

Tjiwarl Country (Leinster)
Bush Blitz
Arachnids & Myriapods

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Nomenclature and taxonomy used in this report is consistent with:

The Australian Faunal Directory (AFD)

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List of contributors

List of contributors to this report.			
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Abstract

The arachnid and myriapod fauna of the Tjiwarl determination area was assessed during a 10-day trip. The area is situated between Wiluna and Leinster and includes Wanjarri Nature Reserve. The focus was on 'sedentary' arachnids, including those living in burrows and in cryptic environments under bark and rocks. 116 new specimens were collected for the state collection (along with DNA-ready tissue for 32 specimens). This sample included 62 putative species, of which 5 were undescribed but previously recognised species, and 6 were newly recognised undescribed species. Many of the new species are mygalomorph spiders (tarantulas, trapdoor spiders and their relatives), which were the major group of focus for this trip. These spiders live a particular lifestyle that makes them good for study, yet vulnerable, being long-lived, with low dispersal ability and high habitat specificity. Any management plans aimed at them must take into account the unique lifestyle of these spiders.

1. Introduction

The arachnid and myriapod fauna of the Tjiwarl determination area, in the W.A. Northern Goldfields region, was assessed during a 10-day trip. The area is situated between Wiluna and Leinster and includes Wanjarri Nature Reserve.

The focus was on 'sedentary' arachnids, including those living in burrows in the ground, and in cryptic environments under bark and rocks. The Tjiwarl determination area includes a mosaic of habitats, each of which is likely to contain a different arachnid assemblage, and time was spent sampling in each of these broad habitats: mulga woodland, spinifex sand plains, on/around salt lakes, and on/around granite outcrops/breakaways.

Sedentary arachnids, especially burrowing species, include many groups that tend to have small natural ranges, making them both diverse over relatively small areas, and intrinsically vulnerable because they have limited ability to move out of harms way or recolonise altered environments (Harvey 2002; Rix et al. 2017). A major focus group was the mygalomorph spiders. This group is comprised of tarantulas, trapdoor spiders, and their relatives, all of which are relatively robust spiders that construct burrows or retreats (Raven 1985; Wilson et al. 2023). In the Tjiwarl determination area we expected to find those mygalomorph families that are best adapted to more arid regions of Australia, including wishbone spiders (Anamididae), tarantulas (Theraphosidae), spiny trapdoor spiders (Idiopidae), mouse spiders (Actinopodidae) and saddle-legged trapdoor spiders (Halonoproctidae). All of these represent highly diverse groups that contain many undescribed species. Mygalomorph spiders are also comparatively well-represented on state and national threatened species lists, reflecting their naturally small ranges and high vulnerability to habitat destruction/fragmentation.



***Gaius villosus*, a species of spiny trapdoor spider (Idiopidae) collected on Tjiwarl Bush Blitz. Left, closed burrow. Middle, open burrow. Right, spider. Photos by Jeremy Wilson.**

Some araneomorph spiders (the other major spider group) also construct burrows and have very sedentary lifestyles and may also be of conservation importance. These include tube spiders (Segestriidae), wolf spiders (Lycosidae), ant-eating spiders (Zodariidae) and some huntsman spiders (Sparassidae). Other burrowing arachnids that were targeted include urodacid scorpions. These make cork-screw burrows with a slit-shaped entrance.



Burrowing/ground-living araneomorph spiders. Left, an ant-eating spider (Zodariidae). Right, a wolf spider (Lycosidae) about to close its trapdoor burrow.

Search effort was also focused on cryptic environments under rocks and tree bark. In these areas, we expected to find sedentary arachnid groups adapted to living in these flattened spaces, including flat spiders (Selonopidae and Trachycosmidae), prowling spiders (Miturgidae), huntsman spiders (Sparassidae), messy-webbed spiders such as the family Desidae, ant-eating spiders (Zodariidae), some jumping spiders (Salticidae), ground spiders (Gnaphosidae), pseudoscorpions, scorpions, and centipedes.



Some arachnids found under rocks on the Tjiwarl Bush Blitz. Left, a prowling spider (Miturgidae), of the genus *Miturga*. Right, a centipede (Chilopoda) of the species *Scolopendra morsitans*.

