Session 3

International Working Group & Country Group Review

46th Meeting of IRAC International, Brussels, Belgium

Wednesday - March 30th, 2011

Oilseed Rape WG

(formerly Pollen Beetle WG)

Russell Slater

Team Members

Team Leader, Deputy and Members for 2010/11

- Russell Slater, Syngenta (chair)
- Gerald Huart, Makhteshim (deputy chair)
- Michel Sarazin, FMC
- Chris Longhurst, DOW Agrosciences
- Ralf Nauen, Bayer CropScience
- Lynne Matthews, BASF
- Jean-Luc Rison, DuPont
- Jean Paul Genay, NuFarm
- Udo Heimbach, JKI (Germany)
- Steve Ellis, ADAS (UK)
- Alan Porter, APA (IRAC Facilitator)

***Ad hoc* members in 2010/11**

- Thomas Thieme, BTL (Germany)
- Melanie Andrews, Syngenta
- Harald Köhler, Bayer CropScience
- Helen Pruul, FMC

Team Goals

Team Goal Summary:

- To co-ordinate pollen beetle sensitivity monitoring in European oilseed rape crops, using validated methodologies.
- To provide researchers, validated methods for measuring the susceptibility of other oilseed rape pests.
- To provide oilseed rape pest sensitivity information to growers and regulators, so that informed decisions on oilseed rape pest control and resistance managment can be made.

Unchanged from previous years – goal is to provide updated information that allow growers to make informed decisions.

Activities 2009/10

2010/2011 Activities:

- Publication of a scientifc paper, recording findings of the group (2007-2009).
- Monitoring of pollen beetle susceptibility to pyrethroids 2010.
- Limited monitoring of the *kdr* target site mutation in field collected pollen beetle (2009 reporting).
- Field validation of methods to measure susceptibility to OP‘s and NNI‘s.
- New method development for indoxacarb monitoring.
- Monitoring methods for other OSR beetles and weevils.
- Publication of 2010 susceptiblity monitoring results.

Insecticide Resistance Action Committee

Publication of 2007-2009 Pollen beetle resistance monitoring

Research Article

SCI

Received: 9 September 2010 Revised: 19 November 2010 Accepted: 19 November 2010 Published online in Wiley Online Library:

(wileyonlinelibrary.com) DOI 10.1002/ps.2101

Pyrethroid resistance monitoring in European populations of pollen beetle (*Meligethes* spp.): a coordinated approach through the Insecticide Resistance Action Committee (IRAC)

Russell Slater,[a*] Steve Ellis,[b] Jean-Paul Genay,[c] Udo Heimbach,[d] Gerald Huart,[e] Michel Sarazin,[f] Chris Longhurst,[g] Andreas Müller,[d] Ralf Nauen,[h] Jean Luc Rison[i] and Fabrice Robin[j]

Abstract

BACKGROUND: Pollen beetle (*Meligethes* spp.) is a major pest of European oilseed rape crops. Its resistance to pyrethroid insecticides has been recorded in samples of beetles collected in Europe since at least 1999, and problems with the control of the beetle in the field have been widely reported. In 2007, a Pollen Beetle Working Group was formed through the Insecticide Resistance Action Committee (IRAC) in order to coordinate efforts for surveying pyrethroid resistance development.

RESULTS: The results of the first 3 years of the pollen beetle pyrethroid susceptibility survey using a laboratory test are presented in this paper. Resistant beetle samples were collected from 20 of the 21 countries surveyed, with a general trend of increasing frequency and spread of resistant samples in European oilseed-rape-growing regions.

CONCLUSION: Pyrethroid-resistant beetles dominate in Western and Central Europe and are becoming established in the North and East, the main oilseed-rape-growing areas of Europe. The development and spread of pyrethroid-resistant pollen beetles highlights the need for effective management strategies for oilseed rape insect pests.
© 2011 Society of Chemical Industry

Keywords: pollen beetle; *Meligethes aeneus*; pyrethroid resistance; susceptibility monitoring; IRAC; oilseed rape

