



# Current research in fruit fly biological control

**Dr Paul Cunningham**

*Agriculture Victoria Research*

# Fruit fly projects at Agriculture Victoria Research

Biocontrol (parasitoids)

Biopesticides

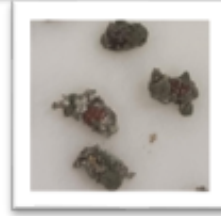
Mass Trapping Strategies

Exotics (SWD)

Post Harvest

Diagnostics (LAMP)

Detection & host status  
(strawberry / Rubus)



# A NATIONAL **BIOCONTROL PROGRAM** TO MANAGE PEST FRUIT FLIES IN AUSTRALIA



**Hort  
Innovation**



**Australian Government**  
**Department of Agriculture  
and Water Resources**

**Parasitoids**

**Biopesticides**

Summerfruit, citrus, table grape, papaya, Rubus,  
strawberry, apple and pear, and vegetable industries

# FRUIT FLY BIOCONTROL PROJECT TEAM

- Paul Cunningham (Agriculture Victoria)
- Lucy McLay
- Blair Grossman
- Aimee McKinnon
- Madita Lauer (PhD)
- Neil Penfold
- Joanne Dawson
- Lauren Daw
- Greg Lefoe
  
- Tony Clarke (QUT)
- Linda Clarke
- Colin Harris
  
- Markus Riegler (WSU)
- Sitaram Aryal
  
- Diana Leemon (QDAF)
  
- Peter Crisp (SARDI)
- Katharina Merkel
  
- Paul Horne (IPM Technologies)
- Jessica Page





# Conservation Biocontrol

## Biocontrol using Parasitoids

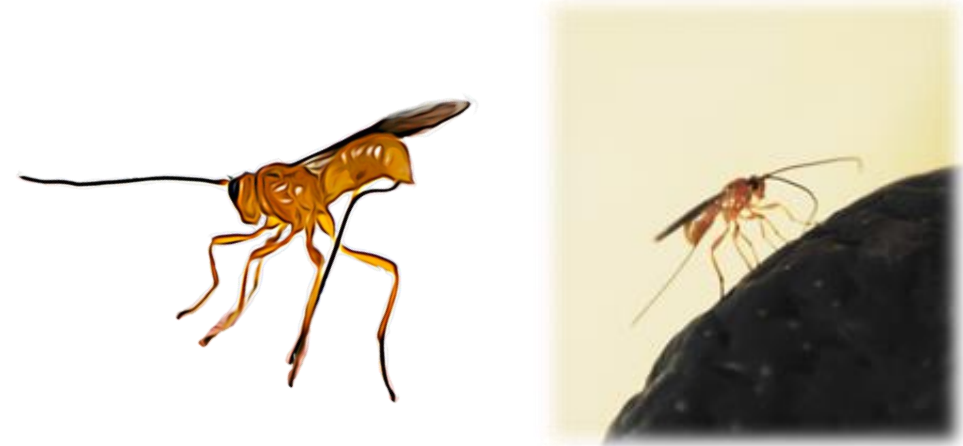
# Augmentative Biocontrol

- *Fopius arisanus*



- Only attacks tephritid fruit flies
- Introduced 70 years ago
- Established in QLD, NSW (absent from VIC)
- Egg-pupal parasitoid

