

Emerging Voices Shaping Regional Integration for a Food Secure World

10–11 August 2026

Parliament House, Canberra,
Australia, and online



Identification of Fruit Fly Biomarkers using MALDI-ToF Mass Spectrometry

Jowell Darwiche

The Crawford Fund For Food Security Annual Conference

11/08/2026



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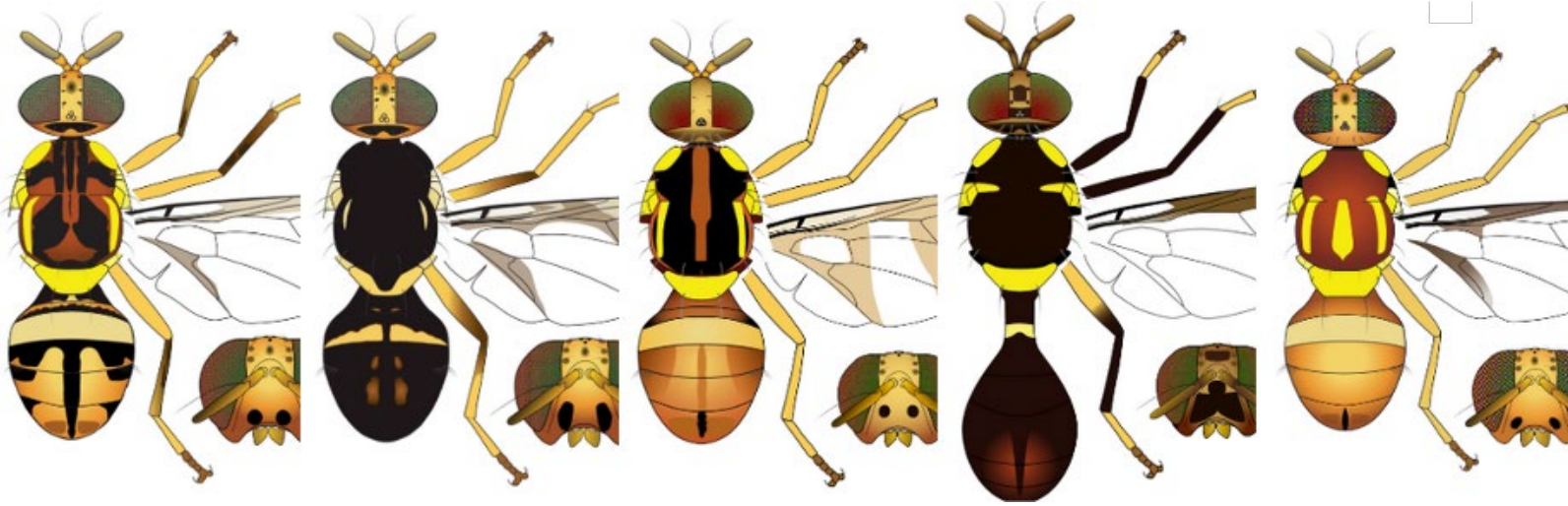


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The Foundation of Biosecurity – Pest Diagnostics!



Morphological Identification

- Cost-effective, rapid & versatile
- Requires entomological expertise
- Difficultly with damaged, immature or morphologically-similar specimens

Genetic Analysis

- Accurate, reproducible & sensitive
- Laborious, costly & time-consuming
- Poor differentiation of closely-related species



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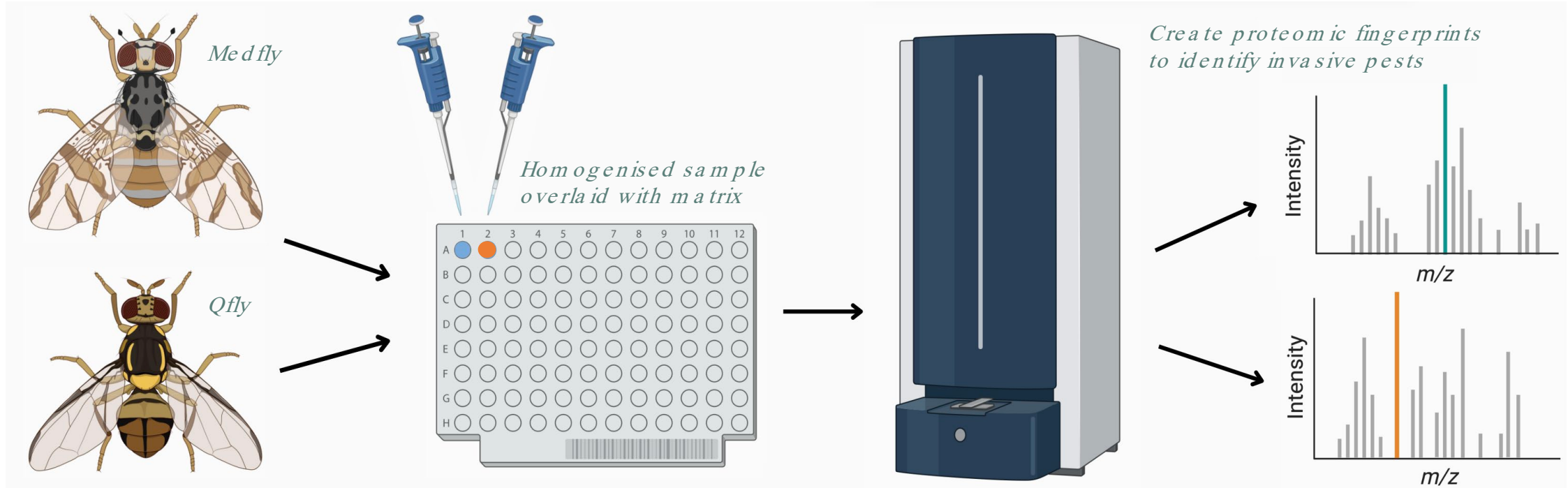
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MALDI-ToF Mass Spectrometry

