The Food & Environment Research Agency

# Methodologies used for Pesticide Usage Surveys and their Potential for Monitoring Plant Pests

Pesticide Usage Survey Team

Food & Environment Research Agency

Sand Hutton, York

http://pusstats.fera.defra.gov.uk/

# Pesticide Usage Surveys - Overview

- Surveys started in 1965 over concerns of organochlorine usage
- Small team - 3 field surveyors; 2 office based staff
- All surveys are voluntary
- The surveys have over 90% uptake
- The surveys are currently funded by the Chemicals Regulation Directorate

# Aims of the Surveys - Policy

- Complying with the requirements of EU Statistics Regulation (1185/2009/EC)
- Informing the pesticide risk (approval) process
- Targeting pesticide monitoring programs
- Providing indicators for the Pesticide Forum and others

# Aims of the Surveys – Other uses

- Responding to queries from Government, industry and members of the public
- Providing base data for research
- Provision of data for training/teaching programs to improve pesticide practice on farms
- Web-based publication of reports and pesticide usage statistics

# PUS Surveys – Key Requirements

- National cropping statistics and grower database
- Stratified sampling methodology
- Effective statistical evaluation
- Well designed forms, instructions & relational databases
- Experienced and trained staff

# National Cropping Statistics

- Defra June Survey team collects information on the type of crops and the areas of each grown on a holding
- Spatial information on the location of a farm is recorded
- Address details for each holding are also recorded

# Stratified Sampling Methodology

- Frequency distributions are requested from the June Survey team which show the area of selected crops and the number of farms within each region
- Farms are allocated to one of five size groups with 20% of the area grown in each
- Representative samples are selected with the number of sampled farms being proportional to the area grown in each region and size group

# Making National Estimates

- The sample selection procedure is reversed in order to make national estimates
- Using three factors the sampled area of crops are multiplied (raised) to:
  - The overall area of sampled crops in each region & size group
  - The regional area of specific crops
  - The national area of specific crops

# PUS Surveys – Data collected

- All usage - conventional pesticides; biopesticides & biocontrol organisms
- Dates and methods of application
- Reasons for application
- Use of crop covers & growing media (selected surveys)

The Food & Environment Research Agency

# Range of surveys conducted by the UK PUS teams

| Surveyed Crops | Number of Farms | % Area Grown |
|---|---|---|
| | | |
| Arable | 1,736 | 6 |
| Grassland & Fodder | 675 | 9 |
| Edible Protected | 258 | 48 |
| Outdoor Vegetables | 637 | 35 |
| Soft Fruit | 325 | 45 |
| Orchards | 314 | 44 |

# Use of pesticides on dessert apples - 2012

| Active substance | Area treated (ha) | Weight applied (kg) |
|---|---|---|
| | | |
| Captan | 35,134 | 50,521 |
| Myclobutanil | 22,799 | 1,296 |
| Penconazole | 14,329 | 542 |
| Dithianon | 10,879 | 6,357 |
| Pyrimethanil | 9,467 | 2,802 |
| Copper oxychloride | 9,324 | 6,381 |
| Gibberellins | 6,872 | 18 |
| Urea | 6,555 | 10,908 |
| Chlorpyrifos | 6,156 | 4,194 |
| Boscalid/pyraclostrobin | 5,872 | 1,757 |

