

Yalata Bush Blitz

Lepidoptera – Moths and Butterflies

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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	4
2.1 Site selection.....	4
2.2 Survey techniques.....	5
2.2.1 Methods used at standard survey sites.....	5
2.3 Identifying the collections	6
3. Results and Discussion	7
3.1 Un-named or not formalised taxa	7
3.2 Putative new species (new to science).....	8
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	10
6. Other significant findings	10
7. Conclusions.....	10
Acknowledgements	10
References.....	12
Appendices	13
Appendix 1. List of Lepidoptera recorded during the Yalata Bush Blitz	13

List of contributors

List of contributors to this report.			
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Abstract

Lepidoptera were surveyed in the Yalata-Fowlers Bay region over a 10-day period in late November and early December 2021, where a total of 64 species from 20 families were recorded.

Eight species are identified as undescribed species, one of which is not known from any museum/public collection, while a further two described species are recorded from this region as range extensions. Twenty-two taxa could not be identified to species, and may represent undescribed species, while a further six were identified with some uncertainty as 'sp. near' or 'sp. aff' which may represent undescribed species or variation of known species.

Nocturnal Lepidoptera were sampled from Fowlers Bay CP, Yalata IPA (Red Gate Track) and the township of Fowlers Bay, while diurnal Lepidoptera and/or their larvae were collected from 22 additional localities across the study region from Fowlers Bay to Head of Bight. The nocturnal sites were selected on the basis of plant composition, habitat structure, complexity of vegetation, and shelter from wind for the purposes of light trapping, while diurnal collecting prioritised locating flowering plants or targeting known significant hostplant species.

Both the low number and diversity of Lepidoptera recorded is attributed primarily to poor and challenging conditions experienced prior to and over the duration of much of the survey period, and is not expected to reflect an average potential diversity or abundance for late Spring to early Summer in the region.

1. Introduction

The Yalata bioregion is an area of over 4, 500 km² comprised of many different coastal and semi-arid to arid environments. Within the coastal Wahgunyah CP and Fowlers Bay CP there are dense stands of mallee woodlands, heathlands, chenopod shrublands and samphire, open chenopod plains near Head of Bight on the eastern end of the Nullarbor Plain, and open Myall woodlands and grassland to the north in Yalata IPA. All are environments that are known to support a diverse range of Lepidoptera in Australia, however generally the Lepidoptera of the Yalata bioregion is very poorly studied.

The regions directly to the west and east of the study location, such as the Nullarbor Plain and Eyre Peninsula west coast regions respectively, are well-known areas of Lepidoptera endemism occasionally visited by entomologists. Several large-scale studies on specific families or superfamilies record species known from these nearby areas (e.g. Braby 2000, Moulds *et al.* 2020), though it is rare for lepidopterists to target specifically the Yalata-Fowlers Bay area. A notable exception is that at least one species, *Synemon colona* Grund, is endemic to the study locality (Grund 2011), and the rarely seen Australian endemic family Lophocoronidae is represented near Yalata by the species *Lophocorona pediasia* Common, and *L. commoni* Nielsen & Kristensen, both species also known from Western Australia (Common 1973, Nielsen & Kristensen 1996). The arid and semi-arid regions of both coastal and inland areas of Australia have a high diversity of Lepidoptera, however comparatively little is known of this fauna as the majority of the published literature has built upon a historical focus on taxa from coastal high rainfall areas particularly in proximity to major urban centres in eastern or Western Australia.

The main pre-survey expectations were that (1) Lepidoptera would be diverse and abundant at this locality and time, (2) that species typically known from the more studied regions to the West and East of the study area would be located, and that (3) undescribed species would also be discovered. Expectation (2) and (3) were supported, however expectation (1) was not, due to poor weather over the duration of the survey.



Figure 1. Low open chenopod shrubland with Western Myall *Acacia papyrocarpa* within Yalata Indigenous Protected Area, near Head of Bight, South Australia
Photographer: Ethan P. Beaver

2. Methods

2.1 Site selection

Sites were selected by a combination of factors in order to sample from both a wide geographic area, and to cover the major floristic communities within the study location. Sites with certain floral assemblages, hostplants, or plants that were in flower were prioritised for day-work, while diverse, unburnt mallee in sheltered areas was prioritised for night-work. Due to unfavourable conditions, light trapping was possible only on three nights.

Table 1. Survey sites where light trapping was conducted during the Yalata Bush Blitz.

