

NATIONAL FRUIT FLY SURVEILLANCE PROGRAMME

New Zealand's National Fruit Fly Surveillance Programme entails seasonal monitoring for the presence of fruit fly with lure traps placed at high-risk locations throughout the country. This programme was initiated in the mid-1970s to help provide assurance that New Zealand is free from economically important fruit flies, and as an early warning of fruit fly incursions to assist in an eradication effort.

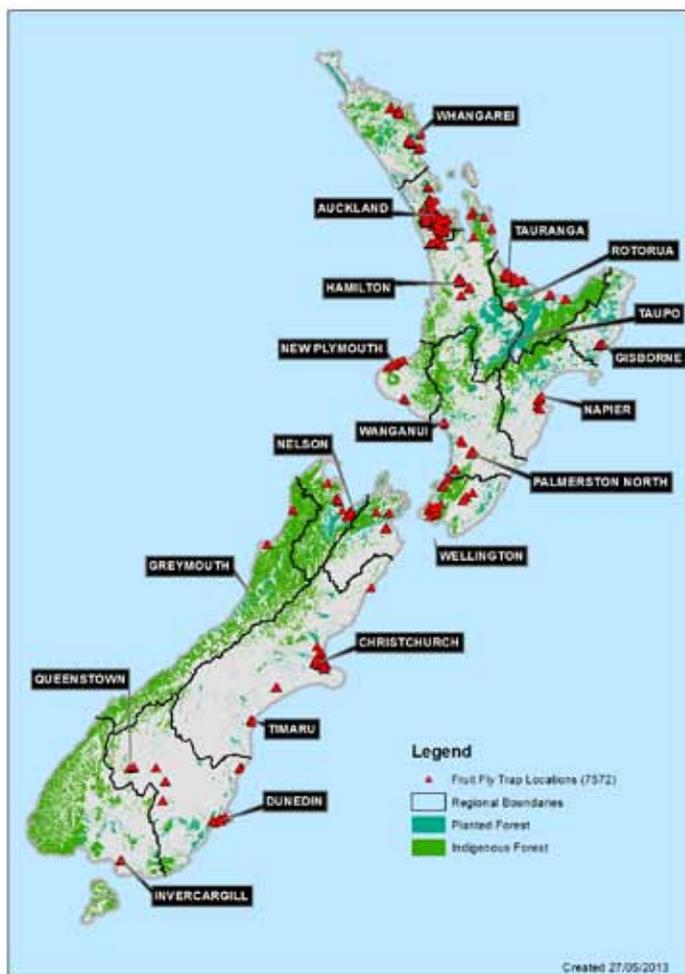


Figure 1: Map of New Zealand showing distribution of trap sites for fruit fly surveillance

fruit fly (*Ceratitis capitata*), Oriental fruit fly (*Bactrocera dorsalis*), and Queensland fruit fly (*B. tryoni*).

Since 1989 there have been six recorded fruit fly interceptions: five in Auckland and one in Northland. Five of these involved three different *Bactrocera* spp. and one involved *Ceratitis capitata*. Only the *C. capitata* find resulted in an eradication programme being initiated; all other finds (including the most recent, in May 2012) were determined, by heightened surveillance, not to be from an established breeding population.

AsureQuality has conducted fruit fly surveillance, originally as part of MAF and later as a separate entity under contract to MPI, for almost 20 years. A total of 7572 fruit-fly traps were serviced fortnightly in 149 individual trap runs by AsureQuality staff servicing the North and South Islands (Table 1). A trap run is a series of traps from within a defined geographic area, which are serviced by a trained trapper, and the number of traps in a run ranges from seven to 98 with the mean being 51. Traps are placed in the centres of cells making up a grid located in a high-risk area (Figure 2). Within each cell, a host tree is selected for trap placement using a hierarchical ranking system.

REGION	NUMBER OF TRAP RUNS	NUMBER OF TRAPS
Auckland/Northland	71	4 841
Waikato/Bay of Plenty	18	672
Lower North Island	28	928
Upper South Island	20	757
Lower South Island	12	374
Total	149	7 572

There are currently about a hundred species of fruit fly listed on the MPI website as regulated organisms. The absence of economically important fruit flies enables fresh produce to be exported without the need for fruit fly treatments, thus facilitating trade. It also enables crops susceptible to fruit fly to be grown here without the need to manage fly populations and the associated damage that they cause. As an illustration of how important this is, produce exports in 2012 earned \$3.6 billion, and more than 90 percent of fresh fruit and vegetable exports by value were of species that are considered hosts for fruit flies (Horticulture New Zealand, 2012).

Fruit flies belong to the family Tephritidae, which includes more than 4500 species. The economically important species monitored here are Mediterranean

A pheromone-impregnated fruit fly lure and a plastic strip impregnated with an insecticide (dichlorvos) are placed into Lynfield-type fruit fly traps, which are inspected every 13–15 days. Suspect flies are submitted to either the Tamaki or Christchurch Investigation and Diagnostic Centre (IDC) for taxonomic identification.

Although the Fruit Fly Surveillance Programme season ran from the end of September 2012 until the end of June 2013, each region had its own start and finish dates based on local temperature, which is considered to accurately reflect the risk of fruit fly establishment. This season's sampling effort ran from 17 September 2012 to 17 June 2013 (Figure 1).

