

Insecticide Resistance Action Committee

46th Meeting of IRAC International, Brussels, Belgium
March 28th – March 31st, 2011



at CropLife International Headquarters
Blue Tower, Avenue Louise



Session 3

IRAC International, Working Group & Country Group Reviews

46th Meeting of IRAC International, Brussels, Belgium

Wednesday - March 30th, 2011



Antitrust law reminder

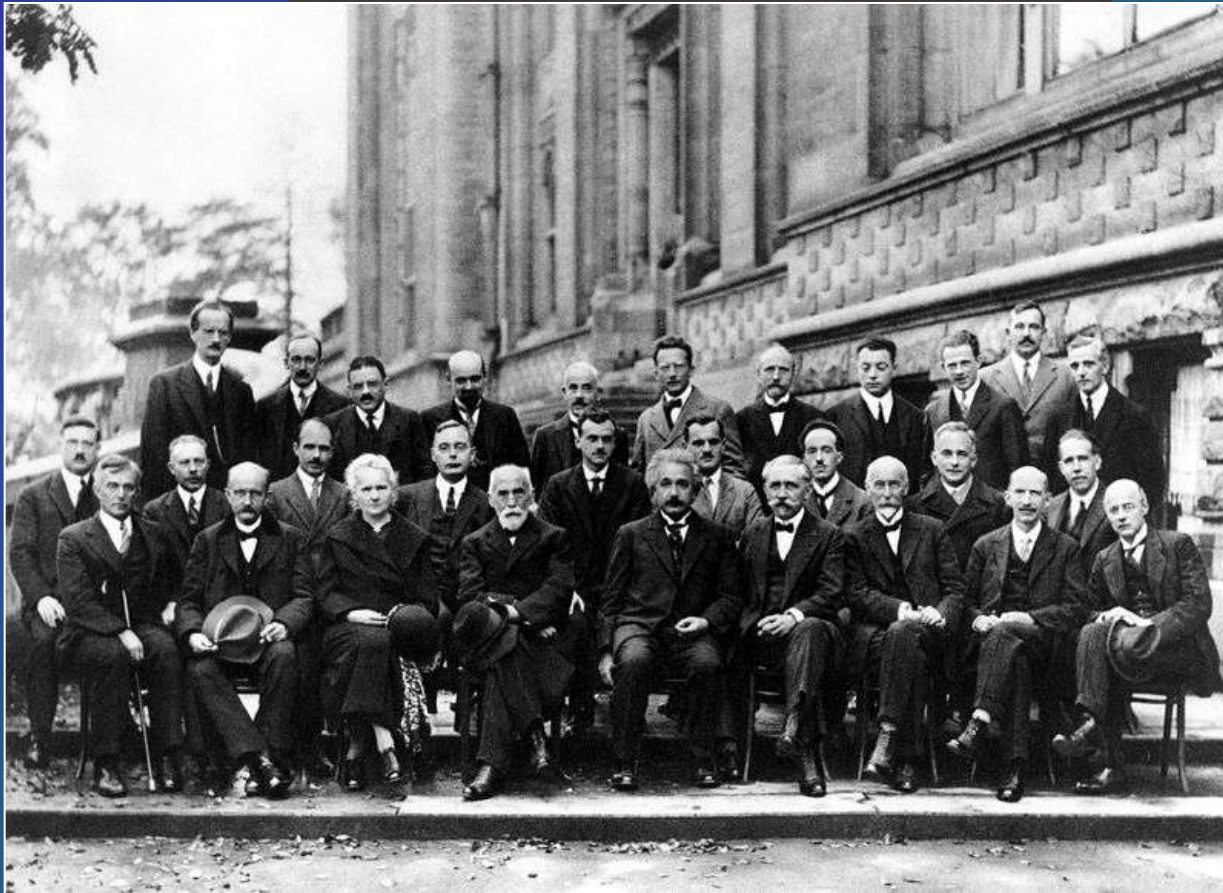
ANTITRUST LAW REMINDER **for all CropLife International meetings**

While some activities among competitors are both legal and beneficial to the industry, group activities of competitors are inherently suspect under the antitrust laws. Agreements or combinations between or among competitors need not be formal to raise questions under antitrust laws, but may include any kind of understanding, formal or informal, secretive or public, under which each of the participants can reasonably expect that another will follow a particular course of action.

Each of you is responsible to see that topics, which may give an appearance of an agreement that would violate the antitrust laws, are not discussed at your meetings. It is the responsibility of each participant in the first instance to avoid raising improper subjects for discussion. This reminder has been prepared to assure that participants in meetings are aware of this obligation.

Selected IRAC meetings will be attended by Morten Nissen (antitrust lawyer): Crop WG Session and Executive Meeting

Welcome to Brussels



The 1927 Solvay Conference in Brussels (1st world physics conference)

First recorded reference
in 695 to a place called
„Brosella“

Founded in 979

Population: 1,125 mio

„Capital of Europe“

Multilingual with Belgian
French as the major
language (60%)

And...