IRAC

Insecticide Resistance Action Committee

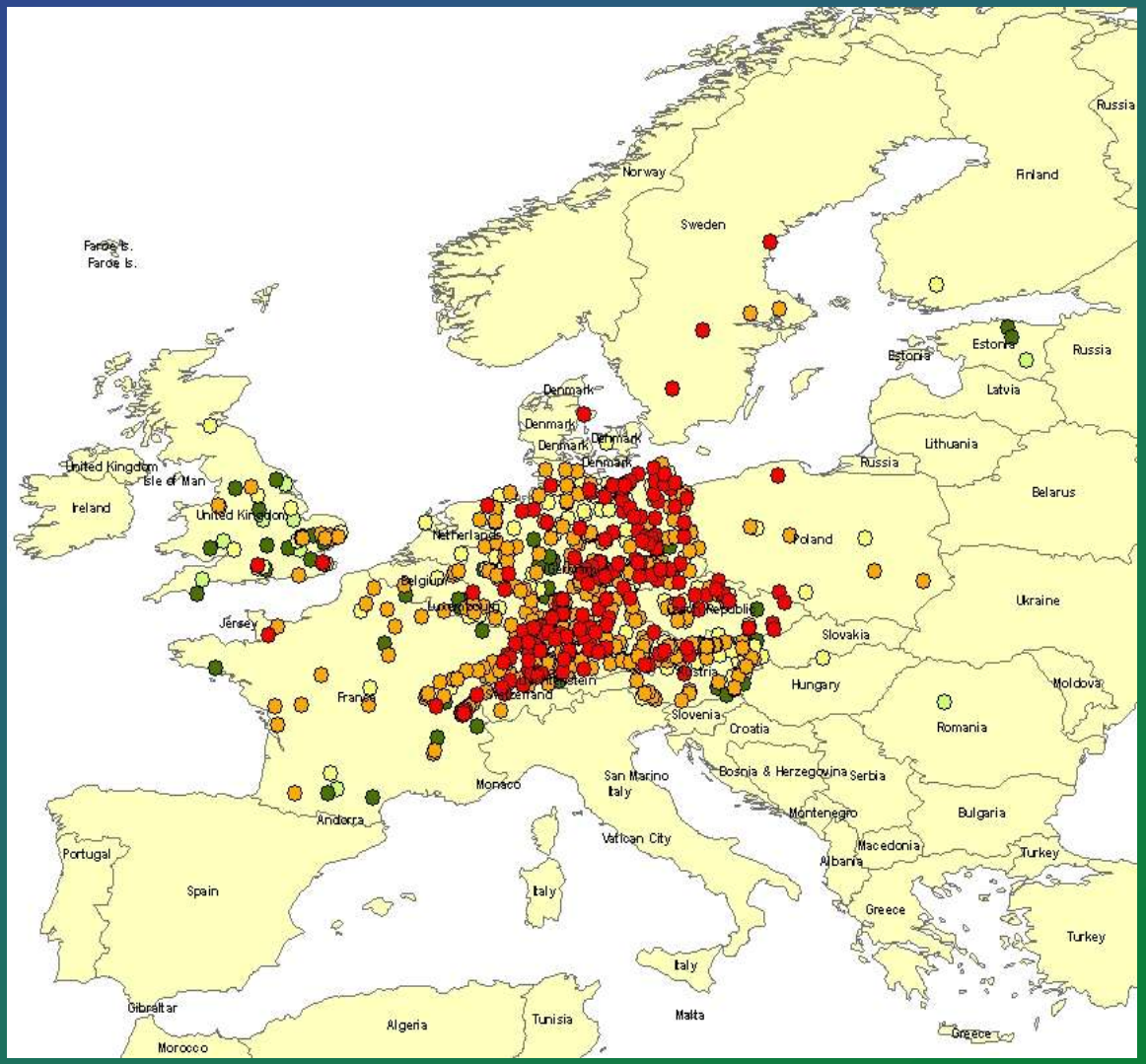
Trial of new system for mapping resistance – MSU database software

- 2009 data mapped.
- Not yet been validated.

- However useful to show distribution of different susceptibilities.

- Could be considered for future mapping.

