

# Cold storage of Queensland fruit fly eggs and pupae for mass-rearing programs



**SITplus**

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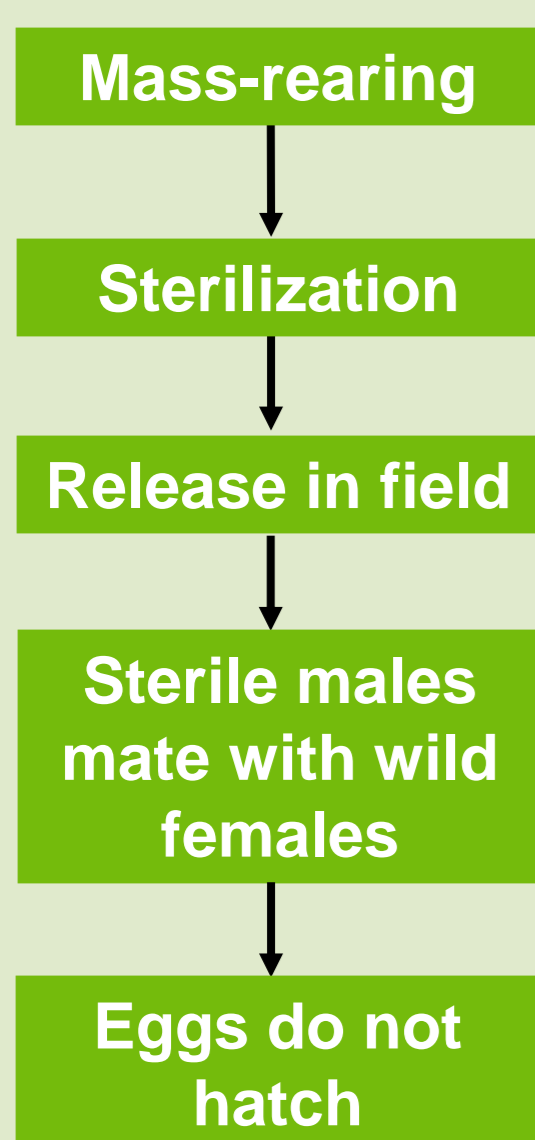
Native to Eastern Queensland and North-Eastern New South Wales, the Queensland fruit fly (Q-fly) has become **Australia's most important insect pest of horticultural crops.**



Eggs are laid by adult flies into fruit. Larvae cause **direct damage** by feeding on the fruit and **indirect damage** by causing decay and premature fruit drop.

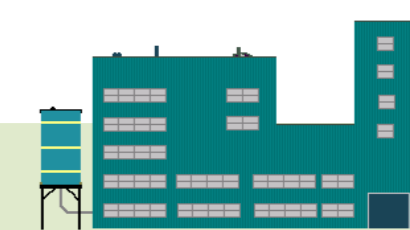


SIT scheme:

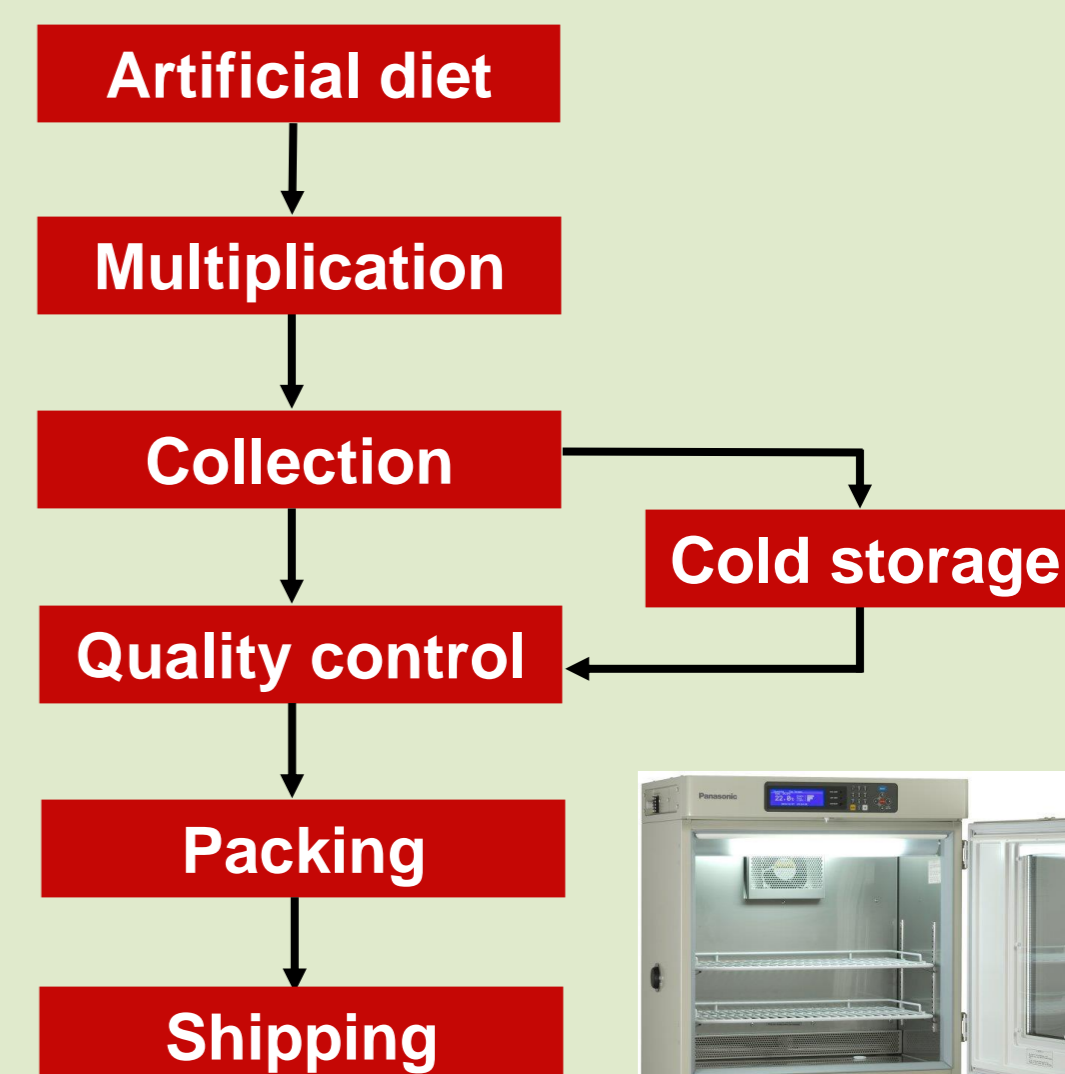


The **Sterile Insect Technique (SIT)** is currently being developed as a sustainable approach to control the Q-fly. SIT relies on mass production facilities to supply massive numbers of high-quality male flies, which are sterilized and released into the field to corrupt the reproduction of wild populations, and reduce numbers.

During **cold storage** mass-reared insects are exposed to sub-optimal temperatures in order to prolong their developmental time. Considering the complexity of synchronizing field releases during pest outbreaks, **an increased shelf-life with little loss of post-release performance will benefit SIT programmes.**



Mass-rearing facility scheme:



## Cold storage of Q-fly eggs

With the aim of increasing the flexibility of the rearing process through producing a useful stockpile of Q-flies, an experiment was set up to investigate the effect of cold storage on eggs.

The effect of four temperatures (10, 13, 16 and 19 °C) and three storage periods (3, 6 or 9 days) were evaluated using, as a control, the standard rearing temperature of 25 °C.

