Charnley River Bush Blitz

Lepidoptera (Butterflies)

18–29 July 2022

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Nomenclature and taxonomy used in this report is consistent with:

The Australian Faunal Directory (AFD) - < https://biodiversity.org.au/afd/home>

Taxonomic names in the tribe Candalidini follow:

Braby, M. F., Espeland, M., Müller, C. J., Eastwood, R., Lohman, D. J., Kawahara, A.Y., Maunsell, S. C. and Pierce, N. E. (2020) Molecular phylogeny of the tribe Candalidini (Lepidoptera: Lycaenidae): systematics, diversification and evolutionary history. *Systematic Entomology* 45(3): 703-722.

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 4
3. Results and Discussion 4
3.1 Un-named or not formalised taxa 4
3.2 Putative new species (new to science) 5
3.3 Exotic and pest species 5
3.4 Threatened species 5
3.5 Range extensions 5
3.6 Genetic information 6
4. Information on species lists 6
5. Information for land managers 6
6. Other significant findings 6
7. Conclusions 6
Acknowledgements 7
References 7
Appendices 8
Appendix 1. List of Butterflies recorded during the Charnley River Bush Blitz 8

List of contributors

List of contributors to this report.			
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Abstract

A mid dry season Bush Blitz survey for butterflies (Lepidoptera) at the Charnley River Wildlife Sanctuary between 18–29 July 2022 yielded 36 species from six habitat types. This is likely to be a typical number of adult butterfly species for that time of year. The most speciose habitat was in relict rainforest and the highest butterfly numbers were found on a hilltop just four kilometres from Charnley Cottage. No new species were discovered, but three range extensions were recorded.

1. Introduction

The Kimberley region of Western Australia is one of the oldest and largest wilderness areas remaining in the world. It covers nearly 424,000 km^2 and is sparsely settled with a population of only 35,000 people, about half of which are Indigenous Australians. Until recently, the butterfly and day flying moth fauna of the Kimberley's was not well known due to its remoteness, relative inaccessibility, and extreme climate. Recent research on the Kimberley region by Braby (2012) and Braby et al. (2018) resulted in a dataset of nearly 24,000 records of butterflies and diurnal moths based on field observations, museum records and the historical literature. They recorded a total of 105 species (88 butterflies and 17 diurnal moths) for the Kimberley, but many of the records remain as isolated dots on the map.

Butterflies are among the best-known fauna worldwide, so the rate of new species discovery is slowing down considerably, even in remote places. The Bush Blitz survey to Charnley River Wildlife Sanctuary, approximately 500 km east of Broome, provided an opportunity to expand our knowledge of taxa in the Western Kimberley, hopefully fill in some blanks in spatial and temporal distributions and maybe add some new records for Western Australia or even new species. The survey took place from 18–29 July 2022 which coincided with the peak of the Dry season, so we were not expecting to find large numbers or high species diversity.

2. Methods

Butterflies were collected by the author and several others including Charnley Station staff, rangers, volunteers, and visiting schoolteachers using hand nets. Two specimens were found dead on the ground and a few day-flying moths were collected opportunistically. Access to most sites was provided by 4WD vehicles and a helicopter transported participants to more isolated and remote sites.

2.1 Site selection

A variety of habitat types including vine thicket, remnant rainforest, open forest, river gorges and riparian zones were identified at Charnley River and preselected as sampling sites. The purpose of this was to maximise the number of species recorded, especially those that are found preferentially in a narrow habitat range. In addition, several hilltop sites were identified by the author and visited by helicopter to assess their suitability. The hilltop most suitable was only a short drive from camp. Butterflies from a wide area tend to accumulate on hilltops to increase their chances of finding a mate, so many species may be encountered on the hilltop that may not be encountered elsewhere. Obligate hilltoppers, usually rare species, are only found at such locations.

2.2 Survey techniques

Field surveys typically involved walking with a hand net while scanning within an approximate 5 m radius of the observer. Most butterflies could be identified on sight, so only the uncertain or uncommon species were targeted for collection. Sunny patches, pathways, flowering plants, and butterfly host plants were also targeted. Ambush techniques were adopted when butterfly flight paths were identified and particularly on the hilltop where males set up territories on prominent leaves or twigs to scan for females. Host plants were searched for early stages (larvae and pupae) of the associated butterfly species.

