



# Spotted Wing Drosophila - a 2015 season update and a look forward to 2016



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Alison Dolan and Gaynor Malloch

# *Drosophila suzukii* – spotted wing *drosophila* (SWD)

- Vinegar fly native to Asia - damaging to a wide range of soft and stone fruit giving rise to collapse and juice leakage
- First described in Japan in 1916, then USA first report in Europe 2008, first recording in UK 2012 (Scotland 2014)
- The serrated ovipositor of the female causes physical damage to the host fruit and provides a wound which can be accessed by other insects and pathogens including fungi and bacteria



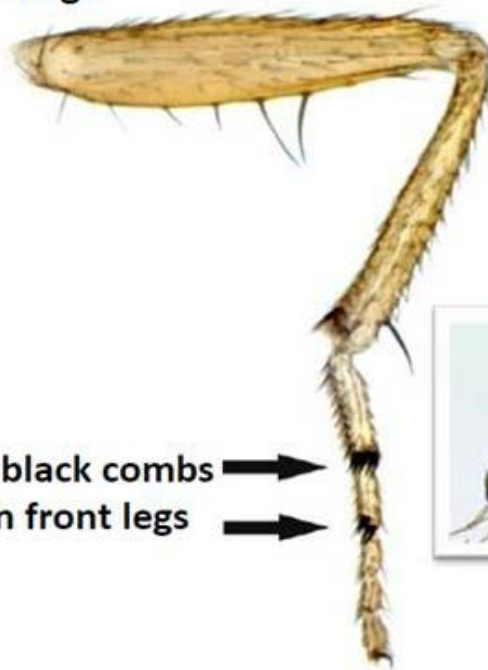
Martin Hauser, CDFA

# SWD Identification – key characters

**Male**



Black spot  
on wings



2 black combs  
on front legs



**Female**



She inserts saw-like device  
(ovipositor) into fruits and  
lays eggs



## SWD – biology



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- Female lays eggs in healthy ripening fruit (up to 500 in lifetime)
- Development from egg to adult 8-25 days
- Can survive cool temperatures and high humidity.
- Active flyer – can travel up to several Km
- Also travels in imported fruit





# National monitoring project



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## Project funded from 2013 - 2017 involving EMR, NRI and the James Hutton Institute

- Traps, bait and synthetic lures
- Habitat studies and looking at wild hosts
- Time of activity for egg laying and crop preferences
- Crop Protection Products
  
- Monitoring catches at growers sites
- Waste handling and disposal
- Flotation test for detecting larvae





# National monitoring sites 2014



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## Region and crops

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### South East England (46 traps)

Farm 1	Raspberry, strawberry
Farm 2	Raspberry, strawberry
Farm 3	Cherry
Farm 4	Raspberry, strawberry
Farm 5	Blackcurrant, cherry, raspberry, strawberry
Farm 6	Blueberry, redcurrant, strawberry

### Eastern England (20 traps)

Farm 7	Blueberry, raspberry, strawberry
Farm 8	Raspberry, strawberry

### West Midlands (27 traps)

Farm 9	Blackberry, blackcurrant, blueberry, raspberry, redcurrant, strawberry
Farm 10	Blueberry, cherry, raspberry, strawberry
Farm 15	Cherry, raspberry

### Scotland (40 traps)

Farm 11	Blackcurrant, blueberry, raspberry, strawberry
Farm 12	Blueberry, cherry, redcurrant, strawberry
Farm 13	Blackberry, blueberry, raspberry, strawberry
Farm 14	Blackberry, blueberry, raspberry, strawberry

