IRAC

Insecticide Resistance Action Committee

IRAC Coleoptera Working Group

Pollen Beetle Resistance Monitoring 2015

www.irac-online.org

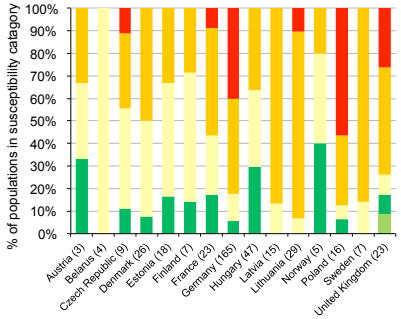
Introduction and Background

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 Coleopteran 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 and organophosphate susceptibility is measured by the use of insecticide coated glass vial assays. Results of the 2015 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).

Pyrethroid susceptibility of pollen beetle populations in Europe 2015

3A IRAC MoA



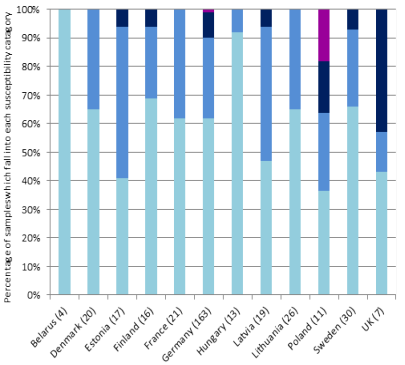
- IRAC method #11
- 0.075 & 0.015 ug/cm² lambda-cyhalothrin doses
- Scoring system based on mortality at both doses indicates susceptibility status.
- The number of populations tested per country is given in brackets (x-axis)

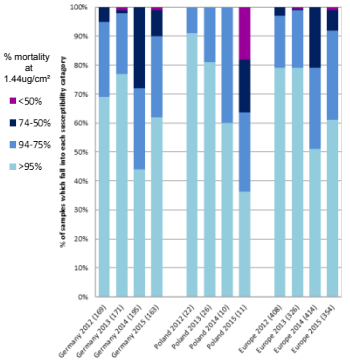
Pyrethroid resistant populations of pollen beetle dominate in almost all European countries surveyed.

Neonicotinoid susceptibility monitoring in pollen beetle

4A IRAC MoA

2015





2012 – 2015

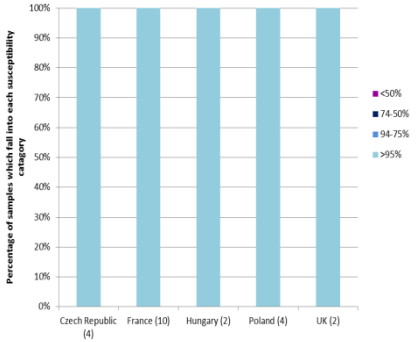
- IRAC method #21
- 1.44ug/cm² thiacloprid dose: > 95% mortality indicates high susceptibility.

Pollen beetle populations with lower neonicotinoid susceptibility (<75% mortality) are observed in most countries except Belarus, Lithuania, Denmark, France & Hungary. 36% of samples from Poland belonged in the lower susceptibiliyt catagories.

Pollen beetle populations with lower neonicotinoid susceptibility (94-50% mortality) are observed at slightly lower frequencies than the previous year. However the number of low susceptibility (<50% mortality) in Poland is much higher than in previous years.

OP susceptibility of pollen beetle populations in Europe 2015

1B IRAC MoA

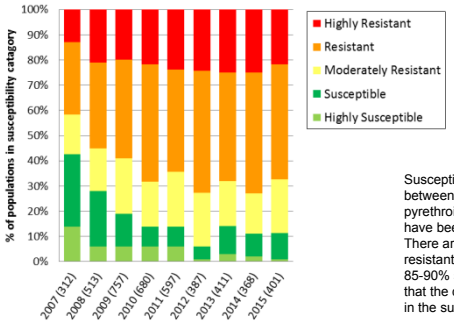


- IRAC method #25
- 0.3ug/cm² chlorpyriphos dose: ≤100 to 90% mortality: susceptible.
- 0.3ug/cm² chlorpyriphos dose: <90% mortality: potential to be tolerant

Pollen beetle populations (n=22) from five different European countries were tested without detecting any potential to be tolerant against organophosphates.

Changes in the pyrethroid susceptibility of pollen beetle populations in Europe 2007 - 2015

3A IRAC MoA



Susceptibility surveys conducted in Europe between 2007 & 2015 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.

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 both demonstrated high levels of pyrethroid sensitivity, but the data is not presented here due to the limited number of samples and relatively low importance of oilseed rape in those countries.
- In 2015 only 11% of pollen beetle populations 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) decreased from 21% to 8%, however there was an increase in the number of populations where less than 50% mortality was observed, with most samples originating from Poland.
- 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.
- 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.

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

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