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# The water mites of Western Australia (Acari: Hydrachnidia), with the description of 13 new species

Harry Smit<sup>a</sup>

<sup>a</sup>Naturalis Biodiversity Center, P.O. Box 9517, 2300 RA Leiden, the Netherlands.

## Original research

### ABSTRACT

The following 13 new species are described from Western Australia: *Tartarothyas curtipalpis* n. sp., *T. beedehup* n. sp., *T. setosa* n. sp. (Hydryphantidae), *Oxus siniscutatus* n. sp. (Oxidae), *Procorticacarus beedehup* n. sp., *Procorticacarus minutus* n. sp. (Hygrobatidae), *Koenikea (Notomideopsis) longiseta* n. sp., *Unionicola neowalkeri* n. sp. (Unionicolidae), *Piona kimberleyensis* n. sp. (Pionidae), *Austraturus simplex* n. sp., *Axonopsella porphyria* n. sp., (Aturidae), *Arrenurus (Truncaturus) pinderi* n. sp. (Arrenuridae) and *Momoniella rubripes* n. sp. (Momoniidae). A key is provided for the Australian *Tartarothyas* species. Many new records are given for Western Australia, resulting in 16 species new to the fauna of the state (apart from the new species described).

**Keywords** systematics; new species; new records

**Zoobank** <http://zoobank.org/3FB48596-91AB-4072-B471-874D4D220348>

## Introduction

Western Australia is the largest state of Australia, covering nearly a third of the land area of the continent. The climate of the north and south of the state are very different. The north is tropical, with summer monsoonal rains. Rainfall is the highest in the extreme north and the extreme southwest, with a precipitation of more than 1,400 mm. Precipitation decreases inland, with less than 200 mm, or even less than 150 mm precipitation. The south has a Mediterranean climate, with dry summers and wet winters and about 900 mm rainfall annually.

The knowledge of the water mite fauna of this state is still limited. Thus far, 127 species have been reported from Western Australia, while 574 species are known from Australia. Most of the species from Western Australia have been reported from the north of the state, from the SW-corner relatively few species are known. Harvey (1996a) studied the pionids of Australia, including those of Western Australia. Other papers (partly) dealing with water mites from the Western Australia are Halík (1940), K.O. Viets (1980), Harvey (1987, 1990a, b, 1996b, 1998b) and Smit (1997, 2002, 2009, 2015, 2016, 2021).

## Material and methods

The material described in this paper has been collected in Western Australia in August 1994, September-October 1998, March-April 2008 and January-February 2019. The material was collected with a dip net, sorted in the field and fixed in so-called Koenike solution (5 parts glycerine, 2 parts glacial acetic and 3 parts water). All material from this study is collected by the author, unless stated otherwise. The genus *Limnesia* Koch, 1836 will be treated in a separate paper. During my collecting trip in 2019 many streams in the SW-corner were dry, hampering the results. Holotypes and paratypes will be lodged in the Western Australian Museum in Perth

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Corresponding author  
Harry Smit: [harry.smit@naturalis.nl](mailto:harry.smit@naturalis.nl)

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(WAM), paratypes and all non-type material in Naturalis Biodiversity Center, Leiden (RMNH). The following abbreviations are used: asl = above sea level; Cx-IV – fourth coxae; Cxgl-4 – coxoglandularia 4; Dgl-1-6 – dorsoglandularia 1-6; NP – National Park; P1-5 – palp segments 1-5; IV-leg-2 – second segment of fourth leg, W.A. – Western Australia. All measurements are in  $\mu\text{m}$ , measurements of palp and leg segments are of the dorsal margins, measurements of paratypes are given in parentheses. Ventral length is measured from the tip of Cx-I till posterior idiosoma margin. Numbers are given as male/female/deutonymph or adult/deutonymph. All coordinates are taken with a GPS. Coordinates given as degrees, minutes and seconds are taken from Google Earth and are by approximation. No water mites are known from the Australian Capital Territory. So, when in the distribution is referred to all states and territories, it is without the Australian Capital Territory. Data on the world distribution are taken from Smit (2020).

## Taxonomy

### Family Limnocharidae Grube

#### Subfamily Limnocharinae Grube

#### Genus *Limnochares* Latreille, 1796

#### *Limnochares (Cyclothrix) australica* Lundblad, 1941

**New records** — 17/4/8, pool downstream of Manning Gorge, at campground, the Kimberley, 12 Sept. 1998; 1/4/0, Plunge pool Emma Gorge, the Kimberley, 16 Sept. 1998; 0/0/5, Lily Creek Lagoon, 15°46' S 128°44' E, 17 Sept. 1998; 0/1/0, Taylor's Lagoon, E of Broome, 17°46'43.15" S 122°53'18.26" E, 14 Oct. 1998; 0/1/0, Lake Campion, 17°50'50.37" S 122°44'29.84" E, 14 Oct. 1998.

**Distribution** — Smit (1996b) provisionally assigned specimens from New Zealand to this species, but a definitive assignment can only be made when the larvae are known. Within Australia, previously reported from Tasmania, Victoria, New South Wales and Western Australia (Harvey 1990b).

### Family Hydryphantidae Piersig

#### Subfamily Pseudohydryphantinae K. Viets

#### Genus *Pseudohydryphantes* K. Viets, 1907

A widespread genus, known from the Holarctic, New Zealand and Australia. From Australia 13 species are known, two of these have been reported from Western Australia (Harvey 1987, 1988; Smit 1998b).

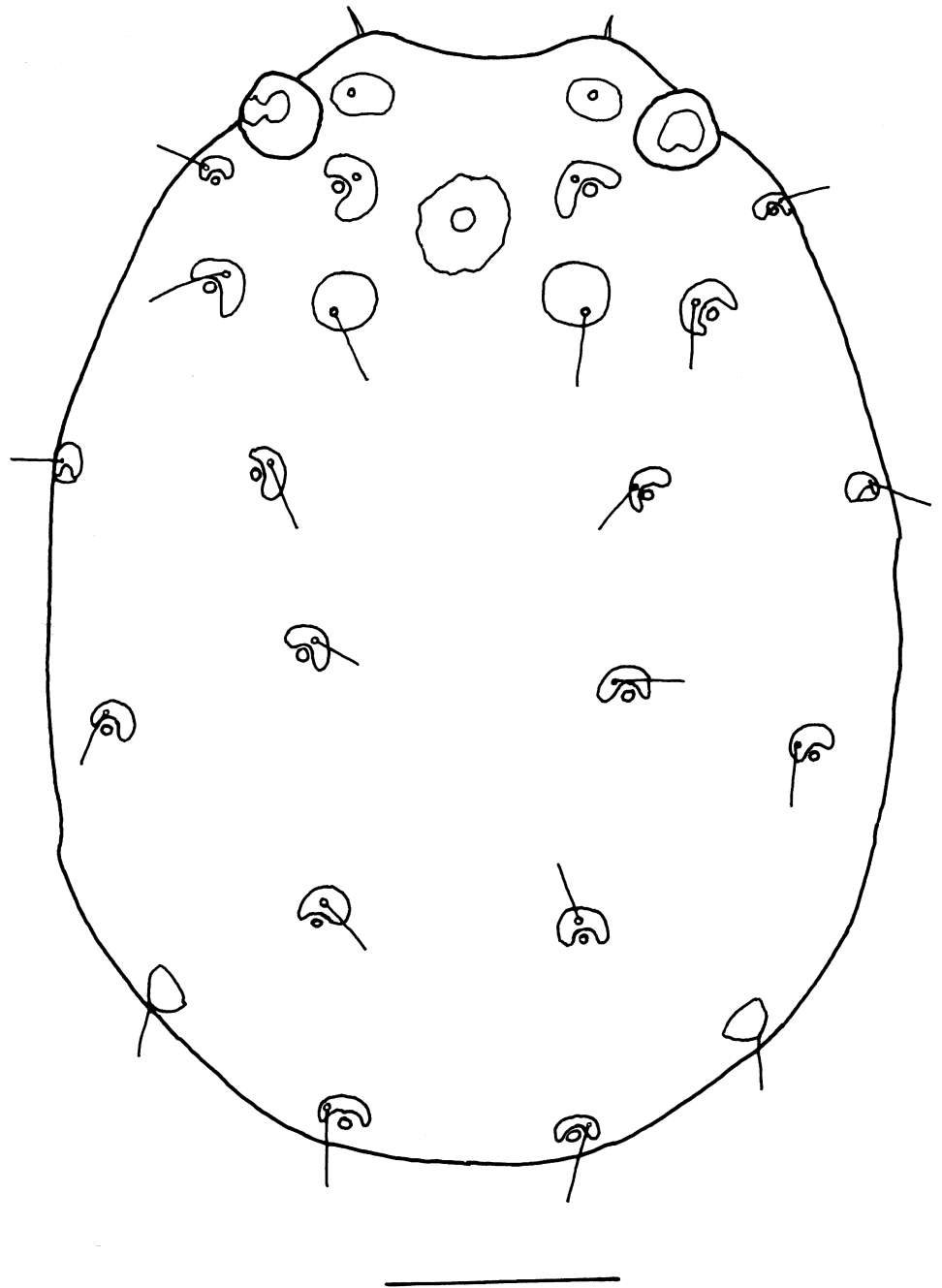
#### *Pseudohydryphantes aroona* Harvey, 1988

(Figure 1)

**New record** — 0/1/0, Python Pool. Millstream-Chichester NP, 21°20.031' S 117°14.310' E, 180 m asl, 30 Jan. 2019.

**Remarks** — Thus far, only the male was known. The female is in all characters similar to the male (Figure 1), therefore only some measurements are given. Idiosoma dorsally 945 long and 714 wide, ventrally 931 long. Genital field 211 long. Length of P1-5: 52, 98, 58, 150 (including dorsodistal extension), 40.

**Distribution** — Thus far, known only from the type locality in the Northern Territory, and reported here for the first time from Western Australia.



**Figure 1** *Pseudohydryphantes aroona* Harvey, female dorsum. Scale bar = 200  $\mu$ m.

***Pseudohydryphantes mataranka* Harvey, 1988**

**New records** — 0/1/0, Bell Creek at crossing with Gibb River Road, 17°9'1.11" S 125°28'9.73" E, 10 Sept. 1998; 0/2/0, plunge pool Adcock Gorge, The Kimberley, 12 Sept. 1998; 1/2/0, Spillway Creek, near Lake Argyle, 20 Sept. 1998; 3/0/0, pool W of Tunnel Creek, Tunnel Creek NP, 30 Sept. 1998.

**Distribution** — Previously known from the Northern Territory and Western Australia.

***Pseudohdryphantes wangai* Harvey, 1988**

**New records** — 0/6/0, plunge pool Adcock Gorge, The Kimberley, 12 Sept. 1998; 1/0/0, pool Manning Gorge Falls, The Kimberley, 13 Sept. 1998; 2/6/0, Middle Springs, W of Kununurra, 15°38'1.38" S 128°40'10.67" E, 18 Sept. 1998; 6/3/0, plunge Pool Cathedral Gorge, Purnululu NP, 17°28'49.60" S 128°22'22.47" E, 24 Sept. 1998.

**Distribution** — Previously known from the Northern Territory and Western Australia.

**Subfamily Tartarothyadinae K. Viets****Genus *Tartarothyas* K. Viets, 1934**

A genus with a disjunct distribution, with several species known from the Nearctic and Palearctic and one from eastern Australia (Harvey 1987).

***Tartarothyas beedelup* n. sp.**

Zoobank: [D2921B33-2414-4342-88F6-845839435ED8](https://doi.org/10.24349/2ew3-Djkg)

(Figures 2A-D)

**Material examined** — Holotype female, Beedelup Brook south, Western Australia, Australia, 34°26" S 115°47' E, Jul. 1993, leg. K. Trayner (slide T147381, WAM). Paratype: one female, Collier Creek northern tributary, on Cemetery Rd., site 20, Walpole-Normalup NP, Western Australia, Australia, 34°58'30" S 116°45'12" E, 11 Sept. 1996, leg. A. Pinder (T147379, WAM).

**Diagnosis** — Acetabula elongated, Cx-IV small, first leg segments stocky.

**Description** — The holotype is fixed in ethanol, and therefore some structures, like the dorsal glandularia and the integument are difficult or none at all to see. Idiosoma dorsally 948 (608) long and 535 (478) wide, ventrally 931 (616) long. Postocularia anterior to dgl-3 (?). Cx-IV small, without a medial margin (Figure 2A). Genital field 190 (118) long, the three pairs of acetabula elongated, especially anterior pair. Genital flaps with a few short setae. Length of P1-5 (measurements of second palp in brackets): - (34), 63, 46, 84, - (54). P2 medially with two setae near ventral margin and a large, pectinate seta near dorsal margin (Figure 2B). Length of I-leg-4-6: 92, 100, 102; I-leg-6 dorsally with a group of setae (Figure 2C). Length of IV-leg-4-6: 136, 140, 112 (Figure 2D). Legs without swimming setae.

Male: Unknown.

**Etymology** — Named after the type locality, the Beedelup Brook. The name is a noun in apposition.

**Remarks** — The new species differs from *T. boultoni* Harvey, 1987 in more slender acetabula, a smaller Cx-IV and a less slender P4, I-leg-6 and IV-leg-6 (e.g., compare Figure 6 of Harvey (1987) with Figure 2C). *Tartarothyas curtialpis* n. sp. has a much stockier palp, especially P4. One of the paratype females from Collier Creek is much smaller than the holotype, but I don't see any morphological differences.

***Tartarothyas curtialpis* n. sp.**

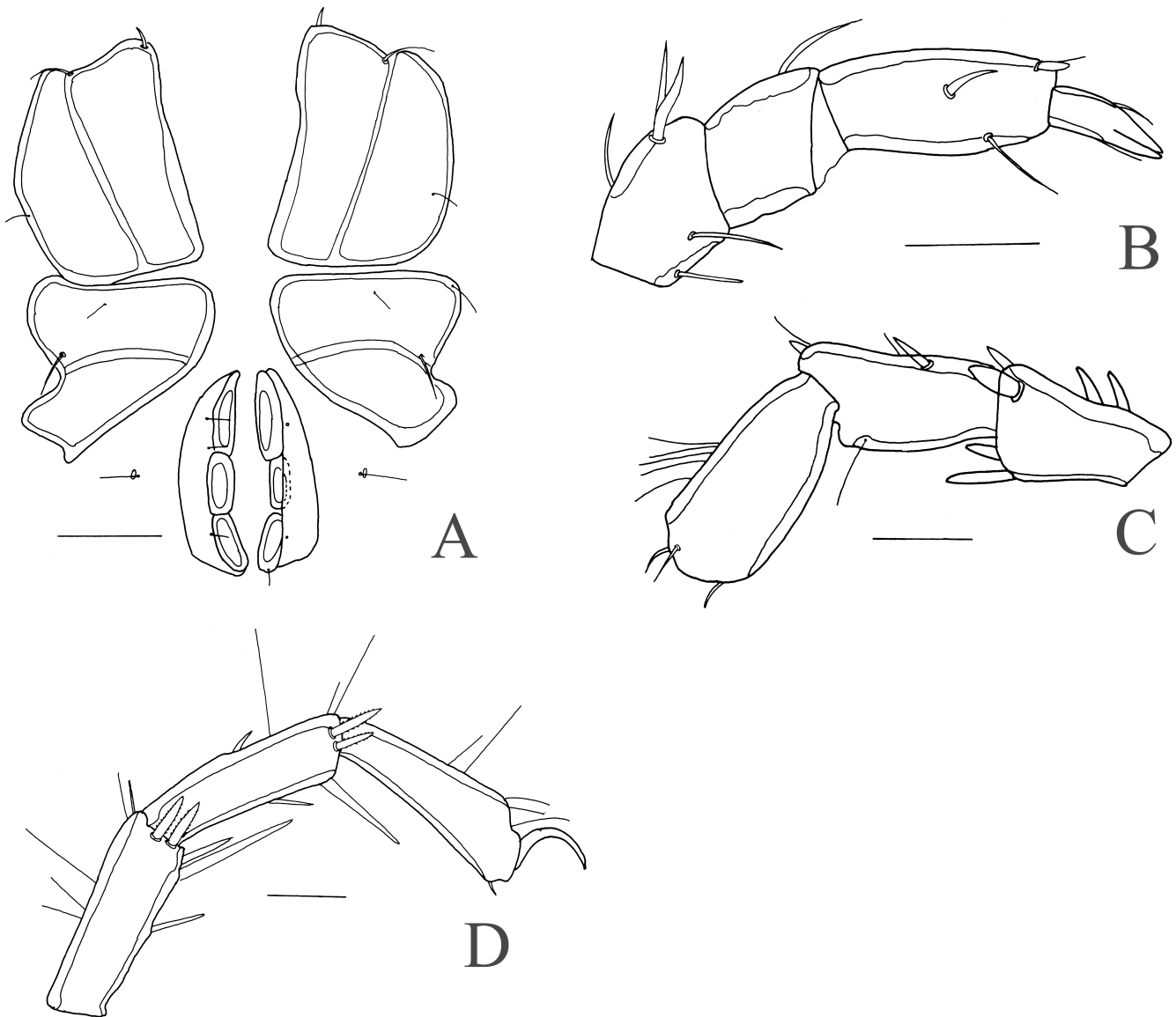
Zoobank: [38853F74-22D5-4D73-941F-7AE6C30FD03A](https://doi.org/10.24349/2ew3-Djkg)

(Figures 3A-D)

**Material examined** — Holotype female, Carey Brook near Pemberton, Western Australia, Australia, 34°26' S 115°47' E, 18 Sept. 1989, leg. I. Grows (slide T147382, WAM).

**Diagnosis** — P2 and P4 and leg segments very stocky.

**Description** — Female: Due to mounting, idiosoma length and width cannot be measured anymore. Dorsum not well visible in the slide. Coxae in four groups, Cx-III and Cx-IV relatively short (Figure 3A). Genital field 156 long, with three pairs of elongate acetabula. Length of P1-5: 24, 54, 30, 62, 39. P2 and P4 very stocky (Figure 3B). Length of I-leg-4-6: 64, 74, 89 (till tip of segment); I-leg-6 dorsally with a group of setae. First leg segments stocky



**Figure 2** *Tartarothyas beedelup* n. sp., holotype female. A – venter; B – palp; C – I-leg-4-6; D – IV-leg-4-6. Scale bars: A = 100  $\mu$ m, B-D = 50  $\mu$ m.

