Friends of the Porongurup Range
CITIZEN SCIENCE REPORT

by Loxley Fedec

Meeting 12th July 2017

MILLIPEDES INFORMATION FROM JULIANNE WALDOCK

Julianne Waldock is a Technical Officer with the Dept of Terrestrial Zoology Western Australian Museum (Locked bag 49, Welshpool D.C., W.A. 6986). Phone 92123734. She has also been helping out along with Mark Harvey for spider ID's. Many thanks go to Julianne for her past ID's and for info on Millipedes as follows:

Millipedes of the Porongurups & Stirling Ranges (WA Native species highlighted)

SMOOTH-BODIED MILLIPEDES:

JULIDA: NOT NATIVE -Portuguese Millipede, *Ommatoiulus moreleti* (Julidae), shiny black to slate grey in colour, 2-4.5 cm long with a tiny 'tail' extending from the last segment.

Juveniles are paler in colour. These millipedes do not have large male gonopods but the females tend to be larger.

Distribution: These millipedes are native to the southern Iberian Peninsula of Europe but have been transported globally and occur in all states of Australia except Queensland and the Northern Territory. First recorded in W.A. (at Roleystone) in 1984, this invasive millipede has extended west onto the coastal plain, moved into native bushland around Perth and found its way into the southwest. There are records of this species from Stirling Range Retreat (2016) and a property at the southern end of the Porongurup (2014).

OTHER JULIDA: Small, pale or light brown millipedes, 1 cm or less. Depending on the species, they may have stripes dorsally or reddish spots on the sides. Specimens of several unidentifiable introduced Julida have been collected from 15 km SE. of Mt Lindsey and near Bridgetown, Northcliffe and Walpole (specialist orchards) as well as a species of *Cylindroiulus latestriatus* (Julidae) from a domestic garden at Lort River. Other families of Julida have also been turning up in specialist orchards such as *Nopoiulus kochii* (Blaniulidae) from near Manjimup; *Brachyiulus lusitanus* or *B. pusillus*? (Julidae) outside Pemberton. These species of Julida appear to be specific to the orchards and may not be able to disperse into the native habitat (although the Mt Lindsey collection was from a bushland habitat).

SPIROSTREPTIDA: These native millipedes are easily confused with the Portuguese millipede as some species are black to slate grey. These millipedes LACK the tiny tail on the last segment, this area is smoothly rounded. There are two genera commonly found in the southern regions of the south-west.

Atelomastix spp. (Iulomorphidae), very speciose genus along the south coast, range in length from 1 to 5 cm and, depending on the species, can have stripes across the body and other colour patterns. Rarely found outside bushland, easily located under rocks and in damp leaf litter.

Samichus (Iulomorphidae) (not yet recorded from the Porongurup but possible), generally smaller than *Atelomastix* but occur in similar habitats.

KEELED MILLIPEDES:

POLYDESMIDA:

Akamptogonus novarae (Paradoxosomatidae), brownish-orange in colour, about 2 cm long with distinctive yellowish flanges (keels) on each side of each body segment. Male gonopods evident as short yellow structures ventrally. These millipedes do not curl-up as tightly as the smooth-bodied species above.

Distribution: This species is a native Australian species that has been introduced to W.A. from eastern Australia, its exact origins are unclear but it is now found in urban and suburban areas in New South Wales, Tasmania and Victoria, and has been introduced to New Zealand, the Hawaiian Islands and San Francisco, California, USA. *Ak. novarae* has been observed in plaguing numbers around Margaret River over the past 10 years and appears to be extending north, south and east.

Oxidus gracilis (Paradoxosomatidae), commonly known as the Hothouse or Greenhouse Millipede, a small brown millipede (up to 2cm long) with pronounced orangey flanges (keels) on the sides of each segment. May have originated in Japan but now distributed throughout Europe, North and South America as well as sporadic records from metropolitan Perth and other locations including a record from a small bushland patch at Big Grove (near Albany).

Antichiropus species (Paradoxosomatidae) (not recorded from the Porongurup yet but possible). This genus is extremely speciose in Western Australia and is unique to southern Australia. Generally black or dark brown in colour, with reduced flanges (keels) that are the same colour as the body. Can range in size from less than 1 cm to up to 3 cm long. The most distinguishing feature for these millipedes is that the male gonopods are very large, elongate, yellow structures on the anterior of the ventral surface. Can be observed from the side as the millipede walks. Habitats include under rocks and in leaf litter. Usually only active for a short period after good drenching rains.