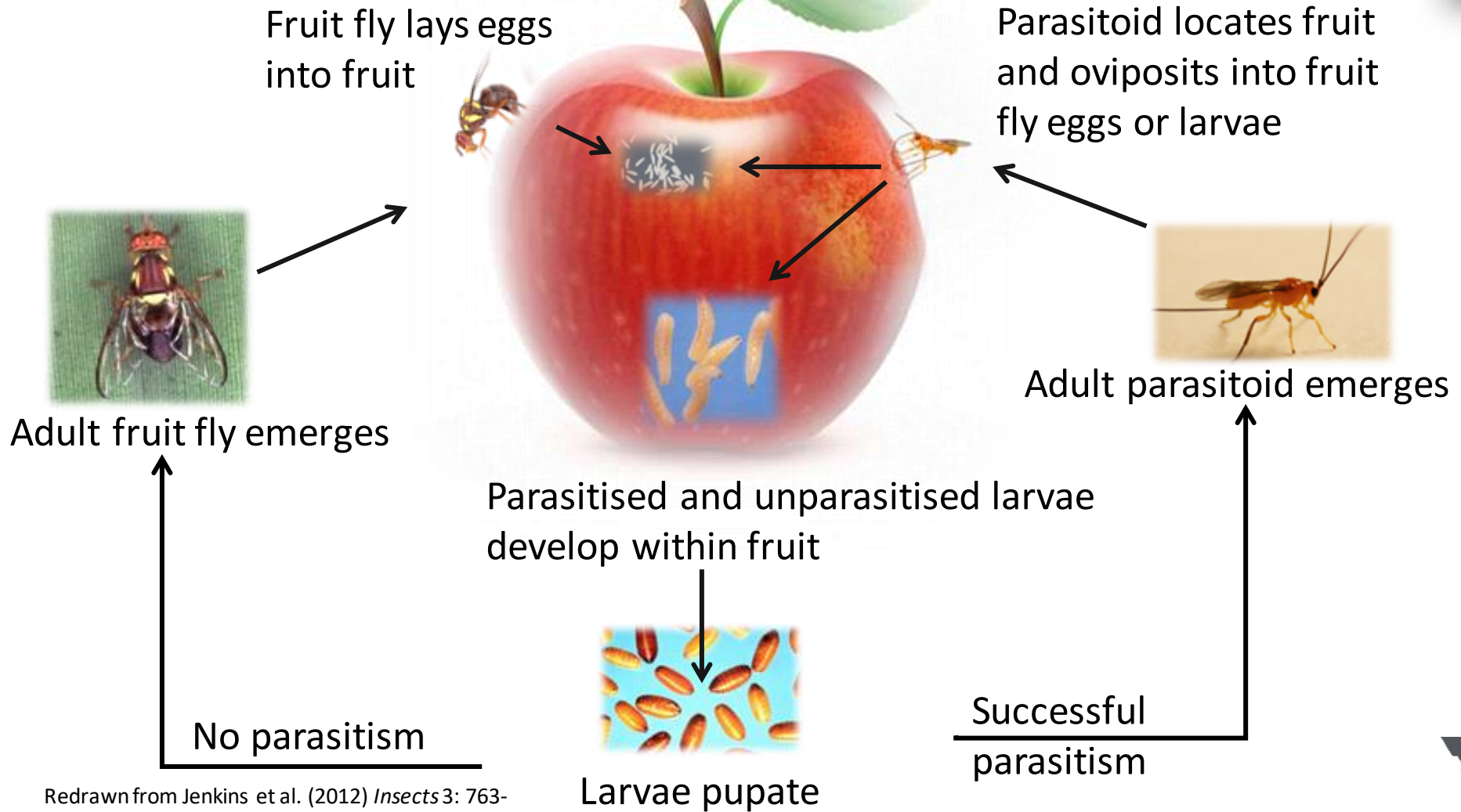
- *Diachasmimorpha kraussii*



Now in VIC!

- Only attacks tephritid fruit flies
- Native to QLD
- Range extends NT, QLD, NSW and **VIC**
- Larval-pupal parasitoid

