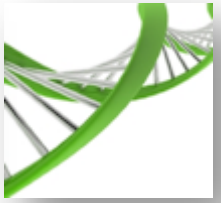
Insecticide Resistance Action Committee

IRAC Coleoptera WG

Review of activities in 2013




2012/13 Workgroup Members

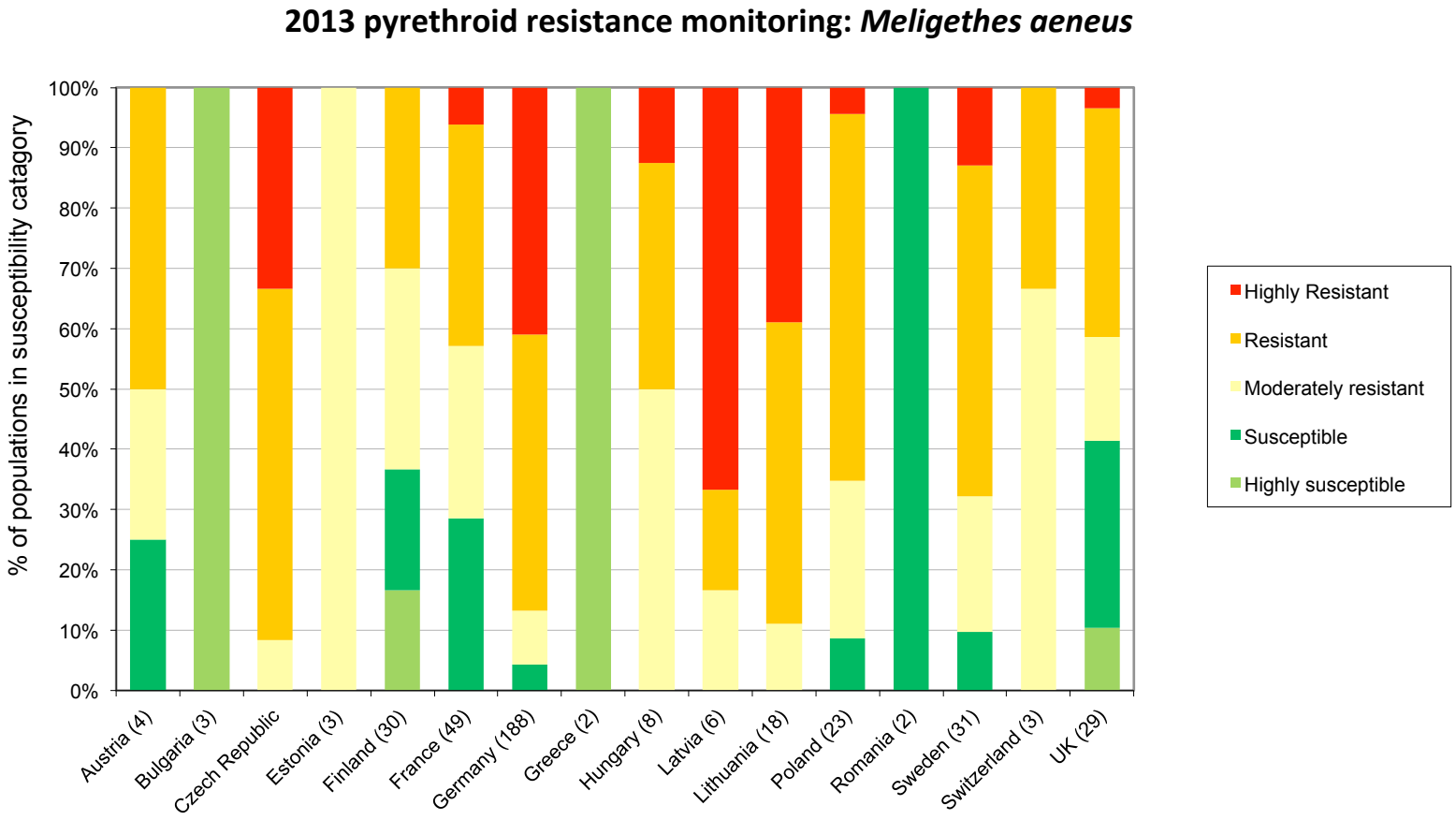
Current members

- **Gerald Huart, Makhteshim (chair)**
- **Russell Slater, Syngenta**
- **Anil Menon, BASF**
- **Ralf Nauen, Bayer CropScience**
- **Imre Mezei, DOW Agrosciences**
- **Magali Gravouil, DuPont**
- **Michel Sarazin, FMC**
- **Ben Bolton, NuFarm**
- **Udo Heimbach, JKI (Germany)**
- **Steve Ellis, ADAS (UK)**

