



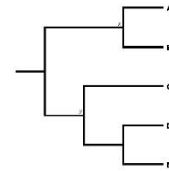
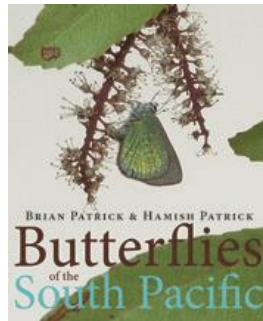
Is it a Queensland fruit fly? Using NGS data to develop diagnostic markers

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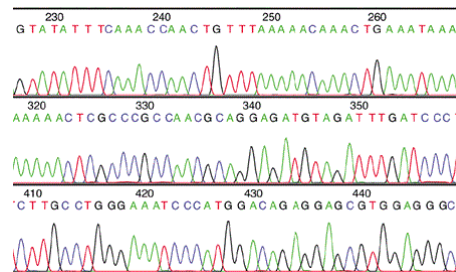
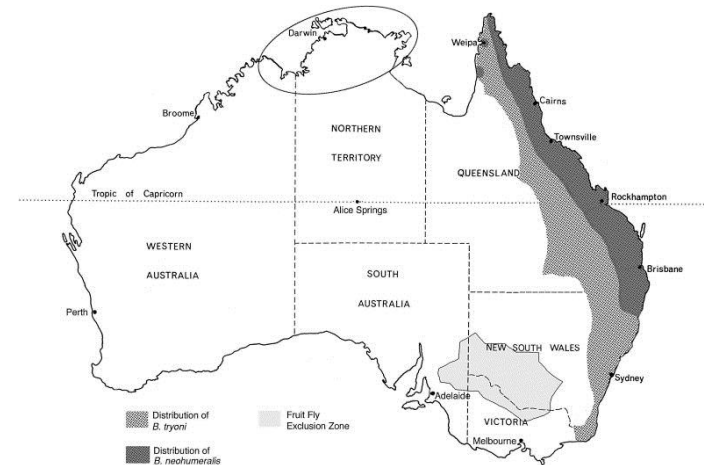
My background

- Native butterfly and moth (Lepidoptera) taxonomy
- Exotic and native (Tephritidae) fruit flies
- DNA sequencing and phylogenetics



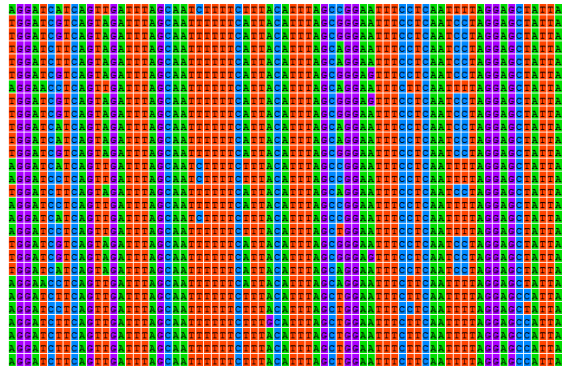
Bactrocera tryoni species complex

- 4 named species
- *B. tryoni* & *B. neohumeralis* are sympatric
- *B. tryoni* is a serious pest
- Occasionally intercepted in NZ
- Differ in two characteristics
- Species status of other two unknown
- No fixed genetic differences known



