Spotted Wing Drosophila

(*Drosophila suzukii*)

Introduction

In 2008 *Drosophila suzukii* (Spotted wing drosophila) was detected in three European countries, Italy, France and Spain as well as in the United States (California). Its presence in the United Kingdom was first recorded in 2012. In June 2015 its presence in Ireland was confirmed, with samples trapped simultaneously at a commercial fruit growing farms in Dublin and Wexford. To date the numbers of SWD trapped have been extremely low by comparison with other countries.

Figure 1. Male *Drosophila suzukii* with characteristic wing spots (Red arrows) and a Female *Drosophila suzukii* with prominent serrated ovipositor (Blue arrow)

D. suzukii is a fruit fly or vinegar fly native to Asia. Although thought to originate from Japan, where it was first recorded as a pest in 1916, it is possible that it was introduced into Japan from a neighbouring country. There are a number of evolutionary adaptions which make this fly a significant pest of fruit

D. suzukii, unlike most other *Drosophila* species has the ability to lay its eggs in ripening and ripe fruit. This is possible due to its serrated ovipositor (Fig 2), which allows it to puncture the relatively hard skin of fruits and lay eggs in them. These puncture wounds become soft and sunken and can also allow secondary pathogens to infest fruit.

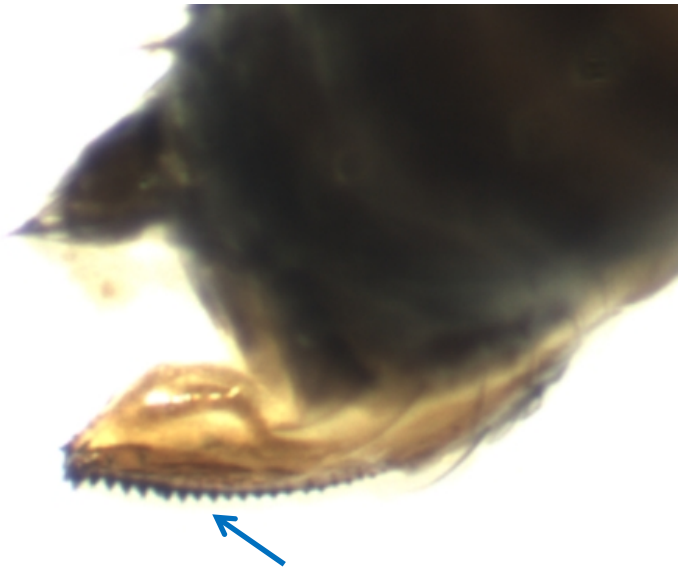

Figure 2. Serrated female ovipositor (tube through which eggs are inserted into fruit)

D. suzukii has a high reproductive output, a single female can lay hundreds of eggs (400-600 eggs), which can develop from egg to adult in 10 days at room temperature (mean 6 – 26 days), with up to 10 generations a year. Females can typically lay 1-3 eggs per fruit in up to 7-16 fruits per day, with an egg laying period of 10-59 days.

The limiting reproduction temperatures for *D. suzukii* is between 10-32^{o}C for oviposition (egg laying) and 30^{o}C for male fertility, with optimal temperatures for both sexes between 20-25^{o}C. Viable adults have been found overwintering in Spanish tunnels as far north as Scotland and adults have regularly survived harsh winter conditions in Europe, Asia and America

D. suzukii is able to develop on a very wide range of both cultivated and wild soft skinned fruit. Commercially relevant fruits which can be attacked are included in the table below. There are also a number of common hedgerow plants, such as honeysuckle, blackberry and other *Rubus* spp, dogwood, *Ribes* spp, which *D. suzukii* can reproduce on. A recent French study found that out of 220 fruit producing hedgerow plants, approx. 80 were susceptible to *D. suzukii* oviposition. Given its wide host range, eradication of this pest, once introduced into a country is not considered feasible.

Crops vulnerable to spotted wing drosophila		
Berries	**Stone fruits**	**Others**
Blueberries*	Sweet cherries*	Tomatoes
Blackberries*	Plums	Apples
Raspberries*		Pears
Other cane fruits*		
Strawberries*		
Currants		

*Crops at significant risk

Identification

SWD is a relatively small fly, usually between 2-4mm in length. The males are identifiable by the presence of a shaded spot on each wing, along the first vein on that wing. In addition on the front leg of the male, there are two groups of sex combs, with between 3 and 6 teeth. Each of these described features needs to be present as other fruit flies can have these traits individually.

Figure 3. Characteristic wing spots of male *D. suzukii* and 'sex combs' present on the front leg of the male

The main identification feature of the female is the presence of a 'saw like' ovipositor (Picture 1). Females do not have spots on their wings or sex combs. The dark abdominal bands on the female should be complete and not broken (Figure 4).

