Annotated bibliography for Barrow Island terrestrial invertebrates

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ABSTRACT – A bibliography is provided of publications treating terrestrial invertebrates on Barrow Island. A brief overview is also given of natural history and invertebrate collections on Barrow Island.

KEYWORDS: Arthropoda, Insecta, Arachnida, Gastropoda, publication history

INTRODUCTION

As part of this special issue on the terrestrial invertebrate fauna of Barrow Island in Western Australia, we take the opportunity to present a bibliography of previous publications on the subject. A more general bibliography of Barrow Island's natural history was previously collated by Smith et al. (2006). The current bibliography differs from that in gathering not only publications for which Barrow Island was the primary focus, but also those in which Barrow Island specimens were considered as part of a broader study.

HISTORY OF INVERTEBRATE COLLECTIONS ON BARROW ISLAND

The early history of Barrow Island was reviewed by Hook et al. (2004) as part of a cultural heritage assessment of the island; an earlier review by Cox (1977) has unfortunately become difficult to find. The earliest natural history collections on Barrow Island were taken by the HMS Beagle when it landed in 1840, primarily for the purpose of collecting firewood (Wickham 1841). Kangaroo skins collected from Barrow Island by the Beagle were described by Gould (1841) as Osphranter isabellinus (now Macropus robustus isabellinus) and Lagorchestes conspicillatus, but no invertebrates were described from this landing. The Tien Tsin under the command of Capt. Jarman landed on Barrow Island for two days in December 1864 ('Journal of the late voyage of the Tien Tsin', Perth Gazette and West Australian Times, 27 January 1865). Describing the waterless island as 'altogether...the most unpromising looking spot we have found in the N.W. country', Jarman had the island fired 'from end to end', presumably in the hope that doing so might help improve its productivity.

During the late 1800s Barrow Island was utilised at various times by pastoralists, guano miners, pearl and turtle fishers, and slavers (Hook et al. 2004; 'Supreme Court—Civil Side', West Australian, 26 May 1887; 'The native question', Daily News [Perth], 16 February 1905). If any of these individuals were interested in collecting invertebrates, their endeavours in that field have not been recorded for posterity.

J.T. Tunney of the Western Australian Museum spent six weeks on Barrow Island in 1901 ('News and notes', West Australian, 22 March 1901). He was primarily collecting mammals and birds, but fleas and ticks taken from those vertebrates would be the first terrestrial invertebrate records for Barrow Island (Rothschild 1903; Warburton & Nuttall 1909; Robinson 1926). The publicity from Tunney's vertebrate collections played a part in the declaration of Barrow Island as one of Western Australia's first nature reserves in 1908.

After oil was discovered in Barrow Island on 1964, a mining lease was granted to the West Australian Petroleum Pty (WAPET), who appointed W. H. Butler as their environmental consultant in 1967. Though Butler's own publications were focused on Barrow Island's vertebrate fauna, he also collected invertebrate specimens during his time on the island, a number of which have subsequently been described by other authors. WAPET also sponsored a number of other naturalists for studies on Barrow Island; particularly notable among these from an invertebrate perspective were D. H. Perry in 1971 (publishing on Barrow Island's Isoptera) and C. N. Smithers in 1982 (publishing on Psocoptera, Odonata, Neuroptera and Lepidoptera). Staff from the Western Australian Museum also visited Barrow Island in the late 1990s and following years, collecting arachnids and myriapods (M.S. Harvey

and associates) and gastropods (S. Slack-Smith).

Offshore natural gas reserves to the north-west of Barrow Island were discovered in 1980, leading to an application to establish a gas production plant on the island. Approval for development of the plant was awarded in 2003, subject to the imposition of various conditions to minimise the

plant's impact on Barrow Island's value as a nature reserve. As part of these conditions, a continuing monitoring program for Barrow Island terrestrial invertebrates was begun in 2005 (Callan et al. 2011). Material collected as part of this program has been used in the descriptions of a number of taxa, and work on the material continues today.

