

The role of natural enemies in suppression of paropsine beetles in New Zealand

C. Weser¹, S. Pawson¹, T. Withers²,
Manpreet Dhami³ & Ana Podolyan³



¹University of Canterbury, Christchurch, New Zealand

²Scion, Scion, Rotorua, New Zealand

³Manaaki Whenua Landcare Research, Lincoln, New Zealand

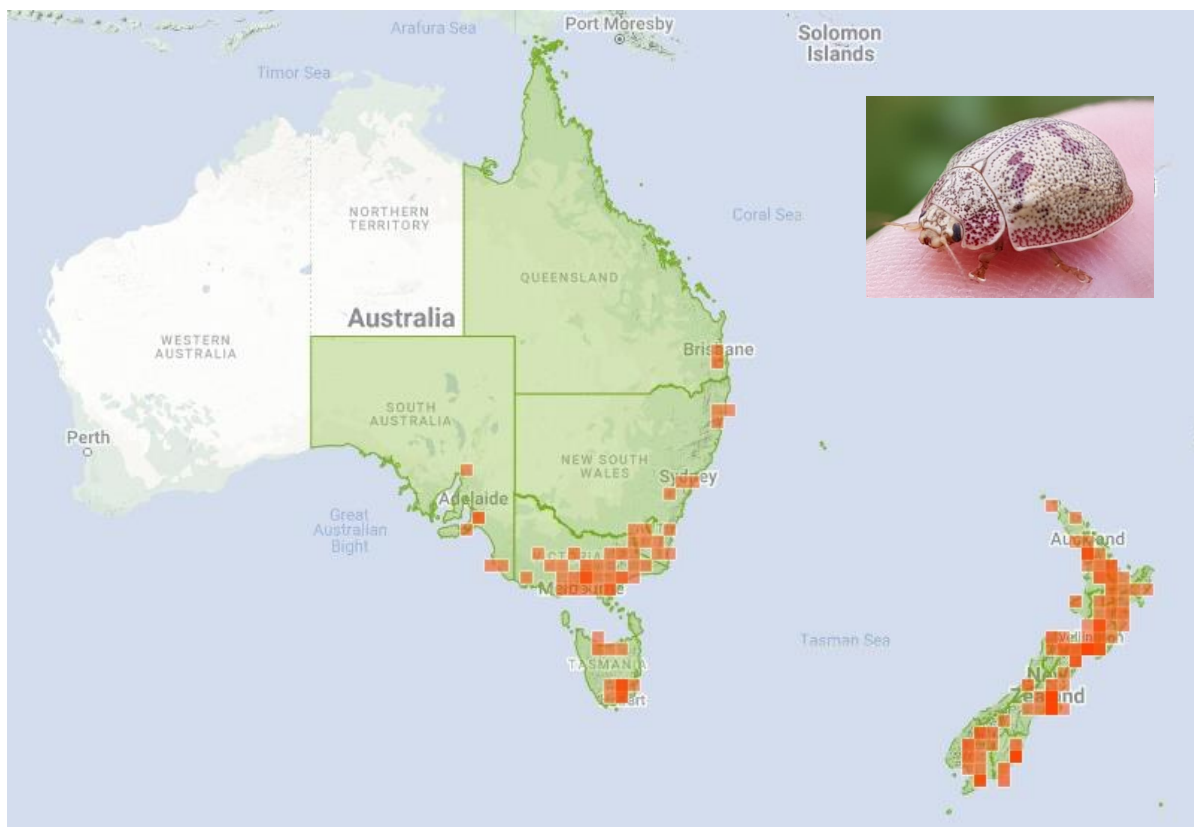
BACKGROUND



- Eucalypts in NZ since 1860s
- 6 eucalypt-defoliating paropsine leaf beetles (Coleoptera: Chrysomelidae) in NZ
- *Paropsis charybdis* in NZ for >100 years and most damaging
- *Paropsisterna cloelia* first detected in NZ in 2016

