



Insecticide Resistance Action Committee

Coleoptera WG Update

51st IRAC International Meeting, Philadelphia
March 28th, 2017

10



First F2F in 2008



Coleoptera WG Team Members

April 2016	March 2017
Alan Porter (IRAC)	
Anil Menon (BASF)	Siddharth Tiwari (BASF)
Brian Duggan (Nufarm)	
Chaoxian Geng (Dow)	
Imre Mezei (Dow)	
Jan Elias (Syngenta) <i>Vice-Chair</i>	
Niels Jacob Jakobsen (ADAMA)	
Ralf Nauen (Bayer) <i>Chair</i>	
Udo Heimbach (JKI)*	
Sacha White (ADAS UK)	
	Jean-Luc Rison (Dupont)
	Harald Köhler (Bayer)

11 WG members
(6 companies)

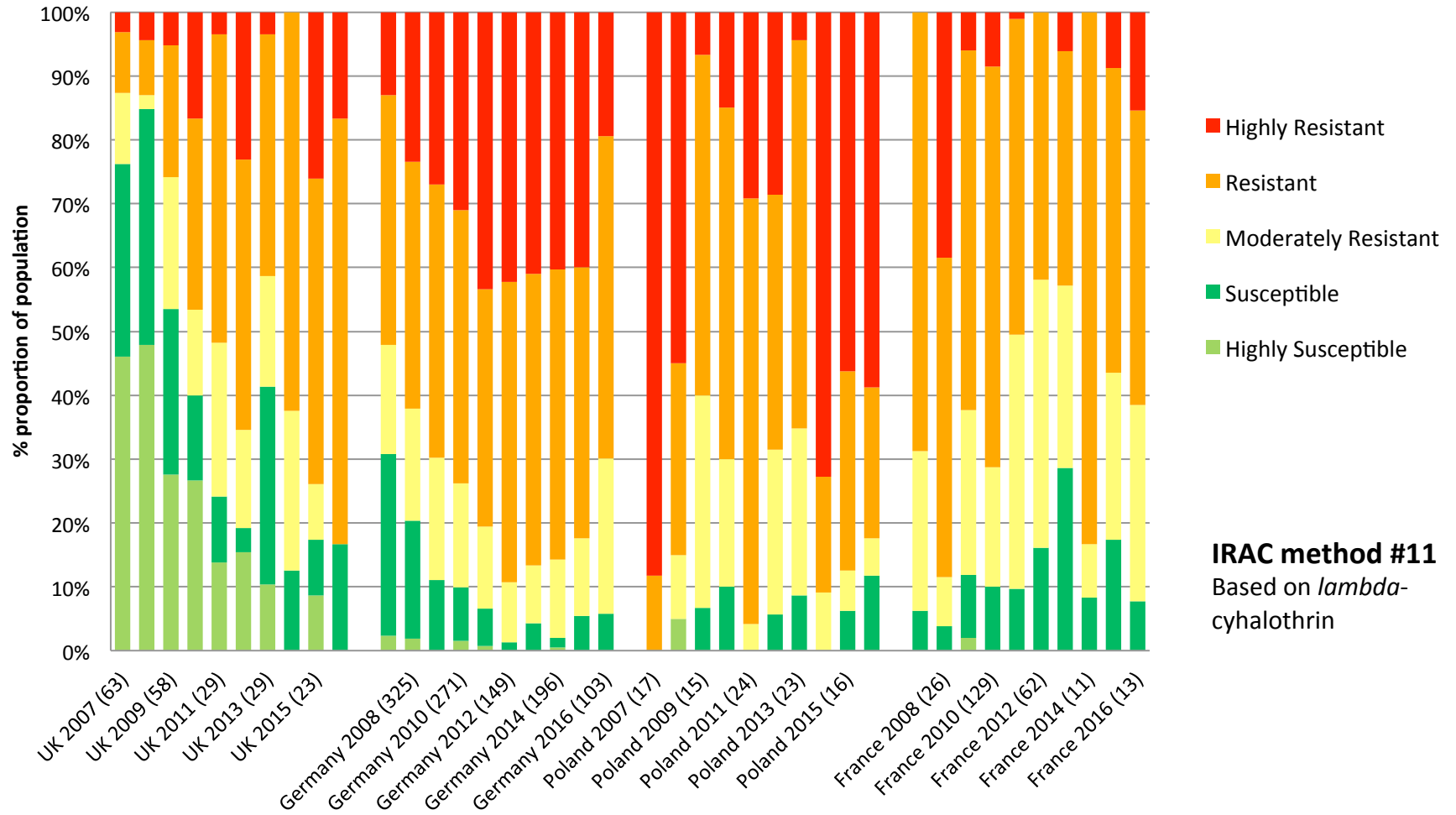
* Retirement in June 2017

(Back to) **Traditional scope**

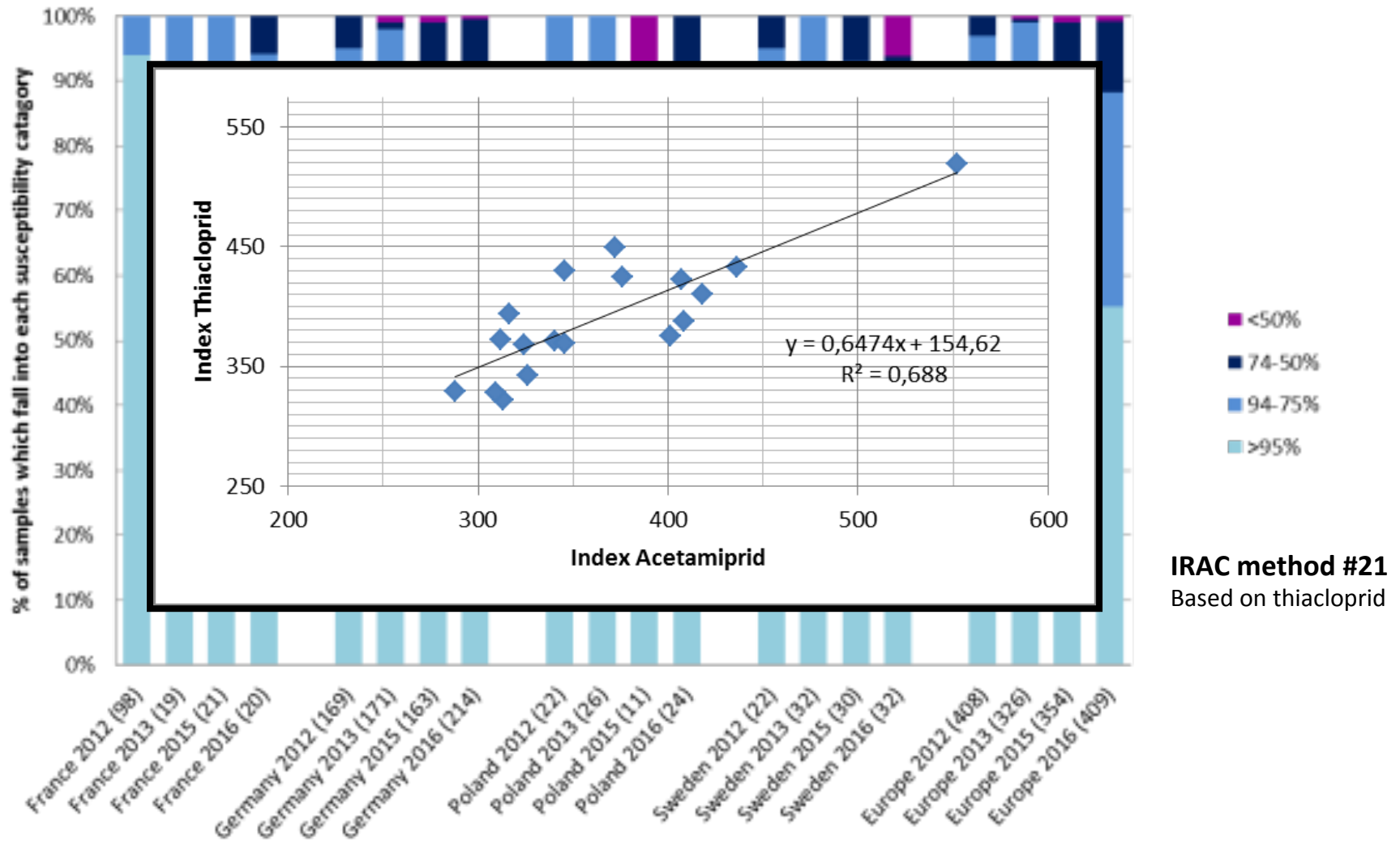


- Coleopteran pests in (winter) oilseed rape in Europe
 - Pollen beetle (*Meligethes aeneus*)
 - Cabbage stem flea beetle (*Psylliodes chrysocephala*)
 - Weevils of the Genus *Ceutorhynchus*, e.g. cabbage seed pod weevil
- Pollen beetle resistance monitoring poster (1B, 3A, 4A, 22A) (9B)
