Insecticide Resistance Action Committee

# IRAC Coleoptera WG

## Review of activities in 2012





# 2011/12 Workgroup Members

**Current members**

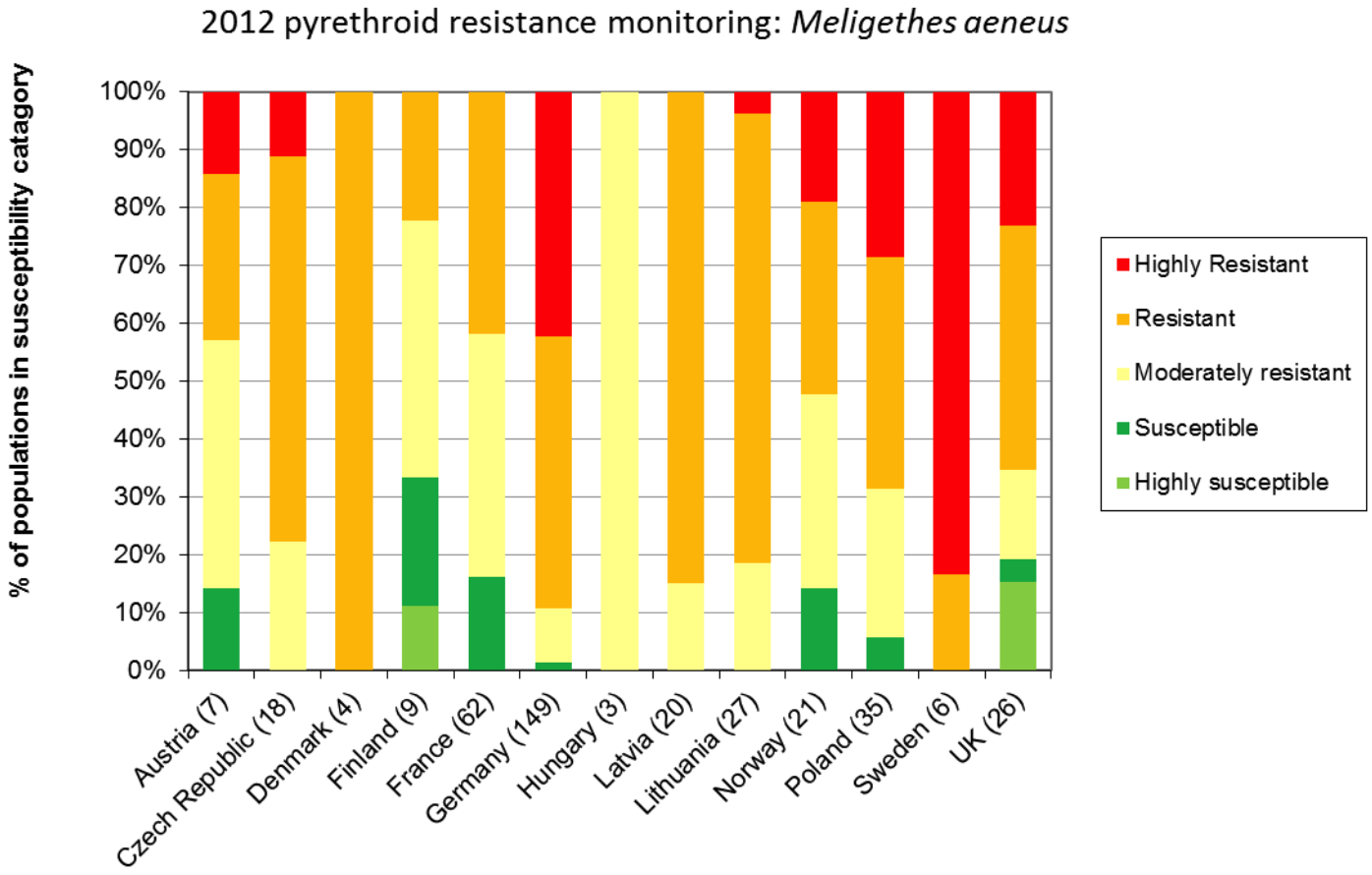
- **Russell Slater, Syngenta (chair)**
- **Gerald Huart, Makhteshim (deputy chair)**
- **Anil Menon, BASF**
- **Ralf Nauen, Bayer CropScience**
- **Matthias Haas, Bayer CropScience**
- **Imre Mezei, DOW Agrosciences (Replacing Chris Longhurst)**
- **Magali Gravouil, DuPont**
- **Michel Sarazin, FMC**
- **Jean Paul Genay, NuFarm**
- **Udo Heimbach, JKI (Germany)**
- **Steve Ellis, ADAS (UK)**

