

Fowlers Bay Bush Blitz

Native Bees

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Nomenclature and taxonomy used in this report is consistent with:
The Australian Faunal Directory (AFD)

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List of contributors

List of contributors to this report.			
Name	Institution/affiliation	Qualifications/area of expertise	Level/form of contribution
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Abstract

Sixty-seven (67) species of native bees were collected with representatives of four of the five families occurring in Australia. Only eight of the collected species were recorded from the area before (ALA search). The total native bee species for the survey area now recorded in databases is 93. At least 6 species are probably undescribed, but this number is likely to increase with further identification of the collected specimens.

1. Introduction

There are some pre-existing data available on the occurrence of native bees for the Yalata-Fowlers Bay survey area: map searches using the ALA website within a rectangular area (approximately 31.28S, 130.91E, 32.03S, 132.47E; <https://ala.org.au>) that roughly encompassed the survey area resulted in only 34 recorded native bee species. Currently there are 1661 known native bee species (AFD 2022) in Australia as well as at least 78 known still undescribed/unpublished Megachilidae species and many more species within the Colletinae, so the total number of Australian native bee species may be closer to 2500. The low representation of species for the area in the ALA search is mainly due to the fact that the majority of native bees in collections have not been catalogued. The expectation is that less well surveyed areas, such as the Yalata Reserve and conservation reserves around Fowlers Bay will reveal many more species, with the probability of un-named species as well.

2. Methods

2.1 Site selection

Sites for collecting native bees were selected based on two rationales: (1) we sampled as many different vegetation types and areas with different fire history as possible; (2) native bees are generally collected on flowering plants where they collect pollen and nectar for provisioning of their brood. Many native bee species have strict relationships with specific flowering plants. Therefore, we focussed on sites with flowering plants and attempted to collect on a large variety of flowering plant species.

2.2 Survey techniques

Native bees were mostly collected individually using a hand net, by sweep netting of specific plants, using blue vane traps, malaise traps and using a vehicle net. Plant species on which the bees were collected were recorded.

2.2.1 Methods used at standard survey sites

Methods used for collecting native bees at the standard survey sites were: blue vane traps and hand netting of flowering plants.

2.3 Identifying the collections

For identification of native bees a number of publications were used: Michener, C.D. (1965, 2007) was used for identification of genera and subgenera within the families. Specific generic and subgeneric revisions were used to identify the specimens to species level. These are:

Exley (1976) for *Euryglossa*; Houston (1975, 1981) for *Hylaeus*; Maynard (2013) for *Leioproctus* and *Goniocolletes*; Walker (1995) for *Lasioglossum* (*Chilalictus*); and Walker (1986) for *Homalictus*.

Identified specimens were also compared to the Padil website at the Museum Victoria, which provides diagnostic images of a majority of the Australian native bees species.

A large number of specimens especially in the Colletinae, Halictidae, and Megachilidae, could not be identified to species level because identification keys for these groups do not exist. These specimens were identified to morphospecies level and were given a species identifier unique for the survey. Further work would be necessary to identify these specimens. This work will consist of comparing specimens with identified species in museum collections or comparing DNA barcodes of the collected specimens with a DNA reference database of Australian bee species (BOLD-AUSBS project) which currently contain more than thousand species of Australian native bee species, many of them still undescribed. Fifteen specimens were submitted to BOLD for DNA barcoding and results were compared with the BOLD sequence database

3. Results and Discussion

Appendix 1 lists 67 native bees species recorded during the Bush Blitz. Collections made during this Bush Blitz resulted in 345 specimens being added to public collections and an equivalent number of records added to publicly accessible databases.

Three hundred and forty-five (345) native bee specimens were collected from 9 flowering plant species. These specimens belong to four of the five Australian bee families, 18 genera (17 identified subgenera) and an estimated 67 different species (Appendix 1). Of these eight were recorded before as a result of an ALA search. 59 species could be identified as new species records (Table 1) for the area and 117 have been identified as different morpho species that are waiting to be identified or could not be identified using available publications. At this stage we recognised eight putative new species (Table 2): and possibly additional unnamed species in the genera *Hylaeus*, *Euhesma* and *Megachile* once proper examined.

