

Yalata Bush Blitz

Hymenoptera and Coleoptera

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List of contributors

List of contributors to this report.			
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Ben Parslow	South Australian Museum	General entomology, Evanioidea	Principal author, Survey participant, identifications of the superfamily Evanioidea, order Coleoptera, other insect orders

Erinn Fagan-Jeffries	The University of Adelaide/South Australian Museum	Hymenoptera, particularly Braconidae, especially Microgastrinae	Principal author, Survey participant, Hymenoptera family level identifications, identifications of the superfamily Ichneumonoidea
Peter Lang	South Australian Herbarium	Burprestidae	Contributing author, Survey participant, burprestid material identification

Abstract

A BushBlitz survey of terrestrial invertebrates in the Yalata and Fowlers Bay region was conducted in November 2021. The focus of the collection effort was on general collecting across insect groups, with particular focus on Hymenoptera and Coleoptera (other focus groups include arachnids, bees, Lepidoptera and Orthoptera reported elsewhere). Several confirmed new species were collected, including a new species of *Gasteruption* (Hymenoptera: Gasteruptionidae), *Aulacus* (Hymenoptera: Aulacidae), and several species of the subfamily Microgastrinae. Over 1000 specimens of hymenopterans and coleopterans, plus hundreds more of other insect groups, were collected and accessioned to The South Australian Museum, and will be available for morphological or DNA-based research in the future.

1. Introduction

Insects are one of the most diverse groups of animals on earth, are critical for ecosystem health, and are vastly understudied in Australia. As such, biodiversity surveys focussing on insects are extremely important, but rife with difficulties in identifying and processing the incredible diversity of specimens collected. This report focusses on the Hymenoptera (excluding bees) and the Coleoptera, collected during the Bush Blitz Yalata expedition. Other insect orders (excluding Lepidoptera, Orthoptera and Hymenoptera: bees) were collected and accessioned into The South Australian Museum but are not reported on due to time constraints and difficulties with identifications.

The survey area included Fowlers Bay, Coorabie and surrounds, Wahgunyah Conservation Park, and Yalata Indigenous Protected Area, and provided an opportunity to fill a significant gap in the knowledge of insects from this area. The site has diverse vegetation, including coastal shrublands, mallee communities, Western Myall low woodlands, grasslands, shrublands of chenopods and *Melaleuca* species, salt lakes, and dune systems.

The Yalata and Fowlers Bay region is not a previously heavily surveyed area for Hymenoptera and Coleoptera. Surveys have been conducted by the South Australian Museum for some of the surrounding areas in the Nullarbor National Park and Maralinga.

It was expected that both Coleoptera and Hymenoptera would be diverse across the survey area based on the large variation in habitat types. As the region has not been extensively surveyed, and there is a large proportion of undescribed insects in Australia, it was expected that many of the collections would include undescribed species. However, it may be many years until the full potential of the collected specimens are realised due to the lack of experts working on both groups.

2. Methods

2.1 Site selection

Coleoptera and Hymenoptera were expected to be present in all habitat types across the survey area. Due to unfavourable cold conditions earlier during the survey we prioritised site selection on a few 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.

Over 166 collection locations were sampled across the survey site (Fig. 1) with all specimen location data available in the point data appendix.