BACKGROUND

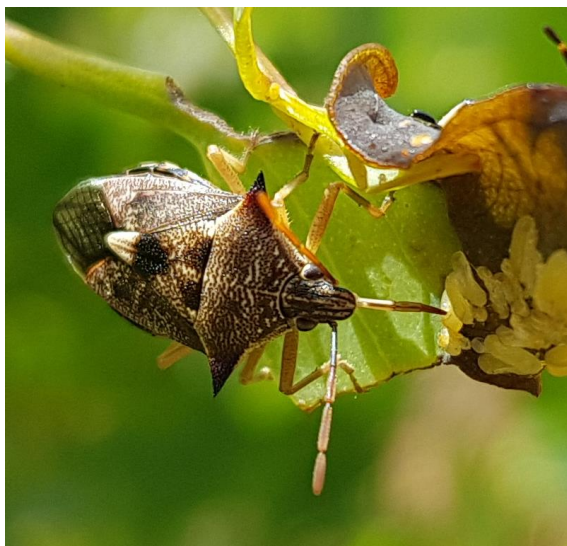
P. charybdis



Pst. cloelia



RESEARCH QUESTIONS



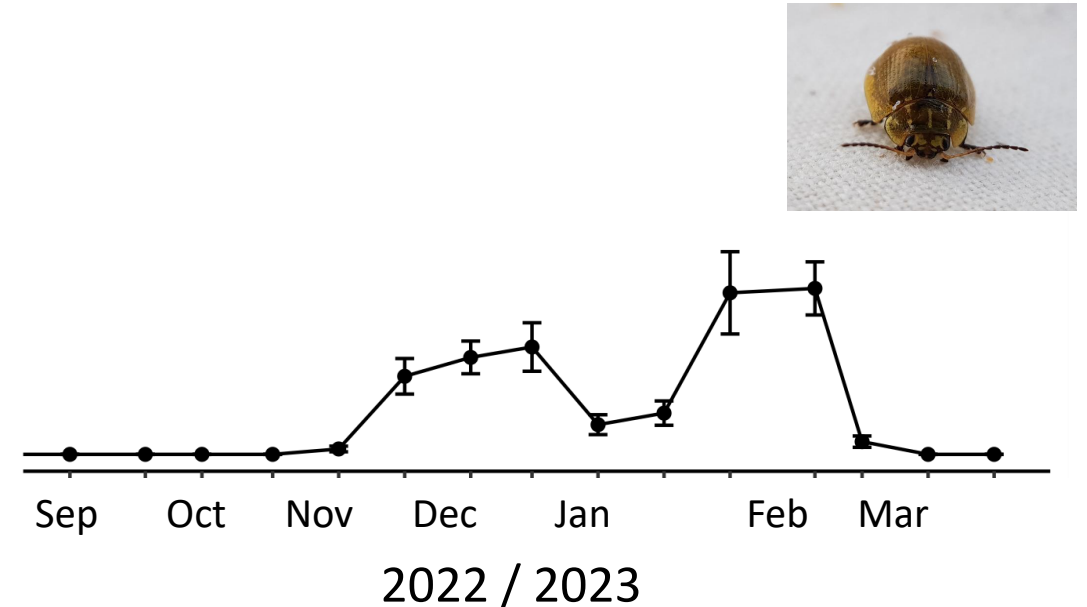
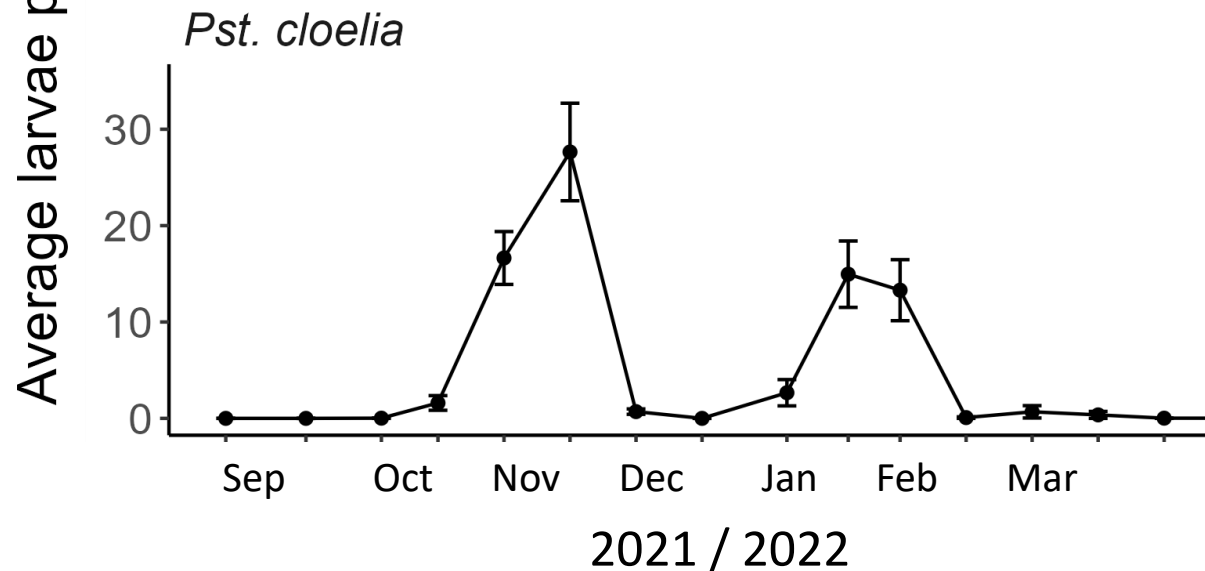
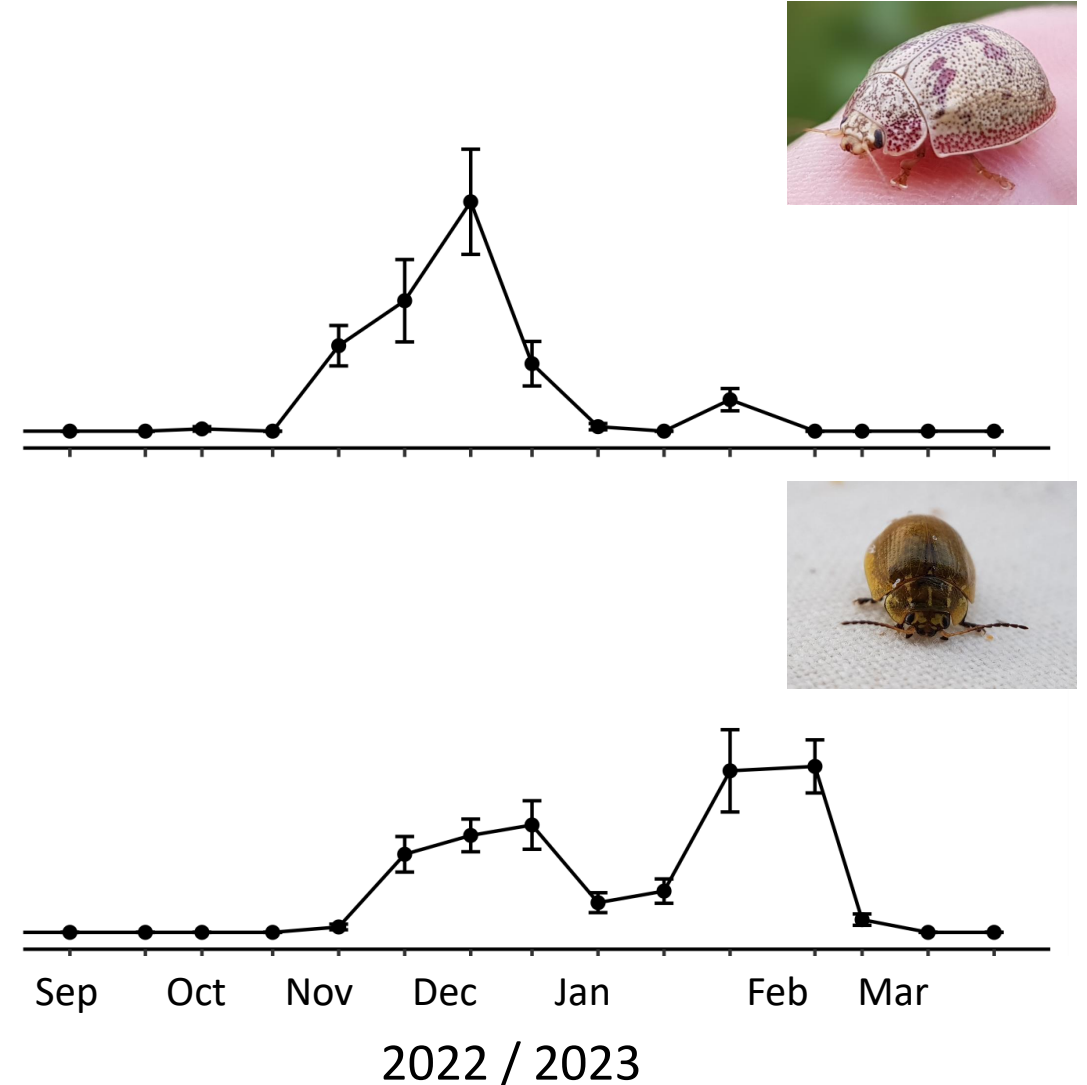
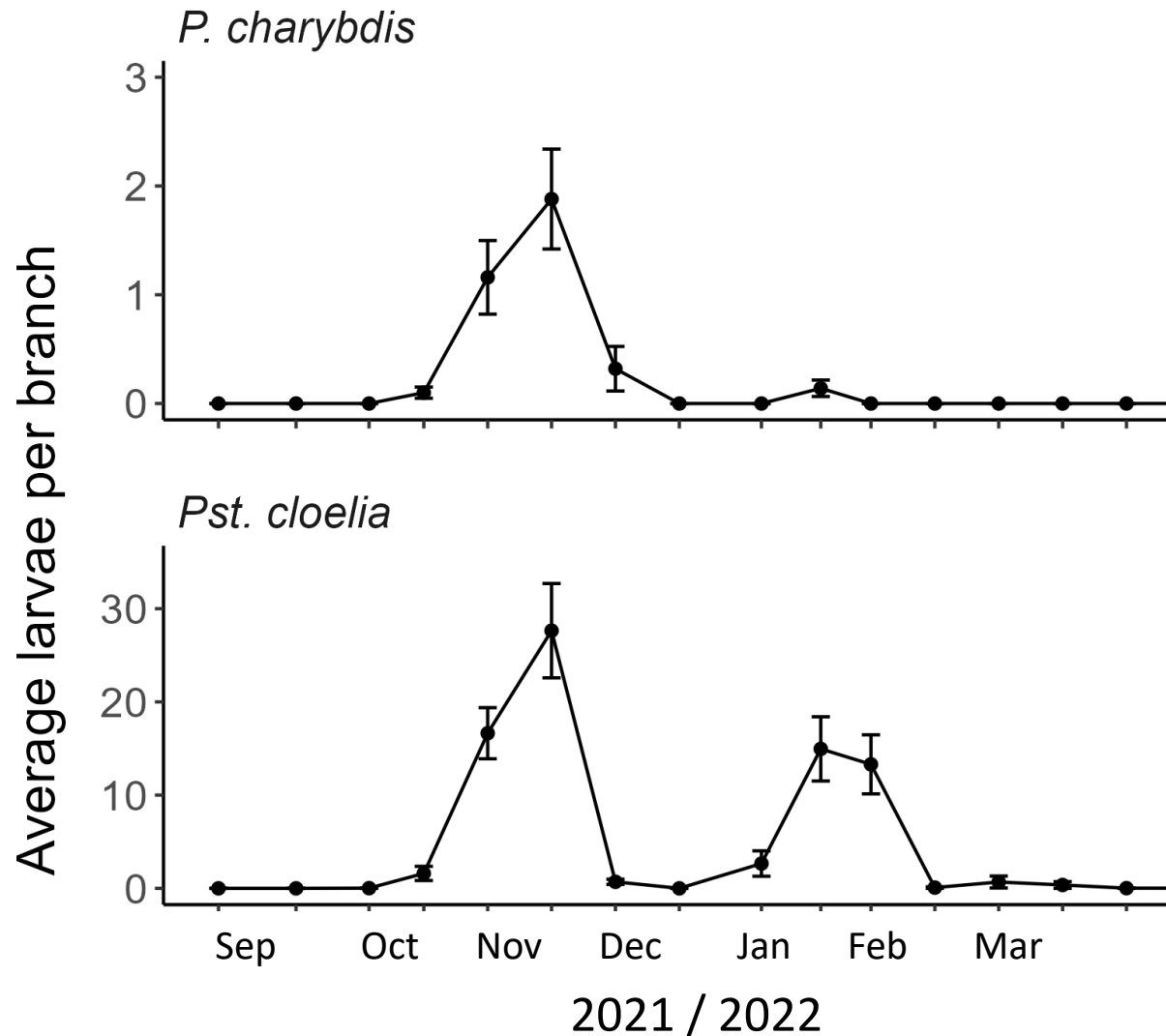
1. What is the **phenology** of *Pst. cloelia* & *P. charybdis*?
2. Which are the most **abundant predators**?
3. Which species are **active paropsine predators**?
4. Do *P. charybdis* **egg parasitoids** have an impact on *Pst. cloelia*?