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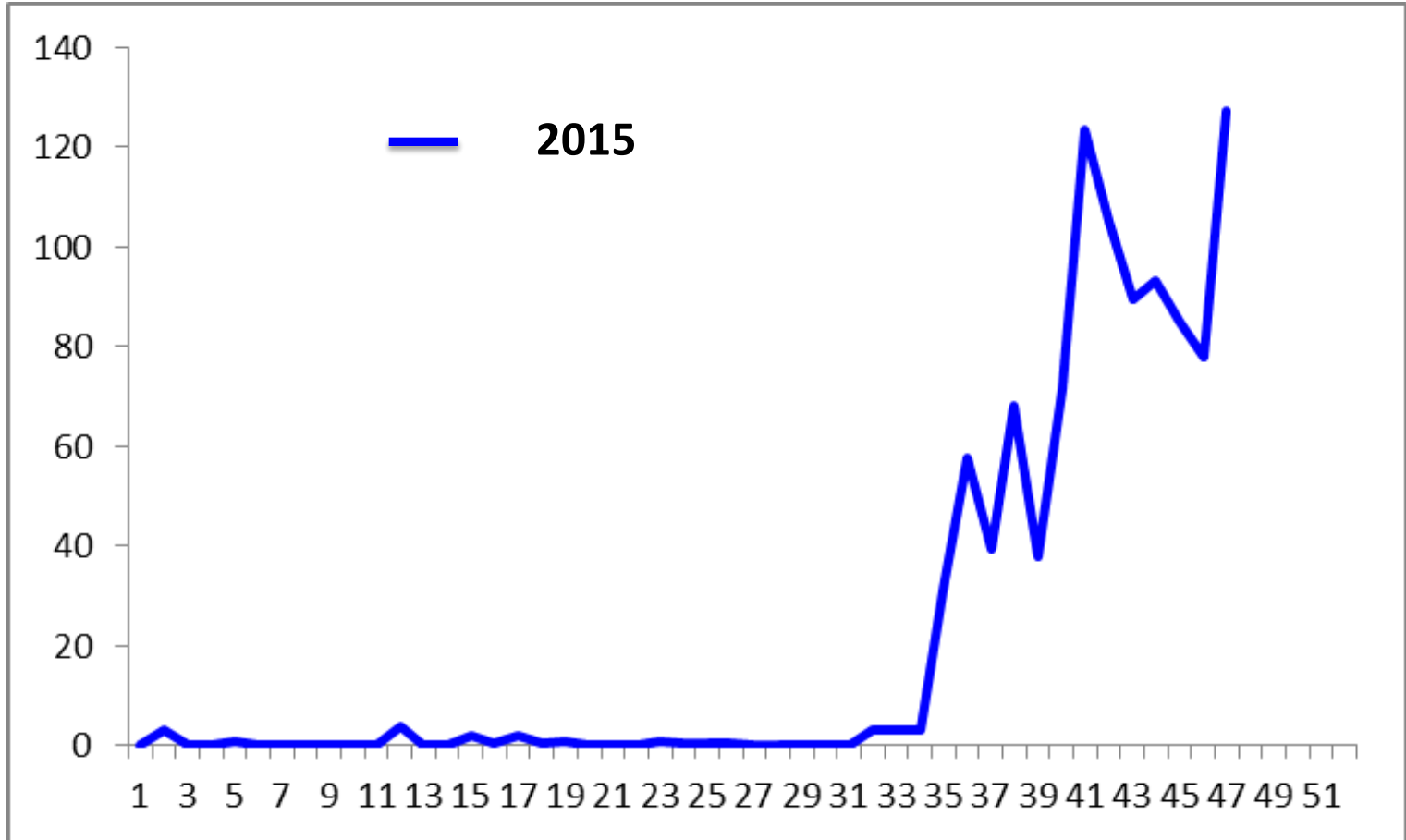


# Total number of SWD caught at 4 monitoring sites in Scotland



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Total  
number of  
SWD  
collected  
in traps