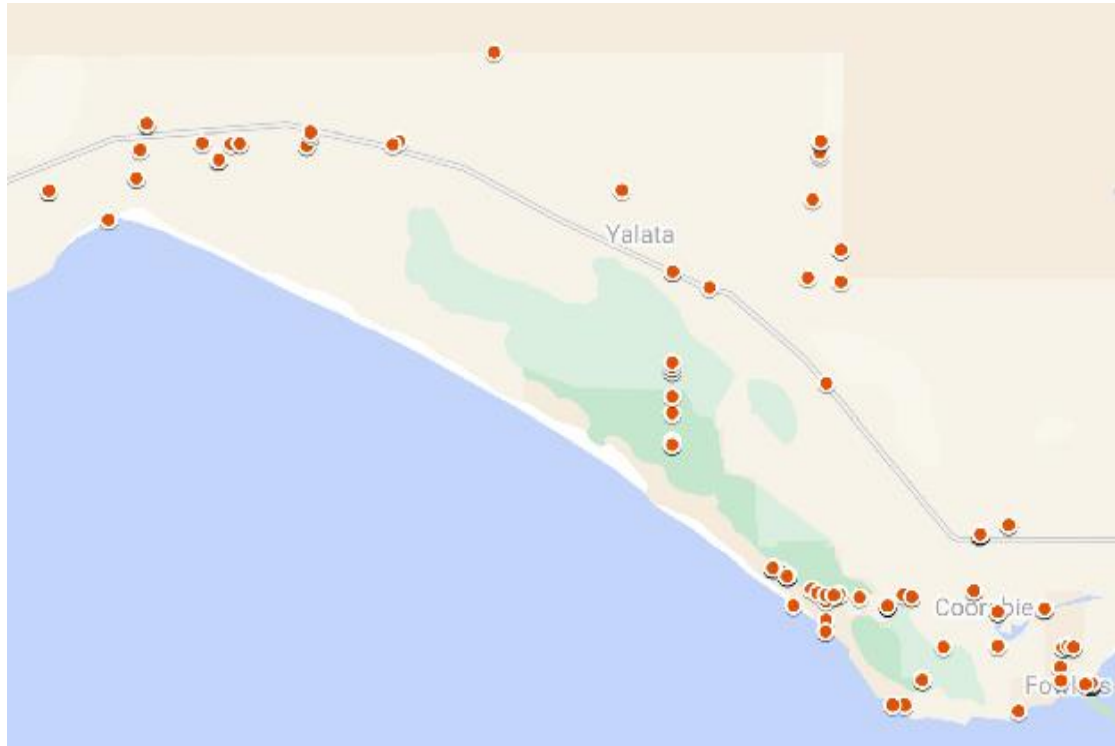


Figure 1: Map of survey area showing terrestrial invertebrate collection locations.

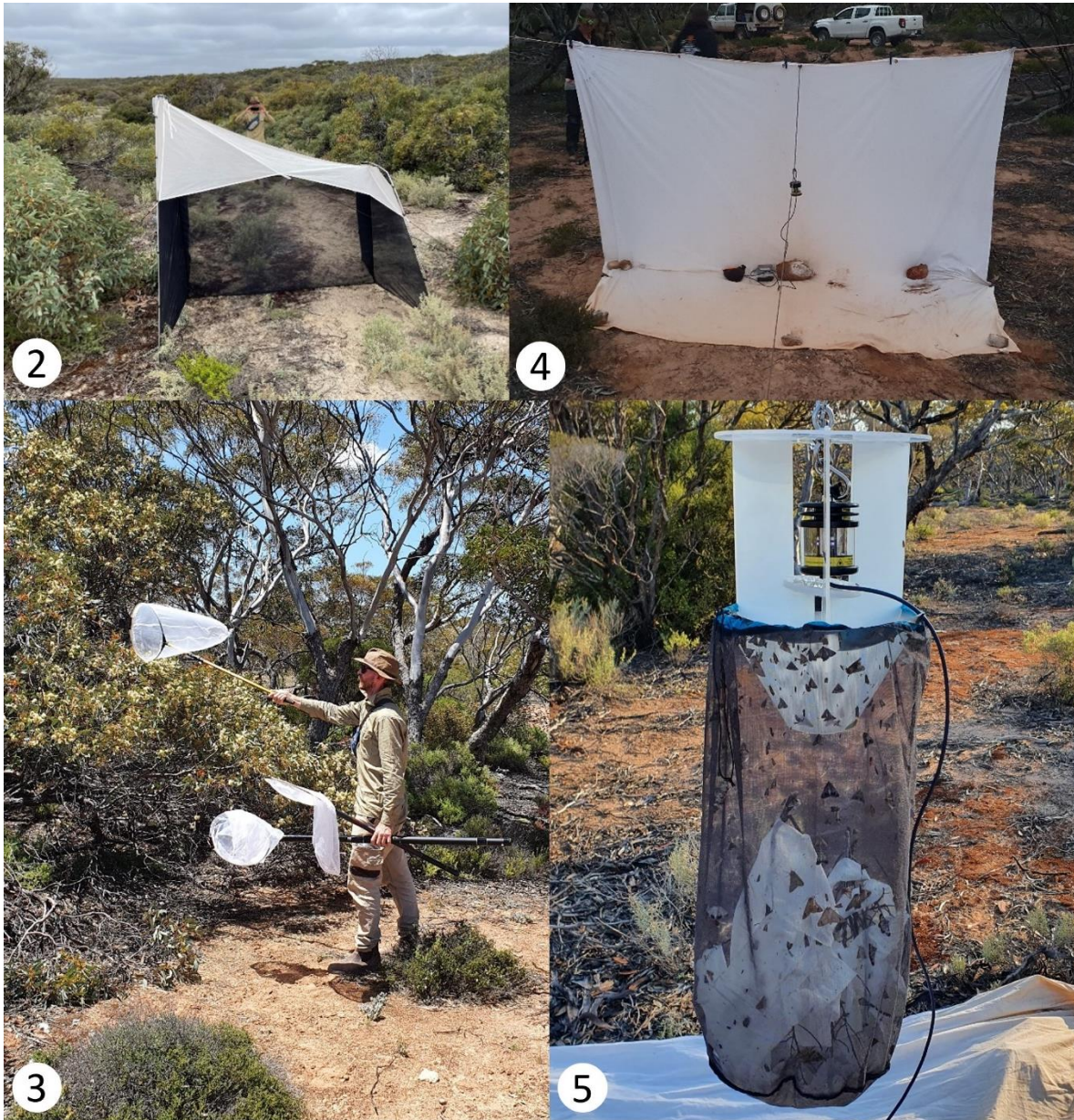
2.2 Survey techniques

The survey techniques used were a combination of passive and active methods.

Hymenoptera and Coleoptera were sampled using the following methods:

- Passive flight intercept traps (five Townes-style Malaise traps) deployed in natural flight corridors for nearly the entire duration of the expedition (Fig. 2).
- Sweep netting of vegetation, particularly of any 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 (Fig. 3).
- Direct visual sighting and collection, particularly of ground-based wasps (e.g. spider wasps, velvet ants) and beetles.
- A LepiLED light (both active collecting at a white sheet placed behind the light (Fig. 4) and an unmanned light trap left overnight (Fig. 5))
- Vehicle mounted insect net for collecting startled and flying insects during transit.
- Pitfall traps placed on the edge of a salt lake or in caves.

