Wudjari Country (Esperance) Bush Blitz

Heteroptera

27 March – 6 April 2023

Submitted: 19 October 2023

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

Contents

List of contributors

List of contributors to this report.			
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Abstract

On this expedition specimens representing 52 different species from 17 families of Heteroptera were collected. The Miridae (15 species) and Pentatomidae (10 species) were the most species-rich families collected. Two of the species collected are believed to be new to science belonging to the stink bug tribe Deroploini, with several others requiring further study to determine if they are also new species.

1. Introduction

The hemipteran suborder Heteroptera is one of the core target taxa for the Bush Blitz program (e.g., Cassis et al. 2019, Symonds and Cassis 2018). Heteroptera is represented in Australia by over 2500 described species (Cassis and Gross 1995, 2002), with nearly 500 new species described in the past 20 years. Much of the taxonomic impediment pertains to the families Miridae and Tingidae, which are sister-taxa (Cassis 2019), though many new species are also to be found across many other families as well (e.g. Pentatomidae, Reduviidae, Lygaeidae, Rhyparochromidae). Heteroptera taxa are generally phytophagous, feeding on a broad range of host plants, particularly eudicot angiosperms. Though some collecting has been undertaken in this region in the past, the Heteroptera of the southwest remain undersampled. Conditions were poor for collecting, as the survey was held well after the peak flowering (and therefore bug) season, which typically occurs in spring to early summer. Collecting was therefore difficult and yielded low diversity and low numbers of specimens. Despite this, we nonetheless collected several significant specimens representing new or rarely seen species.

2. Methods

2.1 Site selection

Most Heteroptera are herbivorous, and are best collected by targeting their host plants, which ideally should be in flower or in seed. Sites were thus chosen on an ad hoc basis, wherever vegetation appeared fresh and plants were in flower. Because of the late timing of the trip, much of the vegetation was past flowering, though there were still many species in flower. Surprisingly, many plants that were in flower and were expected to harbour a diversity of insects yielded few if any specimens.

2.2 Survey techniques

Collecting was primarily by beating vegetation, but also by sweeping, by hand, peeling bark and by turning over stones and logs. Collected specimens were either euthanised with ethyl acetate or by placing them in a freezer upon return to base camp. Specimens were pinned and where multiple individuals of a species were collected some specimens were stored in 100% ethanol for future DNA sequencing.

2.2.1 Methods used at standard survey sites

The above heteropteran survey techniques were also used at the standard survey sites. As noted above, this survey was not conducted at the best time of year for Heteroptera, which is typically in the spring to early summer, when the majority of plants are in flower. Results are therefore not indicative of the true diversity or abundance of Heteroptera likely to be found in the region.

2.3 Identifying the collections

Specimens were initially sorted to family-group level, and then to morphospecies. Following the survey, Prof Cassis spent two weeks at the WAM with Dr Tatarnic in order to curate and identify the specimens collected. Many specimens could be identified by eye, while others were run through published keys or compared to specimens in the WAM collection.

3. Results and Discussion

Appendix 1 lists all Heteroptera recorded during the Bush Blitz. Collections made during this Bush Blitz will result in ~250 specimens being added to both UWA and WAM collections, with WAM database records uploaded to ALA.

3.1 Un-named or not formalised taxa

The following species require additional work to determine to definitively diagnose.

	Table 1. Putatively un-named or not formalised taxa
Taxon	**Comments**
Acanthosomatidae_sp001	The Australian Acanthosomatidae are under revision in the UNSW Cassis lab
Acanthosomatidae_sp002	The Australian Acanthosomatidae are under revision in the UNSW Cassis lab
*Eupolemus*_msp001	The Australian Acanthosomatidae are under revision in the UNSW Cassis lab.
*Eupolemus*_msp002	The Australian Acanthosomatidae are under revision in the UNSW Cassis lab.
*Melanacanthus*_msp001	More work is needed to identify which *Melanacanthus* species was collected.
*Dilompus*_msp001	More work is needed to identify which *Dilompus* species was collected; it if possibly *D. robustus*
*Amorbus*_msp001	The Australian *Amorbus* are under revision in the UNSW Cassis lab.
*Ontiscus*_msp001	More work is needed to identify which *Ontiscus* species was collected.
*Nerthra*_msp001	More work is needed to identify which *Nerthra* species was collected.
*Germalus*_msp001	More work is needed to identify which *Germalus* species was collected.
*Stylogeocoris*_msp001	More work is needed to identify which *Stylogeocoris* species was collected.
*Maevius*_msp001	This could be a new species of *Maevius.* Dissections are required to determine its status.
*Nysius*_msp001	This species is likely to be *N. vinitor*; further work is required to verify this.
Austromirine_mimic_msp001	This is likely a new genus and new species. Further work is required to determine its status.
Cremnorrhinini_msp001	More work is needed to identify which cremnorrhinine species was collected.
*Diomocoris*_msp001	More work is needed to identify which *Diomocoris* species was collected. This genus is widespread in Australia and exhibits significant intraspecific variation. Dissections are required to assess its identity.