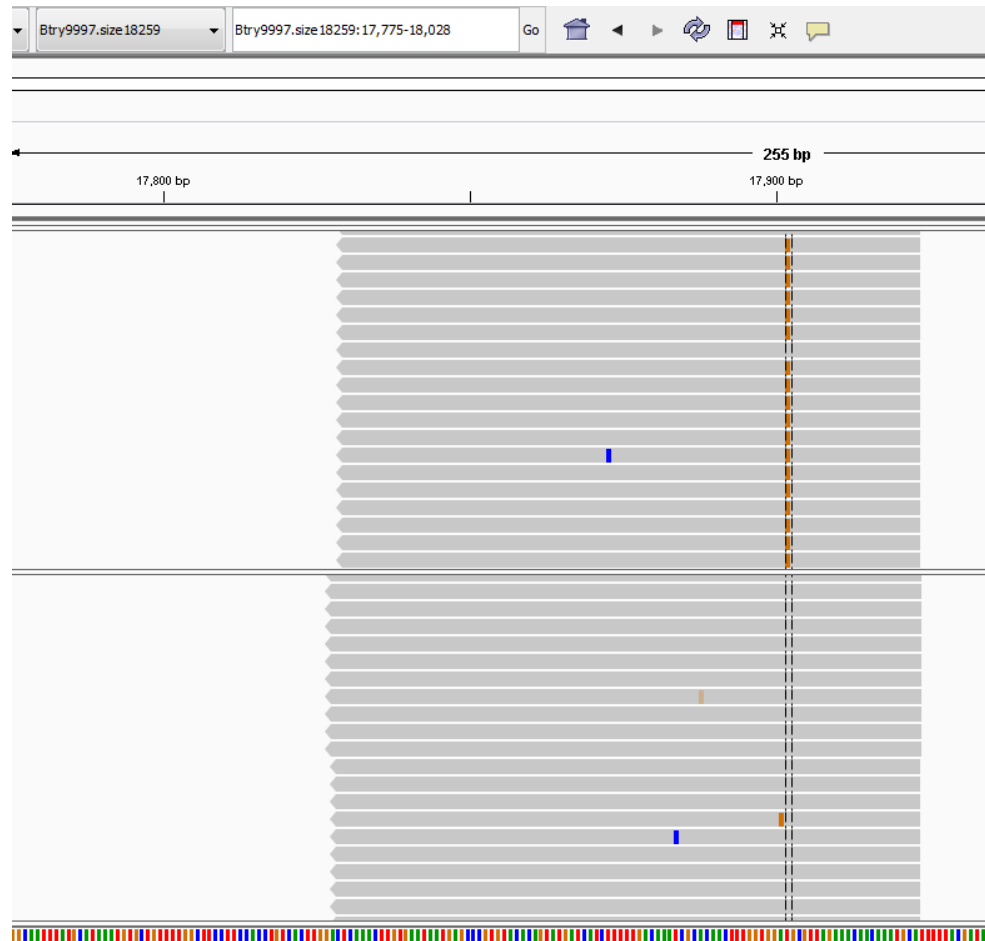
Genotyping by sequencing (GBS)

- Fresh specimens collected from throughout range
- Total of 3 plates (285 samples) sequenced
- Received a large amount of sequence data + GBS data analysis outputs (56,000+ SNPs!)