IRAC and Brussels

The first „IRAC“ Meeting was held in Brussels on March 13th, in 1984 hosted by GIFAP*

Inaugural meeting of IRAC on May 12th, 1984 with 6 members:

Voss / Ciba Geigy (Chair)
Lindley / Cyanamide
Cronin / FMC
Davies / ICI
Knauf / Hoechst
Zoebelein / Bayer



Since then at least 7 IRAC Meetings held in Brussels!

*Groupement International des Associations Nationales de Fabricants de Produits Agrochimiques [*International Group of National Associations of Manufacturers of Agrochemical Products*]

Housekeeping

- Full day with many presentations – please try and stick to the 20 minute time slots as per the agenda as much as possible.
- Coffee/tea/juices/water should be available inside the meeting room at all times
- A buffet lunch with refreshments will be set up in the room for all participants at approximately 12:30h
- Before lunch we will take a group photograph (12.15h)
- The afternoon session will start at 13:30h. Please return promptly
- The meeting is scheduled to finish at 17:30h
- An IRAC International Group dinner is scheduled for the evening at 19.30h at the Hotel Le Chatelain
- *Anyone unable to attend?*

Agenda Changes

- Latest agenda is version 2.0 (issued March 18th)
- Any changes?

Agenda Session 3

- 0830 Introduction and Antitrust reminder. Overview – Members & Structure, Role of Executive, Steering/C&E groups, Importance of the IRAC Mission, Constitution, Goals & SMART Objectives {RN}
- 0900 Brief Public Health Update {MH}
- 0920 Brief Biotech Update {GT}
- 0940 Brief Crop Protection Update & WG introduction {RN}
- 1000 Sucking Pests {JH}
- 1020 Diamides {VC}
- 1040 Coffee/Tea**
- 1100 Oilseed Rape {RS}
- 1120 Codling Moth {MH}
- 1140 Lepidoptera {SL}
- 1200 Discussions
- 1215 Group Photograph
- 1230 Lunch (Buffet brought into room)**

Agenda Session 3

1330 MOA {TS}

1350 Methods {TAS}

1410 Resistance Database {GT}

1430 IRAC Country Group Overview {Liaison Officers/CG Chairs}
IRAC US , India, Brazil, Australia, S. Africa, SEA, Spain

1515 Coffee/Tea

1530 EU Resistance groups
(UK, Germany, Italy, Benelux, Austria, Nordic)

1645 Discussions on presentations and other topics e.g. the use of mixtures in IRM

1730 Close

Evening: IRAC International Group Dinner - Hotel Le Châtelain at 7:30pm

Acknowledgement



A big

THANK YOU

to Alan Porter, for

- Meeting Organization
- Excellent Service all year
- Reminders
- >750 emails
- Monthly conference calls



THANKS TO



especially Catherine Berniquet

- Excellent collaboration
- Meeting organisation
- Hotel organisation
- Lunches

Some further thanks

- **To You - as always!**
 - For your commitment and continued support for IRAC
 - For your time and effort to be here this week
 - For the substantial amount of pre-work
- **To CropLife International**
 - For advice, local arrangements and hosting the meeting
 - For a smooth merger between RAC's and CLI special thanks to Susanne Maise (Director of Operations)
- **To your companies**
 - For continuing to support IRAC
 - For funding your travel and attendance here



And welcome to first time attendees etc.

First attendance at an Annual IRAC International Meeting, e.g.

- Juan Alvarez & Luis Teixeira (Dupont; Executive, Diamide and Lep WG)
- Shuvash Bhattarai (Chemtura; Executive, SP and Methods WG)
- Sybille Lamprecht (BCS; Lep WG)
- Timothy Dennehy (BCS; Biotech)
- Harald Köhler (BCS; Methods WG)

Welcome to our guests

- Udo Heimbach (Julius Kühn Institut, JKI, Chair ECPR-I)
- Guy Smagghe (Gent University, Chair IRAG Bnelux)
- Emanuele Mazzoni (Piacenza University, RAG Italy)
- Paola Eulalio (Monsanto; deputizing Graham Head)
- Helen Pruul (FMC; deputizing Michel Sarazin)



Melander AL (1914)

Can insects become resistant to sprays?

