

Tjiwarl Bush Blitz

Heteroptera

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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>

The Australian Plant Census (APC)

<http://www.anbg.gov.au/chah/apc/about-APC.html>

AusMoss

<http://data.rbq.vic.gov.au/cat/mosscatalogue>

The Catalogue of Australian Liverworts and Hornworts

http://www.anbg.gov.au/abrs/liverwortlist/liverworts_intro.html

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List of contributors

List of contributors to this report.			
Name	Institution/affiliation	Qualifications/area of expertise	Level/form of contribution
Gerry Cassis	UNSW	PhD, Heteropterist	Fieldwork, identifications, report writing
Nikolai Tatarnc	Western Australian Museum	PhD, Heteropterist	Fieldwork, identifications, report writing

Abstract

The Tjiwarl survey resulted in the discovery of 107 different species from 16 families of Heteroptera. The Miridae (74 species), Pentatomidae (11 species) and Tingidae (6 species) were the most species-rich families collected. Thirty-nine putative new species were differentiated of this material, parsed into 36 mirids, two pentatomids and one reduviid.

1. Introduction

The Heteroptera (Cassis 2019) is a core target taxa for the Bush Blitz program (e.g., Cassis and Symonds 2016). The suborder is comprised by over 2500 described species (Cassis and Gross 1995, 2002, Australian Faunal Directory), with over 500 new species described in the past 20 years. These species are nested within 66 families (Cassis 2019), that includes three highly species-rich families, namely the Miridae, Pentatomidae and Reduviidae. The Miridae has 11,000+ species and was poorly represented in Australian collections, and a little more than 150+ species were described, as listed in the Zoological Catalogue of Australia. (Cassis and Gross 1995). The Miridae thereby represents a key example of the taxonomic impediment in the Heteroptera as outlined in Cassis et al. (2018). The Tjiwarl Bush Blitz survey exemplifies the taxonomic impediment of the Miridae in Australia, with the discovery of 74 species, of which 36 are new to science.

2. Methods

2.1 Site selection

Site selection was based on plant condition, particularly if plants were in flower or had fresh leaf growth.

2.2 Survey techniques

The Heteroptera are mostly found on seed plants, and collecting them is historically achieved through the application of the beating sheet method. In the Tjiwarl Bush Blitz survey, woody perennial shrubs were targeted, particularly species of *Acacia* and *Eremophila*, as well as the wax subfamily Myrtaceae: Chamelaucieae.

2.2.1 Methods used at standard survey sites

The above heteropteran survey techniques were also used at the standard survey sites.

2.3 Identifying the collections

Specimens were sorted to family-group level and then morphospecies. Following the survey, Prof Cassis worked at the Western Australian Museum with Dr Tatarnic in order to curate and identify the specimens collected. In the first week in March 2024 visited the University of New South Wales where identifications were verified or corrected. New species were decided on prior knowledge of the Australian Heteroptera and the literature.

3. Results and Discussion

Appendix 1 lists all Heteroptera recorded from the Tjiwarl Bush Blitz survey of 2023, with 107 separate species, with 39 new species. Collections made during this Bush Blitz resulted in the collection of hundreds specimens have been processed and will be made available for study at UNSW and the Western Australian Museum.

Twenty three species were definitively identified to species. Most species were identified to genus rank. Eighty-four were not identified to species. The unnamed species are given in Table 1.