1. PHENOLOGY – Methods



- Two seasons: 2021/22 & 2022/23
- 15 fortnightly sampling trips (Sep-Mar)
- *Eucalyptus bosistoana* in South Island
- 5 branches on 10 sampling trees
- Counted beetle life stages

1. PHENOLOGY – Results



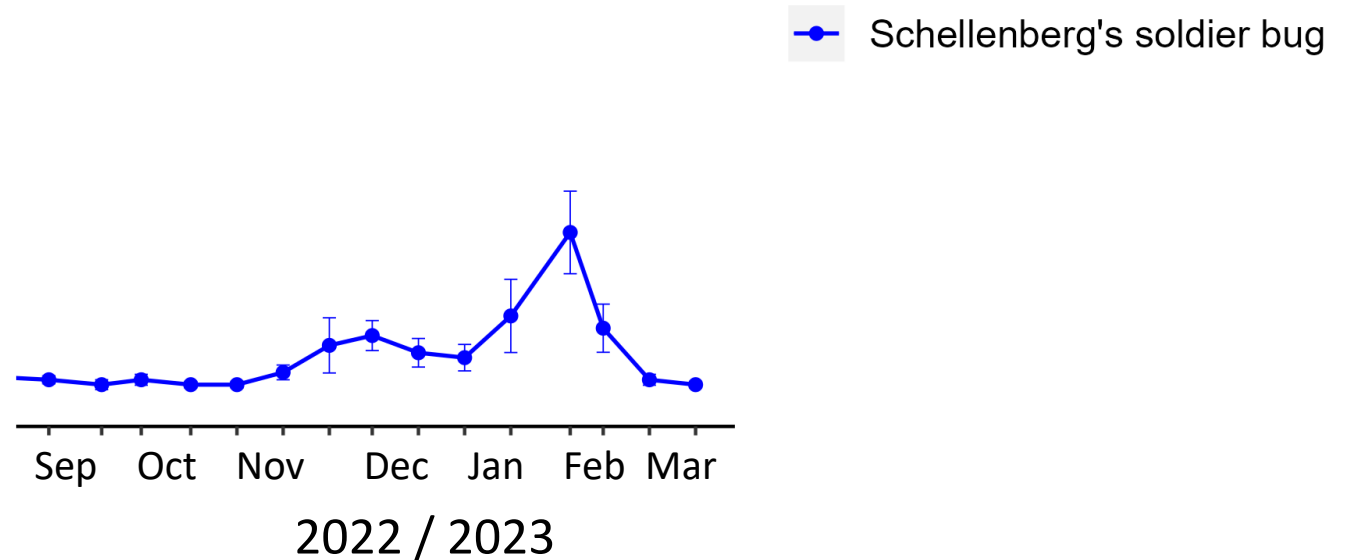
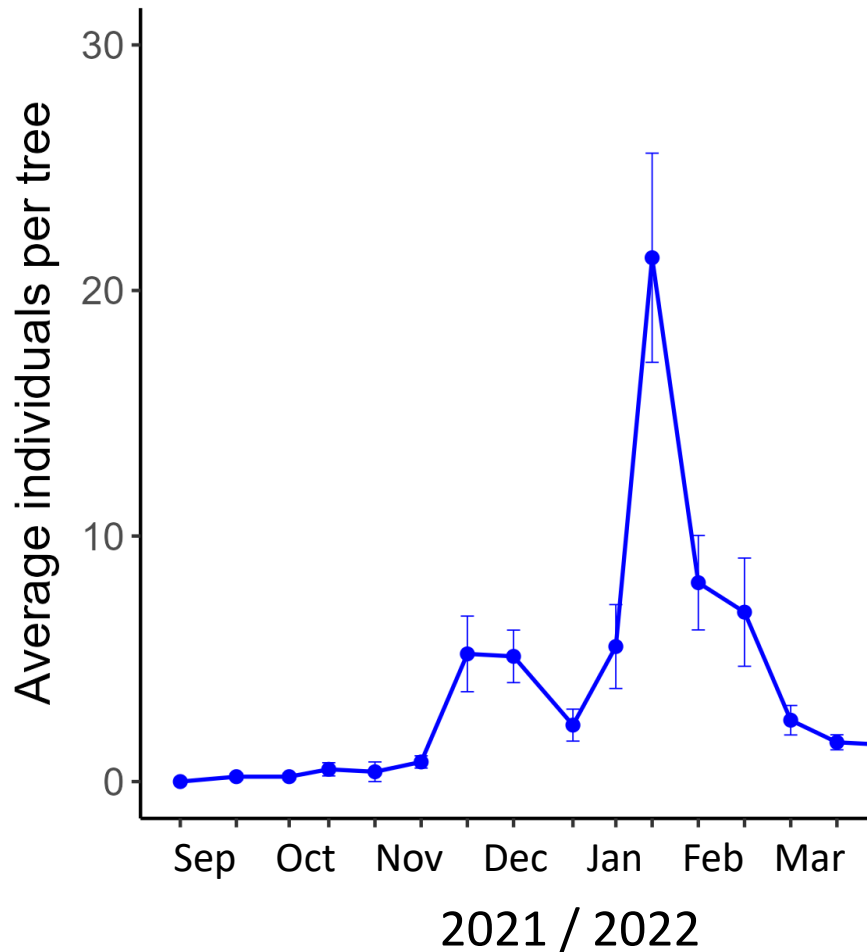
2. PREDATOR ABUNDANCE – Methods



- Two seasons: 2021/22 & 2022/23
- Collected predatory arthropods (entire trees)
- Identified & counted predators

