

Tjiwarl Bush Blitz

Hymenoptera

(Excluding bees and ants)

28 Aug – 8 Sep 2023

Submitted: 26 Feb 2024

Dr Ben A. Parslow



Nomenclature and taxonomy used in this report is consistent with:

The Australian Faunal Directory (AFD)

<http://www.environment.gov.au/biodiversity/abrs/online-resources/fauna/afd/home>

The Australian Plant Name Index (APNI)

<http://www.anbg.gov.au/databases/apni-about/index.html>

Contents

Contents.....	2
List of contributors.....	2
Abstract.....	3
1. Introduction.....	3
2. Methods.....	3
2.1 Site selection.....	3
2.2 Survey techniques.....	4
2.2.1 Methods used at standard survey sites.....	4
2.3 Identifying the collections.....	5
3. Results and Discussion.....	5
3.1 Un-named or not formalised taxa.....	5
3.2 Putative new species (new to science).....	7
3.3 Exotic and pest species.....	8
3.4 Threatened species.....	8
3.5 Range extensions.....	8
3.6 Genetic information.....	9
4. Information on species lists.....	9
5. Information for land managers.....	9
6. Other significant findings.....	9
7. Conclusions.....	10
Acknowledgements.....	10
References.....	11
Appendices.....	13
Appendix 1. List of Hymenoptera (excluding bees and ants) recorded during the Tjiwarl Bush Blitz.....	13

List of contributors

List of contributors to this report.			
Name	Institution/affiliation	Qualifications/area of expertise	Level/form of contribution
Ben A. Parslow	South Australian Museum	Hymenoptera	Principal author, Survey participant
Maddalene Giannotta	Australian National University/ Australian National Insect Collection	Mutillidae	Identified Mutillidae specimens
Mollie Slater-Baker	University of Adelaide	Braconidae	Identified several Braconidae specimens

Abstract

The Hymenoptera fauna was surveyed in Tjiwarl Country with over 1000 individual specimens collected across 30 sites. Despite logistical constraints, the survey identified 18 families and 79 taxa (13 species and 66 morphospecies), including the discovery of four putative new species. These findings highlight the need for continued research and conservation efforts to safeguard Australian Hymenoptera biodiversity.

1. Introduction

The order Hymenoptera encompasses a remarkable diversity of species, found in virtually every habitat across the globe. In Australia, this group of insects holds a significant place in the biodiversity discovery, with a large number of species yet to be discovered. Over the past few decades, the Australian region has witnessed a surge in our understanding of these taxa, shedding light on their ecological roles and evolutionary adaptations.

This report documents the survey conducted in Tjiwarl Country, situated within the Tjiwarl Determination area spanning over 13,000 square kilometers in the northern goldfields region of Western Australia. Tjiwarl Country presents a mosaic of habitats, ranging from pastoral lands managed by mining companies to high quality natural environments. The survey area, predominantly characterised by spinifex grasslands and mulga complexes.

Despite its ecological significance, the Hymenoptera fauna of Tjiwarl Country remains understudied, with limited publicly available records. This survey aims to fill this knowledge gap by conducting a comprehensive assessment of the Hymenoptera community within the area, providing valuable insights into its composition, distribution, and conservation status.

2. Methods**2.1 Site selection**

Hymenoptera were expected to be present in all habitat types across the survey area. Due to the variable nature of collecting insects and the variability of sites closer to Leinster that had pastoral grazing damage, sites were selected on the following factors. The first was to sample across a wide geographic area and to cover the main vegetation types. Sites with flowering plants were prioritised to increase capture success.

Material was collected across 30 sites over the southeast area of the survey area (fig. 1). The Western and Northern parts of the survey area were not sampled by the principle author due to accessibility restraints.

