What goes around comes around: sampling arthropod environmental DNA using active and passive trapping systems.

Francesco Martoni, Lea Rako, Alexander Piper, Jack Scanlan, Brendan Rodoni, Mark Blacket.

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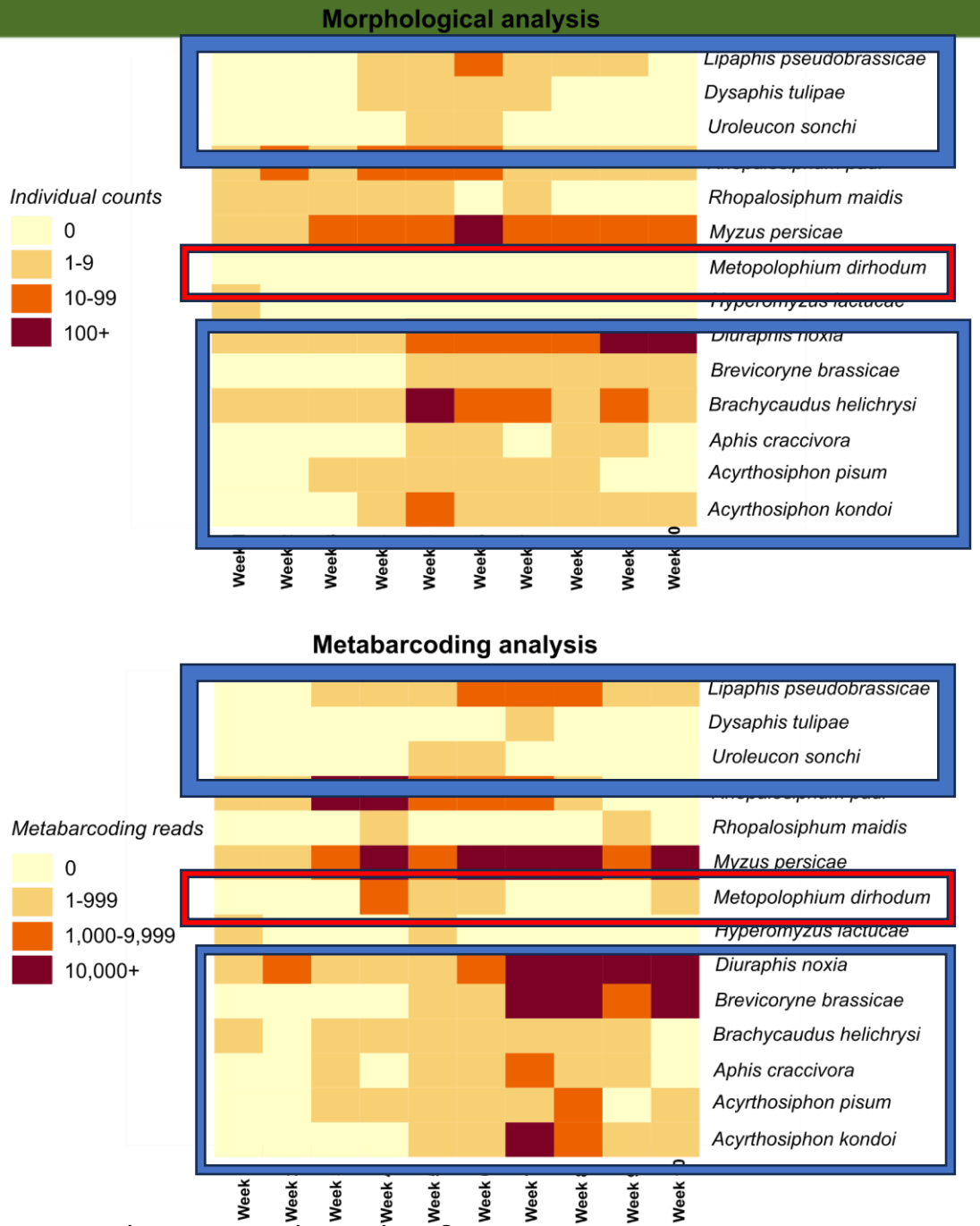
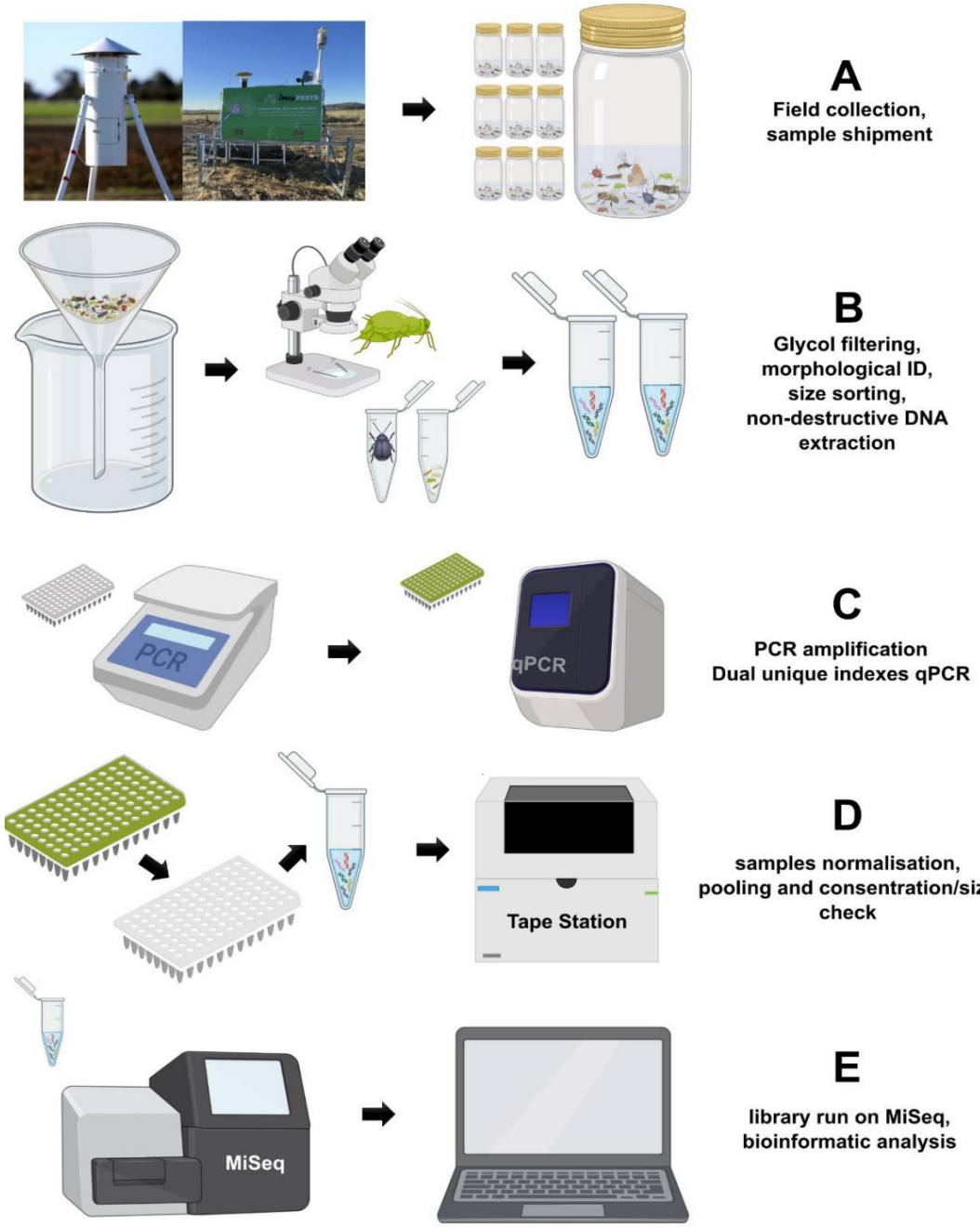
I acknowledge the Wurundjeri people of the Kulin nation, traditional custodians of Naarm (Melbourne)

