Eight New Species of Sucking Lice (Psocodea: Phthiraptera) From Endemic Murine Rodents in Australia and an Updated Identification Key

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Abstract

Based on a comprehensive study of museum specimens, eight new species of sucking lice of the genus Hoplopleura Enderlein, 1904 (Psocodea: Phthiraptera: Hoplopleuridae), are described from six genera of Australian Old Endemic rodents: Conilurus Ogilby, 1838 (Rodentia: Muridae), Leggadina Thomas, 1910 (Rodentia: Muridae), Leporillus Thomas, 1906 (Rodentia: Muridae), Mesembrinomys Palmer, 1906 (Rodentia: Muridae), Pogonomys Milne-Edwards, 1877 (Rodentia: Muridae), and Xeromys Thomas, 1889 (Rodentia: Muridae). The description of these new species increases the number of sucking louse species from endemic Australian rodents from 13 to 21 and extends the records of sucking lice to all of the 14 genera of endemic rodents in Australia. Our results show that sucking lice are much more diverse among rodents in Australia than previously known. Furthermore, the Australian Hoplopleura species are host specific—each Hoplopleura species, including the eight new species described in the present study, parasitizes only a single host species, except Hoplopleura irritans Kuhn and Ludwig, 1967 (Psocodea: Phthiraptera: Hoplopleuridae) and Hoplopleura melomydis Weaver, 2017 (Psocodea: Phthiraptera: Hoplopleuridae), each of which is found on two host species. An updated dichotomous key for identifying Australian Hoplopleura species is included.

Key words: Phthiraptera, Anoplura, Hoplopleura identification key, endemic murine rodents, new species
Rattus Fischer de Waldheim, 1803 (Rodentia: Muridae) (Musser and Carleton 2005, Breed and Ford 2007, Van Dyck and Strahan 2008). Five species of New Endemics are found only in Australia; the other two species, Rattus leucopus (Gray, 1867) (Rodentia: Muridae) and Rattus sordidus (Gould, 1858) (Rodentia: Muridae) are also found on New Guinea and on some Indonesian islands.

Prior to the present study, only 13 louse species had been recorded from 15 endemic rodent species in Australia (Neumann 1909; Johnson 1960; Kuhn and Ludwig 1966; Kim 1972; Palma and Barker 1996; Weaver and Barton 2008; Weaver 2017; Wang et al. 2018, 2020). All of these species are in the genus Hoplopleura except for the introduced spiny rat louse, Polyplax spinulosa (Burmeister, 1839) (Psocodea: Phthiraptera: Polyplacidae), which has been found on six endemic rodent species and two introduced rodent species in Australia (Palma and Barker 1996; Wang et al. 2018, 2020). Twelve Hoplopleura species have been described from 13 endemic rodent species in Australia. Each Hoplopleura species is found on a single host species except for H. irritans, Kuhn and Ludwig, 1967 (Psocodea: Phthiraptera: Hoplopleuridae) and H. melomydis, Weaver 2017 (Psocodea: Phthiraptera: Hoplopleuridae), each of which is found on two rodent species: H. irritans on Rattus fuscipes (Waterhouse, 1839) (Rodentia: Muridae) and Rattus lutreolus (Gray, 1841) (Rodentia: Muridae), and H. melomydis on Melomys burtoni (Ramsay, 1887) (Rodentia: Muridae) and Melomys capensis, Tate 1951 (Rodentia: Muridae) (Kuhn and Ludwig 1966, Weaver 2017). These 12 species are known from 8 of the 14 endemic rodent genera: Hydromys É. Geoffroy, 1804 (Rodentia: Muridae), Mastacomyys Thomas, 1882 (Rodentia: Muridae), Melomys Thomas, 1922 (Rodentia: Muridae), Notomys Lesson, 1842 (Rodentia: Muridae), Pseudomys Gray, 1832 (Rodentia: Muridae), Uromys Peters, 1867 (Rodentia: Muridae), Zyzomys Thomas, 1909 (Rodentia: Muridae), and Rattus (Neumann 1909, Johnson 1960, Kuhn and Ludwig 1966, Kim 1972, Weaver and Barton 2008, Weaver 2017, Wang et al. 2018). Until this study, sucking lice were unknown from the other six endemic genera: Conilurus Ogilby, 1838 (Rodentia: Muridae), Leggadina Thomas, 1910 (Rodentia: Muridae), Leporillus Thomas, 1906 (Rodentia: Muridae), Mesembrinomys Palmer, 1906 (Rodentia: Muridae), Pogonomys Milne-Edwards, 1877 (Rodentia: Muridae), and Xeromys Thomas, 1889 (Rodentia: Muridae). In this study, we comprehensively examined rodent specimens in museums across Australia for the presence of sucking lice. We describe eight new Hoplopleura species from the six genera of endemic rodents in Australia from which sucking lice had not previously been recorded.

Materials and Methods

Sample Collection

In order to investigate the biodiversity of sucking lice that parasitize native rodents in Australia, we examined ethanol-preserved rodent specimens in five museums across Australia (Queensland Museum, QM; Museums Victoria, MV; Museum and Art Gallery of the Northern Territory, MAGNT; South Australia Museum, SAM; Western Australian Museum, WAM). As described in detail in Wang et al. (2020), individual rodent specimens were placed on a tray and the rodent pelage was gently and thoroughly combed with a comb designed for human head louse removal. The rodent was then transferred into a jar filled with 80% ethanol. The jar was sealed and was gently shaken for ~1 min to dislodge lice from the host. The rodent was removed from the jar and the ethanol was filtered through a fine mesh gauze. The filtered solid residue on the gauze was examined under a dissecting microscope (Nikon SMZ800N); the lice collected were kept in 2-ml screw-cap vials (one vial per host specimen) filled with ethanol (80%) and stored in −20°C freezer until further examination.