3.1 Un-named or not formalised taxa

Table 1. Putatively un-named or not formalised taxa	
Taxon	Comment
Metacanthus BBTJI-065	The Australian Berytidae are currently being revised by Tom Henry (US National Museum) and Gerry Cassis (UNSW).
Adrisa BBTJI-177	More research is required to identify this species.
Germalus BBTJI-125	More research is required to identify this species.
Acaciacapsus nr_aureolus BBTJI-023	This species is possibly <i>Acaciacapsus aureolus</i> but requires dissections to confirm its identity.
Ausejanus BBTJI-055	More research is required to identify this species.
Gn_nr_Campylomma BBTJI-116	More research is required to identify this species.
Gn_CARE BBTJI-002	This species is currently in submission to the Invertebrate Systematics journal.
Eremotylus BBTJI-007	More research is required to identify this species.
Eremotylus BBTJI-118	More research is required to identify this species.
Eremotylus BBTJI-141	More research is required to identify this species.
Erysivena BBTJI-166	This genus was revised by Symonds and Cassis (2018). Dissections are required to determine the identity of this species.
Fronsetta BBTJI-021	More research is required to identify this species.
Fronsetta BBTJI-150	More research is required to identify this species.
Fronsetta BBTJI-151	More research is required to identify this species.
Gn_nr_Eremotylus BBTJI-020	More research is required to identify this species.
Gn_nr_Eremotylus BBTJI-038	More research is required to identify this species.
Gn_nr_Eremotylus BBTJI-119	More research is required to identify this species.
GN_nr_Eremotylus BBTJI-169	More research is required to identify this species.
Gn_nr_Melaleucoides BBTJI-003	More research is required to identify this species.
Gn_Palassocoris_001 BBTJI-067	Chin and Cassis (2018) described the <i>Palassocoris</i> complex. Dissections are required to determine the identity of this species.
Gn_Palassocoris_002 BBTJI-054	Chin and Cassis (2018) described the <i>Palassocoris</i> complex. Dissections are required to determine the identity of this species.
Gryophallus BBTJI-099	More research is required to identify this species.
Harpemiris BBTJI-001	Chin and Cassis (2018) described the <i>Palassocoris</i> complex. Dissections are required to determine the identity of this species.
Hypseloecus BBTJI-077	More research is required to identify this species.
Jiwarli BBTJI-053	More research is required to identify this species.

Metopocoris BBTJI-085	More research is required to identify this species.
Naranjakotta BBTJI-170	Cheng and Cassis (2019) revised this genus. Dissections are required to determine the identity of this species.
Naranjakotta BBTJI-171	More research is required to identify this species.
Neomyrtlemiris BBTJI-157	Cheng and Cassis (2019) revised this genus. Dissections are required to determine if this is a new species.
Orthotylinae BBTJI-153	More research is required to identify this species.
Phylini BBTJI-174	More research is required to identify this species.
Spinivesica BBTJI-013	More research is required to identify this species.
Stenonabis BBTJI-149	More research is required to identify this species.
Gn_nr_Andrallus BBTJI-124	More research is required to identify this species.
Cuspicona BBTJI-060	More research is required to identify this species.
Ooldeon BBTJI-136	More research is required to identify this species.
Cystechila BBTJI-029	More research is required to identify this species.
Lasiacantha BBTJI-036	Cullerton and Cassis are revising the genus. More research is required to identify this species.
Lasiacantha BBTJI-129	Cullerton and Cassis are revising the genus. More research is required to identify this species.
Lasiacantha BBTJI-130	Cullerton and Cassis are revising the genus. More research is required to identify this species.
Malandiola BBTJI-015	Cullerton and Cassis are revising the genus. More research is required to identify this species.
Nethersia BBTJI-011	Cullerton and Cassis are revising the genus. More research is required to identify this species.

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.

Thirty-nine species were determined as new species (Table 2). These include 36 mirids, two pentatomids and one reduviid.

Species	Comment
Austromiris BBTJI-056	Austromiris is currently under revision by Honours student Jasmine Lau in the Cassis lab at UNSW.
Austromiris BBTJI-078	Austromiris is currently under revision by Honours student Jasmine Lau in the Cassis lab at UNSW.
Fronsetta BBTJI-005	Cassis (2008) described Fronsetta. Fronsetta BBTJI-005 is a putative new species based on external characters.