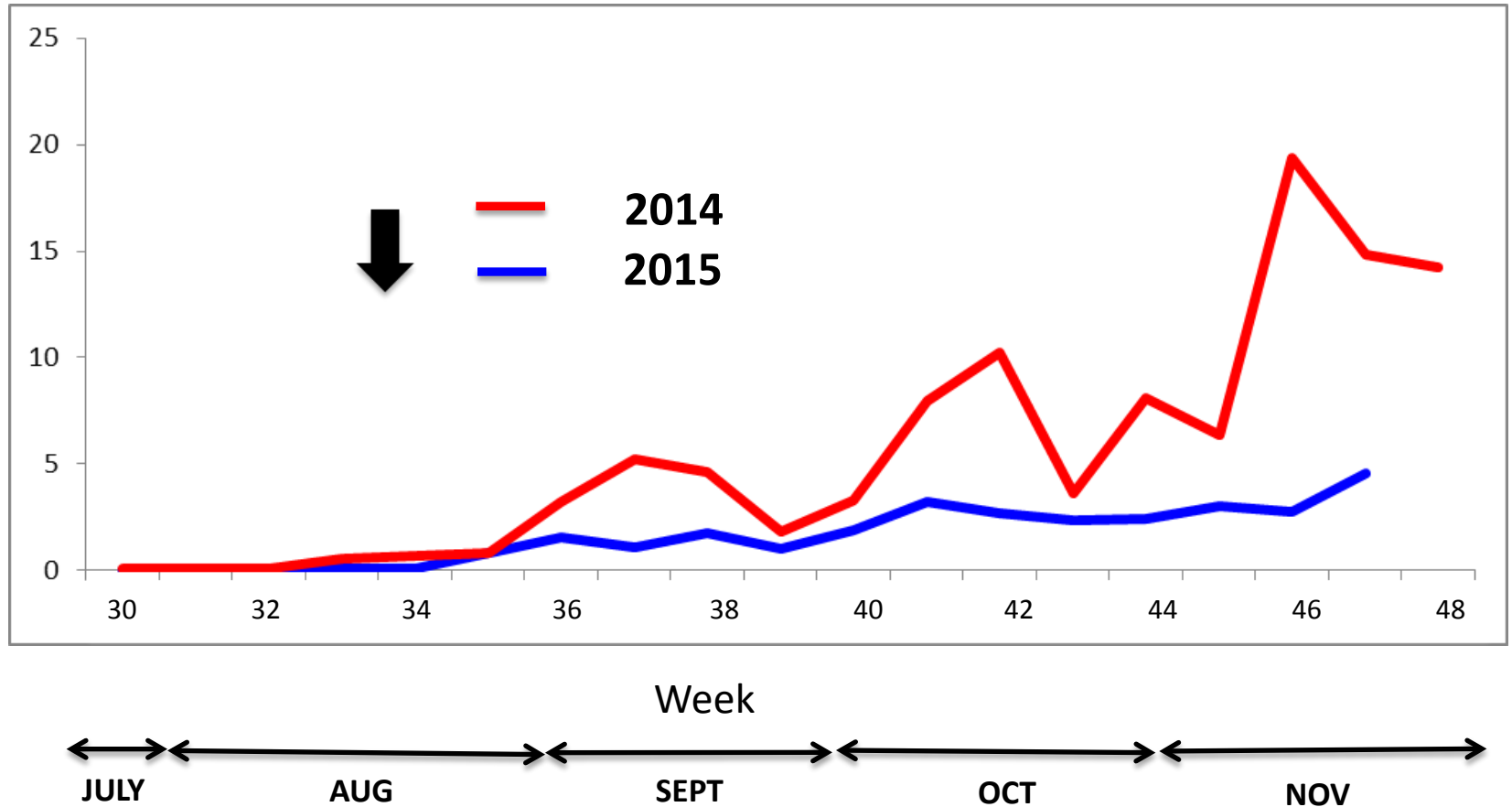


Week

↑  
End of July



# How do the number of SWD trapped in Scotland in 2015 compare to the number trapped in 2014?





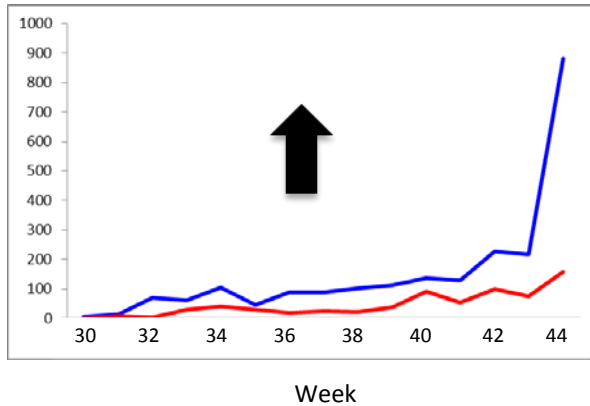


# How do the SWD numbers in 2015 compare to those in 2014 at the other UK monitoring sites?



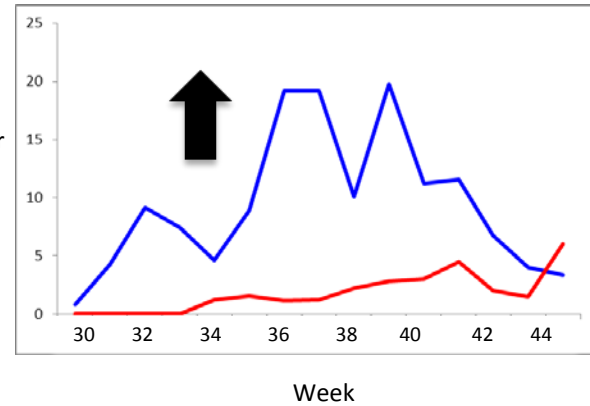
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Average number of SWD per trap