3.1 Un-named or not formalised taxa

Table 1. Putatively un-named or not formalised taxa	
Taxon	Comment
Exoneura () sp.YARL009	
Exoneura () sp.YARL010	
Exoneura () sp.YARL011	
Exoneura () sp.YARL012	
Brachyhesma () sp.YARL40	
Leioproctus (?) sp.YARL036	
Callohesma () n.sp.YARL037	
Euhesma (Euhesma) sp.YARL008	
Euhesma (Euhesma) sp.YARL020 'yellow clypeus'	
Euhesma (Euhesma) sp.YARL034	
Euhesma (Euhesma) sp.YARL035	
Euryglossina (Euryglossina) n.sp.YARL038	
Euryglossina (Euryglossina) n.sp.YARL039	

<p>Hylaeus (Prosopisteron) aralis? Hylaeus (Prosopisteron) chlorosoma? Hylaeus (Prosopisteron) sp.YARL018 Hylaeus (Rhodohylaeus) sp.YARL015 Hylaeus (Rhodohylaeus) sp.YARL016 Hylaeus (Rhodohylaeus) sp.YARL017 Xanthesma (Chaetoesma) cf.baringa Homalictus (Homalictus) sp.YARL019 Homalictus (Homalictus) sp.YARL020 Lasioglossum (Chilalictus) sp.YARL021 Lasioglossum (Chilalictus) sp.YARL022 Lasioglossum (Chilalictus) sp.YARL023 Lasioglossum (Chilalictus) sp.YARL024 Lasioglossum (Chilalictus) sp.YARL025 Lasioglossum (Chilalictus) sp.YARL026 Lasioglossum (Chilalictus) sp.YARL027 Lasioglossum (Chilalictus) sp.YARL028 Lasioglossum (Chilalictus) sp.YARL029 Lasioglossum (Chilalictus) sp.YARL030 Lasioglossum (Chilalictus) sp.YARL031 Lasioglossum (Chilalictus) sp.YARL032 Lasioglossum (Chilalictus) sp.YARL033 Lipotriches (Austronomia) cf.flavoviridis Lipotriches (Austronomia) n.sp.?YARL012 Lasioglossum (Parasphcodes) sp.YARL013 Lasioglossum (Parasphcodes) sp.YARL014 Megachile (Eutricharaea) sp.YARL004 Megachile (Eutricharaea) sp.YARL005 Megachile (Spinitalia) sp.parimaculae unpublished Megachile () sp.YARL002 Megachile () sp.YARL003 Megachile () sp.YARL007</p>	
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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.

Species		Comment
Colletidae	Callohesma n.sp.YARL037	
Colletidae	Euryglossina (Euryglossina) n.sp.YARL038	
Colletidae	Euryglossina (Euryglossina) n.sp.YARL039	
Colletidae	Xanthesma (Chaetoesma) cf.baringa	
Halictidae	Lipotriches (Austronomia) n.sp.?YARL012	
Megachilidae	Megachile (Spinitalia) sp.parimaculae unpublished	

3.3 Exotic and pest species

Native bees are not considered pest species. However, the honeybee, *Apis mellifera*, which is an introduced species, although it is not listed as a pest species, may act as a pest species in certain circumstances. During the time of the survey only occasionally honeybees were found. Feral colonies of the honeybee may take over or occupy nesting hollows that otherwise are used by hollow breeding birds such as parrots, lorikeets, and cockatoos. Honeybees may also compete with native bees, birds and small mammals for nectar and pollen especially when these resources are scarce.

Exotic/pest species	Location sighted/observed	Indication of abundance	Comments
n.a.			

3.4 Threatened species

There are no native bees currently listed under the Environment Protection and Biodiversity Conservation Act 1999 (Cwth) and/or State or Territory legislation.

Species	Listing status and level (EBPC, State/Territory)	Location sighted/observed	Indication of abundance
n.a.			

3.5 Range extensions

Data on range extensions (e.g.as result of climate change) of individual native bee species will only be possible with the availability of fine scale distributional data that include time-series, which are hardly available for native bees in Australia.

Species	Location sighted/observed	Distance from nearest known record (km)	Comments
n.a.			

3.6 Genetic information

Fifteen native bee specimens, representing seven species, were submitted to BOLD for DNA barcoding and results were compared with the BOLD sequence database. Six of the specimens (4 species) did not result in reliable barcode data. The remaining specimens belonged to 5 different species, of which 3 were already present in the BOLD-AUSBS

database under the following BIN's (biological identification numbers): *Lipotriches (Austronomia)* sp. BIN:AEC4383; *Goniocolletes abdominalis* BIN:ACG2176; *Euhesma* sp.YARL08, BIN:ACG1446, two others *Goniocolletes parvula?* (no BIN yet) and *Euhesma* sp.YARL020 (no BIN yet) were additions to the database.