GN_AUSTRO_002 BBTJI-050	This species belongs to the Lattinova complex (Cassis 2008) and represents a new species.
Gn_AUSTRO_003 BBTJI-114	This species belongs to the Lattinova complex (Cassis 2008) and represents a new species.
GN_AUSTRO_004 BBTJI-137	This species belongs to the Lattinova complex (Cassis 2008) and represents a new species.
Gn_BILB BBTJI-017	This species belongs to the Lattinova complex (Cassis 2008) and represents a new species.
GN_BILB BBTJI-018	This species belongs to the Lattinova complex (Cassis 2008) and represents a new species.
GN_BILB BBTJI-033	This species belongs to the Lattinova complex (Cassis 2008) and represents a new species.
GN_BILB BBTJI-058	This species belongs to the Lattinova complex (Cassis 2008) and represents a new species.
GN_BILB BBTJI-059	This species belongs to the Lattinova complex (Cassis 2008) and represents a new species.
Gn_nr_Asterophylus BBTJI-014	This species is unknown to the authors.
Gn_nr_Dicyphylus BBTJI-167	This species is not found in the Schuh and Schwartz (2016) revision of the Cremnorrhini.
Gn_nr_Naranjakotta BBTJI-076	This species belongs to the complex of species that have an orange head (Cassis and Symonds 2016). It is an apparent new species.
Gn_nr_Naranjakotta BBTJI-158	This species belongs to the complex of species that have an orange head (Cassis and Symonds 2016). It is an apparent new species.
GN_ORTHO_001 BBTJI-062	This species is unknown to the authors.
Gn_ORTHO_002 BBTJI-095	This species is unknown to the authors.
Gn_ORTHO-003 msp_BBTJI-102	This species is unknown to the authors.
Gn_ORTHO_004 BBTJI-107	This species is unknown to the authors.
Gn_ORTHO_005 BBTJI-155	This species is unknown to the authors.
Gn_ORTHO_006 BBTJI-067	This species is unknown to the authors.
Gn_ORTHO_007 BBTJI-172	This species is unknown to the authors.
Gn_ORTHO_008 BBTJI-175	This species is unknown to the authors.
Gn_ORTHO_009 BBTJI-016	This species is unknown to the authors.
Gn_ZANC_001 BBTJI-027	The Zanchiini are not described from Australia.
Gn_ZANC_001 BBTJI-048	The Zanchiini are not described from Australia.
Gn_ZANC_002 BBTJI-063	The Zanchiini are not described from Australia.
Gn_ZANC_002 BBTJI-073	The Zanchiini are not described from Australia.
Gn_ZANC_002 BBTJI-074	The Zanchiini are not described from Australia.
Gn_ZANC_002 BBTJI-162	The Zanchiini are not described from Australia.
Gn_ZANC_003 BBTJI-117	The Zanchiini are not described from Australia.
Gn_ZANC_003 BBTJI-163	The Zanchiini are not described from Australia.

Gn_ZANC_004 BBTJI-154	The Zanchiini are not described from Australia.
Gn_ZANC_005 BBTJI-176	The Zanchiini are not described from Australia.
Zanessa BBTJI-083	This species belongs to the Lattinova complex (Cassis 2008) and represents a new species.
Zanessa BBTJI-110	This species belongs to the Lattinova complex (Cassis 2008) and represents a new species.
Gn_nr_Sciomenidia BBTJI-032	This has not been recognised in the stink bug v2.2 manual of Cassis and Schwertner (2023).
Tepperocoris BBTJI-037	This species belongs to the Macrocarenooides complex, this is being currently revised by Schwertner and Cassis.
Aradelloides BBTJI-064	This new species is being described by Tatarnic and Cassis.

3.3 Exotic and pest species

Nysius vinitor is ubiquitous in Australia, including Western Australia. Its collection in the Tjiwarl region is not unexpected. It is a native species of Australia and its presence in natural areas is not considered threat to crops.

Exotic/pest species	Location sighted/observed	Indication of abundance	Comments
<i>Nysius vinitor</i>	Tjiwarl, near Yakabinda Well [BBTJI L5]	Two specimens	This is one of the most common bugs in Australia. Its collection in the Tjiwarl Bush Blitz is considered trivial.

3.4 Threatened species

No Tjiwarl species are listed as threatened.