(Figure 3C). Length of IV-leg-4-6: 104, 107, 88. Fourth leg segments relatively short (Figure 3D). Legs without swimming setae.

Male: Unknown.

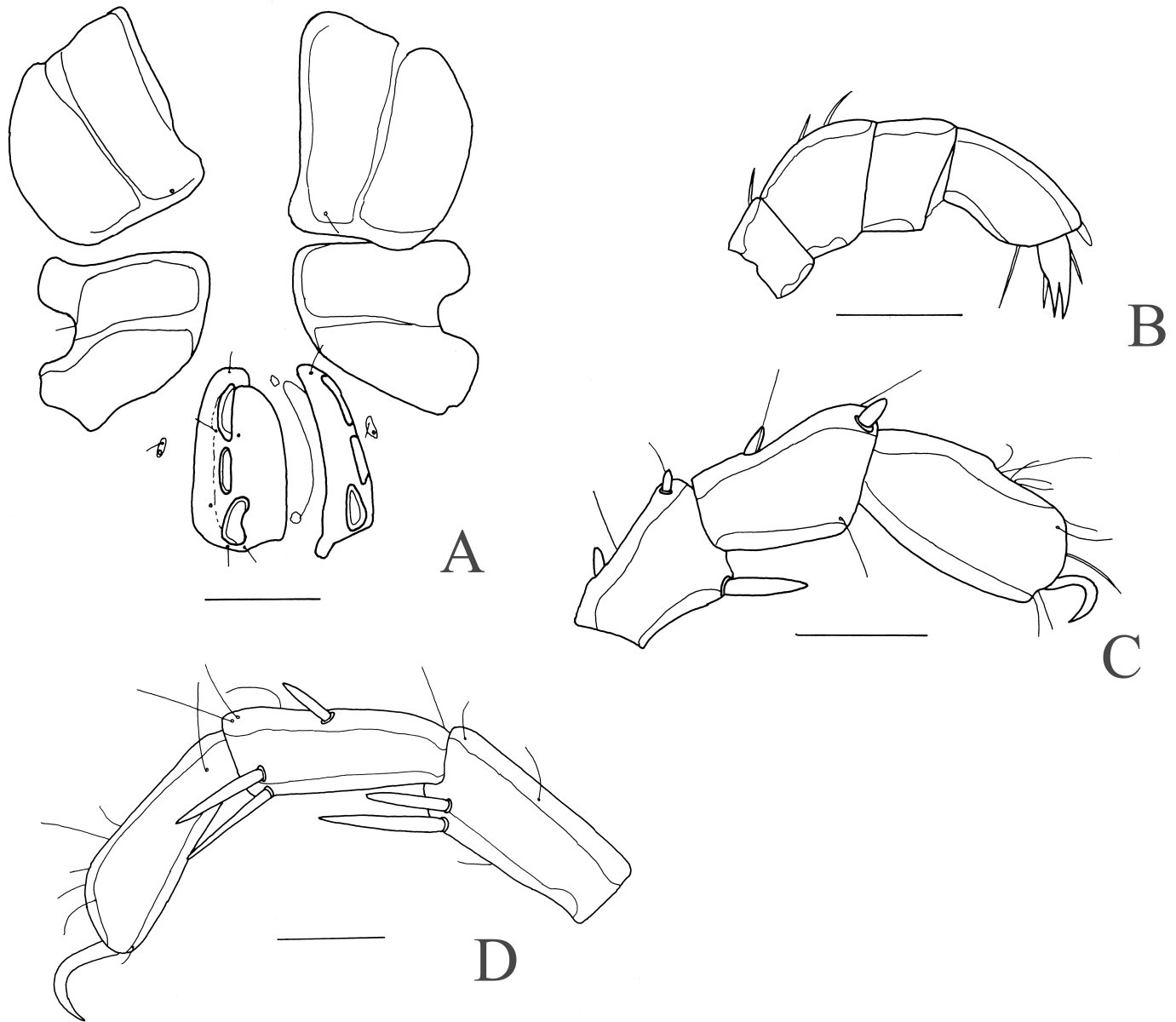
**Etymology** — Named for its stocky palp.

**Remarks** — The new species differs from all other Australian species in the very stocky palp and leg segments. Unfortunately, as the dorsum is not separated from the venter in the slide, the configuration of the dorsal glandularia cannot be examined anymore.

***Tartarothyas setosa* n. sp.**

Zoobank: [BF13B3A0-6F5F-4543-A3DD-4B902D5D12D3](https://doi.org/10.24349/2ew3-Djkg)

(Figures 4A-D)



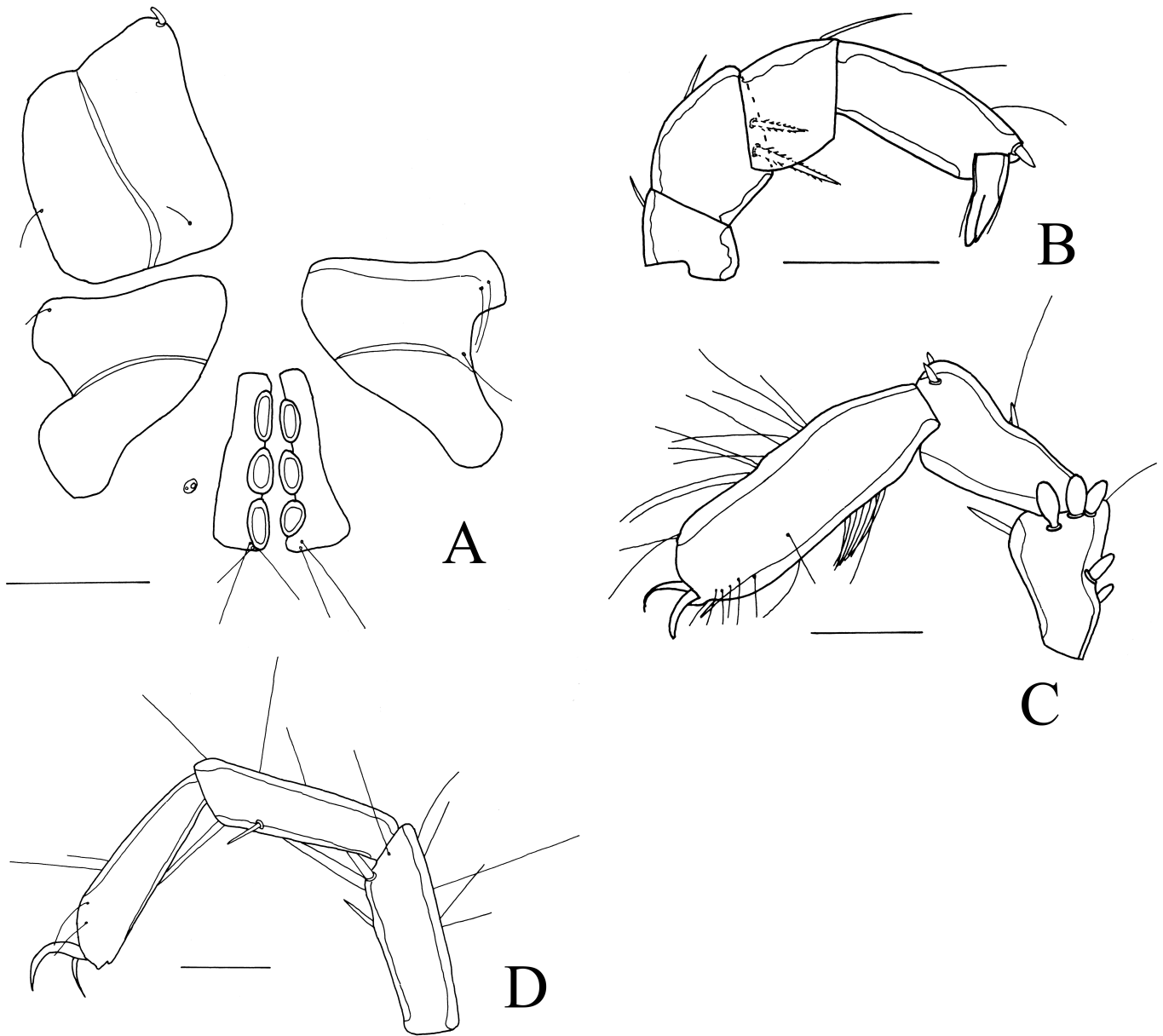
**Figure 3** *Tartarothyas curtispalis* n. sp., holotype female. A – venter; B – palp; C – I-leg-4-6; D – IV-leg-4-6. Scale bars: A = 100  $\mu$ m, B-D = 50  $\mu$ m.

**Material examined** — Holotype female, Three Springs Tumulus, ca. 31 km WSW of Three Springs, site TST 013, Western Australia, Australia, 29°35'19" S 115°26'43" E, 29 Sept. 2010, leg. A. Pinder (mounted, T140382 WAM).

Other material (all in a poor condition). 3/0, Three Springs Tumulus, ca. 31 km WSW of Three Springs, site TST 013, Western Australia, Australia, 29°35'19" S 115°26'43" E, 29 Sept. 2010, leg. A. Pinder (T140381, T140383, T140384, WAM); 1/0, Three Springs Tumulus, ca. 31 km WSW of Three Springs, site TST 013, interstitial, Western Australia, Australia, 29°35'19" S 115°26'43" E, 30 Sept. 2010, leg. A. Pinder (T140380, WAM).

**Diagnosis** — I- and II-leg-6 with numerous relatively long dorsal setae, ventrally with a group of long setae.

**Description** — Female: Idiosoma 624 long and 413 wide, ventrally 680 long. Due to



**Figure 4** *Tartarothyas setosa* n. sp., holotype female. A – venter (Cx-I+II detached); B – palp; C – I-leg-4-6; D – IV-leg-4-6. Scale bars: A = 100  $\mu$ m, B-D = 50  $\mu$ m.

fixation in ethanol, mounting was difficult, and not all details can be seen. Cx-III laterally with three long setae, Cx-IV without medial margin (Figure 4A). Genital field with three pairs of acetabula, genital flab 124 long. Near posterior margin of genital flab 204 relatively long setae. Length of P1-5: 26, 50, 37, 74, 36 (Figure 4B). P2 medially with two pinnate setae. Length of I-leg-4-6: 76, 95, 136. I-leg-6 (and also II-leg-6) dorsally with relatively long setae in anterior half, ventrally with a group of long setae; I-leg-4 with three stout setae near anterior margin (Figure 4C). Length of IV-leg-4-6: 118, 118, 94. Fourth leg segments relatively slender (Figure 4D)

Male: Unknown.

**Etymology** — Named for the setose first and second legs.

**Remarks** — Due to fixation in ethanol, not all structures are visible, e.g. the dorsal and most ventral glandularia. An attempt to collect additional material on the type locality was unsuccessful. The most characteristic feature, however, are the first and second legs, and these are well visible in the slide. The characteristic setation of the legs makes the new species well separable from all other *Tartarothyas* species.

## Key to the Australian *Tartarothyas* species

1. I- and II-leg-6 ventral margin with a tuft of long setae . . . . . *Tartarothyas setosa* **n. sp.**  
— I- and II-leg-6 ventral margin without a tuft of long setae . . . . . 2
2. Palp very stocky, specially P4 . . . . . *Tartarothyas curtipalpis* **n. sp.**  
— Palp less stocky . . . . . 3
3. I-leg-6 slender, third pair of acetabula semi-circular . . . . . *Tartarothyas boultoni*  
— I-leg-6 stocky, all acetabula elongated . . . . . *Tartarothyas beedelup* **n. sp.**

## Family Anisitsiellidae Koenike

### Subfamily Anisitsiellinae Koenike

#### Genus *Sigthoria* Koenike, 1907

A small genus, with two species known, one widespread, known from Africa, Asia and Australia, the other known from Vietnam. According to Harvey (1990c) the specimens of Africa, Asia and the Northern Territory are conspecific with *S. nilotica*, but the specimens from Queensland and Victoria differ in the setation of leg IV.

#### *Sigthoria nilotica* (Nordenskiöld, 1905)

**New records** — 0/1/0, plunge pool Adcock Gorge, the Kimberley, 12 Sept. 1998; 1/1/0, pool near Adcock Gorge, the Kimberley, 12 Sept. 1998.

**Distribution** — A widespread species. Within Australia known from the Northern Territory, Queensland and Victoria (Harvey 1990c), and reported here for the first time from Western Australia.

## Family Limnesiidae Thor

### Subfamily Limnesiinae Thor

#### Genus *Physolimnesia* Halík, 1940

A small genus with two species known from Australia.

#### *Physolimnesia katherine* Smit, 1998

**New record** — 1/4/0, pool Silent Grove Spring, the Kimberley, 11 Sept. 1998.

**Distribution** — Previously known from the type locality in the Northern Territory only, and reported here for the first time from Western Australia.

## Family Oxidae K. Viets

#### Genus *Oxus* Kramer, 1877

A genus occurring worldwide with numerous species known. From Australia ten species are known, no species have been reported from Western Australia.

## ***Oxus (Oxus) australicus* Lundblad, 1947**

**New records** — 1/0, Glenoran Pool, W of Glenoran, 34°12.979' S 115°56.436' E, 160 m asl, 8 Feb. 2019; 2/1, Harvey River at crossing with Kevron Road, Lane Pool Reserve, 33°00.997' S 116°05.585' E, 246 m asl, 13 Feb. 2019.

**Distribution** — Known previously from Victoria, and reported here for the first time from Western Australia.

## ***Oxus (Flabellifrontipoda) carteza* (Cook, 1986)**

**New record** — 0/6/0, St John Brook upstream of Barrabup Pool, St John Brook Conservation Park, 33°56.626' S 115°41.462' E, 53 m asl, 8 Feb. 2019.

**Distribution** — Thus far known only from the holotype female collected in Queensland, and reported here for the first time from Western Australia.

## ***Oxus (Oxus) meridianus* Lundblad, 1947**

**New records** — 16/2, Denmark River at crossing with Churchill Road, 34°53.758' S 117°21.122' E, 46 m asl, 4 Feb. 2019; 1/1, Rowell's Pool, Mount Frankland South NP, 34°49.120' S 116°35.657' E, 34 m asl, 6 Feb. 2019; 23/4, Styx River at crossing with Fernley Road, Denham, 34°53.056' S 117°06.266' E, 43 m asl, 6 Feb. 2019; 16/5, Glenoran Pool, W of Glenoran, 34°12.979' S 115°56.436' E, 160 m asl, 8 Feb. 2019; 5/1, Workers Pool, St John Brook Conservation Park, 33°57.226' S 115°41.207' E, 43 m asl, 8 Feb. 2019; 14/1, Lane Pool Falls, 34°41.700' S 116°15.431' E, 65 m asl, 9 Feb. 2019; 5/0, Five Nile Brook, at crossing with Duck Ponti Road, Pemberton – Greater Beedelup NP, 34°21.760' S 115°57.500' E, 190 m asl, 10 Feb. 2019; 2/0, Boodjidup Brook at crossing with Cave Road, 34°00.693' S 115°01.727' E, 12 m asl, 12 Feb. 2019.

**Distribution** — Known previously from Tasmania, New South Wales, Victoria and Queensland (Smit 1992, Harvey 1998a), and reported here for the first time from Western Australia.

## ***Oxus (Oxus) neotasmanicus* (Cook, 1986)**

**New records** — 3/0, Cockatoo Creek at crossing with Great Northern Highway, 8 Sept. 1998; 1/0, plunge pool Adcock Gorge, the Kimberley, 12 Sept. 1998; 1/0, Miner's Pool, Drysdale River Homestead, the Kimberley, 14 Sept. 1998; 2/0, Lake Kununurra, 10 km SE of Kununurra, 15°52'7.45" S 128°45'46.75" E, 19 Sept. 1998; 18/0, Spillway Creek near Lake Argyle, 20 Sept. 1998.

**Distribution** — Previously known from Queensland (Cook 1986), and reported here for the first time from Western Australia.

## ***Oxus (Oxus) orientalis* Walter, 1915**

**New records** — 6/0, pool Silent Grove Spring, the Kimberley, 11 Sept. 1998; 1/0, plunge pool Adcock Gorge, the Kimberley, 12 Sept. 1998; 2/0, pool Sawpit Gorge, S of Halls Creek, 25 Sept. 1998.

**Distribution** — Previously known from New Caledonia. Within Australia known from Queensland and New South Wales, and reported here for the first time from Western Australia.

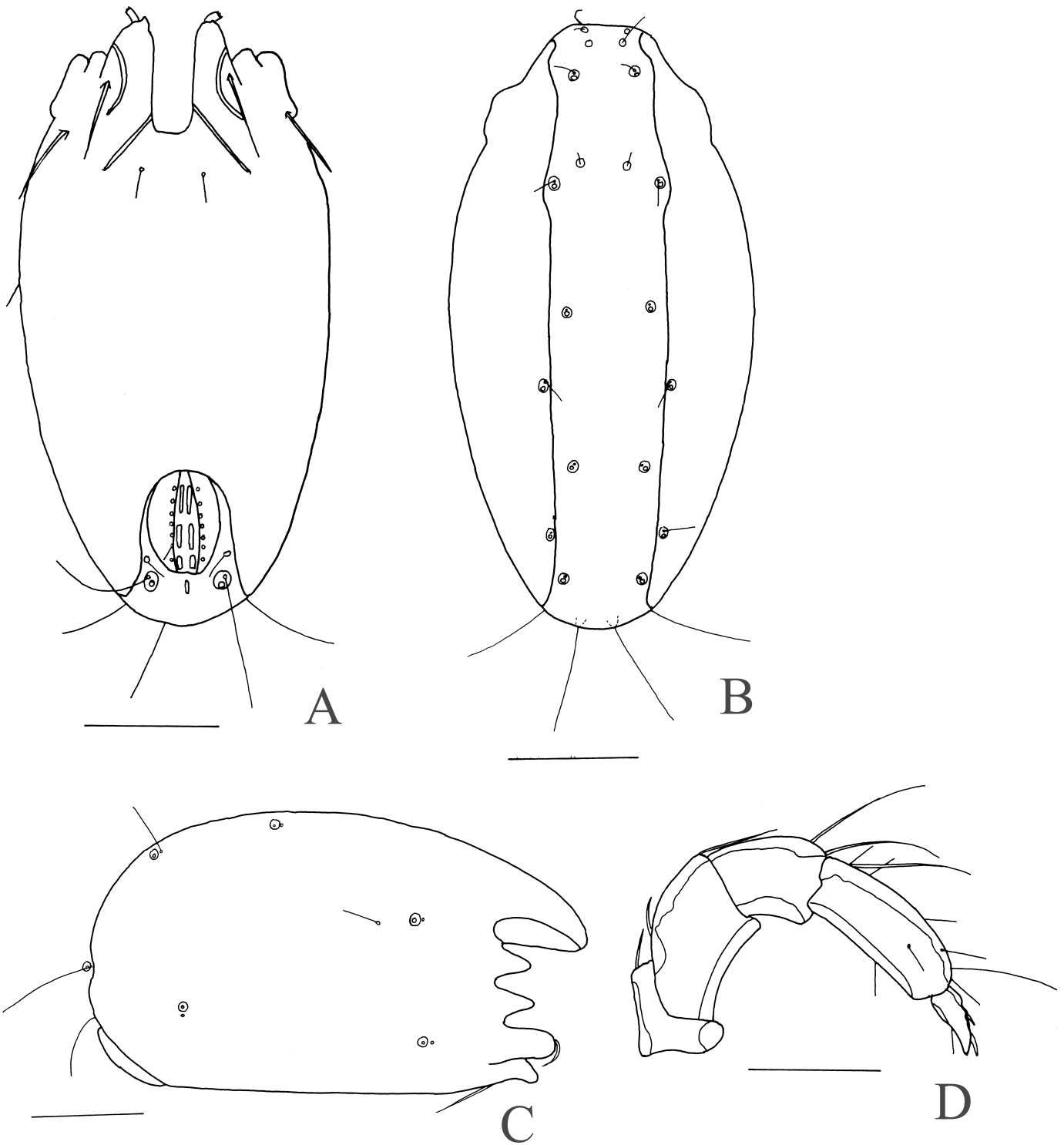
## ***Oxus (Oxus) siniscutatus* n. sp.**

Zoobank: [036E9A9F-9CB1-49C0-9EC9-19BFFC50278B](https://doi.org/10.24349/2ew3-Djkg)

(Figures 5A-D)

**Material examined** — Holotype female, stream El Questro Gorge, El Questro Homestead, the Kimberley, Western Australia, Australia, 15 Sept. 1998 (WAM).

