with the background information and recommendations they will need to design and undertake best practice Insecticide Resistance Management (IRM) programmes. In the same year the IRAC Public Health team also published a "pocket" version of the manual, focusing more on vector control practitioners and students, with the aim of providing them with the knowledge and tools required to implement IRM in vector management programmes. With nearly 4000 copies of each version distributed, these booklets have proven to be popular and valuable tools.

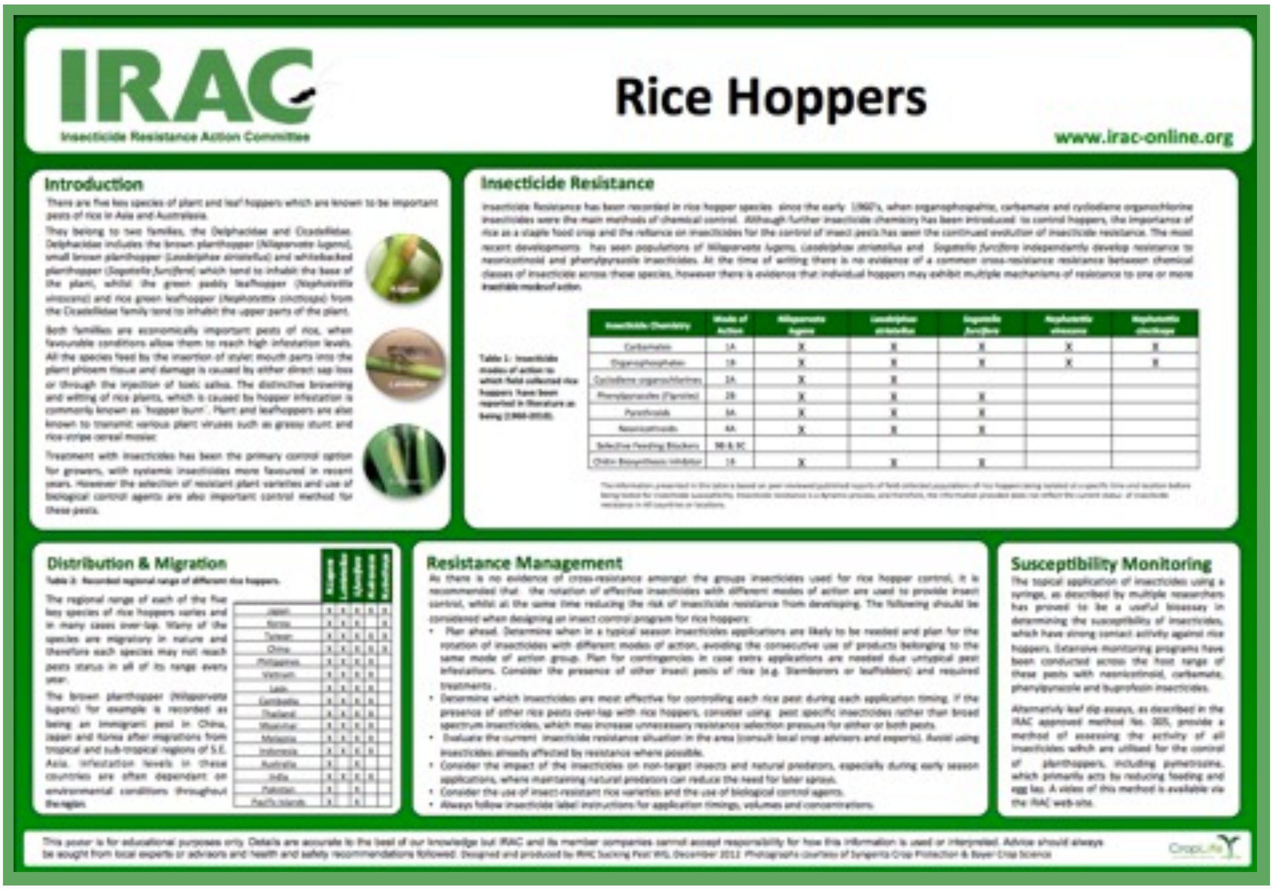
Originally these publications were only available in English, however, to support mosquito vector control practitioners in francophone countries, the "pocket" edition has now been translated into French, and is available from the Public Health Team Page of the IRAC website. Printed copies will be available upon request in the future.