Species	Listing status and level (EBPC, State/Territory)	Location sighted/observed	Indication of abundance
Not applicable			

3.5 Range extensions

Given the taxonomic impediment of this group, range extensions cannot be assessed.

Species	Location sighted/observed	Distance from nearest known record (km)	Comments
None			

3.6 Genetic information

No genetic information can be reported for the Tjiwarl survey.

4. Information on species lists

We estimate that the Miridae may reach over 3000 species in Australia, based on equivalent land area of the continental United States. The description of about 500 species since the early 2000s is an indication of the taxonomic impediment of the Miridae. The discovery of 36 new species of Miridae in the Tjiwarl region indicates that the taxonomic accumulation curve is not reaching an asymptote.

5. Information for land managers

The Goldfields region is remarkably diverse for Heteroptera. It is undoubtedly a hot spot for species richness and endemism for Australian Miridae. The preservation of woody shrubs is a recommended practice for mitigating against extinction risk for Heteroptera, particularly the Miridae.

6. Other significant findings

A significant highlight of the Tjiwarl Bush Blitz was the discovery of a large number of Miridae: Orthotylinae: Austromirini, which we colloquially refer to as the Green Monsters. These large orthotyline mirids are identified as species of *Austromiris*, *Fronsetta* and *Zanessa*, as well as the putative new genera Gn_AUSTRO_002, Gn_AUSTRO_003, Gn_AUSTRO_004 and Gn_BILB.

7. Conclusions

107 species of Heteroptera were found in the Tjiwarl Bush Blitz, nested in the following sixteen families (species number in brackets): Berytidae (1), Blissidae (1), Coreidae (1), Cydnidae (1), Geocoridae (2), Lestoniidae (1), Lygaeidae (1), Miridae (74), Nabidae (2), Oxycarenidae (2), Pachygronthidae (1), Pentatomidae (11), Reduviidae (1), Rhopalidae (1), Scutelleridae (1) and Tingidae (6). 39 species were found to be new to science, including 36 mirids, two pentatomids and one reduviid. The species list is given in the Appendix 1 spreadsheet.

Acknowledgements

We thank Dr Katrina Menard of the University of Connecticut who identified /verified a few species of Phylinae for us.

References

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Appendix 1. List of Heteroptera recorded during the Tjiwarl Bush Blitz						
Family	Species	Common name	Putative new species	Threatened (EPBC Act)	Threatened (WA)	Exotic/ pest
Berytidae	Metacanthus BBTJI-065	stilt bug	no	no	no	no
Blissidae	Slaterellus hackeri		no	no	no	no
Coreidae	Mictis profana	crusader bug	no	no	no	no
Cydnidae	Adrisa BBTJI-177		no	no	no	no
Geocoridae	Germalus BBTJI-125	big-eyed bug	no	no	no	no
Geocoridae	Germalus victoriae	big-eyed bug	no	no	no	no
Lestoniidae	Lestonia haustorifera		no	no	no	no
Lygaeidae	Nysius vinitor	Rutherglen bug	no	no	no	Australian pest
Miridae	Acaciacapsus nr_aureolus BBTJI-023	plant bug	further research	no	no	no
Miridae	Ausejanus BBTJI-055	plant bug	further research	no	no	no
Miridae	Austromiris BBTJI-078	plant bug	yes	no	no	no
Miridae	Austromiris BBTJI-056	plant bug	yes	no	no	no
Miridae	Gn_nr_Campylomma BBTJI-116	plant bug	no	no	no	no
Miridae	Gn_CARE BBTJI-002	plant bug	in press	no	no	no
Miridae	Chimsunchartella schwartzi	plant bug	no	no	no	no
Miridae	Coridromius pilbarensis	plant bug	no	no	no	no
Miridae	Creontiades dilutus	plant bug	no	no	no	no
Miridae	Eremotylus BBTJI-007	plant bug	further research	no	no	no
Miridae	Eremotylus BBTJI-118	plant bug	further research	no	no	no
Miridae	Eremotylus BBTJI-141	plant bug	further research	no	no	no
Miridae	Erysivena BBTJI-166	plant bug	further research	no	no	no
Miridae	Fronsetta BBTJI-005	plant bug	yes	no	no	no
Miridae	Fronsetta BBTJI-021	plant bug	further research	no	no	no
Miridae	Fronsetta BBTJI-150	plant bug	further research	no	no	no
Miridae	Fronsetta BBTJI-151	plant bug	further research	no	no	no
Miridae	GN_AUSTRO_002 BBTJI-050	plant bug	yes	no	no	no

