Alexander Piper

Research Scientist

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I am a Molecular Biologist and Bioinformatician specialising in the production and analysis of large-scale genomic datasets for fundemental and applied ecological studies. I have experience conducting both laboratory and field experiments, from the initial experimental design through to statistical analysis and publication in peer reviewed scientific journals. I have familiarity with multiple programming languages, primarily R and bash, which i use to analyse, visualise, and communicate complex datasets. I am currently based with Agriculture Victoria Research developing high-throughput sequencing based diagnostics to improve detection and control of invertebrate pests.

Education

La Trobe University — *Melbourne, Australia*

Doctor of Philosophy (Invertebrate Biology) — *2021*

- Thesis title: Genomic Biosurveillance for Insect Pests

Queensland University of Technology — *Brisbane, Australia*

Bachelor of Science (Biology) — *2015*

- Biotechnology and Genetics Minor
- Chemistry Minor

Research Experience

Agriculture Victoria Research — *Melbourne, Australia*

Research Scientist — *2017-2021*

- Developing high-throughput sequencing assays and bioinformatic pipelines for identification of insect pests within bulk trap samples.

Agriculture Victoria Research — *Melbourne, Australia*

Research Scientist — *2016-2017*

- Investigating the role of microbial volatile organic compounds in the ecology of Bactrocera fruit flies, and their potential for application in novel insect attractant formulations.

Queensland University of Technology — *Brisbane, Australia*

Laboratory Assistant — *2015-2016*

- Isolation and physiological characterisation of environmental microbes from insect pests and their host fruits.

Queensland University of Technology — *Brisbane, Australia*

Vacation Research Scholar — *2015*

- Exploratory research into fungal symbionts of an agricultural pest insect funded by a university scholarship.

Queensland University of Technology — *Brisbane, Australia*

B.Sc. Capstone Research Project — *2015*

- Developing an environmental DNA PCR assay for detection of an invasive freshwater fish species.

Queensland University of Technology — *Brisbane, Australia*

Undergraduate Research — *2013-2014*

- Validation of transcriptomics assays using qRT-PCR.

Journal articles

1. Piper, A., Cunningham, J., Cogan, N., & Blacket, M. (2021). DNA metabarcoding enables high-throughput detection of spotted wing drosophila (drosophila suzukii) within unsorted trap catches. In *Fronteirs in Ecology and Evolution (In Review)*.
2. Batovska, J., Piper, A., Valenzuela, I., Cunningham, J., & Blacket, M. (2021). Developing a non-destructive metabarcoding protocol for detection of pest insects in bulk trap catches. *Scientific Reports*.
3. Martoni, F., Nogarotto, E., Piper, A., Mann, R., Valenzuela, I., Eow, L., Rako, L., & …. (2021). Propylene glycol and non-destructive DNA extractions enable preservation and isolation of insect and hosted bacterial DNA. *Agriculture*.

4. Baig, F., Farnier, K., Piper, A., Speight, R., & Cunningham, J. (2020). Yeasts influence host selection and larval fitness in two frugivorous carpophilus beetle species. *Journal of Chemical Ecology*.
5. Piper, A., Batovska, J., Cogan, N., Weiss, J., Cunningham, J., Rodoni, B., & …. (2019). Prospects and challenges of implementing DNA metabarcoding for high-throughput insect surveillance. *GigaScience*.
6. Piper, A., Farnier, K., Linder, T., Speight, R., & Cunningham, J. (2017). Two gut-associated yeasts in a tephritid fruit fly have contrasting effects on adult attraction and larval survival. *Journal of Chemical Ecology*.

Preprint articles

1. Piper, A., Cogan, N., Cunningham, J., & Blacket, M. (2021). Computational evaluation of DNA metabarcoding for universal diagnostics of invasive insect pests. *bioRxiv*.

Selected scientific presentations

Australian Entomological Society Conference — *Online*

A DNA metabarcoding assay for early detection of Spotted Wing Drosophila within unsorted bulk trap catches. — *2021*

International Congress of Entomology — *Helsinki, Finland (Postponed)*

Detecting the Unexpected: Invasive Insect Surveillance using Non-Destructive DNA Metabarcoding. — *2020*

Australian Entomological Society Conference — *Brisbane, Queensland*

Towards quantitative and high-throughput insect surveillance using DNA Metabarcoding. — *2019*

Agriculture Victoria Regional Science Conference — *Tatura, Victoria*

An updated molecular toolbox for Biosecurity. — *2019*

AgriBio Science Conference — *Melboure, Victoria*

Detecting the unexpected, DNA metabarcoding for high-throughput insect surveillance. — *2018*

Victorian DNA Barcoding Workshop — *Melbourne, Victoria*

Quality control considerations for metabarcoding. — *2018*

Australian Entomological Society Conference — *Alice Springs, Northern Territory*

Detecting the unexpected, DNA metabarcoding for high-throughput insect surveillance. — *2018*

iMapPESTS metabarcoding Workshop — *Melbourne, Victoria*

Quality control considerations for metabarcoding. — *2018*

SciPlant 17 — *Brisbane, Queensland*

The importance of Yeasts in the ecology and control of the Queensland Fruit Fly. — *2017*

Australian Entomological Society Conference — *Terrigal, New South Wales*

Yeast-insect interactions in the Queensland fruit fly (Bactrocera tryoni). — *2017*

Biology of Tephritid Fruit Flies Meeting IV — *Melbourne, Victoria*

A microbial hypothesis for Queensland fruit fly host selection. — *2016*

Software development

2021 — **taxreturn**: Lead developer
An R package for retrieving and curating public DNA sequence datasets for use in metabarcoding studies.

2021 — **piperline**: Lead developer
A nextflow-based pipeline for identification of regulated species in metabarcoding datasets.

Service

- Reviewer for EU-funded project 'VALITEST' Work Package 2 - Guidelines for validation and application of non-targeted HTS diagnostic procedures in plant pest diagnostics.
- Reviewer for Molecular Ecology Resources (2), Evolutionary Ecology (1), Computational and Structural Biotechnology Journal (1), and Journal of Economic Entomology (1).
- Participant in the Insect Genetic Technologies Research Coordination Network (IGTRCN).

Awards & Distinctions

2019	Emerging Scientist Award	*Agriculture Victoria*
2015	Vacation Research Scholarship	*QUT*
2015	Deans Scholar award for Excellence	*QUT*
2014	STEM Overseas Exchange Scholarship	*QUT*
2014	Deans Scholar award for Excellence	*QUT*

Society memberships

- Member, Australian Bioinformatics and Computational Biology Society.
- Member, Australian Entomological Society.
- Member, Statistical Society of Australia.
- Member, Society for Molecular Biology and Evolution.
- Member, International Society for Computational Biology.

References

- **Assoc Prof. Paul Cunningham**
  Research Leader — Invertebrate and Weed Sciences
  Agriculture Victoria Research
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  Email: `paul.cunningham@agriculture.vic.gov.au`
- **Dr. Noel Cogan**
  Research Leader — Molecular Genetics
  Agriculture Victoria Research
  Phone: +613 9032 7096
  Email: `noel.cogan@agriculture.vic.gov.au`
- **Dr. Mark Blacket**
  Senior Research Scientist — Invertebrate and Weed Sciences
  Agriculture Victoria Research
  Phone: +613 9032 7333
  Email: `mark.blacket@agriculture.vic.gov.au`