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



Figures 2–5: Survey techniques. 2. Towns-style Malaise trap placed, Wahgunyah Conservation Park (E.P. Fagan-Jeffries 2021); 3. Sweep netting flowering *Eucalyptus yalataensis*, Wahgunyah Conservation Park (E.P. Fagan-Jeffries 2021); 4. Light sheet with LepiLED, Fowlers Bay Conservation Park (E.P. Fagan-Jeffries 2021); Unmanned overnight light trap using LepiLED, Fowlers bay Conservation Park (B.A. Parslow 2021).

2.2.1 Methods used at standard survey sites

All 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 Malaise trap was placed at each standard

survey site during the first few days of the expedition and collected on the last day before departure. At SS1, weather was extremely cold and windy during visits which resulted in minimal material.

2.3 Identifying the collections

Specimens were identified to species level where possible with the majority of material identified to generic and family level due to time and expertise restrictions. Where material was identified to generic level, specimens were sometimes separated into distinct morphospecies. For material that could not be identified confidently past family level were grouped and documented as a family assemblage with a number of individuals.

Hymenoptera:

Hymenopteran families were identified using the CSIRO Australian Insect Families Key (Hymenoptera: By Nick Stevens, Claire Stephens, Muhammad Iqbal, John Jennings and Andy Austin (University of Adelaide) and John La Salle (CSIRO Entomology)) and using other taxonomic literature (Quicke, 1999; Klopstein, 2016) and/or specimens lodged at SAMA where needed. The *Eurymutilla* sp. was identified by Maddalene Giannotta (Australian National University/ Australian National Insect Collection) (Fig. 6).

Sixty-two specimens were sequenced for the COI DNA barcoding gene fragment, which assisted with genus and subfamily identification.

Coleoptera:

Coleoptera material was identified using a combination of Lackner & Leschen 2017, Matthews, 1980, 1982, 1984, 1985, 1987, 1992, 1997, Mathews & Reid 2002, Slipinski & Escalona, 2013, and direct comparison of material held in the South Australian Museum (SAMA). The specimen of *Rhytiphora frenchi* was identified by Dr Lauren G. Ashman (Australian National University/ Australian National Insect Collection).

3. Results and Discussion

Appendix 1 lists all specimens of Coleoptera and Hymenoptera (excluding bees) recorded during the survey. Collections made during this Bush Blitz resulted in 952 hymenopteran and 185 coleopteran specimens being added to public collections and an equivalent number of records added to publicly accessible databases.

An additional 380 Diptera, 118 Hemiptera, 7 Mantodea, 5 Neuroptera and 1 Phasmatodea specimens were collected and will be accessioned into The South Australian Museum but are not reported here. Also note that bees (Hymenoptera), Lepidoptera and Orthoptera are reported separately by other survey participants.

3.1 Un-named or not formalised taxa

Hymenoptera:

There were 952 specimens collected, of which 722 were identified to at least family level, with several identified to subfamily or genus level (Table 1). Twenty-six different hymenopteran families are recorded from the material, likely constituting over 150 different species (as an extremely conservative estimate). There were 230 specimens of the superfamilies Chalcidoidea and Platygastroidea which were not identified to family level and labelled simply as 'microhymenoptera' for the purposes of this report.



Figure 6: *Eurymutilla* sp. "Bush Blitz Yalata 1" (Hymenoptera: Mutillidae) collected in Wahgunyah Conservation Park (E.P. Fagan-Jeffries 2021).

Coleoptera:

A total of 185 specimens were collected with 45 identified to genus and sorted to morpho-species (Table 1). Nineteen Curculionoidea specimens were collected but were not identified to family level and labelled as "Curculionoidea" for the purpose of this report.

Table 1. Putatively un-named or not formalised taxa	
Hymenoptera	
Taxon	Comment
<i>Aleiodes</i> sp. "Bush Blitz Yalata 1"	Not keyed or identified beyond genus
Bethylidae	77 specimens collected, at least 5 different species
Brachistinae sp. "Bush Blitz Yalata 1"	Not keyed or identified beyond subfamily
Braconidae	77 specimens were collected that were not identified beyond family level
Braconidae (Cheloninae)	6 specimens, at least three different species
Braconidae (Microgastrinae)	16 other specimens (not DNA barcoded and thus not listed individually) collected. At least one is definitely a different species to the DNA barcoded ones.
Braconinae sp. "Bush Blitz Yalata 1"	Not keyed or identified beyond subfamily
Braconinae sp. "Bush Blitz Yalata 2"	Not keyed or identified beyond subfamily