2.2.1 Methods used at standard survey sites

Butterfly surveys at the three preselected Standard Survey Sites (SSS) were undertaken as a random walk not exceeding a few hundred metres radius from the central star picket at each SSS. Each survey lasted one hour (one person), and all butterfly species were either identified in situ or collected for confirmation. A standard net with 40 cm hoop was used to capture specimens, which were euthanised with ethyl acetate and placed in glassine envelopes for transporting in the field. The weather was consistently dry and sunny across the survey days, although survey timing varied due to the long travel distance to SSS 3.

2.3 Identifying the collections

Captured specimens were prepared on setting boards at our camp as per WAM protocols to facilitate correct identification. After quarantine at the WAM (two weeks at -18ºC), data labels and catalogue numbers were attached to all prepared specimens before databasing at the WAM. All butterfly specimens were positively identified by the author either on the wing (‘observations’ of relatively common species) or as captured specimens. At the time of data basing the specimens, identifications were checked again. Braby (2016) was used to confirm some identifications or to check the subspecies names. Moth species were determined by examination and comparison with identified species in the WAM Entomological Collection. These were also databased.

3. Results and Discussion

Appendix 1 lists all the butterflies and some moths recorded during the Charnley River Bush Blitz. Collections made during this Bush Blitz resulted in 80 specimens being added to public collections and an equivalent number of records will be added to publicly accessible databases. As expected, small numbers of butterflies were observed at most sites except at the hilltop where a constant stream of arrivals kept all the participants busy. Across all sites, 138 data points were recorded with most of these representing multiple individuals. A total of 36 butterfly species and four moths were identified from seven families. Butterfly species collected represent just under half of the 88 species recorded from the Kimberley, but some of those species are restricted to coastal areas or specific habitats that are not present at Charnley River. So, the total of 36 adult butterfly species for Charnley River Station in mid Dry season may be the typical number of adult butterfly species for that time of year. Species diversity was greatest at the relict rainforest site, while butterfly numbers were highest at the hilltop site. The moths collected were all widespread and common species.

3.1 Un-named or not formalised taxa

No undescribed or non-formalised butterfly taxa were recorded on the survey.

3.2 Putative new species (new to science)

No captured butterfly species were identified as new to science as a direct result of this Bush Blitz.

3.3 Exotic and pest species

A recent arrival in Australia, *Acraea terpsicore* (Tawny Coster) was recorded at several localities at Charnley River (Table 1). The species first arrived near Darwin in April 2012 after a rapid range expansion from India, through SE Asia and Indonesia into Australia, possibly because of deforestation (Sanderson et al., 2012). It was first recorded in the Kimberley region in Western Australia in 2014 (Braby et al. 2014). The butterfly is not considered a pest species, but it may qualify as an invasive species if it is shown to outcompete the endemic *A. andromacha* (Braby et al. 2014). However, there is no evidence for this at Charnley River since *A. andromacha* was more common at all locations where *A. terpsicore* were collected.

Table 1. *Acraea terpsicore* records from Charnley River – a potential invasive species

Location sighted/observed	Indication of abundance	Comments
Charnley River vine thicket, A6	Two seen	
Lilly Pool, Grevillia Gorge	One seen	A female passing through
Charnley River nr. Oombalot Ck. A5/L5	One seen	A female passing through
Relict rainforest site, A25	Two seen	
Forbes Hill, 4 km south of Charnley Cottage	Ten sighted	Males aggregating on hilltop

3.4 Threatened species

There are no threatened, endangered or priority listed butterfly species in the Western Kimberley.

3.5 Range extensions

Almost all the butterflies collected were within their known range in the Kimberley, except for three taxa whose ranges were extended as detailed in Table 2.

Table 2. Range extensions records for butterfly species at Charnley River

Species	Location collected	Distance from nearest known record (km)	Comments
Hypochrysops ignitus erythrina	Forbes Hill	370 km ENE and 250 km S	Breeding on *Planchonia* sp.
Telicota augias krefftii	Charnley River Cottage site, A23	200 km SW	Breeding at the cottage site
Elodina walkeri	Charnley River vine thicket, A6	130 km S	

3.6 Genetic information

No tissue samples were taken, although tissue may be taken from the prepared specimens if required.