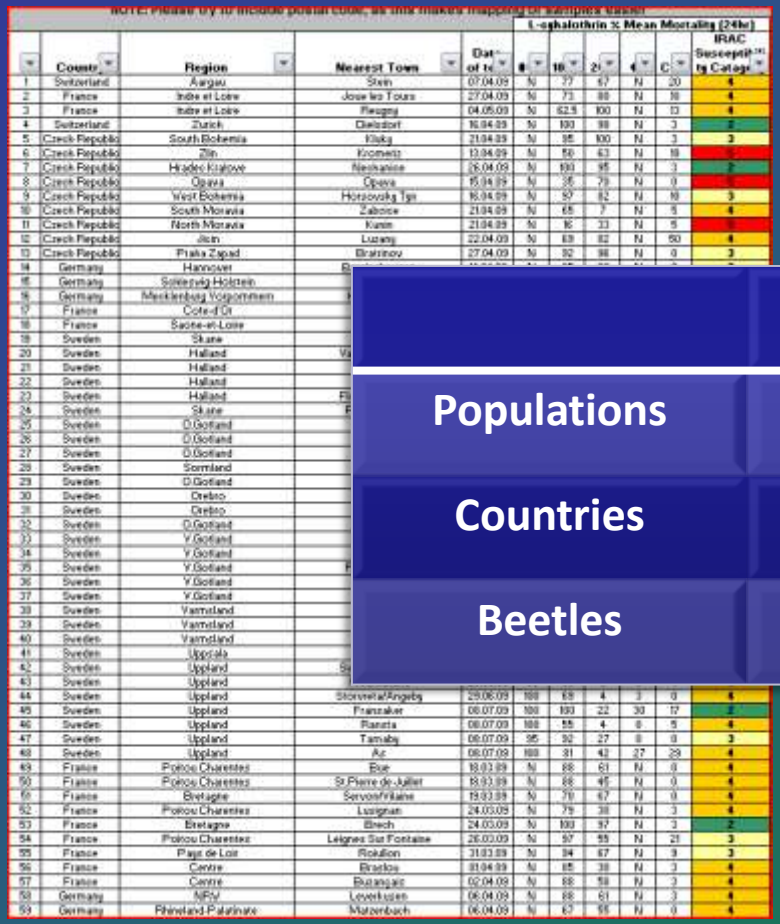
- Thanks to Mark Whalon & MSU Team.