**S. East England**

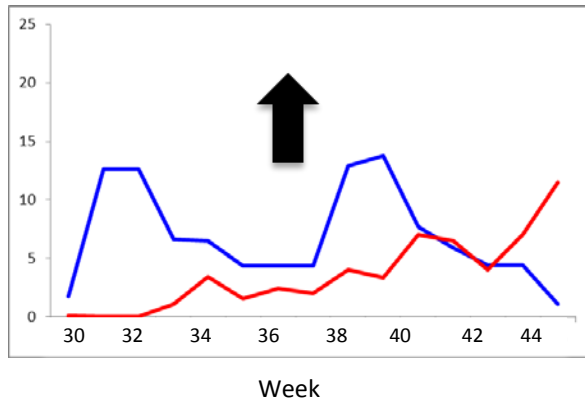
Average number of SWD per trap



**W. Midlands**

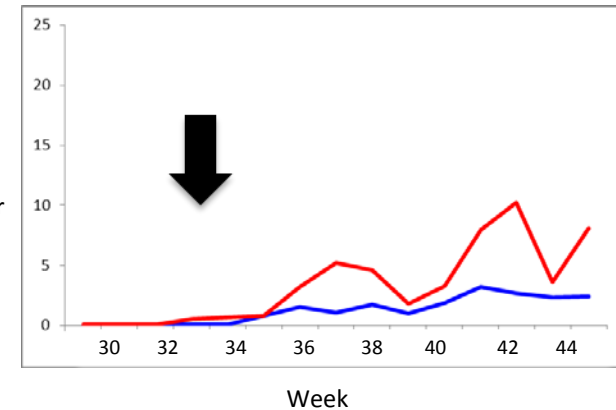
— 2014  
— 2015

Average number of SWD per trap



**East England**

Average number of SWD per trap



**Scotland**

## Possible reasons for the decrease in number of SWD caught at some of the Scottish monitoring sites

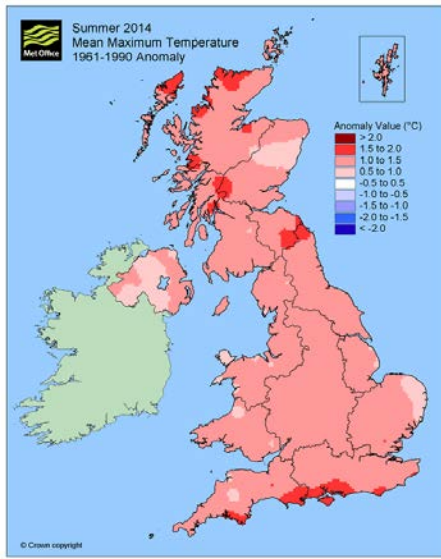
- Problems with inconsistent data collection
- Improved crop management /control strategies
- Improved waste management and disposal



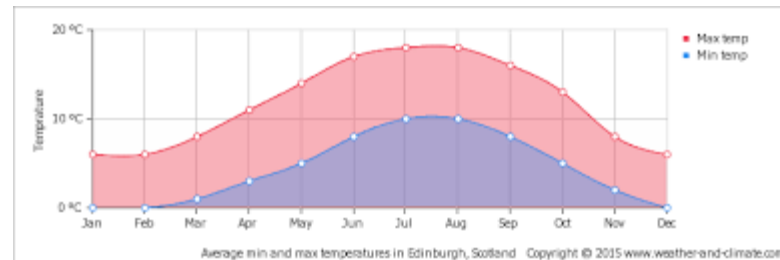
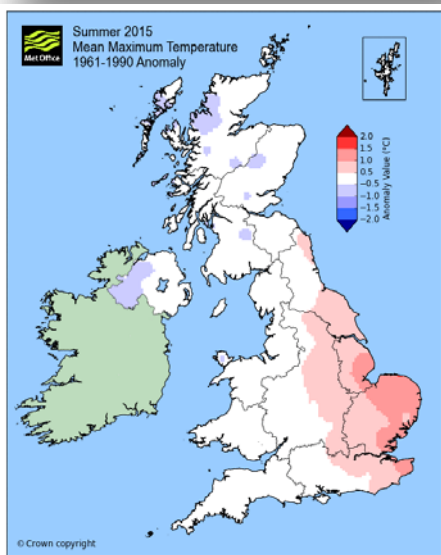
- Cooler summer in Scotland in 2015