Prior to the Bush Blitz, the Western Australian Museum records were examined for an indication of the spiders likely to be found in the region. The WAM collection contains a

relatively large sample of spiders from the region and as expected, contains a high diversity of the spider types mentioned above. However, many of the specimens currently in the museum collection were collected using pitfall traps. For mygalomorph spiders (one of the focus groups), pitfall traps capture male spiders, who leave their burrows when they become adults in order to find and mate with females. The Bush Blitz, therefore, provided an opportunity not only to look for previously undocumented species, but also to find and collect females and document burrow architecture that matches with previously collected males that are already in the museum collection.

2. Methods

2.1 Site selection

Site selection was limited somewhat by trip logistics and accessibility, but, in general, we tried to select sites that looked relatively pristine (that is, with little stock damage) and that seemed to represent different habitats within the area. We paid attention mostly to soil type (e.g., sand, loam/clay, rocky) and vegetation type (mulga, mallee, spinifex). For mygalomorph spiders, areas with less grass cover were preferred as this makes visually searching for burrows easier.

2.2 Survey techniques

Active searching was primarily employed to look for burrows of mygalomorph spiders, other burrowing spiders, and scorpions. Upon finding a burrow, the entrance was photographed, and the burrow was then excavated using a standard technique of digging a large channel about a foot away from the burrow entrance before gradually digging from this channel towards the burrow until the burrow cross-section was exposed and the arachnid could be extracted without harming it. This was done using a geological pick and pocketknife for more precise digging. We also flipped rocks and peeled the bark of trees to look for sedentary arachnids living in these environments. For most spiders collected on the trip, live images of the spider against a white background were taken.

Other survey methods that were not employed, or were employed only sparingly, were pitfall trapping, foliage beating, and night spotting. Pitfall trapping catches cursorial ground-hunting spiders that can't climb up smooth surfaces (e.g. wolf spiders - Lycosidae), and male mygalomorph spiders. However, the herpetology team were able to identify and collect male mygalomorph spiders for me from their pitfall traps, and I was able to go with them to inspect the pitfall traps for other spiders once as well. Foliage beating catches arboreal species (living on trees) such as crab spiders (Thomisidae) and spiders that hide in vegetation during the day such as orb-weaving spiders (Araneidae). Although I did not actively conduct foliage beating, the Entomology team, who were sweep netting (which catches a similar fauna), gave me any arachnids they collected. Night spotting is predominantly used to catch nocturnal hunters such as wolf spiders (Lycosidae), huntsman spiders (Sparassidae), scorpions and nocturnal web-building spiders such as orb-weaving spiders (Araneidae). We were able to spend one night, towards the end of the trip, night spotting with a large team.

2.2.1 Methods used at standard survey sites

- Active searching for burrows and webs (all sites).
- Rock flipping (where rocks were present) (all sites).
- Bark peeling (where trees with loose bark were present) (all sites).

2.3 Identifying the collections

Preliminary identifications were made in the field by Jeremy Wilson (field arachnologist), before these were refined and updated by Julianne Waldock (Technical Officer of Arachnids & Myriapods, Western Australian Museum) with assistance from Mark Harvey (Curator of Arachnids & Myriapods, WAM).


Specimens were identified from published keys combined with referral to W.A. Museum collections.

3. Results and Discussion

Appendix 1 lists all arachnids recorded during the Bush Blitz. Collections made during this Bush Blitz will result in 116 new specimens for the state collection, to be uploaded to ALA. Within this sample were 62 putative species, of which 5 were undescribed species but previously recognised species, and 6 were newly recognised undescribed species.




3.1 Un-named or not formalised taxa

Table 1. Putatively un-named or not formalised taxa	
Taxon	Comment
<i>Venator</i> sp. nov. " <i>palabunda</i> spp. grp"	Undescribed species that has already been recognised by Volker Framenau based on museum specimens.
<i>Venator</i> sp. nov. " <i>koyuga</i> spp. grp"	Undescribed species that has already been recognised by Volker Framenau based on museum specimens.

<p><i>Aname</i> sp. nov. "MYG031 - chevrons"</p> 	<p>Undescribed species that has already been recognised by the WA Museum based on museum specimens.</p>
<p><i>Conicochernes</i> sp. nov. "PSE024"</p>	<p>Undescribed species that has already been recognised by the WA Museum based on museum specimens.</p>
<p><i>Afrostermophorus</i> sp. nov. "PSE242"</p>	<p>Undescribed species that has already been recognised by the WA Museum based on museum specimens.</p>

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.

