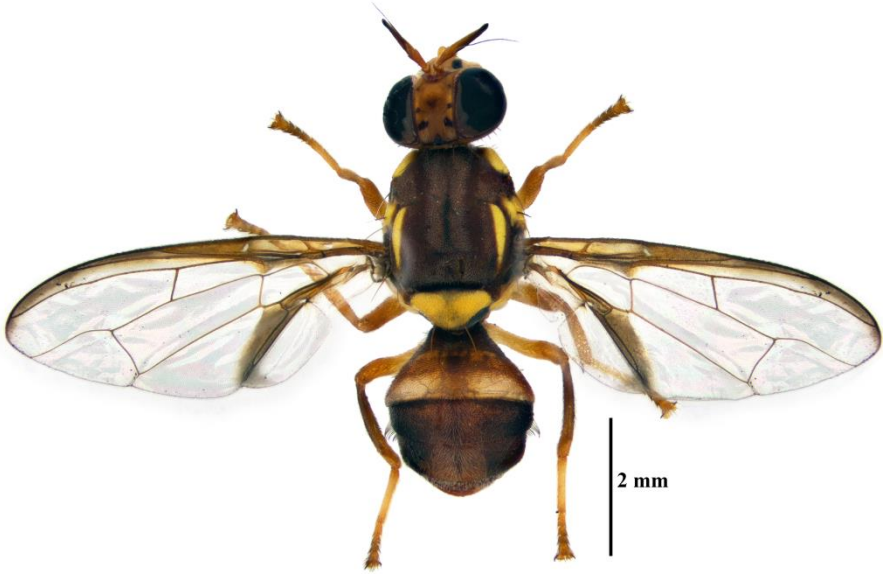
Information for KiwiNet
Fruit Flies
(Mediterranean, Oriental and Queensland)



1. Hazard identification

Description

Three species of fruit fly have been identified as the most serious threat to the kiwifruit industry;

- Mediterranean fruit fly (Med fly, *Ceratitis capitata*)
- Oriental fruit fly (Ofly, *Bactrocera dorsalis*)
- Queensland fruit fly (Qfly, *Bactrocera tryoni*)

Potential impacts

Each of these species has a well demonstrated ability to cause serious market access and production impacts to a wide range of horticultural species when established.

Production impacts from fruit flies have been reported from a wide range of commercial crops. Kiwifruit is not considered a primary host for any of these species. However, limited impacts by Medfly have been reported on kiwifruit in Italy.

Market access implications resulting from incursions of fruit fly breeding populations can be severe, particularly for Qfly as this has a very limited global distribution and is likely to result in access implications across nearly all major export markets. Market restrictions typically require produce to undergo cold disinfestation treatments which can present a significant expense and logistical challenge to industry.

The financial impact of a fruit fly incursion to New Zealand's kiwifruit industry is estimated to be between $2 million and $430 million (a report modelling the economic impact of various scenarios is available on the KVH website.

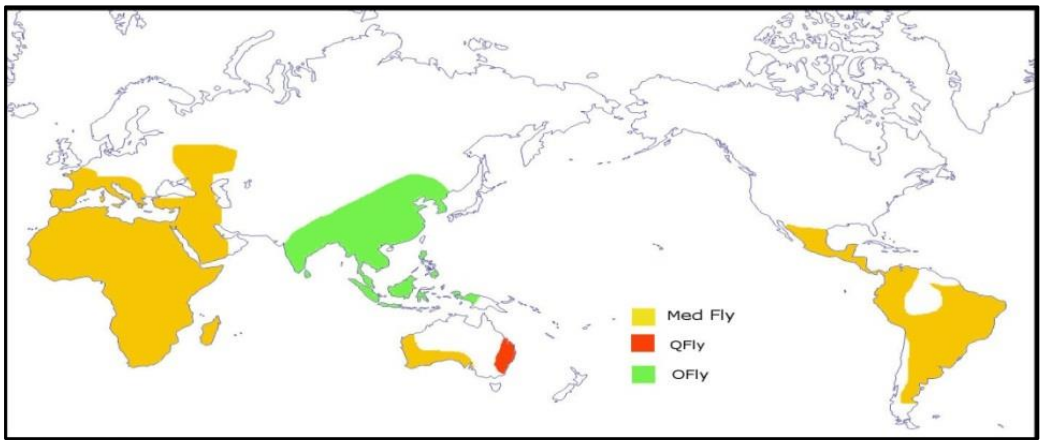
A major long-term project is underway with KVH, Zespri, MPI and other horticultural industries, to pre-negotiate market access agreements with trading partners in the event of an incursion.