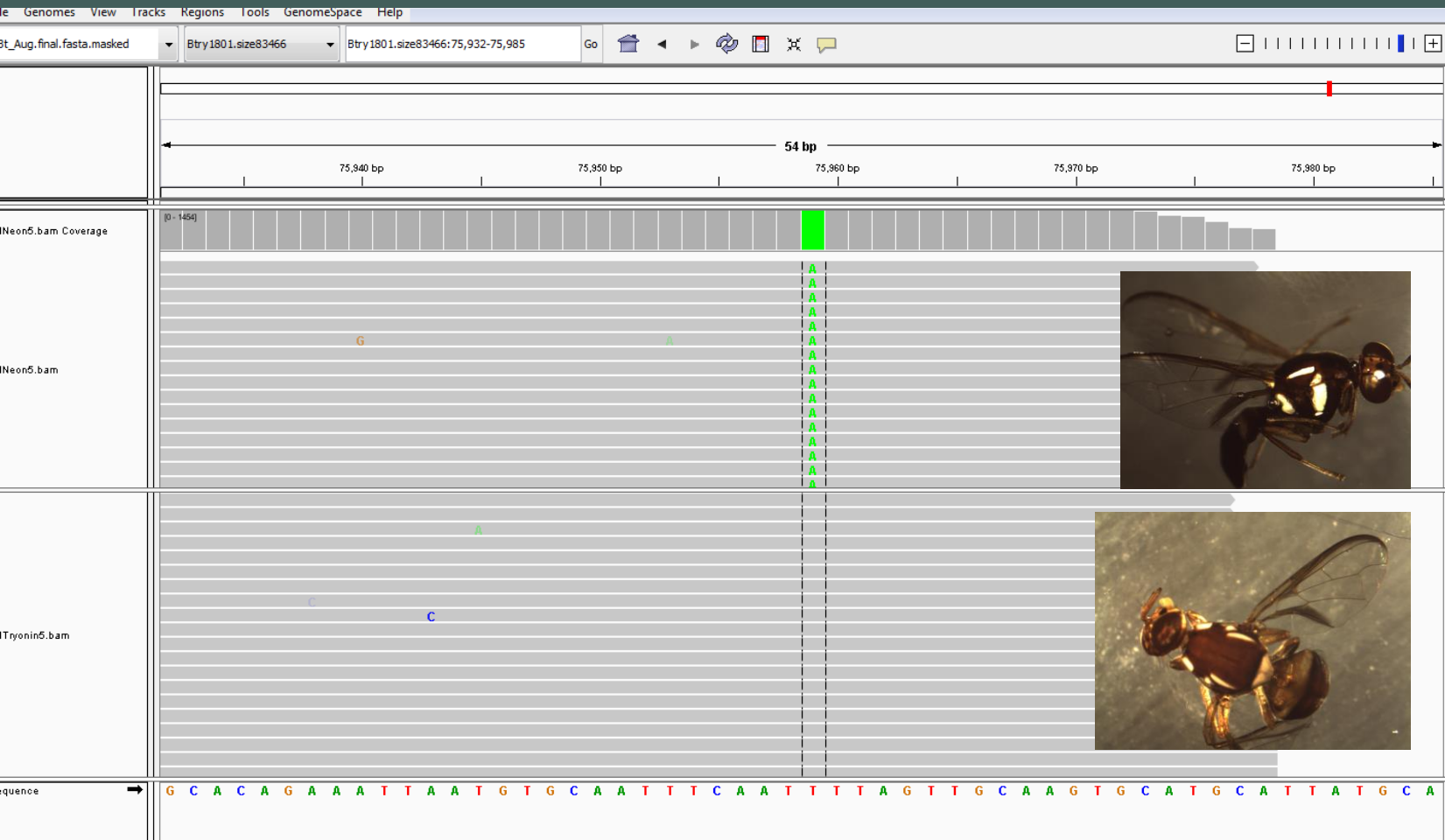


Diagnostic markers

- Diagnostic markers identified through two different methods
- Located on genome
- Primers developed for testing



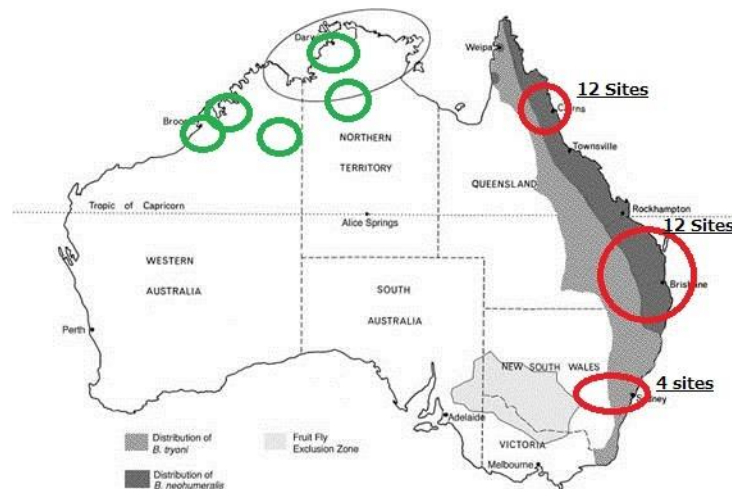
Bactrocera tryoni & *Bactrocera neohumeralis*



HARBI1 Transposase-derived protein that may have nuclease activity

Bactrocera aquilonis?

- Potential diagnostic regions identified
- Testing to take place shortly
- Significant biosecurity implications



Using GBS data for Phylogenetics

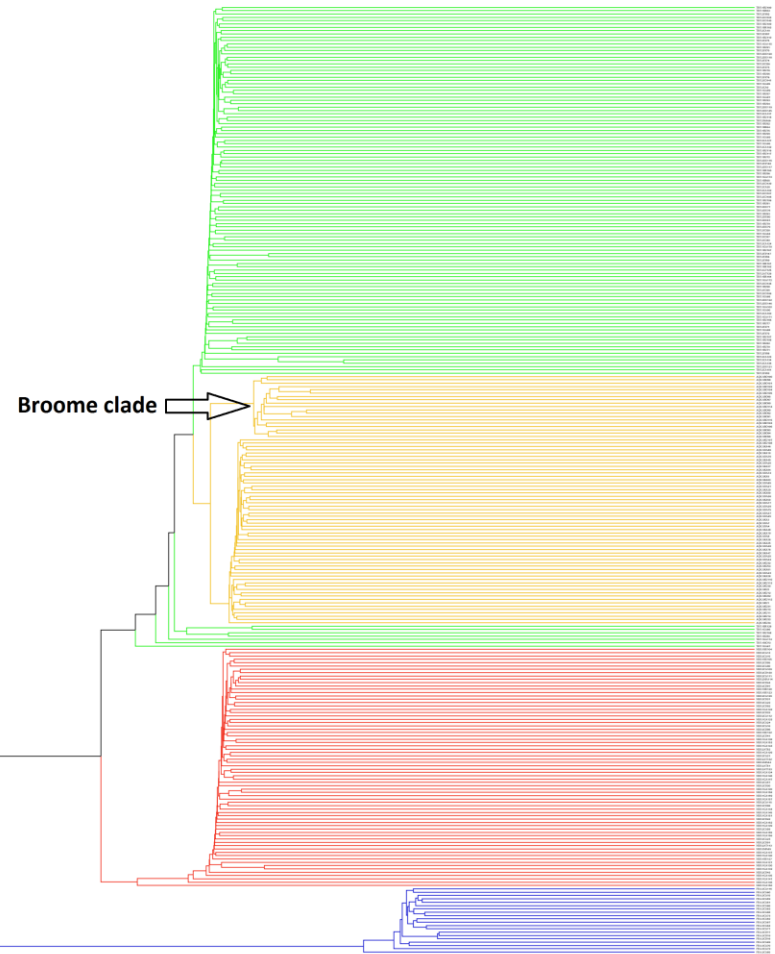
8 April 2015 UPGMA phylogenetic tree

285 samples

56,404 bp sequence length (independent SNPs)