Location	Lat/long	Date	Recorders	Habitat	Comment
Fowlers Bay CP	-31.94532, 132.40584	24 Nov 2021	E.P. Beaver, B.A. Parslow, E.P. Fagan-Jeffries, J. Marsh	Mallee woodland on sand with diverse shrub layer comprised mainly of <i>Melaleuca</i> , <i>Exocarpus</i> , <i>Eremophila</i>	Two moths only, conditions unfavourable (windy)
Fowlers Bay CP	-31.94536, 132.31239	29 Nov 2021	E.P. Beaver, B.A. Parslow, E.P. Fagan-Jeffries	As above	Moths abundant
Red Gate Track, Yalata IPA	-31.39429, 131.27982	30 Nov 2021	E.P. Beaver, B.A. Parslow	Open mallee woodland on dunes with <i>Myoporum</i> , <i>Lomandra</i>	Low numbers due to wind.

2.2 Survey techniques

Light trapping – a battery powered LepiLED light system with white and UV lights was placed in the field to attract nocturnal flying insects which land on a white sheet placed with the light, or into a Trap T funnel with net bag attachment when the trap is left unmanned. Lights were turned on at twilight and run until approximately 10 PM unless unmanned in which case the trap was run for the duration of the night. A representative sample of each species that arrived was collected where possible, were then euthanised with ammonium bicarbonate, temporarily stored frozen and later set in the field or at Fowlers Bay. These specimens are vouchered within the South Australian Museum entomology collection.

Hand sweep netting – using a hoop net to sweep through foliage or flowers to collect diurnal feeding adults or hidden larvae, from ground level to 5 m.

Collecting by hand – many larvae can be collected by hand as they rest on foliage of plants. The larvae of Psychidae and Geometridae were primarily targeted by searching foliage of known or suspected hostplants.



Figure 2. SAMA Entomologists Ben Parslow (left) and Ethan Beaver (right) sweep netting for diurnal Lepidoptera in Wahgunyah CP, South Australia
Photographer: Erinn P. Fagan-Jeffries, SAMA

2.2.1 Methods used at standard survey sites

SS1 (sapphire) SS2 (mallee), SS3 (grassland) – hand sweep netting was prioritised at all Standard Survey Sites. None of the sites were ideal light trapping locations.

The weather for much of the survey during the day was overcast, cool, and windy. Lepidoptera do not fly in these conditions, so effort was focused on locating larvae within foliage, such as undescribed Psychidae. More favourable conditions arrived towards the end of the survey, however diurnal Lepidoptera were low in numbers and diversity despite this.

Only three nights were suitable for light trapping, on all other nights the conditions were not suitable due to high wind.



Figure 3. LepiLED light with Trap T funnel and net as stationed unmanned overnight in Fowlers Bay CP, South Australia. Tissue paper and foliage is added to the bag to provide shelter for moths to settle within.

Photographer: Ben Parslow, SAMA

2.3 Identifying the collections

Specimens were identified primarily by morphological comparison with specimens including type material held within the entomology section of the South Australian Museum, Adelaide, and the Lepidoptera section of the Australian National Insect Collection, Canberra. Useful reference materials examined were Braby 2016, Common 1990, Hewish *et al.* 2014, Hewish *et al.* 2016, Kallies *et al.* 2015, Marriott 2011, Marriott 2012a, Marriott 2012b, Marriott 2015, Marriott *et al.* 2017, Marriott *et al.* 2020, Moulds *et al.* 2020, Nielsen *et al.* 1996, Robinson & Nielsen 1993.



Figure 4. *Archaeoses polygrapha* (Lower) Cossidae. Fowlers Bay, 24 Nov 2021. This and several other species were collected at artificial lights at the campsite in Fowlers Bay township.

Photographer: Ethan P. Beaver

3. Results and Discussion

Appendix 1 lists all Lepidoptera recorded during the Bush Blitz. Collections made during this Bush Blitz will result in 149 specimens being added to public collections and a total of 153 records added to publicly accessible databases.

3.1 Un-named or not formalised taxa

Several undescribed taxa were collected during the Bush Blitz, most are well known with four having been figured in publications (see Table 2)

One new species, the undescribed *Clania* sp. nov 'Yalata', is an obscure species at the present time known only from the Yalata IPA. However, it is suspected to be more widespread, as the hostplant is the widely-distributed *Acacia papyrocarpa* (Fig. 1). Live larvae (n=27) were collected during the survey and are presently being reared to adult. Prior to the survey the species was known from only two male specimens. The new material allows for a description of the larval morphology (Fig. 5), general biology, and parasitoid interactions which was not possible prior to the survey. Females are unknown but are expected to be reared from the material collected.