Host range

Each fruit fly has a host range of hundreds of different fruits and vegetables (link). Kiwifruit is a known host (though not a primary host) to both Medfly and Qfly. However, a breeding population of Ofly could still result in market access restrictions, at least initially.

Current distribution:

Medfly: Widespread through Europe, Africa, Central & South America and South West Australia
Ofly: South East Asia, Tahiti, Pulau, Nauru and Hawaii
QFly: Eastern Australia, New Caledonia and Austral Islands



Potential distribution in New Zealand

Climate can be a significant limiter in the ability for fruit fly species establish. Qfly and Ofly would have the ability to establish in at least the warmer, northern regions of New Zealand. Medfly, being more tolerant to colder climates, could establish throughout most of New Zealand.

Description—what to look out for in passive surveillance

The most significant production damage is inflicted on fruit by larval feeding and decomposition by invading secondary pathogens. Attacked mature fruits may develop a water soaked appearance; young fruits become distorted and usually drop. Infested fruits may show 'sting' marks on the skin.

Mediterranean fruit fly	Oriental fruit fly	Queensland fruit fly
		
Adult medfly are slightly smaller than a common housefly (6 mm) and very colourful with red and blue eyes, a brown head, and a yellowish abdomen with silver bands. Wings are normally drooping, have a blotchy yellow and brown pattern and black spots and bands.	Adults are noticeably larger than house flies with a body length of 8 mm, and a wingspan of about 7 mm. Colour is variable but there are prominent yellow and dark brown markings on the body.	The adult female is approximately 6-8mm long with a 10-12mm wingspan. The wings are mostly transparent, marked with brown and the fly is reddish brown with yellow markings.

Dispersal ability

Fruit flies are capable of flying long distances (>50km). However, they do not normally disperse beyond 100-200m when host fruit is present. Dispersal of larvae in host fruit is one of the greatest risks of long distance spread.

2. Current status of readiness activities

Pathways – likelihood of entry assessment

Fruit flies are likely to enter the country on host material, which is typically fresh produce. There are numerous potential pathways including commercial produce, air passengers, cruise ship passengers, recreational yachts and mail. Given the number of potential entry pathways and number of items entering our borders each year, these pests are considered highly likely to enter New Zealand, as reflected in the two post-border detections in 2014 and detection of a breeding population in Grey Lynn, Auckland in 2015.

Targeted surveillance

New Zealand has a targeted surveillance programme for fruit flies. This provides assurance to our trading partners that New Zealand has country freedom for these organisms. It also serves as an

early warning of fruit fly incursions to assist in an eradication effort given the high-risk of entry and establishment.

The surveillance programme consists of a network of 7572 pheromone traps placed throughout the country and serviced on a fortnightly basis. Traps are placed in grids in areas considered to be high-risk; 4841 of these traps (64%) are located in Auckland or Northland as all post border detections have occurred in these regions since 1989.

This surveillance network uses three different pheromone lures to detect Medfly, Ofly and Qfly. These pheromone lures attract the male flies; female lures are not as effective but are the focus of international research efforts.

Border Measures:
MPI is responsible for pre-border and border measures to manage risks of unwanted organisms such as fruit flies entering New Zealand. KVH works with MPI in an advocacy role to manage these risks, which is an important aspect of the GIA partnership but sits outside of readiness activities. An overview of potential fruit fly pathways of entry is provided below as background information.

Fruit flies are most likely to arrive through the movement of eggs or larvae in host material. There are a number of pathways on which this could occur and MPI have resources and interventions dedicated to reducing the risk of this occurring.

The commercial fresh produce pathway: The commercial fresh produce pathway imports the highest volume of fruit fly host material. This pathway also has the greatest level of pre-border and border interventions specific to fruit fly and therefore is not necessarily the pathway presenting the highest risk of fruit fly introduction.

Air passengers: This is a high-risk pathway for the potential introduction of fruit fly, with slippage monitoring showing fresh produce accounts for almost 5% of all the risk items that pass through the border undetected.

Cruise ships: The number of cruise ships visiting New Zealand waters is increasing rapidly. Each season there is roughly 80-90 cruise ship arrivals that visit the Port of Tauranga bringing 211,000 passengers and crew. A similar number visit New Zealand's other main cruise ship destinations. The major risk cruise ships present is passengers bringing fruit contaminated with fruit fly off the vessel and on to shore. MPI have increased detector dog presence for disembarking passengers, a move which KVH supports and advocated for.