Braconinae sp. "BushBlitz Yalata 3"	Not keyed or identified beyond subfamily
Braconinae sp. "BushBlitz Yalata 4"	Not keyed or identified beyond subfamily
Chalcididae	21 specimens were collected that were not Identified beyond family level
Cheloninae sp. "BushBlitz Yalata 1"	Not keyed or identified beyond subfamily
Chrysididae	1 specimen collected
Crabronidae	52 specimens collected, at least 10 species
Diapriidae	4 specimens collected
<i>Dolichogenidea</i> sp "BushBlitz Yalata 1"	Putative new species, also known from Hiltaba station (SA) and Barakula State Forest (QLD), first record for the Yalata region.
<i>Dolichogenidea</i> sp "BushBlitz Yalata 6"	Putative new species, also known from Budj Bim Cultural Landscape in Victoria, ACT, Albany WA, and Picola, Victoria.
<i>Dolichogenidea</i> sp "BushBlitz Yalata 7"	Putative new species, also known from the border of Hinks Conservation Reserve, Eyre Peninsula.
Dryinidae	3 specimens collected
Encyrtidae	2 specimens were collected that were not Identified beyond family level
Eucharitidae	2 specimens were collected that were not Identified beyond family level
Euphorinae sp. "BushBlitz Yalata 1"	Not keyed or identified beyond subfamily
<i>Eurymutilla</i> sp. "Bush Blitz Yalata 1"	Not keyed or identified beyond genus
Formicidae	80 specimens collected, at least 10 different species
<i>Gasteruption</i> sp. <i>BB_Yalata_02</i>	Male specimen that can't be accurately associated with described female specimens.
Ichneumonidae	53 specimens were collected that were not Identified beyond family level
Lysiterminae sp. "Bush Blitz Yalata 1"	Not keyed or identified beyond subfamily
<i>Macrocentrus</i> sp. "BushBlitz Yalata 1"	Also known from Millstream NP, WA (based on matching COI sequence BOLD:ACX2620)
Megastigmidae	1 specimen collected that was not Identified beyond family level
Microgastrinae unknown gen sp. "BushBlitz Yalata 1"	Putative new species, only known from the Bush Blitz material and from Albany WA
Microhymenoptera	230 specimens not Identified to family level, of microhymenoptera (generally of the superfamilies Chalcidoide of Platygastroidea) were collected.
Mutillidae	18 specimens collected, at least 12 different species
Opiinae sp. "BushBlitz Yalata 1"	Not keyed or identified beyond subfamily
<i>Opius</i> sp. "Bush Blitz Yalata 1"	Not keyed or identified beyond genus
<i>Phanerotoma</i> sp. "BushBlitz Yalata 1"	COI sequence matches " <i>Phanerotoma</i> sp. ADC6031" on BOLD, also known from NW Western Australia and Renmark, SA.
Platygasteridae	>20 specimens collected
Pompilidae	52 specimens collected, at least 18 different species
Proctotrupidae	8 specimens collected
Pteromalidae	7 specimens were collected that were not Identified beyond family level
Sclerogibbidae	2 specimens collected

Scoliidae	1 specimen collected
Sphecidae	9 specimens collected, at least 4 different species
<i>Szepligetella</i> sp. BB_Yalata_04	Identified to genus and sorted to morphospecies
<i>Szepligetiella</i> sp. BB_Yalata_01	Identified to genus and sorted to morphospecies
<i>Szepligetiella</i> sp. BB_Yalata_02	Identified to genus and sorted to morphospecies
<i>Szepligetiella</i> sp. BB_Yalata_03	Identified to genus and sorted to morphospecies
Thynnidae	136 specimens collected, at least 10 different species
Vespidae	3 specimens collected
Coleoptera	
Taxon	Comment
<i>Aneucomides</i> sp. BB_Yalata_01	Identified to genus and sorted to morphospecies
<i>Arthropterus</i> sp. BB_Yalata_01	Identified to genus and sorted to morphospecies
<i>Calomela</i> sp. BB_Yalata_01	Identified to genus and sorted to morphospecies
<i>Carenum</i> sp. BB_Yalata_01	Identified to genus and sorted to morphospecies
<i>Carenum</i> sp. BB_Yalata_02	Identified to genus and sorted to morphospecies
<i>Carenum</i> sp. BB_Yalata_03	Identified to genus and sorted to morphospecies
<i>Cassida</i> sp. BB_Yalata_01	Identified to genus and sorted to morphospecies
<i>Cassida</i> sp. BB_Yalata_02	Identified to genus and sorted to morphospecies
<i>Cenogmus</i> sp. BB_Yalata_01	Identified to genus and sorted to morphospecies
<i>Cerotalis</i> sp. BB_Yalata_01	Identified to genus and sorted to morphospecies
<i>Cerotalis</i> sp. BB_Yalata_02	Identified to genus and sorted to morphospecies
<i>Chalcopteroides</i> sp. BB_Yalata_01	Identified to genus and sorted to morphospecies
<i>Colpochila</i> sp. BB_Yalata_01	Identified to genus and sorted to morphospecies
<i>Colpochila</i> sp. BB_Yalata_02	Identified to genus and sorted to morphospecies
Curculionoidea	19 specimens (estimated 17 morphospecies)
<i>Eleale</i> sp. BB_Yalata_01	Identified to genus and sorted to morphospecies
<i>Eleale</i> sp. BB_Yalata_02	Identified to genus and sorted to morphospecies
<i>Eleale</i> sp. BB_Yalata_03	Identified to genus and sorted to morphospecies
<i>Epilectus</i> sp. BB_Yalata_01	Identified to genus and sorted to morphospecies
<i>Euryscaphus</i> sp. BB_Yalata_01	Identified to genus and sorted to morphospecies
<i>Euryscaphus</i> sp. BB_Yalata_02	Identified to genus and sorted to morphospecies
<i>Helea</i> sp. BB_Yalata_01	Identified to genus and sorted to morphospecies
<i>Helea</i> sp. BB_Yalata_02	Identified to genus and sorted to morphospecies
<i>Heteronyx</i> sp. BB_Yalata_01	Identified to genus and sorted to morphospecies
<i>Heteronyx</i> sp. BB_Yalata_02	Identified to genus and sorted to morphospecies
<i>Heteronyx</i> sp. BB_Yalata_03	Identified to genus and sorted to morphospecies
<i>Heteronyx</i> sp. BB_Yalata_04	Identified to genus and sorted to morphospecies
<i>Heteronyx</i> sp. BB_Yalata_05	Identified to genus and sorted to morphospecies
<i>Heteronyx</i> sp. BB_Yalata_06	Identified to genus and sorted to morphospecies
<i>Heteronyx</i> sp. BB_Yalata_07	Identified to genus and sorted to morphospecies
<i>Liparetrus</i> sp. BB_Yalata_01	Identified to genus and sorted to morphospecies
<i>Liparetrus</i> sp. BB_Yalata_02	Identified to genus and sorted to morphospecies
<i>Liparetrus</i> sp. BB_Yalata_03	Identified to genus and sorted to morphospecies
<i>Mordella</i> sp. BB_Yalata_01	Identified to genus and sorted to morphospecies
<i>Paederus</i> sp. BB_Yalata_01	Identified to genus and sorted to morphospecies