**Changes in WG leadership**
Proposal for either Gerald Huart or Ralf Nauen to become WG chair in 2013

# Objectives 2012/13

| 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.<br>• To encourage projects and information to be shared on other resistance concerns involving Coleopteran pests. | CPB Poster Q3, 2012<br>MOA poster Q4, 2012 |
| 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.<br>• Validate methodologies for testing susceptibility of *Psylliodes spp* and other OSR coleoptera to pyrethroids. | Larvae Q3, 2012<br>Adults Q4, 2012<br>Q4, 2012 |
| To provide summarised information to growers and influencers on available control options and strategies for controlling key coleoptera pests (posters, leaflets, etc). | • Review data generated by IRAC coleoptera team members on the neonicotinoid susceptibility of Apple Weevils in Europe. | Q4 2012 |
| 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 2012 season. | Q3, 2012 |
| 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 2011 resistance monitoring, into IRAC IRM recommendations for oilseed rape.<br>• Present findings at international conferences.<br>• Provide summary poster of learning's from 2012 pollen beetle susceptibility monitoring.<br>• Update summary poster of OSR pest resistance management recommendations. | Q2, 2012<br>Q2, 2012<br>Q2, 2013<br>Q2, 2012 |

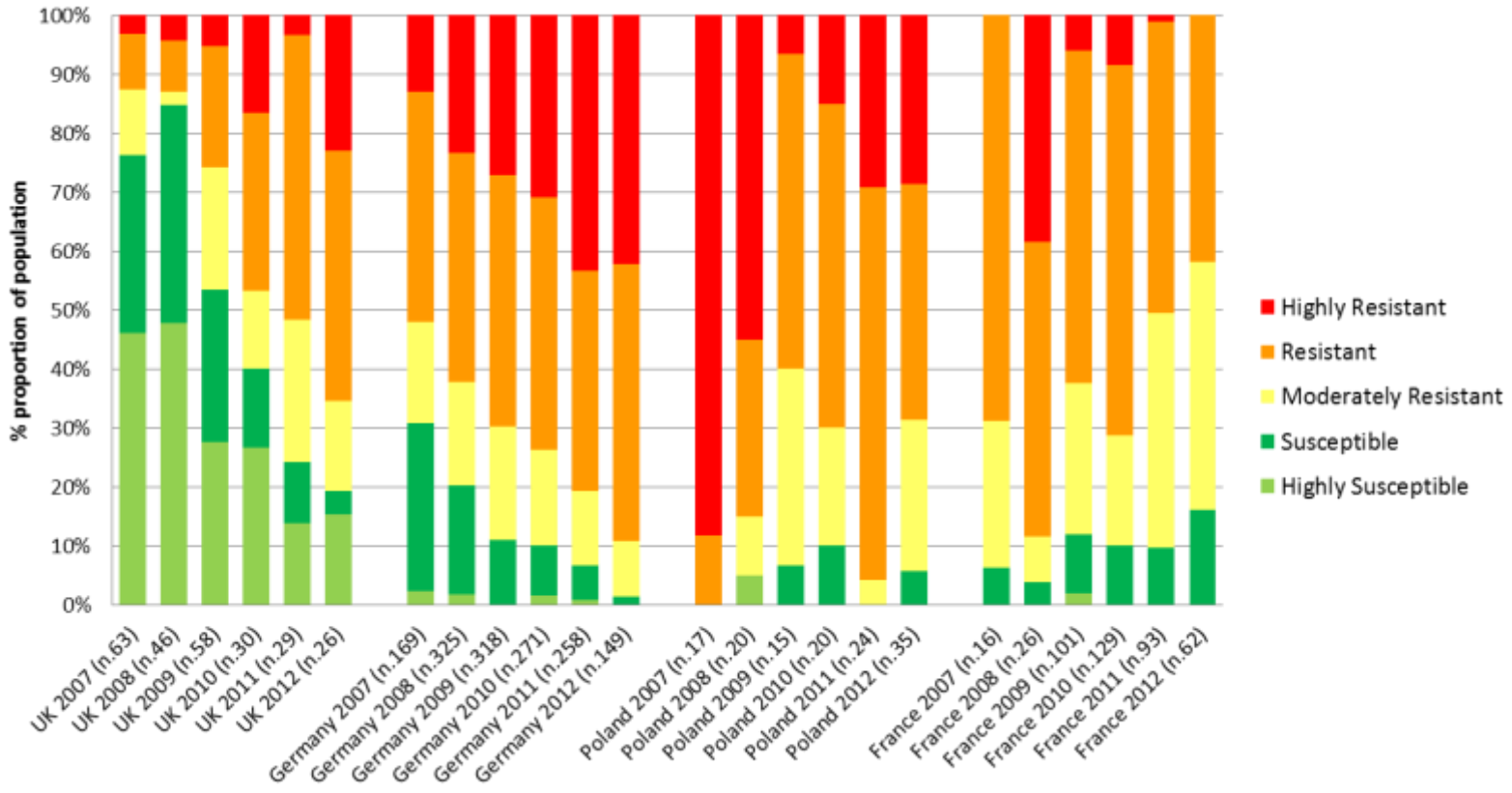
# 2012 Pyrethroid resistance monitoring: Pollen Beetle