Matrix Assisted Laser Desorption/Ionization – Time of Flight



- Non-quantitative, proteomic-based identification
- Takes <1 minute & costs <\$1 per spot!
- May also differentiate different biological traits ...



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What Could we do with MALDI-ToF Analysis?



Life Stages and Age

Discern age of specimen and species from eggs, larvae and pupae



Laboratory vs Wild Flies

Differentiate rearing origin of fruit fly to aid assessment of SIT & MAT



Fertility and Mating Status

Distinguish sex, fertility & mating status for more better assessment of breeding activity and risk



Pesticide-Resistance

Identify biomarkers indicative of pesticide-resistance



Radiation Exposure

Determine if a pest has been irradiated to test phytosanitary irradiation



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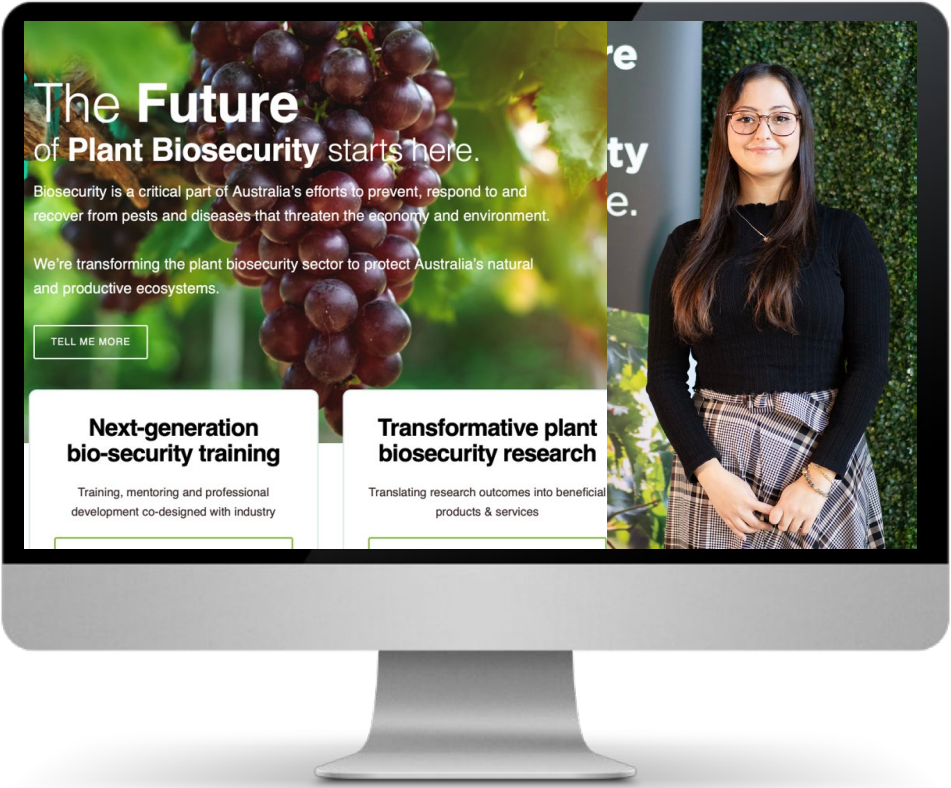
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Thank You!

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Acknowledgements:



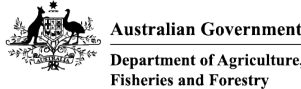
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