# Parasitoid



Redrawn from Jenkins et al. (2012) *Insects* 3: 763-788

# Mass rearing and release of *Fopius arisanus*



# Collection of wild parasitoids, laboratory culture & mass rearing



- Tony Clarke (QUT)
- Linda Clarke
- Colin Harris

- Paul Cunningham
- Lucy McLay
- Neil Penfold
- Joanne Dawson
- Lauren Daw

≈ 40,000 adult *F. arisanus*







# 2021 RELEASES

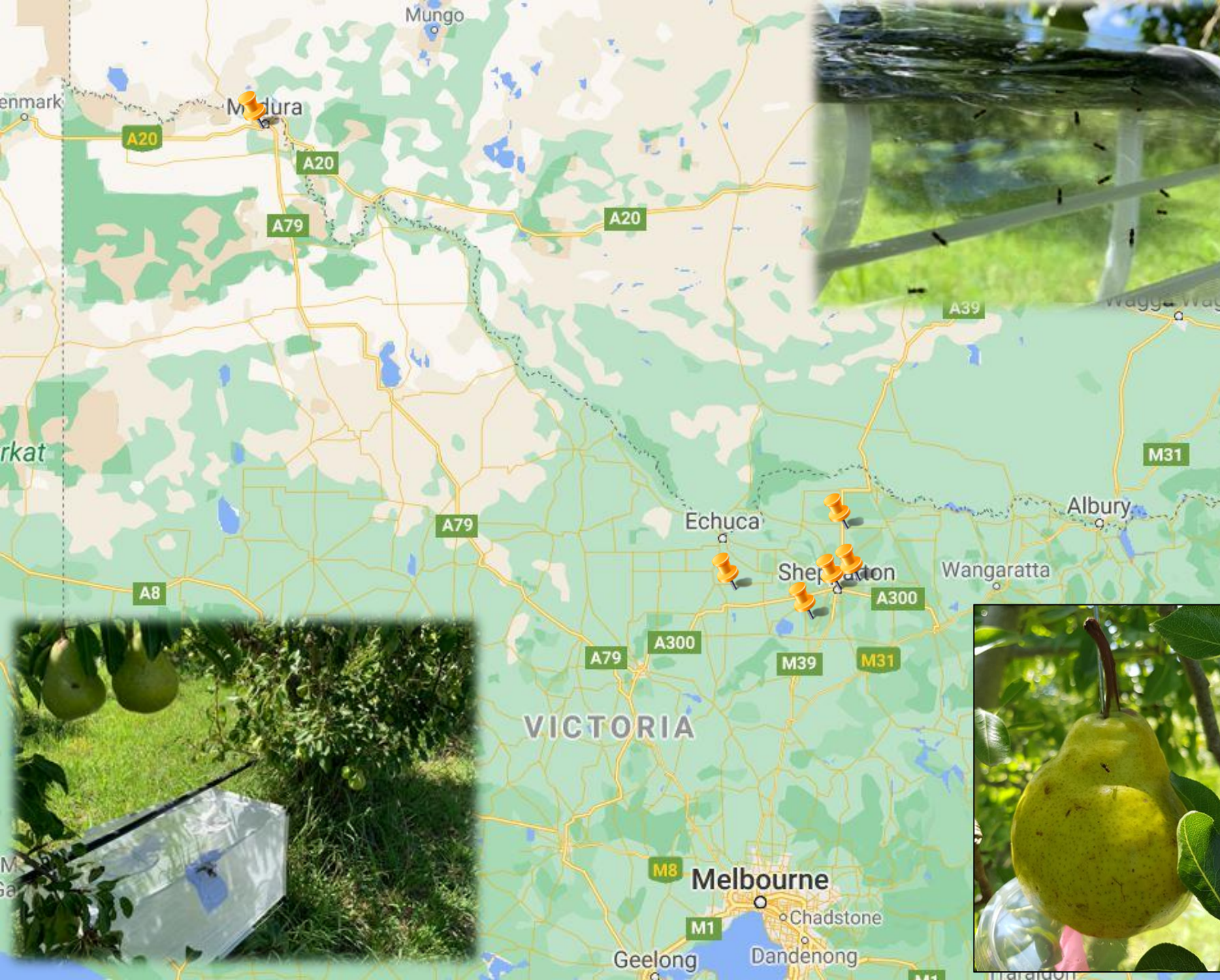
## 35,000 *F. arisanus*

### ORCHARDS (x 2)

- Organic farms / zero spraying
- Presence of fruit fly

### URBAN LOCATIONS (x 4)

- High fruit fly population
- Fruiting hosts / succession





# Orchard releases



Adult parasitoids emerging from harvested fruits collected up to 4 weeks after release



