Predatory arthropods associated with potential locally-adapted native insectary plants for Australian vineyards

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Introduction

- Predatory arthropods contribute to the biocontrol of grapevine, *Vitis vinifera*, pests each season.
- Three native plants were evaluated to determine their capacity to provide insectary benefits to predatory arthropods in Australian vineyards, and thereby to enhance biological control of insect pests.
- Native plants are preferred as supplementary flora, as they are locally-adapted to Australia's climatic conditions.

Aims

To determine if selected candidate insectary plants:

- Have the capacity to support populations of natural enemies throughout the year,
- Could provide habitat for economically damaging vineyard pests.

Fig 1. Australian native plants that provide insectary benefits

Methodology

- Stands of mature Christmas bush, *Bursaria spinosa*, prickly tea-tree, *Leptospermum continentale*, and wallaby grasses *Rytidosperma* ssp., located adjacent to or in vineyards in the Adelaide Hills and Barossa were sampled for arthropods in 2013/14.
- Grapevines were also sampled to explore relationships between each plant and associated arthropods using diversity indices.
- A total of 27,091 individual invertebrate specimens were collected, comprising 20 orders and 287 morphospecies. They were categorised into different functional groups including predators, herbivores and other.

Results

- The richness of predator morphospecies across all plant types (S = 98) was nearly double the number found in association with grapevines. Predators dominated the diversity of morphospecies present on each plant by an average of **2:1 (predator : herbivore)**.
- It may be possible to increase the functional diversity of predators **by more than 3x** when *B. spinosa* or *L. continentale* is planted versus grapevines only, and increase the net number of predator morphospecies **by around 27%** when wallaby grasses are planted in combination with the woody perennial plants.

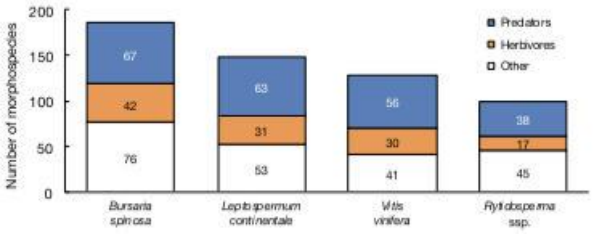

Fig 2. Number of arthropod morphospecies recorded over a 12-month period on each plant. The ratio of predator to herbivore morphospecies was 1.6:1 on *Bursaria spinosa*, 2.1:1 on *Leptospermum continentale*, 1.8:1 on *Vitis vinifera*, and 2.2:1 on *Rytidosperma* spp.

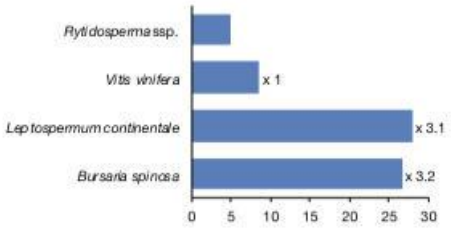

Fig 3. Predatory arthropod morphospecies diversity (Shannon's index) for each plant. The x increase in functional diversity by *Bursaria spinosa*, and *Leptospermum continentale* when compared to *Vitis vinifera*.

Conclusion

Bursaria spinosa, *Leptospermum continentale* and *Rytidosperma* ssp. provide a suitable habitat to support diverse and functional populations of predatory arthropods. These native insectary plants were not found to be breeding sites for vineyard herbivores and are not considered a threat when planting them in and around mature vineyards. Vineyard managers are encouraged to explore the use of these and other native insectary plants in association with vineyards.

The opportunity to plant native insectary species could help grape growers save time and resources by producing fruit with lower pest incidence, while enhancing biodiversity associated with vineyards

Acknowledgements

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