Journal of Economic Entomology 7, 167



1908 –

Quadraspidotus perniciosus

First resistance observation

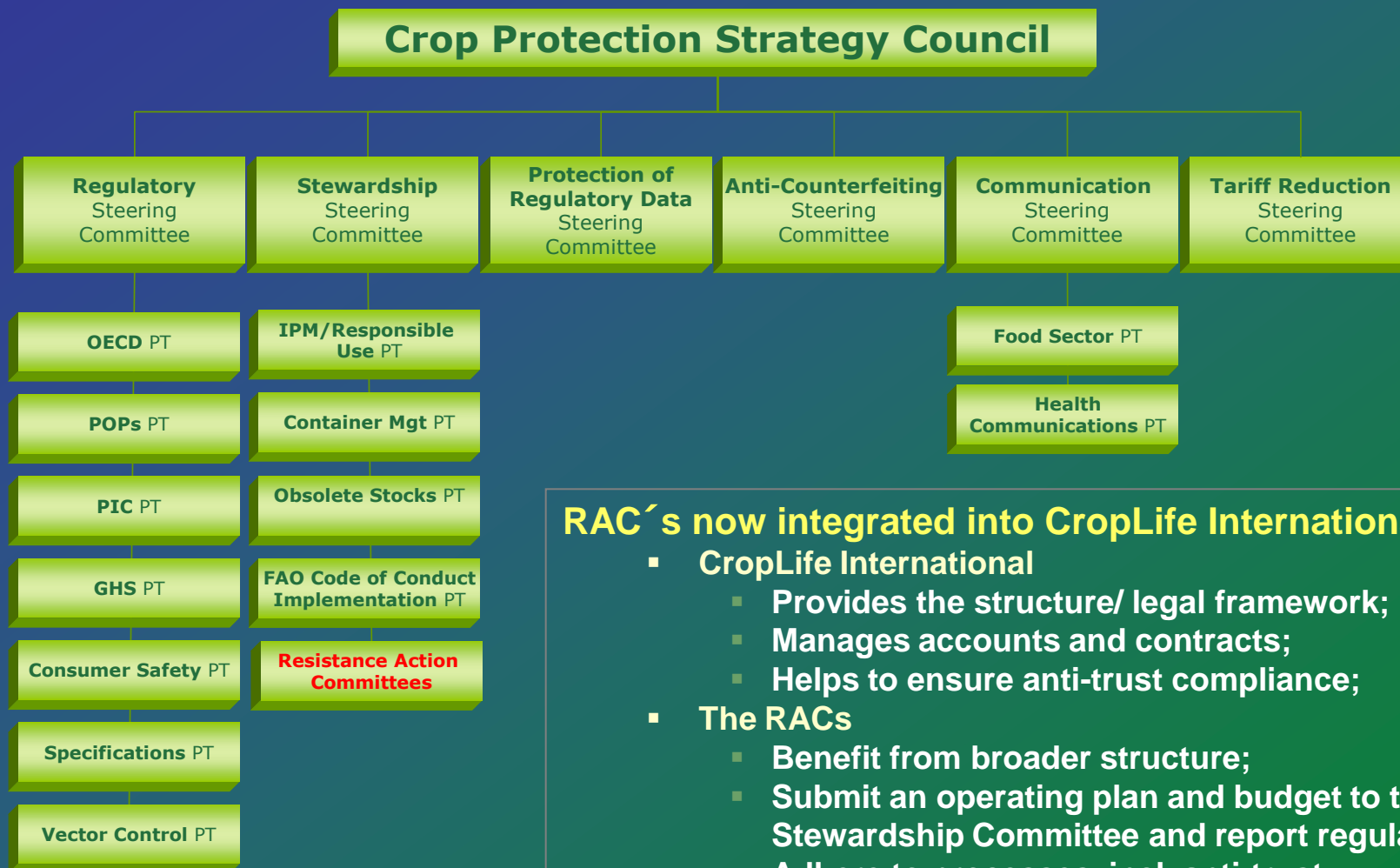
Compound: Lime sulphur



- **Insecticide Resistance Action Committee (IRAC)**
 - Formed in 1984 – now in its 27th year and still growing
 - Specialist technical expert group of the agrochemical industry
 - Association with CropLife International (Formal part of CLI's Stewardship Committee since June 2010)
 - Provides a coordinated industry response to the development of resistance in insect and mite pests
 - Around 70 industry representatives and specialist members in different working groups
 - 7 Country/Regional Groups with a further 70-80 representatives



CLI Crop Protection Structure



RAC's now integrated into CropLife International

- **CropLife International**
 - Provides the structure/ legal framework;
 - Manages accounts and contracts;
 - Helps to ensure anti-trust compliance;
- **The RACs**
 - Benefit from broader structure;
 - Submit an operating plan and budget to the Stewardship Committee and report regularly;
 - Adhere to processes, incl. anti-trust compliance.

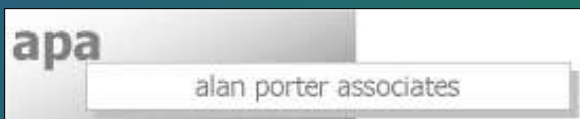
IRAC Intl. Meeting Florence, 2005



- Currently 15 IRAC Executive member companies



- Plus an international coordinator



IRAC Mission:

- Facilitate communication and education on insecticide and acaricide resistance.
- Promote development of resistance management strategies to maintain efficacy and support sustainable agriculture and improved public health.
 - Pool expertise
 - Cross-industry advocacy and lobbying group
 - Industry commitment to product stewardship and sustainability
 - Foster communication and education on IRM
 - Provide regional support by IRAC CG liaison