**Diagnosis** — Dorsal strip without sclerites; P4 relatively stocky, with a few small setae.



**Figure 5** *Oxus (Oxus) siniscutatus* n. sp., holotype female. A – venter; B – dorsum; C – lateral view; D – palp. Scale bars: A-C = 200 μm, D = 50 μm.

**Description** — Female: Idiosoma laterally compressed. Idiosoma colour brownish, dorsally 915 long and 454 wide, ventrally 859 long; height 494. Coxae greatly expanded and occupying most of idiosoma except a wide dorsal strip. This dorsal strip with five pairs of glandularia and without sclerites (Figure 5B). Expanded coxal region with five pairs of glandularia (Figure 5C). Tip of Cx-I with a stout, seta. Venter without a midventral suture line (Figure 5A). Genital field 148 long, with three pairs of acetabula, anterior two pairs elongated. Lengths of P1-5: 32, 62, 44, 66, 36. P4 relatively stocky, dorsal margin with a few small setae only (Figure 5D). Leg segments of first and fourth legs dislodged during mounting and therefore not measurable. Terminal seta of IV-leg-6 shorter than segment; claws pectinate.

Male: Unknown.

**Etymology** — Named for the absence of sclerites in the dorsal strip.

**Remarks** — The new species is in most characters similar to *O. setipalpis* (Cook, 1986), but differs noticeably in the palp. P4 of the new species is stockier compared to the P4 of *O. setipalpis*, and the numerous small dorsal setae of *setipalpis* are lacking in the new species.

### ***Oxus (Oxus) spinosus* (K.O. Viets, 1977)**

**New records** — 2/0, pool Lennard Gorge, the Kimberley, 10 Sept. 1998; 5/0, pools upstream Bell Gorge Falls, the Kimberley, 11 Sept. 1998; 12/1, pool Silent Grove Spring, the Kimberley, 11 Sept. 1998; 3/0, pool Galvans Gorge, the Kimberley, 12 Sept. 1998; 16/0, plunge pool Adcock Gorge, the Kimberley, 12 Sept. 1998; 4/0, pool downstream of Manning Gorge, at campground, the Kimberley, 12 Sept. 1998; 2/0, pool Manning Gorge Falls, the Kimberley, 13 Sept. 1998; 5/0, Miner's Pool, Drysdale River Homestead, the Kimberley, 14 Sept. 1998; 2/0, Russ Creek at crossing with Gibb River Road, the Kimberley, 14 Sept. 1998; 24/0, Jackeroo's Waterhole, El Questro Station, the Kimberley, 15 Sept. 1998; 1/0, stream El Questro Gorge, El Questro Homestead, the Kimberley, 15 Sept. 1998; 21/0, plunge pool Emma Gorge, the Kimberley, 16 Sept. 1998; 3/0, pool Amalia Gorge, El Questro Station, the Kimberley, 16 Sept. 1998; 3/0, Zebedee Springs (hot springs), El Questro Station, the Kimberley, 16 Sept. 1998; 1/0, Lake Kununurra, 10 km SE of Kununurra, 15°52'7.45" S 128°45'46.75" E, 19 Sept. 1998; 3/0, Spillway Creek near lake Argyle, 20 Sept. 1998; 2/0, pool Sawpit Gorge, S of Hall's Creek, 25 Sept. 1998; 1/0, pool downstream of Circular Pool, Karijini NP, 22°28.646' S 118°33.773' E, 601 m asl, 28 Jan. 2019; 1/0, Python Pool, Millstream-Chichester NP, 21°20.031' S 117°14.310' E, 180 m asl, 30 Jan. 2029.

**Distribution** — Cook (1986) mentioned a possible record of this species from Palau Islands. Within Australia, previously known from Queensland, and reported here for the first time from Western Australia.

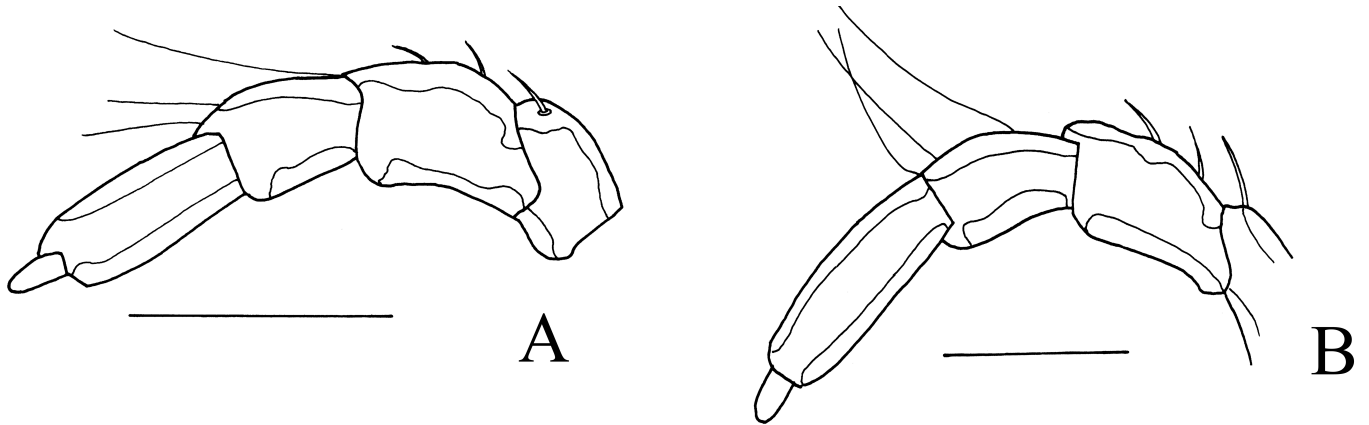
### ***Oxus (Flabellifrontipoda) striatus* (Cook, 1986)**

(Figures 6A-B)

**Material examined** — 1/0/0, Rowell's Pool, Mount Frankland South NP, 34°49.120' S 116°35.657' E, 34 m asl, 6 Feb. 2019; 1/0/0, Boorara Brook at crossing with Boorara Road, SE of Northcliffe, 34°41.149' S 116°12.999' E, 53 m asl, 9 Feb. 2019; 3/0/0, Beedelup Brook, downstream of falls, Beedelup NP, 34°25.107' S 115°52.071' E, 103 m asl, 10 Feb. 2019.

**Remarks** — The specimens from Western Australia differ in a number of characters from the specimens from eastern Australia. One of the coxal glandularia is much more distanced from the periphery, and the number of 4-7 swimming setae is lower than the ten swimming setae in the populations from eastern Australia. There is also much variation between the specimens from Western Australia. The palp varies from somewhat stocky to slender (Figures 6A-B), the length of IV-leg-6 varies from 96-140 (in the holotype 96). As all specimens from Western Australia have the striations on the expanded coxae, they are, for the time being, assigned to *O. striatus*.

**Distribution** — Previously reported from Tasmania and Victoria, and reported here for the first time from Western Australia.



**Figure 6** *Oxus (Oxus) striatus* (Cook), males from Beedelup Brook. A – palp; B – palp, male. Scale bars: A-B = 50  $\mu$ m.

***Oxus (Oxus) tasmanicus* (K.O. Viets, 1978)**

(Figure 7)

**New records** — 1/0/0, Deep River at Fernhook Falls, Mt Frankland NP, 34°49.036' S 115°35.684' E, 52 m asl, 19 Apr. 2008; 2/0, Stockton Lake, E of Collie, 33°23'6.33" S 116°13'38.72" E, 23 Apr. 2008; 0/1/0, Harvey River at crossing with Kevron Road, Lane Pool Reserve, 33°00.997' S 116°05.585' E, 246 m asl, 13 Feb. 2019.



**Figure 7** *Oxus (Oxus) tasmanicus* (K.O. Viets), female from Harvey River, lateral view. Scale bar = 200  $\mu$ m.

**Remarks** — The specimens from Western Australia differ from the specimen illustrated by Cook (1986), one of the glandularia of the coxae is much more distanced from the periphery (Figure 7), and the dorsal strip has one anteriorly situated median sclerite or none. In all other characters (shape of palp and gnathosoma, number of glandularia in dorsal strip and coxae, shape of the excretory pore platelet) the specimens from this study match the description given by Cook (1986). For the time being I assign my specimens to *O. tasmanicus*. More research is needed to elucidate the variation in the configuration of the coxal glandularia and the sclerites of the dorsal strip.

**Distribution** — Previously reported from Tasmania and New South Wales, and reported here for the first time from Western Australia.

### ***Oxus (Oxus) troma* Cook, 1986**

(Figures 8A-C)

**New records** — 1/0, spring along Mt Barker – Denham Road, 34°45.528' S 117°29.607' E, 75 m asl, 5 Feb. 2019; 1/1/0, Rowell's Pool, Mount Frankland South NP, 34°49.120' S 116°35.657' E, 34 m asl, 6 Feb. 2019; 4/0, Styx River at crossing with Fernley Road, Denham, 34°53.056' S 117°06.266' E, 43 m asl, 6 Feb. 2019; 4/0, Glenoran Pool, W of Glenoran, 34°12.979' S 115°56.436' E, 160 m asl, 8 Feb. 2019; 1/0, small tributary of Big Brook, Pemberton, 34°23.718' S 115°59.614' E, 120 m asl, 10 Feb. 2019; 1/0, Beedelup Brook, downstream of falls, Beedelup NP, 34°25.107' S 115°52.071' E, 103 m asl, 10 Feb. 2019.

**Remarks** — According to Cook (1986) *O. troma* has a narrow median sclerite in the dorsal strip. This strip is absent in the specimens from Western Australia (Figure 8A). As the specimens of this study agree in all other characters, I have assigned them to *O. troma*. More research is needed to elucidate the importance of presence or absence of the dorsal sclerite.

**Distribution** — The species has been reported previously from Tasmania, New South Wales and Queensland, and is reported here for the first time from Western Australia.

## **Family Hygrobatidae Koch**

### **Genus *Australiobates* Lundblad, 1941**

The genus has a Gondwanan distribution, with numerous species known from Australasia, South America and South Africa. The majority, however, are known from Australia, where 19 species are known, six of these have been reported from Western Australia (Harvey 1998a; Smit 2001).

### ***Australiobates (Australiobates) linderi* Lundblad, 1941**

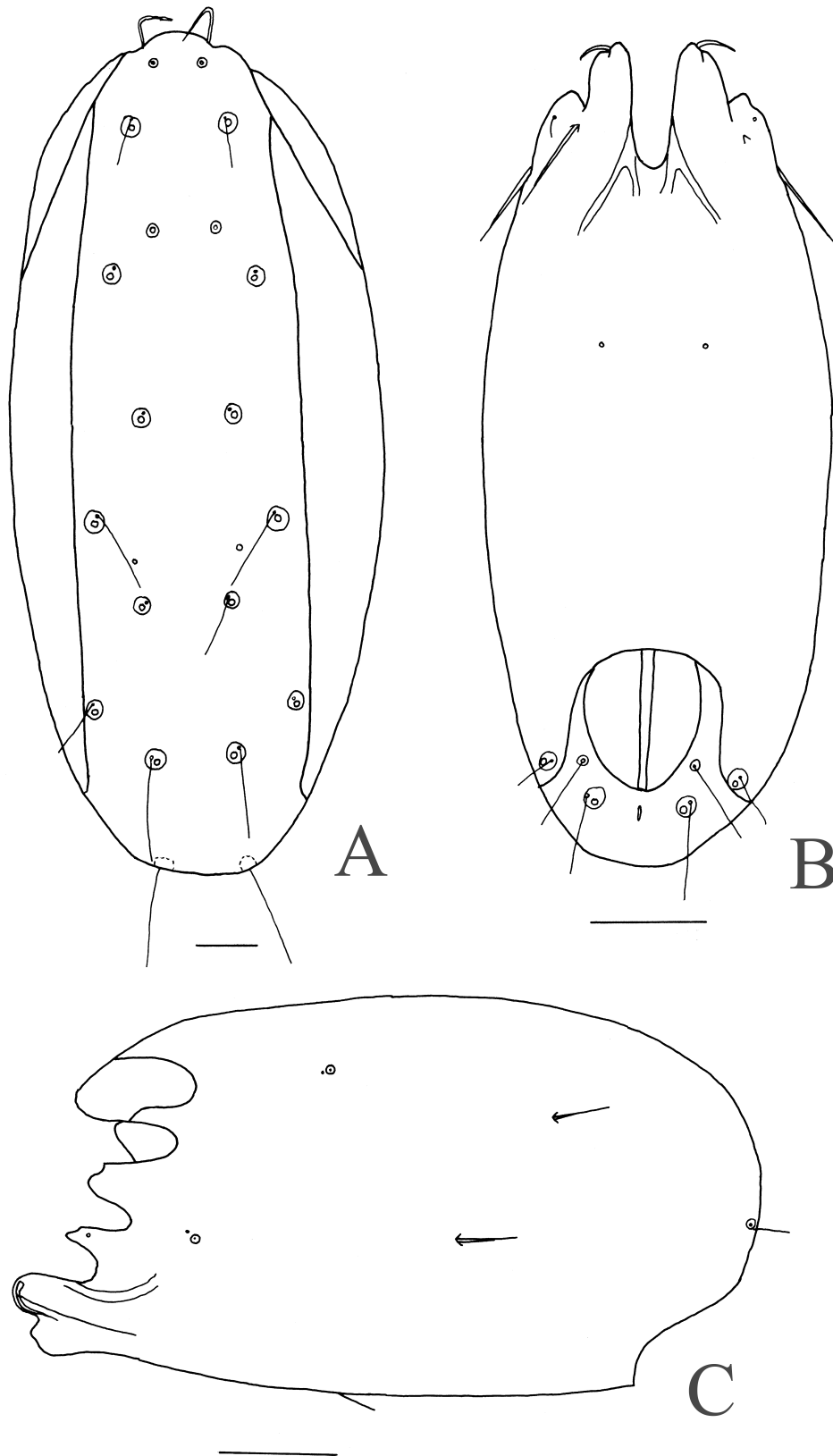
**New records** — 1/0/0, St John Brook upstream of Barrabup Pool, St John Brook Conservation Park, 33°56.626' S 115°41.462' E, 53 m asl, 8 Feb. 2019; 3/2/0, Boorara Brook at crossing with Boorara Road, SE of Northcliffe, 34°41.149' S 116°12.999' E, 53 m asl, 9 Feb. 2019; 0/1/0, Carey Brook at crossing with Carey Road, Beedelup NP, 34°23.442' S 115°51.648' E, 113 m asl, 10 Feb. 2019; 11/3/2, Beedelup Brook downstream of falls, Beedelup NP, 34°25.107' S 115°52.071' E, 103 m asl, 10 Feb. 2019; 5/6/1, Harvey River at crossing with Kevron Road, Lane Pool Reserve, 33°00.997' S 116°05.585' E, 246 m asl, 13 Feb. 2019; 2/4/1, Nanga Brook, Lane Pool Reserve, 32°48.265' S 116°05.407' E, 199 m asl, 14 Feb. 2019.

**Distribution** — Previously reported from all states and territories.

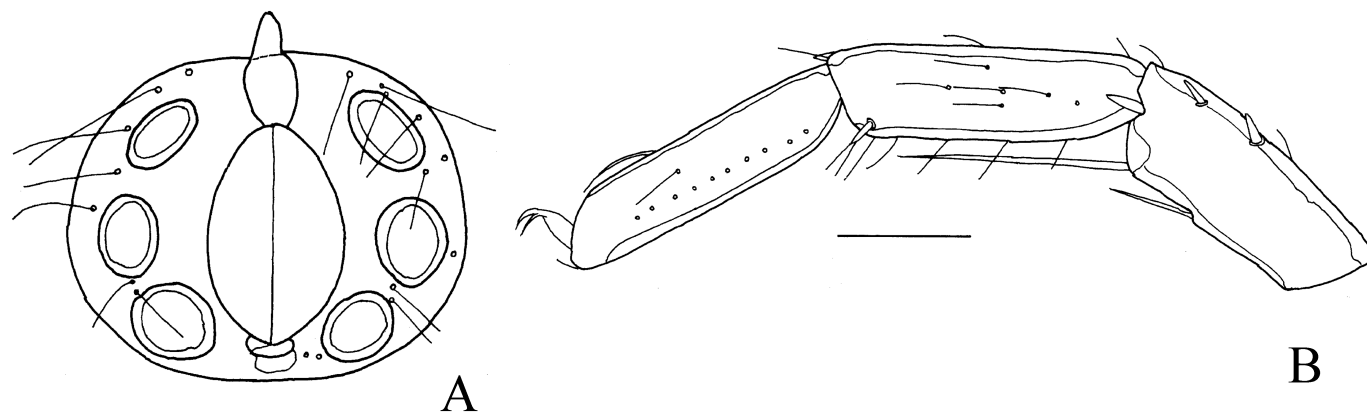
### ***Australiobates (Australiobates) mutatus* K.O. Viets, 1978**

**New records** — 0/1/0, stream downstream of Fortescue Falls, Karijini NP, 22°28.656' S 118°33.068' E, 606 m asl, 28 Jan. 2019; 0/1/0, Fortescue River, Millstream-Chichester NP, 21°34.236' S 117°03.276' E, 277 m asl, 30 Jan. 2019.