Family	Species	Common name	Putative new species	Threatened (EPBC Act)	Threatened (WA)	Exotic/ pest
Miridae	Gn_AUSTRO_003 BBTJI-114	plant bug	yes	no	no	no
Miridae	GN_AUSTRO_004 BBTJI-137	plant bug	yes	no	no	no
Miridae	Gn_BILB BBTJI-017	plant bug	yes	no	no	no
Miridae	GN_BILB BBTJI-018	plant bug	yes	no	no	no
Miridae	GN_BILB BBTJI-033	plant bug	yes	no	no	no
Miridae	GN_BILB BBTJI-058	plant bug	yes	no	no	no
Miridae	GN_BILB BBTJI-059	plant bug	yes	no	no	no
Miridae	Gn_nr_Asterophylus BBTJI-014	plant bug	yes	no	no	no
Miridae	Gn_nr_Dicyphylus BBTJI-167	plant bug	yes	no	no	no
Miridae	Gn_nr_Eremotylus BBTJI-020	plant bug	further research	no	no	no
Miridae	Gn_nr_Eremotylus BBTJI-038	plant bug	further research	no	no	no
Miridae	Gn_nr_Eremotylus BBTJI-119	plant bug	further research	no	no	no
Miridae	GN_nr_Eremotylus BBTJI-169	plant bug	further research	no	no	no
Miridae	Gn_nr_Melaleuroides BBTJI-003	plant bug	further research	no	no	no
Miridae	Gn_nr_Naranjakotta BBTJI-076	plant bug	yes	no	no	no
Miridae	Gn_nr_Naranjakotta BBTJI-158	plant bug	yes	no	no	no
Miridae	GN_ORTHO_001 BBTJI-062	plant bug	yes	no	no	no
Miridae	Gn_ORTHO_002 BBTJI-095	plant bug	yes	no	no	no
Miridae	Gn_ORTHO-003 msp_BBTJI-102	plant bug	yes	no	no	no
Miridae	Gn_ORTHO_004 BBTJI-107	plant bug	yes	no	no	no
Miridae	Gn_ORTHO_005 BBTJI-155	plant bug	yes	no	no	no
Miridae	Gn_ORTHO_006 BBTJI-067	plant bug	yes	no	no	no
Miridae	Gn_ORTHO_007 BBTJI-172	plant bug	yes	no	no	no
Miridae	Gn_ORTHO_008 BBTJI-175	plant bug	yes	no	no	no
Miridae	Gn_ORTHO_009 BBTJI-016	plant bug	yes	no	no	no
Miridae	Gn_Palassocoris_001 BBTJI-067	plant bug	further research	no	no	no
Miridae	Gn_Palassocoris_002 BBTJI-054	plant bug	further research	no	no	no
Miridae	Gn_PHYL_001 BBTJI-143	plant bug	further research	no	no	no