- Monitor for possible weaknesses of OSR pest monitoring methods
- Providing test kits for AVT to support RM activities by public labs, authorities and other bodies involved in resistance monitoring
- Support of EU RAG and IRM country groups by sharing and interpreting resistance monitoring data
- Molecular diagnostics of *kdr/skdr* in coleopteran OSR pests (service to others such as JKI)

393 pollen beetle samples tested for pyrethroid resistance in 2016



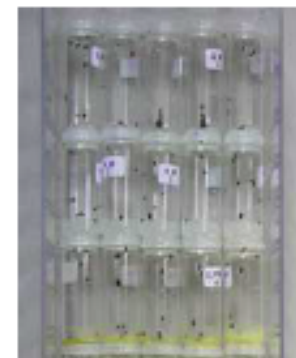
409 pollen beetle samples tested for neonicotinoid resistance in 2016



IRAC method #21
Based on thiacloprid

Method #027 (updated in 2016)

- IRAC Method #027
 - Glass vials coated with insecticide
 - 3-4 replicates of 10 adults
 - Incubation in the dark at 20°C
 - Evaluation 24 hours later
- Since 2010, tests are run with the liquid formulation Avaunt[®] (DPX-KN128 150EC)
- Rates tested:



DC rates	ngai cm ²	% Field rate	% Expected mortality
DC1	63.75	25%	>90
DC2	255	100%	>90