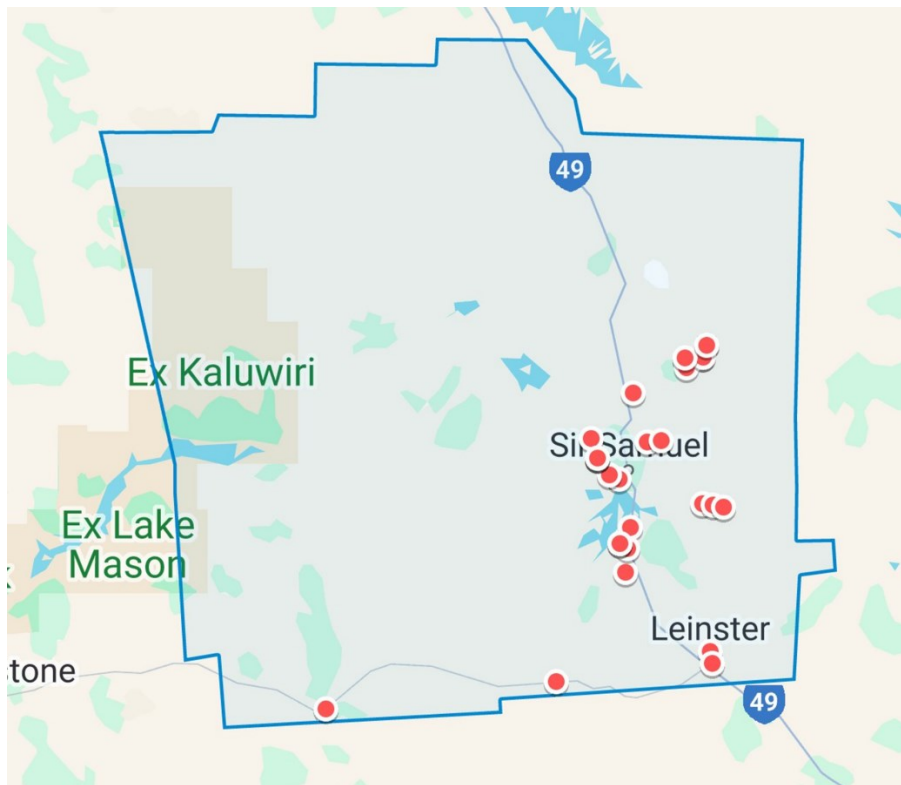


Figure 1: Map of survey area (blue outline) with Hymenoptera collection locations (red points).

2.2 Survey techniques

Hymenoptera were sampled using a combination of passive and active methods.

- Sweep netting of vegetation, particularly of flowering plants. This included using 1.5m nets between ground and ~3m above ground and using canopy (6m) nets to sample flowers and vegetation in higher stories.

- Passive flight intercept traps ('Sea, Land, and Air Malaise Traps' (SLAM)) deployed in natural flight corridors at the standard survey sites.

- Direct visual sighting and collection, particularly of ground-based wasps (e.g. spider wasps, velvet ants).

- Active collecting at a white sheet placed behind a LepiLED light.

- Vehicle mounted insect net for collecting flying insects.

Specimens were collected into 95% ethanol and kept cold, either in a fridge or a freezer for the duration of the expedition. A representative series of specimens were pinned for identification. Material was transported to The South Australian Museum for identification and deposited in the West Australian Museum.

2.2.1 Methods used at standard survey sites

Both standard survey sites were visited at least once during the expedition, and at least half hour of sweep netting (often more) was conducted at each site. A SLAM style hybrid Malaise trap was placed at each standard site.

The overall Hymenoptera diversity at standard survey sites was very low with several specimen collected in traps and active collecting. This was likely to be caused by minimal flowering resources at both sites which reduced the effectiveness of sweeping. The proximity of SS1 to a water source had resulted in degradation of the understorey plants from livestock visitation.

2.3 Identifying the collections

Specimens were identified to species level where possible with the majority of material identified to generic level. For hyper diverse groups individuals were identified to subfamily and family level due to time and expertise restrictions. Where material was identified higher than specific level, specimens were separated into distinct morphospecies and given a unique identifier (e.g. BBTJI-sp1). For the superfamilies Chalcidoidea and Platygastroidea, material that could not be identified confidently to family level were grouped and documented as a superfamily assemblage with a number of individuals.

Material was identified using the following resources and compared with specimens held at the South Australian Museum (SAMA). (Bohart et al., 1976; Dangerfield & Austin, 1995; Evans & Matthews, 1973; Gauld, 1984a, 1984b; I. D. Naumann, 1991; Jennings & Austin, 2002; Kittel & Austin, 2014; Pasteels, 1957; Quicke & Ingram, 1993; Riek, 1955; Turner & Waterston, 1920; van Achterberg, 1990). The Mutillidae specimens were identified by Maddalene Giannotta (Australian National University/ Australian National Insect Collection) and several Braconidae specimens were identified by Mollie Slater-Barker (University of Adelaide).