Table 2. Putative new species (new to science)	
Species	Comment
<p><i>Poecilopta</i> sp. nov. "carnarvon spp. grp"</p> 	<p>We have tentatively recognised this as a new species, closely related to <i>P. harveyi</i> and <i>P. smaragdinea</i>. These spiders mimic green ants.</p>
<p><i>Aname</i> sp. nov. "silky"</p>  	<p>Undescribed species of <i>Aname</i> that does not match currently recognised <i>Aname</i> species (described or undescribed) from the Murchison bioregion. The species makes a burrow with quite a lot of silk around the entrance, sometimes attached to grass or leaf-litter near the entrance.</p>

Aname sp. nov. "mellosa-complex"


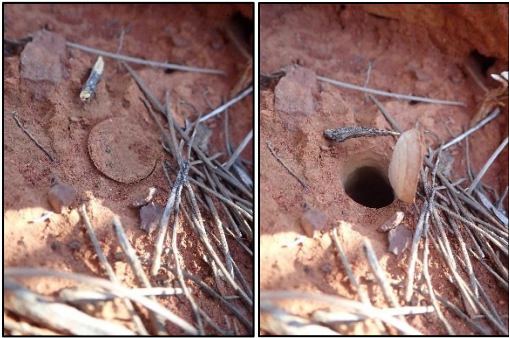


Undescribed species of *Aname* from the 'mellosa-complex', a clade currently under revision. These specimens don't match with currently recognised *mellosa-complex* species. The species makes an open burrow with the entrance on an angle and with a slight 'hood', where one side is raised relative to the other.

Kwonkan sp. nov. "chevrons"



An undescribed species of *Kwonkan*, that does not match recognised species in the area. It makes a 'collar-door' burrow. The entrance has a soft collar of sand and silk that collapses inward to cover and disguise the burrow entrance.

<p><i>Synochele</i> sp. nov. "cf. MYG269"</p>  	<p>We have tentatively identified this a new species as the location is quite far from the locations of other recognised described and undescribed species.</p>
<p><i>Synsphyronus</i> sp. nov. "PSE241"</p>	<p>Mark Harvey (WA Museum) has confirmed that this species doesn't match any previously recognised described or undescribed species in the region.</p>

3.3 Exotic and pest species

None

3.4 Threatened species

None

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
None.			

None.

3.6 Genetic information

Tissue was taken, preserved in 100% ethanol and kept frozen for 38 specimens of groups of interest or under current revision (Mygalomorphae, pseudoscorpions, scorpions) for future molecular work.

4. Information on species lists

As is typical when sampling spiders and other diverse assemblages, for some poorly-known but diverse groups it is difficult to identify species (or even genera), and difficult to tell if a species has been described previously (revisions may be very old with little detail).

5. Information for land managers

Many of the new species recognised here are mygalomorph spiders (tarantulas, trapdoor spiders and their relatives), which were the major group of focus for this trip. These spiders live a particular lifestyle that makes them good for study, yet vulnerable, and any management plans must take into account the lifestyle of these spiders.

Firstly, mygalomorph spiders have very limited ability to disperse and colonise new environments. This is because unlike other spiders that use silk to ‘balloon’ to disperse, spiderlings of most mygalomorph species disperse on foot, limiting their dispersal to a matter of meters. Mygalomorph spiders are also long-lived, taking several years to reach maturity. In ideal conditions, a young mygalomorph spider will make a burrow and never leave it, enlarging it as it grows. These spiders will re-burrow if forced out of their existing burrow (by a predator or a flood, for example), but are clumsy outside of the burrow and dehydrate very quickly, so their burrow is essential to their survival and any time they must construct a new one is a potential risk to them. Females live their whole lives in their burrow and may live multiple decades. Male spiders leave their burrow when they reach adulthood, and wander at night, often after rain, looking for females in order to mate. The males die soon after this. This means that females are generally surveyed by finding burrows and excavating the spider from them, but males are usually caught in pitfall traps while wandering looking for females. It also means that female spiders can be monitored over a long time, once their burrow is located, because they will not leave and construct a new burrow unless forced to.

