# Additional information – call for orchards to participate in microbat research

- I am seeking orchards with varying levels of canopy density across Australia (particularly southeast Queensland, Bundaberg and NNSW regions).
- **Importance of research:** Canopy density affects the amount of space available for flying microbats and will likely affect which bat species use an orchard. **We want to understand which types of orchards microbats prefer** (more open canopy, closed canopy, or orchards with intermediate canopy density) **to help growers better support them and their free pest control services on their farm**




*Figure 1. Example of the range of orchards I am seeking for my research.*

**Equipment used:**

**Bat surveys**

- Bat detectors will be deployed on posts for 2-3 nights per survey.
- Surveys may be repeated up to 4 times over the production season (e.g. once in November, Dec, Jan, Feb).
- Surveys will not impact farm practices, all equipment will be placed to not impede machinery access along rows.

- Example of a bat detector setup:





- Bats will be captured at night using specialised bat traps known as harp traps, and mist nets:

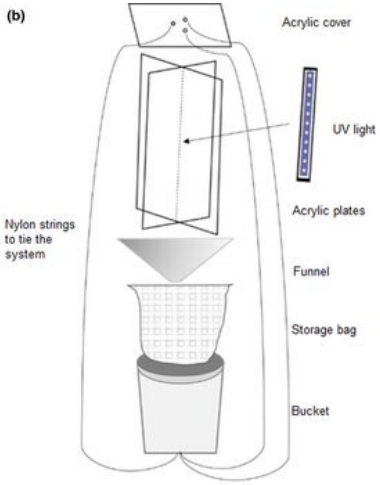


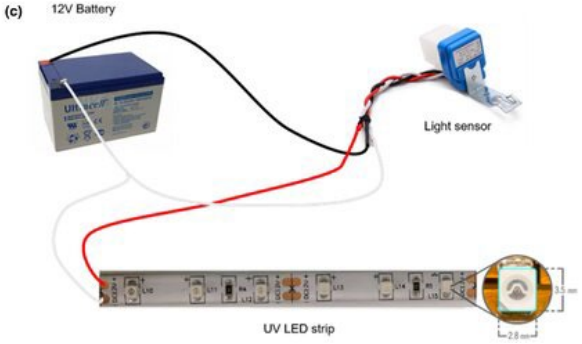
**Pest surveys**

- Pests and other invertebrates will be measured for 1-3 nights following bat detector surveys.
- Pest monitoring equipment may include a light trap for nocturnal invertebrates (see below diagram), or specialised traps targeting spotting bugs and nut borers (permitting that these will not interfere with any existing practices and or trials on the farm).

- Example of a light trap setup:


(a)

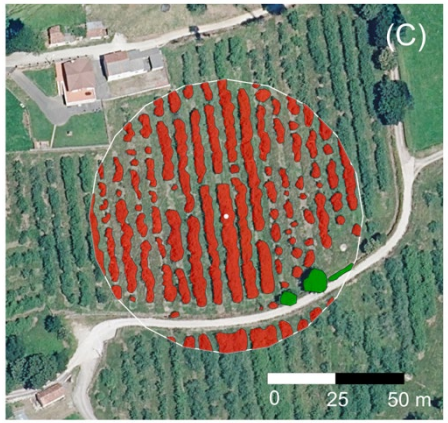

(b)
Acrylic cover
UV light
Acrylic plates
Nylon strings to tie the system
Funnel
Storage bag
Bucket


(c)
12V Battery
Light sensor
UV LED strip

**Recent similar studies:**

**Apple orchards in Spain, 2025 -** 'Landscape composition and orchard management effects on bat assemblages and bat foraging activity in apple crops'

- https://esajournals.onlinelibrary.wiley.com/doi/full/10.1002/ecs2.70140
- Findings: **Apple orchards with more open canopies (low canopy cover) had higher bat activity**.




**Olive groves in Portugal, 2020 -** Structural simplification compromises the potential of common insectivorous bats to provide biocontrol services against the major olive pest Prays oleae'

- https://www.sciencedirect.com/science/article/pii/S016788091930324X
- Findings: **Higher bat activity** in olive groves with **greater 'structural complexity'** – i.e. groves exhibiting the highest variability in both planting patterns (large tree spacings) and tree features (high variability in tree size and canopy volume).



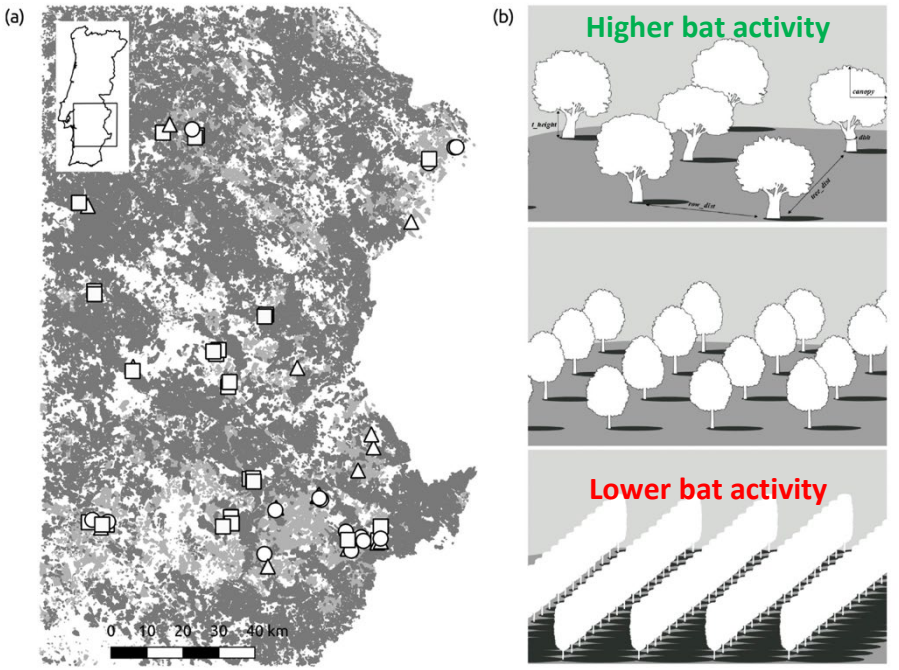



**Fig. 1.** In (a), the location of the study region (inset in at the upper-left corner) and the spatial distribution of the tree types of olive groves (see the main text for details). In (b), conceptual diagram showing the structural features of the three types of olive production systems. Namely, olive groves showing a high (upper panel), intermediate (mid panel) and low (lower panel) structural complexity are shown. The variables used to characterize the structural complexity of olive groves are represented within the upper panel in (b).

**Bird research, 2018 -** 'Birds as suppliers of pest control in cider apple orchards: Avian biodiversity drivers and insectivory effect'

- Findings: The abundance, functional diversity, and insectivore role of birds in apple orchards are promoted by surrounding forest cover and within-orchard apple tree canopy. **Orchards with more closed canopies (higher canopy cover) had higher bird abundance and richness.**
- https://www.sciencedirect.com/science/article/pii/S0167880917305315