<i>Phlogistomorpha</i> sp. BB_Yalata_01	Identified to genus and sorted to morphospecies
<i>Phlogistomorpha</i> sp. BB_Yalata_02	Identified to genus and sorted to morphospecies
<i>Phlogistomorpha</i> sp. BB_Yalata_03	Identified to genus and sorted to morphospecies
<i>Phlogistomorpha</i> sp. BB_Yalata_04	Identified to genus and sorted to morphospecies
<i>Porrostoma</i> sp. BB_Yalata_01	Identified to genus and sorted to morphospecies
<i>Pterohelaeus</i> sp. BB_Yalata_01	Identified to genus and sorted to morphospecies
<i>Sarothrocrepi</i> sp. BB_Yalta_01	Identified to genus and sorted to morphospecies
<i>Sarothrocrepi</i> sp. BB_Yalta_02	Identified to genus and sorted to morphospecies
<i>Sarothrocrepi</i> sp. BB_Yalta_03	Identified to genus and sorted to morphospecies
<i>Sarothrocrepis</i> sp. BB_Yalta_04	Identified to genus and sorted to morphospecies
<i>Syllitus</i> BB_Yalata_01	Identified to genus and sorted to morphospecies

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.

Hymenoptera:

There were 11 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 much higher than this but would require specialist expertise on the different families and genera. The authors of this report, who have worked extensively on the braconid subfamily Microgastrinae and the superfamily Evanioidea, were able to identify that there are two putative new species of the genus *Choeras* (Braconidae: Microgastrinae), four putative new species of the genus *Dolichogenidea* (Braconidae: Microgastrinae), two putative new species of the genus *Miropotes* (Braconidae Microgastrinae), and a putative new species of each of the genera *Pristomerus* (Ichneumonidae), *Gasteruption* (Gasteruptionidae) and *Aulacus* (Aulacidae).

Coleoptera:

No putative new species were identified but it is likely in the diverse groups that undescribed material would have been collected.

Species	Comment
<i>Aulacus</i> sp. BB_Yalata_01	First record of this putative new species, only known from the Bush Blitz material
<i>Choeras</i> sp. "BushBlitz Yalata 1"	First record of this putative new species, only known from the Bush Blitz material
<i>Choeras</i> sp. "BushBlitz Yalata 2"	First record of this putative new species, only known from the Bush Blitz material
<i>Dolichogenidea</i> sp "BushBlitz Yalata 2"	First record of this putative new species, only known from the Bush Blitz material
<i>Dolichogenidea</i> sp "BushBlitz Yalata 3"	First record of this putative new species, only known from the Bush Blitz material
<i>Dolichogenidea</i> sp "BushBlitz Yalata 4"	First record of this putative new species, only known from the Bush Blitz material
<i>Dolichogenidea</i> sp "BushBlitz Yalata 5"	First record of this putative new species, only known from the Bush Blitz material

<i>Gasteruption</i> sp. <i>BB_Yalata_01</i>	Superficially resembles <i>Gasteruption raphidioides</i> but can be separated based on size and morphological differences. First record of this putative new species, only known from the Bush Blitz material
<i>Miropotes</i> sp. " <i>BushBlitz Yalata 1</i> "	First record of this putative new species, only known from the Bush Blitz material
<i>Miropotes</i> sp. " <i>BushBlitz Yalata 2</i> "	First record of this putative new species, only known from the Bush Blitz material
<i>Pristomerus</i> (Ichneumonidae) sp. " <i>BushBlitz Yalata 1</i> "	Appears to not key to anything in Klopstein's 2016 revision, putative new species

3.3 Exotic and pest species

Hymenoptera:

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

Coleoptera:

Only a single exotic species of Coleoptera was identified during this survey: the actively spreading introduced species *Blaps polychresta* (Egyptian beetle) was recorded around the Fowlers Bay community hall. This species is associated with organic waste from animals and is likely to be dispersing via anthropogenic means.