Morphological Examination

Louse specimens were mounted on microscope slides in Canada balsam as described in detail in Wang et al. (2020). Intact louse specimens with minimal gut contents were selected for slide mounting. The specimens were cleared and softened in KOH (20%) for 24–48 h at room temperature, sequentially immersed in distilled water for 30 mins, and then in acetic acid (10%) for 30 mins to neutralize residual KOH. The specimens were then stained in acid fuchsin (1%) for 6–12 h, and dehydrated in ethanol of different concentrations (40, 70, and 100%), each for 30 min. The specimens were clarified with pure clove oil for 24–48 h, and finally mounted on slides using Canada balsam. Specimens mounted on slides were examined and measured with a photomicroscope (Nikon ECLIPSE Ts 2); all measurements are in micrometers (range followed by the mean).

Descriptive format and abbreviations of morphological features follow Kim et al. (1986) and Durden et al. (2018, 2019), with full names of setae spelled out in full at first mention (Kim et al. 1986; Durden et al. 2018, 2019). We collected both adult and nymphal louse specimens, but we mounted only adult specimens on microscope slides for detailed morphological examination. Following widely accepted museum preservation practices, the host rodents had been immersed in formalin prior to being stored in ethanol, so it was not possible to extract DNA from louse specimens for genetic comparisons.

Results

Hoplopleura Specimens Collected From Endemic Rodents in Australia

We examined 162 endemic rodent species of eight species from six genera: Conilurus penicillatus (n = 22), Leggadina forresti (Thomas, 1906) (Rodentia: Muridae) (n = 45), Leggadina lakedownensis Watts, 1976 (Rodentia: Muridae) (n = 36), Leporillus conditor (Sturt, 1848) (Rodentia: Muridae) (n = 5), Mesembrinomys Gouldii (Gray, 1843) (Rodentia: Muridae) (n = 10), Mesembrinomys macrurus (Peters, 1876) (Rodentia: Muridae) (n = 20), Pogonomys mollipilus (n = 9), and Xeromys myoides (n = 15) (Table 1). We collected 412 louse specimens in total, both adults and nymphs, from these rodents (Table 2). The prevalence of lice on the rodents we examined ranged from 15% on M. macrurus to 20% on X. myoides, 22.2% on P. mollipilus, 27.3% on C. penicillatus, 30.6% on L. lakedownensis, 33.3% on L. forresti, and 60% on L. conditor. For the rodent species that had lice, the abundance ranged from 1.7 lice per rodent (average) on X. myoides to 5 on P. mollipilus, 5.7 on M. macrurus and L. lakedownensis, 8.6 on L. forresti, 12.3 on C. penicillatus, 15 on L. conditor, and 23 on M. Gouldii. Based on the morphological features of adult lice, we identified these specimens as eight new species in the genus Hoplopleura.

Nomenclature

This paper and the nomenclatural act(s) it contains have been registered in Zoobank (www.zoobank.org), the official register of the International Commission on Zoological Nomenclature. The LSID (Life Science Identifier) number of the publication is: urn:lsid:zoobank.org:pub:8EE9E14C-1942-4B6B-9C3A-A25F90B3C265.
Table 1. Collection of new species of *Hoplopleura* lice from murine rodent specimens in five museums across Australia

<table>
<thead>
<tr>
<th>Rodent species (n = 8)</th>
<th>Rodents sampled (n = 162)</th>
<th>Rodents with <em>Hoplopleura</em> lice</th>
<th><em>Hoplopleura</em> lice collected</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Conilurus penicillatus</em></td>
<td>QM^a, MV, WAM, SAM, MAGNT</td>
<td>Adults: 24</td>
<td>24</td>
</tr>
<tr>
<td><em>Leggadina forresti</em></td>
<td>MV, WAM, SAM</td>
<td>Nymphs: 50</td>
<td>50</td>
</tr>
<tr>
<td><em>Leggadina lakedoaeensis</em></td>
<td>WAM</td>
<td>Adults: 33</td>
<td>33</td>
</tr>
<tr>
<td><em>Leporillus conditor</em></td>
<td>MV, WAM, SAM</td>
<td>Nymphs: 96</td>
<td>96</td>
</tr>
<tr>
<td><em>Mesembrinomys gouldii</em></td>
<td>MV, WAM, SAM</td>
<td>Adults: 15</td>
<td>15</td>
</tr>
<tr>
<td><em>Mesembrinomys macrurus</em></td>
<td>MV, WAM, SAM</td>
<td>Nymphs: 37</td>
<td>37</td>
</tr>
<tr>
<td><em>Pogonomys mollipilosus</em></td>
<td>MV, WAM, SAM</td>
<td>Adults: 29</td>
<td>29</td>
</tr>
<tr>
<td><em>Xeromys myoides</em></td>
<td>WAM</td>
<td>Nymphs: 16</td>
<td>16</td>
</tr>
</tbody>
</table>


^bHyphen ‘-’ indicates no specimen was checked or collected.