3. Results and Discussion

Appendix 1 lists all Hymenoptera recorded during the Bush Blitz. Collections made during this Bush Blitz resulted in over 1000 Hymenoptera specimens being added to public collections. Notably while the collections encompass a broad spectrum of Hymenoptera diversity, bees (Hymenoptera, Apoidea) are reported separately by other survey participants.

3.1 Un-named or not formalised taxa

In total 18 different families were recorded from the collections with 66 distinct morphospecies identified (table 1). The hyper diverse superfamilies Chalcidoidea, Platygastroidea and some Braconidae were identified to family/sub family level where possible but not sorted into morpho species for the purposes of this report, instead a number of individuals is presented.

Taxon	Comment
<i>Goniozus</i> BBTJI-sp1	Identified to genus and sorted to morphospecies
<i>Goniozus</i> BBTJI-sp2	Identified to genus and sorted to morphospecies
<i>Goniozus</i> BBTJI-sp3	Identified to genus and sorted to morphospecies
<i>Austrocotesia</i> BBTJI-sp1	Identified to genus and sorted to morphospecies
<i>Bracon</i> BBTJI_sp1	Identified to genus and sorted to morphospecies
<i>Bracon</i> BBTJI_sp2	Identified to genus and sorted to morphospecies
Braconinae BBTJI-sp1	Identified to subfamily and sorted to morphospecies
Braconinae BBTJI-sp2	Identified to subfamily and sorted to morphospecies
Braconinae BBTJI-sp2	Identified to subfamily and sorted to morphospecies
Braconinae BBTJI-sp3	Identified to subfamily and sorted to morphospecies
Braconinae BBTJI-sp4	Identified to subfamily and sorted to morphospecies
Braconinae BBTJI-sp5	Identified to subfamily and sorted to morphospecies

Braconinae BBTJI-sp5	Identified to subfamily and sorted to morphospecies
Braconinae BBTJI-sp6	Identified to subfamily and sorted to morphospecies
Braconinae BBTJI-sp7	Identified to subfamily and sorted to morphospecies
<i>Cardiochiles</i> BBTJI-sp1	Identified to genus and sorted to morphospecies
<i>Chelonus</i> BBTJI-sp1	Identified to genus and sorted to morphospecies
Euphorinae BBTJI-sp1	Identified to subfamily and sorted to morphospecies
Homolobinae BBTJI-sp1	Identified to subfamily and sorted to morphospecies
<i>Macrocentrus</i> BBTJI-sp1	Identified to genus and sorted to morphospecies
Rogadinae BBTJI-sp1	Identified to subfamily and sorted to morphospecies
Rogadinae BBTJI-sp3	Identified to subfamily and sorted to morphospecies
Rogadinae BBTJI-sp4	Identified to subfamily and sorted to morphospecies
Rogadinae BBTJI-sp5	Identified to subfamily and sorted to morphospecies
Rogadinae BBTJI-sp6	Identified to subfamily and sorted to morphospecies
<i>Yelicones</i> BBTJI-sp1	Identified to genus and sorted to morphospecies
<i>Chrysis</i> BBTJI-1	Identified to genus and sorted to morphospecies
<i>Primeuchoroeus</i> BBTJI_sp1	Identified to genus and sorted to morphospecies
Crabronidae BBTJI-sp1	Identified to family and sorted to morphospecies
Crabronidae BBTJI-sp2	Identified to family and sorted to morphospecies
Crabronidae BBTJI-sp3	Identified to family and sorted to morphospecies
Crabronidae BBTJI-sp4	Identified to family and sorted to morphospecies
Crabronidae BBTJI-sp5	Identified to family and sorted to morphospecies
Nyssoninae BBTJI-sp1	Identified to subfamily and sorted to morphospecies
<i>Podergritus</i> BBTJI-sp1	Identified to genus and sorted to morphospecies
<i>Podergritus</i> BBTJI-sp2	Identified to genus and sorted to morphospecies
<i>Tachysphex</i> BBTJI-sp1	Identified to genus and sorted to morphospecies
Dryininae BBTJI-sp1	Identified to subfamily and sorted to morphospecies
Dryininae BBTJI-sp2	Identified to subfamily and sorted to morphospecies
Eucharitidae BBTJI-sp1	Identified to subfamily and sorted to morphospecies
<i>Szepligetilla</i> BBTJI-sp1	Identified to genus and sorted to morphospecies
Campopleginae BBTJI-sp1	Identified to subfamily and sorted to morphospecies
Cryptinae BBTJI-sp1	Identified to subfamily and sorted to morphospecies
Ichneumonidae BBTJI-sp1	Identified to family and sorted to morphospecies
<i>Netelia</i> BBTJI-sp1	Identified to genus and sorted to morphospecies
Megaspilinae BBTJI-sp1	Identified to subfamily and sorted to morphospecies
Megaspilinae BBTJI-sp2	Identified to subfamily and sorted to morphospecies
<i>Ancistrotilla</i> BBTJI-sp1	Identified to genus and sorted to morphospecies
<i>Ephutomorpha</i> BBTJI_SP1	Identified to genus and sorted to morphospecies
<i>Aglaotilla</i> BBTJI-sp1	Identified to genus and sorted to morphospecies
Mymaridae BBTJI-sp1	Identified to family and sorted to morphospecies
<i>Anoplius</i> BBTJI-sp1	Identified to genus and sorted to morphospecies
<i>Ctenostegus</i> BBTJI-sp1	Identified to genus and sorted to morphospecies
<i>Ctenostegus</i> BBTJI-sp2	Identified to genus and sorted to morphospecies

