IRAC

Insecticide Resistance Action Committee

IRAC Coleoptera Working Group

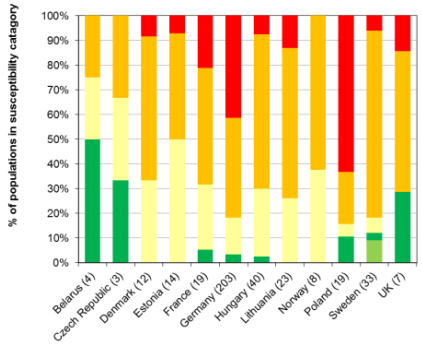
Pollen Beetle Resistance Monitoring 2016

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 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.irac-online.org).



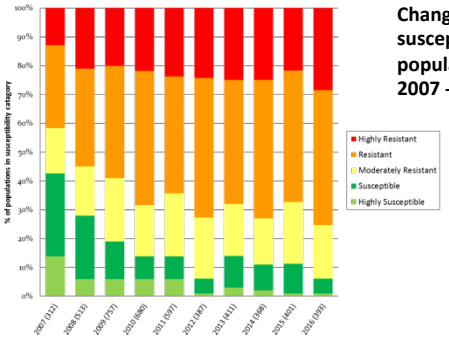
3A IRAC MoA

IRAC method #11

0.075 & 0.015 µg/cm²
Based on *lambda*-Cyhalothrin

Pyrethroid susceptibility of pollen beetle populations in Europe 2016

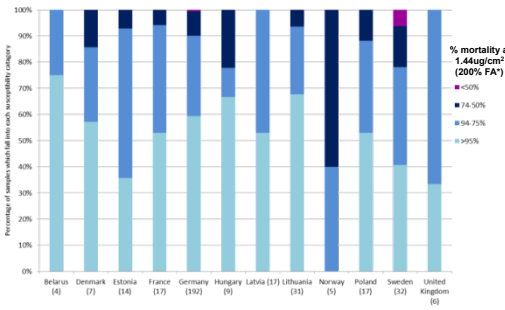
Numbers given in brackets indicate the total number of populations tested.



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.

Neonicotinoid susceptibility monitoring 2016



4A IRAC MoA

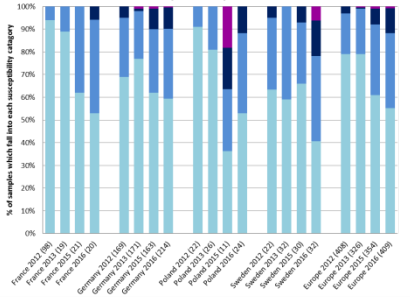
IRAC method #21

Based on thiacloprid > 95% mortality at 1.44 µg/cm² indicates high susceptibility

*FA = Field application rate

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

Changes in neonicotinoid susceptibility in selected countries and EU (total) between 2012 - 2016



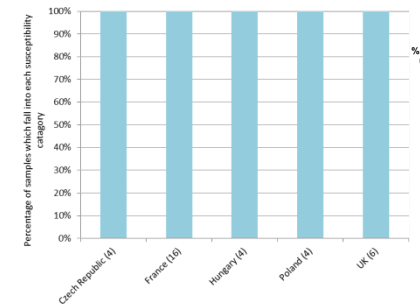
4A IRAC MoA

IRAC method #21

*FA = Field application rate

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

OP susceptibility monitoring 2016



1B IRAC MoA

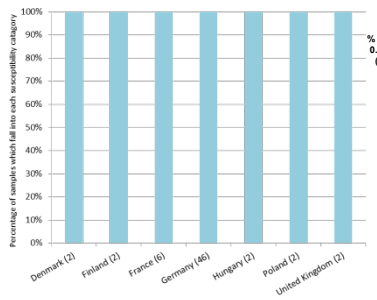
IRAC method #25

Based on chlorpyriphos 100 to 90% mortality at 0.3 µg/cm² indicates susceptibility

*FA = Field application rate

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

Indoxacarb susceptibility monitoring 2016



22A IRAC MoA

IRAC method #27

Based on indoxacarb

*FA = Field application rate

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

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.irac-online.org).
- IRAC would like to thank all of those who contributed to the survey.

Version 1.0, Designed and produced by IRAC Coleoptera Working Group, January 2017, Photographs courtesy of Syngenta Crop Protection

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

CropLife INTERNATIONAL