**Distribution** — Known from all states and territories.



**Figure 8** *Oxus (Oxus) troma* Cook, female from Rowell's Pool. A – dorsum; B – venter; C – lateral view. Scale bars: A = 50  $\mu\text{m}$ , B-C = 100  $\mu\text{m}$ .



**Figure 9** *Coaustraliobates rostratus* Smit, male from Harvey River. A – genital field; B – I-leg-4-6. Scale bars = 50  $\mu$ m.

### Genus *Coaustraliobates* Cook, 1974

A small genus with four species known, confined to the Australasian region.

#### *Coaustraliobates minor* (Lundblad, 1947)

**New records** — 4/2/0, Denmark River at crossing with Churchill Road, 34°53.758' S 117°21.122' E, 46 m asl, 4 Feb. 2019; 3/0/0, Styx River at crossing with Fernley Road, Denham, 34°53.056' S 117°06.266' E, 43 m asl, 6 Feb. 2019; 1/0/0, Workers Pool, St John Brook Conservation Park, 33°57.226' S 115°41.207' E, 43 m asl, 8 Feb. 2019; 2/9/2, Boorara Brook at crossing with Boorara Road, SE of Northcliffe, 34°41.149' S 116°12.999' E, 53 m asl, 9 Feb. 2019; 2/2/0, Lane Pool Falls, Boorara-Gardner NP, 34°41.700' S 116°15.431' E, 65 m asl, 9 Feb. 2019; 3/3/3, Five Mile Brook at crossing with Duck Ponti Road, Greater Beedelup NP, Pemberton, 34°21.760' S 115°57.500' E, 190 m asl, 10 Feb. 2019; 3/1/1, small tributary of Big Brook, Pemberton, 34°23.718' S 115°59.614' E, 120 m asl, 10 Feb. 2019; 6/3/1, Carey Brook at crossing with Carey Road, Beedelup NP, 34°23.442' S 115°51.648' E, 113 m asl, 10 Feb. 2019; 3/0/2, Harvey River at crossing with Kevron Road, Lane Pool Reserve, 33°00.997' S 116°05.585' E, 246 m asl, 13 Feb. 2019; 0/1/0, Nanga Brook, Lane Pool Reserve, 32°48.265' S 116°05.407' E, 199 m asl, 14 Feb. 2019.

**Distribution** — *Coaustraliobates minor* is a common water mite in Australia, occurring in all states and territories. It has not been reported from South Australia and the SW-corner of Western Australia (Harvey 1998a; Smit 2001). Therefore, only records of the latter region are given here.

#### *Coaustraliobates rostratus* Smit, 2001

(Figure 9A-B)

**New records** — 1/0/1, Rowell's Pool, Mount Frankland South NP, 34°49.120' S 116°35.657' E, 34 m asl, 6 Feb. 2019; 1/0/0, Harvey River at crossing with Kevron Road, Lane Pool Reserve, 33°00.997' S 116°05.585' E, 246 m asl, 13 Feb. 2019.

**Description** — Male: Idiosoma dorsally 567 (794) long and 389 (535) wide, ventrally 575 (745) long. Coxae as in female. Gonopore 66 long and 40 wide, genital field 100 long and 118 wide (Figure 9A). Length of P1-5: 34, 82, 80, 170, 46. Palp as in female. Length of I-leg-4-6: 110, 122, 100. I-leg-5 anteroventrally with two short, stout setae. Leg segments of first leg relatively stocky (Figure 9B). Length of IV-leg-4-6: 154, 200, 154. III-leg-5 and IV-leg-5 with two long swimming setae.

**Remarks** — Thus far, only the female was known. Above a description of the male is given.

**Distribution** — Previously reported only from the type locality in Victoria, and reported here for the first time from Western Australia.

## Genus *Procorticacarus* K.O. Viets, 1978

A genus known from Australia, New Guinea and New Caledonia. From Australia 31 species are known, only two of these are known from Western Australia (Smit 2015).

### *Procorticacarus beedelup* n. sp.

Zoobank: [D60C4D2F-B085-44E1-BF77-A829520F379B](https://zoobank.org/D60C4D2F-B085-44E1-BF77-A829520F379B)

(Figure 10A-E)

**Material examined** — Holotype male, Beedelup Brook downstream of falls, Beedelup NP, Western Australia, Australia, 34°25.107' S 115°52.071' E, 103 m asl, 10 Feb. 2019 (WAM). Paratypes: three females (WAM), one male, three females (RMNH), same data as holotype.

**Diagnosis** — Both male and female with a pair of postocularia platelets, ventral extension of P2 blunt.

**Description** — Male: Idiosoma dorsally 397 (365) long and 332 (308) wide, ventrally 433 (413) long. Integument with small papillae and a fine striation. Dorsum with a pair of postocularia platelets, 108 long and with a reticulate pattern, posterior to postocularia platelets four pairs of glandularia platelets (Figure 10A). Cx-I medially fused. Cxgl-4 located near the middle of Cx-IV (Figure 10B). Genital field with three pairs of acetabula. Gonopore rhomboid, 42 long. Length of P1-5: 24, 70, 82, 110, 43. P2 ventrally with a blunt extension, its tip with small papillae, ventral margin of P3 with numerous papillae, P4 ventrally with large setal tubercles (Figure 10C). Length of I-leg-4-6: 95, 103, 90. Length of IV-leg-4-6: 138, 158, 126.

Female: Idiosoma dorsally 510 (356-591) long and 454 (332-486) wide, ventrally 551 (397-624) long. Integument structure as in male. Configuration of dorsal platelets as in male (Figure 10D), postocularia platelets 114 long. Cx-I separated medially, Cxgl-4 in the middle of Cx-IV (Figure 10E). Genital field with three pairs of acetabula, posterior pair near-separated from anterior two pairs (Figure 10E). Pre-genital sclerite 118 wide, genital field 180 wide, genital plate 80 long. Length of P1-5: 28, 92, 116, 156, 58. Palp as in male. Length of I-leg-4-6: 110, 128, 96. Length of IV-leg-4-6: 158, 182, 160.

**Etymology** — Named after the type locality. The name is a noun in apposition.

**Remarks** — The new species is close to *P. angulicoxalis* (K.O. Viets, 1978) in the presence of paired postocularia platelets in both male and female. The new species differs from the latter species (characters in parentheses) in the medially fused Cx-I (separated), a blunt ventral extension of P2 (pointed) and the ventral margin of P3 with numerous papillae (smooth). Moreover, the gonopore of *P. angulicoxalis* is not rhomboid.

### *Procorticacarus minutus* n. sp.

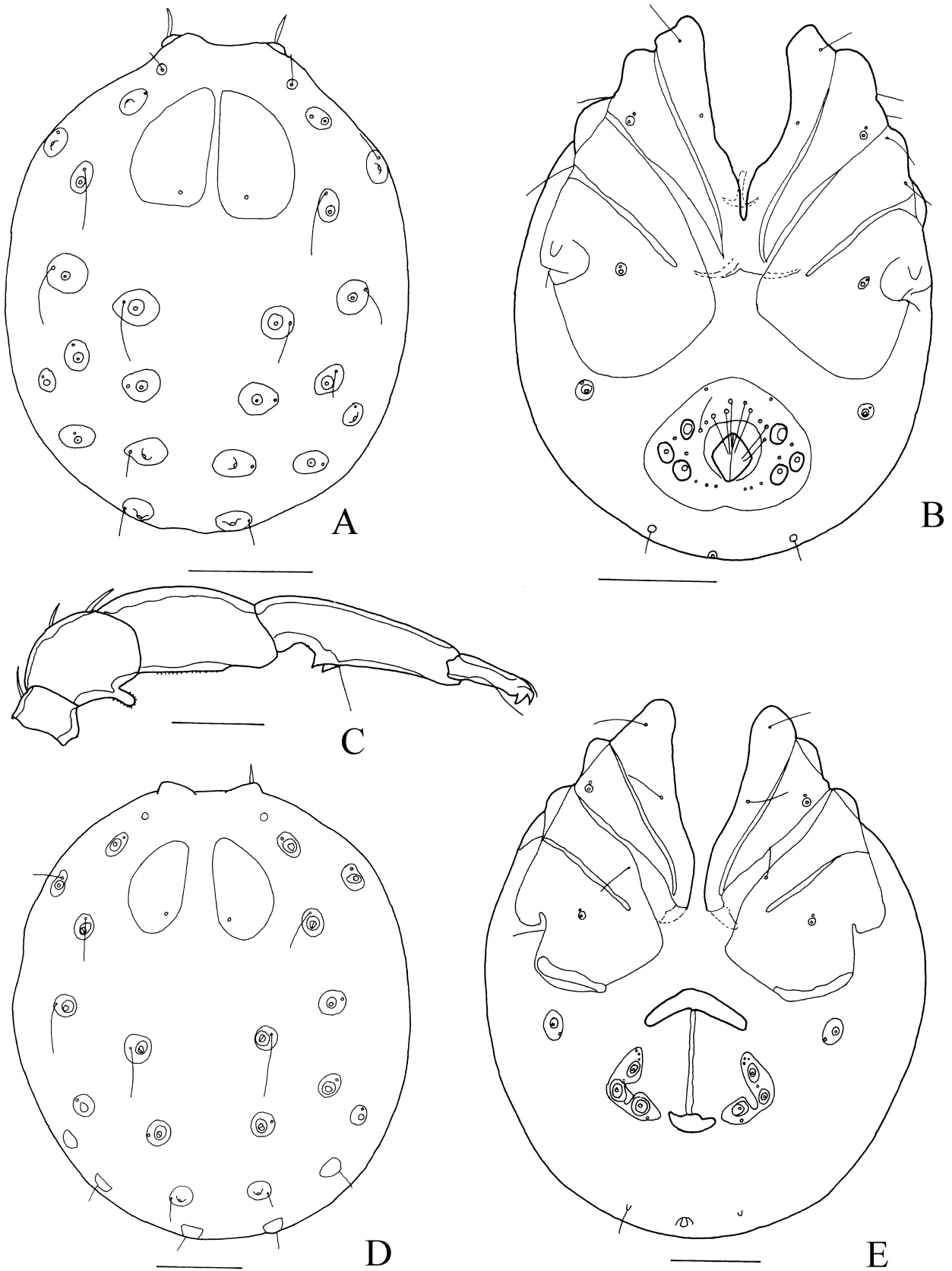
Zoobank: [35E95A24-6D27-4CC5-A6EB-9779056F2DB5](https://zoobank.org/35E95A24-6D27-4CC5-A6EB-9779056F2DB5)

(Figures 11A-C)

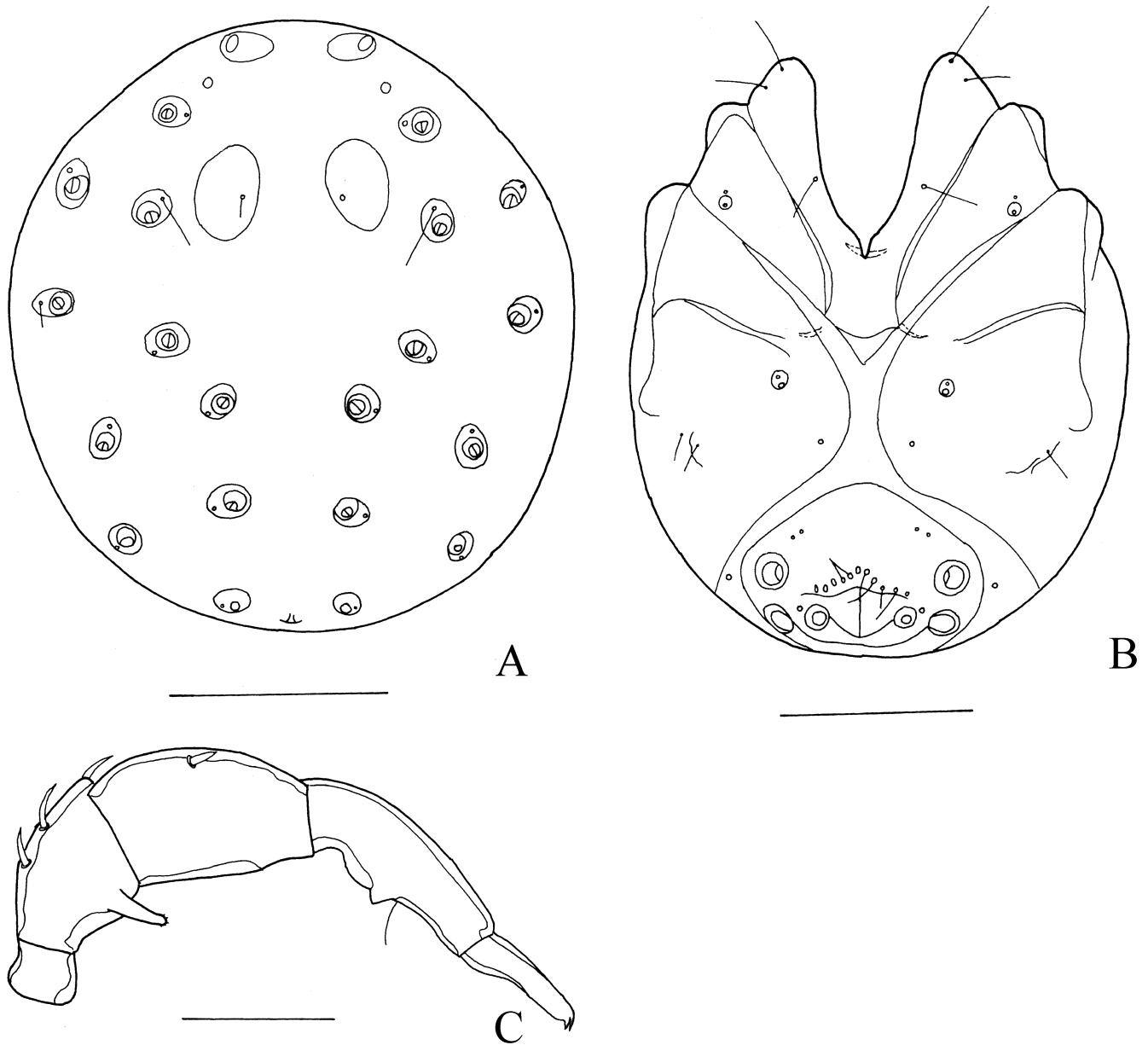
**Material examined** — Holotype male, stream downstream of Fortescue Falls, Karijini NP, Western Australia, Australia, 22°28.656' S 118°33.068' E, 606 m asl, 28 Jan. 2019 (WAM).

**Diagnosis** — Dorsum with a pair of postocularia platelets, Cx-I fused medially, gonopore relatively large.

**Description** — Idiosoma with numerous fine papillae, dorsally 267 long and 251 wide, ventrally 308 long. Dorsum with a pair of small sclerotized postocularia platelets; posterior to postocularia platelets four pairs of glandularia platelets, the anterior pair more separated than the posterior three pairs (Figure 11A). Excretory pore located near posterior margin of dorsum. Cx-I fused medially; Cxgl-4 well posterior to suture line of Cx-III/IV. Genital field on



**Figure 10** *Procorticacarus beedelup* n. sp., A-C holotype male, D-E paratype female. A- dorsum; B – venter; C – palp; D – dorsum; E – venter. Scale bars: A-B, D-E = 100 µm, C = 50 µm.



**Figure 11** *Procorticacarus minutus* n. sp., holotype male. A – dorsum; B – venter; C – palp. Scale bars: A-B = 100  $\mu$ m, C = 50  $\mu$ m.

a rounded plate, with three pairs of acetabula lying close to each other (Figure 11B). Gonopore wider than long (if examined in posteromedial view), but width not measurable in ventral view. Length of P1-5: 13, 56, 70, 79, 38. P2 with a slender ventral extension with some minute papillae at its tip, ventral margin of P3 smooth, P4 with a small ventral setal tubercle (Figure 11C). Length of I-leg-4-6: 70, 74, 68. Length of IV-leg-4-6: 112, 124, 104.

Female: Unknown.

**Etymology** — Named for its small size.

**Remarks** — In the presence of a pair of postocularia platelets in the male, the new species is similar to *P. angulicoxalis* and *P. beedelup* n. sp. However, the genital field is most close to *P. cooki* (Imamura, 1984). The latter species differs from the new species in an unpaired postocularia plate, and the ventral margin of P3 has many small papillae. Moreover, *P. cooki*

has the glandularia with slit-like openings, in the new species the glandularia have “normal” openings. From *P. beedelup* n. sp. the new species differs in the position of Cxgl-4, which are located closer to the medial margin of Cx-IV. Moreover, the shape of the gonopore is longer than wide in *P. beedelup* n. sp. but wider than long in *P. minutus* n. sp.

## Family Wettinidae Cook

### Genus *Wheenyoides* Harvey, 1990

An endemic genus, with one species known from SW-Australia.

#### *Wheenyoides cooki* Harvey, 1990

**New record** — 0/1/0, Rowell’s Pool, Mount Frankland South NP, 34°49.120’ S 116°35.657’ E, 34 m asl, 6 Feb. 2019.

**Distribution** — Apparently, a rare species, previously known from two records from SW-Australia.

## Family Pionidae Thor

### Subfamily Pioninae Thor

#### Genus *Piona* Koch, 1842

A genus with a worldwide distribution, with numerous species known.