**Taxonomy**

**Family Hoplopleuridae Ewing, 1929**

**Genus *Hoplopleura* Enderlein, 1904**

(*urn:lsid:zoobank.org:act:08920E3F-EED6-497E-AD8C-9D4AB70C7287*).

**Male:** [Fig. 1a] Body length 911–1045 (983).

**Head:** Head slightly longer than wide. Pre-antennal region short with pointed antero-lateral apex. Apical head setae (ApHS) 4, anterior marginal head setae (AnMHS) 4. Dorsally, sutural head setae (SuHS) 4. Dorsal marginal head setae (DMHS) 4 on each side. DMHS not aligned in row, first DMHS on top of postantennal angle, 2nd, 3rd, and 4th DMHS offset medially. Small dorsal accessory head setae (DACHS) 2, small dorsal anterior central head setae (DANCHS) 2, small dorsal posterior central head setae (DPoCHS) 2, large dorsal principal head setae (DPHPS) 2. Ventrally, ventral principal head setae (VPHS) 2. Antenna with five segments; first segment large, about as wide as long; second segment smaller, longer than wide; segments 3–5 about as wide as long. Distal seta on dorsal surface of antennal segment 3 not sexually dimorphic. Antennal angle well developed.

**Thorax:** About as wide as long, with 1 dorsal principal thoracic seta (DPTS) on each side, DPTS length 108.5–156.6 (126.2). Thoracic sternal plate shield-shaped with elongate anterior and posterior processes, posterior process longer than anterior process (Fig. 1b).Forelegs small, with small acuminate claws; midlegs and hindlegs progressively larger with correspondingly more robust tibio-tarsal claws, midlegs nearly twice longer than forelegs.

**Abdomen:** Wider than thorax. Dorsally, 1 tergite per segment, except for segment 3 with 2 tergites and segment 8 lacking tergite. Tergite 1 with 1 pair of small tergal abdominal setae (TeAS) posterolaterally. Tergite 2 with 2 pairs of TeAS posterolaterally, equal in length. Tergite 3 with 2 pairs of TeAS posterolaterally, with laterally placed seta on each side much longer. Tergites 4–6 each with 4 pairs of TeAS, lateral pair of TeAS much longer on tergite 4. Tergite 7 with 7 TeAS. Tergite 8 with 2 pairs of TeAS. Tergites 5–8 each with 1 pair of dorsal lateral abdominal setae (DLAS). Ventrally, no sternites on segments 1, 8. Segment 2 with 1 sternite. Segments 3–7 each with 2 sternites, except for segment 4 with 3 sternites. Sternite 1 extended laterally to articulate with paratergal plate II and with 7 sternal abdominal setae (StAS). Sternite 2 extended laterally to articulate with paratergal plate III and with 7 StAS, lateral 2 pairs long and stout; medial StAS longer than 3rd pair StAS. Stermites 3, 5 each with 4 pairs of StAS equal in length. Stermites 4, 6, 7 with 7 StAS. Stermites 8–10 each with 3 pairs of StAS. Sternite 11 with 2 pairs of StAS and sternite 12 with 1 pair of StAS. One pair of ventral lateral abdominal setae (VLAS) adjacent to each of sternites 6, 7, 9, 11.

**Paratergites:** Paratergal plates (Fig. 1c) present on abdominal segments 1–8. All plates differentially sclerotized. Paratergal plate I small and offset medially. Paratergal plates II–V each with 2 posterior lobes. Paratergal plate II with 1 small medial seta, 2 large posterior setae and acuminate posterior lobes. Paratergal plate III with 2 large setae and 2 serrated posterior lobes. Paratergal plates IV–VI each with 1 large seta posteriorly. Paratergal plates IV with serrated posterior lobes. Paratergal plate V with 2 acuminate posterior lobes. Paratergal plate VI with 1 acuminate posterior lobe dorsally. Paratergal plates VII, VIII each with 2 long setae and lacking posterior lobe. Paratergal plates I, II without spiracle. Spiracles on paratergal III–VII plates larger in size, paratergal plate V spiracle 20.5–30.7 (25.1) in diameter. Spiracle on paratergal plate VIII smaller than other paratergal spiracles.

**Genitalia** (Fig. 1d): Subgenital plate with narrow anterolateral extension and small 3 lacunae on each side. Basal apodeme slightly longer than parameres. Parameres uniformly sclerotized, with pseudopenis tapering to a point extending slightly beyond apices of parameres.

**Female:** [Fig. 2a] Body length 1422–1447 (1434).

**Head:** Head slightly longer than wide, with 4 ApHS and 4 AnMHS. Pre-antennal region short with pointed antero-lateral apex. Dorsally, head with 4 SuHS, 2 Dachs, 2 DAnCHS, 2 DpOCHS, 2 DPHS, and 8 DMHS. Second, 3rd and 4th DMHS offset medially on each side. Ventrally, head with 2 VPHS. Antenna with 5 segments; relative sizes of segments as in male, antennal angle well developed.

**Thorax:** About as wide as long, with 1 pair of DPTS dorsally, DPTS length 110.5–113.6 (112.1). Thoracic sternal plate shield shaped with elongate anterior and posterior processes, posterior process longer than anterior process (Fig. 1b). Paratergites: 3 small lacunae on each side. Basal apodeme slightly longer than parameres. Parameres uniformly sclerotized, with pseudopenis tapering to a point extending slightly beyond apices of parameres.