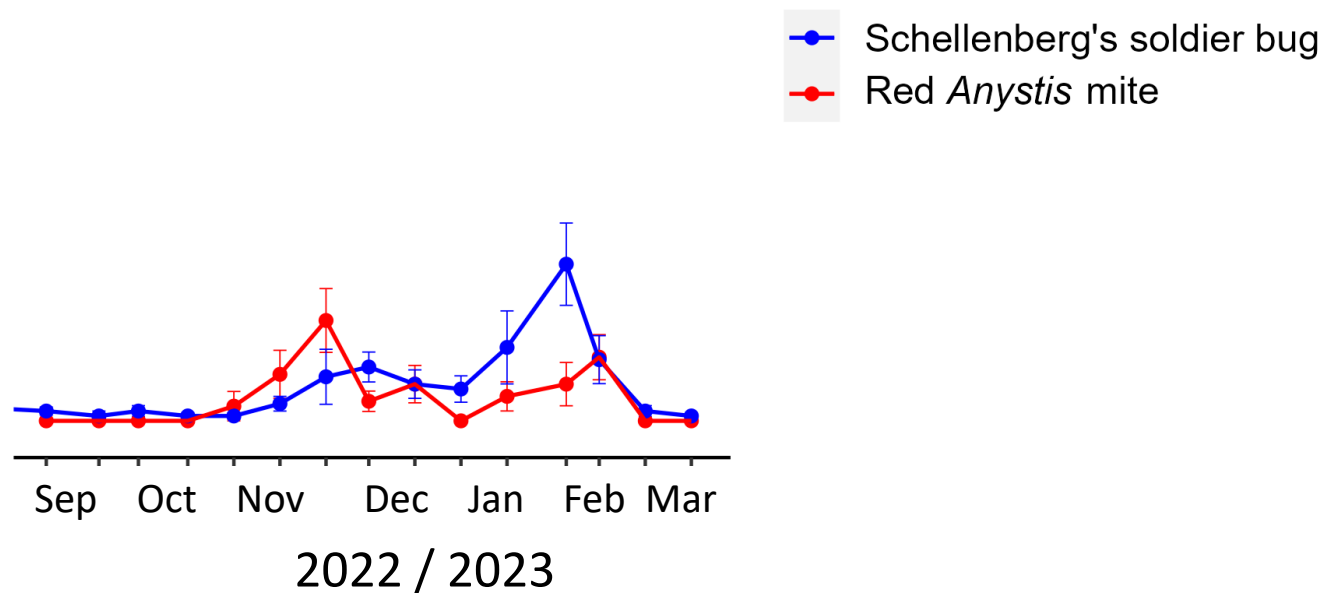
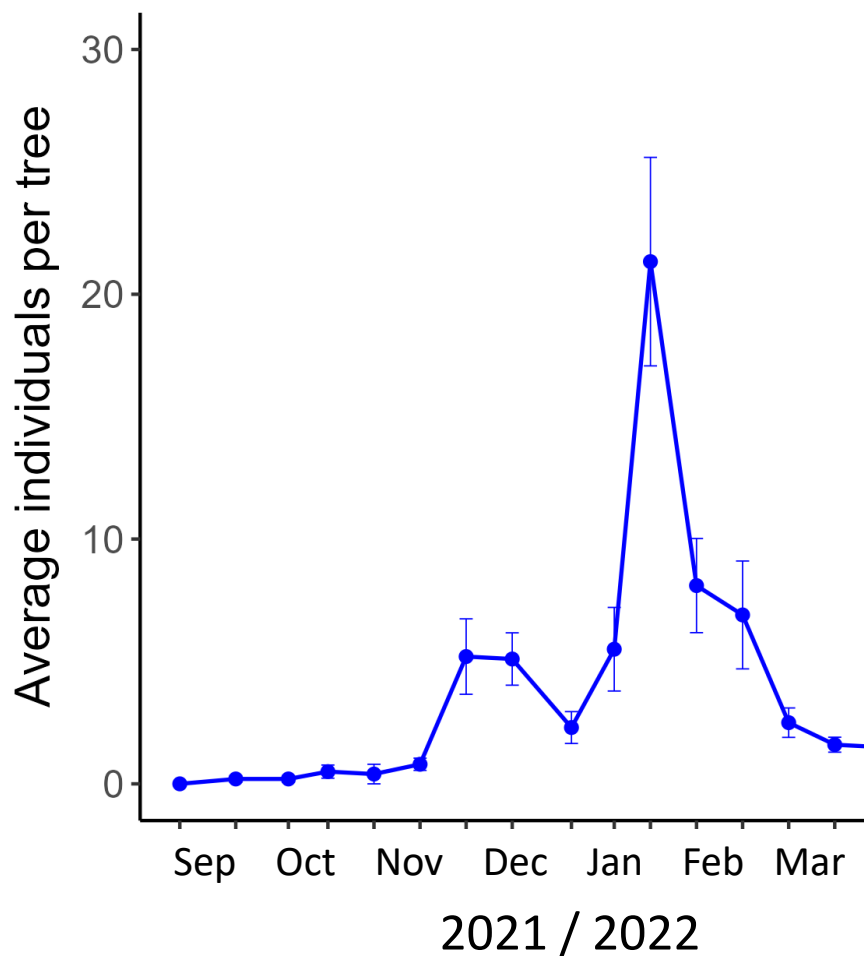
2. PREDATOR ABUNDANCE – Results

Insects & red mites



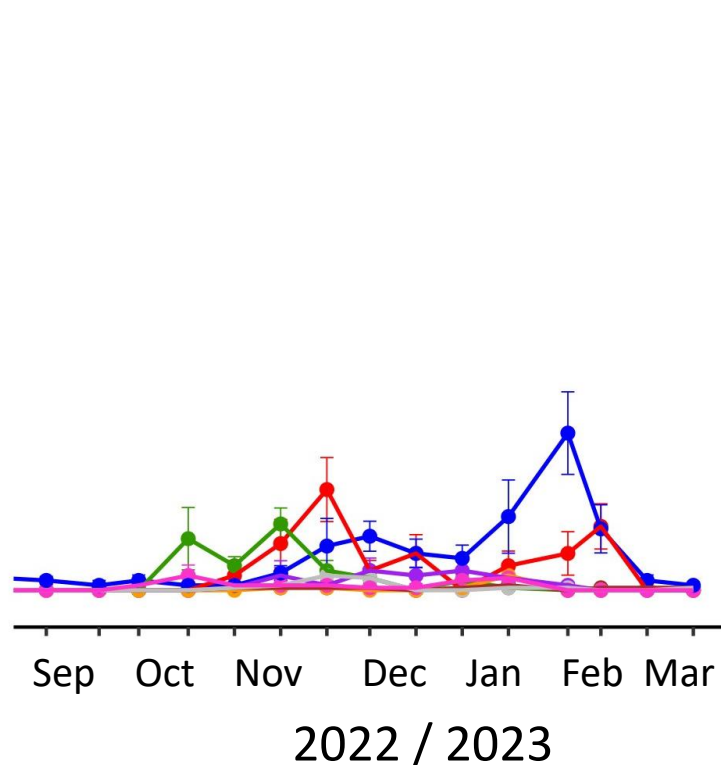
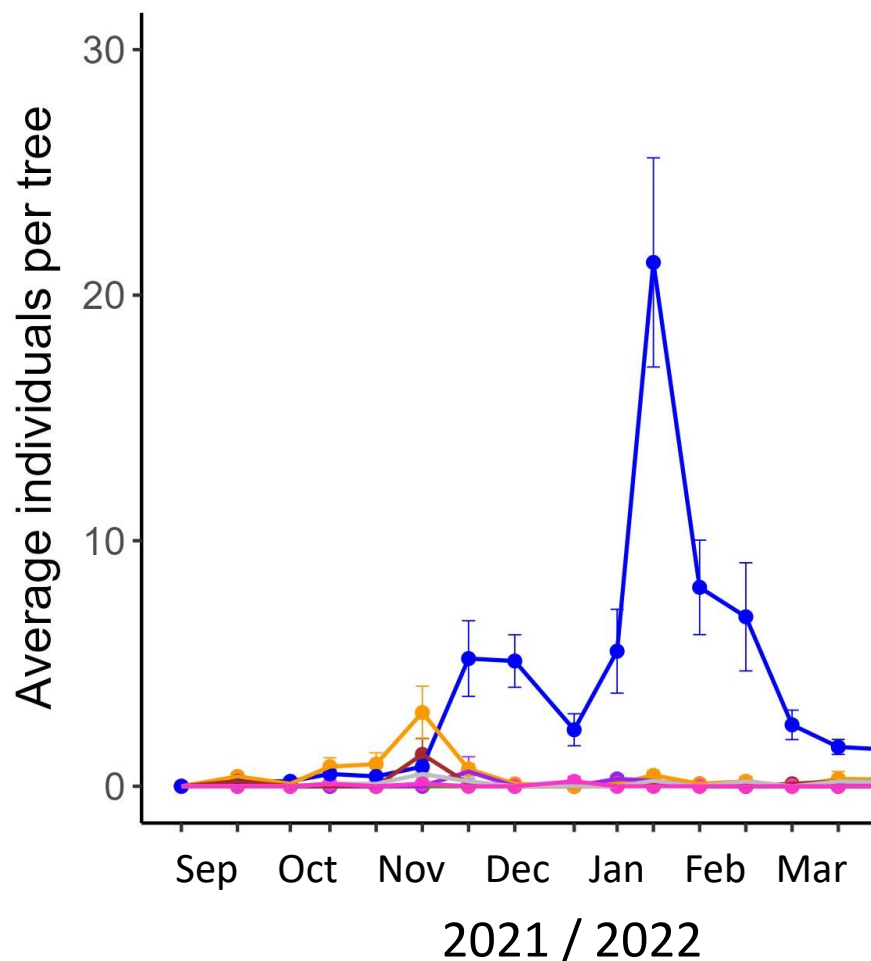
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Insects & red mites