IRAC

Insecticide Resistance Action Committee

Pyrethroid Resistance Monitoring 2010

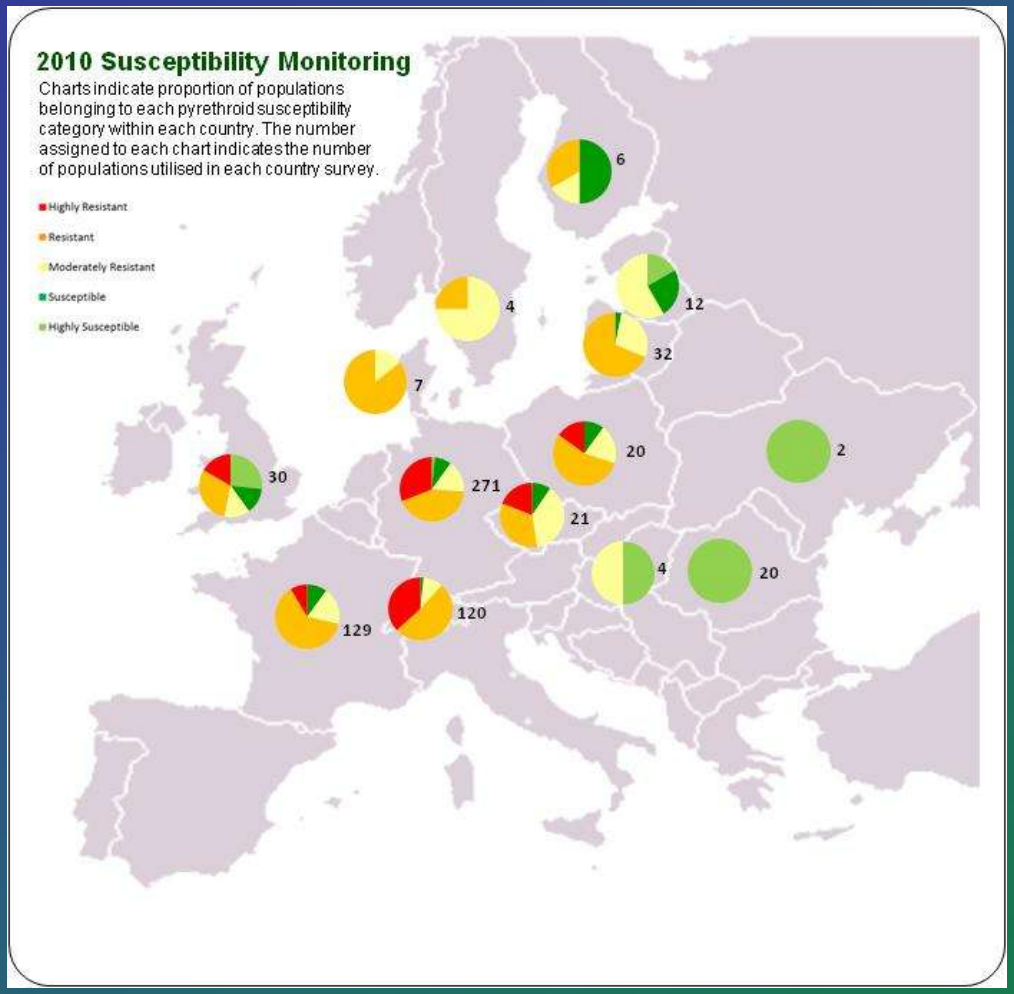


	2007	2008	2009	2010
Populations	608	577	804	723
Countries	10	17	20	15
Beetles	120,000	115,000	160,000	145,000

Insecticide Resistance Action Committee

Pollen Beetle Pyrethroid Resistance Monitoring 2010

Monitoring allows us to map location of resistant populations.....



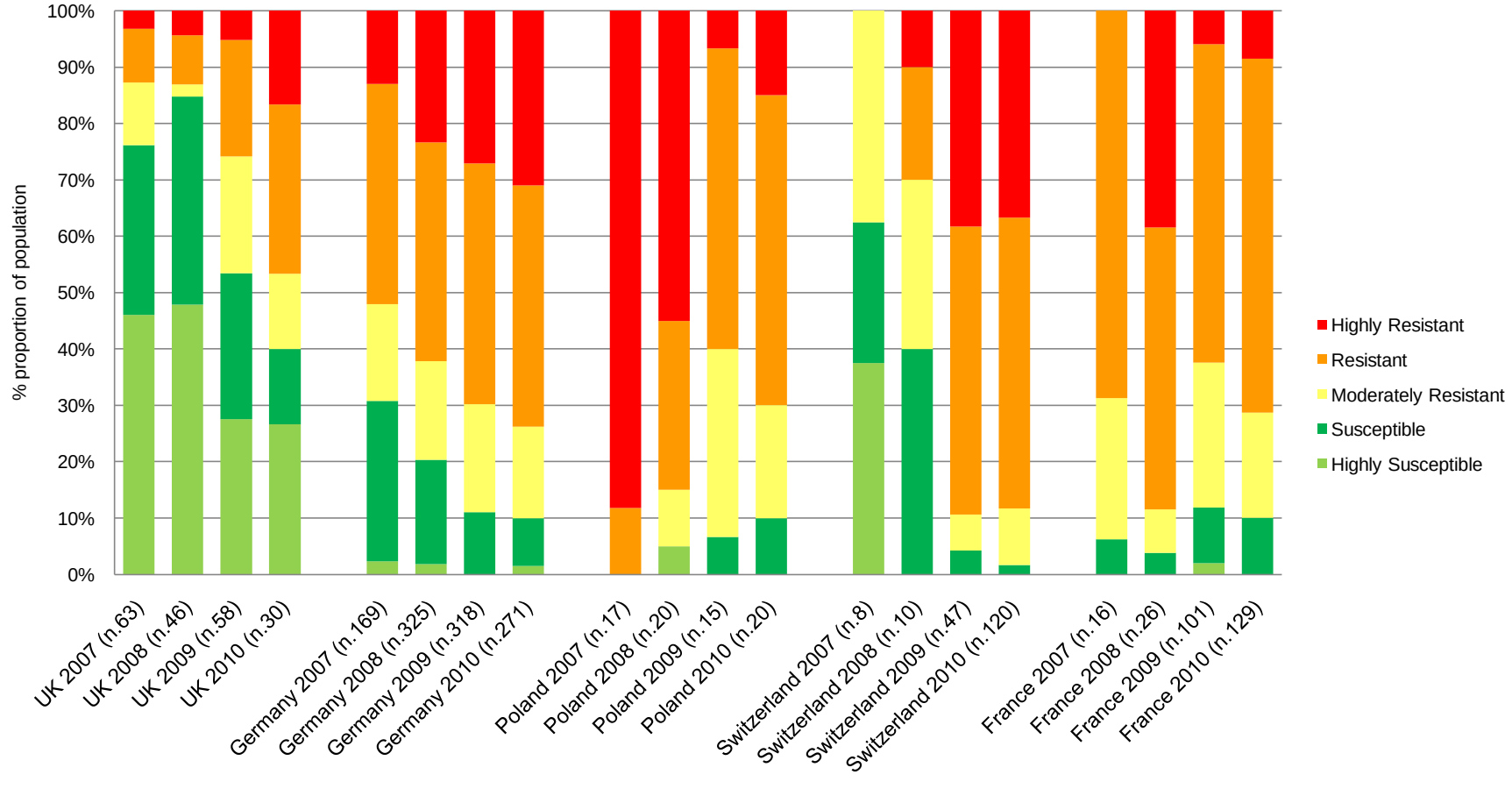
- Pyrethroid resistant populations dominate in western Europe as well as the Czech Republic, Lithuania and Poland.
- Large increases (>10%) in the frequency of resistant populations are observed in Latvia, Lithuania, Finland, Hungary and the UK as resistant beetles spread North and North-East.
- Small increases in the proportion of total susceptible beetles are observed in Poland and the Czech Republic.
- Only Romanian and Ukrainian populations of pollen beetles have remained fully susceptible to pyrethroids in this and previous surveys.