Untreated check	0	0	<20

2016

**9 countries
65 samples**

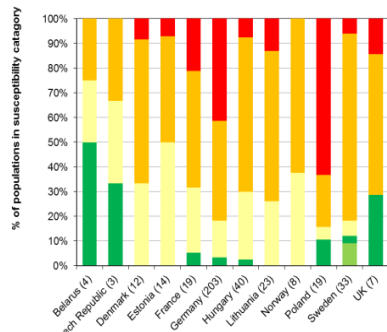


Pollen Beetle Resistance Monitoring 2016

Introduction and Background

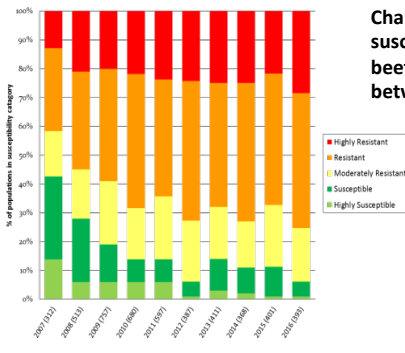
Pyrethroid resistance has been recorded in European populations of the pollen beetle (*Meligethes aeneus*) since 1999, when it was first reported in Eastern France. The IRAC Coleoptera Working Group brings together expertise from agrochemical companies and independent researchers in order to monitor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

spread of resistance in pollen beetles and other coleopteran pests of oilseed rape. Pyrethroid, neonicotinoid, organophosphate and indoxacarb susceptibility is measured by the use of insecticide coated glass vial assays. Results of the 2016 susceptibility monitoring program are presented in this poster. More details of the methods used in this survey can be found on the IRAC website (www.irc-online.org).