Who were the first psyllid taxonomists, using different names for different lerps





Martoni *et al.* 2023 Metabarcoding & Metagenomics

“Buttare via il bambino con l’acqua sporca” [Throw away the baby with the dirty water]

“Don’t throw away the glycol, either!”

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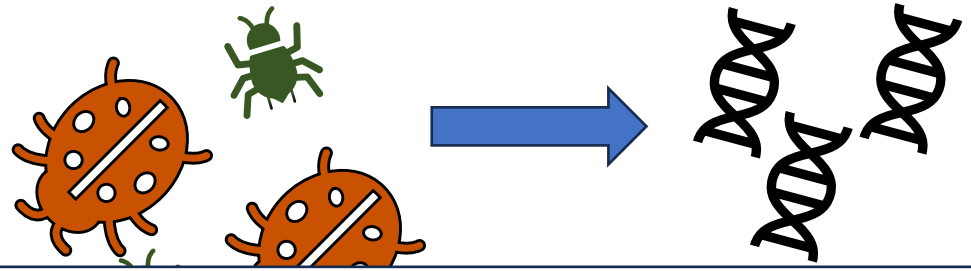
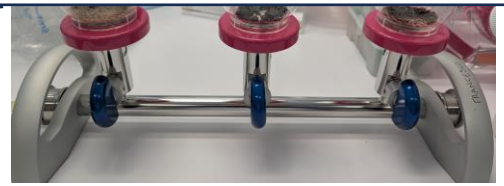


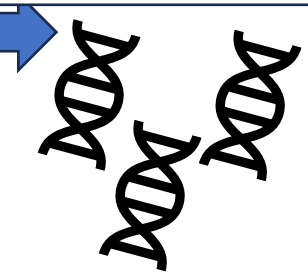
Insect DNA

Can we throw away the baby and keep the dirty water?

Insects trapped in Glycol



DNA extraction from filtered Glycol



Insect DNA

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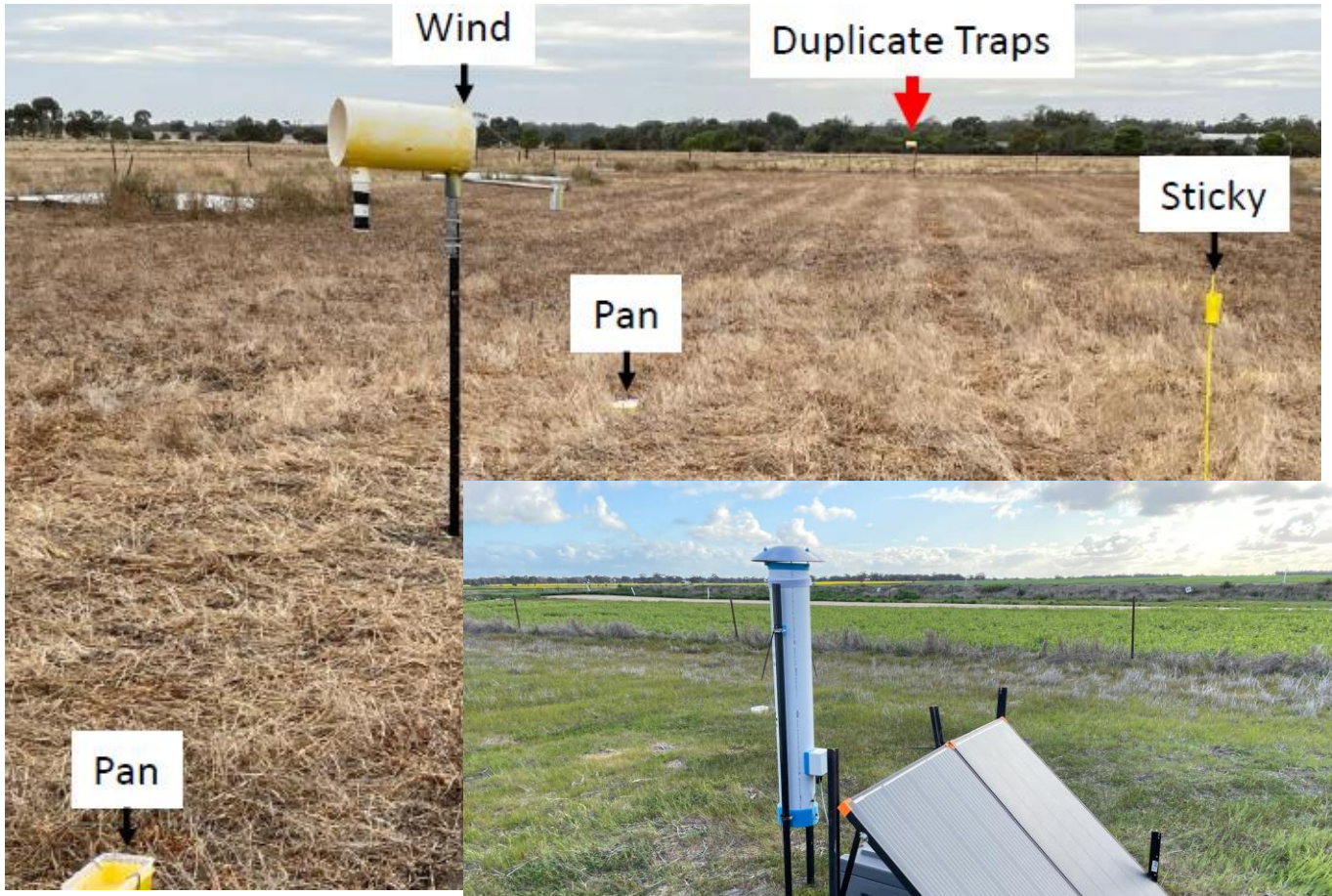
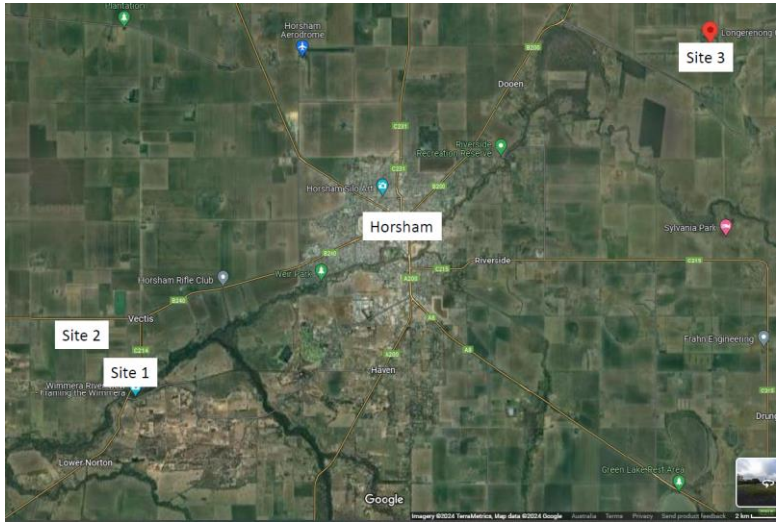