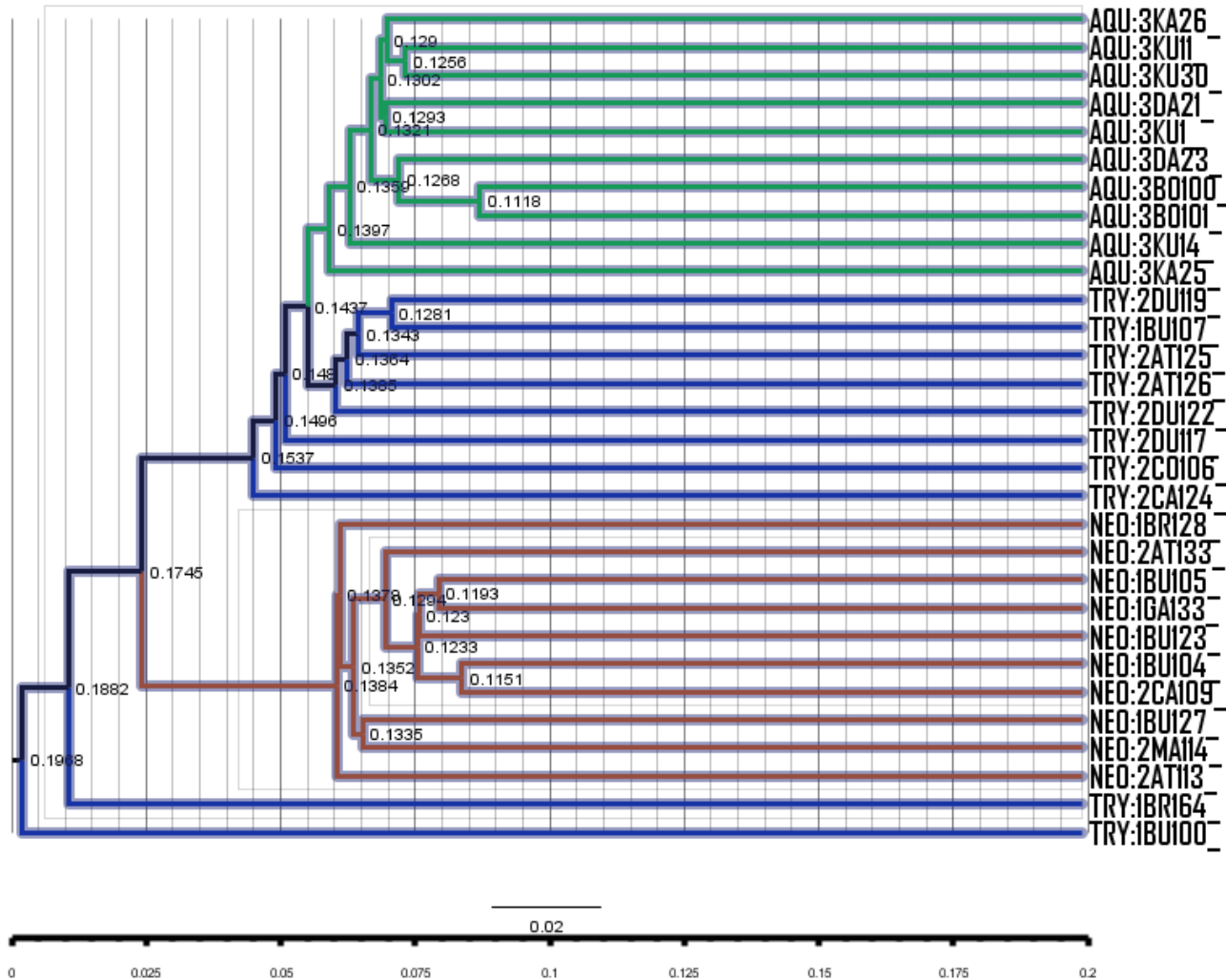
4 species:

- - *Bactrocera tryoni*
- - *Bactrocera aquilonis*
- - *Bactrocera neohumeralis*
- - *Bactrocera frauenfeldi*



BEAST

30taxa(10XTry/Neo/Aqu) 7millionGenerations 28Jan16



Support

Technical support



NeSI
New Zealand eScience
Infrastructure



Any Questions?