<i>Guerinius</i> BBTJI-sp1	Identified to genus and sorted to morphospecies
<i>Rhagigaster</i> BBTJI-sp1	Identified to genus and sorted to morphospecies
Rhagigasterini BBTJI-sp1	Identified to tribe and sorted to morphospecies
Thynnini BBTJI-sp1	Identified to tribe and sorted to morphospecies
<i>Delta</i> BBTJI_sp1	Identified to genus and sorted to morphospecies
<i>Paralastor</i> BBTJI_sp1	Identified to genus and sorted to morphospecies
<i>Pseudabispa</i> BBTJI_sp1	Identified to genus and sorted to morphospecies
Microgastrinae	22 specimens identified to subfamily level
Chalcididae	12 specimens identified to family level
Encyrtidae	75 specimens identified to family level
Eupelmidae	9 specimens identified to family level
Eurytomidae	12 specimens identified to family level
Megastigmidae	Two specimens identified to family level
Perilampidae	32 specimens identified to family level
Platygastrinae	119 specimens identified to subfamily level
Scelioninae	10 specimens identified to subfamily level
Telenominae	12 specimens identified to subfamily level
Proctorupidae	Two specimens identified to family level
Torymidae	38 specimens identified to family level
Pirenidae	12 specimens identified to family level
Chalcidoidea	~753 specimens identified to superfamily level

3.2 Putative new species (new to science)

In this report, 'putative new species' means an unnamed species that, as far as can be ascertained, was identified as a new species as a direct result of this Bush Blitz.

There were four species that were able to be identified as putative new species, that were collected for the first known time during this Bush Blitz (Table 2). The true total of putative new species is expected to be much higher but would require additional specialist expertise on the different families and genera.

Species	Comment
<i>Aphelotoma</i> BBTJI-sp1	First record of this putative new species, only known from the Bush Blitz material. Distinctive colouration and size separate it from described species of <i>Aphelotoma</i> .
<i>Phanaustrotoma</i> BBTJI-sp1	First record of this putative new species, only known from the Bush Blitz material. The two described species are restricted tropical habitats in Northern Queensland.
<i>Gasteruption</i> BBTJI-sp1	First record of this putative new species, only known from the Bush Blitz material.
<i>Gasteruption</i> BBTJI-sp2	First record of this putative new species, only known from the Bush Blitz.

3.3 Exotic and pest species

There were no exotic or pest species of Hymenoptera (excluding bees, which are not reported here) identified in the material collected. Notably, there were no specimens of the invasive European wasp (*Vespula germanica*) collected during the survey.

3.4 Threatened species

None of the Hymenoptera species collected during the survey were listed as critically endangered, endangered, vulnerable or conservation dependent under the Australian Environment Protection and Biodiversity Conservation Act 1999.

3.5 Range extensions

Detailed information on Hymenoptera distributions is generally only available for well studied groups. Current distributions were compiled based on published information, publicly available databases (Atlas of living Australia and iNaturalist) and physical specimens present in collections.

Of the hymenopteran specimens identified to species level, nearly all of them represent range extensions or infill in distribution (Table 5), due to the limited records for the survey area.