Trapping

Each trap is clearly labelled “Fruit Fly Trap” and displays the MPI and AsureQuality logos and a freephone contact number. The spacing between grid cell centres that contain the traps is based on the efficacy of each lure and biology of targeted species. For example, grid cells that contain trimedlure and cuelure traps are 400 x 400 m while grid cells that contain methyl eugenol traps are 1200 x 1200 m. The minimum size of the trapping network is two adjacent grid cells, and both cells are selected so as not to overlap if possible. An example of a grid network in Levin is shown in Figure 2.

Host trees are preferentially selected as close to the grid centre as possible, and the trees themselves are ranked by four host preference types: evergreen fruit trees, deciduous fruit trees, New Zealand native evergreen trees with fleshy fruit, and gooseberry trees.

Traps are placed so that they are protected from direct sunlight, wind and dust, and are typically located at least 1.3 m above the ground, in an area of dappled light within the foliage and not beneath the canopy. These factors increase the chance of attracting the target species. To avoid cross-contamination between lures the traps are placed at least 3 m apart, and also at least 3 m from any other insect trap (e.g., for codling moth or gypsy moth).

Any fly from three to 15 mm long is regarded as suspect. Suspect submissions and nil returns are submitted to the diagnostic laboratory within two working days of trap servicing. New traps are used at the start of each season and all traps and lures are destroyed within two weeks after the end of the season.



Figure 2: Grid cells overlaid on aerial photograph showing systematic grid network for Queensland and Mediterranean fruit fly (blue) traps and Oriental fruit fly (yellow) traps in Levin

Trappers attend refresher courses every year on trap servicing, where they are also updated on any changes of procedure.

Results

It is considered here that in terms of meeting the programmes objectives, the 2012–13 surveillance season was a success. No fruit flies were found during the season. A precautionary measure of 33 fruit fly traps placed within a 400 m radius of the May 2012 Queensland fruit fly detection remained in place until mid-November 2012 and also did not detect any fruit flies.

There were 2805 routine submission events, with a total of 5833 suspect fly samples. An additional 18 suspect samples were forwarded for taxonomic determination as a result of trapper passive surveillance within the fruit fly programme.

Table 2 records that a total of 5833 suspect fly submissions were made. The Auckland/Northland region recorded the highest number of suspect samples (2865, or 49 percent of the total number of samples). The number of traps per run ranged from 7 to 98 (mean = 51, S.E. = 0.6), with a total deployment of 7572 traps (Table 1).

More than half of the submissions (51 percent) were made from October to January (**Table 2**).

The number of suspect sample submissions generally followed a similar pattern to previous years (**Figure 3**), with the majority of submissions made between November and February. This indicates that a trapping season from September to May/June sufficiently spans the period fruit flies are most likely to be captured.

As in past seasons, MPI favoured starting the surveillance programme in September to maximise the chance of detecting fruit fly incursions. This period is considered the best compromise of operational effectiveness and biological considerations. The increase in temperature at this time increases insect activity and the season is long enough for plenty of trap days to gather a large sample size.

TABLE 2: NUMBERS OF SUBMISSIONS BY REGION, 2012–2013 SEASON

MONTH/REGION	AUCKLAND/ NORTHLAND	WAIKATO/BAY OF PLENTY	LOWER NORTH ISLAND	UPPER SOUTH ISLAND	LOWER SOUTH ISLAND	TOTAL
September 2012	396	18	70	16	0	500
October 2012	437	36	109	114	95	791
November 2012	428	59	189	196	185	1057
December 2012	497	56	189	196	214	1057
January 2013	249	65	117	126	129	686
February 2013	115	31	60	72	99	377
March 2013	84	35	70	54	47	290
April 2013	104	51	433	71	39	308
May 2013	267	27	45	53	25	416
June 2013	293	0	0	0	0	293
Total	2 865	378	843	909	833	5 833

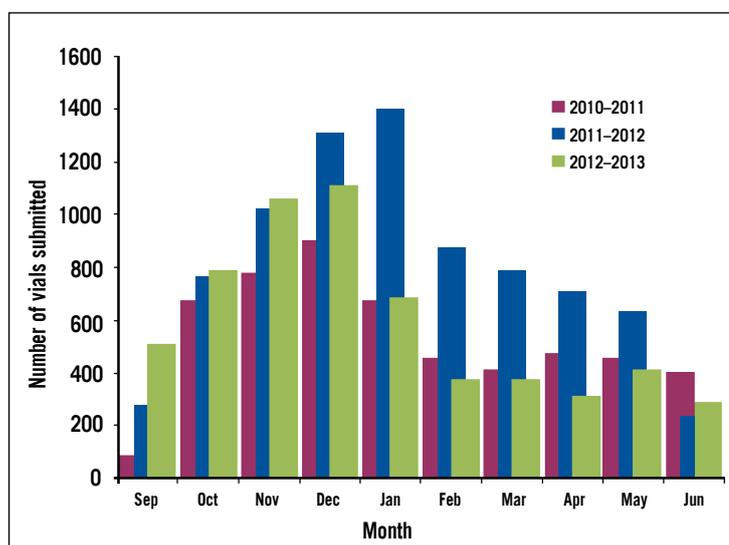


Figure 3: Fruit fly sample submission by month and year.

Rory MacLellan
Senior Advisor
Surveillance and Incursion Investigation (Plants and Environment)
Ministry for Primary Industries
Rory.MacLellan@mpi.govt.nz

Kerry King
Surveillance Co-ordinator
Asurequality Ltd
Kerry.King@Asurequality.com