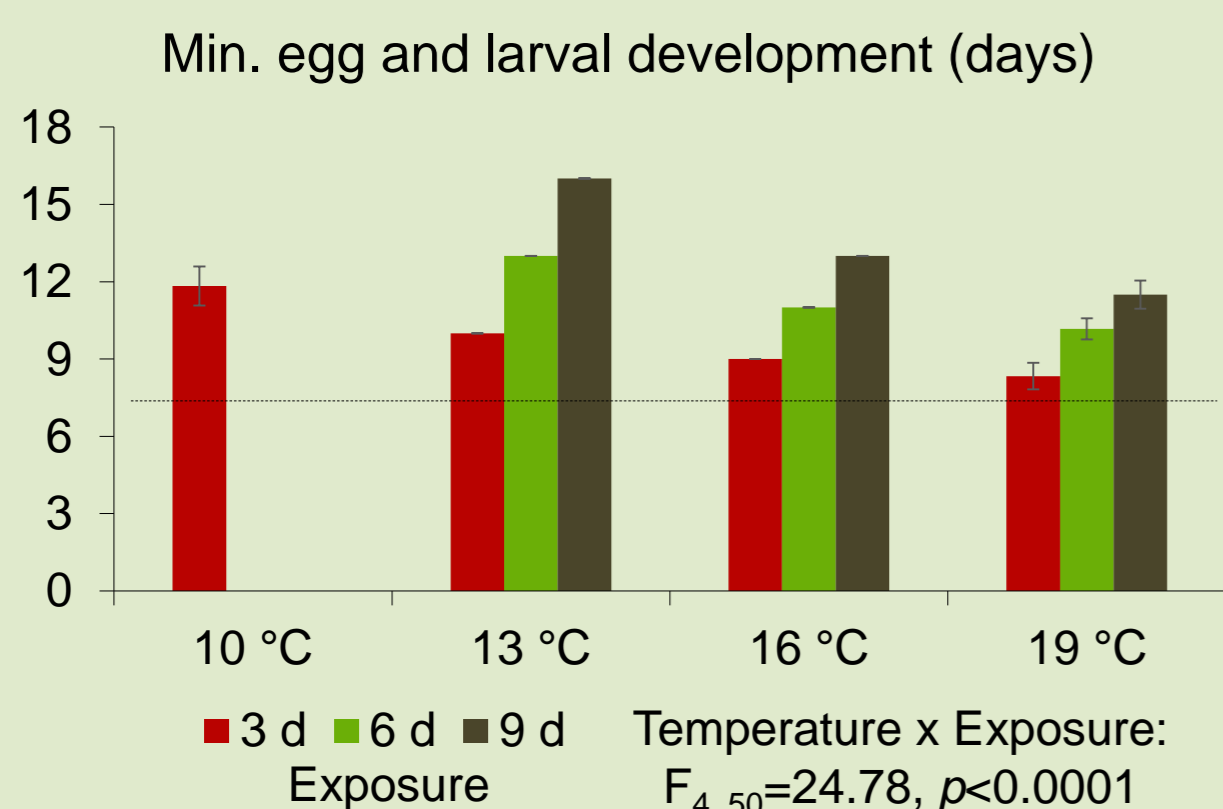
Key biological parameters, including egg hatching rate and pupal recovery, were evaluated.



Unhatched eggs exposed at 10 °C



Larval rearing was performed using a high productivity gel-based diet



## Cold storage of Q-fly pupae

An experiment was set up to establish a protocol for cold storage of Q-fly pupae and to investigate the consequences on standard quality control parameters used for mass-reared fruit flies.

In a first test, Q-fly pupae were kept at 13, 15, 17, 19 and 25 °C (control) with 65% RH and complete darkness until adult emergence was completed.



Q-fly pupae were stored at the Plant Growth Facility at Macquarie University in Sydney

Temp. (°C)	Emergence (%)	Partial emerg. (%)	No emerg. (%)	Min. pupal stage (days)
25	93.83	0.67	5.5	12
19	83.83	5.67	10.5	21
17	52.17	18.17	29.67	28
15	0.33	8.67	91	41
13	0	0	100	/

A second test is now investigating the quality of Q-fly adults using the standard FAO/IAEA/USDA flight ability and chill coma recovery tests.



The storage at 17 °C considerably increased the number of partially emerged adults



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