#### *Piona cumberlandensis* (Rainbow, 1906)

**New record** — 0/3/0, Lake Monger, 31°55’28.35” S 115°49’37.28” E, 29 Apr. 2008.

**Distribution** — Widespread, occurring in all states and territories, but not reported from Queensland.

#### *Piona kimberleyensis* n. sp.

Zoobank: [3306B3ED-298F-4B2B-9B0A-BD9FE8A25299](https://doi.org/10.3306B3ED-298F-4B2B-9B0A-BD9FE8A25299)

(Figures 12A-D)

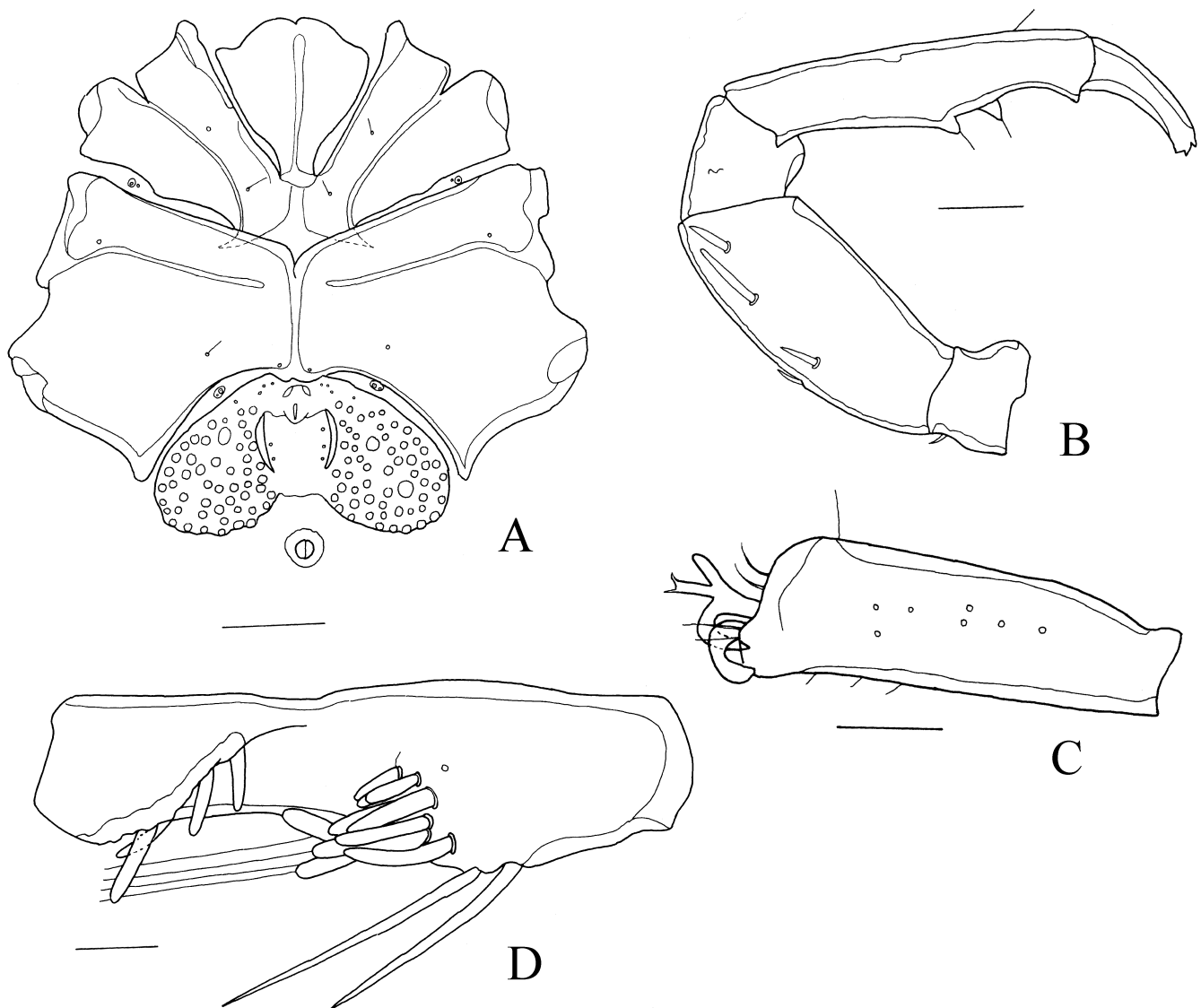
**Material examined** — Holotype male, Lake Kununurra, 10 km SE of Kununurra, Western Australia. Australia, 15°52’7.45” S 128°45’46.75” E, 19 Sept. 1998 (WAM). Paratypes: one male (juvenile), one female (juvenile), one deutonymph (WAM), one male (RMNH), same data as holotype.

**Diagnosis** — Male gonopore shallow with 2-4 setae, male genital plates with numerous acetabula.

**Description** — Male: Idiosoma dorsally 1628 (1849) long and 1405 (1427) wide, ventrally 1568 (1708) long. Dorsum with a pair of small platelets, 90-96 long. Apodemes of anterior coxae short. Suture lines Cx-III/IV incomplete. Cx-III and Cx-IV fused medially. Genital plates lightly fused with Cx-IV. Gonopore shallow, laterally with 2-4 setae (Figure 12A). Genital plates with numerous acetabula, 1-2 acetabula larger than others; genital plates fused posteriorly. Excretory pore sclerotized. Length of P1-5: 92, 373, 160, 429, 182. P2 medially with three setae, P4 with two large setal tubercles, anteroventrally with a tubercle with a peg-like seta (Figure 12B). Length of I-leg-4-6: 429, 510, 365 (till tip of segment). III-leg-6 with tripartite short claw and a single, stout, short seta (Figure 12C). Length of IV-leg-4-6: 356, 486, 365. IV-leg-4 with four blunt setae on one side and a group of many blunt setae at the other side, two long setae and four swimming setae (Figure 12D).

Female: The female is a juvenile, and therefore no measurements of the idiosoma can be given. Genital plates with numerous acetabula. Length of P1-5: 105, 389, 186, 494, 211. Palp as in male. Length of I-leg-4-6: 486, 522, 381. Length of IV-leg-4-6: 486, 522, 381.

Deutonymph. Provisional genital field with two pairs of acetabula.



**Figure 12** *Piona kimberleyensis* n. sp., A-D holotype male. A – venter; B – palp; C – III-leg-6; D – IV-leg-4. Scale bars: A = 200  $\mu$ m, B-D = 50  $\mu$ m.

**Etymology:** Named after the region where the type locality is situated.

**Remarks** — The third and fourth leg are very similar to those of *Piona cumberlandensis* (Rainbow, 1906), but the latter species has the male genital field with much less acetabula, the gonopore is a deep pit with lateral lobes and IV-leg-4 is with two groups of many blunt setae. Moreover, the gonopore is without setae in *cumberlandensis*.

***Piona puripalpis* K.O. Viets, 1984**

**New records** — 5/12/0, pool Lennard River, east side Windjana Gorge, 17°21' S 125°20' E, 10 Sept. 1998; 0/1/0, pools upstream of Bell Gorge Falls, the Kimberley, 11 Sept. 1998; 0/3/0, plunge pool Adcock Gorge, the Kimberley, 12 Sept. 1998; 1/1/0, Jack's Waterhole, Gibb River Road, the Kimberley, 14 Sept. 1998; 0/1/0, Lily Creek Lagoon, Kununurra, 15°46' S 128°44' E, 17 Sept. 1998; 0/1/0, Lake Kununurra, 10 km SE of Kununurra, 15°52'7.45" S 128°45'46.75" E, 19 Sept. 1998; 0/9/0, Arthur Creek at crossing with Great Northern Highway, 23 Sept. 1998;

3/3/0, Geikie Gorge, western side, Geikie Gorge NP, 18°7'23.92" S 125°39'42.47" E, 28 Sept. 1998; 1/3/0, Fitzroy River at Fitzroy Crossing, 18°12'39.07" S 125°34'40.91" E, 28 Sept. 1998.

**Remarks** — In most females, the platelet between the pregenital sclerite and the large genital plates has two pairs of acetabula, but occasionally 3-4 pairs of acetabula can be found.

**Distribution** — Known from the Northern Territory, Western Australia and New South Wales (Harvey 1996a).

## **Subfamily Tiphynae Oudemans**

### **Genus *Australotiphys* Cook, 1986**

A small endemic Australian genus, with three species known. From Western Australia one species is known.

#### ***Australotiphys barmutai* Harvey, 1996**

**New records** — 3/2/4, Deep River at Fernhook Falls, Mount Frankland NP, 34°49.036' S 115°35.684' E, 52 m asl, 19 Apr. 2008; 24/16/5, Denmark River at crossing with Churchill Road, 34°53.758' S 117°21.122' E, 46 m asl, 4 Feb. 2019; 2/5/0, Weld River at crossing with Beardmore Road, 34°48.897' S 116°34.736' E, 52 m asl, 6 Feb. 2019; 0/1/1, Styx River at crossing with Fernley Road, Denham, 34°53.056' S 117°06.266' E, 43 m asl, 6 Feb. 2019; 8/7/2, Rowell's Pool, Mount Frankland South NP, 34°49.120' S 116°35.657' E, 34 m asl, 6 Feb. 2019; 11/16/3, Workers Pool, St John Brook Conservation Park, 33°57.226' S 115°41.207' E, 43 m asl, 8 Feb. 2019; 0/1/0, Boorara Brook at crossing with Boorara Road, SE of Northcliffe, 34°41.149' S 116°12.999' E, 53 m asl, 9 Feb. 2019; 10/4/0, Lane Pool Falls, Boorara-Gardner NP, 34°41.700' S 116°15.431' E, 65 m asl, 9 Feb. 2019; 8/7/4, Harvey River at crossing with Kevron Road, Lane Pool Reserve, 33°00.997' S 116°05.585' E, 246 m asl, 13 Feb. 2019.

**Distribution** — SW-corner of Western Australia.

#### ***Australotiphys himonius* Harvey, 1996**

**New record** — 0/1/0, stream El Questro Gorge, El Questro Homestead, The Kimberley, 15 Sept. 1998.

**Distribution** — Previously reported from two localities, one in the Northern Territory and one in Queensland (Harvey 1996a), and reported here for the first time from Western Australia.

## **Family Unionicolidae Oudemans**

### **Subfamily Encentridophorinae K. Viets**

#### **Genus *Encentridophorus* Piersig, 1897**

A widespread genus, with a dozen species known from the Afrotropical, Oriental and Australasian regions. From Australia one species is known.

#### ***Encentridophorus (Encentridophorus) sarasini* Walter, 1915**

**New records** — 1/6/0, Arthur Creek at crossing with Great Northern Highway, 23 Sept. 1998; 0/1/0, Geikie Gorge, western side, Geikie Gorge NP, 18°7'23.92" S 125°39'42.47" E, 28 Sept. 1998; 1/0/0, Taylor's Lagoon, E of Broome, 14 Oct. 1998; 0/1/0, Lake Champion, 17°50'50.37"S 122°44'29.84" E, 14 Oct. 1998; 12/10/4, Boodjidup Brook at crossing with Cave Road, 34°00.693' S 115°01.727' E, 12 m asl, 12 Feb. 2019.

**Distribution** — A widespread species, known from New Caledonia, India and New Guinea. Within Australia known from Queensland, Victoria and the Northern Territory (Harvey 1998a), and reported here for the first time from Western Australia.

**Subfamily Pionatacinae K. Viets****Genus *Koenikea* Wolcott, 1900**

Numerous species known from North, Central and South America and Australasia. From Australia 22 species are known, 9 of these have been reported from Western Australia (Harvey 1998a; Smit 2004).

***Koenikea (Notomideopsis) australica* Lundblad, 1947**

**New records** — 1/0/0, Deep River at Fernhook Falls, Mt Frankland NP, 34°49.036' S 115°35.684' E, 52 m asl, 19 Apr. 2008; 1/1/0, Frankland River at crossing with Bridge Road, 34°55.115' S 116°47.461' E, 19 Apr. 2008; 0/1/0, Murray River at entrance Lane Pool Reserve, 32°46'5.27" S 116°4'47.64" E, 25 Apr. 2008 (juv.); 4/0/0, Rowell's Pool, Mount Frankland South NP, 34°49.120' S 116°35.657' E, 34 m asl, 6 Feb. 2019; 0/1/0, Carey Brook at crossing with Carey Road, Beedelup NP, 34°23.442' S 115°51.648' E, 113 m asl, 10 Feb. 2019.

**Distribution** — Known from Tasmania, Victoria, New South Wales, Queensland and Western Australia (Harvey 1998a, Smit 2004).

***Koenikea (Notomideopsis) crinita* Cook, 1986**

**New record** — 2/0/0, Glenoran Pool, W of Glenoran, 34°12.979' S 115°56.436' E, 160 m asl, 8 Feb. 2019.

**Remarks** — The specimens from (SW) Western Australia have an obsolete posterior margin of Cx-IV and fewer acetabula (26). Specimens from eastern Australia have a distinct posterior margin of Cx-IV, and more acetabula (I counted 38 acetabula in Figure 1040 of Cook 1986). Cook (1986) mentioned a large variation in size but not in the number of acetabula. As all specimens have the long coxal setae, the specimens of this study are assigned to *K. crinita*.

**Distribution** — Known from Tasmania, Victoria, New South Wales and Queensland and reported here for the first time from Western Australia.

***Koenikea (Notomideopsis) distans* K.O. Viets, 1980**

**New record** — 5/13/0, pool downstream of Circular Pool, Karijini NP, 22°28.646' S 118°33.773' E, 601 m asl, 28 Jan. 2019.

**Distribution** — Known from New South Wales, Queensland, Northern Territory and Western Australia.

***Koenikea (Notomideopsis) longiseta* n. sp.**

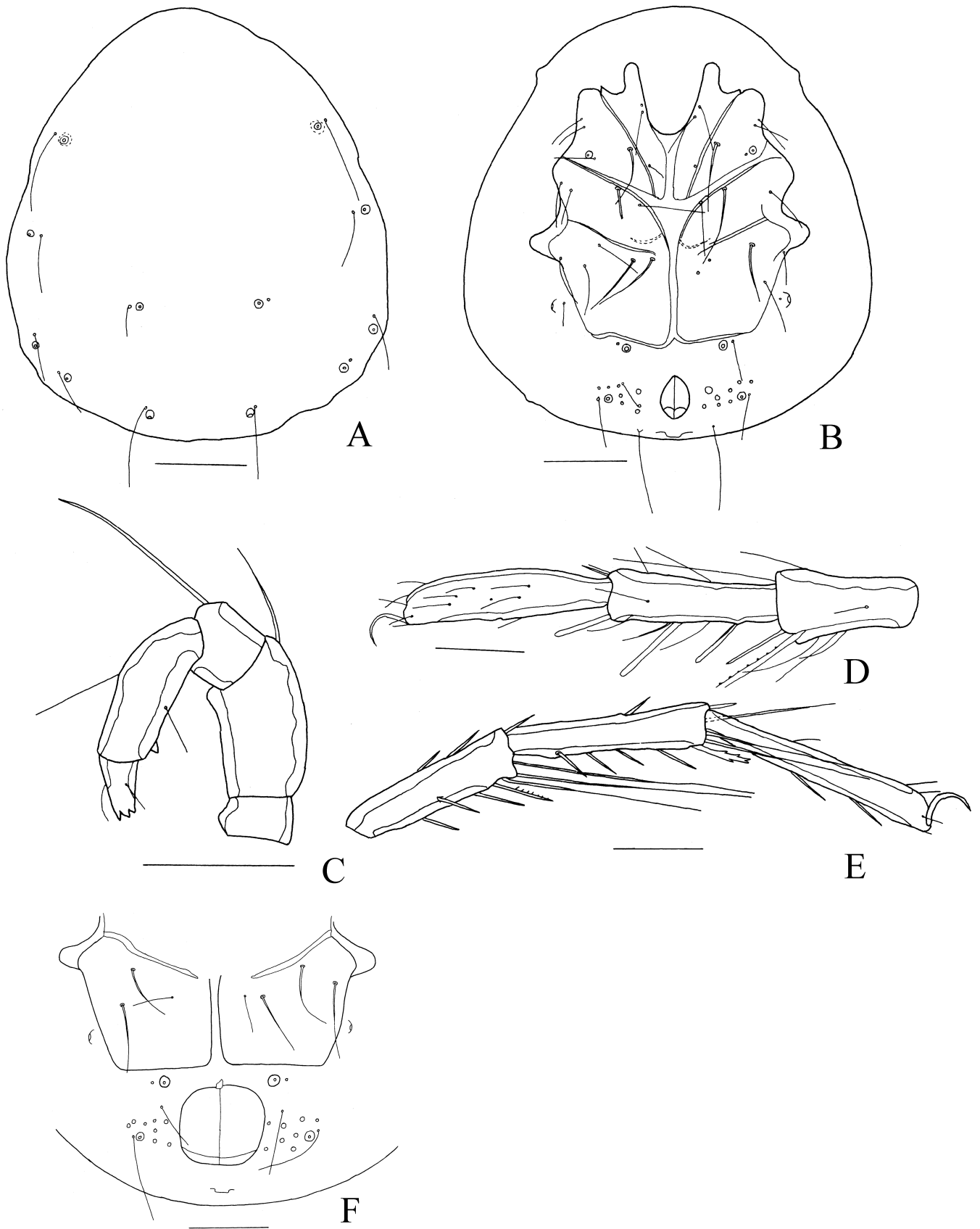
Zoobank: [36129DB3-0405-44B4-8A90-5EC8AE426BE7](https://doi.org/10.24349/2ew3-Djkg)

(Figure 13A-F)

**Material examined** — Holotype male, Kent River at crossing with South Coast Highway, Western Australia, Australia, 34°57.576' S 117°02.430' E, 25 m asl, 19 Apr. 2008 (WAM). Paratypes: two females, Rowell's Pool, Mount Frankland South NP, Western Australia, Australia, 34°49.120' S 116°35.657' E, 34 m asl, 6 Feb. 2019 (WAM).

**Diagnosis** — Idiosoma reddish with yellow spot, setae of dorsum and venter relatively long, apodemes of anterior coxae short, gonopore of male wide.