**Abdomen:** Wider than thorax. Dorsally, 3 tergites per segment, except for segments 2, 7 with 2 tergites and 1 tergite. All tergites narrow. Tergite 1 with 1 pair of TeAS posterolaterally. Tergite 2 with 2 pairs of TeAS posterolaterally, all equal in length. Tergites 3, 4, 6, 15, 17 with 5 TeAS, respectively. Tergites 5, 7, 10, 12–14, and 16 each with 3 pairs of TeAS. Tergites 8, 9, 11 each with 7 TeAS, respectively. Tergites 18,
Table 2. Murine rodent specimens (n = 46) from which new species of Hoplopleura sucking lice were collected

<table>
<thead>
<tr>
<th>Host species</th>
<th>Museum accession No.</th>
<th>Collection Locality</th>
<th>Hoplopleura spp. collected</th>
<th>Collection date</th>
<th>Museum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conilurus penicillatus</td>
<td>U6037</td>
<td>Angurugu, Groote Eylandt, NT (13° 59′ 50.4″ S, 136° 28′ 34.8″ E)</td>
<td>5 (5)</td>
<td>Unknown</td>
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<tr>
<td></td>
<td>U5128</td>
<td>Melville Island, Tiwi Islands, NT</td>
<td>3 (12)</td>
<td>28-July-2000</td>
<td>Museum and Art Gallery of the Northern Territory</td>
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<td></td>
<td>U5303</td>
<td>Araru Point, 18 km from Araru Outstation, Cobourg Peninsula, NT. 11° 11′ S, 131° 53′ E</td>
<td>1 (11)</td>
<td>23-June-2001</td>
<td>Museum and Art Gallery of the Northern Territory</td>
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<tr>
<td></td>
<td>M4071</td>
<td>Melville Island, NT. 11° 10′ S, 131° 10′ E</td>
<td>(1)</td>
<td>14-Aug.-1913</td>
<td>South Australian Museum</td>
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<td></td>
<td>MS4823</td>
<td>Wyndham-East Kimberley, Mitchell Plateau, WA. 14° 37′ S, 125° 52′ E</td>
<td>8 (20)</td>
<td>01-Jan.-2003</td>
<td>Western Australian Museum</td>
</tr>
<tr>
<td></td>
<td>MS4632</td>
<td>Wyndham-East Kimberley, Mitchell Plateau, WA. 14° 35′ S, 125° 45′ E</td>
<td>7 (1)</td>
<td>20-May-2003</td>
<td>Western Australian Museum</td>
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<tr>
<td></td>
<td>JM12692</td>
<td>Blair Athol Coal Mine, QLD. 22° 42′ S, 147° 30′ E</td>
<td>21 (63)</td>
<td>02-Dec.-1997</td>
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<td></td>
<td>JM14858</td>
<td>Monkland Station via Alpha, QLD. 23° 23′ S, 146° 28′ E</td>
<td>(4)</td>
<td>13-May-1998</td>
<td>Queensland Museum</td>
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<td>JM4486</td>
<td>Pelican Waterhole, Mt Leonard, QLD. 25° 42′ S, 140° 37′ E</td>
<td>(8)</td>
<td>17-April-1984</td>
<td>Queensland Museum</td>
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<td></td>
<td>JM10077</td>
<td>Cannington Stn, 80 km S McKinlay, QLD. 21° 53′ S, 140° 55′ E</td>
<td>(2)</td>
<td>18-May-1993</td>
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<td>JM11630</td>
<td>Blair Athol Coal Mine, QLD. 22° 42′ S, 147° 36′ E</td>
<td>1 (5)</td>
<td>22-Feb.-1997</td>
<td>Queensland Museum</td>
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<td></td>
<td>JM8816</td>
<td>LAKE YAMMA YAMMA, 2 km EAST, QLD. 26° 17′ S, 141° 37′ E</td>
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<td>12-Sept.-1991</td>
<td>Queensland Museum</td>
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<td></td>
<td>C4530</td>
<td>Charlotte Waters, MacDonnell, NT. 25° 55′ S, 134° 55′ E</td>
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<td>Unknown</td>
<td>Museums Victoria</td>
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<td>C4527</td>
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<td>C4517</td>
<td>Mulka, SA. 28° 21′ S, 138° 39′ E</td>
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<td>C4518</td>
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<td></td>
<td>C11331</td>
<td>Fowlers Gap, NSW. 31° 04′ S, 141° 42′ E</td>
<td>(2)</td>
<td>05-May-1973</td>
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<td>C4513</td>
<td>Mulka, SA. 28° 21′ S, 138° 39′ E</td>
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<td>09-Nov.-1931</td>
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<td>C4515</td>
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<td>C4519</td>
<td>Mulka, SA. 28° 21′ S, 138° 39′ E</td>
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<td>Unknown</td>
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<td>JM12149</td>
<td>Clement SF, Rollingstone, ca. 5 km SE, Townsville, QLD. 19° 04′ S, 146° 25′ E</td>
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<td>21-Oct.-1997</td>
<td>Queensland Museum</td>
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<td></td>
<td>JM11573</td>
<td>Undara NP, Archway Cave, Etheridge, QLD. 18° 13′ S, 144° 34′ E</td>
<td>(1)</td>
<td>20-Nov.-1996</td>
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<td>Unknown</td>
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<td>JM16574</td>
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<td>2</td>
<td>Unknown</td>
<td>Queensland Museum</td>
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<td>U4198</td>
<td>Tjanyera Falls Area, Litchfield National Park, NT. 13° 15′ S, 130° 44′ E</td>
<td>1 (2)</td>
<td>08-Oct.-1995</td>
<td>Museum and Art Gallery of the Northern Territory</td>
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<td></td>
<td>M62366</td>
<td>Halls Creek, WA. 17° 36′ S, 128° 00′ E</td>
<td>17 (1)</td>
<td>01-Jan.-2006</td>
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<td></td>
<td>M61252</td>
<td>Approx 9 km S Great Northern Highway Argyle, Wyndham-East Kimberley, WA. 16° 34′ S, 128° 16′ E</td>
<td>8 (16)</td>
<td>31-Mar.-2012</td>
<td>Western Australian Museum</td>
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<td></td>
<td>M64892</td>
<td>Roebourne, WA. 20° 48′ S, 116° 42′ E</td>
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<td>Sept.-2006</td>
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<td></td>
<td>M61814</td>
<td>Ashburton, WA. 22° 18′ S, 117° 30′ E</td>
<td>4 (2)</td>
<td>Sept.-2005</td>
<td>Western Australian Museum</td>
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Table 2. Continued