Companies



Working Groups

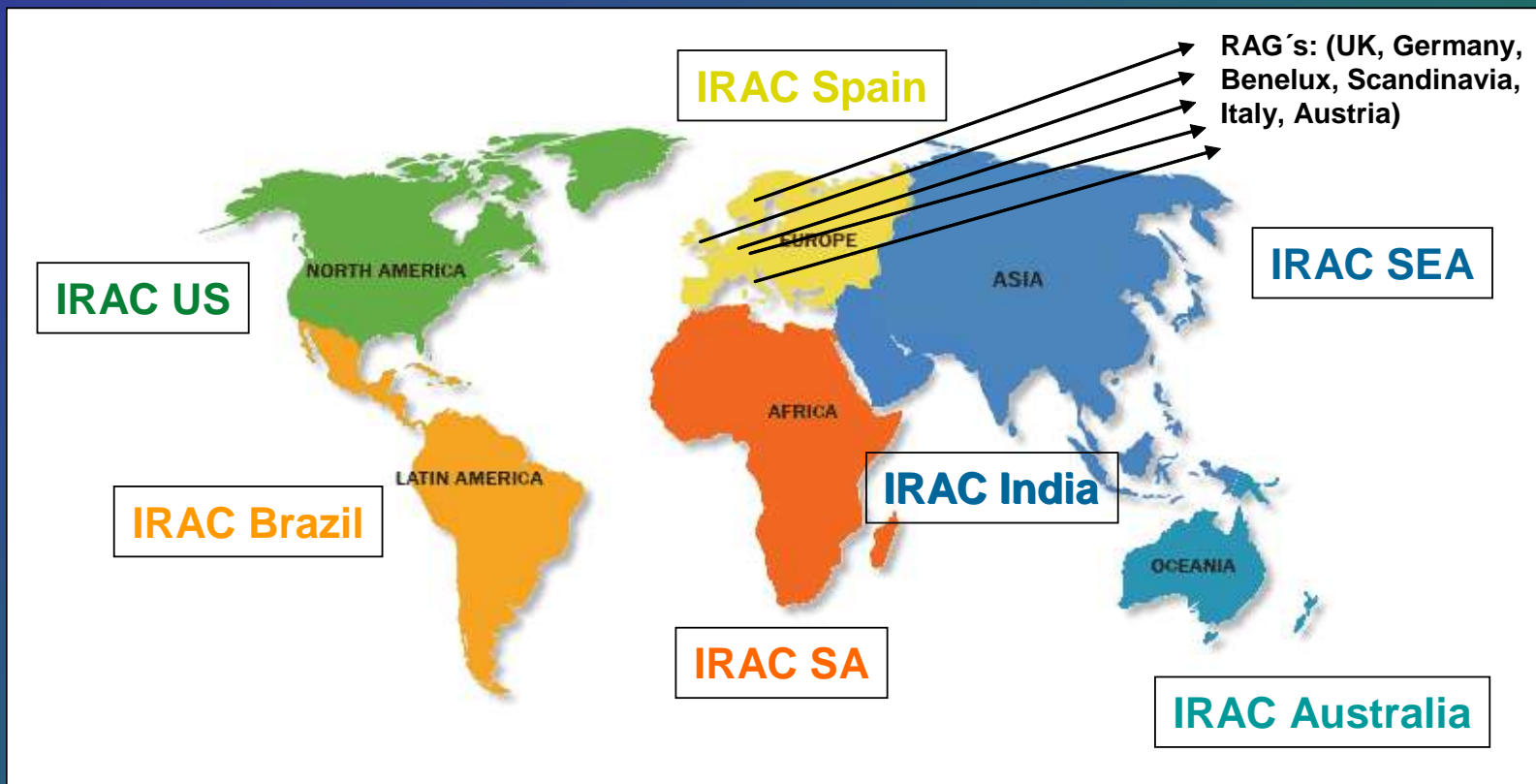


- Steering Group
- Public Health
- Biotechnology
- Methods
- Mode of Action
- Comm./Education
- Stakeholder Relations
- R. Database (MSU)
- Oilseed Rape
- Sucking Pest
- Coding Moth
- Lepidoptera
- Diamide

Country/Regional Groups

- IRAC Spain
- IRAC US
- IRAC S.E. Asia
- IRAC Australia
- IRAC Brazil
- IRAC India
- IRAC S. Africa

Regional RAC's and RAG's



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IRAC Executive Committee Team & Working Group SMART Objectives – 2010/11

- 12 (13) Teams and WGs with Goals & SMART* objectives
- Reviewed and updated every year by WG's

*SMART: Specific, Measurable, Achievable, Realistic and Time-bound

	Goals	Objectives	Timeline
Pollen Beetle WG	Coordinated European pollen beetle monitoring	<ul style="list-style-type: none"> Collaborate as member team companies and cooperate with public labs, regulators and other bodies involved in resistance monitoring of pollen beetle in to assemble, share and interpret coordinated set of monitoring data for 2010 season. Continuing to expand into other European countries. Continue to conduct limited survey of the distribution and frequency of the <i>kdr</i> target site mutation in European populations of pollen beetle using molecular biology techniques. 	<p>Q3 2010</p> <p>Q3, 2010</p>
	Provide researchers validated methods.	<ul style="list-style-type: none"> Validate methods for monitoring pollen beetle susceptibility to OP's & neonicotinoids and publish on IRAC web-site. Provide draft methodologies for testing susceptibility of pollen beetle to indoxacarb and susceptibility of <i>Psylliodes spp.</i> to pyrethroids. 	<p>Q4 2010</p> <p>Q4 2010</p>
	Provide and distribute relevant information on OSR pest sensitivity to growers and regulators.	<ul style="list-style-type: none"> Review and incorporate new learning's from OSR pest research, including 2009 resistance monitoring, into IRAC IRM recommendations for oilseed rape. Provide summary poster of learning's from 2010 pollen beetle susceptibility monitoring. Provide summary poster of OSR pest resistance management recommendations. Construct and publish a document which highlights work conducted in co-operative monitoring project, including outputs, such as IRM recommendations. Document should be targeted to wide EU agricultural community. 	<p>Ongoing</p> <p>Q4 2010</p> <p>Q4 2010</p> <p>Q4 2010</p>

And a good example as well, because all objectives were accomplished!