# UK Climate Anomaly Maps-Relative to 1961-1990 Average

**Warm summer in 2014**



**Cool / average summer in 2015**



**Average  
summer  
temp in  
Edinburgh  
15-17 °C**

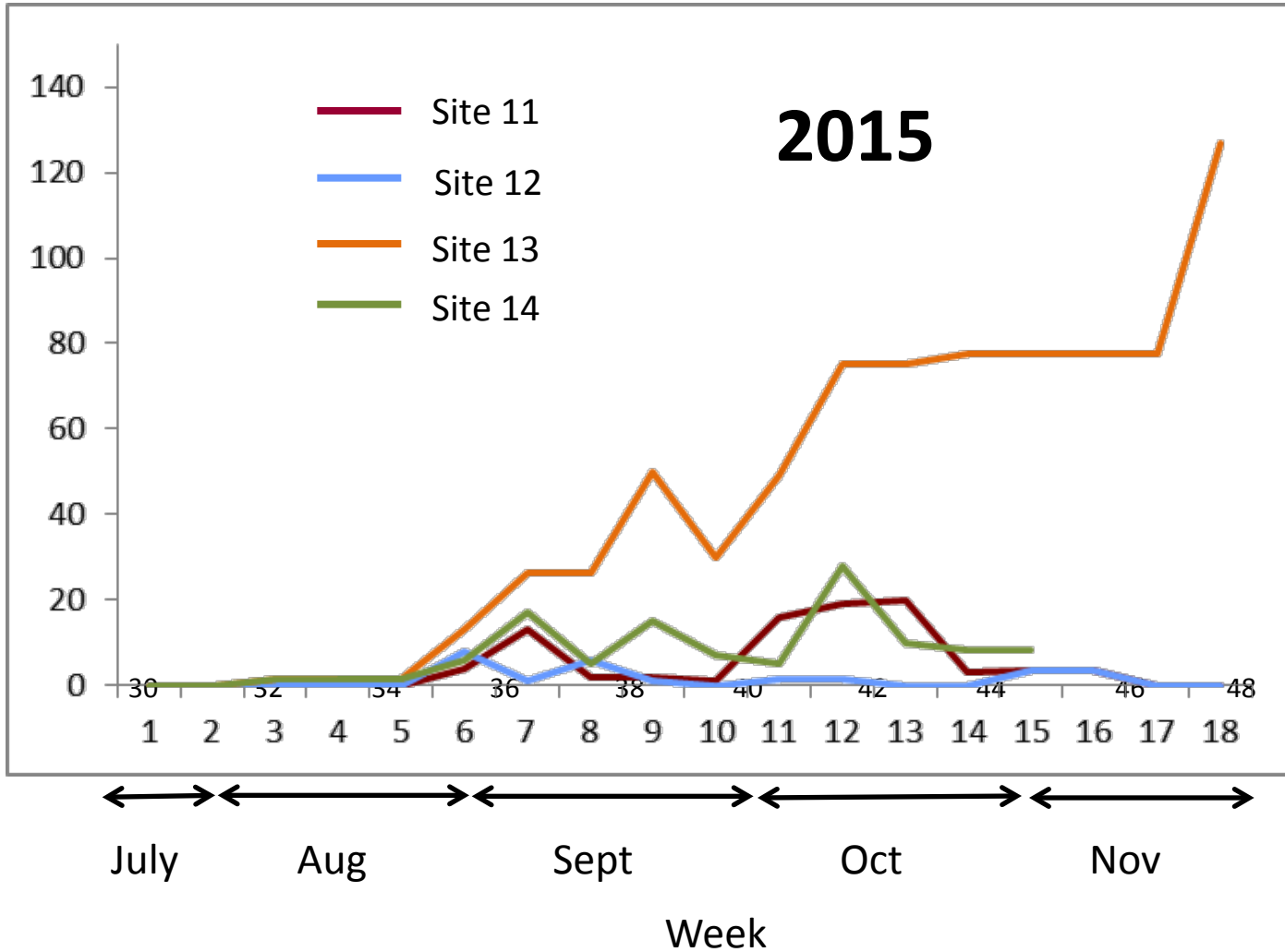
At 25°C one generation every 8-10 days

At 15°C one generation every 21-25 days



# Total number of SWD caught at 4 monitoring sites in Scotland

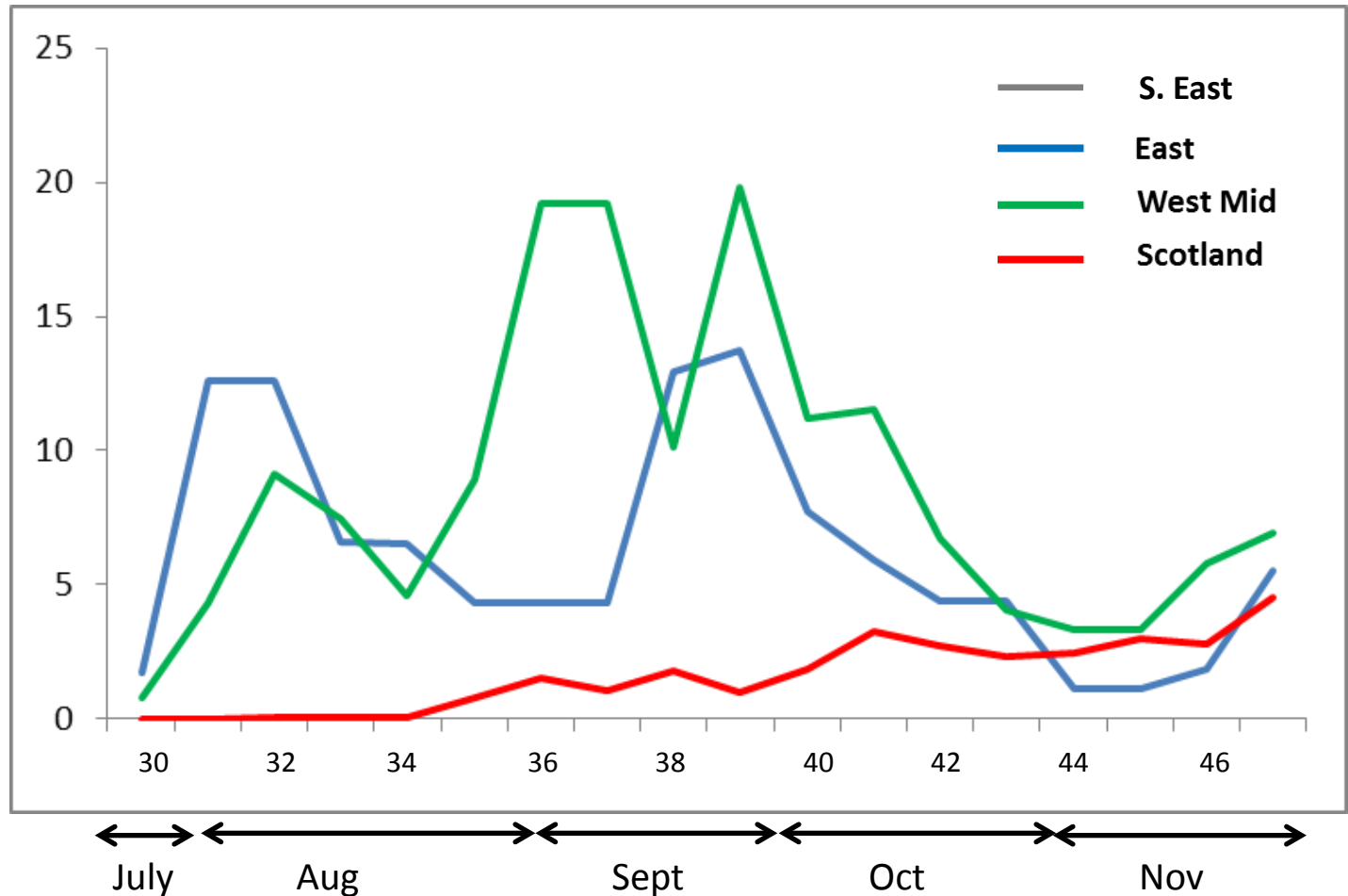
Total number of SWD collected in traps





# Average number of SWD caught per trap at the other UK monitoring sites (South East data removed)

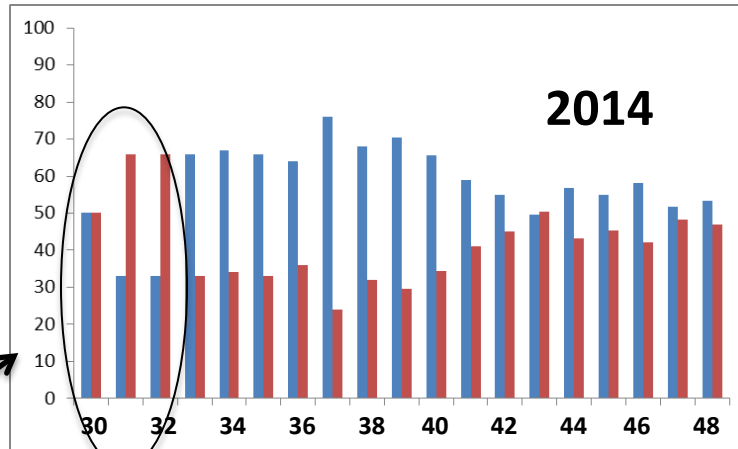
Average number of SWD per trap





# Gender ratio of SWD caught in the Scottish traps over the monitoring period

% male or female

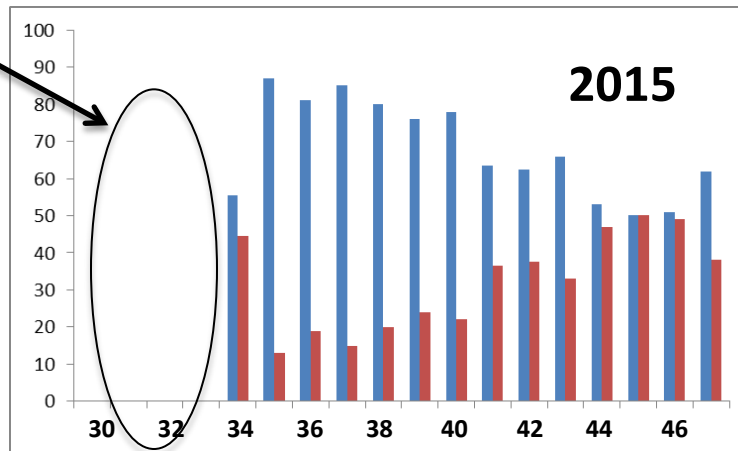


Male  
Female

**57.8% male 42.2% female**

Small numbers

% male or female  
SWD in total  
weekly catch  
(Scotland)



**64.4% male 35.6% female**



# Is this a genuine gender bias in the SWD population or is it caused by the trap attracting more males than females?



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This is one of the questions we aimed to answer as part of the SSCR project 2015