*Exocarpocoris*_msp001	This genus is found on the hemiparasite plant genus *Exocarpocoris.* Dissections are required to assess its identity.
Fulviini_msp001	This group is poorly known in Australia
Mirini_msp001	This group is poorly known in Australia
Mirini_msp002	This group is poorly known in Australia
*Naranjakotta*_msp001	This is possibly a new species but requires genitalic dissections to decide.
Orthotylini_msp001	Dissections are required to assess its identity.
Orthotylini_msp002	Dissections are required to assess its identity.
Phylini_msp001	Dissections are required to assess its identity.
*Tinginotum*_msp001	This genus is represented in Australia by a single genus. More work is needed to assess the identity of this species.
*Wallabicoris*_msp001	Dissections are required to assess its identity.
Zanchiini_msp001	Dissections are required to assess its identity.
*Anisops*_msp001	More work is needed to identify which *Anisops* species was collected.
*Ochterus*_msp001	More work is needed to identify which *Ochterus* species was collected.
*Cuspicona*_msp001	More work is needed to identify which *Cuspicona* species was collected.
*Ocirrhoe*_msp001	More work is needed to identify which *Occirhoe* species was collected.
*Platycoris*_msp001	More work is needed to identify which *Platyocoris* species was collected.
*Poecilotoma*_msp001	More work is needed to identify which *Poecilotoma* species was collected.
*Trachylestes*_msp001	More work is needed to identify which *Trachylestes* species was collected.
Rhyparochromidae_msp001	More research is needed to determine genus and species was collected.
Rhyparochromidae_msp002	More research is needed to determine genus and species was collected.
Rhyparochromidae_msp003	More research is needed to determine genus and species was collected.
*Epimixia*_msp001	More work is needed to identify which *Epimixia* species was collected.
*Nethersia*_msp001	More work is needed to identify which *Nethersia* species was collected.
*Oncophysa*_msp001	More work is needed to identify which *Oncophysa* species was collected.

3.2 Putative new species (new to science)

In this we report two putative new species of stink bug tribe Deroploini. These are under review by Cassis.

Table 2. Putative new species (new to science)	
Species	**Comment**
*Numilia*_msp001	The tribe Deroploini is under review by G Cassis.
*Deroploopsis*_msp001	The tribe Deroploini is under review by G Cassis.

3.3 Exotic and pest species

Table 3. Exotic and pest species recorded			
Exotic/pest species	**Location sighted/observed**	**Indication of abundance**	**Comments**
N/A			

3.4 Threatened species

Table 4. Threatened species			
Species	**Listing status and level (EBPC, State/Territory)**	**Location sighted/observed**	**Indication of abundance**
N/A			

3.5 Range extensions

Table 5. Range extensions or significant infill in distribution records for species			
Species	**Location sighted/observed**	**Distance from nearest known record (km)**	**Comments**
N/A			

3.6 Genetic information

Specimens have been stored for genetic sampling contingent upon future funding.

4. Information on species lists

Because of the imperfect timing of this survey and the subsequent low yield of specimens, the species list recorded herein would not reflect the full diversity of Heteroptera in the region. The collecting was patchy and the abundances were lower than expected.

5. Information for land managers

As most Heteroptera species are associated with native vegetation, the best strategy for their conservation is through habitat preservation. This includes the maintenance of large, unbroken tracts of native habitat, the avoidance of pesticides and other pollutants, and a careful consideration of the timing and extent of intrusive management practices, such as controlled burns.

6. Other significant findings

The collection of the two new deroploine species – *Deroploopsis*_msp001 and *Numillia*_msp001 – were the most significant finding in the Wudjari Country Bush Blitz. The discovery of *loopsis*_msp001 was a major finding, including the determination of *Hakea commutata* as the host plant was of great significance, and received wide media coverage.