# Use of insecticide active substances on dessert apples - 2012

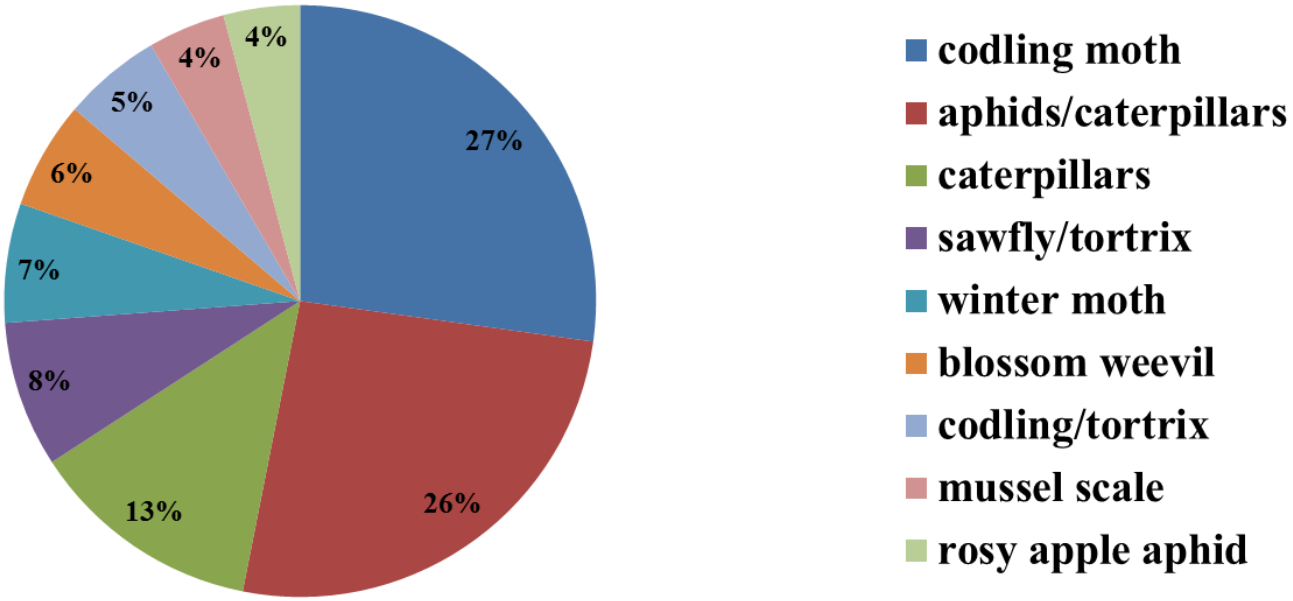
| Active substance | Area treated (ha) | Weight applied (kg) |
|---|---|---|
| | | |
| Chlorpyrifos | 6,156 | 4,194 |
| Chlorantraniliprole | 3,028 | 106 |
| Thiacloprid | 2,672 | 370 |
| Flonicamid | 2,591 | 182 |
| Indoxacarb | 1,589 | 112 |
| Fenoxycarb | 1,456 | 155 |
| Methoxyfenozide | 1,411 | 152 |
| Pirimicarb | 823 | 227 |
| Cypermethrin | 758 | 20 |
| Pyrethrins | 246 | 13 |

# Regional use of chlorpyrifos on dessert apples - 2012

| County/district | Area treated (ha) | Weight applied (kg) |
|---|---|---|
| | | |
| Kent | 5,081 | 3,533 |
| H&W | 467 | 247 |
| E.Sussex | 164 | 118 |
| Cambs | 140 | 93 |
| Suffolk | 86 | 72 |
| Essex | 68 | 49 |
| Gloucs | 59 | 46 |
| Dorset | 38 | 11 |
| Norfolk | 22 | 11 |
| Notts | 21 | 10 |