Pyrethroid susceptibility of pollen beetle populations in Europe 2016

Numbers given in brackets indicate the total number of populations tested.

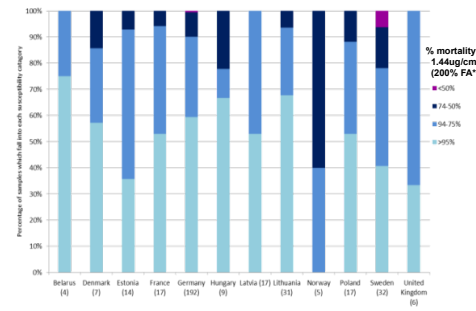


Changes in the pyrethroid susceptibility of pollen beetle populations in EU between 2007 - 2016

Susceptibility surveys conducted in Europe between 2007 and 2016 suggest that in general pyrethroid resistant populations of pollen beetle have been on the increase at least until 2010. There are suggestions that the proportion of resistant populations have stabilised at about 85-90% since then. However, we have to consider that the countries and number of samples included in the survey have varied during each year.

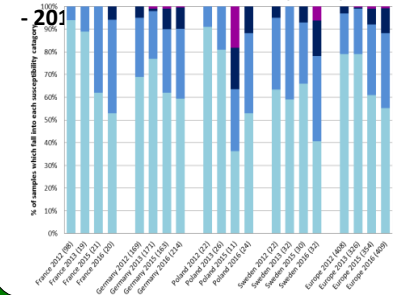
3A
IRAC MoA

Neonicotinoid susceptibility monitoring 2016



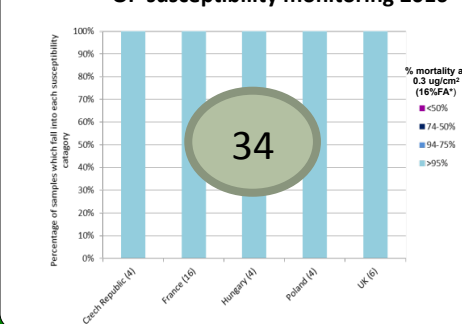
4A
IRAC MoA

Changes in neonicotinoid susceptibility in selected countries and EU (total) between -2016



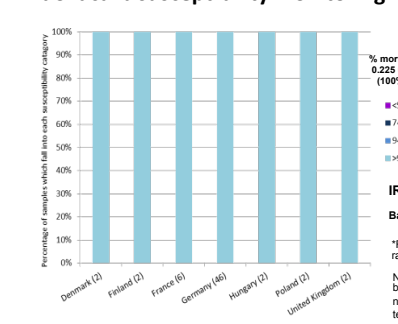
4A
IRAC MoA

OP susceptibility monitoring 2016



1B
IRAC MoA

Indoxacarb susceptibility monitoring 2016



22A
IRAC MoA

Summary & Recommendations

- In the majority of countries surveyed, pyrethroid resistant populations of pollen beetle dominate (> 60% are resistant).
- Samples of pollen beetle collected in Spain, Greece and Romania showed high levels of pyrethroid sensitivity, but the data is not presented here due to the limited number of samples collected (<3).
- In 2016 less than 10% of pollen beetle populations (n=393) surveyed in Europe could be classified as pyrethroid susceptible.
- After an initial decline in the number of susceptible pollen beetle populations observed in Europe since the IRAC survey began in 2007, only small variations in the percentage of pyrethroid susceptible and resistant beetle populations have been observed since 2010.
- The majority of populations tested across Europe remained susceptible to neonicotinoid insecticides. The percentage of populations with a lower sensitivity (<75% mortality) slightly increased from 8% to 12%. It should be noted that EU monitoring