Insecticide Resistance Action Committee

IRAC Executive (n=27)

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Quarterly conference calls (one F2F per year)

One vote per member company

Approvals need 2/3rd majority

Executive Goals

- Coordinate and facilitate the work of IRAC in accordance with the IRAC Mission
- Encourage formation of new Country Groups to address local IRM issues
- Promote membership of IRAC at a country, regional and international level
- Provide direction and support to IRAC including Country & Regional Groups
- Facilitate cooperation and communication on insecticide resistance and IRM issues between groups, teams, and countries internally within IRAC, within member companies, within CLI SC and with external stakeholders.
- Encourage all Executive Teams to hold 4-6 conference calls and if possible one face-to-face meeting each year to set, review and progress their SMART objectives.

Steering Group

- **Team members:**
 - Chair, Vice-Chair(s), Treasurer, Coordinator, CG Representative, Core Team Leaders (Crop, PH, Biotech), but open to all members
 - Total of 5 conference calls April 10 to Feb 11 – approx. bi-monthly
- **Key topics:**
 - Finances
 - IRAC Membership
 - IRAC Structure and nomenclature
 - Constitution (with CLI)
 - IRAC Executive team organisation and workplans
 - Internal interactions and communications – e.g. Country Groups
 - External interactions – e.g. CropLife
 - Planning for meetings – e.g. this meeting
 - Often in conjunction with C&E conference call

IRAC Constitution (v6.2): needs update by CLI

IRAC Constitution

Issued, November 2009

Version 6.2

Prepared by: IRAC Steering Group

Approved by: IRAC Executive Committee

The Objectives of the Constitution

The IRAC Constitution provides guidance and recommendations on how an IRAC Committee should be set up and run. It details the Code of Conduct and Antitrust Guidelines that IRAC Committees using the IRAC brand should follow. Additional information is included in the Appendix such as the IRAC Structure and Interactions (Appendix I) and recommended Template Project Agreement which can be used when work is being carried out by a third party on behalf of IRAC (Appendix II).

Steering Group – What and Why?

- **Team developed to handle day-to-day running of IRAC**
 - Originated from discussion at 2007 IRAC meeting (Rothamsted)
 - Need for a core team to run basic business and admin in IRAC
 - Especially these days with theoretically up to 27 participants in IRAC Executive conference calls
- **Avoids the need for involvement of everyone**
 - Especially important as IRAC membership increases
- **Concept: Team prepares ideas and proposals for review, discussion and agreement by the Executive**
- **Meets approximately every two months**
 - Allows Executive meetings to occur around once a quarter (with one F2F per year)
- **Aim to improve overall efficiency**
- **Budget plan proposal to Executive (→ CLI)**

- **IRAC representation at:**
 - 6th Intl. IPM Symposium, March 2009
 - 5th Bemisia Workshop, November 2009
 - CropLife Malaysia, December 2009
 - ESA Meeting, December 2009
 - Japan PPA, January 2010
 - R&D Conference, Barcelona, 2010
 - EPPO Resiatnce Panel, Oeiras, 2010
 - ES of Israel, Beit Dagan, 2010
 - ASTM Conference, USA, 2010
 - ESA Meeting, San Diego, 2010
 - Beltwide Cotton Conference, USA, 2011
 - Intl. DBM Workshop, Thailand, 2011



Alan Porter (Leader)

- Nigel Armes (Deputy)
- Ralf Nauen
- Jonathan Henen
- Dan Vincent
- Tom Sparks
- Russell Slater



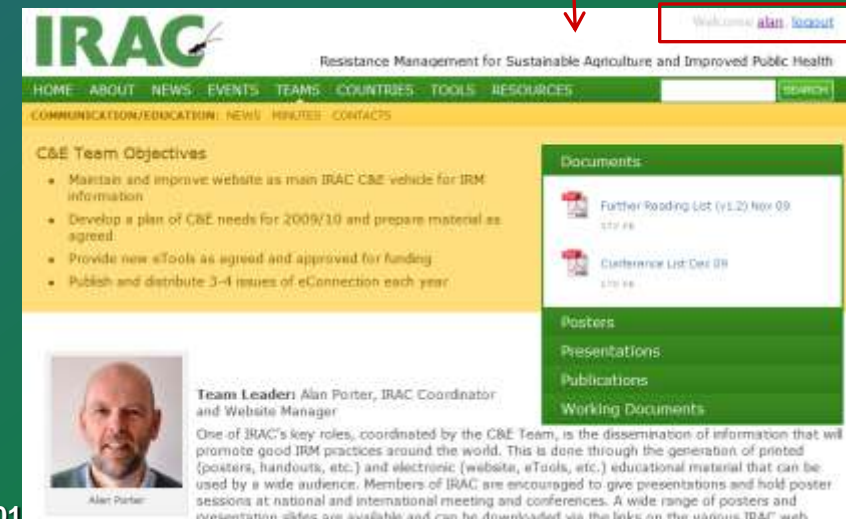
The screenshot shows the IRAC homepage with the following elements:

- Header:** IRAC logo, tagline "Resistance Management for Sustainable Agriculture and Improved Public Health", and navigation menu (HOME, ABOUT, NEWS, EVENTS, TEAMS, COUNTRIES, TOOLS, RESOURCES).
- Latest News:** "Myzus persicae Resistance Alert!" with a date of 10/10 and a photo of aphids.
- Subscription:** "SUBSCRIBE TO OUR RSS FEED" and "SUBSCRIBE TO IRAC'S NEWSLETTER" with a form for name and email.
- Main Content:** "IRAC is an international group of 150+ members of the Crop Protection Industry organised by sector and region to advise on the prevention and management of insecticide resistance." Below this are three columns of quick links:
 - Learn more about IRAC:** View the IRAC Organisational Chart, Download the IRAC Constitution, Check-out the Executive Members, Start a new IRAC Country Group.
 - IRAC Mode of Action:** Download the MoA Poster, Try the interactive eClassification, Download the MoA Classification, Visit the MoA Team webpage.
 - IRAC Test Methods:** Try our interactive eMethods tool, Learn about the IRAC Methods, Visit the Methods Team webpage.
- Footer:** Logos for HEMICAL, Mulsan, MONSANTO, Bayer CropScience, and syngenta GLOBAL.

Site Navigation

- About**
 - IRAC
 - RESISTANCE
 - OUR SPONSORS
 - OUR PARTNERS
 - STARTING GROUPS
- Resources**
 - IRAC POSTERS
 - IRAC PRESENTATIONS
 - IRAC GUIDELINES
- Teams**
 - EXECUTIVE
 - STEERING
 - CROP PROTECTION
 - LEPIDOPTERA
 - SUCKING PESTS
 - POLLEN BEETLE
 - BIOTECHNOLOGY
 - PUBLIC HEALTH
 - MODE OF ACTION
 - METHODS
 - COMMUNICATION/EDUCATION
 - RESISTANCE DATABASE
 - EU LIAISON
- Countries**
 - IRAC SPAIN
 - IRAC INDIA
 - IRAC AUSTRALIA
 - IRAC SE ASIA
 - IRAC US
 - IRAC BRAZIL
 - IRAC SOUTH AFRICA
- Tools**
 - ECONECTION
 - ECLASSIFICATION
 - EMETHODS

Quick Links to popular pages



The screenshot shows the "C&E Team Objectives" page with the following elements:

- Header:** IRAC logo, tagline, and navigation menu.
- Navigation:** "COMMUNICATION/EDUCATION", "NEWS", "NOTES", "CONTACTS".
- Objectives:**
 - Maintain and improve website as main IRAC C&E vehicle for IRM information.
 - Develop a plan of C&E needs for 2009/10 and prepare material as agreed.
 - Provide new eTools as agreed and approved for funding.
 - Publish and distribute 3-4 issues of eConnection each year.
- Documents:**
 - Further Reading List (v1.2) Nov 09
 - Conference List Oct 09
- Posters, Presentations, Publications, Working Documents:** A list of available materials.
- Team Leader:** Alan Porter, IRAC Coordinator and Website Manager. Includes a photo of Alan Porter.

Website Dimensions: (Feb 2010)

- No of pages created = 118 **(118)**
- No of posts (news & events) = 68 **(30)** • No of Minutes = 85 **(38)**
- No of documents uploaded = 398 **(293)** • Registered IRAC members = 107 **(90)**

Visitor Statistics: 2010/11 (% change from 2009/10)

- Site visits = 33,464 **(+28%)**, Page Views/document downloads = 127,356 **(+16%)**
- Pages per visit = 3.8 **(-9%)**, average time (mins.) per visit = 3:53 **(+1%)**
- Top areas were N. America, Visits = 7,927 **(+34%)** and W. Europe = 9,427 **(+29%)**
- Top keywords were “IRAC” and “insecticide resistance action committee”
- Total unique visitors = 21,502 **(+24%)**
- Most popular web pages were Mode of Action, Resources Document Library & IRAC Spain
 - MOA Team page was viewed 8,557 **(-18%)**
 - MOA structure poster (English) downloaded 499 **(-29%)** [Sp=592, Port=76, Chinese=58]
 - MOA classification scheme was downloaded 2,190 **(+15%)**
- Most popular resource was the IRAC Posters: total poster downloads = 5,240
 - Breakdown: MoA (inc. Sp.) = 3,188, Spanish = 1,534, Crop IRM = 562, P. Health = 481
- IRAC methods: total downloads = 1,100
 - Top Methods: P.Beetle (011) = 96, Coleoptera (007) = 84, Myzus (001) = 78

