

Maximising field vigour of mass reared Qfly

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SITplus

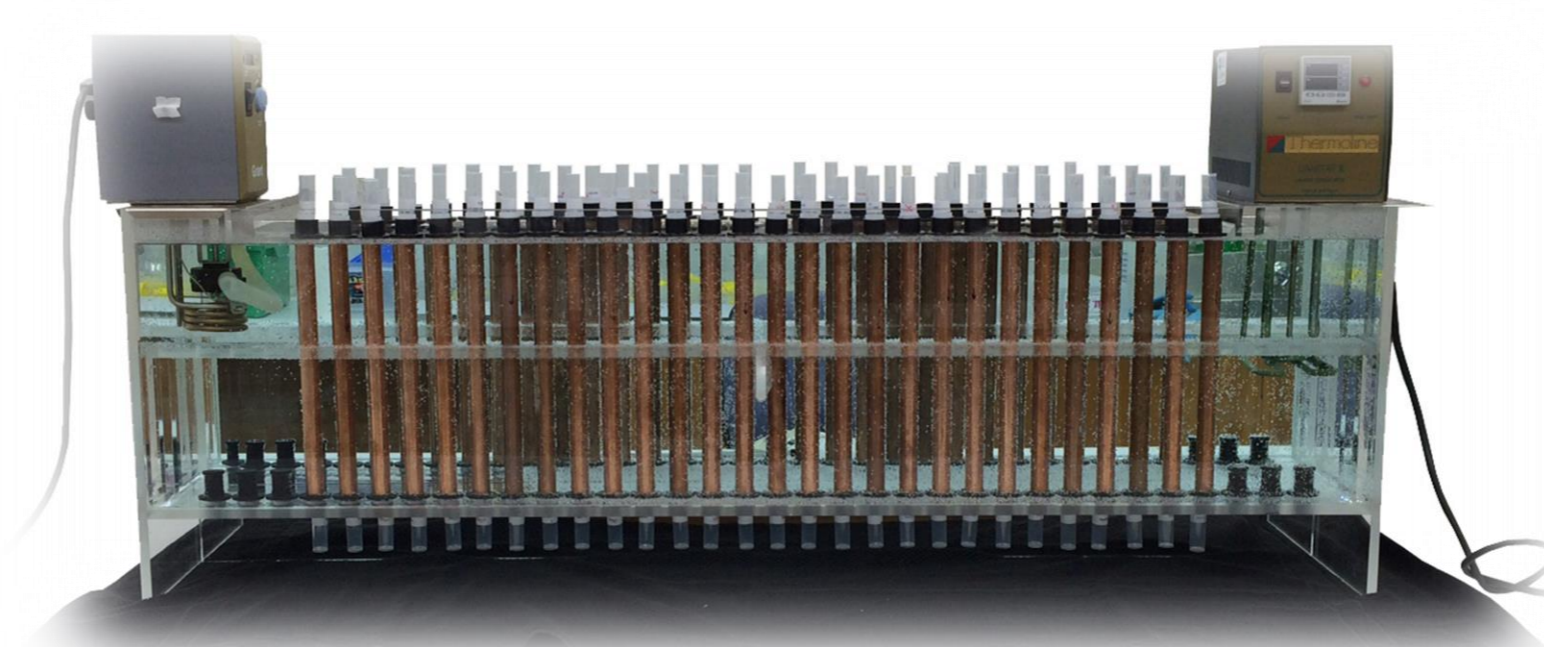
Ecological competence of mass-reared flies is critical to the success of Sterile Insect Technique (SIT) programs. However, vigour diminishes during the domestication process. It is also unclear which strains from across the geographical range of Qfly might be the most suitable to initiate the SIT lines. To understand and address these two issues, we are determining:

fitness components that are affected by domestication and their genetic causes
geographic strains of Qfly that attain the highest scores in fitness assays

Characters we measure

- 1) **Climate stress resistance**
 - ❖ Heat
 - ❖ Cold
 - ❖ Desiccation
- 2) **Life history characters**
 - Development time
 - Food use efficiency
 - Sexual maturation
 - Mating behaviour
 - Locomotive ability
- 3) **Genetic changes**
 - Gene frequency
 - Gene activity
 - Gene function

Apparatus we use



Duruga (The Falling Star) – a custom built apparatus to measure heat tolerance in Qfly.