Wind
Duplicate Traps
Sticky
Pan
Pan


Site 1 A
Site 1 B


Site 3
Horsham
Site 2
Site 1
Google

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Aims

- Understand if DNA sequences that cannot be matched to insect bodies can be due to airborne DNA and can therefore be considered “true positives”.
- To improve our current metabarcoding approaches for surveillance and biosecurity. If we can get same/similar results when extracting DNA from the air (glycol) as compared to the insects, then this would significantly streamline our workflows.
- First preliminary insight into trap comparisons.

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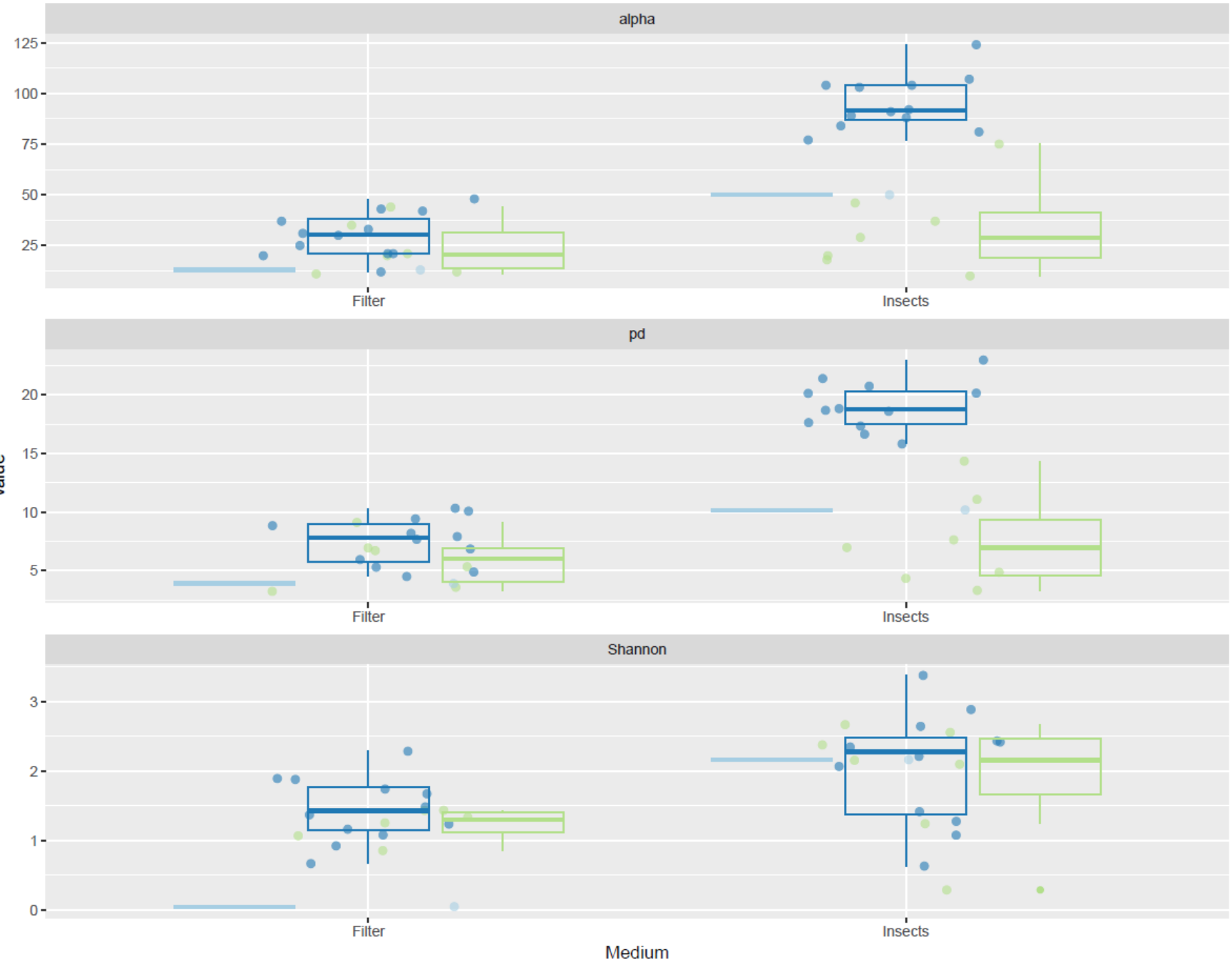