Current IRAC Posters

Poster Details	Date	Status
General Posters		
IRAC Structure	Apr 10	Current
Overview	Jul 09	Current
General IRM for Crop	Oct 07	Should be reviewed
General IRM for Vectors	Aug 08	Should be reviewed
General IRM for Biotech	Oct 07	Should be reviewed
Crop WG Posters		
P. Beetle Monitoring (09)	Apr 09	Current
P. Beetle Monitoring (10)	Mar 10	Draft
OSR pests – IRM Strategy	Jul 10	Draft
CM WG - Aims & Scope	Jan 09	Current
Whitefly IRM	Oct 08	Current
Thrips IRM	Mar 09	Final draft
<i>Myzus</i> IRM	Sept 09	Current
<i>Plutella</i> - IRM	Mar 11	Current
<i>Spod. exigua</i> - IRM	Jan 11	Final draft
<i>Tuta absoluta</i> - IRM	May 10	Current
Diamides – Stewardship	Mar 09	To be reviewed

Poster Details	Date	Status
MOA Posters		
MoA Structures x 4	09/10	Current
MOA - General (type 1)	Jan 10	Current
MOA - General (type 2)	Jan 10	Draft
MOA - Lepidoptera	Sep 09	Current
MOA - Sucking Pests	Jan 10	Current
MOA - Mites	Aug 09	Current
MOA - Mosquitoes	Aug 09	Current
Methods		
Methods overview	Mar 11	Final draft
Public Health Posters		
Mosquito IRM	Nov 11	Current
Biomolecular Monitoring	Nov 11	Current
Mosquitoes	Aug 08	Current
House Flies	Aug 08	Current
Bed bugs	Aug 08	Current
Cockroaches	Aug 08	Current
Mexico Trial	Oct 08	Current

Total Posters = 30 (last year = 22) (almost all developed or updated in the last 2-3 years)




Insecticide Resistance Action Committee

Issue 25

February 2011
www.irc-online.org

About This Issue

This is a single article eConnection to advise on a developing resistance situation with neonicotinoids and *Myzus persicae* in Southern France and Northern Spain. IRAC provides some important resistance management recommendations.

***Myzus persicae* Resistance Alert!**

Aphid monitoring surveys in peach orchards conducted by Syngenta Crop Protection and Bayer CropScience have revealed that some populations of the green peach aphid (*Myzus persicae*) in Southern France and Northern Spain have developed high levels of resistance to neonicotinoid insecticides. The neonicotinoid class of insecticides includes the active ingredients; acetamiprid, imidacloprid, thiacloprid and thiamethoxam (IRAC MoA Group 4A), which are currently registered for the control of aphids in European stone fruit.



Although low level tolerance to neonicotinoids in green peach aphids has been reported for some time, these are the first cases of high levels of resistance affecting aphid control. Highly resistant samples of aphids have been identified in several peach orchards in the Languedoc-Roussillon, Provence-Alpes-Cote d'Azur and Rhone-Alpes regions of France as well as in the Catalonia region of Spain. The monitoring surveys have yet to identify any resistant aphids in other crops.



The management of neonicotinoid resistant green peach aphids in peach and other stone fruit crops is further complicated by the presence of pyrethroid and carbamate resistant aphids in the same regions. The IRAC Sucking Pest Working Group recommends that growers in affected regions do not use insecticides that are affected by resistance*. It is recommended that control of pre-flowering pests in these regions is managed with mineral oils. The post-flowering use of neonicotinoid insecticides when green peach aphids are present in the crop should also be avoided to prevent the further spread and intensification of resistance. It is recommended to use aphicides of mode of action classes locally not affected by resistance** in order to prevent the further spread and intensification of resistance in aphids on stone fruits and on other host crops.



In 2011, the IRAC Sucking Pest Working Group will continue to monitor the distribution and impact of resistant aphids, whilst working with local experts to develop practical pest and resistance management strategies.

*Consult local advisors for advice on which aphicides are affected by resistance in your locality.
** See IRAC poster on [Myzus persicae resistance management](#)




Insecticide Resistance Action Committee

Issue 26

March 2011
www.irc-online.org

About This Issue

Welcome to the this special issue of eConnection, reporting back on the sponsored IRAC Symposium at the Entomological Society of America Annual Meeting. IRAC has the mission of fostering communications and developing practical strategies for Insecticide Resistance Management (IRM). Sponsoring an annual symposium at the ESA, the largest gathering of entomologists, has and continues to be an effective mechanism for accomplishing this goal. Although well attended, many who did not hear the symposium in person could benefit from the information. IRAC is therefore providing a short executive summary in the form of an eConnection along with a link to the [slide presentations located on the IRAC web site](#).

As always we hope you enjoy the issue.

Symposium Topics

The theme of the 2010 annual ESA meeting was: *"Entodiversity – Disciplinary, Biological and Geographical"*. IRAC-US incorporated this theme into the sponsored IRAC symposium which was titled: *"Understanding and Capitalizing on Agricultural Biodiversity in IPM and IRM"*. The speakers addressed the theme of agricultural biodiversity from a spatial and temporal perspective. In addition to key pests such as *Spodoptera frugiperda*, *Helicoverpa zea*, *Bemisia tabaci* and *Lygus lineolaris*, the invited speakers discussed ecosystem services and pollinators relative to biodiversity.

