IRAC

Insecticide Resistance Action Committee

IRAC Coleopteran Working Group

Pollen Beetle Resistance Monitoring 2014

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 2014 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).

2014 pyrethroid resistance monitoring: *Meligethes aeneus*

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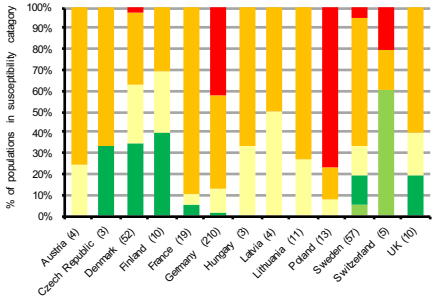

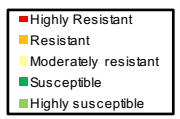

- IRAC method #11
- 0.075 & 0.015 ug/cm^2 lambda-cyhalothrin doses
- Scoring system based on mortality at both doses indicates susceptibility status.

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

2014 Neonicotinoid susceptibility monitoring: *Meligethes aeneus*

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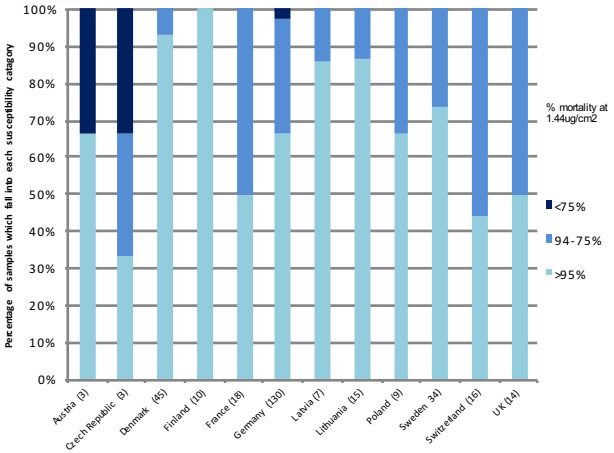

- IRAC method # 21
- 1.44ug/cm^2 thiacloprid dose: > 95% mortality indicates high susceptibility.

Pollen beetle populations with lower neonicotinoid susceptibility (<75% mortality) are observed in Austria, Germany and the Czech Republic .

2012-14 Neonicotinoid susceptibility monitoring: *Meligethes aeneus*

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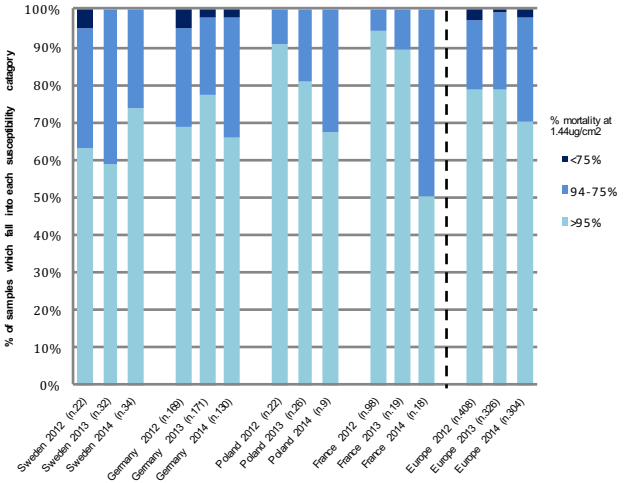

Pollen beetle populations with lower neonicotinoid susceptibility (94-75% mortality & <75% mortality catagories combined) are observed at slightly higher frequencies than previous years, with frequencies over or equal to 50% observed in the Czech Republic, France, Switzerland and the UK.

Changes in the pyrethroid susceptibility of pollen beetle populations in Europe 2007 - 2014

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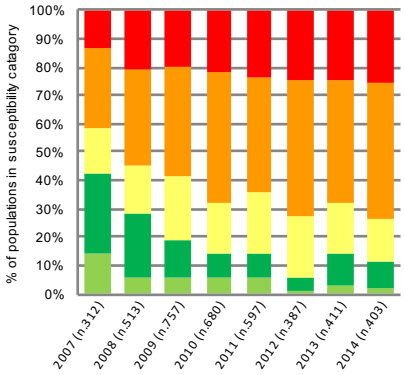

Susceptibility surveys conducted in Europe between 2007 & 2014 suggest that in general pyrethroid resistant populations of pollen beetle have been on the increase at least until 2010. There are suggestions that the proportion of resistant populations have stabilised at about 85% since then. However, 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).
- From the countries surveyed, it is only in Switzerland that susceptible populations dominate but sample size was considered too small to be representative of the overall country situation.
- During 2014, 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, however the percentage of populations with a lower sensitivity increased to 30% (21% in 2012 & 2013).
- 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 or indoxacarb 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. Participants are too numerous to name, but their contributions are very much appreciated.

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.

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