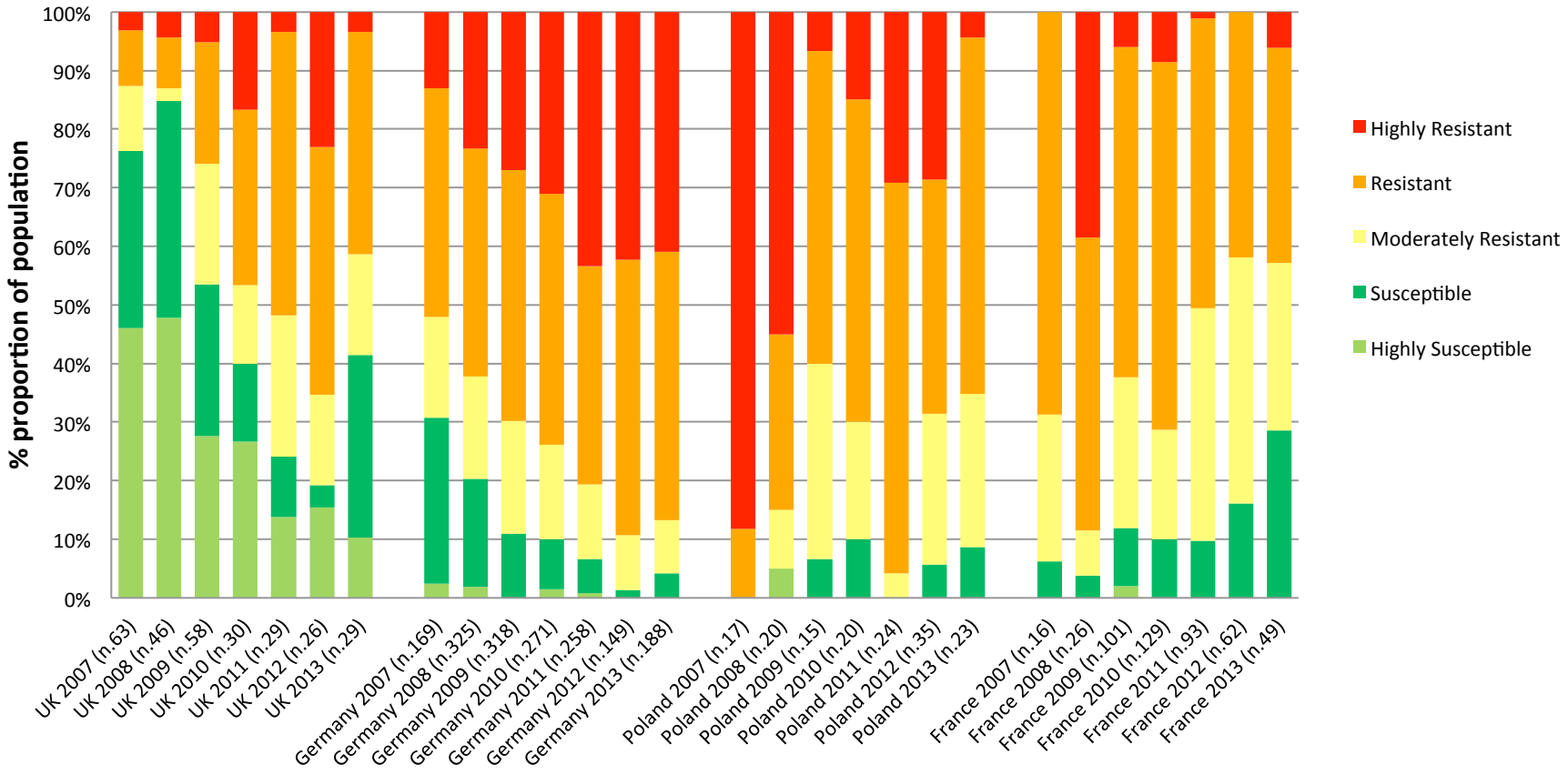
Objectives 2013/14

Goals	Objectives	Timeline
To expand the remit of the team to include prioritised activities against a wider range of coleoptera pests.	• To provide information (resistance monitoring, literature review, information posters, etc) on key coleopteran pests other than OSR pest species. • To encourage projects and information to be shared on other resistance concerns involving Coleopteran pests.	CPB Poster Q2, 2013 MOA poster Q4, 2013
To provide researchers, validated methods for measuring the susceptibility of coleopteran pests.	• To provide a draft method for assessing the insecticide sensitivity of CRW larvae and adults to a range of insecticides used for their control. • Update the IRAC n°25 on chlorpyrifos with regards to test kit storage	Larvae Q2, 2013 Adults Q4, 2013 Q1 2014
To provide summarised information to growers and influencers on control options and strategies for controlling key coleoptera pests.	• Review data generated by IRAC coleoptera team members on the neonicotinoid susceptibility of Apple Weevils in Europe.	Q4 2013
To co-ordinate oilseed rape coleoptera sensitivity monitoring in European oilseed rape crops, using validated methodologies.	• 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 2013 season. • In collaboration with IRAC methods team, provide a video methodology for all IRAC susceptibility monitoring bioassays targeting pollen beetle.	Q1, 2014 Q3, 2013
To provide oilseed rape pest sensitivity information to growers and regulators, so that informed decisions on oilseed rape pest control and resistance management can be made.	• Review and incorporate new learning's from OSR pest research, including 2013 resistance monitoring, into IRAC IRM recommendations for oilseed rape. • Provide summary poster of learning's from 2013 pollen beetle susceptibility monitoring. • Update summary poster of OSR pest resistance management recommendations.	Q1, 2014 Q1, 2014 Q2, 2014