Exotic/pest species	Location sighted/observed	Indication of abundance	Comments
<i>Blaps polychresta</i>	Fowlers Bay, Community hall -31.986868, 132.436761	common	Introduced to Australia

3.4 Threatened species

There are currently no wasps and beetles listed under the EPBCA or under South Australian legislation, and therefore no listed threatened species were collected or identified during the survey.

3.5 Range extensions

Detailed information on Hymenoptera and Coleoptera 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 (Table 5), due to the limited collection records for the region (or at least the limited databased records).

Table 5. Range extensions or significant infill in distribution records for species			
Species	Location sighted/observed	Distance from nearest known record (km)	Comments
<i>Dolichogenidea bonbonensis</i>	Roadside, track off Wookata Road, Coorabie -31.900139, 132.1664621	358.74 km	Species also known from Bon Bon Station, Witchelina Station, Kariijini NP (WA) and near Lajamanu (NT).
<i>Iphiaulax australiensis</i>	Wahgunyah CP, near sand dunes -31.8571218, 132.0139676		Species broadly distributed across the country, but this fills in a significant gap between Eyre Peninsula & Western Australia according to the records reported in Quicke 1991.
<i>Apanteles ippeus</i>	Wahgunyah CP, -31.8641789, 132.0318379		There are no records databased or available on ALA, so the exact distance from nearest record is difficult to quantify. However, it is very unlikely there are any identified specimens from the region in collections.
<i>Gasteruption longipes</i>	Yalata IPA, along dog fence track, -31.6309522, 131.8807435	~500 km	This record is the western most record for the species which has been collected in Adelaide and across Tasmania.
<i>Szepligetella perfida</i>	Wahgunyah CP, -31.866095, 132.033859	~1700 km	The species was described from material collected in Tasmania (Westwood, 1851), it is likely this species has a broader distribution across southern Australia.
<i>Rhytiphora frenchi</i>	Wahgunyah CP, -31.86299, 132.06744	936 km	This species is known from Western Australia with this collection representing the first record for South Australia.
<i>Hoppodamia variegata</i>	Wahgunyah CP, -32.010897, 132.172815	~300 km	Species broadly distributed across southern Australia, but this provides records in a large gap between the Eyre Peninsula & Western Australia.
<i>Argrilus assimilis assimilis</i>	Wahgunyah CP, -31.864179, 132.031838	~315 km	This is the most western record of the species (Lang, 2022).

3.6 Genetic information

Sixty-two wasp specimens, mostly from the family Braconidae, were DNA barcoded and uploaded to BOLD. The BOLD codes for specimens are given in the appendix with the point data for each specimen.

4. Information on species lists

The hymenopteran and coleopteran fauna of Australia is extremely diverse (over 12,000 and 23,000 described species respectively) and vastly unknown, with estimates of 70% of species yet to be described. The high diversity and lack of suitable keys 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 the identification of other specimens to either family or genus level.

5. Information for land managers

It was clear that during the survey Wahgunyah Conservation Park was mainly comprised of high-quality habitat. The south eastern parts of the park, closer to Coorabie and Fowlers bay was more degraded due to varying levels fragmentation caused by private property and agricultural land. Although large portion of the Yalata IPA was not included in the survey due to COVID-19 precautions, areas that were visited were of high-quality with minimal disturbance. It is recommended to continue to maintain the habitat in Wahgunyah Conservation Park and Yalata IPA as both these areas had high-quality habitat and provided new species from the survey.

6. Conclusions

Despite not ideal weather (particularly for the collection of flying hymenopterans) during part of the expedition, a large diversity of Hymenoptera and Coleoptera were collected, all of which will provide invaluable DNA-quality specimens for future researchers and taxonomists working on specific families or genera. The significant diversity of habitats surveyed within the expedition area no doubt contributes to the large number of different species collected. Significantly more new species are likely to have been collected than the few reported here and will be gradually identified and described as taxonomists access material and work on particular groups of insects.

Acknowledgements

We would like to thank the Far West Coast Aboriginal Corporation, the traditional custodians of the Far West Coast land for their cooperation and facilitation during the expedition. We also extend our thanks to the rangers and members from the Yalata Anangu Aboriginal Corporation and the Yumbarra Conservation Park Co-management Board for the assistance with access on land and the transfer of knowledge during the expedition.

We thank the Bush Blitz organisation team and other survey participants for their hard work organising the expedition and building a productive scientific environment.

We particularly thank survey participants Ethan Beaver, Jess Marsh and Remko Leijs for the invaluable discussion and collaboration during the field work and we thank Madalene Giannotta for identifying the *Eurymutilla* specimen and Dr Lauren G. Ashman for identifying the *Rhytiphora frenchi* specimen.