TABLE 1 Publication and identification tallies for higher invertebrate taxa on Barrow Island.

Taxon	Number of publications	Number of named species recorded from Barrow Island	Number of morphospecies recorded by Callan et al. (2011)
Acariformes	3	8	81
Araneae	21	52	171
Chilopoda	3	7	15
Coleoptera	6	24	282
Collembola	2	17	41
Dictyoptera	5	33	49
Diplopoda	4	4	3
Diptera	1	3	171
Embioptera	0	1	1
Gastropoda	10	10	12
Hemiptera	5	42	246
Hymenoptera	11	86	373
Isopoda	1	8	14
Lepidoptera	2	61	181
Neuroptera	7	30	27
Odonata	1	7	4
Orthoptera	0	24	92
Parasitiformes	6	8	17
Phasmatodea	0	4	6
Platyhelminthes	1	3	-
Pseudoscorpiones	3	5	14
Psocodea	2	7	19
Schizomida	2	1	_
Scorpiones	2	2	4
Siphonaptera	2	1	-
Strepsiptera	0	1	2
Thysanoptera	7	14	40
Thysanura	0	1	8
Total	111*	464	1873

^{*} Including four general references.

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METHODOLOGY

Publications were located using online resources, as well as in the library of the Western Australian Museum. Aquatic stygofauna were not included in this survey; for a review of the Barrow Island stygofauna, see Humphreys (2001). I have, however, included publications on non-aquatic troglofauna with relatives in the terrestrial epigean environment. For each publication, a brief note on its relevance to the Barrow Island invertebrate fauna has been appended. Taxa previously described from other locations have been noted as 'recorded from Barrow Island'; new taxa in the publication cited have been noted as 'described from Barrow Island' (if known from Barrow Island material only) or 'described from Barrow Island and mainland Australia' (if material from other localities in Australia was also included in the description). If any relevant publications have been omitted from this bibliography, the author would be grateful to be informed of them.

SUMMARY

A total of 104 publications were found discussing the Barrow Island invertebrate fauna or commenting on specimens from Barrow Island. The great majority of these had a taxonomic focus. Only two studies were not primarily concerned with either invertebrate taxonomy or taxonomic surveys: Withers et al. (1997) on the physiology of snails during aestivation, and Abdad (2011) on transmission of *Rickettsia* by ticks.

Table 1 compares the publication effort for each major invertebrate group with the potential number of species on Barrow Island. For convenience, the number of morphospecies recorded by Callan et al. (2011) has been used as a proxy for the true diversity, though in most (if not all) cases the former will be more or less lower than the latter. The tally of formally named species recorded on Barrow Island for each group includes those listed in the electronic appendices from Callan et al. (2011); those records that were only provisionally attributed to formal species therein have been included in the tally.

A number of smaller invertebrate groups appear to have been reasonably well studied relative to their diversity, in particular Diplopoda and terrestrial Gastropoda (with the highest number of publications relative to recorded morphospecies), and Neuroptera and Odonata (with the highest proportions of species identified to formally named taxa). Amongst the larger groups (with over 100 morphospecies), the Araneae have been the most extensively published on, though Lepidoptera include a slightly higher proportion of formally named species. Particularly poorly surveyed are the

Barrow Island Diptera, of which only three species (two of them mosquitoes) have been identified in press to named species.

Preliminary results suggest that endemism on Barrow Island is relatively low. Of 464 formally named species recorded from the island, only 40 (9%) have not been recorded from other localities (including Quistrachia barrowensis Solem, 1997, which is known from adjacent islets only, and Draculoides bramstokeri Harvey & Humphreys, 1995, for which supposed mainland populations have been reidentified as a distinct species). Though this may change as more currently unnamed species become formally recognised, there is no reason to assume the rate of endemism will go up. Indeed, the current value may well be an overestimate, as our ability to assess Barrow Island's fauna in this regard is limited not only by our knowledge of Barrow Island itself, but also by our restricted knowledge of faunas in adjacent regions of the Australian mainland.