SPAEROTHERIDIIDA: At first glance, sphaerotheriidan 'pill millipedes' resemble the introduced 'pillbug' slater *Armadillidium vulgare*, which is an isopod crustacean. This order contains native species.

CHORDEUMATIDA: Small, inconspicuous millipedes living mainly in forest litter- contains native species

https://www.polydesmida.info/tasmanianmultipedes/milli-key.html

https://www.polydesmida.info/tasmanianmultipedes/milli-jul-key.html

ISOPODS CONTACT SIMON JUDD

Keith Bradby wrote to Maggie on the 26th June to pass on contact details for the ISOPOD specialist Simon Judd (smjudd@primus.com.au 0429 020 042) for our information. Simon did his PhD on Isopods (slaters) biogeography about 15 years ago, and has been the main taxonomic go to person since. Based at Edith Cowan, he does a lot of wetland work as well with Pierre Horwitz. Keith Bradby heard him deliver a great talk on the evolutionary history of south western Australia, using the interaction between 'wet and dry' isopod species as his example. Simon apparently has a habit of turning up some weird and wonderful Isopods during his field trips (Keith attached sample photo to Maggie & also has some real spikey Gondwanan relictual ones – I did not recieve). Simon was the original Gondwana Link science guru, funded through the Wilderness Society's then Wild Country program. Keith says that Simon comes down occasionally and works from the office on various things, so could be easy to grab for a few extra days. I have written to Simon to find out more.

CLARIFYING FROG ID WITH PROFESSOR DALE ROBERTS

When asking Dale to ID the frog on the left he says Heleioporous psammophilus is most likely.

I also asked him to ID the frog on the right that I thought might be a juvenile Heleioporous albopunctatus. He thought more likely a juvenile Heleioporous eyrie.
Both frogs found at Nunarrup Lagoon.

Dale sent me a 73 page document – Tony Lee's paper - discussing the patterns of speciation of the closely related Heleioporous psammophilus, Heleioporous eyrie & Heleioporous albopunctatus. Interpopulation in-vitro crosses supports the recognition of these 3 species as a closely related species group called the Eyrean group. The breeding biology of all these species appears closely tied to our Mediterranean climate. This explains to some degree why the confusion with identification of the Eyrean group of Heleioporous. This information will also be very useful for recognizing this group as indicator species.

If anyone would like a copy of the document please let me know; otherwise I will keep it on file. Thankyou as always to Dr Roberts for his very useful information.

In the drawings below Tony Lee discusses the differences of these species in detail eg; Nostril distance from eyes in relation to distance from snout, and the size of the Tympanum in relation to the length of the eye are diagnostic for ID.