Table 5. Range extensions or significant infill in distribution records for species

Species	Location sighted/observed	Distance from nearest known record (km)	Comments
<i>Gasteruption leptothecus</i>	WA, Sir Samuel, Yakabini road, shed well	>2800 km	Species is recorded from type material in ACT and Tasmania. Likely to be more broadly distributed.
<i>Gasteruption genale</i>	WA, Leinster, off Agnew-Lake Miranda Road	~480 km	Widely distributed species, not recorded from survey area before.
<i>Gasteruption zebriforme</i>	WA, Sir Samuel, 1.9 km NNW Mount Mann	~550 km	Species recorded from around Southwestern Australia closer to Perth.
<i>Pseudofoenus cardaleae</i>	WA, Sir Samuel, off Goldfields Highway	~417 km	This is the most northern record of the species.
<i>Pseudofoenus feckneri</i>	WA, Sir Samuel, Wanjarri nature reserve	~596 km	This is the most western record of the species.

<i>Labium centrale</i>	WA, Sir Samuel, Wanjarri nature reserve.	~1553 km	Recorded from near Lake Eyre, South Australia. This is the western most record of the species.
<i>Lissopimpla excelsa</i>	WA, Yakabinda Well - Yakabindie Homestead.	357 km	The closest record is Kalgoorlie, WA.
<i>Cryptochilus bicolor</i>	WA, Yakabinda Well - Yakabindie Homestead.	413 km	The closest record is Goldfields Woodlands Conservation Park, WA.
<i>Prionyx globosus</i>	Sir Samuel, Wanjarri nature reserve	381 km	The closest record is Kalgoorlie, WA.

3.6 Genetic information

No specimens were sequenced for this report, but the majority of material is stored in ethanol for future molecular characterisation.

4. Information on species lists

The hymenopteran fauna of Australia is extremely diverse with over 12,000 described species, with estimates of 70% of species yet to be described. The high diversity and lack of suitable identification resources for many groups makes identifying specimens beyond family or generic level time-consuming and often impossible. Therefore, distinctive species were identified using identification keys where available. Material was identified to genus level where possible, but in some groups it is unlikely to be informative due to the large proportion of undescribed species. Therefore, the main focus of the identification was on groups in which the survey participants had expertise in and where suitable resources were available.

5. Information for land managers

The survey in Tjiwarl Country highlighted the impact of pastoral grazing on habitat quality, particularly evident in reduced understory plant diversity. Wanjarri Nature Reserve, identified as the highest-quality habitat, showed signs of recent cattle access, urging a need for grazing management to preserve flora and support invertebrate diversity, including Hymenoptera species.

To maintain biodiversity, it's recommended to minimise grazing in sensitive areas like Wanjarri Nature Reserve. Monitoring indicator species, particularly isolated flowering plants attracting Hymenoptera, can aid in assessing ecosystem health. Collaborative efforts in implementing sustainable land management practices are crucial for balancing conservation and livestock production needs in Tjiwarl Country.

6. Other significant findings

There were no other notable or unexpected findings.

7. Conclusions

The results of the survey of Tjiwarl Country have increased our knowledge of Hymenoptera diversity in Western Australia, with over 1000 individual specimens collected. Despite limitations a total of 18 families and 79 taxa were identified with four putative new species discovered. The findings underscore the need for ongoing research and conservation efforts for Australian Hymenoptera. Collaborative initiatives are crucial for sustainable land management to continue to preserve biodiversity.

Acknowledgements

We would like to thank the Tjiwarl Aboriginal Corporation RNTBC, the Tjiwarl native title holders, Tjiwarl Rangers, Department of Biodiversity, Conservation and Attractions (DBCA) rangers, BHP and station managers for facilitating access to sites and assisting with collections and knowledge on country. We are grateful to the other BushBlitz participants and BushBlitz organisation team who assisted with collections and logistics in the field.