Taxon	Comment
<i>Cyneoterpna</i> sp. nov BBY1, Geometridae	This is a known taxon listed in Marriott (2012b) as 'sp. 1'. It occurs broadly across southern SW Australia and W Vic, and is recorded from Nullarbor and Eucla, WA. Represented in ANIC by 27 specimens, in tray labelled ' <i>Cyneoterpna</i> sp. 2'.
<i>Agrotis</i> sp. nov BBY1, Noctuidae	This is a known taxon listed in Marriott <i>et al.</i> (2021) as 'sp. 1'.
<i>Thoracolopha</i> sp. nov BBY1, Noctuidae	This is a known taxon listed in Marriott <i>et al.</i> (2021) as as 'sp. 7'.
<i>Epicoma</i> sp. nov BBY1, Notodontidae	This undescribed species is represented by additional specimens in SAMA from western SA.
<i>Clania</i> sp. nov 'Yalata' Psychidae	First collected in 2019 at Yalata airstrip, two specimens within the private collection of the author. It is in the process of being described in a revision of the genus.
<i>Porela</i> sp. nov BBY1, Lasiocampidae	Additional specimens present in SAMA matching this species, all from western SA and eastern WA. Four specimens in ANIC from Eucla are similar however they lack orange scales across forewing veins.
<i>Gastrinopa</i> sp. nov BBY1, Geometridae	Nineteen additional specimens in ANIC, in tray labelled <i>Gastrinopa</i> sp 'ANIC 5' from dry country SA and WA.

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.

One species matching this definition was collected, however any of the 28 taxa that are unidentified or identified with low certainty could potentially be new undescribed species, or known undescribed species. Some of these specimens are still larvae (i.e. the *Lepidoscia* spp., *Lomera* sp., Psychidae) and cannot be identified until they are reared to maturity, which may take several months.

Table 2. Putatively new taxa	
Taxon	Comment
<i>Gastrinopa</i> sp. nov BBY2, Geometridae	No specimens located in ANIC or SAM.

3.3 Exotic and pest species

Only a single pest species was identified during this survey, a well-known native species found broadly across southern Australia whose larvae feed on a diverse range of agricultural crops and can cause significant losses under the right circumstances. This species was not particularly abundant in the study region. It generally prefers open or grassy areas.

Table 3. Exotic and pest species recorded			
Exotic/pest species	Location sighted/observed	Indication of abundance	Comments
<i>Helicoverpa punctigera</i> (Wallengren), Noctuidae	Red Gate Track, Yalata IPA	Uncommon	Native, of major economic importance.

3.4 Threatened species

N/A

3.5 Range extensions

Published detailed range information for Lepidoptera is available only for groups that are well studied. The two range extensions identified here are both taxa that have detailed published distribution ranges within the respective publications cited in Table 4. Many species that are poorly discussed in the literature may be well represented by specimens within museum collections. Obscure taxa that have no prior publication record for the Yalata region may be represented from the general Nullarbor or West Coast regions by way of specimens held in the SA museum collection, due to the presence of these unpublished museum records, some specimens from this survey are not necessarily considered as range extensions here.

Table 4. Range extensions or significant infill in distribution records for species			
Species	Location sighted/observed	Distance from nearest known record (km)	Comments
<i>Erina acasta</i> (Cox), Lycaenidae	Wahgunyah CP, 34.1 km WNW of Fowlers Bay	160 km (Approximately)	This species is known to occur both east and west of the

		Ceduna, as per Braby 2015)	Nullarbor Plain. This record is the furthest west in SA that the species is known.
<i>Hopliocnema lacunose</i> Tuttle, Moulds, & Lane, Sphingidae	Red Gate Track, Yalata IPA	500 km (Cocklebidy, WA, as per Moulds et al. 2020)	This is the furthest east this species has been taken, and the first record for SA.

3.6 Genetic information

Three larvae of the undescribed *Clania* Walker, as well as several larvae of the *Lepidoscia* spp. were preserved in 95% ethanol for potential future genetic use.



Figure 5. Close-up of head and prothorax of mature larva of *Clania* sp. 'Yalata', undescribed species known only from Yalata, South Australia.
Photographer: Ethan P. Beaver

4. Information on species lists

The main difficulty with identifying some taxa is that many of the species observed are part of diverse genera where the species boundaries are not well established (e.g. *Cleora* Curtis, *Dichromodes* Guenée, *Lepidoscia* Meyrick, *Rhuma* Walker, etc.) and determining if a taxon is undescribed, or represents variation upon a named species is

a major challenge even for specialists. Other taxa, such as *Arhodia* Guenée, are currently undergoing revision (M. Horak pers. comm.) and assigning a name to material is not practical at this time.