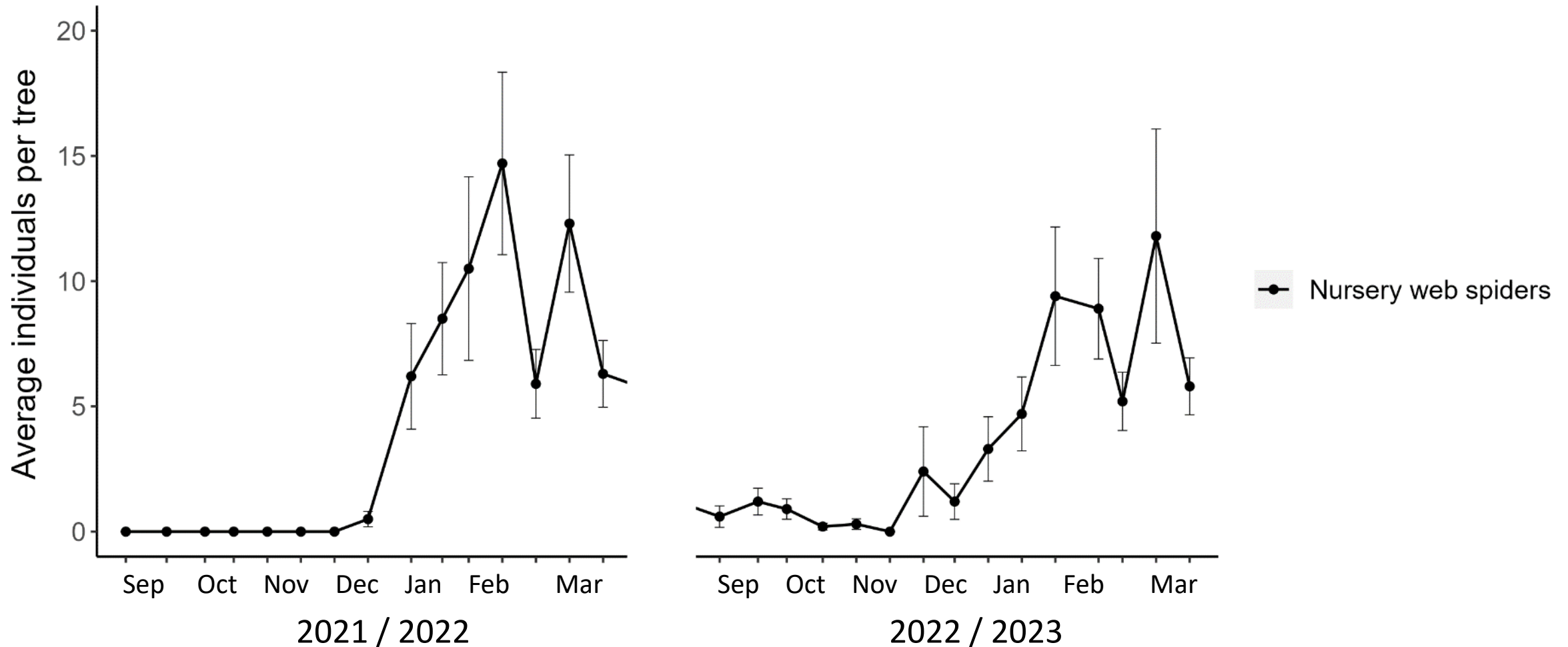


- Schellenberg's soldier bug
- Red *Anystis* mite
- *Ausejanus* mirid
- Harlequin ladybeetle
- Tasmanian ladybeetle
- 2-spotted ladybeetle
- 11-spotted ladybeetle
- Tasmanian lacewing



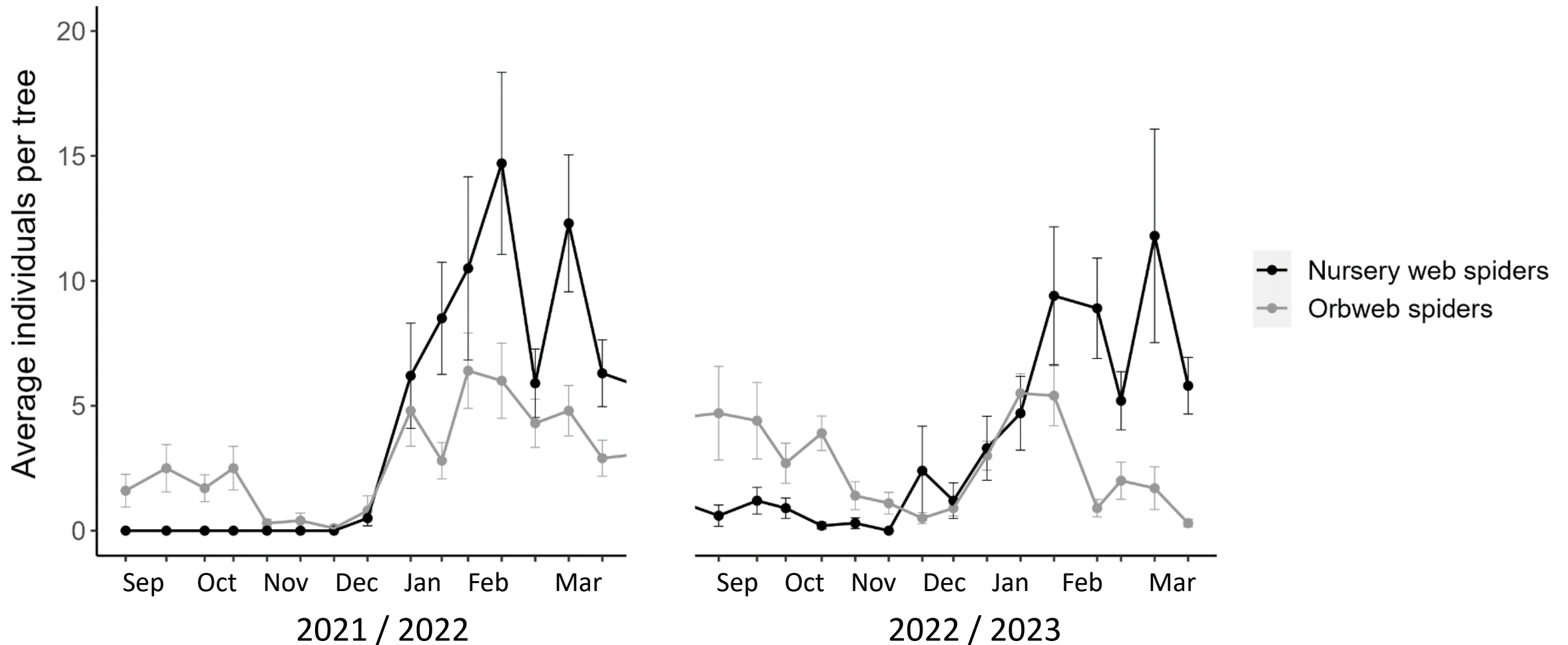
2. PREDATOR ABUNDANCE – Results (cont.)