IRAC

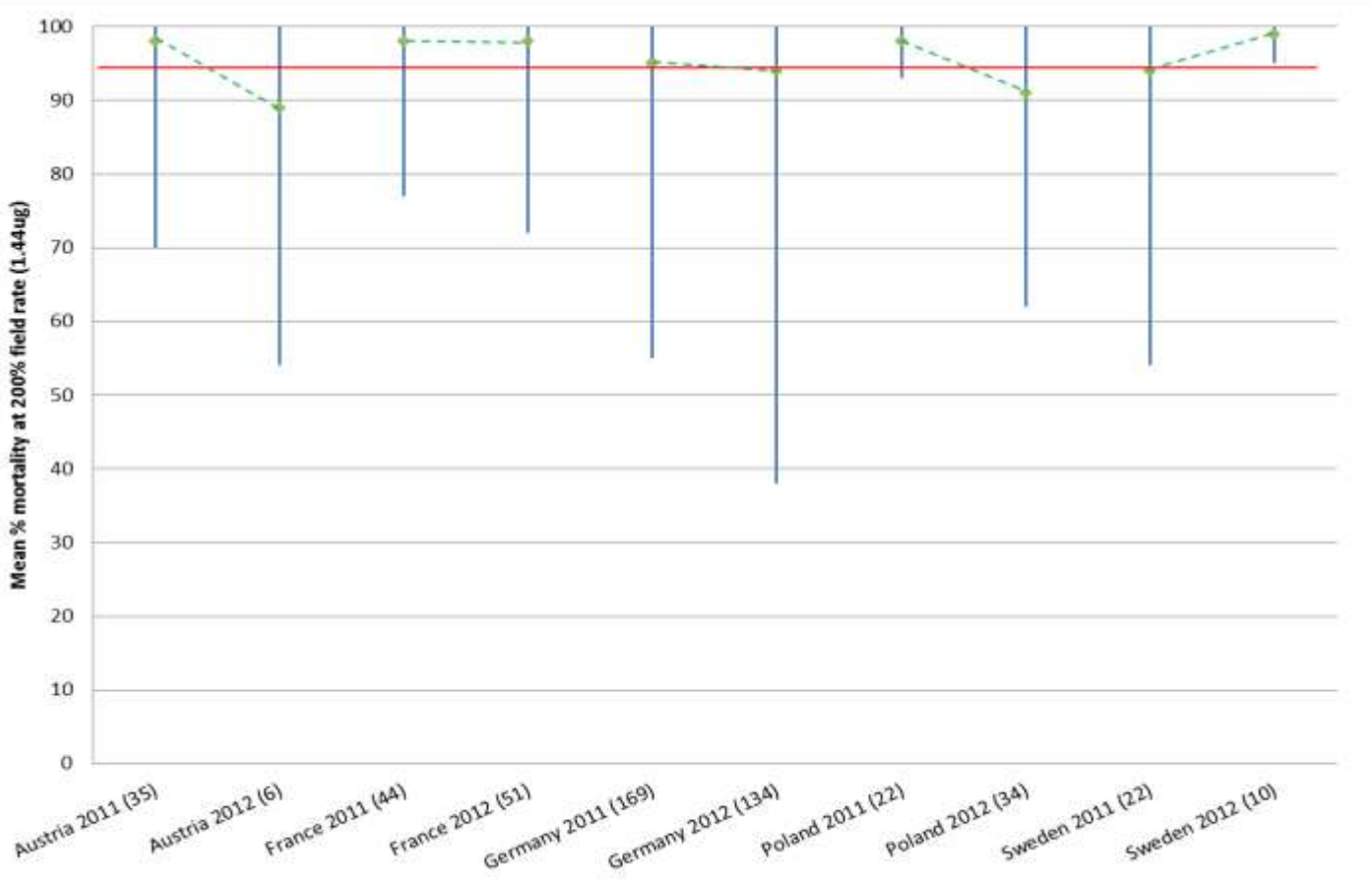
# 2007-2012 Pyrethroid resistance monitoring: Pollen Beetle