2013 Pyrethroid resistance monitoring: Pollen Beetle

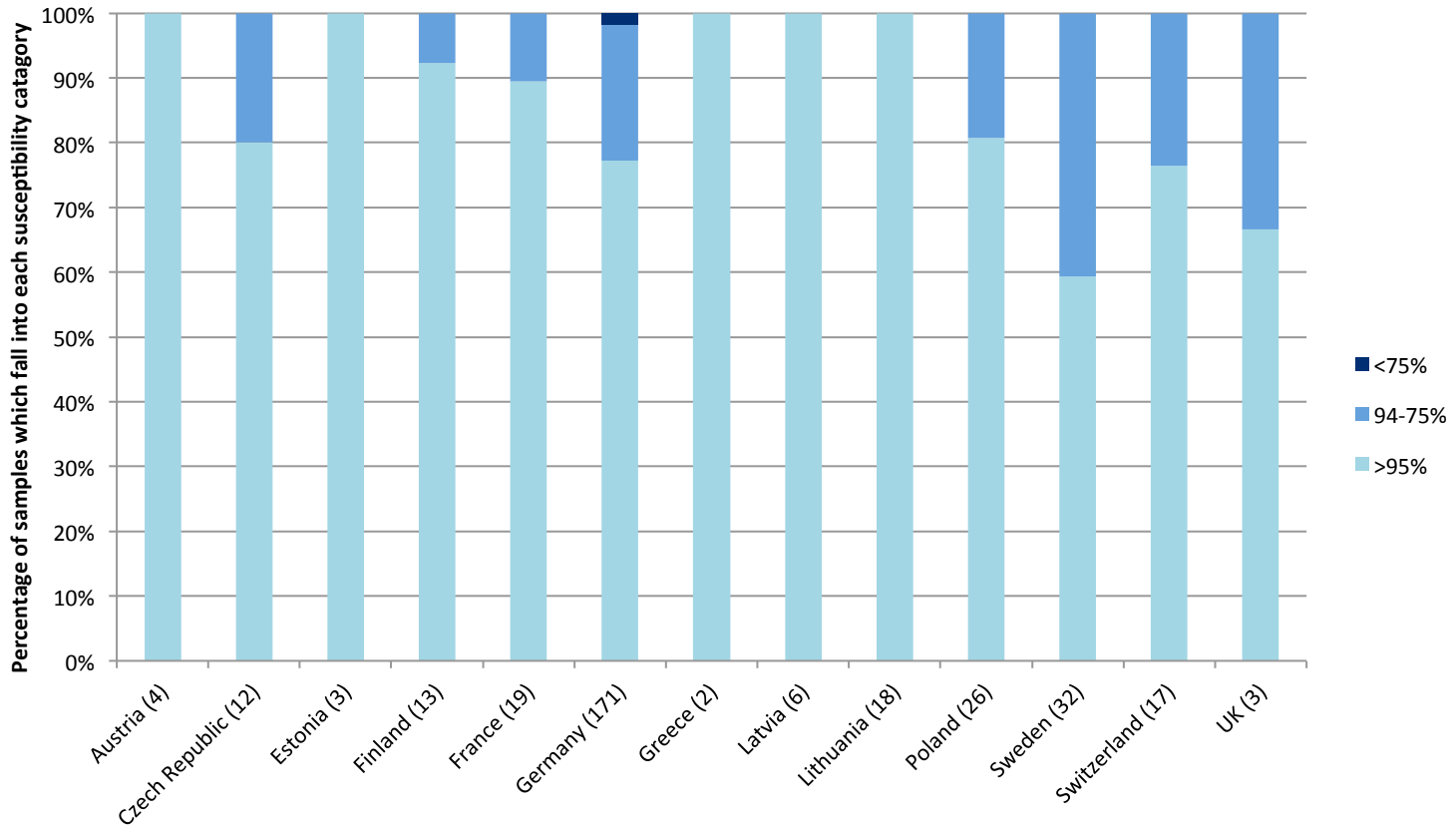


2007-2013 Pyrethroid resistance monitoring: Pollen Beetle



IRAC

2013 neonicotinoid susceptibility monitoring: Meligethes aeneus



Summary

- In the majority of countries surveyed, pyrethroid resistant populations of pollen beetle dominate (> 60% are resistant).
- 14% of pollen beetle populations surveyed in Europe can be classified as pyrethroid susceptible (2012= 7%).
- Across the UK, France, Germany and Poland there was evidence for an increase in the percentage of susceptible populations compared with 2012, with changes most noticeable in the UK and France.
- From the countries surveyed in Greece, Bulgaria, Romania, most populations were susceptible.
- The majority of populations tested across Europe remained susceptible to neonicotinoids, with only a small number of populations from Germany indicating a reduced susceptibility (<1% total samples).