**Description** — Male: Idiosoma reddish with yellow spots, dorsally 494 long and 470 wide, ventrally 454 long. Dorsal shield 470 long and 413 wide, with six pairs of glandularia with relatively long associated setae. Dgl-3 and Dgl-4 closer to each other than Dgl-5 and Dgl-6; Dgl-5 distanced from lateral margin of dorsal shield (Figure 13A). Apodemes of anterior coxae extending onto Cx-III. Setae of coxae relatively long, those of Cx-IV nearly as long as length of Cx-IV. Cxgl-4 lying close to posterior margin of Cx-IV (Figure 13B). Gonopore 51 long and 34 wide, relatively wide, with eight pairs of acetabula. Between the acetabula a pair of glandularia. Length of P1-5: 18, 52, 25, 57, 22. P4 with a short anteroventral tubercle (Figure



**Figure 13** *Koenikea (Notomideopsis) longiseta* n. sp., A-E holotype male, F paratype female. A – dorsum; B – venter; C – palp; D – 1-leg-4-6; E – IV-leg-4-6; F genital field. Scale bars: A-B, F = 100 µm, C-E = 50 µm.

13C). Length of I-leg-4-6: 76, 92, 116. First leg with relatively short and narrow grooved or fluted setae (Figure 13D). Length of IV-leg-4-6: 108, 136, 122. IV-leg-5 with two swimming setae, IV-leg-4 with three swimming setae (Figure 13E).

Female: Idiosoma colour as in male, dorsally 567 (583) long and 535 (535) wide, ventrally 535 (526) long. Dorsal shield 518 (547) long and 462 (462) wide; configuration of dorsal glandularia as in male. Coxae, including long setae, as in male. Gonopore 116 long and 114 wide. Genital field with eight pairs of acetabula; between the acetabula a pair of glandularia (Figure 13F). Length of P1-5: 22, 58, 27, 56, 22. Length of I-leg-4-6: 92, 104, 110. Length of IV-leg-4-6: 90, 124, 132. Legs as in male. All legs with swimming setae. I-leg-4 with one swimming seta, I-leg-5 with two swimming setae, IV-leg-3 with one, IV-leg-4 and IV-leg-5 with three swimming setae

**Etymology** — Named for its long coxae and dorsal setae.

**Remarks** — The only other *Koenikea* species with long coxal setae is *K. crinita*. The latter species is much larger males (dorsal shield 562-805), Dgl-5 are more separated from each other and the genital field has more acetabula. Like *K. curtiseta* Cook, 1986 the new species has the first leg with short grooved setae, but the former is larger (dorsal shield 623) has a genital field with more acetabula and Dgl-5 are more distanced from each other.

### ***Koenikea (Notomideopsis) pseudodistans* Cook, 1986**

**New record** — 1/0/0, pool downstream of Circular Pool, Karijini NP, 22°28.646' S 118°33.773' E, 601 m asl, 28 Jan. 2019.

**Distribution** — Known from Queensland, Northern Territory and Western Australia.

### ***Koenikea (Notomideopsis) rubipes* Smit, 2004**

**New records** — 1/1/0, 0, Eastern Channel Flow, Millstream-Chichester NP, 21°35.394' S 117°03.900' E, 29 m asl, 29 Jan. 2019; 0/9/0, streams originating from Jirndawurrhanha Pool, Millstream-Chichester NP, 21°35.424' S 117°04.202' E, 30 Jan. 2019.

**Distribution** — Known only from Western Australia (Smit 2004).

### ***Koenikea (Notomideopsis) setosa* Smit, 2004**

**New records** — 0/1/0, pool downstream of Circular Pool, Karijini NP, 22°28.646' S 118°33.773' E, 601 m asl, 28 Jan. 2019; 1/0/0, Eastern Channel Flow, Millstream-Chichester NP, 21°35.394' S 117°03.900' E, 29 m asl, 29 Jan. 2019; 2/10/0, Fortescue River at crossing with NW Coastal Highway, 21°17.667' S 116°08.680' E, 40 m asl, 31 Jan. 2019; 1/0/0, Rocky pool Gascoyne River, E of Carnarvon, 24°45.350' S 114°08.234' E, 35 m asl, 1 Feb. 2019.

**Distribution** — Known from Western Australia and Northern Territory.

### ***Koenikea (Koenikea) sorpresa* Cook, 1986**

**New record** — 1/0/0, pool downstream of Circular Pool, Karijini NP, 22°28.646' S 118°33.773' E, 601 m asl, 28 Jan. 2019.

**Distribution** — Known from New South Wales, Queensland, Northern Territory and Western Australia.

## **Genus *Recifella* K. Viets, 1935**

A genus with numerous species known from South and Central America, New Caledonia and New Guinea. From Australia 21 species are known, ten species have been reported from Western Australia (Harvey 1998a; Smit 2007b).

## ***Recifella (Recifellida) pseudoszalayi* Smit, 2007**

**New records** — 1/1/0, pool downstream of Circular Pool, Karijini NP, 22°28.646' S 118°33.773' E, 601 m asl, 28 Jan. 2019; 2/6/0, Python Pool, Millstream-Chichester NP, 21°20.031' S 117°14.310' E, 180 m asl, 30 Jan. 2019.

**Distribution** — Known only from Western Australia.

## ***Recifella (Recifellida) tinka* (K.O. Viets, 1975)**

**New records** — 10/26/0, South Cervanthes Palaeo Creek, 30°28'48.7" S 115°04'33.6" E, 23 Sept. 2011, leg. A. Pinder & K. Quinlan; 10/12/0, Murray River at entrance of Lane Pool Reserve, 32°46'5.27" S 116°4'47.64" E, 25 Apr. 2008; 4/11/0, Fortescue River at crossing with NW Coastal Highway, 21°17.667' S 116°08.680' E, 40 m asl, 31 Jan. 2019; 3/2/0, Glenoran Pool, W of Glenoran, W.A., Australia, 34°12.979' S 115°56.436' E, 160 m asl, 8 Feb. 2019.

**Distribution** — A species known from Queensland, the Northern Territory and Western Australia.

## **Subfamily Unionicolinae Oudemans**

### **Genus *Unionicola* Haldeman, 1842**

A widespread genus with numerous species known. Many subgenera have been erected, but I follow Smit (2020), who proposed to abandon the use of subgenera in this genus.

### ***Unionicola aberrans* K.O. Viets, 1984**

**New record** — 3/4/2, Circular Pool, Karijini NP, 22°28.527' S 118°33.728' E, 711 m asl, 28 Jan. 2019.

**Distribution** — Known from New Guinea and Australia. From the latter country known from Queensland, the Northern Territory and Western Australia (Smit 2008).

### ***Unionicola longiseta* Walter, 1915**

**New records** — 5/7/10, Kent River at crossing with South Coast Highway, 34°57.576' S 117°02.430' E, 25 m asl, 19 Apr. 2008; 1/1/1, Gingin Brook near Old Junction Bridge – Neergabby, 31°18'9.56" S 115°36'25.87" E, 29 Apr. 2008; 14/9/0, Styx River at crossing with Fernley Road, Denham, 34°53.056' S 117°06.266' E, 43 m asl, 6 Feb. 2019.

**Distribution** — A widespread species, known from New Caledonia, Australia and New Zealand. Within Australia the species is widespread, but not known from the Northern Territory and South Australia (Smit 2008).

### ***Unionicola minutissima* Lundblad, 1947**

**New record** — 0/4/0, Python Pool. Millstream-Chichester NP, 21°20.031' S 117°14.310' E, 180 m asl, 30 Jan. 2019.

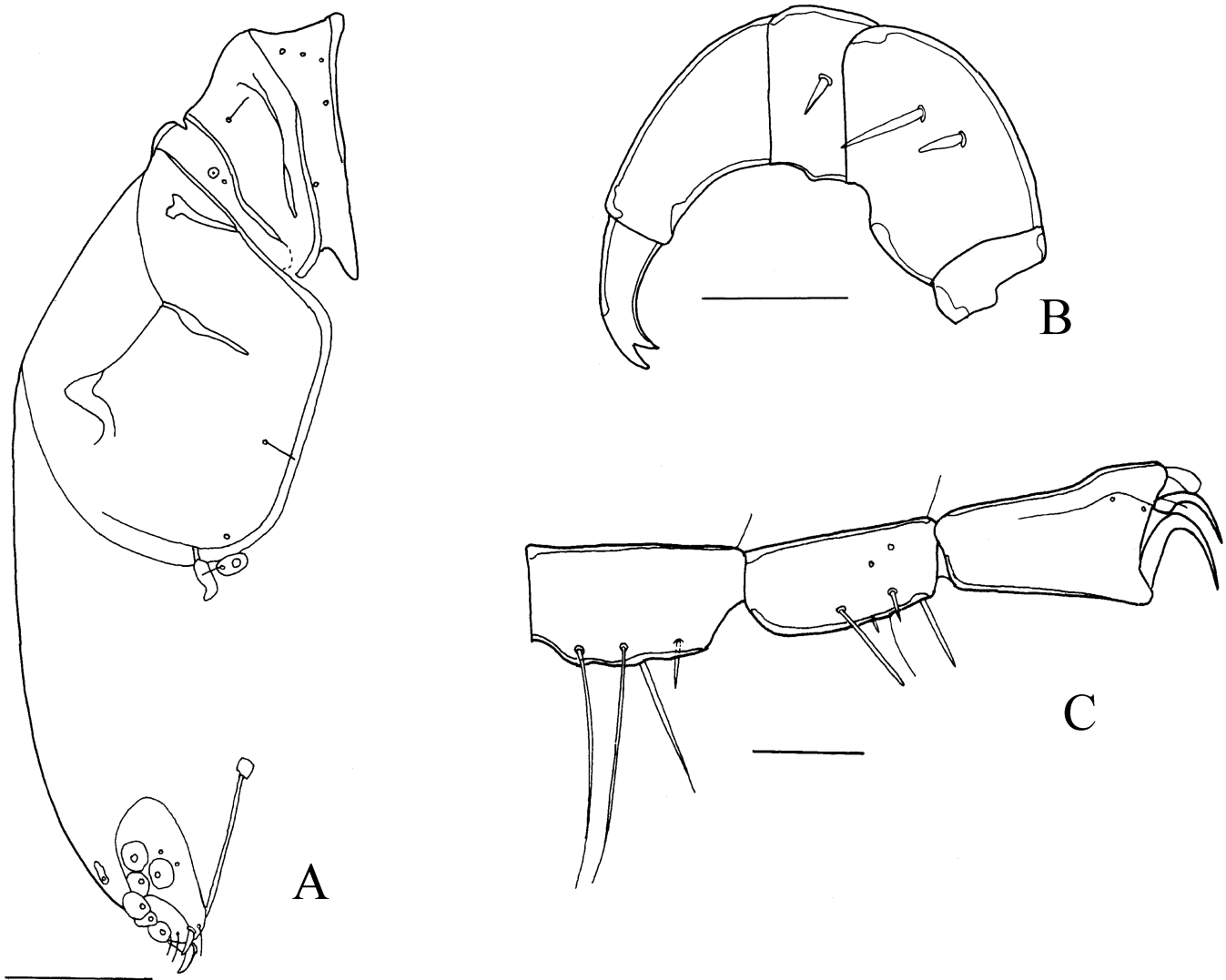
**Distribution** — Known from New Guinea and Australia. With the latter country reported from most states and territories, but no records known from Victoria and South Australia (Smit 2008).

### ***Unionicola neowalkeri* n. sp.**

Zoobank: [EB7278D5-5B80-4FEC-9537-FC0E65F397D3](https://zoobank.org/EB7278D5-5B80-4FEC-9537-FC0E65F397D3)

(Figure 14A-C)

**Material examined** — Holotype female, Kent River at crossing with South Coast Highway, from mussel *Westralunio carteri* Iredale, 1934 (Hyriidae), Western Australia, Australia, 34°57.576' S 117°02.430' E, 19 Apr. 2008 (WAM).



**Figure 14** *Unionicola neowalkeri* n. sp., holotype female. A – left half of venter; B – palp; C – I-leg-4-6. Scale bars: A = 100  $\mu$ m, B-C = 50  $\mu$ m.

**Diagnosis** — Genital field with two pairs of platelets, each platelet with three acetabula and a stout seta; P4 stocky, only I-leg-6 with an anterodorsal spatulate seta.

**Description** — Female: Idiosoma dorsally 624 long and 445 wide, ventrally 648 long. Dorsum with two pairs of platelets, anterior pair 50 long, posterior pair of similar size. Coxal area 380 long. Apodemes of anterior coxae short. Suture line of Cx-III/IV incomplete, posterior margin of Cx-IV with a well-developed projection. Genital field terminal, with two pairs of platelets, each platelet with three acetabula. Anterior platelets with a relatively short posterior extension with a stout seta. Each platelet with two fine setae (Figure 14A). Length of P1-5: 8, 94, 40, 90, 54. P1 short, P2 medially with two setae, P4 stocky, P5 with two claws (Figure 14B). Length of I-leg-4-6: 98, 86, 104. I-leg-6 enlarged, with an anterodorsal spatulate seta, I-leg-5 with two stout setae (Figure 14C). Other legs without a spatulate seta. Length of IV-leg-4-6: 144, 154, 128. Legs without true swimming setae, but several long, stiff setae present on fourth and fifth segments.

Male: Unknown.

**Etymology** — Named for its resemblance to *U. walkeri* K.O. Viets, 1980.

**Remarks** — The species is close to *U. walkeri* (in parentheses *walkeri*), but differs in six pairs of acetabula (five pairs), I-leg-5 with two stout setae (five), P4 stocky (less stocky), only first leg with a spatulate seta (all legs). From the same mussel species in SW-Australia, another *Unionicola* species is known, i.e. *U. assimilis* K.O. Viets, 1980 (see K.O. Viets 1980). The latter species has the anterior platelets with a long posterior extension without a stout seta, the dorsum with a pair of elongated platelets and P4 is less stocky.

## Family Aturidae Thor

### Subfamily Albiinae Viets

#### Genus *Albia* Thon, 1899

A widespread genus, with numerous species known worldwide. From Australia six species have been reported, two of these are known from Western Australia.

#### *Albia (Spinalbia) rectifrons* K. Viets, 1935

**New records** — 2/1/1, Eastern Channel Flow, Millstream-Chichester NP, 21°35.394' S 117°03.900' E, 29 m asl, 29 Jan. 2019; 0/1/0, streams originating from Jirndawurranha Pool, Millstream-Chichester NP, 21°35.424' S 117°04.202' E, 30 Jan. 2019; 0/1/0, Murchison River at crossing with NW Coastal Highway, 27°49.592' S 114°41.411' E, 177 m asl, 2 Feb. 2019.

**Distribution** — Widespread, from SE-Asia to Australia. Within Australia known from most states and territories.

### Subfamily Axonopsinae K. Viets

#### Genus *Axonopsella* Lundblad, 1930

A widespread genus with numerous species known from Central and South America and New Guinea. From Australia 39 species have been reported, two of these are known from Western Australia (Cook 1986; Smit 1996a, 2018).

#### *Axonopsella porphyria* n. sp.

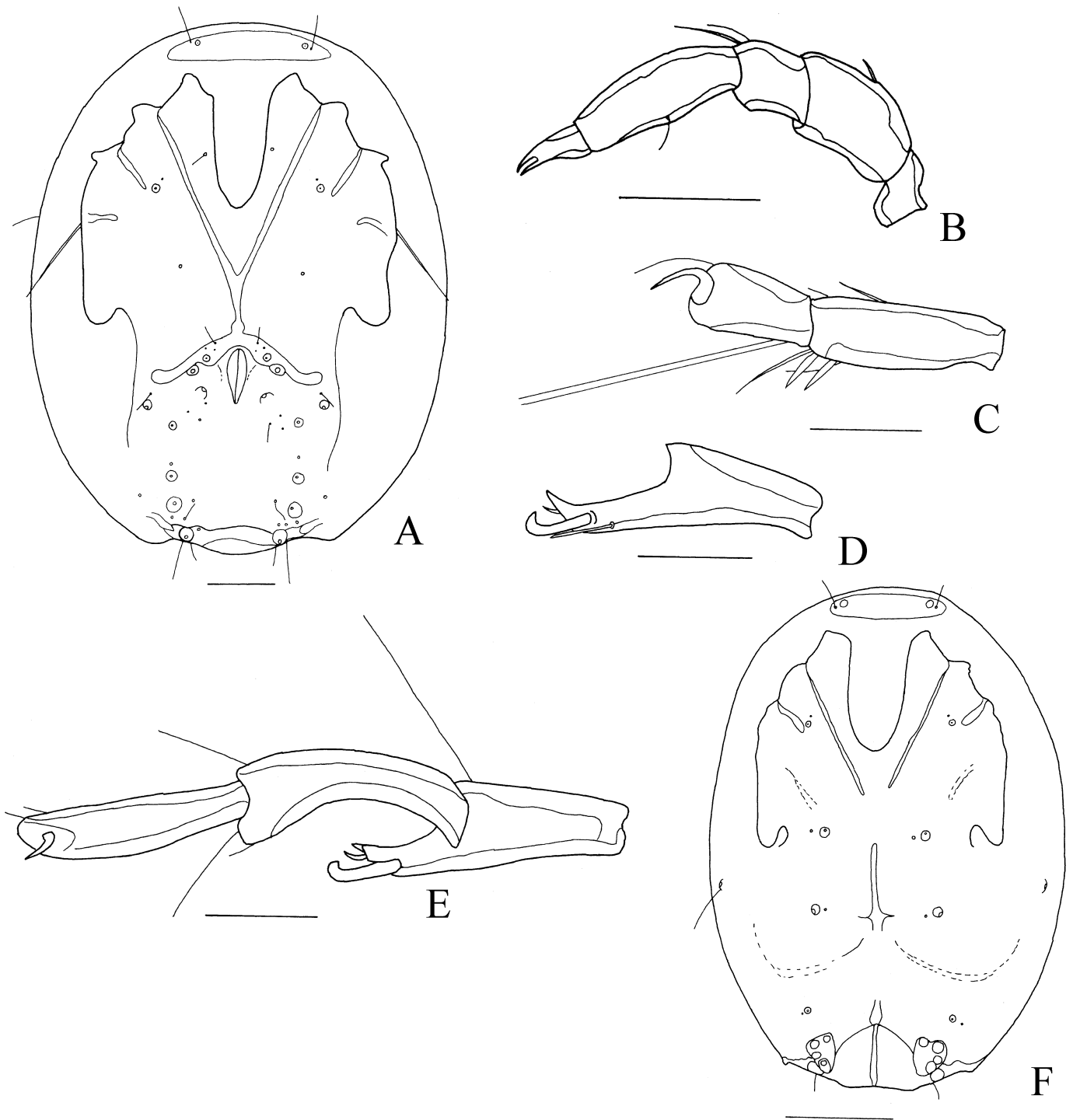
Zoobank: [48C9A35B-91EE-4B0E-AEAC-063869EA4855](https://doi.org/10.24349/2ew3-Djkg)

(Figure 15A-F)

**Material examined** — Holotype male, Rowell's Pool, Mount Frankland South NP, Western Australia, Australia, 34°49.120' S 116°35.657' E, 34 m asl, 6 Feb. 2019 (WAM). Paratype: One female, same data as holotype (WAM); two males, one female, St John Brook upstream of Barrabup Pool, St John Brook Conservation Park, Western Australia, Australia, 33°56.626' S 115°41.462' E, 53 m asl, 8 Feb. 2019 (RMNH).