4. Information on species lists

Pre-existing data for native bees in the Yalata-Fowlers Bay survey area may be found by map searches using the ALA website within a rectangular area (approximately 31.28S, 130.91E, 32.03S, 132.47E; <https://ala.org.au>)

5. Information for land managers

Please see the comments made under 3.4 Exotic and pest species. During the survey honey bees (*Apis mellifera*) were only occasionally found in Wahgunyah Conservation Reserve and Yalata Aboriginal Reserve. My recommendation to land managers is not to allow honey bee hives (managed by bee keepers) in the conservation areas, because often they result in establishment of feral colonies due to swarming. As mentioned in 3.4. honey bees may have negative impacts on native fauna which include native bees, birds and small mammals.

6. Conclusions

During the survey 67 native bee species were found in the area. Some species are confirmed to be undescribed, but it is expected that several others will be undescribed as well, after further identifications and careful comparison with museum specimens. The number of species was lower than expected, mainly due to the weather conditions. The temperature before and during the survey were much lower than normal for the season. During the survey there were also a number of rainy and overcast days not suitable for efficient bee collecting. Native bee species in the Fowlers Bay area during the time the survey took place, are most active above 30 degrees Celsius, that occurred only for three days. Therefore, the findings are just a snap-shot of the potential bee biodiversity in the area. The native bee diversity most likely will turn out to be much higher (>350 species) when surveyed over longer times and during different seasons.

Acknowledgements

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Appendix 1 List of native bees recorded during the Fowlers Bay Bush Blitz						
Family	Species	Common name	Putative new species	Threatened (EPBC Act)	Threatened (State/Territory Act)	Exotic/pest
Apidae	Amegilla (Notomegilla) chlorocyanea	blue banded bee	no	no	no	no
Apidae	Exoneura () sp.YARL009	n.a.	no	no	no	no
Apidae	Exoneura () sp.YARL010	n.a.	no	no	no	no
Apidae	Exoneura () sp.YARL011	n.a.	no	no	no	no
Apidae	Exoneura () sp.YARL012	n.a.	no	no	no	no
Apidae	Exoneurella tridentata	n.a.	no	no	no	no
Colletidae	Brachyhesma (?) sp.YARL040	n.a.	no	no	no	no
Colletidae	Leioproctus (?) sp.YARL036	n.a.	no	no	no	no
Colletidae	Callohesma n.sp.YARL037	n.a.	yes	no	no	no
Colletidae	Euhesma (Euhesma) sp.YARL008	n.a.	no	no	no	no
Colletidae	Euhesma (Euhesma) sp.YARL020 'yellow clypeus'	n.a.	no	no	no	no
Colletidae	Euhesma (Euhesma) sp.YARL034	n.a.	no	no	no	no
Colletidae	Euhesma (Euhesma) sp.YARL035	n.a.	no	no	no	no
Colletidae	Euryglossina (Euryglossina) n.sp.YARL038	n.a.	yes	no	no	no
Colletidae	Euryglossina (Euryglossina) n.sp.YARL039	n.a.	yes	no	no	no
Colletidae	Euryglossina (Euryglossina) atra	n.a.	no	no	no	no
Colletidae	Goniocolletes abdominalis	n.a.	no	no	no	no
Colletidae	Goniocolletes parvula?	n.a.	no	no	no	no
Colletidae	Hylaeus (Euprosopellus) chrysoaspis	n.a.	no	no	no	no
Colletidae	Hylaeus (Euprosopis) elegans	n.a.	no	no	no	no
Colletidae	Hylaeus (Euprosopis) honestus	n.a.	no	no	no	no
Colletidae	Hylaeus (Euprosopis) violaceus	n.a.	no	no	no	no
Colletidae	Hylaeus (Gnathoprosopis) amicus	n.a.	no	no	no	no
Colletidae	Hylaeus (Prosopisteron) aralis?	n.a.	no	no	no	no
Colletidae	Hylaeus (Prosopisteron) chlorosoma?	n.a.	no	no	no	no
Colletidae	Hylaeus (Prosopisteron) sp.YARL018	n.a.	no	no	no	no
Colletidae	Hylaeus (Rhodohylaeus) sp.YARL015	n.a.	no	no	no	no
Colletidae	Hylaeus (Rhodohylaeus) sp.YARL016	n.a.	no	no	no	no