IRAC

# 2007-2012 Pyrethroid resistance monitoring: Pollen Beetle



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# Summary

- In all countries surveyed, pyrethroid resistant populations of pollen beetle dominate (> 60%).
- Only 7% of pollen beetle populations surveyed in Europe can be classified as pyrethroid susceptible.
- In Germany and the UK the number of pyrethroid-susceptible populations continue to decline and the percentage of the most resistant populations (Resistant + Highly Resistant) continues to increase.
- Large decreases in the percentage of susceptible populations of pollen beetle were also observed in the Czech Republic, Hungary and Norway when compared to 2011 levels.
- A slight decrease in the mean sensitivity of pollen beetles to neonicotinoids was observed in 6 out of 9 countries surveyed, when compared to 2011 data. Monitoring of neonicotinoid susceptibility will continue in subsequent years in order to observe year to year variability.
- There was no evidence of changes in indoxacarb or organophosphate susceptibility observed in all countries surveyed.

# Other activities

- Method development and neonicotinoid resistance monitoring for Apple Weevil (*Anthonomus pomorum*).
- Corn Rootworm (Diabrotica spp.) larval bioassay method proposed and under review.
- Video of  pollen beetle susceptibility monitoring bioassays (PYR, NNI, INDO, OP) planned with IRAC Methods WG (Q2, 2013).
- Update of OSR pest resistance references.
- Investigation into possible reports of pyrethroid efficacy problems when applied against Phyllotreta Striolata in Canadian OSR (Sorry ...Canola)
- Investigate possible method development/information package for Rice Water Weevil & Cereal Leaf Beetle.

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Insecticide Resistance Action Committee

## IRAC Coleopteran Working Group

# Pollen Beetle Resistance Monitoring 2012

www.irac-online.org

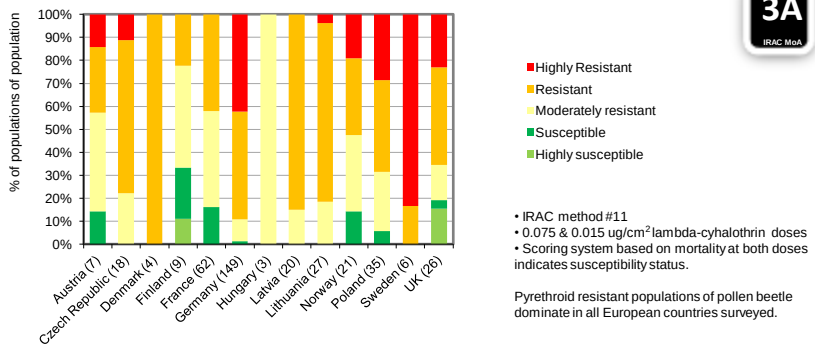
## Introduction and Background

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 2012 susceptibility monitoring program are presented in this poster. More details of the methods used in this survey can be found on the IRAC website