*Drosophila suzukii* (SWD) – emergence and flotation test studies on a range of fruit crops on four fruit farms in Scotland

## Do the traps give a true indication of SWD in the crop ?

- To determine the incidence of the pest, traps are used and the catches are assessed. However observations from the UK monitoring project in 2014 show that the trap catches are not always indicative of the number of flies in the crop. It is not only important to know the incidence of the pest in the crop but also in the fruit in order to put effective control measures in place







## Aims of the project

- To establish the true incidence of SWD within the crop and assess the accuracy of the monitoring data
- To monitor the gender ratio of the SWD population independently of the trap
- To obtain live SWD insects to establish a laboratory culture for future experiments





## Method



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- Collect two fruit samples from every crop (at the fruiting stage) from each of the four Scottish monitoring sites on a fortnightly basis over a sixteen week period
- Carry out a flotation test on one fruit sample
- Carry out an emergence test on the second fruit sample
- Flotation and emergence test protocols have already been established and verified (see AHDB website)
- Control fruit samples were obtained from a site elsewhere in the UK that was known to be heavily affected by SWD
- Flotation and emergence tests were carried out using the control samples to verify that our test systems were robust





# Results from the Scottish Monitoring sites

- A total of 95 different fruit samples were collected from the 4 Scottish sites between the 3<sup>rd</sup> of June and the 23<sup>rd</sup> of September
- Crops sampled included Strawberry, Raspberry, Blackberry, Blackcurrant, Cherry and Blueberry
- No juveniles were detected in any of the flotation tests

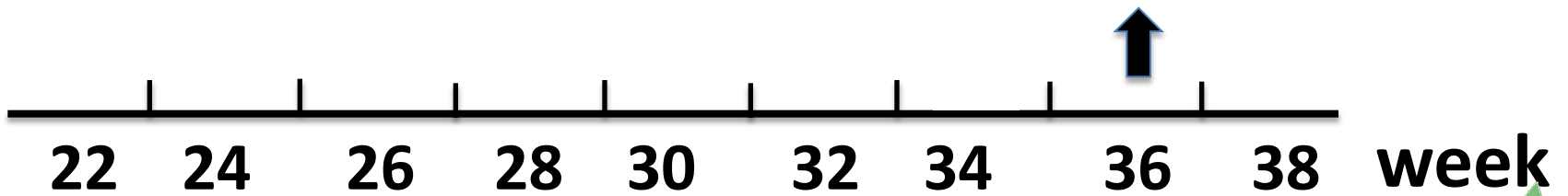
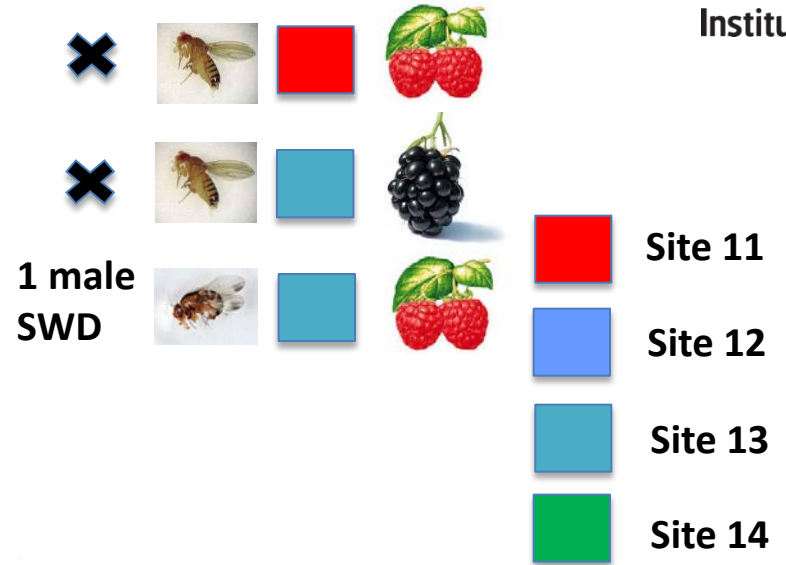