Family	Species	Common name	Putative new species	Threatened (EPBC Act)	Threatened (State/ Territory Act)	Exotic/ pest
Colletidae	Hylaeus (Rhodohylaeus) sp.YARL017	n.a.	no	no	no	no
Colletidae	Leioproctus (Leioproctus (amabilis group)) amabilis	n.a.	no	no	no	no
Colletidae	Leioproctus (Leioproctus (amabilis group)) cupreus	n.a.	no	no	no	no
Colletidae	Pachyprosopis (Pachyprosopula) purnongensis	n.a.	no	no	no	no
Colletidae	Xanthesma (Chaetohesma) cf.baringa	n.a.	yes	no	no	no
Colletidae	Xanthesma (Xanthesma) furcifera	n.a.	no	no	no	no
Halictidae	Homalictus (Homalictus) sp.YARL019	n.a.	no	no	no	no
Halictidae	Homalictus (Homalictus) sp.YARL020	n.a.	no	no	no	no
Halictidae	Lasioglossum (Chilalictus) cognatum	n.a.	no	no	no	no
Halictidae	Lasioglossum (Chilalictus) eremaeae	n.a.	no	no	no	no
Halictidae	Lasioglossum (Chilalictus) florale	n.a.	no	no	no	no
Halictidae	Lasioglossum (Chilalictus) lanarium	n.a.	no	no	no	no
Halictidae	Lasioglossum (Chilalictus) mediopolitum	n.a.	no	no	no	no
Halictidae	Lasioglossum (Chilalictus) platyichilum	n.a.	no	no	no	no
Halictidae	Lasioglossum (Chilalictus) pulvitectum	n.a.	no	no	no	no
Halictidae	Lasioglossum (Chilalictus) sp.YARL021	n.a.	no	no	no	no
Halictidae	Lasioglossum (Chilalictus) sp.YARL022	n.a.	no	no	no	no
Halictidae	Lasioglossum (Chilalictus) sp.YARL023	n.a.	no	no	no	no
Halictidae	Lasioglossum (Chilalictus) sp.YARL024	n.a.	no	no	no	no
Halictidae	Lasioglossum (Chilalictus) sp.YARL025	n.a.	no	no	no	no
Halictidae	Lasioglossum (Chilalictus) sp.YARL026	n.a.	no	no	no	no
Halictidae	Lasioglossum (Chilalictus) sp.YARL027	n.a.	no	no	no	no
Halictidae	Lasioglossum (Chilalictus) sp.YARL028	n.a.	no	no	no	no
Halictidae	Lasioglossum (Chilalictus) sp.YARL029	n.a.	no	no	no	no
Halictidae	Lasioglossum (Chilalictus) sp.YARL030	n.a.	no	no	no	no
Halictidae	Lasioglossum (Chilalictus) sp.YARL031	n.a.	no	no	no	no
Halictidae	Lasioglossum (Chilalictus) sp.YARL032	n.a.	no	no	no	no
Halictidae	Lasioglossum (Chilalictus) sp.YARL033	n.a.	no	no	no	no
Halictidae	Lipotriches (Austronomia) cf.flavoviridis	n.a.	no	no	no	no
Halictidae	Lipotriches (Austronomia) n.sp.?YARL012	n.a.	yes	no	no	no

Family	Species	Common name	Putative new species	Threatened (EPBC Act)	Threatened (State/ Territory Act)	Exotic/ pest
Halictidae	Lasioglossum (Parasphecodes) sp.YARL013	n.a.	no	no	no	no
Halictidae	Lasioglossum (Parasphecodes) sp.YARL014	n.a.	no	no	no	no
Megachilidae	Megachile (Coorooa) aurifrons	n.a.	no	no	no	no
Megachilidae	Megachile (Eutricharaea) sp.YARL004	n.a.	no	no	no	no
Megachilidae	Megachile (Eutricharaea) sp.YARL005	n.a.	no	no	no	no
Megachilidae	Megachile (Spinitalia) sp.parimaculae unpublished	n.a.	yes	no	no	no
Megachilidae	Megachile () sp.YARL002	n.a.	no	no	no	no
Megachilidae	Megachile () sp.YARL003	n.a.	no	no	no	no
Megachilidae	Megachile () sp.YARL007	n.a.	no	no	no	no