IRAC

Insecticide Resistance Action Committee

Pyrethroid Resistance Monitoring 2007 - 2010

.....and allows us to see changes over the growing seasons



2010 Monitoring Poster

DRAFT

IRAC
Insecticide Resistance Action Committee

IRAC Oilseed Rape Working Group

Pollen Beetle Resistance Monitoring 2010

www.irac-online.org

Introduction and Background

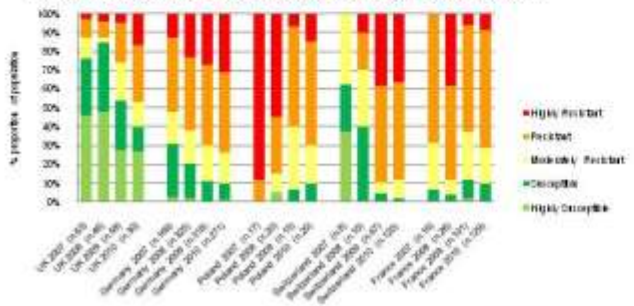
Pyrethroid resistance has been recorded in European populations of the pollen beetle (*Meligethes aeneus*) since 1999, when it was first reported in Eastern France. The IRAC Oilseed Rape Working Group brings together expertise from agrochemical companies and independent researchers in order to monitor the development and spread of pyrethroid resistance in pollen beetles.

Pyrethroid susceptibility is measured by the use of an insecticide coated glass vial assay. This results of the 2010 susceptibility monitoring program are presented in this poster. More details of the method utilised in this survey can be found on the IRAC website (www.irac-online.org).

Summary & Recommendations

- Pyrethroid resistant populations of pollen beetle dominate in western mainland European countries (France, Germany, Denmark, Switzerland) as well as the Czech Republic, Lithuania and Poland.
- Large increases (>10%) in the frequency of resistant populations of pollen beetle are observed in Latvia, Lithuania, Finland, Hungary and the UK as resistant beetles spread North and North-East.
- Small increases in the proportion of total susceptible beetles are observed in Poland and the Czech Republic. It is speculated that this may be due to a reduction on the reliance of pyrethroid insecticides in these countries, however this may only be a reflection of a small sample number.
- Only Romanian and Ukrainian populations of pollen beetles have remained fully susceptible to pyrethroids in this and previous surveys.
- Susceptibility surveys conducted between 2007 and 2010 suggest that in general pyrethroid resistant populations are continuing to increase in Europe and spread into the North and East.
- In order to prevent further insecticide resistance development, it is recommended that insecticides with different modes of action are utilised in a effective resistance management program, dependant on local insecticide availability and national use guidelines. IRAC guidelines for resistance management in oilseed rape can be found on the IRAC web-site.