IRAC US - Our role in IRM

Daniel Vincent, DuPont Crop Protection: Agriculture is a necessary and challenging occupation. Pressures abound that must be dealt with; such as, diminishing arable land, finite water resources, available labor, regulatory pressure, and societal perception. IRAC plays a role in supporting activities that help us understand resistance mechanisms; monitor and catalog resistance development, and educate the user public on how to prevent or respond to resistance outbreaks.

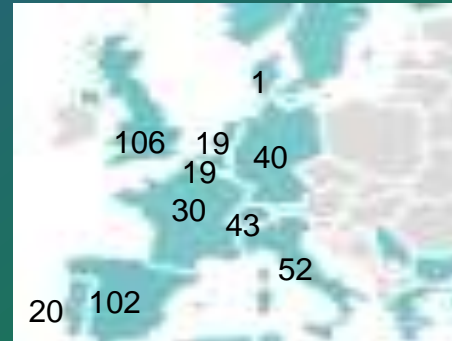
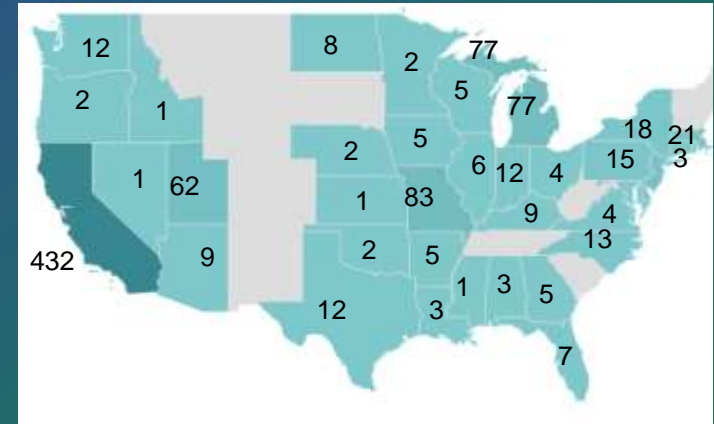
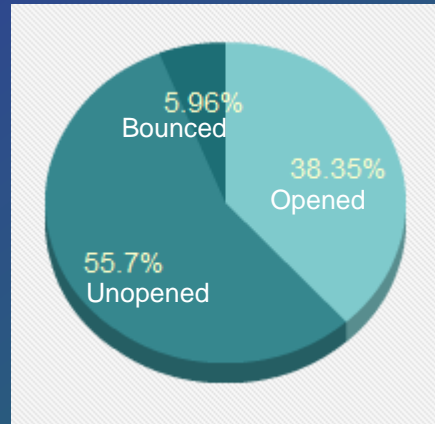


4 Issues of eConnection during the last year – Distribution ~1700



Delivery Statistics

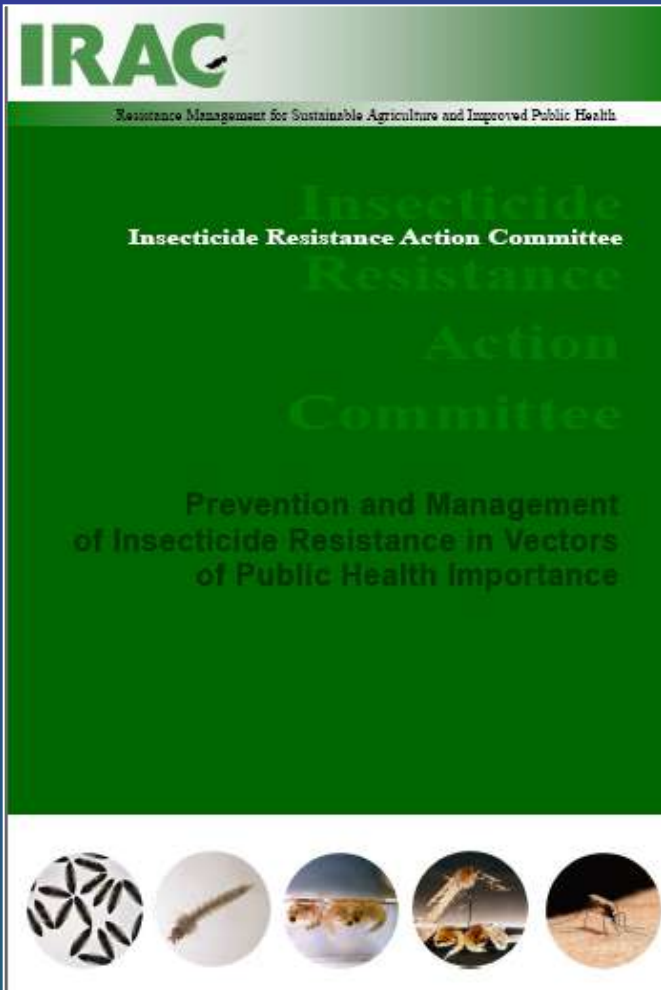
- Total Recipients = 1,729
- Successful Deliveries = 1,626
- Total email opening = 2,380
- Total no of clicks = 1,234
- Clicks to website = 159
- Clicks to eConnection = 1,075



Number of Opens by Location

Hard Copy Layout & Printing

Vector manual - 72 page Booklet – 4,000 copies



Drafts in preparation