## Urban releases

Adult parasitoids emerging from fruits collected up to 8 weeks after release



# Biopesticide Project

ISOLATE



SCREEN



FORMULATE



EVALUATE

Entomopathogenic Nematodes



 **WESTERN SYDNEY**  
UNIVERSITY

Entomopathogenic Fungi



Queensland Government

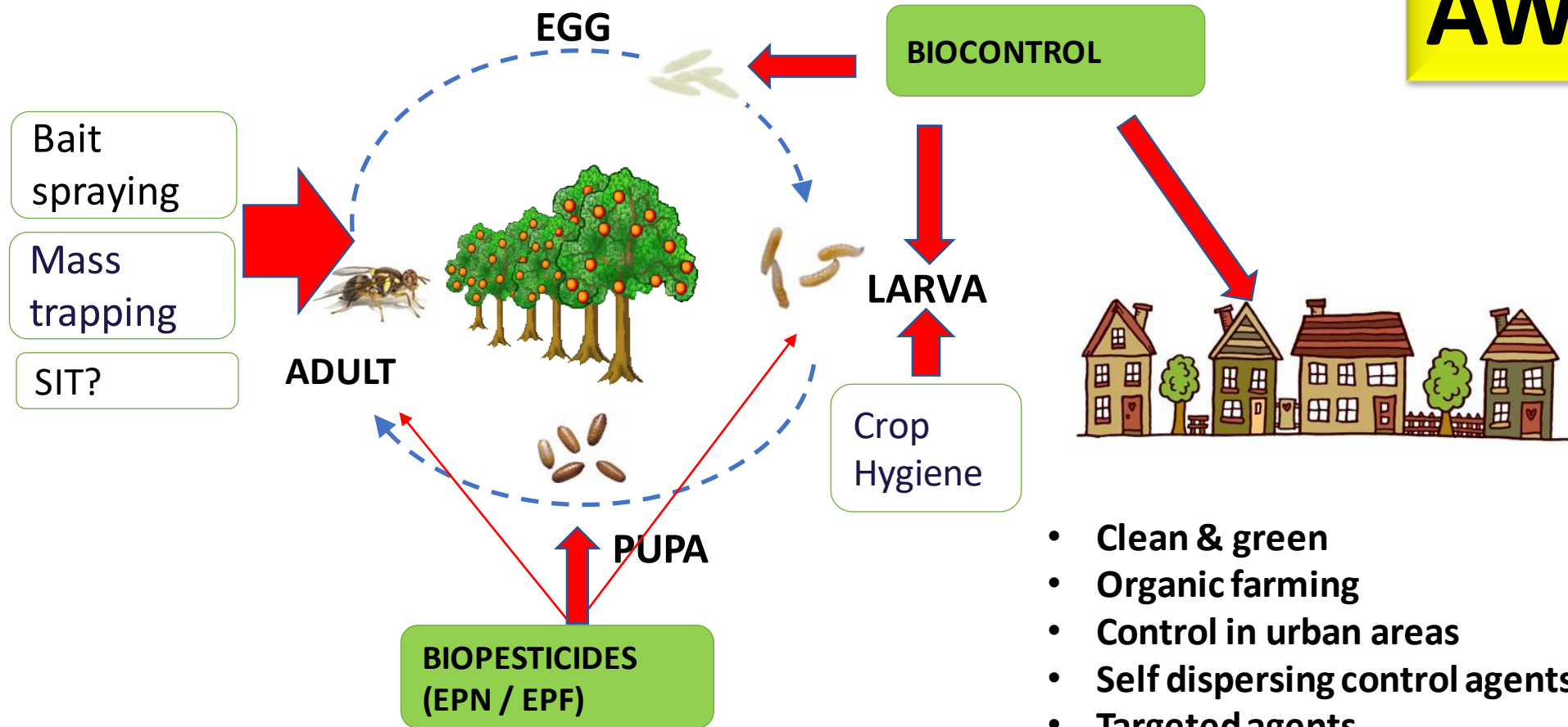
Department of Agriculture and Fisheries



Jobs,  
Precincts  
and Regions

# Targeting the pest at EVERY life stage

**AWM**



- Clean & green
- Organic farming
- Control in urban areas
- Self dispersing control agents
- Targeted agents
- Can be permanent (establishment)