- There was no evidence of changes in indoxacarb or organophosphate susceptibility observed in all 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 Coleopteran Working Group

Pollen Beetle Resistance Monitoring 2013

Insecticide Resistance Action Committee

www.irac-online.org

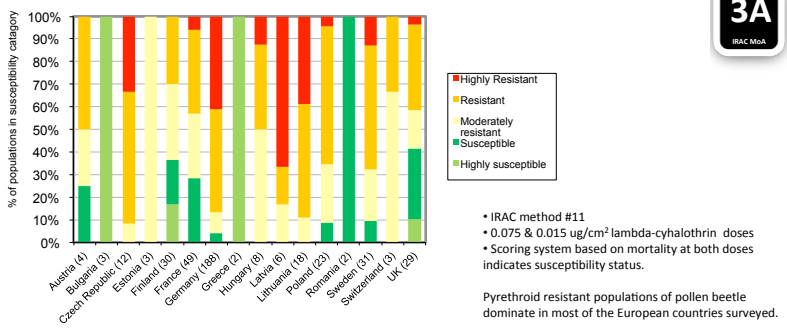
Introduction and Background

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, indoxacarb and organophosphate susceptibility is measured by the use of insecticide coated glass vial assays. Results of the 2013 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).

2013 pyrethroid resistance monitoring: *Meligethes aeneus*

3A IRAC MoA



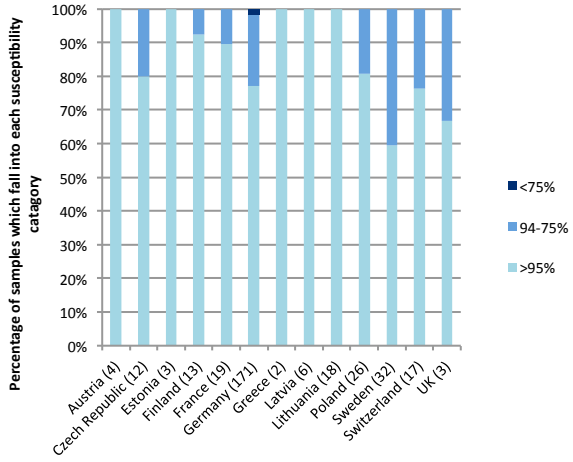
- IRAC method #11
- 0.075 & 0.015 ug/cm² lambda-cyhalothrin doses
- Scoring system based on mortality at both doses indicates susceptibility status.

Pyrethroid resistant populations of pollen beetle dominate in most of the European countries surveyed.