2012 IRAC-US Symposium - Do Crises Drive Innovation? Insect Resistance Management: Proactive or Reactive?

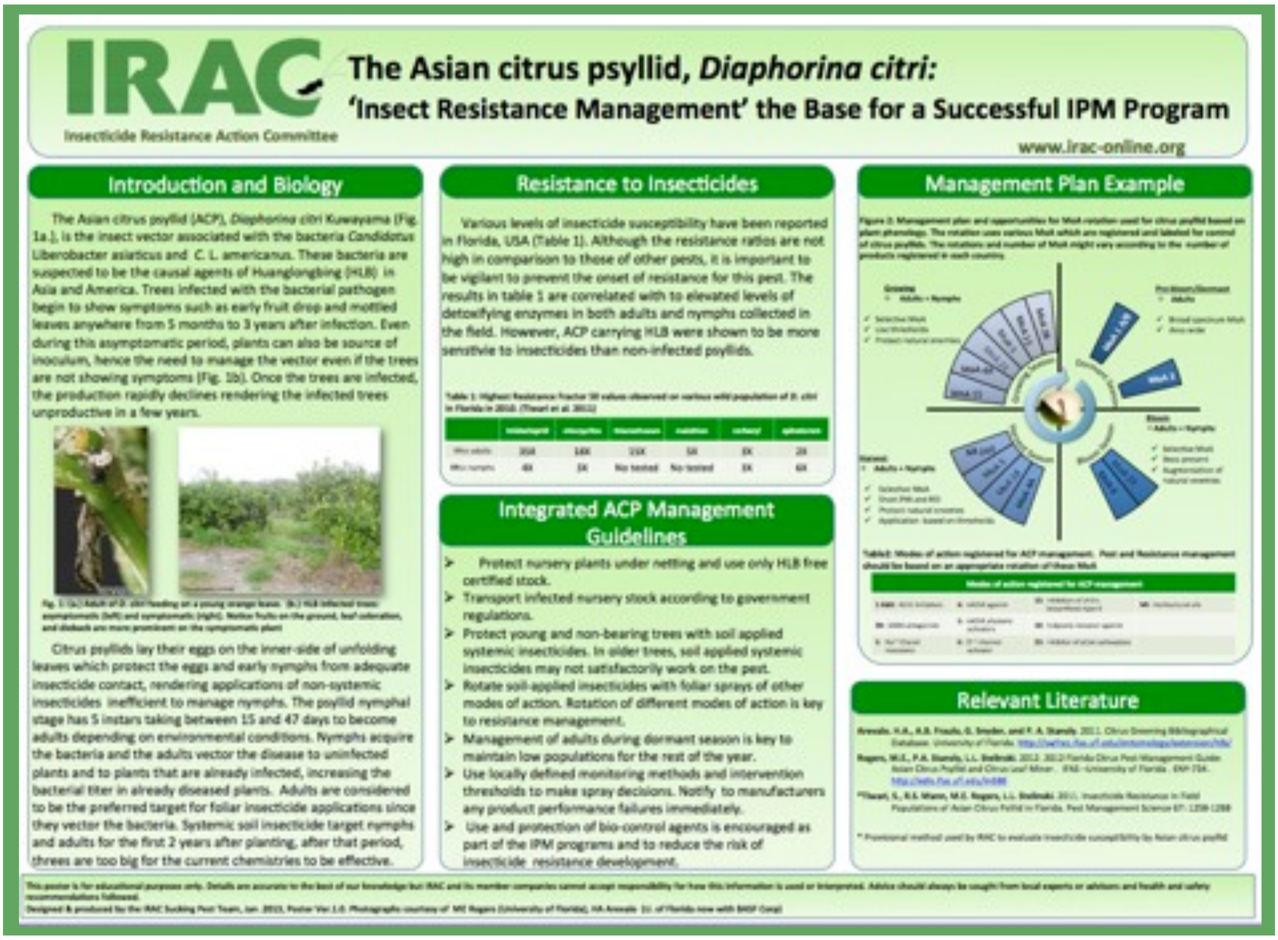
This symposium, the 8th in a series, was held at the 60th Entomological Society of America (ESA) meeting in Knoxville, TN, on Tuesday, 13 November 2012. The session was very well attended by industry and academia. Ten speakers from academia, government and industry presented many excellent examples of old and new challenges in insect control as it relates to insect resistance management programs. The speakers and their talks are shown in the following list. An article regarding the information given in this symposium is being prepared by IRAC-US for publication.