7. Conclusions

Overall collecting on this survey was poorer than expected. While the timing of the survey was not ideal, with spring being the peak flowering time, we were nonetheless surprised at how few bugs we encountered. Despite this, we still managed to collect several significant specie, some of these in large numbers. This helps to highlight the hyperdiverse nature of Heteroptera, and insects more generally: even in the poorest of conditions we continue to discover new species.

Acknowledgements

Kate Grarock, Helen Cross and Jo Harding of Bush Blitz are thanked for their fantastic support in arranging and implementing the Wudjari Country Bush Blitz. We thank Doc Reynolds and family for allowing us to undertake our survey on country and hosting us on their property.

References

1. Cassis, G. (2019). True Bugs (Insecta: Hemiptera: Heteroptera): Evolution, Classification, Biodiversity and Biology. In Reference Module in Life Sciences.
2. Cassis G and Gross GF. 1995. Zoological Catalogue of Australia. Heteroptera. Volume 27.3A. Canberra: CSIRO.
3. Cassis G and Gross GF. 2002. Zoological Catalogue of Australia. Heteroptera. Volume 27.3B. Canberra: CSIRO.
4. Cassis G; Symonds C; Branson L, 2019. Systematics and species radiation of the sheoak lace bug genus *Epimixia* Kirkaldy (Insecta: Heteroptera: Tingidae) in Australia, New Caledonia and Papua New Guinea. *Invertebrate Systematics* 33: 277–366.
5. Symonds CL, Cassis G. 2018. Systematics and Analysis of the Radiation of Orthotylini Plant Bugs Associated with Callitroid Conifers in Australia: Description of Five New Genera and 32 New Species (Heteroptera: Miridae: Orthotylini, *Bulletin of the American Museum of Natural History*, 2018: 1-228.

Appendices

Appendix 1. List of Heteroptera recorded during the Kepa Kurl (Esperance) Bush Blitz

FAMILY	SPECIES
Acanthosomatidae	Acanthosomatidae_sp001
Acanthosomatidae	Acanthosomatidae_sp002
Acanthosomatidae	*Eupolemus*_msp001
Acanthosomatidae	*Eupolemus*_msp002
Alydidae	*Melanacanthus*_msp001
Artheneidae	*Dilompus*_msp001
Coreidae	*Amorbus*_msp001
Cymidae	*Ontiscus*_msp001
Gelastocoridae	*Nerthra*_msp001
Geocoridae	*Germalus*_msp001
Geocoridae	*Stylogeocoris*_msp001
Hyocephalidae	*Maevius*_msp001
Lygaeidae	*Lepionysius grossi*
Lygaeidae	*Nysius*_msp001
Miridae	Austromirine_mimic_msp001
Miridae	*Coridromius chenopoderis*
Miridae	Cremnorrhinini_msp001
Miridae	*Diomocoris*_msp001
Miridae	*Exocarpocoris*_msp001
Miridae	Fulviini_msp001
Miridae	Mirini_msp001
Miridae	Mirini_msp002
Miridae	*Naranjakotta*_msp001
Miridae	Orthotylini_msp001
Miridae	Orthotylini_msp002
Miridae	Phylini_msp001
Miridae	*Tingonotum*_msp001
Miridae	*Wallabicoris*_msp001
Miridae	Zanchiini_msp001
Notonectidae	*Anisops*_msp001
Ochteridae	*Ochterus*_msp001
Pentatomidae	*Cuspicona thoracica*
Pentatomidae	*Cuspicona*_msp001
Pentatomidae	*Deroploopsis*_msp001
Pentatomidae	*Numilia*_msp001
Pentatomidae	*Ocirrhoe*_msp001
Pentatomidae	*Oechalia schellenbergii*
Pentatomidae	*Platycoris*_msp001
Pentatomidae	*Poecilometis callosus*

Pentatomidae	*Poecilotoma*_msp001
Pentatomidae	*Tholosanus proximus*
Reduviidae	*Trachylestes*_msp001
Rhyparochromidae	*Laryngodus cervantes*
Rhyparochromidae	*Porander scudderi*
Rhyparochromidae	Rhyparochromidae_msp001
Rhyparochromidae	Rhyparochromidae_msp002
Rhyparochromidae	Rhyparochromidae_msp003
Scutelleridae	*Austrotichus rugosus*
Scutelleridae	*Choerocoris paganus*
Tingidae	*Epimixia*_msp001
Tingidae	*Nethersia*_msp001
Tingidae	*Oncophysa*_msp001