### 2012 pyrethroid resistance monitoring: *Meligethes aeneus*

3A IRAC MoA

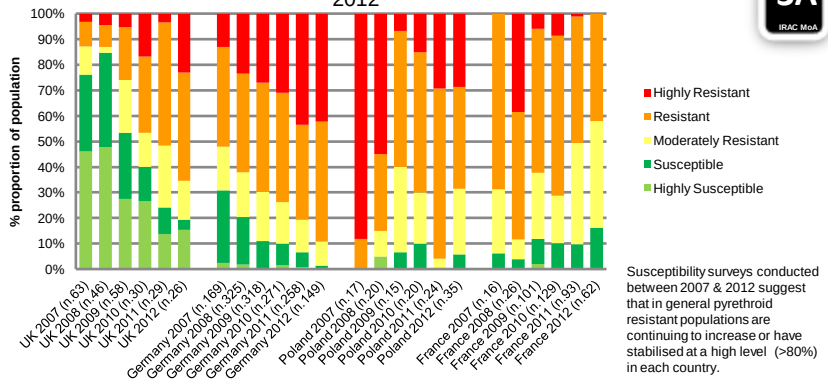



- IRAC method #11
- 0.075 & 0.015 ug/cm$^2$ lambda-cyhalothrin doses
- Scoring system based on mortality at both doses indicates susceptibility status.

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

### Changes in the pyrethroid susceptibility of pollen beetle populations 2007 - 2012

3A IRAC MoA

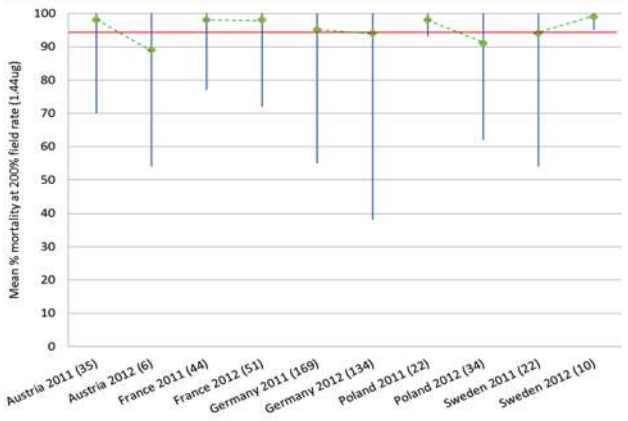



Susceptibility surveys conducted between 2007 & 2012 suggest that in general pyrethroid resistant populations are continuing to increase or have stabilised at a high level (>80%) in each country.

### Neonicotinoid susceptibility

4A IRAC MoA

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




Most pollen beetle populations tested were susceptible to neonicotinoids, but a slight reduction in the mean percentage mortality (green diamond) and an increase in the variation between populations were observed. Neonicotinoid susceptibility will continue to be monitored in the following years.

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 |
| Austria | 0 | 3 |
| Czech Republic | 0 | 2 |
| France | 0 | 9 |
| Germany | 10 | 8 |
| Hungary | 0 | 3 |
| Poland | 0 | 2 |
| United Kingdom | 0 | 1 |

## Summary & Recommendations

- In all countries surveyed, pyrethroid resistant populations of pollen beetle dominate (> 60%).
- Only 7% of pollen beetle populations surveyed in Europe can be classified as pyrethroid susceptible.
- In Germany and the UK the number of pyrethroid-susceptible populations continue to decline and the percentage of the most resistant populations (Resistant + Highly Resistant) continues to increase.
- Large decreases in the percentage of susceptible populations of pollen beetle were also observed in the Czech Republic, Hungary and Norway when compared to 2011 levels (data not shown in poster).
- A slight decrease in the mean sensitivity of pollen beetles to neonicotinoids was observed in 6 out of 9 countries surveyed, when compared to 2011 data. Monitoring of neonicotinoid susceptibility will continue in subsequent years in order to observe year to year variability (Not all data shown).
- 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, January 2013, Photographs courtesy of Syngenta Crop Protection

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

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| 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. | Larvae Q2, 2013<br>Adults Q4, 2013 |
| 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.<br>• In collaboration with IRAC methods team, provide a video methodology for all IRAC susceptibility monitoring bioassays targeting pollen beetle. | Q1, 2014<br>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.<br>• Provide summary poster of learning's from 2013 pollen beetle susceptibility monitoring.<br>• Update summary poster of OSR pest resistance management recommendations. | Q1, 2014<br>Q1, 2014<br>Q2, 2014 |