Trikinetics system to measure locomotive ability of Qfly. Image source: www.trikinetics.com

Next-Generation high-throughput sequencing technology to investigate genetic variation in natural Qfly populations and genetic consequences of domestication. Image source: <http://www.illumina.com/>



Qfly strains we measure

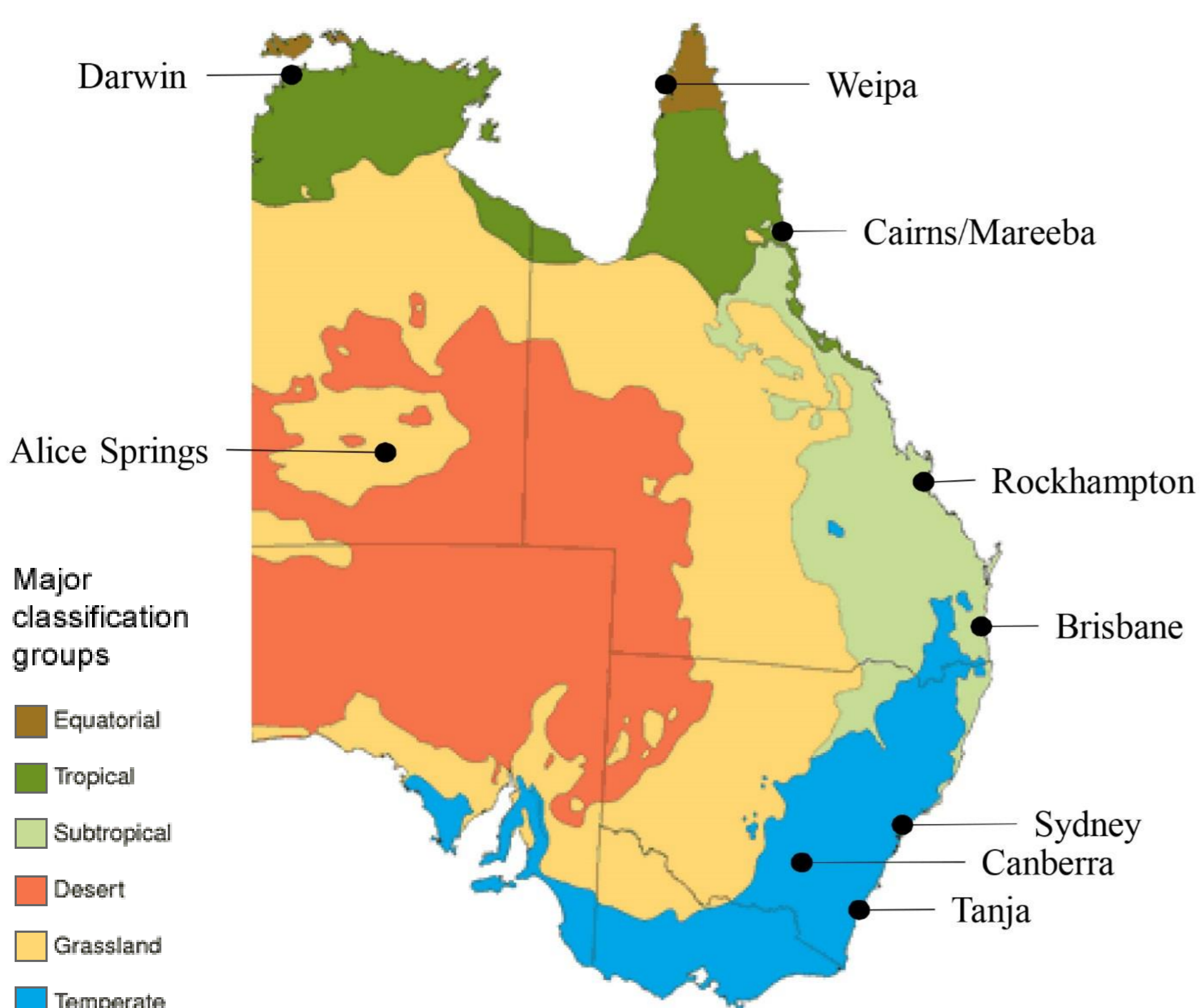


Image source: Bureau of Meteorology (<http://www.bom.gov.au/>)

Preliminary observations we have

- ✓ Climate stress tolerance levels vary between populations from north and south of Australia
- ✓ Climatic stress tolerance levels vary between male and female flies
- ✓ Development time shortens in domesticated flies
- ✓ Sexual maturation rate is faster in domesticated flies

Significance of our study

- ✓ Informs selection of optimal SIT strain based on geographical survey
- ✓ Better husbandry processes to retain desirable properties in the SIT strain



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