<table>
<thead>
<tr>
<th>Host species</th>
<th>Museum accession No.</th>
<th>Collection Locality</th>
<th>Hoplopleura spp. collected</th>
<th>Collection date</th>
<th>Museum</th>
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<tbody>
<tr>
<td><strong>Leporillus conditor</strong></td>
<td>M12291</td>
<td>West Franklin Island, SA. 32° 27' S, 133° 38' E</td>
<td>9 (11)</td>
<td>28-Oct.-1983</td>
<td>South Australian Museum</td>
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<td>M12236</td>
<td>West Franklin Island, SA. 32° 27' S, 133° 38' E</td>
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<td><strong>Mesembriomys gouldii</strong></td>
<td>DTC346</td>
<td>Lower Archer River, QLD. 13° 34’ S, 142° 09’ E</td>
<td>2 (1)</td>
<td>22-July-1933</td>
<td>Museums Victoria</td>
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<td>MG C</td>
<td>DTC349</td>
<td>Caledon Bay, NT. 12° 51’ S, 136° 33’ E</td>
<td>15 (33)</td>
<td>Jan.-1943</td>
<td>Museums Victoria</td>
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<td>M21694</td>
<td>Wyndham-East Kimberley, WA. 14° 36’ S, 125° 54’ E</td>
<td>3 (2)</td>
<td>Jan.-1982</td>
<td>Western Australian Museum</td>
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- **NSW**: New South Wales; **QLD**: Queensland; **SA**: South Australia; **WA**: Western Australia; **NT**: Northern Territory. Collection locality information is from [https://www.ala.org.au](https://www.ala.org.au) (access date: 2 April 2020).

- Number of adult specimens outside brackets, number of nymphal specimens inside brackets.

19 with 2 pairs of TeAS. One pair of DLAS adjacent to each of tergites 6, 7, 9, 12, 13. Tergites 10, 13, 16 each with 2 pairs of adjacent DLAS. Ventrally, 3 sternites per segment except for segment 2 with 1 sternite, and segments 1, 8 each with no sternites. Sternite 1 with 4 pairs of StAS and extended laterally to articulate with paratergal plate II. Sternite 2 extended laterally to articulate with paratergal plate III and with 7 StAS, lateral 2 pairs long and stout, 3rd pair of StAS short, medial StAS longer than 3rd pair. Sterntes 3, 5, 8 each with 7 StAS. Sterntes 4, 7, 10 each with 4 pairs of StAS. Sterntes 6, 9, 11–14 each with 3 pairs of StAS. Sternte 15 with 2 pairs of StAS. Sternte 16 with 4 pairs of StAS, lateral two pairs much longer than medial two pairs. One pair of VLAS adjacent to each of sternites 6, 8, 9, 11–13, and 16. Sternte 15 with 2 pairs of adjacent VLAS.  

**Paratergites**: Paratergal plates (Fig. 2c) present on abdominal segments 1–8. All plates differentially sclerotized. Paratergal plate I small and offset medially. Paratergal plates II–V each with 2 posterior lobes. Paratergal plate II with 1 small medial seta, 2 large posterior setae, and acuminate posterior lobes. Paratergal plate III with 2 large posterior setae and 2 serrated posterior lobes. Paratergal plates IV–VI each with 1 large seta postero-dorsally. Paratergal plates IV with 2 acuminate posterior lobes. Paratergal plate VI with 1 acuminate posterior lobe postero-dorsally. Paratergal plates VII, VIII each with 2 long setae and lacking posterior lobe. Paratergal plates I, II without spiracle. Spiracles on paratergal III–VII plates large in size, spiracle of paratergal plate V 23.5–31.7 (27.6) in diameter. Spiracle on paratergal plate VIII smaller than other paratergal spiracles.  

**Genitalia** (Fig. 2d): Subquadrangular subgenital plate tapering to broadly rounded posterior apex, with 2 small mediolateral setae on each side. Gonopods VIII, IX distinct; gonopods VIII with 3 posterior setae subequal in size; gonopods IX with 3 posterior setae of differing lengths, lateral seta longest and medial seta shortest. Vulvar fimbriae indistinct. Three small setae on each side medial to gonopods IX.  