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Appendices

Appendix 1. List of Coleoptera and Hymenoptera recorded during the Yalata Bush Blitz

Appendix 1. List of Hymenoptera and Coleoptera recorded during the Yalata Bush Blitz						
Family	Species	Common name	Putative new species	Threatened (EPBC Act)	Threatened (State/Territory Act)	Exotic /pest
Aulacidae	<i>Aulacus</i> sp. BB_Yalata_01		Yes	No	No	No
Braconidae	<i>Aleiodes</i> sp. "Bush Blitz Yalata 1"		No	No	No	No
Braconidae	<i>Apanteles ippeus</i>		No	No	No	No
Braconidae	<i>Brachistinae</i> sp. "Bush Blitz Yalata 1"		No	No	No	No
Braconidae	<i>Braconinae</i> sp. "BushBlitz Yalata 1"		No	No	No	No
Braconidae	<i>Braconinae</i> sp. "BushBlitz Yalata 2"		No	No	No	No
Braconidae	<i>Braconinae</i> sp. "BushBlitz Yalata 3"		No	No	No	No
Braconidae	<i>Braconinae</i> sp. "BushBlitz Yalata 4"		No	No	No	No
Braconidae	<i>Cheloninae</i> sp. "BushBlitz Yalata 1"		No	No	No	No
Braconidae	<i>Choeras</i> sp. "BushBlitz Yalata 1"		Yes	No	No	No
Braconidae	<i>Choeras</i> sp. "BushBlitz Yalata 2"		Yes	No	No	No
Braconidae	<i>Dolichogenidea bonbonensis</i>		No	No	No	No
Braconidae	<i>Dolichogenidea</i> sp "BushBlitz Yalata 1"		No	No	No	No
Braconidae	<i>Dolichogenidea</i> sp "BushBlitz Yalata 2"		Yes	No	No	No
Braconidae	<i>Dolichogenidea</i> sp "BushBlitz Yalata 3"		Yes	No	No	No
Braconidae	<i>Dolichogenidea</i> sp "BushBlitz Yalata 4"		Yes	No	No	No
Braconidae	<i>Dolichogenidea</i> sp "BushBlitz Yalata 5"		Yes	No	No	No
Braconidae	<i>Dolichogenidea</i> sp "BushBlitz Yalata 6"		No	No	No	No
Braconidae	<i>Dolichogenidea</i> sp "BushBlitz Yalata 7"		No	No	No	No
Mutillidae	<i>Eurymutilla</i> sp. BB_Yalata_01		No	No	No	No
Braconidae	<i>Iphiaulax australiensis</i> (<i>Braconinae</i>)		No	No	No	No
Braconidae	<i>Lysiterminae</i> sp. "Bush Blitz Yalata 1"		No	No	No	No
Braconidae	<i>Macrocentrus</i> sp. "BushBlitz Yalata 1"		No	No	No	No
Braconidae	<i>Microgastrinae</i> unknown gen sp. "BushBlitz Yalata 1"		No	No	No	No

Braconidae	<i>Miropotes sp. "BushBlitz Yalata 1"</i>		Yes	No	No	No
Braconidae	<i>Miropotes sp. "BushBlitz Yalata 2"</i>		Yes	No	No	No
Braconidae	<i>Opiinae sp. "BushBlitz Yalata 1"</i>		No	No	No	No
Braconidae	<i>Opius sp. "Bush Blitz Yalata 1"</i>		No	No	No	No
Braconidae	<i>Phanerotoma sp. "BushBlitz Yalata 1"</i>		No	No	No	No
Evaniidae	<i>Szepligetiella sp. BB_Yalata_01</i>		No	No	No	No
Evaniidae	<i>Szepligetiella sp. BB_Yalata_03</i>		No	No	No	No
Evaniidae	<i>Szepligetiella sp. BB_Yalata_04</i>		No	No	No	No
Evaniidae	<i>Szepligetiella perfida</i>		No	No	No	No
Gasteruptiidae	<i>Gasteruption longipes</i>		No	No	No	No
Gasteruptiidae	<i>Gasteruption raphidioides</i>		No	No	No	No
Gasteruptiidae	<i>Gasteruption sp. BB_Yalata_02</i>		No	No	No	No
Gasteruptiidae	<i>Gasteruption sp. BB_Yalata_01</i>		Yes	No	No	No
Ichneumonidae	<i>Pristomerus sp. "BushBlitz Yalata 1"</i>		Yes	No	No	No
Tenebrionidae	<i>Blaps polychresta</i>	Egyptian beetle	No	No	No	Yes
Carabidae	<i>Euryscaphus sp. BB_Yalata_01</i>		No	No	No	No
Carabidae	<i>Cerotalis sp. BB_Yalata_01</i>		No	No	No	No
Carabidae	<i>Cerotalis sp. BB_Yalata_02</i>		No	No	No	No
Carabidae	<i>Carenum sp. BB_Yalata_01</i>		No	No	No	No
Carabidae	<i>Carenum sp. BB_Yalata_02</i>		No	No	No	No
Carabidae	<i>Carenum sp. BB_Yalata_03</i>		No	No	No	No
Carabidae	<i>Euryscaphus sp. BB_Yalata_02</i>		No	No	No	No
Carabidae	<i>Epilectus sp. BB_Yalata_01</i>		No	No	No	No
Carabidae	<i>Pseudotetracha australis</i>		No	No	No	No
Carabidae	<i>Cenogmus sp. BB_Yalta_01</i>		No	No	No	No
Carabidae	<i>Sarothrocrepis sp. BB_Yalata_01</i>		No	No	No	No
Carabidae	<i>Sarothrocrepis sp. BB_Yalata_02</i>		No	No	No	No
Carabidae	<i>Sarothrocrepis sp. BB_Yalata_03</i>		No	No	No	No
Carabidae	<i>Sarothrocrepis sp. BB_Yalata_04</i>		No	No	No	No
Histeridae	<i>Tomogenius ripicola</i>		No	No	No	No
Staphylinidae	<i>Paederus sp. BB_Yalata_01</i>		No	No	No	No