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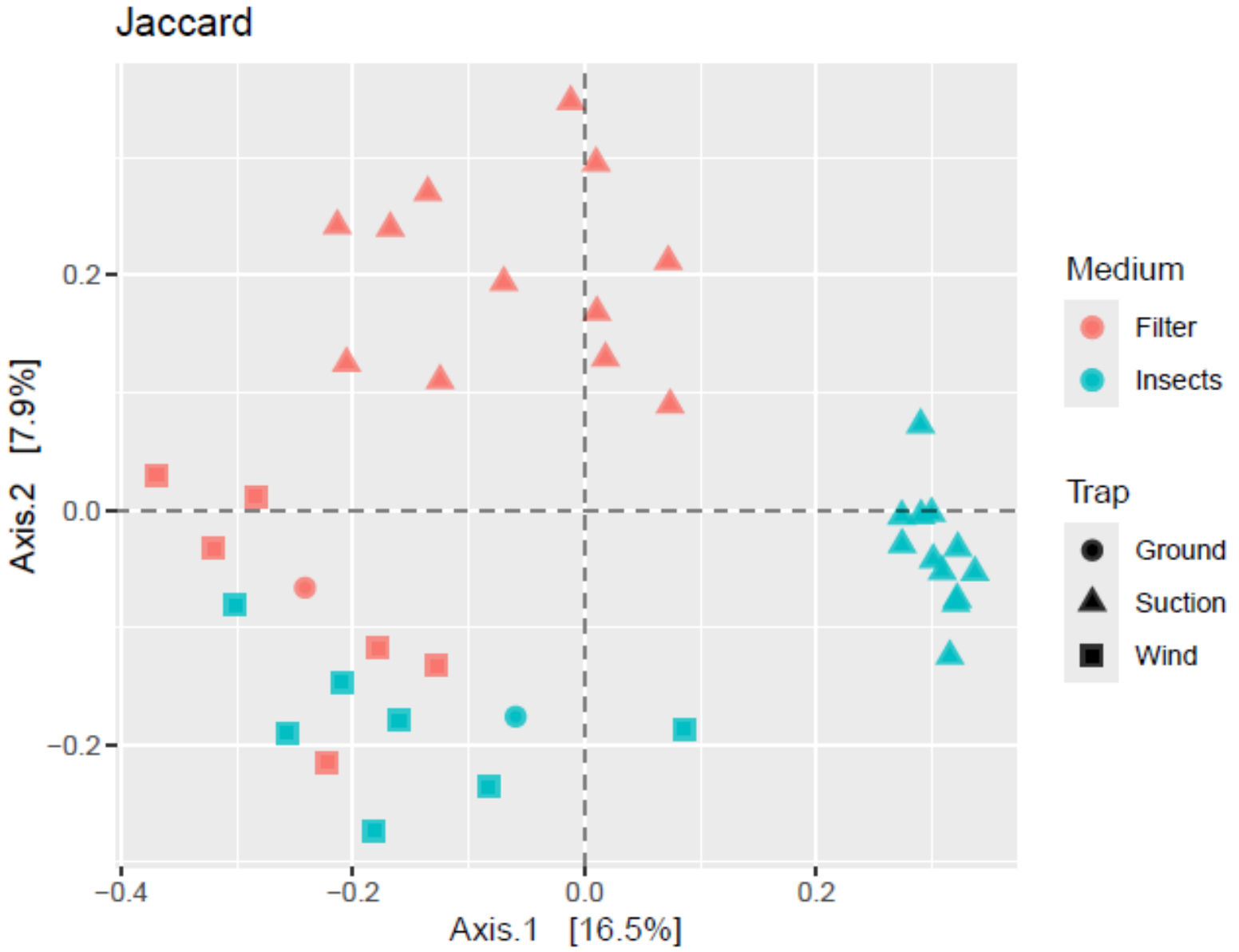

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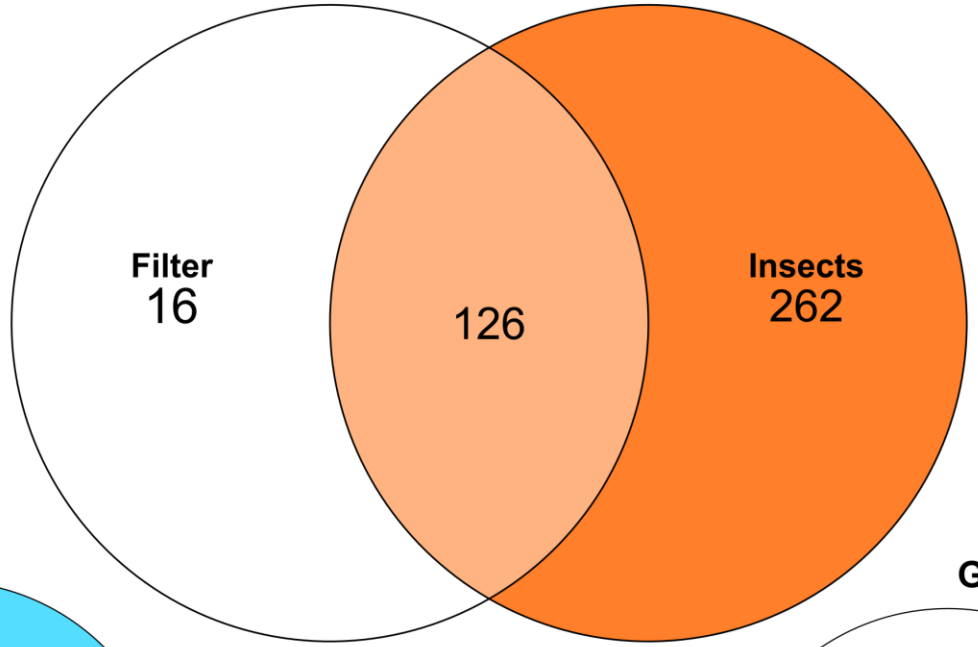