# Results of Emergence Tests



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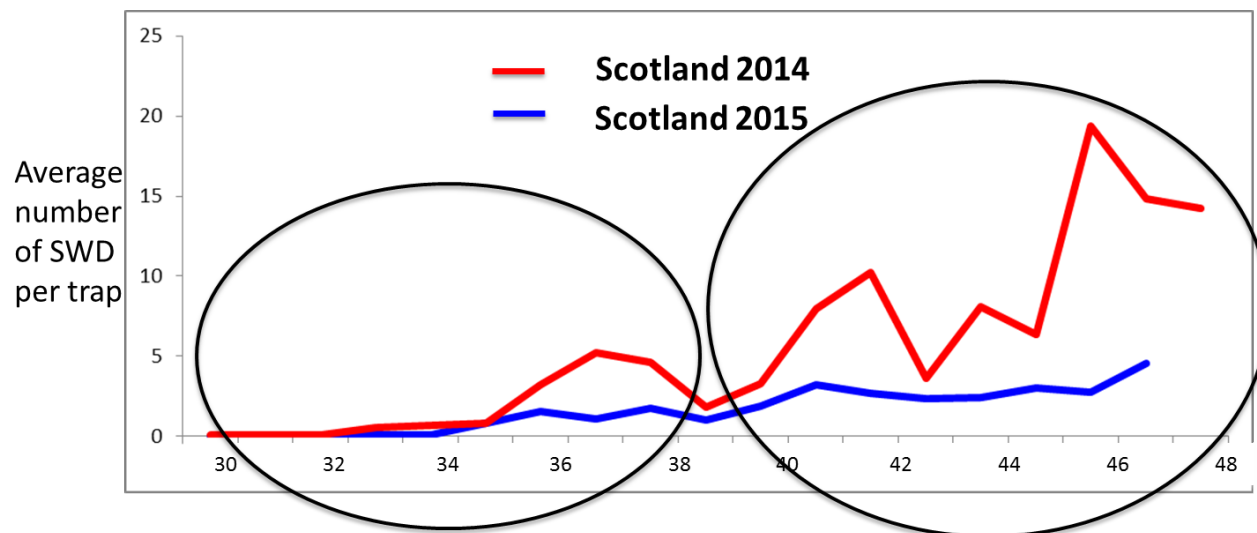


3<sup>rd</sup> June – 23<sup>rd</sup> Sept 2015



# Conclusion and Future Work

- The results suggest that, at the present time, the number of SWD found within the different fruit crops at the four Scottish monitoring sites is very low and is likely to be below the threshold required for damage to be evident
- Continued monitoring for SWD
- Sample fruit and possible wild sites later in the season



**Our sampling time period  
June- September**

**Future sampling time period  
include October - December**



## SWD – control recommendations



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- Begin monitoring in February – traps in woodland and hedgerows
- Monitor for adults until November with recommended lures
- Pick fruit regularly, every 2 days
- Remove damaged and fallen fruit – ferment for at least 48 hours
- Do not open compost fermented waste, bury under soil
- Sample harvested fruit for signs of larvae damage – flotation test
- Keep up to date with SWD page on AHDB website
- Consult a BASIS qualified advisor for advice on the use of crop protection products
- Effective monitoring and good crop hygiene measures are key

# Thanks to the Scottish Government, AHDB and SSCR

- Ailsa Smith
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- Adam Rennie
  
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- NRI – David Hall and Dudley Farman
  
- Growers in monitoring project





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