- data of 2014 have been taken out of the graph due to the fact that many adult vial test-kits were of low quality due to wrong shipment conditions.
- There is currently no evidence to suggest that the lower sensitivity observed in the survey correlates with a reduced performance of neonicotinoid containing insecticide products which are used under field conditions, however resistance management practice should be implemented to avoid further susceptibility decline.
- There was no evidence of changes in organophosphate susceptibility observed in the European countries surveyed.
- There was no evidence of changes in indoxacarb susceptibility observed in the European countries surveyed.
- Pymetrozine (MoA Group 9B) is not included in the survey yet due to the lack of an appropriate bioassay method.
- In order to prevent further insecticide resistance development, it is recommended that insecticides with different modes of action are utilised in an effective resistance management program, dependent on local insecticide availability and national use guidelines. IRAC guidelines for resistance management in oilseed rape can be found on the IRAC website (www.irc-online.org).

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 any errors or omissions. IRAC would like to thank all of those who contributed to the survey. IRAC would like to thank all of those who contributed to the survey. IRAC would like to thank all of those who contributed to the survey.



Summary 2016

- In 2016 less than 10% of pollen beetle populations (n=393) surveyed in Europe could be classified as pyrethroid susceptible.
- Only small variations in the percentage of pyrethroid susceptible and resistant beetle populations have been observed since 2010.
- The majority of populations tested across Europe remained susceptible to neonicotinoid insecticides. The percentage of populations with a lower sensitivity (<75% mortality) slightly increased from 8% to 12%.
- There is currently no evidence to suggest that the lower sensitivity observed in the survey correlates with a reduced performance of neonicotinoid containing insecticide products which are used under field conditions
- There was no evidence of changes in organophosphate susceptibility observed in the European countries surveyed.
- There was no evidence of changes in indoxacarb susceptibility observed in the European countries surveyed.
- Pymetrozine (MoA Group 9B) is not included in the survey yet due to the lack of an appropriate bioassay method.

Pyrethroid resistance in OSR pests on the move



1. *M. aeneus*: **metabolic** resistance (widely distributed throughout Europe, problems in the field); **kdr** in Denmark & Sweden



2. *P. chrysocephala*: **kdr** distributed (in UK additionally **metabolic** resistance and **skdr** (very few cases), control problems in the field)



3. *C. picitarsis*: **kdr** in France and southern parts of Germany in 2015 (partly control problems in the field)



4. *C. obstrictus*: **kdr** distributed (partly control problems in the field)

M. persicae: **(s)kdr**, **metabolic**, **R81T**, **MACE** (worldwide, almost all active ingredients affected, problems in the field)

Pyrethroid failure against *Myzus persicae* in winter OSR in 2016



EPPO Workshop on integrated management of insect pests in OSR (Berlin, 09/2017)

Background

At the EPPO Workshop on insecticide resistance of *Meligethes* spp. (pollen beetle) on oilseed rape (Berlin, 2007), it has been recommended that follow-up should be planned to include other oilseed rape pests. The Panel on Resistance and the Working Party on Plant Protection Products welcomed the German proposal to organize a Workshop on integrated management of insect pests in oilseed rape.

TOPICS

- Importance of insect control for OSR production
- Brief background and history to the problem
- Biology/life cycle/host preferences
- Alternative non-chemical control strategies including resistant varieties
- Nature of resistance and resistance mechanisms
- Resistance monitoring method
- Present situation and recommendations for the control of XXXX on oilseed rape with regard to insecticide resistance
- Present status of available active substances
 - risk assessment concerning resistance to different substances, results of laboratory studies and field monitoring
- Resistance strategies to be recommended
- Problems outside EPPO region



Coleoptera WG objectives will be updated on Thursday, April 30th (Room: Penn)

Agenda:

13:30 Welcome, reminder of antitrust guidelines (Ralf)

13:35 Working group members and changes

13:45 Update on oilseed rape coleopteran pests

- Pollen beetle poster 2016
- Planned resistance monitoring activities 2017
- Update flea beetle resistance
- Others

14:15 Pre-work for WG on list with most relevant resistance risks/issues

14:30 *Anthonomus grandis* adult vial test pyrethroids

14:35 Do we want to include stored product coleopteran pests?

14:45 Definition of 4-5 realistic objectives for 2017

14:55 AOB



Thank you !