**Diagnosis** — Male: Idiosoma blue with purple legs, dorsum with a yellow broad, Y-shaped colour pattern. Cx-IV without glandularia, posterior venter with a sclerotized bar with a pair of glandularia, IV-leg-4 with an extension with one stout, curved seta and a small seta on pointed dorsal extension, IV-leg-5 bowed. The large coxal shield might be diagnostic for the female, but many females not described.

**Description** — Male: Idiosoma blue with purplish legs, with a yellow, broad Y-shaped colour pattern, dorsally 377 (373) long and 292 (289-292) wide, ventrally 330 (332-340) long. Venter with antenniform setae on a separate platelet. Posterior to insertion of fourth legs a long ridge. Cx-IV without glandularia. Posterior margin of Cx-IV with a pair of genital glands (sensu Cook 1986). Apophyses on lateral end of posterior margin of Cx-IV. Between first pair of acetabula and second pair one pair of genital glands (Figure 15A). In one of the paratypes this genital gland shifted more anteriorly to the level of first acetabulum. Fourth pair of acetabula



**Figure 15** *Axonopsella porphyria* n. sp., A-E holotype male, F paratype female. A – venter; B – palp; C – II-leg-5-6; D – IV-leg-4; E – IV-leg-4-6; F – venter. Scale bars: A, B-E = 50  $\mu$ m, F = 100  $\mu$ m.

on a sclerotized bar near posterior margin of venter. Length of P1-5: 22, 50, 24, 60, 30 (Figure 15B). P4 slender, but with little diagnostic characters like in most Australian *Axonopsella* species (Cook 1986). Length of I-leg-4-6: 66, 70, 52. One of the claws of second leg enlarged (Figure 15C). Length of IV-leg-4-6: 76, 104, 96. IV-leg-4 with an extension with ventrally a large, curved setae, and dorsal extension pointed with a small seta inserted, IV-leg-5 bowed (Figures 15D-E). II-leg-5 and III-leg-5 with two long swimming setae.

Female: Idiosoma brownish or blue, legs purplish, with the same broad Y-shaped pattern as in male, dorsally 445 (446) long and 316 (356) wide, ventrally 409 (389) long. Dorsal shield 413 long and 284 wide. Antenniform platelet as in male. Venter with a large ventral shield, covering nearly complete venter. Suture lines of coxae incomplete, including the Y-shaped suture line of Cx-I/II and Cx-IV (Figure 15F). Posterior margin of Cx-IV obsolete. Genital field with four pairs of acetabula, partly fused with ventral shield. Length of P1-5: 26, 60, 32, 68, 32. Ventral margin of P2 with a few small papillae. Length of I-leg-4-6: 67, 68, 44. Length of IV-leg-4-6: 82, 92, 86. Second leg without enlarged claw. Swimming setae as in male.

**Etymology** — Named for the conspicuous purplish colour of the legs, after the Greek *porhyra*.

**Remarks** — The male of *Axonopsella bipartita* Smit, 2018 has a more or less similar IV-leg-4, but IV-leg-5 of this species is less bowed, the medial margin of Cx-III/IV is much longer and ridges posterior to insertion of fourth legs are absent.

## Subfamily Notoaturinae Besch

### Genus *Austraturus* K.O. Viets, 1978

A genus endemic to Australia, with 26 species known (Cook 1986; Smit 2007a, 2010a, 2018).

#### *Austraturus simplex* n. sp.

Zoobank: [4B80D8C8-B0B6-4EC8-8B84-742BEF839BAF](https://zoobank.org/4B80D8C8-B0B6-4EC8-8B84-742BEF839BAF)

(Figures 16A-E)

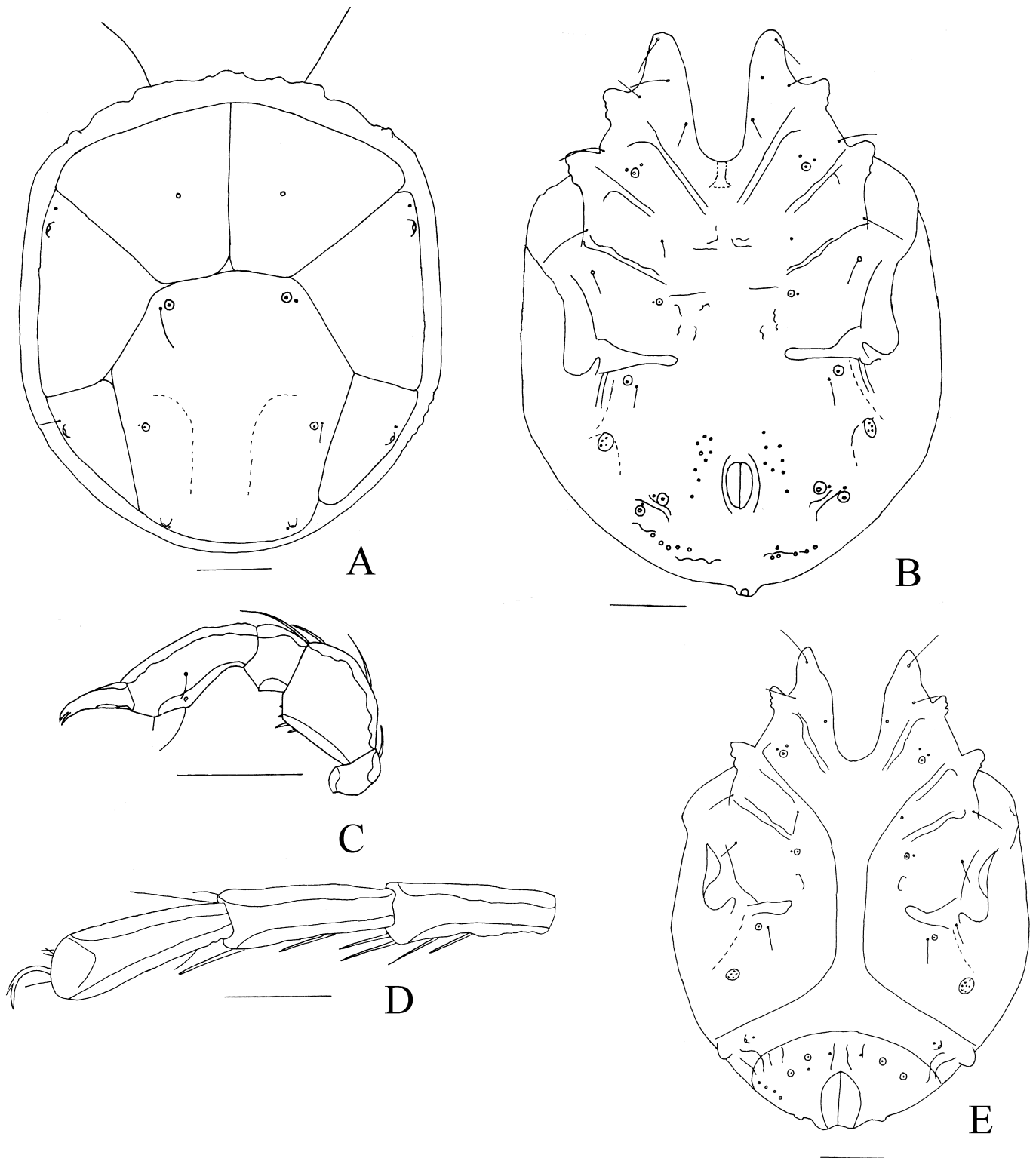
**Material examined** — Holotype male, Boorara Brook at crossing with Boorara Road, SE of Northcliffe, W.A., Australia, 34°41.149' S 116°12.999' E, 53 m asl, 9 Feb. 2019 (WAM). Paratypes: one male (RMNH), one female (WAM), Nanga Brook, Lane Pool Reserve, Western Australia, Australia, 32°48.265' S 116°05.407' E, 199 m asl, 14 Feb. 2019.

**Diagnosis** — Male posteromedial dorsal plate and fourth legs without modifications, male gonopore relatively wide.

**Description** — Male: Idiosoma with purplish spots, rugose, dorsally 308 (296) long and 267 (262) wide, ventrally 356 (356) long. Dorsum with three pairs of platelets and an unpaired posteromedial plate, the latter with two shallow concavities. Laterodorsal platelets each with one glandularium, anterior pair of platelets with the postocularia, posteromedial plate with three pairs of glandularia (Figure 16A), the latter 172 (152) long and 158 (149) wide. Gnathosomal bay U-shaped. Coxal suture lines incomplete. Gonopore relatively wide, 38 long and 16 wide. Posterolateral to gonopore a pair of glandularia (Figure 16B). Most acetabula not visible in ventral view. Excretory pore terminal. Length of P1-5: 19, 51, 25, 58, 30. P2 anteroventrally with several small teeth, one larger than the others; P4 ventrally expanding (Figure 16C). Length of I-leg-4-6: 58, 70, 76 (till tip of segment). Length of IV-leg-4-6: 80, 84, 86 (till tip of segment). Fourth leg not modified, claw of IV-leg-6 with a dorsal clawlet (Figure 16D).

Female: Idiosoma dorsally 292 long and 259 wide, ventrally 357 long. Dorsum as in male, posteromedial plate 144 long and 148 wide. Gnathosomal bay U-shaped. Suture lines of coxae incomplete. Gonopore 46 long, genital field with two pairs of glandularia (Figure 16E); most acetabula not visible in ventral view. Length of P1-5: 15, 50, 32, 58, 30. Palp as in male. Length of I-leg-4-6: 52, 64, 66. Length of IV-leg-4-6: 74, 78, 72.

**Etymology** — Named for the simple morphology.



**Figure 16** *Austraturus simplex* n. sp., A-D holotype male, E paratype female. A – dorsum; B – venter; C – palp; D – IV-leg-4-6; E – venter. Scale bars: 50  $\mu$ m.

**Remarks** — This is the second unmodified *Austraturus* species, *A. crystalensis* Smit, 2007 being the other one. The new species differs from the latter species in the position of the glandularia near the gonopore, anterolaterally in *crystalensis*, posterolaterally in the new species. Moreover, the gonopore of *crystalensis* is located more anteriorly, P2 has only two ventral teeth and P4 is not ventrally expanded in *A. crystalensis*. The new species is the first notoaurine species of the SW-corner of Australia.

## Family Arrenuridae Thor

### Genus *Arrenurus* Dugès, 1834

The most species-rich genus of the water mites, with about 1000 species known worldwide. From Australia 61 species and one subspecies are known, 22 species have been reported previously from Western Australia.

#### *Arrenurus (Arrenurus) balladoniensis* Halík, 1940

**New records** — 3/1/0, Murchison River at crossing with NW Coastal Highway, 27°49.592' S 114°41.411' E, 177 m asl, 2 Feb. 2019.

**Distribution** — Known from Australia only, where reported from Western Australia, Queensland, Victoria and the Northern Territory (Smit 1997).

#### *Arrenurus (Arrenurus) harveyi* Smit, 1997

**New records** — 1/2/0, pool downstream of Circular Pool, Karijini NP, 22°28.646' S 118°33.773' E, 601 m asl, 28 Jan. 2019.

**Distribution** — Known from Western Australia only (Smit 1997).

#### *Arrenurus (Arrenurus) rouxi* Walter, 1915

**New records** — 1/0/0, pool downstream of Circular Pool, Karijini NP, 22°28.646' S 118°33.773' E, 601 m asl, 28 Jan. 2019.

**Distribution** — Widespread in SE-Asia, New Caledonia and Australia. Within Australia reported from Western Australia only (Smit 1997).

#### *Arrenurus (Arrenurus) vanderpalae* Smit, 1992

**New records** — 2/1/0, pool downstream of Circular Pool, Karijini NP, 22°28.646' S 118°33.773' E, 601 m asl, 28 Jan. 2019.

**Distribution** — Known only from Australia, where reported from Queensland and Western Australia (Smit 1992, 1997, 2010b).

#### *Arrenurus (Megaluracarus) glaucus* Smit, 2010

**New records** — 2/1/0, Helena River, 31°56'37" S 116°26'11" E, 21 Aug. 1999, leg. A. Pinder & J. McRae; 0/5/0, Utcha Swamp, 28°04'54" S 114°11'53" E, 21 Sept. 1999, leg. A. Pinder & J. McRae; 4/3/0, spring along Mt Barker-Denham road, 34°45.528' S 117°29.607' E, 75 m asl, 5 Feb. 2019; Styx River at crossing with Fernley Road, Denham, 34°53.056' S 117°06.266' E, 43 m asl, 6 Feb. 2019; 1/0/0, Lake McLarty, 32°42'20" S 115°42'53" E, 22 Oct. 2019, leg. A. Pinder & D. Cale.

**Distribution** — Known only from Western Australia.

#### *Arrenurus (Micruracarus) anbangbang* Smit, 1997

**New records** — 1/4/0, pool downstream of Circular Pool, Karijini NP, 22°28.646' S 118°33.773' E, 601 m asl, 28 Jan. 2019; 1/6/0, Fortescue River at crossing with NW Coastal Highway, 21°17.667' S 116°08.680' E, 40 m asl, 31 Jan. 2019.

**Distribution** — Known only from Australia, where reported from Northern Territory and Western Australia (Smit 1997, 2010b).

***Arrenurus (Micruracarus) purpureus* Smit, 1997**

**New records** — 1/0/0, Eastern Channel Flow, Millstream-Chichester NP, 21°35.394' S 117°03.900' E, 29 m asl, 29 Jan. 2019; 3/2/0, streams originating from Jirndawurranha Pool, Millstream-Chichester NP, 21°35.424' S 117°04.202' E, 30 Jan. 2019; 7/10/0, Fortescue River at crossing with NW Coastal Highway, 21°17.667' S 116°08.680' E, 40 m asl, 31 Jan. 2019.

**Distribution** — Known only from Australia, where reported from Western Australia and Queensland (Smit 1997, 2002, 2010b).

***Arrenurus (Dividuracarus) tripartitus* Smit, 1997**

New records 1/6/0, pool downstream of Circular Pool, Karijini NP, 22°28.646' S 118°33.773' E, 601 m asl, 28 Jan. 2019.

**Distribution** — Known only from Australia, where reported from Western Australia and Queensland (Smit 1997).

***Arrenurus (Truncaturus) pinderi* n. sp.**

Zoobank: [E7A4E756-5A69-4EB8-9812-C77780EFC84A](https://doi.org/10.24349/2ew3-Djkg)

(Figure 17A-D)

**Material examined** — Holotype male, Three Springs, Tumulus Spring one, Western Australia, Australia, 29°35'29" S 115°27'94" E, 28 Sept. 2010, leg. A. Pinder & A. Leung (WAM). Paratypes: Two females, Three Springs, Tumulus Spring Thirteen, Western Australia, Australia, 29°35'19" S 115°26'43" E, 29 Sept. 2010, leg. A. Pinder & A. Leung (WAM).

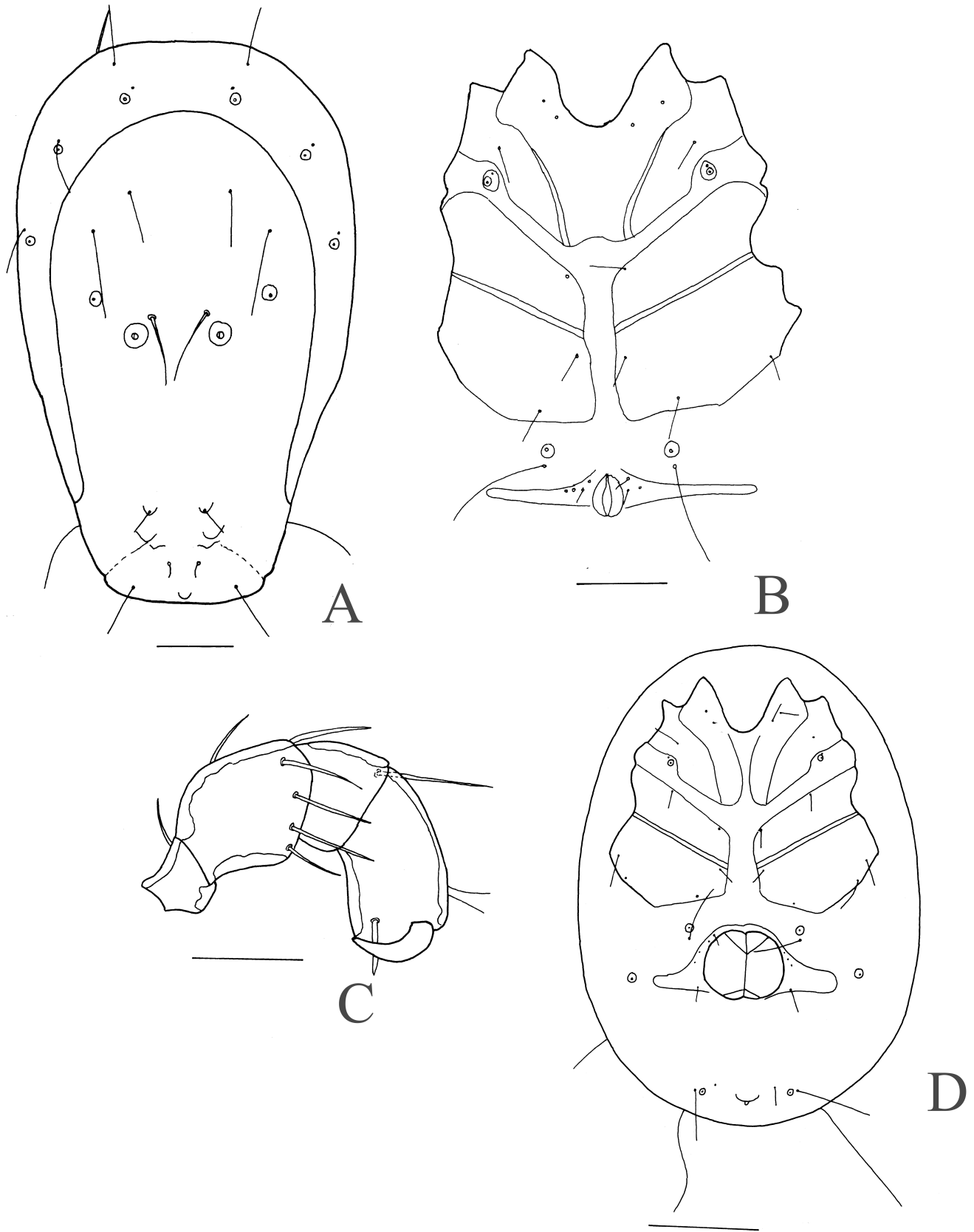
**Diagnosis** — Male: Cauda indistinctly set off from anterior idiosoma, cauda with a rounded rudimentary hyaline petiole. Female: Genital plates short and narrow, medial margin of Cx-IV as long as medial margin of Cx-III

**Description** — Male: Idiosoma bluish, dorsally 737 long and 332 wide, ventrally not measurable. Dorsal shield incomplete, 324 wide. Posterior margin of cauda slightly indented, posterolateral margin of cauda more distinctly indented. Cauda with a pair of short setae, near posterior margin a rounded, a rudimentary hyaline petiole (Figure 17A). Gnathosomal bay U-shaped. Medial margin of Cx-IV larger than medial margin of Cx-III. Gonopore 52 long, genital plates long and narrow, not extending to lateral idiosoma margin (Figure 17B). Length of P1-5: 28, 66, 44, 76, 39. P2 medially with four setae (Figure 17C). Length of I-leg-4-6: 114, 126, 110. Length of IV-leg-4-6: 134, 162, 168; IV-leg-4 with a long spur. Third and fourth legs with numerous swimming setae.