2013 neonicotinoid susceptibility monitoring: Meligethes aeneus

4A IRAC MoA

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



22A IRAC MoA 1B IRAC MoA

Indoxacarb & Organophosphate susceptibility

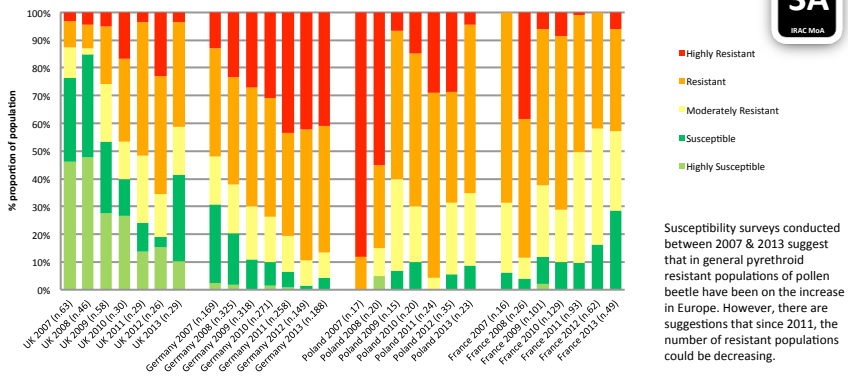
- IRAC method # 25 (Chlorpyrifos-ethyl)
- IRAC Method # 27 (Indoxacarb)

All European populations of pollen beetle tested were susceptible to both Indoxacarb and organophosphates based on the IRAC recommended discriminating dose.

Country	No. of populations tested	
	Indoxacarb	OP
United Kingdom	4	0
Czech Republic	0	1
France	7	9
Germany	30	1
Hungary	1	2
Poland	2	5
Greece	0	2
Sweden	1	0

Changes in the pyrethroid susceptibility of pollen beetle populations 2007 - 2013

3A IRAC MoA



Susceptibility surveys conducted between 2007 & 2013 suggest that in general pyrethroid resistant populations of pollen beetle have been on the increase in Europe. However, there are suggestions that since 2011, the number of resistant populations could be decreasing.

Summary & Recommendations

- In the majority of countries surveyed, pyrethroid resistant populations of pollen beetle dominate (> 60% are resistant).
- 14% of pollen beetle populations surveyed in Europe can be classified as pyrethroid susceptible (2012= 7%).
- Across the UK, France, Germany and Poland there was evidence for an increase in the percentage of susceptible populations compared with 2012, with changes most noticeable in the UK and France.
- From the countries surveyed in Greece, Bulgaria, Romania, most populations were susceptible.
- The majority of populations tested across Europe remained susceptible to neonicotinoids, with only a small number of populations from Germany indicating a reduced susceptibility (<1% total samples).
- There was no evidence of changes in indoxacarb or organophosphate susceptibility observed in all 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.

Version 1.0, Designed and produced by IRAC Coleopteran Working Group, February 2014, Photographs courtesy of Syngenta Crop Protection

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

CropLife INTERNATIONAL

Objectives 2014/15

Goals	Objectives	Timeline
To expand the remit of the team to include prioritised activities against a wider range of coleoptera pests.	• To provide information (resistance monitoring, literature review, information posters, etc) on key coleopteran pests other than OSR pest species. • To encourage projects and information to be shared on other resistance concerns involving Coleopteran pests.	CPB Poster Q4, 2014 MOA poster Q4, 2014
To provide researchers, validated methods for measuring the susceptibility of coleopteran pests.	• To finalise the insecticide sensitivity of CRW larvae and adults to a range of insecticides used for their control. • Update the IRAC n°27 on indoxacarb with regards to test kit storage	Larvae Q2, 2014 Adults Q2, 2014 Q4, 2014
To provide summarised information to growers and influencers on control options and strategies for controlling key coleoptera pests.	• To review current status on resistance flea beetle and seed weevil in European OSR • To produce a electronic version of a tri-fold which provides information on resistance, IRM advice and susceptibility monitoring assays for European oilseed rape pests.	Q4 2014 Q4 2014
To co-ordinate oilseed rape coleoptera sensitivity monitoring in European oilseed rape crops, using validated methodologies.	• 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 2013 season. • To Validate and publish IRAC test method on flea beetle and seed weevil	Q1, 2014 Q2, 2014
To provide oilseed rape pest sensitivity information to growers and regulators, so that informed decisions on oilseed rape pest control and resistance management can be made.	• Review and incorporate new learning's from OSR pest research, including 2014 resistance monitoring, into IRAC IRM recommendations for oilseed rape. • Provide summary poster of learning's from 2014 pollen beetle susceptibility monitoring. • Update summary poster of OSR pest resistance management recommendations. • Only after receiving the results on the 2014 PB monitoring, study from 2007 to 2014 the matching between the change the susceptibility of pollen beetle populations to pyrethroids and that of field practice in controlling PB. This could be done in UK, FR, DE and PL	Q4, 2014 Q4 2014 Q4, 2014 Q2-2015