Many mygalomorph spiders are short range endemics, having small natural ranges, so species found in the Tjiwarl determination area may not be widespread outside of this region (although we lack relevant data to understand the distribution of many species).

The Goldfields region has many different types of mygalomorph spiders. These spiders rely on the integrity of the topsoil in an area, and two factors that may affect their survival in an area are hooved grazing animals (that damage the topsoil) and invasive plants that smother the ground. Any management around these spiders should focus on maintain the integrity and availability of exposed soil areas.

6. Other significant findings

None.

7. Conclusions

The survey yielded a mixture of previously described species, known undescribed species, and new discoveries. Of particular interest were the mygalomorph spiders and pseudoscorpions, as these groups are potentially vulnerable short-range endemics, and are

being actively researched. Management of mygalomorph spiders should focus on protecting the integrity of the soil layer, and will need to be long-term, as these spiders are long-lived, with long generation times.

Acknowledgements

We thank the Bush Blitz team for the invitation to participate, the Tjiwarl aboriginal corporation for allowing the Bush Blitz team onto their determination area for this survey. We also thank staff at the Western Australian Museum for facilitating identification and long-term preservation of the samples.

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Appendix 1. List of Arachnids recorded during the Tjiwarl Country (Leinster) Bush Blitz						
Family	Species	Common name	Putative new species	Threatened (EPBC Act)	Threatened (WA)	Exotic/ pest
ACARI						
Caeculidae	<i>Neocaeculus</i> ?	mite	No	No	No	No
Trombidiidae	genus indet.	mite	No	No	No	No
Trombidiidae	genus indet.	mite	No	No	No	No
ARANEOMORPHAE						
Araneidae	<i>Acroaspis</i> sp. indet. (juvenile)	orb weaver	No	No	No	No
Araneidae	<i>Argiope protensa</i>	tear-drop spider	No	No	No	No
Araneidae	<i>Backobourkia</i> sp. indet. (juvenile)	desert orb weaver	No	No	No	No
Araneidae	<i>Backobourkia heroine</i>	desert orb weaver	No	No	No	No
Araneidae	<i>Socca pustulosa</i> ? (juvenile)	orb weaver	No	No	No	No
Corinnidae	<i>Nyssus coloripes</i>	swift spider	No	No	No	No
Corinnidae	<i>Poecilopta</i> sp. nov. "carnarvon spp. grp"	ant-mimicking spider	Yes	No	No	No
Desidae	genus indet. (juvenile)		No	No	No	No
Desidae	<i>Badumna insignis</i>	black house spider	No	No	No	No
Desidae	<i>Phryganoporus candidus</i>	foliage-webbing spider	No	No	No	No
Gnaphosidae	gen. indet.	ground spider	No	No	No	No
Gnaphosidae	<i>Ceryerda cursitans</i>	ground spider	No	No	No	No
Lamponidae	<i>Lampona quinqueplagiata</i>	white-tailed spider	No	No	No	No
Lycosidae	gen. indet. "sp. 2 - flap door" (juvenile)	wolf spider	No	No	No	No
Lycosidae	gen. indet. "sp. 1 - turret" (juvenile)	wolf spider	No	No	No	No
Lycosidae	<i>Venator</i> ? sp. indet. (juvenile)	wolf spider	No	No	No	No
Lycosidae	<i>Venator</i> sp. nov. "palabunda spp. grp"	wolf spider	Yes	No	No	No
Lycosidae	<i>Hoggicosa bicolor</i>	two-toned wolf spider	No	No	No	No
Lycosidae	<i>Mainosa longipes</i>	shuttle-cock wolf spider	No	No	No	No
Lycosidae	<i>Venator</i> sp. nov. "koyuga spp. grp"	wolf spider	Yes	No	No	No
Lycosidae	<i>Venatrix arenaris</i> "sp. 2 - fishing"	wolf spider	No	No	No	No
Miturgidae	<i>Miturga</i> "sp. 1 - rock tube"	prowling spider	No	No	No	No
Miturgidae	<i>Miturgopelma</i> "cf. <i>echinoides</i> "	prowling spider	No	No	No	No