Family	Species	Common name	Putative new species	Threatened (EPBC Act)	Threatened (WA)	Exotic/ pest
Miridae	Gn_PHYL_002 BBTJI-088	plant bug	further research	no	no	no
Miridae	Gn_ZANC_001 BBTJI-027	plant bug	yes	no	no	no
Miridae	Gn_ZANC_001 BBTJI-048	plant bug	yes	no	no	no
Miridae	Gn_ZANC_002 BBTJI-063	plant bug	yes	no	no	no
Miridae	Gn_ZANC_002 BBTJI-073	plant bug	yes	no	no	no
Miridae	Gn_ZANC_002 BBTJI-074	plant bug	yes	no	no	no
Miridae	Gn_ZANC_002 BBTJI-162	plant bug	yes	no	no	no
Miridae	Gn_ZANC_003 BBTJI-117	plant bug	yes	no	no	no
Miridae	Gn_ZANC_003 BBTJI-163	plant bug	yes	no	no	no
Miridae	Gn_ZANC_004 BBTJI-154	plant bug	yes	no	no	no
Miridae	Gn_ZANC_005 BBTJI-176	plant bug	yes	no	no	no
Miridae	Gryophallus BBTJI-099	plant bug	further research	no	no	no
Miridae	Harpemiris BBTJI-001	plant bug	further research	no	no	no
Miridae	Hypseloecus BBTJI-077	plant bug	no	no	no	no
Miridae	Jiwarli BBTJI-053	plant bug	no	no	no	no
Miridae	Jiwarli solanum	plant bug	no	no	no	no
Miridae	Metopocoris BBTJI-085	plant bug	further research	no	no	no
Miridae	Myrtlemiris agnew	plant bug	no	no	no	no
Miridae	Naranjakotta BBTJI-170	plant bug	no	no	no	no
Miridae	Naranjakotta BBTJI-171	plant bug	no	no	no	no
Miridae	Neomyrtlemiris BBTJI-157	plant bug	further research	no	no	no
Miridae	Orthotylinae BBTJI-153	plant bug	further research	no	no	no
Miridae	Phylini BBTJI-174	plant bug	further research	no	no	no
Miridae	Spinivesica BBTJI-013	plant bug	further research	no	no	no
Miridae	Teddu katrinae	plant bug	no	no	no	no
Miridae	Wallabicoris paradicrastyli	plant bug	no	no	no	no
Miridae	Zanessa BBTJI-083	plant bug	yes	no	no	no
Miridae	Zanessa BBTJI-110	plant bug	yes	no	no	no

Family	Species	Common name	Putative new species	Threatened (EPBC Act)	Threatened (WA)	Exotic/ pest
Nabidae	Nabis kinbergii	plant bug	no	no	no	no
Nabidae	Stenonabis BBTJI-149	plant bug	no	no	no	no
Oxycarenidae	Oxycarenus arcatus		no	no	no	no
Oxycarenidae	Oxycarenus westraliensis		no	no	no	no
Pachygronthidae	Stenophyella macreta		no	no	no	no
Pentatomidae	Anaxilauus musgravei	stink bug	no	no	no	no
Pentatomidae	Aplerotus maculatus	stink bug	no	no	no	no
Pentatomidae	Gn_nr_Andrallus BBTJI-124	stink bug	further research	no	no	no
Pentatomidae	Cuspicona BBTJI-060	stink bug	further research	no	no	no
Pentatomidae	Oechalia schellenbergii	stink bug	no	no	no	no
Pentatomidae	Ooldeon BBTJI-136	stink bug	no	no	no	no
Pentatomidae	Poecilometis fuscescens	stink bug	no	no	no	no
Pentatomidae	Poecilometis patruelis	stink bug	no	no	no	no
Pentatomidae	Gn_nr_Sciomenidia BBTJI-032	stink bug	yes	no	no	no
Pentatomidae	Tepperocoris BBTJI-037	stink bug	yes	no	no	no
Pentatomidae	Turrubulana plana	stink bug	no	no	no	no
Reduviidae	Aradelloides BBTJI-064	assassin bug	yes	no	no	no
Rhopalidae	Liorhyssus hyalinus		no	no	no	no
Scutelleridae	Choerocoris paganus	jewel bug	no	no	no	no
Tingidae	Cystechila BBTJI-029	lace bug	further research	no	no	no
Tingidae	Lasiacantha BBTJI-036	lace bug	further research	no	no	no
Tingidae	Lasiacantha BBTJI-129	lace bug	further research	no	no	no
Tingidae	Lasiacantha BBTJI-130	lace bug	further research	no	no	no
Tingidae	Malandiola BBTJI-015	lace bug	further research	no	no	no
Tingidae	Nethersia BBTJI-011	lace bug	further research	no	no	no