**Type host**: *Conilurus penicillatus* (Gould, 1842) (Rodentia: Muridae), brush-tailed rabbit rat.  

**Type locality**: Wyndham-East Kimberley, Mitchell Plateau, Western Australia (14° 35’ S, 125° 45’ E).  

**Type material**: Holotype male and allotype female ex *Conilurus penicillatus* (WAM, M54632); holotype, σ, allotype, Φ. Partypes: 3 σ and 1 Φ, same data as for the holotype. Museum accession numbers are linked to the ZooBank record.  

**Additional material examined**: 2 σ ex *Conilurus penicillatus* (WAM, M54832), Wyndham-East Kimberley, Mitchell Plateau, Western Australia (14° 35’ S, 125° 45’ E). 1 Φ ex *Conilurus penicillatus* (MAGNT, U6037), Angurugu, Groote Eylandt, NT (13° 59’ 50.4” S, 136° 28’ 34.8” E).  

**Distribution**: Australia: Western Australia.  

**Etymology**: The species epithet is a noun in apposition referring to the generic name of the host, *Conilurus*. 

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Fig. 1. Hoplopleura conilurudis n. sp. Male. (a) Habitus (dorsal morphology to the left of the midline, ventral morphology to the right). (b) Thoracic sternal plate. (c) Paratergal plates. (d) Genitalia.

Fig. 2. Hoplopleura conilurudis n. sp. Female. (a) Habitus (dorsal morphology to the left of the midline, ventral morphology to the right). (b) Thoracic sternal plate. (c) Paratergal plates. (d) Genitalia.

Remarks. The pre-antennal region of H. conilurudis n. sp. has a pointed anterolateral apex which is different from that in H. irritans Kuhn and Ludwig, 1967, H. calabyi, Johnson, 1960 and H. uromydis Kuhn and Ludwig, 1967 (Johnson 1960, Kuhn and Ludwig 1966). This region is rounded in H. irritans and H. calabyi and truncated in H. uromydis. The third antennal segment of the male H. conilurudis is not sexually dimorphic, which is different from H. irritans. The DMHS of H. conilurudis n. sp. are not aligned, whereas in H. gyomydis Kuhn and Ludwig, 1967, and H. melomydis, the DMHS are all aligned in a row (Kuhn and Ludwig 1966, Weaver 2017). The 2nd, 3rd, and 4th DMHS of H. conilurudis are offset medially, which is similar in H. uromydis, H. villosissima Wang, 2018 and H. irritans but different from H. uromydis, H. villosissima and H. irritans (Kuhn and Ludwig 1966, Wang et al. 2018). Hoplopleura conilurudis n. sp. has four pairs of DMHS, which is different from H. zyzomydis Weaver, 2008 (two pairs), and H. notomydis Weaver, 2017 and H. setosa Weaver, 2017 (three pairs) (Weaver and Barton 2008, Weaver 2017). The sternal plate of H. conilurudis n. sp. is shield shaped, which differentiates it from H. uromydis (less rounded in shape). Hoplopleura conilurudis n. sp. has a small central seta on paratergal plate II, which is absent in H. pacifica Ewing, 1924, H. bidentata (Neumann, 1909), H. cornata Kim, 1972, H. zyzomydis, and H. notomydis (Neumann 1909, Ewing 1924, Kim 1972). Paratergal plates IV–VI each have one large posterior setae in H. conilurudis n. sp. These three paratergal plates have two posterior setae in H. uromydis, H. gyomydis, H. irritans, H. mastacomydis, and H. melomydis, but lack posterior setae in H. notomydis and H. zyzomydis. The spiracle on paratergal plates V of H. conilurudis n. sp. is large in size (male 25.1, female 27.6), and is larger than in H. gyomydis (7–9). Hoplopleura conilurudis n. sp. has one posterior lobe dorsally on paratergal plate VI, whereas H. zyzomydis, H. melomydis, H. notomydis, H. setosa, H. uromydis, H. gyomydis, H. mastacomydis, and H. calabyi have two posterior lobes on this plate. Hoplopleura conilurudis does not have posterior lobes on paratergal plate VII. However, H. setosa, H. melomydis, H. zyzomydis, and H. mastacomydis have one posterior lobe on this paratergal plate, whereas H. mastacomydis and H. calabyi have two posterior lobes on this plate. Hoplopleura conilurudis has two posterior setae on paratergal plate III, whereas H. mastacomydis has one short and stout seta posteriorly. Males of H. conilurudis have one pair of DLAS on each segment of IV to VI; H. uromydis, H. calabyi, and H. mastacomydis have no DLAS on the abdomen. The female of H. conilurudis has two pairs of DLAS on tergites 10, 13 and 16, and two pairs of VLAS on sternites 15, which differentiate it from all other Hoplopleura species in Australia.

Hoplopleura leggadinadis Wang n. sp. (urn:lsid:zoobank.org:act:0D839340-F044-49E4-A996-D337CF663C33).