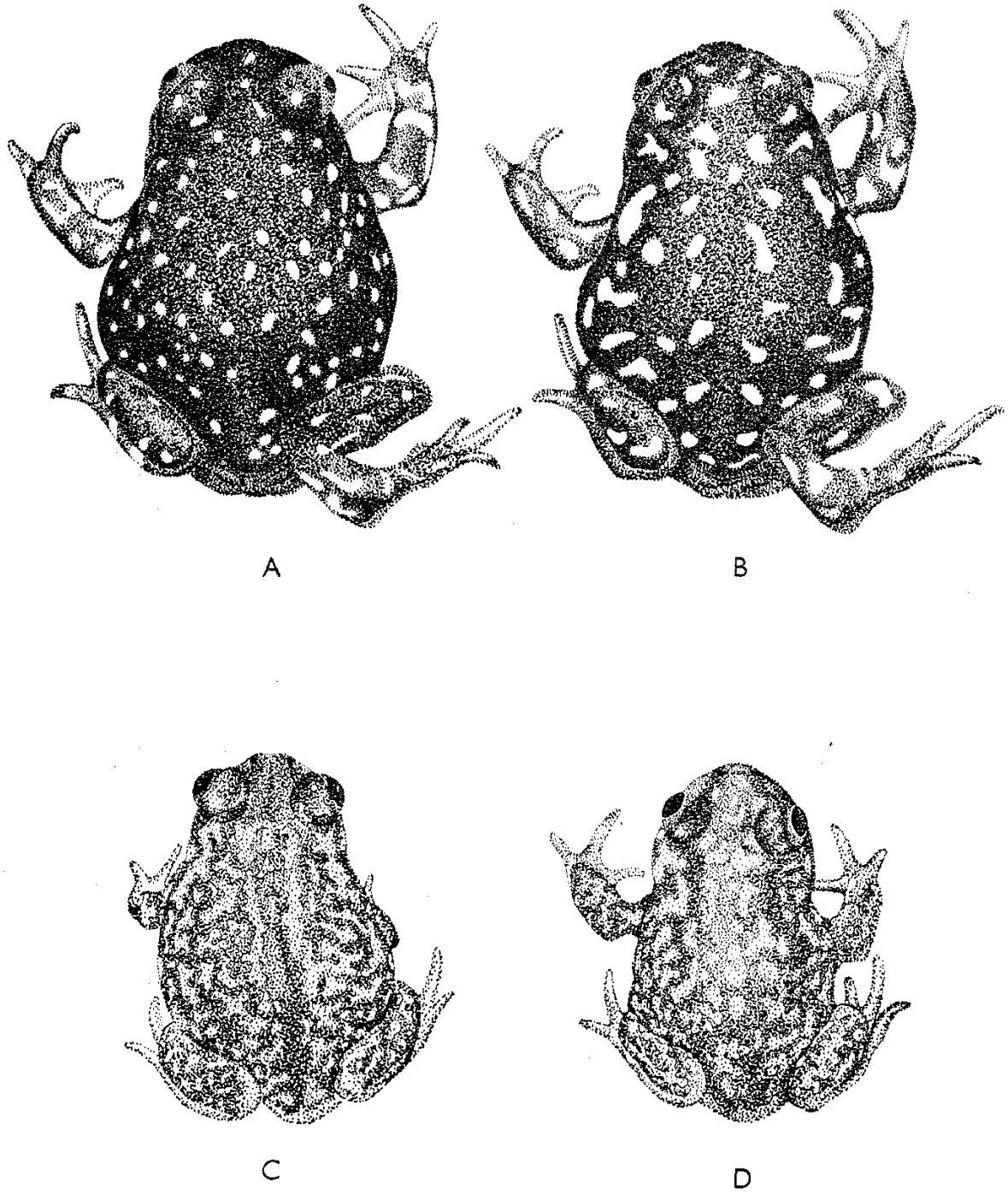

Fig. 1.—Dorsal patterns of *Heleioporus* spp. *A* and *B*, *H. albopunctatus*; *C*, *H. eyrei*; *D*, *H. psammophilus*.

During our spider walk we also came across 2 frogs for which I have sought ID from Dale Roberts. The frog on the left is about 20mm & is confirmed as Geocrinia leai – probably female.

The frog on the right, with an estimated length of 25-30mm and a smooth body is also likely to be Geocrinia leai but without a pic of its ventral side we can't be certain. The undersurface of G. leai is smooth with an overall faint green (see above pic), a colour not exhibited by any other Geocrinia nor Crinia. This specimen is quite large for a male of this species and quite different to the frog shown above.

GONDWANAN RELICTUAL MOIST REFUGIA INDICATOR SPECIES ACRONYM

I have come up with an acronym for this - GRiMRI'S – reflecting on their outlook as possibly GRIM. Not too bright I know but better than saying Gondwanan Relictual Moist Refugia Indicator Species!

REGULATION 17 LICENCE

An application for a Regulation 17 licence was made to DPaW and granted for a year to June 2018 on the basis of hand foraging and chance encounter only. For the purposes of this part of our project where the GRiMRI'S concerned are sensitive, I decided we can manage without pit traps at this time. We still have the option of amending the licence at a later date when surveying less sensitive species should pit trapping be appropriate.

NOCTURNAL SPIDER WALK WITH DR MARK HARVEY

The Nocturnal Spider Walk was very successful with 24 participating including 4 young children & 3 teenagers: Dr Mark Harvey, Loxley Fedec, Lisa Braun, Judy McKinnon, Lucia Quearry, Garry Mulder, Bill Shanklin, Jeff Stolze, Kingsley & Kathleen Faulkner, Judy Clarke, Peter Morrison, Karen Bleach, Evan Rogers, Wendy Meill, Alexis Meill (6yrs), Solomon Eckermann (6yrs), Makiko Shagino & her 2 young daughters (11 & 6), Geraldine Boetel, Millicent Boetel, Haydn Boetel & Ben Battley (the last 3 were 'the teenagers'). Mark was fantastic at putting the young ones in pole position and engaged beautifully with them. He also managed extremely well for a relatively large group in that environment. The weather was kind: about 9 – 11 degrees, virtually no wind and the rain mostly held off. Waddy's Hut coped well with the numbers and made for a great meeting place.