Changes in the pyrethroid susceptibility of pollen beetle populations 2007 - 2010



2010 Susceptibility Monitoring

Charts indicate proportion of populations belonging to each pyrethroid susceptibility category within each country. The number assigned to each chart indicates the number of populations utilised in each country survey.

The IRAC Pollen Beetle Working Group would like to thank to all who contributed to the survey ☺

	% of total number of populations falling into susceptibility category					
	Highly susceptible	Susceptible	Moderately resistant	Resistant	Highly Resistant	Percentage in susceptible (number of populations) 2009 to 2010
Czech Republic (n=20)	0	10	35	35	10	+ 5
Denmark (n=1)	0	0	14	86	0	0
Finland (n=5)	0	20	0	20	0	- 10
France (n=129)	0	10	10	63	9	- 2
Germany (n=271)	1	8	16	43	31	- 2
Latvia (n=12)	17	25	58	0	0	- 58
Lithuania (n=32)	0	3	25	69	0	- 44
Poland (n=20)	0	10	20	55	15	+ 3
Romania (n=20)	100	0	0	0	0	0
Sweden (n=4)	0	0	75	25	0	- 4
Switzerland (n=20)	0	5	10	55	30	- 5
UK (n=30)	27	13	13	30	17	- 14
Ukraine (n=2)	100	0	0	0	0	0
Hungary (n=6)	50	0	50	0	0	- 17

The poster is for educational purposes only. Details are accurate to the best of our knowledge but IRAC and its member companies cannot accept responsibility for how the information is used or interpreted. Advice should always be sought from local experts on pesticide use and health and safety recommendations. Trademarks

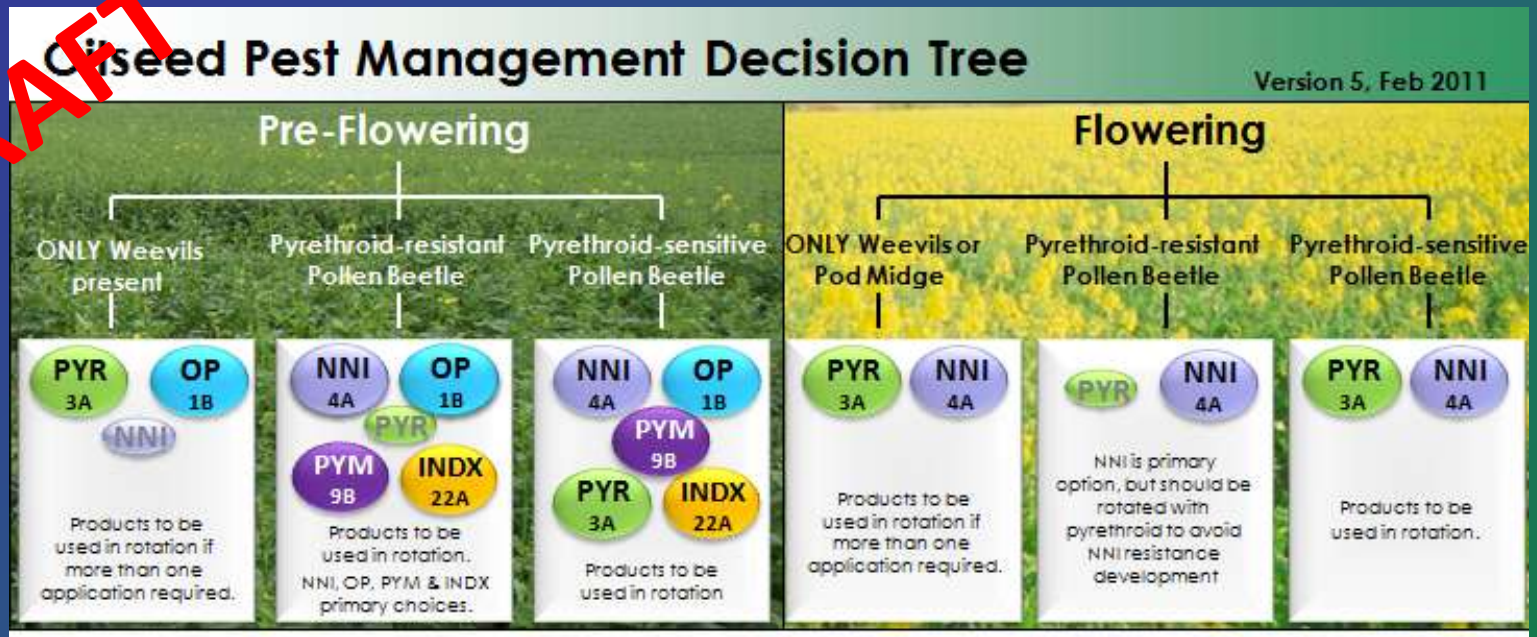
Version 1.0, Designed and produced by IRAC Oilseed Rape Working Group, January 2011. Photographs courtesy of Syngenta Crop Protection.

