



Issue 14

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Introduction to eConnection

■ eConnection Issue 14

Welcome to the latest IRAC eConnection. In this issue we have information on a new IRAC Spain MoA Classification based on the International scheme, details of the latest MoA poster covering control of lepidoptera and brief notes about a recent EPPO workshop on pollen beetles followed by a more detail article on pyrethroid resistance in this pest. As always remember that eConnection is best read in conjunction with the IRAC website which will often have further information on the topics described. [See the site](#)

Past issues of eConnection (Nos. 1-13) can be located on the website, now under the heading "eTools" or via [this link](#).

■ Visit with IRAC at BCPC/IPPC Glasgow and NPMA Orlando

IRAC will be sharing an industry stand with CropLife International and ECPA at the BCPC/IPPC conference in Glasgow on October 15-18th. IRAC will also have a stand at the NPMA PestWorld 2007 Trade Show in Orlando October 17-19th. If you are attending pop along, say hello and have a look at the IRAC posters and pick up an information pack.

■ Send us your feedback and News

If you have Resistance Management information that you think should appear on the IRAC website or eConnection please contact us with details. For IRAC Country Groups and Teams around the world please send updates on your activities, meeting minutes etc. for inclusion in the relevant areas of the IRAC website.
<mailto:aporter@intraspin.com>.

IRAC News

■ IRAC Spain

IRAC Spain has just published the new version of the Spanish MoA Classification based on the version 5.2 of the IRAC International Scheme. Members of IRAC Spain have adapted the document removing the banned active ingredients in Spain and highlighting both the ingredients in the process of registration and those to be banned soon (basically voted for non-inclusion in the Annex I of the European Directive 91/414/EEC but still in the market). This 'tool' has been distributed among the officials, advisors and crop protection professionals in the whole country to provide a guide on the selection of actually authorized insecticides and acaricides for IRM programs. A pdf version of the IRAC Spain MOA classification (in Spanish) is available from the IRAC website by clicking [here](#)

■ Latest IRAC Mode of Action Poster - Control of Lepidoptera

Experience has shown that a great majority of the most effective resistance management (IRM) strategies utilise sequences of insecticides with different modes of action. This minimises selection from any one type of insecticide and helps to prevent the evolution of resistance.

Knowing what is available for the control of any one pest or pest type is crucial, and IRAC is developing a number of educational posters which detail the insecticide available for key pest groups. In the latest of these posters the modes of action available for the control of Lepidoptera are detailed. Within the lepidoptera are major crop pest groups such the Heliothines and the Spodoptera species as well as particular pests such as the Diamondback moth *Plutella xylostella*. These, and many other Lepidoptera, have frequently developed resistance in the past, so that developing more effective IRM strategies is especially important. Fortunately, a growing number of insecticides with a diverse range of modes of action are now available for the control of lepidopteran larvae. These include those targeting the nervous system, moulting & metamorphosis, cuticle synthesis, various metabolic processes and the midgut. With such a broad range of mode of action classes, and much available chemistry in many of these classes, there is ample scope to develop effective IRM strategies that do not rely on just one or a few single insecticides. The

pdf version of the new poster can be found on the IRAC website by clicking [here](#)

■ Report from EPPO Workshop on Pollen Beetles

Members of the IRAC Pollen Beetle Working Group participated with around 40 others in an 'Ad hoc EPPO (European and Mediterranean Plant Protection Organisation) Workshop on insecticide resistance of *Meligethes spp* (Pollen beetle) on oilseed rape' that was held at the BBA (Biologische Bundesanstalt für Land- und Forstwirtschaft) headquarters in Berlin from 3-5 September 2007. The participants represented regulators, the agrochemical industry, IRAC and key research institutes and organisations and discussed the biology, control and resistance management of pollen beetle in Europe. The meeting concluded with the development of a series of key recommendations that could provide practical ways forward to combat this problem.