No Lepidoptera lists exist for Yalata, however specimens of various other species from this study region obtained prior to the Bush Blitz can be located primarily within only two institutions, the SA Museum terrestrial invertebrate collection, and the Lepidoptera section of the ANIC, CSIRO. Lepidoptera are highly seasonal and so surveys at different times, under different weather conditions will yield a vastly different fauna to that sampled during this time period. The Atlas of Living Australia (ALA, 2022) lists 81 records of 24 species for this study region, though the accuracy of any of this data is unverified.

5. Information for land managers

The rangelands observed within Yalata IPA and Wahgunyah CP were pristine in parts, though land use change through agriculture has fragmented much of the environment particularly near Fowlers Bay in the south-east of the study region. Some important material including undescribed species were collected in remnant patches and roadside vegetation – these areas should not be overlooked as sites of potential conservation significance.

6. Other significant findings

Several parasitoids have been reared from the psychid larvae, at the time of writing (February 2022) at least four morphospecies representing the family Ichneumonidae, one Braconidae (Hymenoptera), and one Tachinidae (Diptera) have been reared from both the *Lepidoscia* and the *Clania* species. Identification of the psychid species may be possible on the maturity of the remaining larvae, allowing for the association between parasitoid and host to be recorded.

The detached wings of *Dasypodia selenophora* Guenée (Erebidae) were found within the main chambers of two caves (N11 and N14). The related *Speiredonia spectans* Guenée is similarly known to shelter within caves or mines (Fullard *et al.* 2008).

7. Conclusions

Despite weather conditions that were highly unfavourable for Lepidoptera, eight of the 64 recorded species of Lepidoptera are confirmed as undescribed, representing 12.5% of the recorded fauna of this survey. These specimens will be useful for and available to future Lepidoptera taxonomists. Additional specimens of at least one undescribed species were collected (*Clania* sp. n. 'Yalata') which will be useful for a planned generic revision of the genus *Clania* by the author. Yalata is a highly seasonal area, and it is very likely that additional undescribed Lepidoptera will be located here at other times of the year, or under ideal weather.

Acknowledgements

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Appendices

Appendix 1. List of Lepidoptera recorded during the Yalata Bush Blitz

Family	Species	Putative new species	Threatened (EPBC Act)	Threatened (State/Territory Act)	Exotic/pest
Anthelidae	<i>Anthela exoleta</i>	No	No	No	No
Cossidae	<i>Archaeoses polygrapha</i>	No	No	No	No
Cossidae	<i>Endoxyla punctifimbria</i>	No	No	No	No
Cossidae	<i>Endoxyla pycnosticta</i>	No	No	No	No
Crambidae	<i>Metallarcha</i> sp. Bush Blitz Yalata 1	Uncertain	No	No	No
Erebidae	<i>Dasypodia selenophora</i>	No	No	No	No
Erebidae	<i>Eudesmeola lawsoni</i>	No	No	No	No
Erebidae	<i>Niguza anisogramma</i>	No	No	No	No
Erebidae	<i>Praxis edwardsi</i>	No	No	No	No
Erebidae	<i>Thallarcha raptophora</i>	No	No	No	No
Geometridae	<i>Anomocentris</i> sp. nr. <i>trissodesma</i>	Uncertain	No	No	No
Geometridae	<i>Arhodia</i> sp. Bush Blitz Yalata 1	No	No	No	No
Geometridae	<i>Chiasmia gratularia</i>	No	No	No	No
Geometridae	<i>Cleora</i> sp. Bush Blitz Yalata 1	Uncertain	No	No	No
Geometridae	<i>Cyneoterpna</i> sp. nov Bush Blitz Yalata 1	No	No	No	No
Geometridae	<i>Dichromodes aristadelpha</i>	No	No	No	No
Geometridae	<i>Dichromodes</i> sp. Bush Blitz Yalata 1	Uncertain	No	No	No
Geometridae	<i>Dysbatus singularis</i>	No	No	No	No
Geometridae	<i>Epidesmia</i> sp. Bush Blitz Yalata 1	Uncertain	No	No	No
Geometridae	<i>Gastrinodes argoplaca</i>	No	No	No	No
Geometridae	<i>Gastrinodes bitaeniaria</i>	No	No	No	No
Geometridae	<i>Gastrinopa</i> sp. nov Bush Blitz Yalata 1	No	No	No	No
Geometridae	<i>Gastrinopa</i> sp. nov Bush Blitz Yalata 2	Yes	No	No	No
Geometridae	Geometridae sp Bush Blitz Yalata 1	Uncertain	No	No	No
Geometridae	<i>Hypobapta barnardi</i>	No	No	No	No
Geometridae	<i>Notiosterra aglaodesma</i>	No	No	No	No
Geometridae	<i>Rhuma</i> sp. aff. <i>argyraspis</i>	Uncertain	No	No	No
Geometridae	<i>Rhuma</i> sp. Bush Blitz Yalata 1	Uncertain	No	No	No
Geometridae	<i>Sterrhinae</i> sp. Bush Blitz Yalata 1	Uncertain	No	No	No
Geometridae	<i>Syneora</i> sp. Bush Blitz Yalata 1	Uncertain	No	No	No
Hypertrophidae	<i>Eupselia</i> sp. Bush Blitz Yalata 1	Uncertain	No	No	No
Lasiocampidae	<i>Porela</i> sp. nov. Bush Blitz Yalata 1	No	No	No	No
Limacodidae	<i>Pseudanapaea</i> sp. aff. <i>denotata</i>	Uncertain	No	No	No
Lycaenidae	<i>Erina acasta</i>	No	No	No	No
Lycaenidae	<i>Jalmenus icilius</i>	No	No	No	No
Lycaenidae	<i>Nacaduba biocellata</i>	No	No	No	No
Lycaenidae	<i>Ogyris amaryllis meridionalis</i>	No	No	No	No
Noctuidae	<i>Agrotis</i> sp. nov. Bush Blitz Yalata 1	No	No	No	No
Noctuidae	<i>Ectopatria euglypta</i>	No	No	No	No