Visit to IRAC web-site for further details at www.irac-online.org

CropLife

IRM Strategy 2011

DRAFT



- ONLY apply insecticides IF locally recommended pest thresholds are exceeded.
- A maximum of two applications per mode of action (MoA) class should be utilised (excluding autumn applications).
- An application of a insecticide should NOT be followed by an application of an insecticide from the same MoA class.
- Utilise the most efficacious insecticide within its MoA class against INDIVIDUAL TARGET PESTS.
- If pyrethroid resistant pollen beetles are known to be present in the target crop then non-pyrethroid insecticides should be the primary choice for pollen beetle control.
- The use of insecticide mixtures containing pyrethroids for the control of pyrethroid resistant pollen beetle is not recommended. Where insecticide mixtures are used, it is recommended that the following insecticide application should be from a different MoA class than the mixture components.
- In countries where the insecticide spinosad is registered for use to control pollen beetle, it should be utilised in rotation with any other insecticide belonging to a different MoA class.
- If aphid control is necessary during the period when pollen beetle are present in the crop, insecticides not previously used in the current season for pollen beetle control are recommended.
- Where possible alternative methods of oilseed rape pest management should be employed.

IRAC
CropLife

IRM Strategy Poster

DRAFT

IRAC Insecticide Resistance Action Committee

IRAC Oilseed Rape Pest Working Group

Resistance Management for Oilseed Rape Pests

Winter Sown

www.irac-online.org

Oilseed Rape Pest Management

The management of oilseed rape pests whilst trying to prevent the selection of insecticide resistance is made more difficult by the lack of effective insecticide modes of action (MoA).

It is essential to maximise the use of available MoA's, whilst still ensuring effective pest control is achieved.

Plan spray schedules in advance, ensuring that the same MoA's are not used sequentially or multiple times throughout the crop cycle.

MoA's chosen for autumn flea beetle or aphid control, should be avoided during pre-flowering and flowering if the same pests are likely to be present.

OP, indoxacarb and pymetrozine based insecticides can not be used during flowering and therefore, should be considered for use pre-flowering, allowing other MoA to be used later.

If pyrethroid resistant pollen beetle are known to be present in the target crop, then non-pyrethroid. Insecticides should be the primary choice for pollen beetle control.

Non-chemical control options should be considered as part of any pest management strategy.

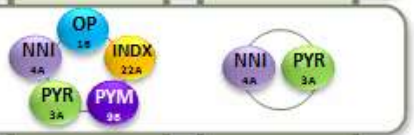
- Maximum of two applications per MoA
- No consecutive applications of same MoA

Only weevils, flea beetles or pod midge present

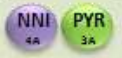
Neonicotinoids provide only limited control of weevils present at pre-flowering, they are not recommended as a primary method of control for these pests.

Pollen beetle targeted

If pyrethroid resistant pollen beetle are known to be present then, non-pyrethroid insecticide options should be primary choice.