ACKNOWLEDGEMENTS

Thanks are due to Jonathan Majer (Curtin University) who suggested the compilation of this bibliography; to Mark Harvey (Western Australian Museum) and Nihara Gunawardene (Curtin University) for their work in putting together this special issue; and to the staff of the Curtin University and Western Australian Museum libraries for their supply of resources utilised in locating the publications cited.

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ISOPODA

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LEPIDOPTERA

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- Smithers, C.N. (1984). The Neuroptera of Barrow and nearby islands off the west coast of Western Australia. *Australian Entomological Magazine* **11**: 61–68.
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- Dorypteryx domestica (Smithers 1958), Liposcelis bostrychophila Badonnel 1931, Ectopsocus nr erosus (Enderlein 1903) and eighteen undescribed species recorded from Barrow Island.
- Smithers, C.N. (1984). The Psocoptera of Barrow and Boodie Islands, Western Australia. *Entomologica Scandinavica* **15**: 215–226.
- Peripsocus fici n. sp., Cladioneura foliata n. sp. and Barrowia insularis n. gen., n. sp. described and Liposcelis entomophila (Enderlein, 1907) recorded from Barrow Island.

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- Rothschild, N.C. (1911). Some new genera and species of Siphonaptera. *Novitates Zoologicae* **18**: 117–122.
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THYSANOPTERA

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- Mound, L.A., and Masumoto, M. (2009). Australian Thripinae of the *Anaphothrips* genus-group (Thysanoptera), with three new genera and thirty-three new species. *Zootaxa* **2042**: 1–76.
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- Mound, L.A. and Minaei, K. (2006). New fungus-feeding thrips (Thysanoptera-Phlaeothripinae) from tropical Australia. *Zootaxa* **1150**: 1–17.
- Majerthrips barrowi n. gen., n. sp., Senithrips psomus n. gen., n. sp. and Jacotia rhodorcha n. sp. described from Barrow Island.
- Mound, L.A. and Minaei, K. (2007). Australian thrips of the *Haplothrips* lineage (Insecta: Thysanoptera). *Journal of Natural History* **41**: 2919–2978.
- Podothrips anomalus n. sp. described from Barrow Island and Western Australia, *P. barrowi* n. sp. described from Barrow Island.
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- Neohydatothrips barrowi n. sp. described from Barrow Island.
- Pereyra, V. and Mound, L.A. (2009). Phylogenetic relationships within the genus *Cranothrips* (Thysanoptera, Melanthripidae) with consideration of host associations and disjunct distributions within the family. *Systematic Entomology* **34**: 151–161.
- Cranothrips kartus Mound, 1972 recorded from Barrow Island.
- Pereyra, V. and Mound, L.A. 2010. Phylogenetic relationships within the genus *Desmothrips* (Thysanoptera, Aeolothripidae), an Australian genus of facultative flower-living predators. *Systematic Entomology* **35**: 306–317.
- Desmothrips barrowi n. sp. described from Barrow Island.

ADDENDUM

While this paper was in press, the following publications were brought to my attention:

- Heterick, B.E. and Shattuck, S. (2011). Revision of the ant genus *Iridomyrmex* (Hymenoptera: Formicidae). *Zootaxa* **2845**: 1–174.
- *Iridomyrmex gibbus* n. sp. described from Barrow Island and mainland Australia; *I. minor* Forel, 1915 recorded from Barrow Island.
- Kohout, R.J. (2013). Revision of *Polyrhachis (Hagiomyrma)* Wheeler, 1911 (Insecta: Hymenoptera: Formicidae: Formicinae). *Memoirs of the Queensland Museum—Nature* **56**: 487–577.

Polyrhachis seducta n. sp. described from Barrow Island.