Yalata Bush Blitz – 2021

Noctuidae	<i>Helicoverpa punctigera</i>	No	No	No	Pest
Noctuidae	<i>Thoracolopha</i> sp. nov. Bush Blitz Yalata 1	No	No	No	No
Nolidae	<i>Armactica conchidia</i>	No	No	No	No
Notodontidae	<i>Epicoma</i> sp. nov. Bush Blitz Yalata 1	No	No	No	No
Nymphalidae	<i>Vanessa kershawi</i>	No	No	No	No
Nymphalidae	<i>Vanesssa itea</i>	No	No	No	No
Oecophoridae	<i>Crepidoscetes exanthema</i>	No	No	No	No
Oecophoridae	<i>Palimmeces</i> sp. nr. <i>pseudomorpha</i>	Uncertain	No	No	No
Psychidae	<i>Clania</i> sp. aff. <i>ignobilis</i>	Uncertain	No	No	No
Psychidae	<i>Clania</i> sp. Bush Blitz Yalata 1	Uncertain	No	No	No
Psychidae	<i>Clania</i> sp. nov. <i>Yalata</i>	No	No	No	No
Psychidae	<i>Lepidoscia</i> sp. Bush Blitz Yalata 1	Uncertain	No	No	No
Psychidae	<i>Lepidoscia</i> sp. Bush Blitz Yalata 2	Uncertain	No	No	No
Psychidae	<i>Lepidoscia</i> sp. Bush Blitz Yalata 3	Uncertain	No	No	No
Psychidae	<i>Lepidoscia</i> sp. Bush Blitz Yalata 4	Uncertain	No	No	No
Psychidae	<i>Lomera</i> sp. Bush Blitz Yalata 1	Uncertain	No	No	No
Psychidae	<i>Lomera</i> sp. Bush Blitz Yalata 2	Uncertain	No	No	No
Pyralidae	<i>Orthaga</i> sp. Bush Blitz Yalata 1	Uncertain	No	No	No
Pyralidae	<i>Salma</i> sp. Bush Blitz Yalata 1	Uncertain	No	No	No
Sphingidae	<i>Agrius convolvuli</i>	No	No	No	No
Sphingidae	<i>Hopliocnema brachycera</i>	No	No	No	No
Sphingidae	<i>Hopliocnema lacunosa</i>	No	No	No	No
Tineidae	<i>Edosa</i> sp. Bush Blitz Yalata 1	Uncertain	No	No	No
Tineidae	<i>Moerarchis</i> sp Bush Blitz Yalata 1	Uncertain	No	No	No
Xyloryctidae	<i>Maroga melanostigma</i>	No	No	No	No