Family	Species	Common name	Putative new species	Threatened (EPBC Act)	Threatened (WA)	Exotic/ pest
Nephilidae	<i>Trichonephila edulis</i>	golden orb weaver	No	No	No	No
Oxyopidae	<i>Oxyopes amoenus</i> ?	lynx spider	No	No	No	No
Pholcidae	<i>Pholcitrichocyclus nigropunctatus</i>	daddy long legs	No	No	No	No
Salticidae	<i>Clynotis severus</i> ? (juvenile)	jumping spider	No	No	No	No
Salticidae	<i>Holoplatys</i> sp. (juvenile female?)	jumping spider	No	No	No	No
Segestriidae	<i>Ariadna</i> "sp. 1 - rock tube"	tube spider	No	No	No	No
Segestriidae	<i>Ariadna</i> "sp. 2 - leaf turret"	tube spider	No	No	No	No
Sparassidae	<i>Neosparassus</i> "sp. 1 - tent burrow"	badge huntsman spider	No	No	No	No
Trachycosmidae	<i>Fissarena</i> ? sp. indet. (juvenile)	flat spider	No	No	No	No
Trochanteriidae	<i>Hemicloea</i> sp. indet. (juvenile)	flat spider	No	No	No	No
Zodariidae	genus indet. "sp. 2 - bark"	ant-eating spider	No	No	No	No
Zodariidae	genus indet. "sp. 4 - shiny, black and white"	ant-eating spider	No	No	No	No
Zodariidae	<i>Habronestes</i> sp. 1 "10 orange spots" australiensis grp	ant-eating spider	No	No	No	No
Zodariidae	<i>Habronestes</i> sp. 3 "orange 3 spot" australiensis grp	ant-eating spider	No	No	No	No
MYGALOMORPHAE						
Anamidae	<i>Aname simoneae</i>	wishbone spider	No	No	No	No
Anamidae	<i>Aname</i> sp. nov. "silky"	wishbone spider	Yes	No	No	No
Anamidae	<i>Aname</i> sp. nov. "MYG031 - chevrons"	wishbone spider	Yes	No	No	No
Anamidae	<i>Aname</i> sp. nov. "mellosa -complex"	wishbone spider	Yes	No	No	No
Anamidae	<i>Kwonkan</i> sp. nov. "chevrons"	collar-door spider	Yes	No	No	No
Barychelidae	<i>Synothele</i> sp. nov. "cf. MYG269"	brush-footed trapdoor spider	Yes	No	No	No
Idiopidae	<i>Eucyrtops</i> sp. indet.	spiny trapdoor spider	No	No	No	No
Idiopidae	<i>Gaius villosus</i>	giant spiny trapdoor spider	No	No	No	No
Idiopidae	<i>Idiosoma manstridgei</i>	spiny trapdoor spider	No	No	No	No
Theraphosidae	<i>Selenocosmia</i> sp. indet.	tarantula	No	No	No	No
PSEUDOSCORPIONES						
Chernetidae	<i>Conicochernes</i> sp. nov. "PSE024"	pseudoscorpion	Yes	No	No	No
Garypidae	<i>Synsphyronus</i> sp. nov. "PSE241"	pseudoscorpion	Yes	No	No	No
Olpiidae	<i>Beierolpium</i> sp. indet.	pseudoscorpion	No	No	No	No
Olpiidae	<i>Indolpium</i> sp. indet.	pseudoscorpion	No	No	No	No

Family	Species	Common name	Putative new species	Threatened (EPBC Act)	Threatened (WA)	Exotic/pest
Sternophoridae	<i>Afrosterphorus</i> sp. nov. "PSE242"	pseudoscorpion	Yes	No	No	No
CHILOPODA						
Scolopendridae	<i>Cormocephalus turneri</i>	centipede	No	No	No	No
Scolopendridae	<i>Scolopendra laeta</i>	centipede	No	No	No	No
Scolopendridae	<i>Scolopendra morsitans</i>	red-headed centipede	No	No	No	No
SCORPIONES						
Buthidae	<i>Isometroides</i> sp.	scorpion	No	No	No	No
Buthidae	<i>Lychas</i> "sp. 1"	marbled scorpion	No	No	No	No
Buthidae	<i>Lychas</i> "sp. 2"	marbled scorpion	No	No	No	No
Urodacidae	<i>Urodacus</i> sp.	burrowing scorpion	No	No	No	No