Male: [n = 5; Fig. 3a] Body length 730–895 (803).
Head: Head longer than wide, with 4 ApHS and 4 AnMHS. Pre-antennal region short, truncated anterolaterally. Antenna with 5 segments; 1st segment large, about as wide as long; 2nd segment smaller, much longer than wide; 3rd–5th segments about as long...
as wide; 4th segment slightly extended postero-apically; distal setae on dorsal surface of antennal segment 3 not sexually dimorphic. Antennal angle not well developed. Dorsally, head with 4 SuHS, 2 DacHS, 2 DAnCHS, 2 DPoCHS, 2 DPHS, and 8 DMHS. Second, 3rd, and 4th DMHS offset medially on each side. Ventrally, head with 2 VPHS.

**Thorax:** Wider than long, with 1 pair of DPTS dorsally, DPTS length 72.7–92.1 (80.7). Thoracic sternal plate shield-shaped, with broadly rounded anterior apex and elongated posterior process (Fig. 3b). Forelegs small, with small acuminate claws; midlegs and hindlegs progressively larger with correspondingly more robust tibio-tarsal claws.

**Abdomen:** Wider than thorax. Dorsally, 1 tergite per segment except for segment 3 with 2 tergites. Tergite 1 with 1 pair of TeAS posterolaterally. Tergite 2 with 2 pairs of TeAS posterolaterally, equal in length. Tergite 3 with 2 pairs of TeAS posterolaterally, lateral pair very long, twice as long as medial pair. Tergites 4–8 each with 7 TeAS, TeAS length varies in tergite 4. One pair of DLAS adjacent to tergite 7. Ventrally, 2 sternites per segment except for segment 3 with 3 sternites, segments 2, 7, 8 each with 1 sternite, and segment 1 with no sternite. Sternite 1 extended laterally to articulate with paratergal plate II and with 4 pairs of StAS, lateral two pairs stout. Sternite 2 partially articulating with paratergal plate III and with 7 StAS, lateral 2 pairs long and stout, medial StAS slightly longer than 3rd pair. Sternite 3 with 4 pairs of StAS, medial pair slightly short and narrow. Sternite 4 with 7 StAS, lateral two pairs slightly stouter and longer than others, medial StAS longer than 3rd lateral pair of StAS. Sternites 5, 7, 9, 10 each with 4 pairs of StAS. Sternites 6, 8 each with 7 StAS. Sternite 11 with 2 pairs of StAS. Sternite 12 with 1 pair of StAS. One pair of VLAS adjacent to each of sternites 6, 8, 9, 11.

**Paratergites:** Paratergal plates (Fig. 3c) present on abdominal segments 1–8. All plates differentially sclerotized. Paratergal plate I small and offset medially. Paratergal plates II–VI each with 2 posterior lobes. Paratergal plate II with 1 small medial seta, 2 large posterior setae and acuminate posterior lobes. Paratergal plate III with 2 large posterior setae and 2 serrated posterior lobes. Paratergal plates IV–VI each with 1 large posterior seta and 2 posterior lobes. Paratergal plates VII, VIII each with 2 large posterior setae. Paratergal plate VII with 1 posterior lobe dorsally, whereas paratergal plate VIII lacks posterior lobe. Paratergal plates I, II without spiracle. Spiracle of paratergal plate VIII smaller than other paratergal spiracles.

**Genitalia (Fig. 3d):** Subgenital plate with narrow anterolateral extension on each side and 4 lacunae; posterior lacunae slightly larger than anterior lacunae. Basal apodeme slightly longer than parameres. Parameres narrow, uniformly sclerotized, with pseudopenis tapering to a point extending slightly beyond apices of parameres. Female: \([n = 4; \text{Fig. } 4a]\) Body length 843–1317 (1007).

**Head:** Head longer than wide, with 4 APhS and 4 AnMHS. Pre-antennal region short, truncated anterolaterally. Antenna with 5 segments; relative sizes of segments as in male. Antennal angle weak. Dorsally, head with 4 SuHS, 2 DacHS, 2 DAnCHS, 2 DPoCHS, 2 DPHS, and 8 DMHS. Second, 3rd, and 4th DMHS offset medially on each side. Ventrally, head with 2 VPHS.

**Thorax:** Wider than long, with 1 pair of DPTS dorsally, DPTS length 68.6–107.5 (88.6). Thoracic sternal plate shield shaped with broadly rounded anterior apex and elongate posterior process (Fig. 4b). Forelegs small, with small acuminate claws; midlegs and hindlegs progressively larger with correspondingly more robust tibio-tarsal claws.

**Abdomen:** Wider than thorax. Dorsally, 3 tergites per segment except for segments 1, 2 each with 1 tergite and segment 8 with 2 tergites. All tergites narrow. Tergite 1 with 1 pair of TeAS posterolaterally. Tergites 2, 3 each with 2 pairs of TeAS posterolaterally, equal in length. Tergites 4, 6, 9, 12–16 each with 5 TeAS. Tergites 5, 17, 18 each with 2 pairs of TeAS. Tergites 7, 10 each with 7 TeAS. Tergites 8, 11 each with 3 pairs of TeAS. Tergites 16, 17 each with 2 pairs of TeAS. One pair of DLAS adjacent to each of tergites 9, 10, 13, 15, 17. Ventrally, 3 sternites per segment, except for segment 2 with 1 sternite, and segment 1, 8 with no sternite. Sternite 1 with 9 StAS, lateral pair stout and extended laterally to articulate with paratergal plate II. Sternite 2 extended laterally to articulate with paratergal plate III and with 7 StAS, lateral 2 pairs long and stout, 3rd pair of stae short, medial StAS slightly longer than 3rd pair. Sternites 3, 5, 11–14 each 7 StAS. Sternites 4, 7–10 with 4 pairs of StAS, respectively. Sternites 6, 15 each with 3 pairs of StAS. Sternite 16 with 4 pairs of StAS, varying in size, lateral 2 pairs much longer than others. One pair of VLAS adjacent to each of sternites 8, 9, 11–13, 15, 16.