The IRAC Pollen Beetle WG held their own face-to-face meeting after the close of the workshop to agree on an overall strategy for IRM for Pollen beetle. Further information on pyrethroid resistance in pollen beetles can be read in the article below.

Resistance Management News

■ Pyrethroid Resistance in Pollen Beetles

The pollen beetle, *Meligethes aeneus* (Coleoptera: Nitidulidae), is one of the major pests in European oilseed rape, particularly winter oilseed rape. Briefly after emerging from overwintering sites, adults start to infest oilseed rape plants in mid-March until May, and can damage the flowering parts by feeding and oviposition, and particularly feeding larvae cause bud abscission. The consequence of such infestations is podless stalks and in the case of heavy beetle infestations, dramatically reduced yields, so the farmers need to control pollen beetles to keep numbers low and to avoid economic damage. German winter oilseed rape acreage was greater than 1,500,000 ha in 2007 and can be considered as a really important crop. Other important countries involved in winter oilseed rape cultivation are for example France, Denmark, UK and Poland.

The major insecticidal chemical class used to control pollen beetles is pyrethroids. Organophosphates are becoming less and less important due to restrictive re-registration procedures and the politically driven intention to replace this chemistry by other, more environmentally friendly compounds. However, due to the fact that alternatives to pyrethroids are limited, the selection pressure has increased tremendously, e.g. in Germany pyrethroids were the only officially registered insecticides for pollen beetle control in 2005/2006 making proper resistance management impossible resulting in pollen beetle devastating 30,000 ha of winter oilseed rape in 2006 - worth more than 21 Million Euro.

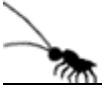
European pyrethroid resistance monitoring activities by industry based on IRAC Method No. 11 (adult vial test) and the results from other methods used by the public sector in some countries, revealed wide-spread pyrethroid resistance in areas such as France, Germany and Poland, while elsewhere such as Belgium the situation was less serious. In a few countries such as Austria and UK, pyrethroid resistance is either absent or very localized. Mechanistically it could be shown that elevated levels of monooxygenases are most likely responsible for the observed resistance and that target-site resistance is apparently not involved (Nauen et al., submitted). The metabolic mechanism of resistance was shown to provide cross-resistance to all pyrethroids used for pollen beetle control however differences in the degree of cross-resistance were noticed in field and laboratory investigations. Nevertheless selection for general pyrethroid resistance is likely to continue irrespective of the level of cross-resistance.

In conclusion, the monitoring results clearly indicated that pyrethroid resistance in pollen beetles seems to spread all over Europe and resistance management strategies should be considered wherever possible. Apart from pyrethroids only two other chemical classes are yet available for pollen beetle control, i.e. organophosphates and neonicotinoids. So in the longer term, the rotational use of insecticides with different modes of action must be established in order to guarantee a proper resistance management, and this is one of the major tasks of the new IRAC Pollen Beetle Team established in early 2007.

Conferences and Symposia

- 4th European Mosquito Control Association Workshop, Prague 11-14th September 2007
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- The XVI International Plant Protection Congress (with IAPPS and BCPC), Glasgow UK, 15-18 October 2007
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- NPMA, PestWorld 2007, Orlando, Florida, 17-20th October 2007
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- **ESA Annual Meeting, San Diego, CA, 9-12th December 2007**
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- **1st Intl. Conference: Agrochemicals protecting crop, health and natural environment (IUPAC sponsored), New Delhi, India, 8-11 January 2008**
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- **Beltwide Cotton Conferences, Nashville, TN, 8-11 January 2008**
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- **International Crop Science Conference & Exhibition, Kuala Lumpur, Malaysia, 24-25 January 2008**
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- **Crop Protection in Northern Britain 2008, Dundee, Scotland 26th-27th February 2008**
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- **3rd European Whitefly Symposium, Almeria, Spain, 6th-10th May 2008**
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- **International Congress of Entomology, Durban S. Africa, 6th-12th July 2008**
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