References

- Bohart, R. M., Bohart, R. M., & Menke, A. S. (1976). *Sphecid wasps of the world: A generic revision*. Univ of California Press.
- Dangerfield, P. C., & Austin, A. D. (1995). Revision of the Australasian species of Cardiochilinae (Hymenoptera: Braconidae). *Invertebrate Systematics*, 9(3), 387–445.
- Evans, H. E., & Matthews, R. W. (1973). *Systematics and nesting behavior of Australian Bembix Sand Wasps (Hymenoptera, Sphecidae)*. American Entomological Institute.
<https://cir.nii.ac.jp/crid/1130282269543656448>
- Gauld, I. D. (1984a). *An introduction to the Ichneumonidae of Australia*. British Museum (Natural History).
- Gauld, I. D. (1984b). *The Pimplinae, Xoridinae, Acaenitinae and Lycorininae (Hymenoptera: Ichneumonidae) of Australia*.
- I. D. Naumann. (1991). Hymenoptera (Wasps, bees, ants, sawflies). In *The insects of Australia: A textbook for students and research workers* (Vol. 2). Cornell University Press.
- Jennings, J. T., & Austin, A. D. (2002). Systematics and distribution of world hyptiogastrine wasps (Hymenoptera: Gasteruptiidae). *Invertebrate Systematics*, 16(5), 735.
<https://doi.org/10.1071/IT01048>
- Kittel, R. N., & Austin, A. D. (2014). Synopsis of Australian chelonine wasps (Hymenoptera: Braconidae: Cheloninae) with description of two new genera. *Austral Entomology*, 53(2), 183–202.
- Pasteels, J. J. (1957). Revision du genre Gasteruption (Hymenoptera, Evanoidea, Gasteruptionidae), [pt. 3.]: Espèces australiennes. *Memoires Institut Royal Des Sciences Naturelles de Belgique*, 56, 1–125.
- Quicke, D. L. J., & Ingram, S. N. (1993). Braconine wasps of Australia. *Memoirs of the Queensland Museum*, 33(1), 299–336.
- Riek, E. F. (1955). Australian Ampulicidae (Hymenoptera: Sphecoidea). *Australian Journal of Zoology*, 3(1), 131–144.

Turner, R. E., & Waterston, J. (1920). A revision of the ichneumonid genus *Labium* Brullé and *Poecilocryptus* Cameron. *Proceedings of the Zoological Society of London*, 1(920), 1–26.

van Achterberg, C. (1990). Illustrated key to the subfamilies of the Holarctic Braconidae (Hymenoptera: Ichneumonoidea). *Zoologische Mededelingen*, 64(1), 1–20.

Appendices

Appendix 1. List of Hymenoptera (excluding bees and ants) recorded during the Tjiwarl Bush Blitz

Ampulicidae	<i>Aphelotoma</i> BBTJI-sp1		yes	no	no	no
Crabronidae	Crabronidae BBTJI-sp1		no	no	no	no
Crabronidae	Crabronidae BBTJI-sp2		no	no	no	no
Crabronidae	Crabronidae BBTJI-sp3		no	no	no	no
Crabronidae	Crabronidae BBTJI-sp4		no	no	no	no
Crabronidae	Crabronidae BBTJI-sp5		no	no	no	no
Eucharitidae	Eucharitidae BBTJI-sp1		no	no	no	no
Ichnumonidae	Ichnumonidae BBTJI-sp1		no	no	no	no
Mymaridae	Mymaridae BBTJI-sp1		no	no	no	no
Bethylidae	<i>Goniozus</i> BBTJI-sp1		no	no	no	no
Bethylidae	<i>Goniozus</i> BBTJI-sp2		no	no	no	no
Bethylidae	<i>Goniozus</i> BBTJI-sp3		no	no	no	no
Braconidae	<i>Austrocotesia</i> BBTJI-sp1		no	no	no	no
Braconidae	<i>Bracon</i> BBTJI_sp1		no	no	no	no
Braconidae	<i>Bracon</i> BBTJI_sp2		no	no	no	no
Braconidae	<i>Cardiochiles</i> BBTJI-sp1		no	no	no	no
Braconidae	<i>Chelonus</i> BBTJI-sp1		no	no	no	no
Braconidae	<i>Macrocentrus</i> BBTJI-sp1		no	no	no	no
Braconidae	<i>Mesocentrus</i> BBTJI-sp1		no	no	no	no
Braconidae	<i>Yelicones</i> BBTJI-sp1		no	no	no	no
Chrysididae	<i>Chrysis</i> BBTJI-1		no	no	no	no
Chrysididae	<i>Primeuchoroeus</i> BBTJI_sp1		no	no	no	no
Braconidae	<i>Phanaustrotoma</i> BBTJI-sp1		yes	no	no	no
Crabronidae	<i>Podergritus</i> BBTJI-sp1		no	no	no	no
Crabronidae	<i>Podergritus</i> BBTJI-sp2		no	no	no	no

