Generating a male-selecting strain of *Bactrocera tryoni* using CRISPR/CAS technology for Sterile Insect Technique applications

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Background

*Bactrocera tryoni* is a major horticultural pest

- *B. tryoni* (Queensland fruit fly, also known as Qfly) is a major horticultural pest in Australia.
- It has the ability to cause damage to >100 different fruit and vegetable crops.
- Recent bans on certain insecticides has increased the threat of Qfly moving into new regions where they are not currently established.

Pest eradication with Sterile Insect Technique (SIT)

Sterile fruit fly release program

**Female**

- tsl/tsl

**Male**

- tsl/wf

- 5, 5 X, Y

- 5, 5 X, X

1) Introduce an autosomal recessive temperature sensitive lethal (tsl) allele into the Qfly genome: Such alleles have been shown to result in temperature sensitivity in other fly species.

2) Translocate or introduce a copy of the normal/wildtype (*wt*) allele on to the Y chromosome so that males will not be temperature sensitive.

⇒ Only females will be temperature sensitive and can be killed by heat treatment.

Project aim

Generate a Qfly male-selecting, temperature sensitive lethal (tsl) strain

We aim to develop a Qfly strain with the ability to kill female embryos using heat exposure. This will provide a cost-efficient strategy for eliminating females and only rearing males at the SITplus facility. Male flies will then be sterilized with X-ray radiation and strategically released for SIT applications.

Approach

Introducing a temperature sensitive (tsl) allele

- SIT has been shown to be an effective method for suppressing or eradicating insect pests.
- It involves mass release of sterile males to mate with wild females.
- The females will lay unfertilized eggs and result in localised eradication of the pest.