RIGHT: Judy McKinnon, Loxley Fedec & Kingsley Faulkner peering down the Proschermacha holes

Dr Mark Harvey with Lisa Braun assisting his attentive students to see the Pisauridae spider

Our sincere thanks to Dr Mark Harvey for coming down to consult for us.

MYGALOMORPHS http://www.arachne.org.au/01_cms/details.asp?ID=2343

In Australia 13% (>240) of all spiders belong to the Mygalomorphae (Primitive Spiders) & their ancestral lineage goes back over 360 million years. The first Mygalomorph spiders encountered on our Nocturnal Spider Walk were a number of Proshermacha's (nicknamed Schmakos). Proshermacha belong to the Nemesiidae Family but very little taxonomic work has been done on this group to date. We could see the open-holed trapdoor spiders in their burrows but didn't see any spiders in the open (didn't expect to). Most importantly for our project this spider is not only a GRiMRI'S but also an as yet un-described SRE species.

Proshermacha sp. From Waddy's Hut area. Photo Credit WA Museum.

There are three genera of large Nemesiidae found around the Porongurup: *Aname*, *Proshermacha* and *Stanwellia*. The Nemesiidae are a family of trapdoor spiders characterised by a double row of teeth (or spines) on the paired leg claws. The genus *Aname* (Wishbone spiders) is very widespread, occurring throughout Australia. This genus is very diverse with many undescribed species. *Proshermacha* (Smackos) is more restricted, ranging from south-western W.A., across the south coastal regions into Victoria. There are at least 20 species in the south-west based on recent genetic work. *Stanwellia* is restricted to the high rainfall areas in the south-west of W.A. with only a few species known from this region. This genus is widespread in the east and more diverse. The large black nemesiids of the genus *Aname* are commonly known as 'wish-bone spiders' as the burrow usually has two entrances which join underground (giving a wish-bone shape to the burrow), one door is an escape hatch and not readily visible, the main door is a loose flap with leaves and debris incorporated so that when it is folded down (closed), it is very difficult to see. These spiders do not build a "door" as such, unlike many other mygalomorph spiders. The highest diversity of Wishbone spiders is in Western Australia where the spiders have had tens of millions of years to adapt. As with most mygalomorphs, these spiders can appear to be aggressive when found in the open, most of this behaviour is a bluff and bites from these spiders are extremely rare. There are no records of serious reactions to bites from these spiders in Western Australia. (Thanks to Julianne Waldock for providing this information). It's interesting to note that most Mygalomorphs that build burrows with lids are found in drier areas whereas those without lids are often in moist forests. Since Mygalomorph spiders are very prone to desiccation – partly due to the fact that they have booklungs - those burrows with lids are much better able to cope with dry climates. A valuable consideration for our GRiMRI'S Project making Proshermacha a useful Indicator Genus. Mygalomorph spiders also moult every year even as adults making them more prone to desiccation as well. Another very interesting fact is that spiders generally – unlike insects – can slow down their metabolism to survive dry or tough times. They also only breed biannually – possibly due to their slow maturing or to a short climatic season. Research on our Mygs breeding cycle could be very enlightening.
A very interesting paper on biennial spider breeding as a survival strategy can be seen at:
http://www.academia.edu/30217485/A_Test_for_Reproductive_Separation_of_Alternate_Generations_in_a_Biennial_Spider_Araneus_Diadematus_Araneae_Araneidae
More information on Wishbone spiders can be found at:
http://www.sciencentre.qm.qld.gov.au/Find+out+about/Animals+of+Queensland/Spiders/Primitive+Spiders+Infraorder+Mygalomorphae/Wishbone+Spiders#.WWLC0umx9PY
A very interesting article by Barbara York Main in regards to Mygalomorphs and fire in the Stirlings https://library.dpaw.wa.gov.au/static/FullTextFiles/016535.pdf