Seed Treatment
(Aphid & Flea beetle)

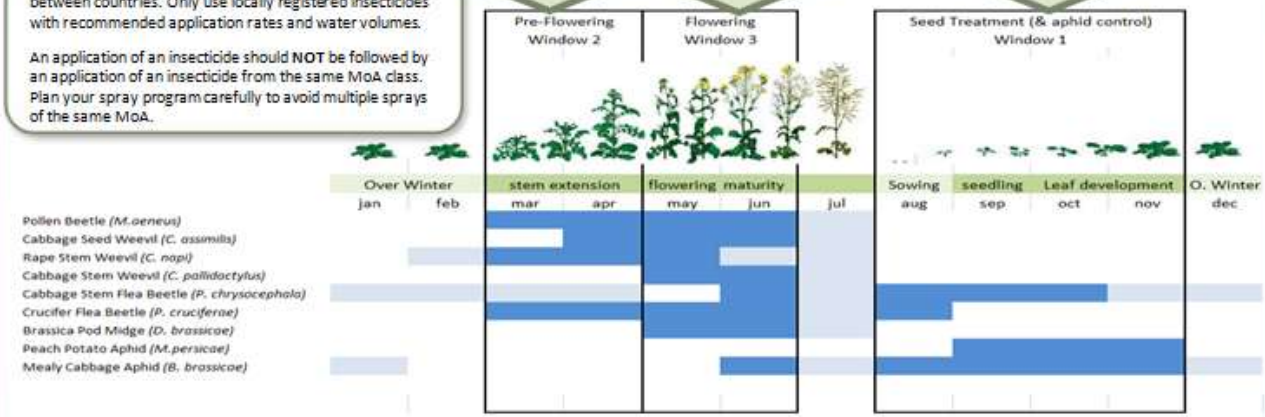


Foliar aphid control

- Carbamates 1A
- Organophosphates 1B
- Pyrethroids 3A
- Neonicotinoid 4A
- Pymetrozine 9B

Availability of different insecticide modes of action varies between countries. Only use locally registered insecticides with recommended application rates and water volumes.

An application of an insecticide should **NOT** be followed by an application of an insecticide from the same MoA class. Plan your spray program carefully to avoid multiple sprays of the same MoA.



This poster is for educational purposes only. Details are 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.

Version 1.0, Designed and produced by IRAC Oilseed Rape Pest Working Group, July 2010, photographs courtesy of Bayer CS

Visit to IRAC web-site for further details at www.ir

CropLife

Monitoring methods for other pests & insecticides

- **New methods for measuring pollen beetle susceptibility……**
  - **Neonicotinoid and OP methods finalized and now on IRAC web site.**
  - **Indoxacarb method for pollen beetle under development.**
  - **Other OSR coleoptera method (pyrethroids) drafted and under review..**
  - **New aphid method on IRAC web-site also**



- **Developing resistance situation in other OSR pests ?**
- *Ceutorhynchus napi* & *C. pallydactylus* – Some variations in pyrethroid sensitivity observed, but no major differences.
- *C.* assimilis (*obstrictus*) – 1 population in 2010 had very low susceptibility to pyrethroids, with only 40% control at highest rate tested.
- Pyrethroid resistant flea beetles continue to be found in Mecklenburg, Germany.
- Neonicotinoid resistant *Myzus persicae* - vigilance in OSR needed

IRAC

Insecticide Resistance Action Committee

Goals & SMART Objectives 2011

Goals	Objectives	Timeline
Coordinated European pollen beetle monitoring	• 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 2011 season.	Q3, 2011
Provide researchers validated methods.	• Validate methods for monitoring pollen beetle susceptibility to indoxacarb and publish on IRAC web-site.	Q4 2011
Provide researchers validated methods.	• Validate methodologies for testing susceptibility of *Psylliodes spp* and other OSR coleoptera to pyrethroids.	Q4 2011
Provide and distribute relevant information on OSR pest sensitivity to growers and regulators.	• Review and incorporate new learning's from OSR pest research, including 2010 resistance monitoring, into IRAC IRM recommendations for oilseed rape. • Present findings at international conferences	All year Q4, 2011
Provide and distribute relevant information on OSR pest sensitivity to growers and regulators.	• Provide summary poster of learning's from 2011 pollen beetle susceptibility monitoring. • Provide summary poster of OSR pest resistance management recommendations.	Q4, 2011
	• Provide set of summary slides of IRAC Oilseed Rape WG activities for WG members to use for national and international meetings and conferences	Q2, 2011