Female: Idiosoma colour as in male, dorsally 846 (857) long and 624 (616) wide, ventrally 810 (826) long. Dorsal shield complete, 761 (749) long and 530 (498) wide. Gnathosomal bay U-shaped. Cx-I not reaching to anterior idiosoma margin. Medial margin of Cx-IV as long as medial margin of Cx-III. Medial distance of Cx-IV less than width of one genital valve. Gonopore 122 long, gonopore field with triangular sclerotized patches. Genital plates relatively short and narrow (Figure 17D). Length of P1-5: 31, 76, 48, 81, 41; palp as in male. Length of I-leg-4-6: 132, 140, 104. Length of IV-leg-4-6: 168, 174, 140. Third and fourth legs with numerous swimming setae.

**Etymology** — Named after Adrian Pinder, one of the collectors of the material.

**Remarks** — The shape of the idiosoma, with the cauda indistinctly set off from the anterior idiosoma in combination with a rudimentary hyaline petiole separates the new species from other *Arrenurus* species. *Arrenurus glaucus* males occasionally have the cauda not well set off from the anterior idiosoma, but this species has two small, well separated forked setae on the cauda. The female is characterized by its short and narrow genital plates. Occasionally *A. glaucus* females have narrow genital plates too, but the medial margin of Cx-IV is always longer than the medial margin of Cx-III.



**Figure 17** *Arrenurus (Truncaturus) pinderi* n. sp., A-C holotype male, D paratype female. A – dorsum; B – venter (acetabula not illustrated); C palp; D – venter (acetabula not illustrated). Scale bars: A-B = 100  $\mu$ m, C = 50  $\mu$ m, D = 200  $\mu$ m.

## Family Mideopsidae Koenike

### Subfamily Gretacarinae K.O. Viets

#### Genus *Gretacarus* K.O. Viets, 1978

A genus endemic to Australia, with 16 species known, three of which are known from Western Australia.

#### *Gretacarus bifalcisetus* Smit, 1998

(Figures 18A-D)

**New record** — 1/0/0, Fortescue River, Millstream-Chichester NP, 21°34.236' S 117°03.276' E, 277 m asl, 30 Jan. 2019.

**Description** — Male: Idiosoma yellowish, central part reddish, dorsally 551 long and 478 wide, ventrally 518 long. Dorsal shield 478 long and 401 wide, middle glandularia closer to each other than anterior and posterior pair. Dorsal shield with three pairs of areas without idiosoma pores and posteriorly an unpaired area without such pores (Figure 18A). Suture lines of coxae incomplete and indistinct. Gonopore 76 long and 51 wide, anteriorly with a maximum of two acetabula in row, posteriorly with a maximum of three acetabula in a row. Glandularia anterolateral to gonopore not covered by flap-like extensions of Cx-IV (Figure 18B). Excretory pore on a shallow hump. Length of P1-5: 20, 42, 30, 48, 22. P4 dorsally with a small hump, ventral with a large setal tubercle with a tooth-like seta (Figure 18C). First leg not measured. Length of IV-leg-4-6: 90, 97, 80. IV-leg-4 anterodorsally with a stout seta, unmounted curved and blunt, mounted curved and pointed, anteromedially three stout, curved setae and anteroventrally with two large setae. IV-leg-3 stocky, with 5 long ventral setae (only two of these illustrated) and two stout anterodorsal setae. IV-leg-2 ventrally with eight long setae (Figure 18D).

**Distribution** — Known from Western Australia only.

**Remarks** — In the original description of Smit (1998a) IV-leg-4 of the male was illustrated with two large, hyaline anteromedial curved setae, the specimen described above has three of these setae. The large ventral seta of P4 of the holotype is not tooth-like, but has a straight anterior margin.

#### *Gretacarus occidentalis* Smit, 2016

**New record** — 1/0/0, Glenoran Pool, W of Glenoran, 34°12.979' S 115°56.436' E, 160 m asl, 8 Feb. 2019.

**Distribution** — Known from Western Australia only.

#### *Gretacarus oldus* Cook, 1986

**New record** — 1/4/0, pool downstream of Circular Pool, Karijini NP, 22°28.646' S 118°33.773' E, 601 m asl, 28 Jan. 2019.

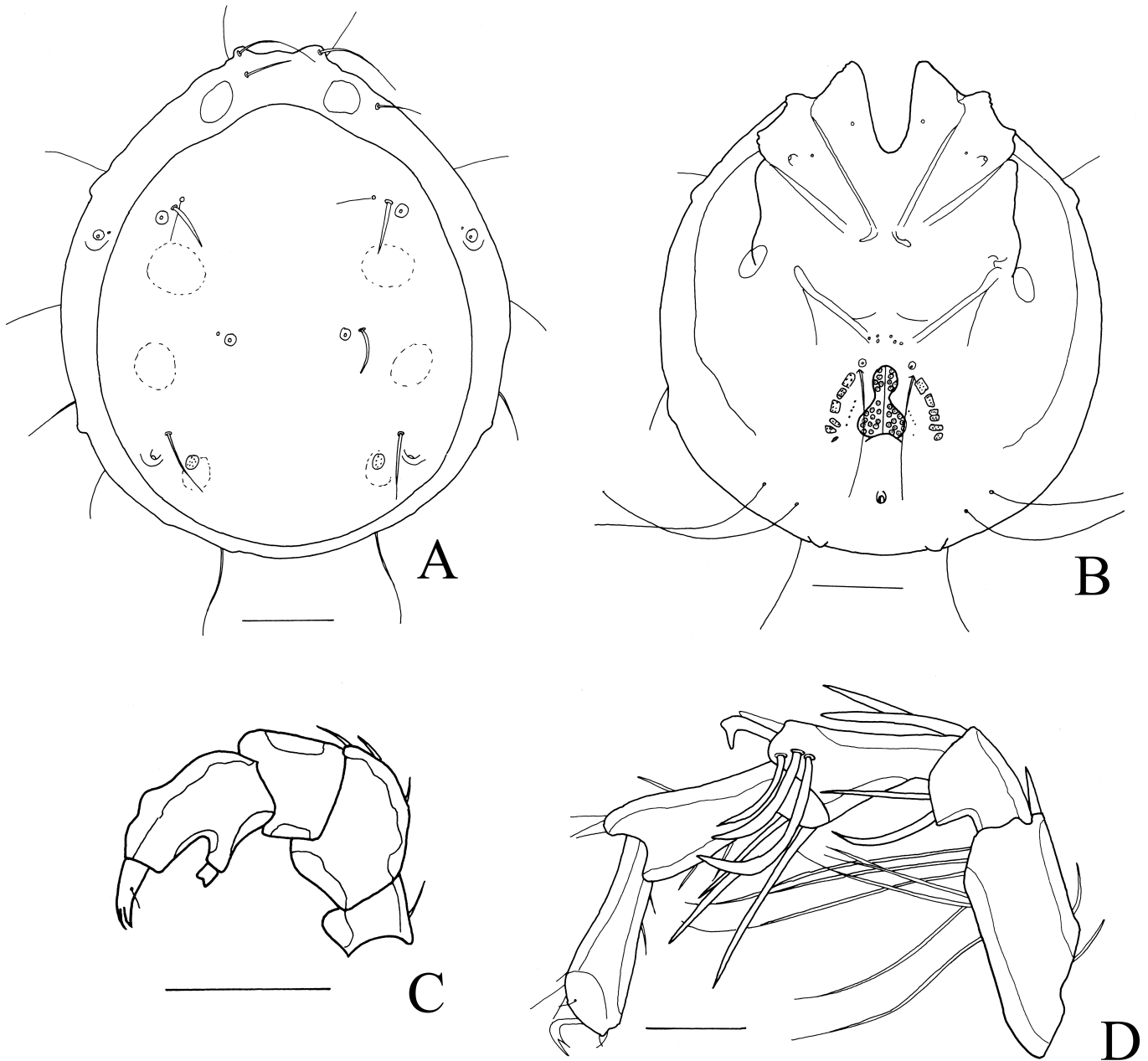
**Distribution** — Previously reported from Queensland and Western Australia (Cook 1986; Smit 2016).

**Remarks** — Smit (2016) reported the heavy seta of IV-leg-4 with a tooth. In the specimens from this study such a tooth is absent.

#### *Gretacarus tuberipalpis* Smit, 1998

**New records** — 1/0/0, pool downstream of Circular Pool, Karijini NP, 22°28.646' S 118°33.773' E, 601 m asl, 28 Jan. 2019; 1/0/0, Fortescue River, Millstream-Chichester NP, 21°34.236' S 117°03.276' E, 277 m asl, 30 Jan. 2019.

**Distribution** — Known from the Northern Territory and Western Australia (Smit 1998a, 2010).



**Figure 18** *Gretacarus bifalcisetus* Smit, male. A – dorsum; B – venter; C – palp; D – IV-leg-2-6. Scale bars: A-B = 100  $\mu$ m, C-D = 50  $\mu$ m.

**Family Momoniidae Viets**

**Genus *Momoniella* Viets, 1929**

A widespread genus, with species known from Sumatra, South Africa, Liberia and an undescribed species from New Zealand. From Australia two species are known (Cook 1986).

***Momoniella australica* Cook, 1986**

**New records** — 1/1/2, Galvans Gorge, the Kimberley, 12 Sept. 1998; 0/6/1, Miner's Pool, Drysdale River Homestead, the Kimberley, 14 Sept. 1998.

**Distribution** — Previously reported from Tasmania, New South Wales, Queensland, Northern Territory and Western Australia (Harvey 1998a; Smit 1998a).

***Momoniella rubripes* n. sp.**

Zoobank: [25A00C3B-39BE-49F3-83A8-34909B14537C](https://zoobank.org/25A00C3B-39BE-49F3-83A8-34909B14537C)

(Figures 19A-F)

**Material examined** — Holotype male, Glenoran Pool, W of Glenoran, Western Australia, Australia, 34°12.979' S 115°56.436' E, alt. 160 m asl, 8 Feb. 2019 (WAM). Paratypes: one female (WAM), one male [juvenile], one female (RMNH) same data as holotype; one male, Rowell's Pool, Mount Frankland South NP, Western Australia, Australia, 34°49.120' S 116°35.657' E, 34 m asl, 6 Feb. 2019 (RMNH).

Other material: Two deutonymphs, same data as holotype.

**Diagnosis** — Idiosoma colour red, posterior margin of Cx-IV short, dorsal shield without glandularia, male gonopore relatively wide, in female acetabula covering only a small part of gonopore.

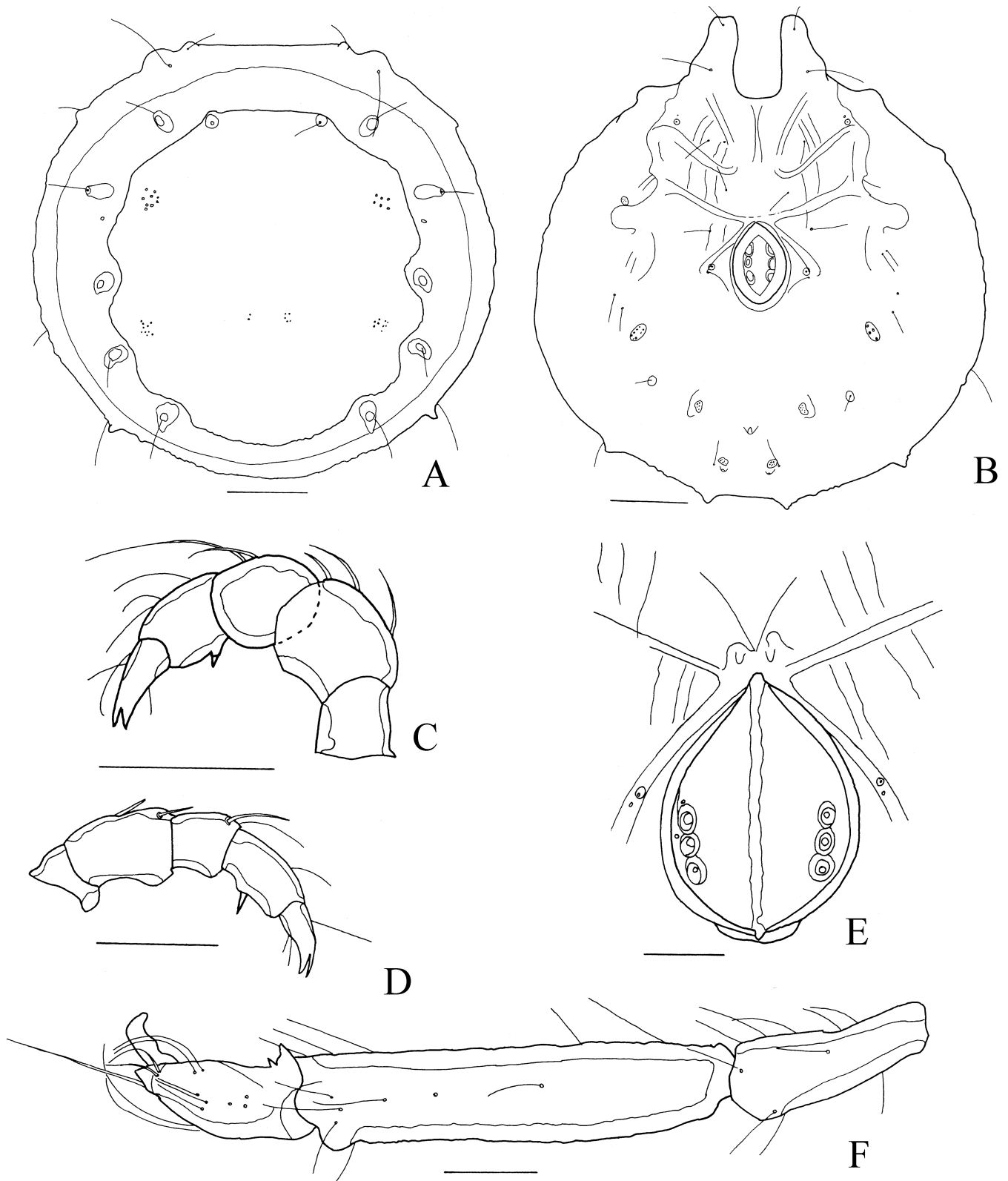
**Description** — Male: Idiosoma rugose, colour red, especially chitinized parts and legs, dorsally 535 (486) long and 567 (502) wide, ventrally 611 (559) long. Dorsal shield 405 (373) long and 393 (340) wide, with the postocularia located near anterior margin, lateral margin undulating. Five pairs of glandularia flanking the dorsal shield, the dorsal shield itself without glandularia (Figure 19A). Anterior coxae projecting, suture lines of coxae incomplete, posterior margin of Cx-IV short, medial margin of Cx-IV angular. Coxae with longitudinal ridges. Projections associated with insertions of fourth legs lobe-like. A short ridge present posteromedial of insertions of fourth legs (Figure 19B). Gonopore 76 long and 38 wide, with three pairs of acetabula; gonopore wide, leaving a large space between the rows of acetabula. Length of P1-5: 24, 40, 30, 38, 26 (palp not lying flat in the slide, so measurements not accurate). P4 stocky, ventrally with a pointed, stout seta, P5 bifurcated (Figure 19C). Length of I-leg-4-6: 98, 212, 96. I-leg-5 elongated, I-leg-6 with a blunt distal claw, one of the setae elongated (Figure 19F). Length of IV-leg-4-6: 136, 192, 164 (till tip of segments). IV-leg-5 with two swimming setae, III-leg-5 with one swimming seta.

Female: In all aspects similar to male, except measurements and genital field. Idiosoma dorsally 616 (567) long and 624 (591) wide, ventrally 688 (652) long. Dorsal shield 454 (510) long and 425 (405) wide. Gonopore 154 long and 106 wide, the three pairs of acetabula covering only a small part of the gonopore (Figure 19E). Length of P1-5: 24, 43, 29, 38, 32. Palp as in male (Figure 19D). Length of I-leg-4-6: 100, 222, 102. First leg as in male, but ventral teeth of claw of I-leg-6 better visible. Length of IV-leg-4-6: 138, 178, 160. Legs as in male, but III-leg-4 of one female with three swimming setae, and III-leg-5 with two swimming setae.

**Remarks** — In the two known Australian species, i.e. *Momoniella australica*, 1986 and *M. parva* Cook, 1986, the acetabula of the males are lying medially much closer to each other, leaving no space between the rows of acetabula. Moreover, the reddish idiosoma colour of the new species differs from the more yellowish idiosoma colour of the two known species.

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**Figure 19** *Momoniella rubripes* n. sp., A-C, F holotype male, D-E paratype female. A – dorsum; B – venter; C – palp; D – palp; E – genital field; F – I-leg-4-6. Scale bars: A-B = 100  $\mu$ m, C-F = 50  $\mu$ m.

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