1. Russell L. Groves, University of Wisconsin-Madison. *Interaction of insecticide resistance and delayed emergence in the Colorado potato beetle – new challenges for an old pest.*
2. Aaron J. Gassmann, Iowa State University. *Western corn rootworm and Bt maize: A case study illustrating the need for IPM and IRM.*
3. Randall G. Luttrell, USDA-ARS, Stoneville, MS. *Deployment of Bt cotton and Bt corn in the agricultural landscape of the southern U.S., opportunities and challenges for strategic resistance management.*
4. Lukasz L. Stelinski, University of Florida – Lake Alfred. *Inevitable emergence of insecticide resistance in populations of Asian citrus psyllid, vector of the greening disease pathogen: Current status, mechanisms, and efforts for proactive management.*
5. John C. Wise, Michigan State University. *Managing resistance in the complex world of tree fruit IPM.*
6. Anthony M. Shelton, Cornell University. *Long-term insecticide resistance management for the diamondback moth: Dreaming the impossible dream?*
7. Brian A. Nault, Cornell University. *Proactive IRM for thrips – a case study of onion thrips in onion.*
8. Ralf Nauen, Bayer Crop Science. *A reactive approach to manage pollen beetle in European winter oilseed rape: Good news, bad news and challenges ahead.*
9. Lance S. Osborne, University of Florida – Apopka. *Are resistant pests more of a threat than new invasive species in ornamentals?*
10. Caydee Savinelli, Syngenta Crop Protection. *Results of a proactive global IRM strategy for diamides.*

New Posters from the IRAC Sucking Pest Working Group - Rice Hoppers



New Posters from the IRAC Sucking Pest Working Group - Asian Citrus Psyllid



What are Mode of Action (MoA) Subgroups?

The IRAC MoA Classification ensures that insecticide and acaricide users are aware of MoA groups and that they are a sound basis on which to implement season-long sustainable resistance management strategies. But what are subgroups?

There are multiple instances of subgroups within MoA groups in the IRAC MoA Classification Scheme. Subgroups represent distinct chemical classes which share a common insecticidal target site and are sufficiently unique so as to have a reduced risk of cross-resistance when resistance is mediated by metabolic rather than target site based mechanisms. As insecticides from different subgroups may be metabolized by distinct enzymes, they have reduced risk for cross-resistance over insecticides within a subgroup.

Is it appropriate to rotate between subgroups?

The cross-resistance potential between subgroups is higher than between different MoA groups, therefore it is not advisable to rotate between subgroups unless there are no alternatives among other MoA groups. In the absence of a suitable rotation group option, it may be possible to rotate insecticides between subgroups if it is clear that cross-resistance mechanisms do not exist in the target insect populations. Knowledge and experience of cross-resistance patterns, resistance mechanisms, and furthermore pest, crop and region should be considered. Consequently, consultation with local experts for advice and information as to existing resistance mechanisms in the pest population being treated, is strongly recommended.

Where can I find more information on subgroups and their use?

For details on specific subgroups and their use, please consult the MoA Classification scheme:
(http://irac-online.org/teams/mode-of-action/).

Additionally, a recent publication provides an excellent overview of the objective of the MoA working group and the use of the MoA Classification Scheme:

R. Nauen, A. Elbert, A. Mccaffery, R. Slater, T.C. Sparks, IRAC: Insecticide resistance, and mode of action classification of insecticides, In W. Kramer, U. Schirmer, P. Jeschke, M. Witschel (Eds.), Modern Crop Protection Compounds: Vol. 3 Insecticides, 2nd ed., Wiley-VCH, Weinheim, GR, (2012), pp.935-955.

IRAC News Snippets

★ The third video from the IRAC Test Methods Group, this time on plant hoppers, has now been finalised and can be viewed on the IRAC Methods Team page of the website or directly on YouTube.

★ Pest Pages have now been added to the IRAC website. This is still under development as new pests are added and information is updated but so far 15 of the most common insect pests have been included with some brief background on biology and pest distribution, status of resistance and links to any IRAC test methods, or other resources available. It is planned to add further pests including those important to vector and hygiene pest control in the future.

Conferences & Symposia

★ 79th AMCA Annual Meeting, Atlantic City, February 24-28, 2013

★ 48th IRAC International Meeting, Bracknell, UK, March 18-22, 2013

★ 1st Intl. Whitefly Symposium, Kolymbari, Crete, May 20-24, 2013

★ 246th American Chemical Society (ACS), Indianapolis, Sept., 8-12, 2013

★ MIM Pan African Malaria, Durban, S. Africa, Oct 2013

★ NPMA PestWorld, Phoenix, Arizona, Oct. 2013

★ Entomological Society of America meeting, Austin, TX, Nov. 10-13, 2013

★ ASTMH Annual Meeting, Washington, DC, Nov. 2013

Feedback

The eConnection is prepared by the IRAC International Communication & Education Working Group and supported by the 15 member companies of the IRAC Executive. If you have information for inclusion in the next issue of eConnection or feedback on this issue please email aporter@intraspin.com

Disclaimer

The Insecticide Resistance Action Committee (IRAC) is a specialist technical group of CropLife. Information presented in this newsletter is accurate to the best of our knowledge but IRAC and its member companies cannot accept responsibility for how this information is used or interpreted. Advice should always be sought from local experts or advisors and health and safety recommendations followed.

FURTHER INFORMATION

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