Crabronidae	<i>Tachysphex</i> BBTJI-sp1		no	no	no	no
Evaniidae	<i>Szepligetiella</i> BBTJI-sp1		no	no	no	no
Ichneumonidae	<i>Netelia</i> BBTJI-sp1		no	no	no	no
Multillidae	<i>Ancistrotilla</i> BBTJI-sp1		no	no	no	no
Multillidae	<i>Ephutomorpha</i> BBTJI_SP1		no	no	no	no
Mutillidae	<i>Aglaotilla</i> BBTJI-sp1		no	no	no	no
Pompilidae	<i>Anoplius</i> BBTJI-sp1		no	no	no	no
Pompilidae	<i>Ctenostegus</i> BBTJI-sp1		no	no	no	no
Pompilidae	<i>Ctenostegus</i> BBTJI-sp2		no	no	no	no
Scoliidae	<i>Radumeris tasmaniensis</i>	Yellow-flower wasp	no	no	no	no
Thynnidae	<i>Guerinius</i> BBTJI-sp1		no	no	no	no
Thynnidae	<i>Rhagigaster</i> BBTJI-sp1		no	no	no	no
Vespidae	<i>Delta</i> BBTJI_sp1		no	no	no	no
Vespidae	<i>Paralastor</i> BBTJI_sp1		no	no	no	no
Vespidae	<i>Pseudabispa</i> BBTJI_sp1		no	no	no	no
Braconidae	Braconinae BBTJI-sp1		no	no	no	no
Braconidae	Braconinae BBTJI-sp2		no	no	no	no
Braconidae	Braconinae BBTJI-sp2		no	no	no	no
Braconidae	Braconinae BBTJI-sp3		no	no	no	no
Braconidae	Braconinae BBTJI-sp4		no	no	no	no
Gasteruptiidae	<i>Gasteruption</i> BBTJI-sp1		yes	no	no	no
Gasteruptiidae	<i>Gasteruption</i> BBTJI-sp2		yes	no	no	no
Braconidae	Braconinae BBTJI-sp5		no	no	no	no
Braconidae	Braconinae BBTJI-sp5		no	no	no	no
Braconidae	Braconinae BBTJI-sp6		no	no	no	no
Braconidae	Braconinae BBTJI-sp7		no	no	no	no
Braconidae	Euphorinae BBTJI-sp1		no	no	no	no

Braconidae	Homolobinae BBTJI-sp1		no	no	no	no
Braconidae	Rogadinae BBTJI-sp1		no	no	no	no
Braconidae	Rogadinae BBTJI-sp3		no	no	no	no
Braconidae	Rogadinae BBTJI-sp4		no	no	no	no
Braconidae	Rogadinae BBTJI-sp5		no	no	no	no
Braconidae	Rogadinae BBTJI-sp6		no	no	no	no
Crabronidae	Nyssoninae BBTJI-sp1		no	no	no	no
Dryinidae	Dryininae BBTJI-sp1		no	no	no	no
Dryinidae	Dryininae BBTJI-sp2		no	no	no	no
Ichnumonidae	Campopleginae BBTJI-sp1		no	no	no	no
Ichnumonidae	Cryptinae BBTJI-sp1		no	no	no	no
Megaspilidae	Megaspilinae BBTJI-sp1		no	no	no	no
Megaspilidae	Megaspilinae BBTJI-sp2		no	no	no	no
Crabronidae	<i>Bembix wiluna</i>		no	no	no	no
Gasteruptiidae	<i>Gasteruption genale</i>		no	no	no	no
Gasteruptiidae	<i>Gasteruption leptothecus</i>		no	no	no	no
Gasteruptiidae	<i>Gasteruption zebriforme</i>		no	no	no	no
Gasteruptiidae	<i>Pseudofoenus cardaleae</i>		no	no	no	no
Gasteruptiidae	<i>Pseudofoenus feckneri</i>		no	no	no	no
Gasteruptiidae	<i>Pseudofoenus kelleri</i>		no	no	no	no
Ichnumonidae	<i>Labium centrale</i>		no	no	no	no
Ichnumonidae	<i>Lissopimpla excelsa</i>	Orchid dupe wasp	no	no	no	no
Pompilidae	<i>Cryptochilus bicolor</i>		no	no	no	no
Pompilidae	<i>Cryptochilus tuberulatus</i>		no	no	no	no
Specidae	<i>Prionyx globosus</i>		no	no	no	no
Thynnidae	Rhagigasterini BBTJI-sp1		no	no	no	no
Thynnidae	Thynnini BBTJI-sp1		no	no	no	no