Recreational vessels: Each year, over 600 recreational vessels enter New Zealand from international waters. Most of these yachts come from South Pacific Islands (82%, mainly from Tonga, Fiji and New Caledonia) and Australia (18%). These vessels and their passengers can carry fruit fly host material into New Zealand waters and while MPI employ a range of measures to mitigate these risks the location of the 2014 finds has increased the scrutiny of this pathway.

Mail: The MPI biosecurity team use risk profiling, x-rays and detector dogs to screen and process incoming mail items. The volume through the mail pathway is increasing significantly and is of concern to the biosecurity system. However, this is considered a low risk pathway for fruit fly entry.

Control options and tools

If a fruit fly was to be detected post-border in New Zealand, the response would follow procedures described in MPI's prepared Standard, (Fruit Fly Response (Field Operations)). This Standard includes the following components:

Definition of response zones (by the Director)

- There are two commonly used response zones, zone A and zone B.
- Zone A has a minimum radius of 200 metres around the fruit fly find.
- Zone B has a minimum radius of 1.5 kilometres around the find.
- Exact size and boundaries of the A and B zones will be defined by the Director and notified via a public notice, media (newspapers, radio/television, electronic) and the MPI website.

Definition of response level by the Director:

- There are three levels of response depending on the circumstances of the find. These are called Response 1, Response 2, and Response 3. The components of these levels are illustrated in Table 1.
- Single male finds are typically Response level 1 and elevate with the discovery of further flies or a breeding population, although this is at the discretion of the Director.

Establishment of control centres:

- There are two types of control centre operating during a fruit fly response, the Response Centre (RC) in Wellington and the Field Headquarters (FHQ).

Table 1: Components of the three fruit fly response levels.

Component	Response 1	Response 2	Response 3
Detection site inspection	+	+	+
Mapping and GIS	+	+	+
Trapping (surveillance)	+	+	+
Fruit monitoring (surveillance)	+	+	+
Movement Control	+	+	+
Fruit collection (organism management)		+	+
Bait application (organism management)		+	+
Ground spraying (organism management)		+	+
Cover spraying (organism management)		+	+
Tracing (surveillance)		+	+
Alternative methods			+

Level of capability required in a response

The following table presents an estimate of the operational capability requirements during the first week of a fruit fly detection (single male fly) in an urban area. This was developed by AQ and MPI and used by the kiwifruit industry at the 2012 fruit fly workshop in Rotorua. KiwiNet deployed kiwifruit industry resources into the 2015 Grey Lynn response with up to 30 individuals involved in a single day. Kiwifruit industry capability would be deployment into surveillance and organism management roles. Some roles would require additional levels of training. The capacity to respond

would depend on the time of year with capability likely to be in short supply during and immediately following harvest.

Response Roles	Number of personnel
Movement Control	
• Manage work stream	1
• Provide movement control operations expertise	1
• Develop maps of Movement Control zoning, address lists	2
• Arrange printing of communications material	1
• Deliver verbal information door to door within Zone A	6
• Deliver communications material to addresses in Zone B	4
• Place signs and bins in zone A & B	2
• Visit and negotiate compliance with commercial operators	7
• Monitor compliance and follow up non-compliance	11
• Issue permits to move risk items	8
Surveillance	
• Enter data into Incursion Response System (IRS)	15
• Develop maps for property survey teams using GIS	2
• Manage and distribute fruit fly field HQ stores	3
• Trace forward and backward pathways, tracing interviews	3
• Prepare survey kits and induction training	2
• Survey properties	60
• Report passive surveillance cases (public submissions)	2
• Collect ripe, slice and inspect in lab	6
• Assemble fruit fly traps, manage trap records and data entry	11
• Deploy traps, inspect and retrieve specimens	16
Organism Management	
• Manage organism workstream	1
• Provide organism management operations expertise	1
• Forecast weather for spray application	1
• Apply bait	30
• Apply ground or cover spray	2
• Maintain equipment and manage hazardous goods depot	1
• Collect fruit in Zone A for disposal	6
Total	**205**

Other response workstreams such as Planning and Intelligence may also have resources deployed into them in a smaller number of more specialist roles which KVH and industry is likely to fill.

Other capability needs

Capability other than human resources will also be required in a response, including:

- Industry data, access to existing networks and communication channels
- Facilities (e.g. site for response headquarters, bait storage depot)
- Equipment (e.g. spray equipment, disposal equipment)