Spiders



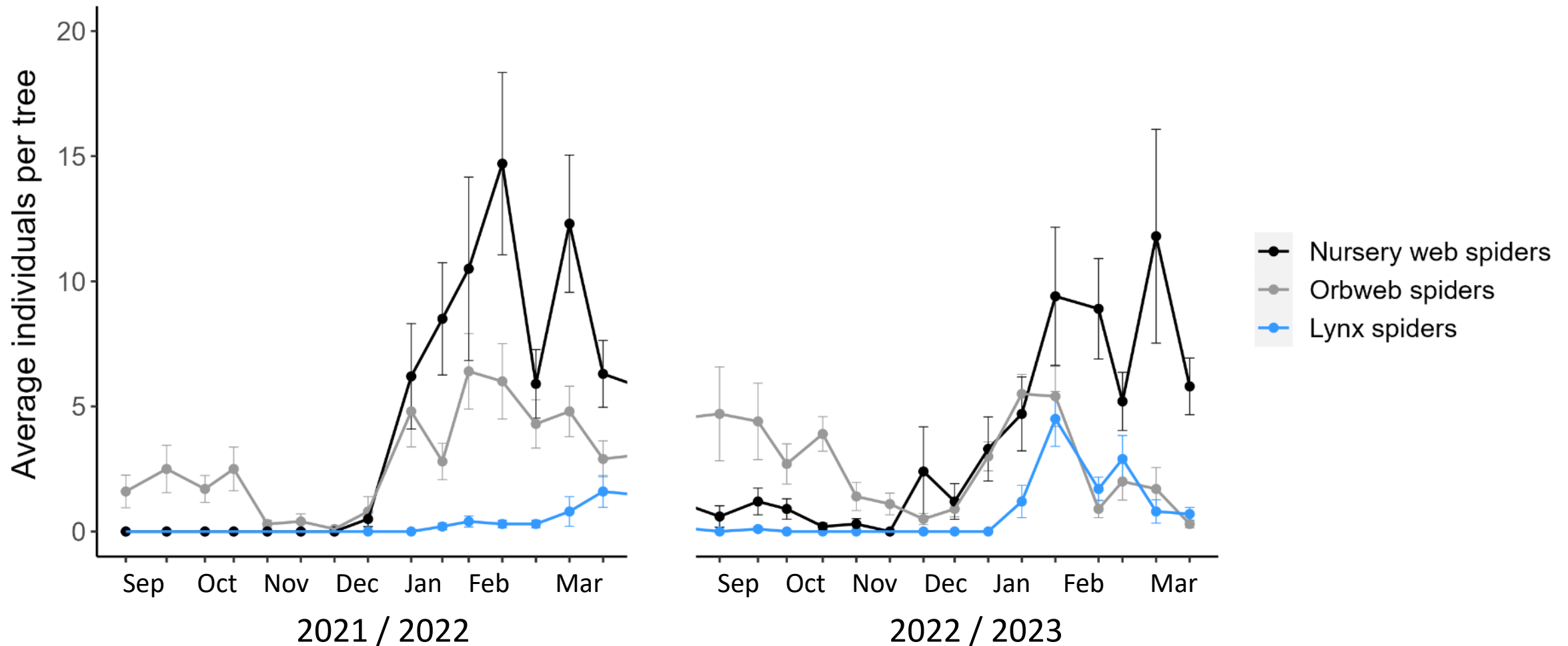
2. PREDATOR ABUNDANCE – Results (cont.)

Spiders



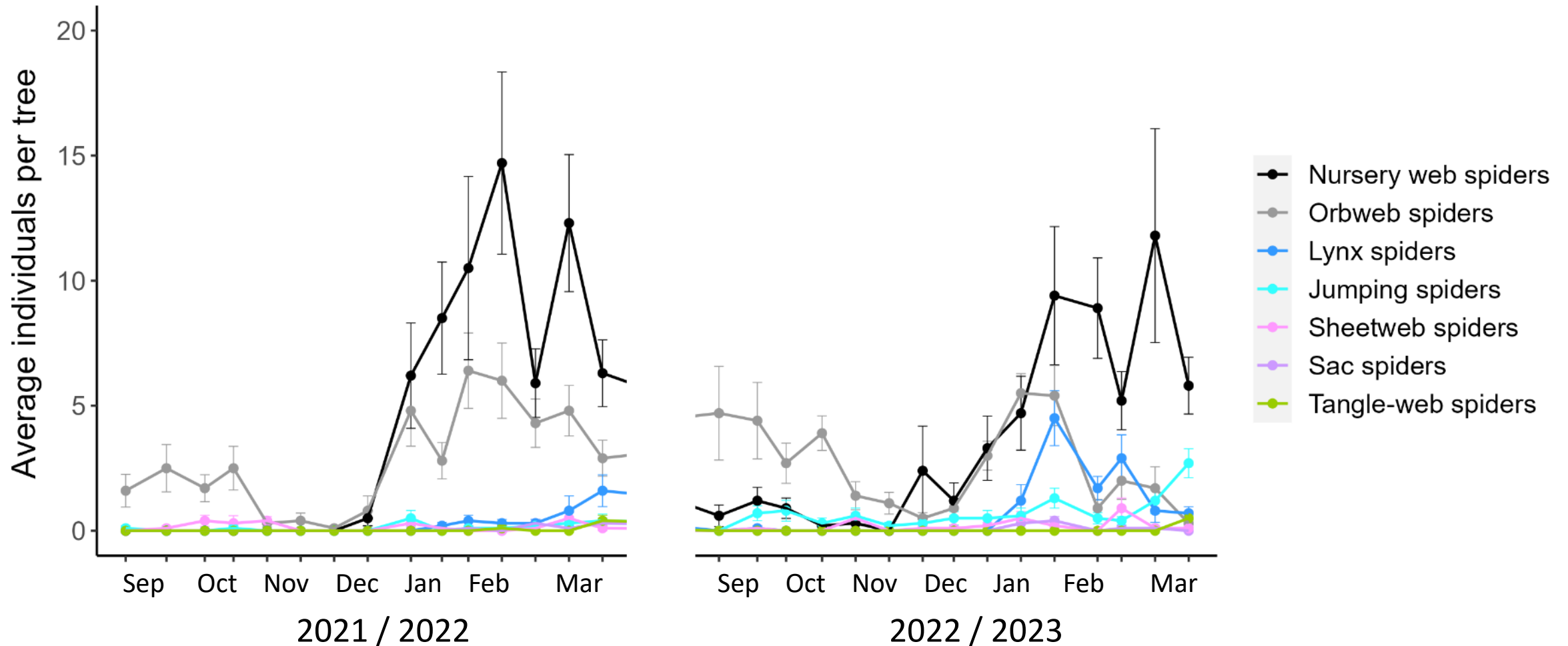
2. PREDATOR ABUNDANCE – Results (cont.)