The Food & Environment Research Agency

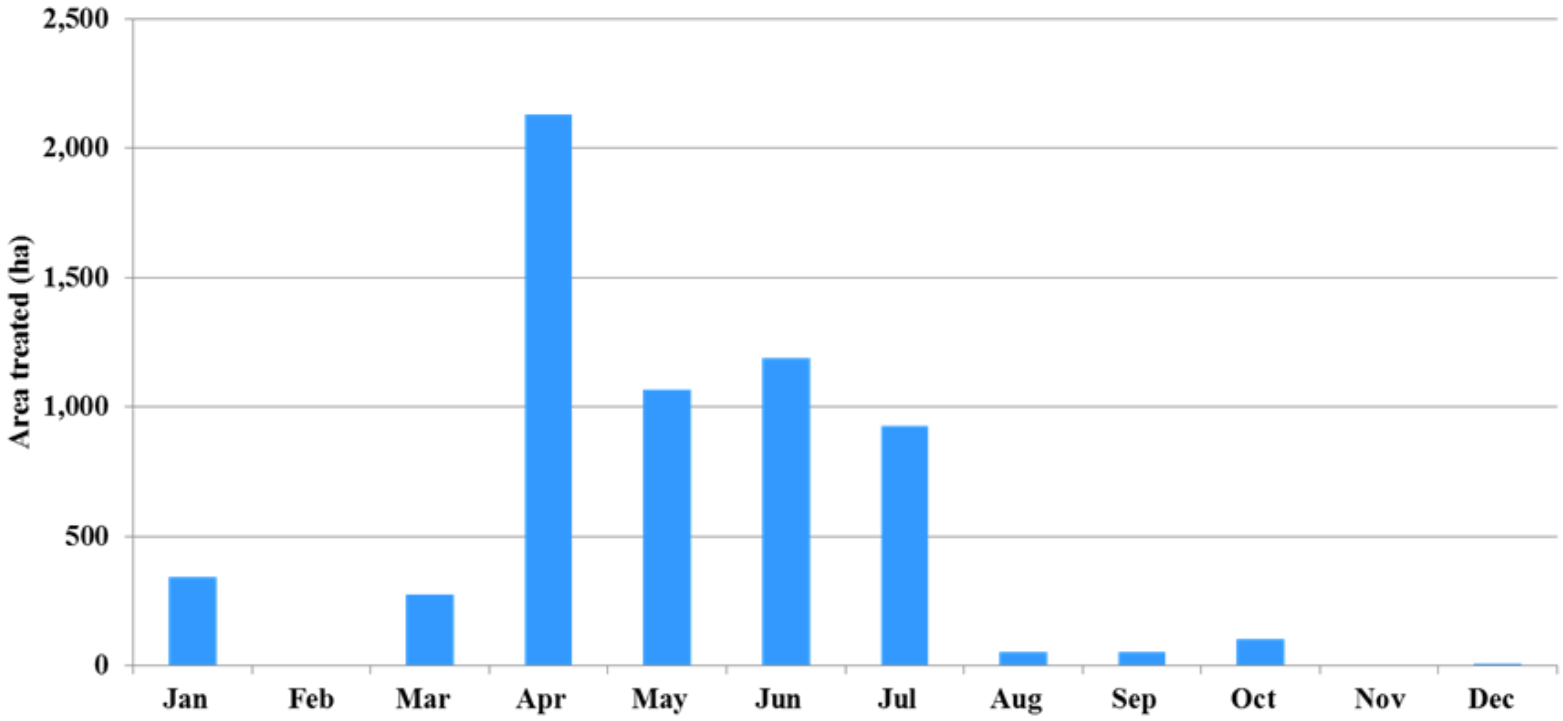
# Reasons for the use of chlorpyrifos on dessert apples - 2012