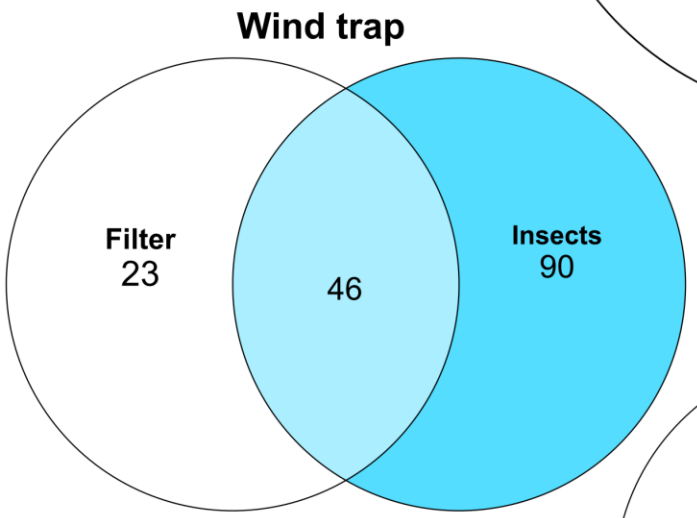

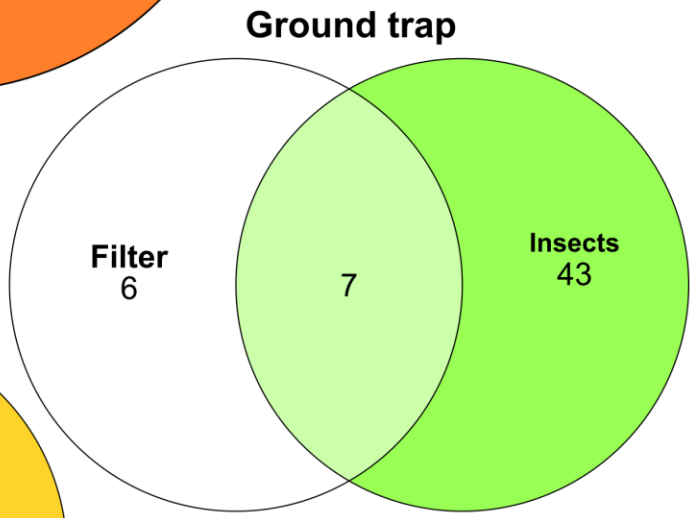

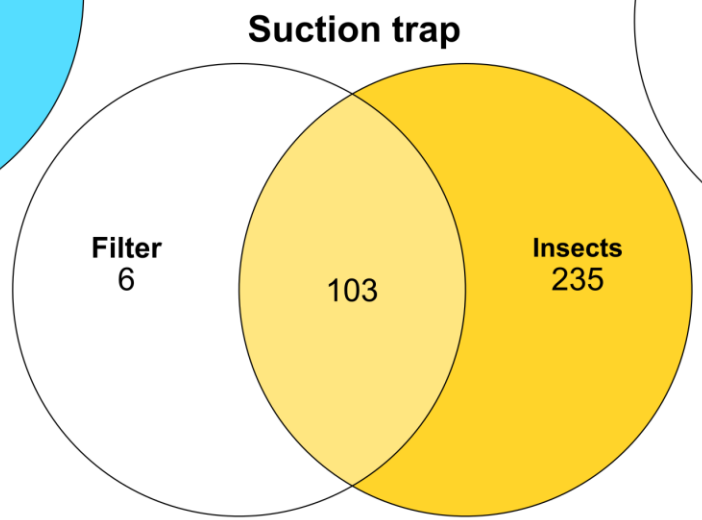

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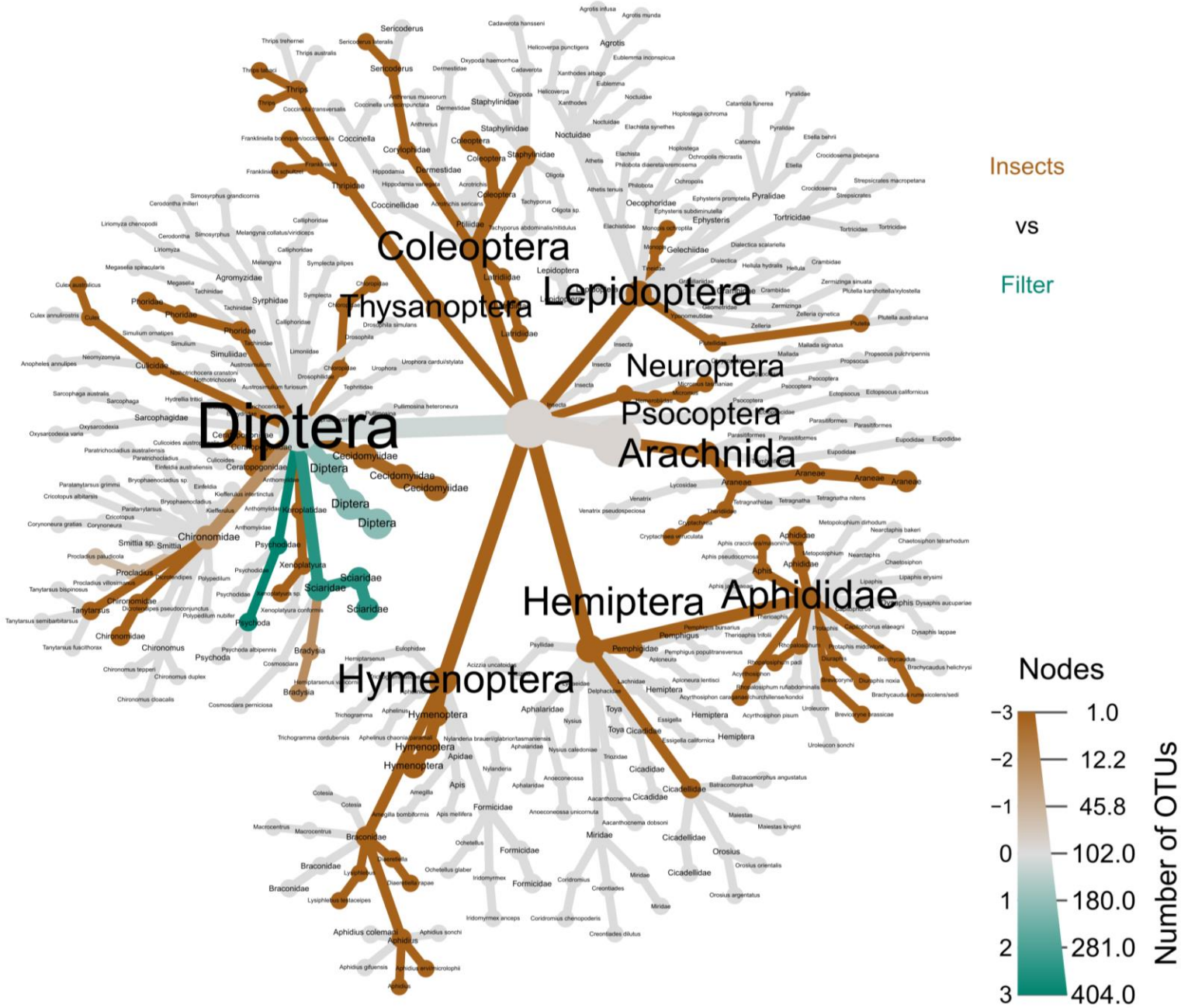

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Summary

- Insect eDNA can be collected from the air, extracting DNA directly from the preservative liquid, but it is not as effective as the insects themselves.
- Number of traps and sampling strategy are of paramount importance and should be tailored on the study focus / stakeholder interest.
- A safe approach would be to keep both the baby and the dirty water..

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The Team

- Brendan Rodoni – MSPD Team leader
- Joshua Fanning – Plant Pathology team leader
- Fiona Constable – Microbiology team leader
- Paul Cunningham – I&WS team leader
- Tim Sawbridge– Plant Pathology
- Saidi Achari– Plant Pathology
- Hari Dadu – Plant Pathology
- Atika Morrell – PhD Student Plant Pathology
- Sally Norton – Australian Grains Genebank
- Shane King- AGG PEQ
- Mark Blacket – Entomology
- Francesco Martoni – Entomology
- Alex Piper – Entomology
- Lea Rako - Entomology
- Jack Scanlan – Entomology/Bioinformatics
- Jessi Henneken - Entomology
- Lachlan Gretgrix – PhD Student Entomology
- Michael Edwards – PhD Student Entomology
- Aimee McKinnon – Microbial Biocontrol
- Madita Prince – PhD Student Microbial Biocontrol