Spiders

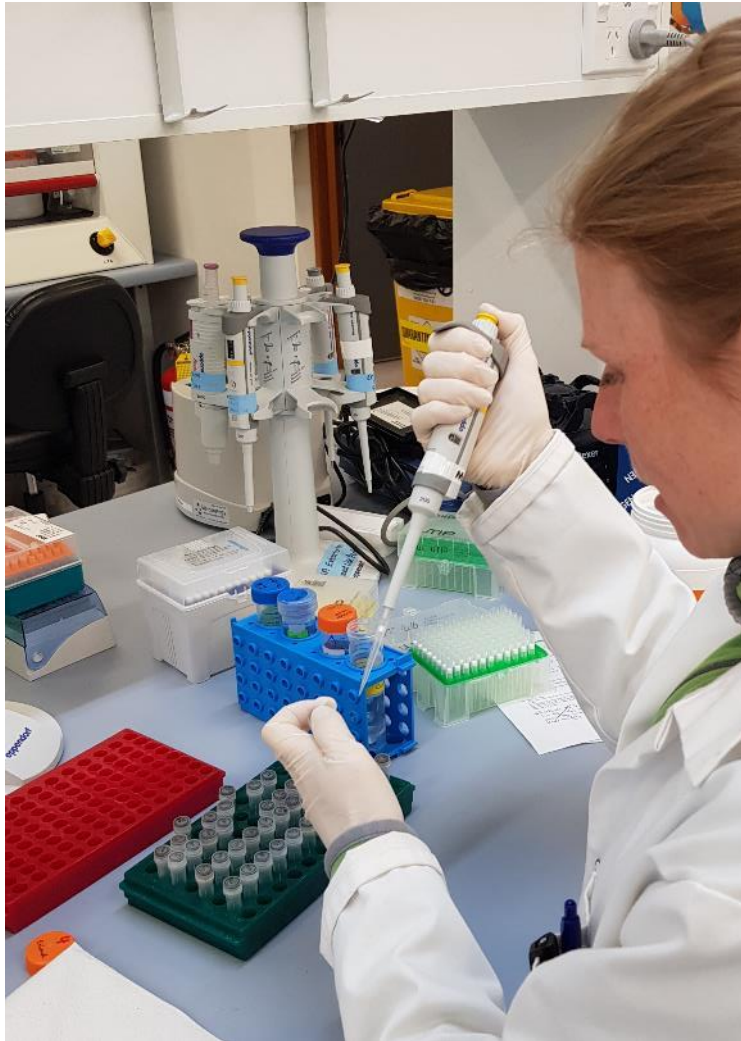


2. PREDATOR ABUNDANCE – Results (cont.)

Spiders

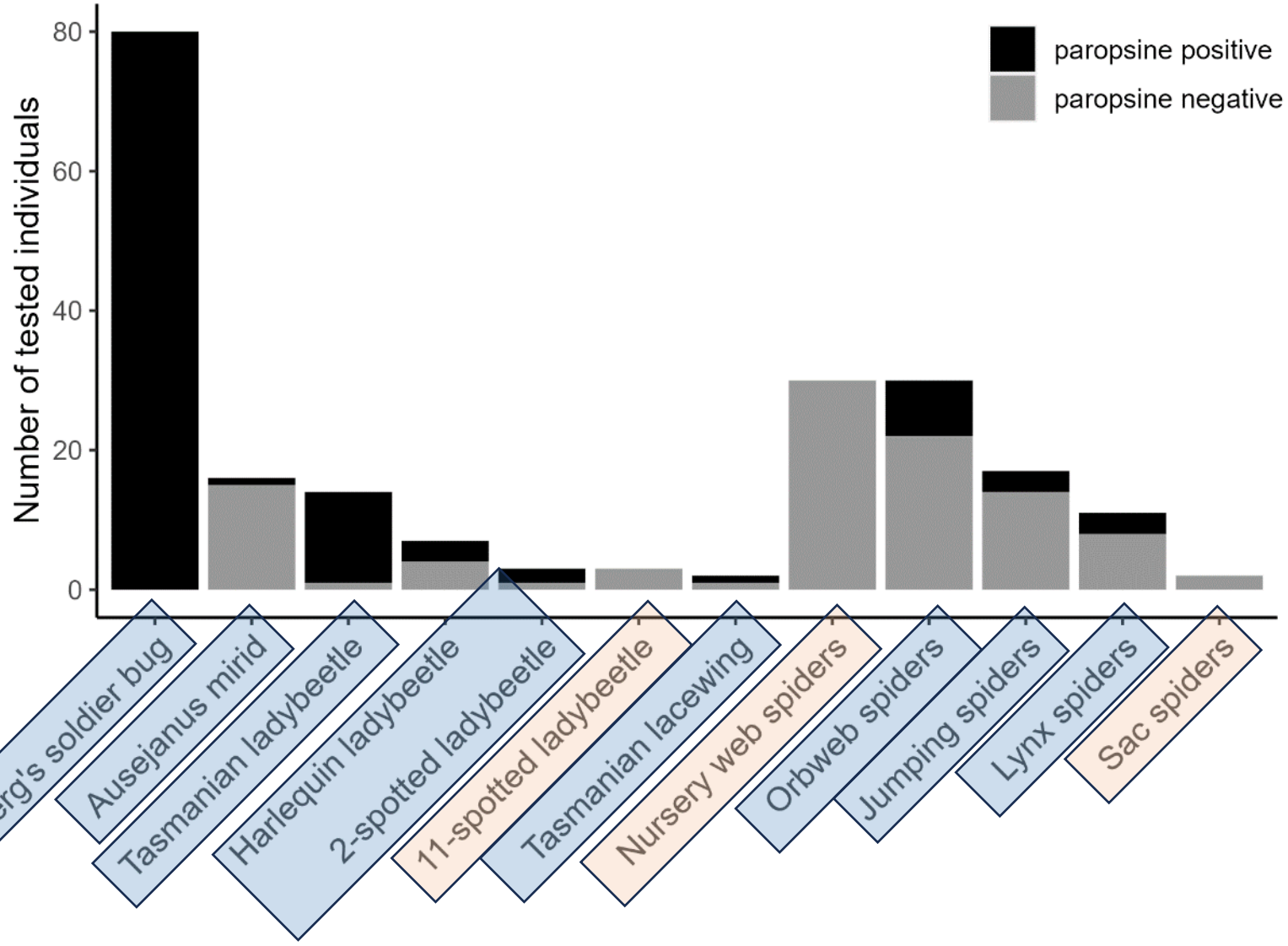


3. ACTIVE PREDATORS – Methods

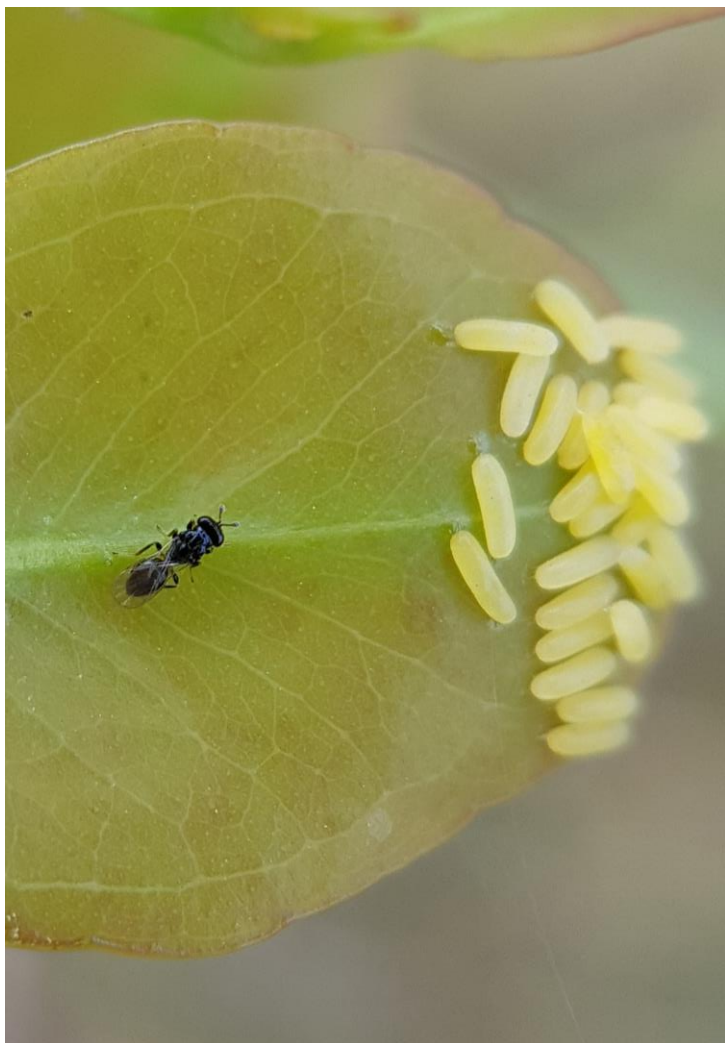


- Designed 2 species-specific qPCR assays
- Used predators collected during egg & larval peak abundances (season 2022/2023)
- Molecular analysis: detect DNA of *Pst. cloelia* and/or *P. charybdis*

3. ACTIVE PREDATORS – Results

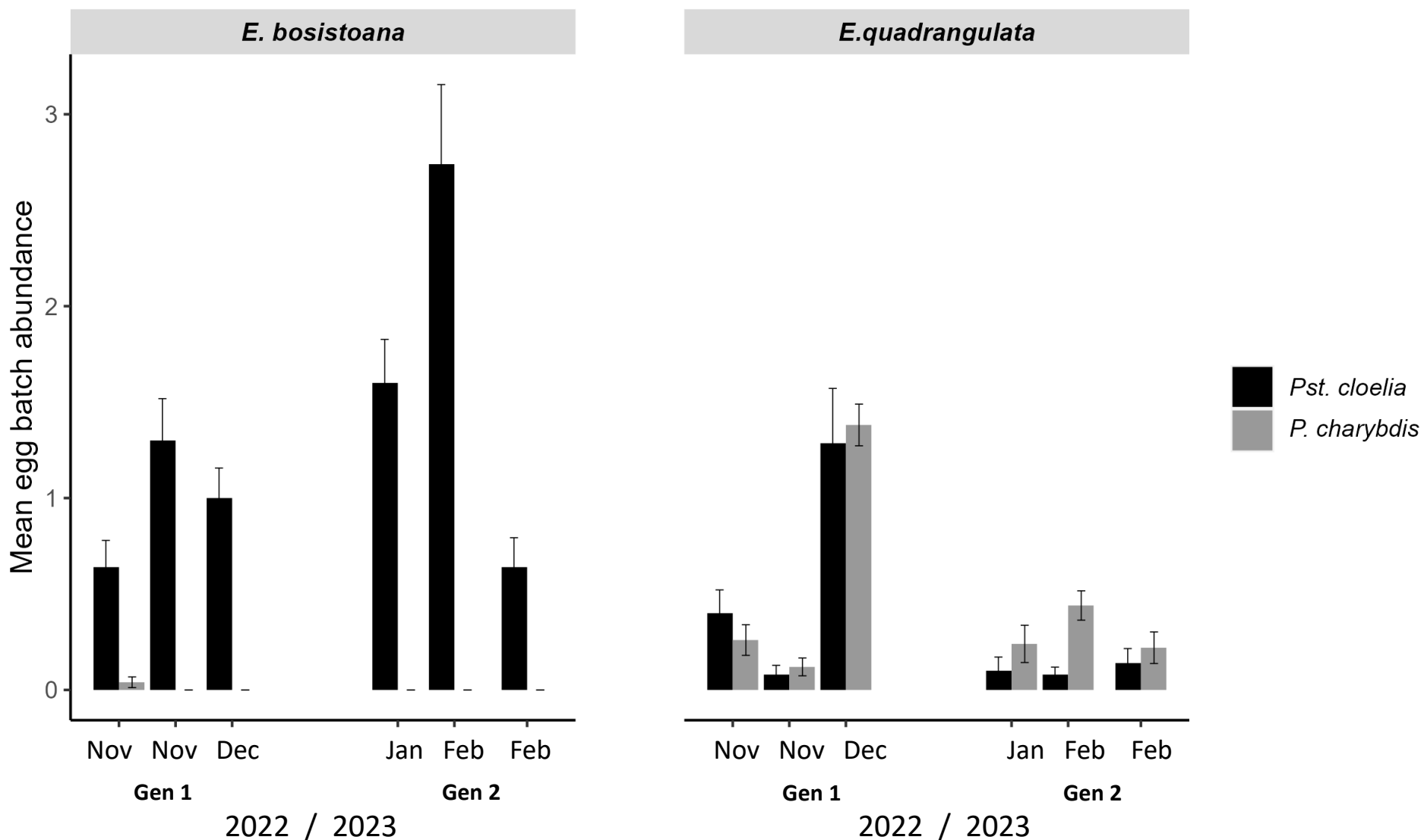


4. PARASITOIDS – Methods



- Season 2022/2023
- 3 sampling dates per beetle generation
- Collected egg batches of *Pst. cloelia* & *P. charybdis*
- 10 *E. bosistoana* & 10 *E. quadrangulata*
- Quantified egg batch abundance per tree
- Reared egg batches in lab

4. PARASITOIDS – Results



SUMMARY



- 2 generations of both species
- Host separation
- Schellenberg's soldier bug most abundant active predator
- Also less abundant species feed on paropsines
- Low effect of parasitoids on *Pst. cloelia*

CONCLUSIONS



- *Pst. cloelia* has pest potential on preferred host species
- Support existing natural enemies (conservation biocontrol)
- Investigate specialist parasitoid for *Pst. cloelia*
- Potential active predators for mass rearing and augmentative releases
- Integrated pest management employing multiple strategies

ACKNOWLEDGEMENTS

Funding: Specialty Wood Products (SWP) Partnership,
Ministry for Primary Industries (Sustainable Food & Fibre Futures Fund),
NZ Entomological Society ('Zondag' Award for Forestry Research 2022),
NZ Institute of Forestry (Future Forest Scholarship 2022),
UC School of Forestry

Support: Paul Millen (NZDFI), Ruth McConnochie (NZDFI), David Dillon, Andrew Lawson,
Vicki Wilton (UC), Meike Holzenkämpfer (UC), Monika Sharma (UC),
Gert Hendriks (UC), GEM Lab team (MWLR), Helen Nahrung (USC, Australia),
Elena Moltchanova (UC), Kate Curtis (LU), Henry Chapman (UC),
Lisa Chahine (UC), David Comerford

Questions?