Figure 4. Continuous unbroken dark bands on the upper abdomen of the female *D. suzukii*

Economic Impact

As this is a new pest, the exact yield loss implications of each crop in each geographic area are still being established, although an expert EPPO working group did conclude that the economic consequences due to *D. suzukii* incursions into Europe were high. This was due to the fact that there is already evidence of high crop yield losses where *D. suzukii* is established. In Oregon losses of up to 20% have been reported from Strawberry crops, although minimal damage of strawberry crops in California has been reported. More recent anecdotal evidence from Holland, France and England have indicated that losses can be substantial (30% +), particularly where protective measures such as monitoring and correct procedures on the disposal of waste fruit have not been followed. What is clear is that cost of treating for SWD is far less than the potential yield loss.

Yield losses for other soft fruits is reported as higher, with potential losses of 50% reported for Raspberry and other cane fruit, 33% for sweet cherry and 25% for Blueberry. In addition to direct yield loss, it should also be noted that crop protection measures will be required to control this pest in the future; however numbers recovered in Ireland are still low. Measures such as collection of all fruit at the end of the cropping cycle can reduce subsequent generations, as can harvesting fruit earlier and increasing the number of harvests per week. Additional costs such as, extra labour for crop monitoring, monitoring for fruit damage in harvested crops and extra labour costs in disposing of infested fruit may also be incurred.

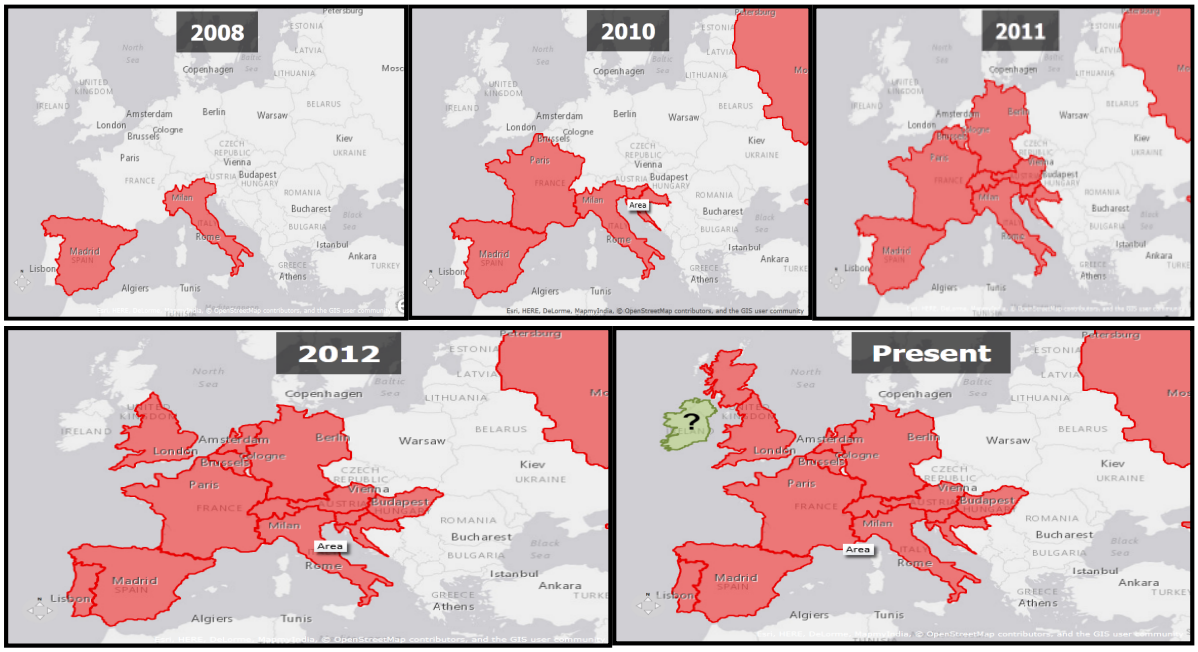

Figure 7. Spread of *D. suzukii* through Europe since its introduction in 2008

Management of *D. suzukii*

As a first step, growers should commence monitoring for the presence of *D. suzukii* in the hedgerows around their nurseries, using vinegar based pheromone traps from early March. Please note that traps should not be placed inside crop growing areas until the presence of *D. suzukii* is established, in order to avoid attracting the pest into the crop.

Once the pest is confirmed as present in the crop, monitoring of the fruit should commence. This involves crushing approx. 100g of randomly sampled fruit (picked from plants directly) in a sugar solution and observing any larvae present. Once the presence of the pest is confirmed, growers have several options. Some cultural techniques, such as modifying harvesting timings, correct disposal of waste fruit and the use of protective crop netting are currently being used to effectively lower pest numbers and reduce the risk of crop infestation.

If insect numbers warrant to use of a plant protection product (not currently the situation in Ireland) is warranted current research suggests that two active ingredients (Spinosad and Chlorpyrifos) offer the most consistent combination of initial knockdown kill of the adults combined with longest period of control across a number of vulnerable crops. As the pest attacks ripening fruit, growers should be aware of harvest intervals on products and consult a professional advisor before application. Currently there is a major international effort to develop biological based controlled methodologies; however it may be years before these become commercially available.

For Further Information and assistance with Identification please contact

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