Lycidae	<i>Porrostoma sp. BB_Yalata_01</i>		No	No	No	No
Carabidae	<i>Arthropterus sp. BB_Yalata_01</i>		No	No	No	No
Cleridae	<i>Eleale sp. BB_Yalata_01</i>		No	No	No	No
Cleridae	<i>Eleale sp. BB_Yalata_02</i>		No	No	No	No
Cleridae	<i>Eleale sp. BB_Yalata_03</i>		No	No	No	No
Cleridae	<i>Phlogistomorpha sp. BB_Yalata_04</i>		No	No	No	No
Cleridae	<i>Phlogistomorpha sp. BB_Yalata_01</i>		No	No	No	No
Cleridae	<i>Phlogistomorpha sp. BB_Yalata_02</i>		No	No	No	No
Cleridae	<i>Phlogistomorpha sp. BB_Yalata_03</i>		No	No	No	No
Cleridae	<i>Opilo congruus</i>		No	No	No	No
Tenebrionidae	<i>Helea sp. BB_Yalata_01</i>		No	No	No	No
Tenebrionidae	<i>Helea sp. BB_Yalata_02</i>		No	No	No	No
Tenebrionidae	<i>Pterohelaus sp. BB_Yalata_01</i>		No	No	No	No
Tenebrionidae	<i>Chalcopteroides sp. BB_Yalata_01</i>		No	No	No	No
Cerambycidae	<i>Syllitus BB_Yalata_01</i>		No	No	No	No
Cerambycidae	<i>Phoracantha semipunctata</i>		No	No	No	No
Cerambycidae	<i>Rhytiphora frenchi</i>		No	No	No	No
Coccinellidae	<i>Coccinella transversalis</i>	Transverse lady beetle	No	No	No	No
Coccinellidae	<i>Hippodamia variegata</i>	Spotted amber lady beetle	No	No	No	No
Mordellidae	<i>Hoshihananomia leucosticta</i>	White-spotted Pintail Beetle	No	No	No	No
Mordellidae	<i>Mordella sp. BB_Yalata_01</i>		No	No	No	No
Scarabaeidae	<i>Liparetrus sp. BB_Yalata_01</i>		No	No	No	No
Scarabaeidae	<i>Liparetrus sp. BB_Yalata_02</i>		No	No	No	No
Scarabaeidae	<i>Liparetrus sp. BB_Yalata_03</i>		No	No	No	No
Scarabaeidae	<i>Colpochila sp. BB_Yalata_01</i>		No	No	No	No
Scarabaeidae	<i>Colpochila sp. BB_Yalata_02</i>		No	No	No	No
Scarabaeidae	<i>Aneucomides sp. BB_Yalata_01</i>		No	No	No	No
Scarabaeidae	<i>Heteronyx sp. BB_Yalata_01</i>		No	No	No	No
Scarabaeidae	<i>Heteronyx sp. BB_Yalata_02</i>		No	No	No	No
Scarabaeidae	<i>Heteronyx sp. BB_Yalata_03</i>		No	No	No	No
Scarabaeidae	<i>Heteronyx sp. BB_Yalata_04</i>		No	No	No	No

Scarabaeidae	<i>Heteronyx sp. BB_Yalata_05</i>		No	No	No	No
Scarabaeidae	<i>Heteronyx sp. BB_Yalata_06</i>		No	No	No	No
Scarabaeidae	<i>Heteronyx sp. BB_Yalata_07</i>		No	No	No	No
Chrysomelidae	<i>Calomela sp. BB_Yalata_01</i>		No	No	No	No
Chrysomelidae	<i>Cassida sp. BB_Yalata_01</i>		No	No	No	No
Chrysomelidae	<i>Cassida sp. BB_Yalata_02</i>		No	No	No	No
Buprestidae	<i>Castiarina nullarborica</i>		No	No	No	No
Buprestidae	<i>Agrilus assimilis</i>		No	No	No	No
Buprestidae	<i>Paracephala pistacina</i>		No	No	No	No
Buprestidae	<i>Temognatha flavocincta</i>		No	No	No	No
Buprestidae	<i>Temognatha stevensii</i>		No	No	No	No
Buprestidae	<i>Temognatha mnizechii mnizechii</i>		No	No	No	No