The Food & Environment Research Agency

100 YEARS OF 1914 fera 2014 SCIENCE SOLUTIONS

# Timing of chlorpyrifos applications made to dessert apples - 2012



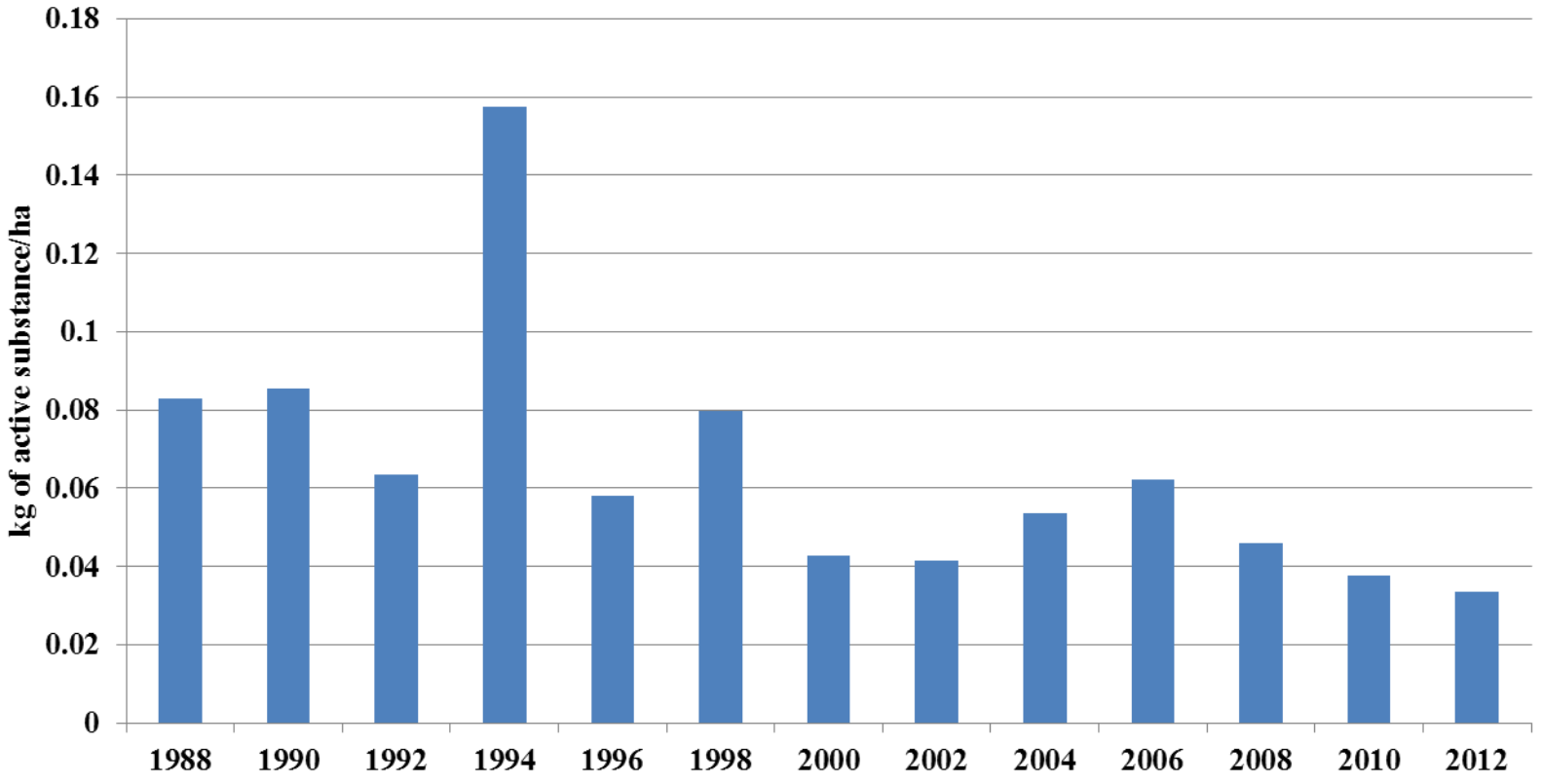
The Food & Environment Research Agency

# Use of biocontrol & biopesticides in orchard crops - 2012

| Species or active substance | Area treated (ha) | Average number of applications |
|---|---|---|
| | | |
| *Bacillus thuringiensis var. kurstaki* | 495 | 2 |
| *Cydia pomonella* granulovirus | 373 | 2 |
| (E,E)-8,10-dodecadien-1-ol | 144 | 2 |
| | | |
| *Phytoseiulus persimilis* | 93 | 2 |
| *Anthocoris spp.* | 90 | 1 |

The Food & Environment Research Agency

# Changes in the use of insecticides on cereal crops since 1988



The Food & Environment Research Agency

100 YEARS OF 1914 fera 2014 SCIENCE SOLUTIONS

# Chlorpyrifos – “Say No to Drift” Campaign

The Food & Environment Research Agency

# Use of Low-Drift nozzles for Chlorpyrifos application

| | 2011 | 2012 | 2013 (future use) |
|---|---|---|---|
| Orchards | 8% | 76% | 85% |
| Soft Fruit | 6% | 37% | 55% |

The Food & Environment Research Agency

# Potential issues of drifting dust at the time of crop drilling

# EFSA study on non-dietary operator exposure – CT/EFSA/PPR/2010

| Type of Data | Number Sampled |
|---|---|
| | |
| Farms | 428 (6 countries) |
| Fields | 1,201 (18,344 ha) |
| Sprayers | 749 |
| Spray Operators | 581 |
| Workers | 481 |

# Data Entry & Data Retrieval (1)

- PUS surveys currently use Informix Relational databases with character based data entry screens
- These have been used since the late 1980's
- Incorporates a range of look-up tables for registered pesticides; approval status; crops; crop growth stages; methods of application etc.

# Data Entry & Data Retrieval (2)

- Future PUS surveys will use web-based data entry screens on a MySQL platform
- Web-based data entry screens have been used for:
  - CT/EFSA/PPR/2010
  - CFT/EFSA/PRAS/2012/05
- Up to 7 EU countries have entered their data via password protected data entry screens

The Food & Environment Research Agency

100 YEARS OF 1914 fera 2014 SCIENCE SOLUTIONS

# Thank You