4. Information on species lists

A comprehensive list of all known butterfly species from the Western Kimberley is given in Braby et al. (2018) including maps and point location data. All butterfly species collected during the Bush Blitz survey were previously recorded in Braby et al. (2018); however, the four moth species were not included in the Braby et al. (2018) dataset. Three butterfly species collected at Charnley River were not represented in the WAM Entomological Collection, as follows:

- *Hypochrysops ignitus erythrina* (Fiery Jewel)
- *Delias argenthona fragalactia* (Scarlet Jezebel)
- *Eirmocides gilberti* (Northern pencil-blue)

5. Information for land managers

Butterfly diversity, as well as all native wildlife, is best protected through the preservation of habitat. At a finer scale, local habitat types including vine thicket, remnant rainforest, open forest, river gorges, riparian zones and especially hilltops, are critical habitat for different butterfly species and are important as stepping-stones for butterfly dispersal and for maintaining genetic diversity. These pockets of vegetation need to be protected from stock grazing and fire, particularly during spring when plants are flowering and fruiting.
The above comments apply equally to the three adjoining properties that comprised the survey area:

- Charnley River–Artesian Range Wildlife Sanctuary, managed by Australian Wildlife Conservancy (AWC)
- Wilinggin Indigenous Protected Area managed by Wilinggin Aboriginal Corporation
- Wunaamin Conservation Park, managed by WA Parks and Wildlife Service

6. Other significant findings

There were no other significant findings.

7. Conclusions

Although, timing of the Bush Blitz survey in the middle of the dry season meant that adult butterfly species numbers and species diversity would be low, the 36 species recorded were likely to be the typical number of adult butterflies for that time of year. Future surveys during the wetter months would be more productive provided access and logistics could be resolved. The survey results add new data to our knowledge of the Kimberley fauna and that of the Charnley River Wildlife Sanctuary.

Acknowledgements

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Appendices

Appendix 1. List of butterflies and some moths (Lepidoptera) recorded during the Charnley River Bush Blitz

Family	*Species*	Common name
Papilionidae	*Papilio demoleus sthenelus*	Chequered Swallowtail
Hesperiidae	*Pelopidas lyelii lyelii*	Lyell's Swift
Hesperiidae	*Ocybadistes hypomeloma*	White-margined Grass-dart
Hesperiidae	*Telicota augias krefftii*	Bright-orange Darter
Pieridae	*Catopsilia pomona*	Lemon Migrant
Pieridae	*Eurema herla*	Macleay's Grass-yellow
Pieridae	*Eurema smilax*	Small Grass-yellow
Pieridae	*Eurema hecabe*	Large Grass-yellow
Pieridae	*Elodina padusa*	Narrow-winged Pearl-white
Pieridae	*Elodina walkeri*	Small Pearl-white
Pieridae	*Cepora perimale*	Caper Gull
Pieridae	*Delias argenthona fragalactea*	Scarlet Jezebel
Nymphalidae	*Danaus petilia*	Lesser Wanderer
Nymphalidae	*Euploea corinna*	Common Crow
Nymphalidae	*Acraea andromacha andromacha*	Glasswing
Nymphalidae	*Acraea terpsicore*	Tawny Coster
Nymphalidae	*Junonia orithya albicincta*	Blue Argus
Nymphalidae	*Junonia villida villida*	Meadow Argus
Nymphalidae	*Hypolimnas bolina nerina*	Varied Eggfly
Nymphalidae	*Charaxes sempronius sempronius*	Tailed Emperor
Nymphalidae	*Hypocysta adiante antirius*	Orange Ringlet
Nymphalidae	*Ypthima arctous*	Dusky Knight
Lycaenidae	*Hypochrysops ignitus erythrina*	Fiery Jewel
Lycaenidae	*Arhopala eupolis asopus*	Purple Oak-blue
Lycaenidae	*Erina erina erina*	Small Dusky-blue
Lycaenidae	*Eirmocides margarita gilberti*	Trident Pencil-blue
Lycaenidae	*Nacaduba biocellata biocellata*	Two-spotted Line-blue
Lycaenidae	*Catopyrops florinda estrella*	Speckled Line-blue
Lycaenidae	*Theclinesthes miskini miskini*	Wattle Blue
Lycaenidae	*Catochrysops panormus platissa*	Pale Pea-blue
Lycaenidae	*Jamides phaseli*	Purple Cerulean
Lycaenidae	*Lampides boeticus*	Long-tailed Pea-blue
Lycaenidae	*Zizina otis labradus*	Common Grass-blue
Lycaenidae	*Famegana alsulus alsulus*	Black-spotted Grass-blue
Lycaenidae	*Euchrysops cnejus cnidus*	Spotted Pea-blue
Lycaenidae	*Freyeria putli putli*	Jewelled Grass-blue
Sphingidae	*Agrius convolvuli*	Convolvulus Hawkmoth
Erebidae	*Argina astraea*	Crotalaria Podborer
Erebidae	*Amata humeralis*	Orange Shoulder Wasp Moth
Erebidae	*Utethesia lotrix*	Salt-and-pepper moth