Dr Mark Harvey was very keen to obtain a male specimen of another very special Mygalomorph spider – Bertmanius tumidus. This 2cm spider is also a short range endemic species and the Porongurup is home to the only population that does not have a representative male specimen in the WA Museum collection. Unfortunatly we didn't find any. This Trapdoor spider is from the Migidae family and has a classical Gondwanan distribution. This species is a classic pre-jurassic GRiMRI'S example. Previously included in the Moggridgea family Dr Mark Harvey's great taxonomy work has now placed it in its own new genus – Bertmanius after Bert Main.
http://www.bioone.org/doi/abs/10.1071/IS15024

Archived picture of the threatened species Bertmanius tumidus or 'Bertie'. The major threatening processes are inappropriate fire regimes and climate change.

Another SRE GRiMRI'S is the Cataxia bolganupensis (aka Neohomogona bolganupensis) which was not seen during the Nocturnal Spider Walk but its burrows have been seen nearby. This species was discussed in last month's report.

There is no doubt a number other as yet undescribed and unnamed species of SRE Mygalomorph spiders (and GRiMRI'S) in the Porongurup but we will have to wait for more research before we can add them to our list for the purposes of the grant project.

ARANOMORPHS:
Several non-Mygalomorph spiders were seen during the Nocturnal Spider Walk shown below.

A small male Sac Spider of the Clubionidae family. The most obvious feature distinguishing most of them from other spider families is the forward-pointing appearance of their large and usually dark chelicerae or jaws. They have 8 equally-sized eyes in two rows, the back row often wider, the front row straight or down-curved.

A tiny Cobweb or Tangle-web Spider is from the very large Theridiidae family

A juvenile Pisauridae well camouflaged and still on this tree trunk

At a casual glance the female Cupboard Spider could easily be mistaken for a Redback Spider, without that distinctive red stripe on the back. Both spiders are from the same family, Theridiidae (also known as comb-footed spiders), so they are closely related. However, the Cupboard Spider is not considered as dangerous as its Redback relative.

Like the majority of members in the Theridiid family, *Steatoda* species have shiny, slender legs, with a small cephalothorax and a larger abdomen, which is somewhat egg-shaped in *Steatoda*. The colour can range from a brown or reddish plum to satiny black. The abdomen often has white or beige spots, a frontal crescent, and sometimes, small red spots or a thin red line (but never a stripe like a Redback Spider). The female can live for about two years, whereas the male will only live for a few months.

Bites from *Steatoda* species occur infrequently. In the past they have not been considered particularly dangerous to humans, however in a few recent cases of *Steatoda* bites where the spider has been identified, more serious symptoms have been recorded. In two cases, Redback antivenom has been used successfully to treat these symptoms. Minor skin lesions have been occasionally associated with the bite.

The non-native female cupboard spider was not seen in the park on the night but was taken along as a specimen to ID. It was found at Bolganup Farm.

OTHER NON-SPIDER SPECIES SEEN

THE FOREST OR WOOD SCORPION

The scorpion Cercophonius is presently the only recognised Genera in Australia from the Bothriuridae family, with 6 species described (only 2-3 of which are found here), all looking very similar. It has close relatives in South America, and is thought to have entered Australia from the southern Gondwanan element. This scorpion certainly stands out from the crowd, with a very shiny exoskeleton and rather fat tail. Usually a dark reddish/brown in colour with reticulated patterning. It is often found amongst native pines or gum trees where it lives amongst rotting ground debris and will often inhabit old tree stumps where termites are abundant. A relatively small scorpion, although more robust than the Buthids, it attains lengths of around 40mm. Cercophonius species have been eliminated from areas cleared for farming. Persistence will be determined by chronic effects such as wind & water erosion – caused largely by grazing livestock.

NATIVE FLAT COCKROACH
is often referred to as a 'Trilobite Roach'

The Flat Cockroach is a native species that spends most of its time under bark or under logs.
Apart from its unusual shape, the Flat Cockroach is notable for its communal behaviour.
It is found throughout Australia and lives in Forest, Woodlands and Heath.

Quite a number of slugs were seen. WA does not have any native species of slugs so all of them were non-native species

Land Hoppers are from the genus Talitridae and are in fact Terrestrial Crustaceans or Amphipoda. They live in the organic debris of the forest and are an important part of the so called Cryptozoa Fauna.

Atelomastix Millipede – see details on this species at the beginning of this report.