**Paratergites:** Paratergal plates (Fig. 4c) present on abdominal segments 1–8. All plates differentially sclerotized. Paratergal plate I small and offset medially. Paratergal plates II–VI each with 2 posterior lobes. Paratergal plate II with 1 small medial seta, 2 large posterior setae, and acuminate posterior lobes. Paratergal plate III with 2 large posterior setae and 2 serrated posterior lobes. Paratergal plates IV–VI each with 1 large posterior seta. Paratergal plates VII, VIII each with 2 large posterior setae. Paratergal plate VII with 1 posterior lobe dorsally, whereas paratergal plate VIII lacks posterior lobes. Paratergal plates I, II without spiracle. Spiracle of paratergal plate...
plate V 16.4–26.6 (19.9) in diameter. Paratergal plate VIII with small spiracle.

*Genitalia* (Fig. 4d): Subtriangular subgenital plate with 5 small mediolateral setae. Gonopods VIII, IX distinct; gonopods VIII with 3 posterior setae subequal in size; gonopods IX with 3 posterior setae of differing lengths, lateral seta longest and medial seta shortest. Vulvar fimbriae indistinct. Three small setae on each side medial to gonopods IX.

**Type host.** *Leggadina lakedownensis* (Watts, 1976) (Rodentia: Muridae), lakeland downs mouse.

**Type locality.** Approx. 9 km S Great Northern Highway Argyle, Wyndham-East Kimberley, Western Australia (16° 34′ S, 146° 25′ E).

**Type material.** Holotype male and allotype female ex *Leggadina lakedownensis* (WAM, M61252): holotype, ♂, allotype, ♀. Paratypes: 2 ♂ and 2 ♀, same data as for the holotype. Museum accession numbers are linked to the ZooBank record.

**Additional material examined.** 2 ♂, 1 ♀ ex *Leggadina lakedownensis* (QM, JMI12149), Clement SF, Rollingstone, ca. 5 km SE, Townsville, Queensland (19° 04′ S, 146° 25′ E).

**Distribution.** Australia: Queensland and Western Australia.

**Etymology.** The species epithet is a noun in apposition referring to the genus name of the host, *Leggadina*.

**Remarks.** The pre-antennal region of *H. leggadinadis* n. sp. is truncated anteriorly, which is different from that in *H. irritans*, *H. calabys*, and *H. bidentata*. Anteriorly, the pre-antennal region is rounded in *H. irritans* and *H. calabys*, but narrow and pointed in *H. bidentata*. The third antennal segment of *H. leggadinadis* n. sp. is not sexually dimorphic, which differentiates it from *H. irritans*, *H. gyomydis*, and *H. mastacomydis*, but no posterior setae in *H. notomydis* and *H. zyzomydis*. The DMHS of *H. leggadinadis* n. sp. are not aligned in a row, whereas in *

**Abdomen:** Wider than thorax. Dorsally, 1 tergite per segment, except for segment 3 with 2 tergites. Tergite 1 with 1 pair of TeAS posterolaterally. Tergite 2 with 2 pairs of TeAS posterolaterally, all equal in length. Tergite 3 with 2 pairs of TeAS posterolaterally, with TeAS much longer on each side. Tergite 4 with 9 TeAS, lateral 2 pairs longer than others. Tergite 5 with 5 pairs of TeAS. Tergites 6, 7 each with 4 pairs of TeAS. Tergite 8 with 7 TeAS. One pair of DLS on segments 6–7. Forelegs small, with small acuminate claws; midlegs and hindlegs progressively larger with corresponding more robust tibio-tarsal claws.

**Abdomen:** Wider than thorax. Dorsally, 1 tergite per segment, except for segment 3 with 2 tergites. Tergite 1 with 1 pair of TeAS posterolaterally. Tergite 2 with 2 pairs of TeAS posterolaterally, all equal in length. Tergite 3 with 2 pairs of TeAS posterolaterally, with TeAS much longer on each side. Tergite 4 with 9 TeAS, lateral 2 pairs longer than others. Tergite 5 with 5 pairs of TeAS. Tergites 6, 7 each with 4 pairs of TeAS. Tergite 8 with 7 TeAS. One pair of DLS adjacent to each of tergites 5–8. Ventrally, 2 sternites per segment except segment 4 which has 3 sternites, segment 2 with 1 sternite, segment 1, 8 with no sternites. Sternite 1 extended laterally to articulate with paratergal plate II and with 7 StAS. Sternite 2 extended laterally to...
articulate with paratergal plate III and with 7 StAS, lateral 2 pairs long and stout, 3rd pair setae short, medial StAS longer than 3rd pair. Sternite 3 with 4 pairs of StAS, equal in length. Stermites 4, 7 each with 7 StAS. Stermites 5, 6 each with 9 StAS. Stermites 8–10 each with 3 pairs of StAS. Sternite 11 with 2 pairs of StAS. Sternite 12 with 1 pair of TeAS. One pair of VLAS adjacent to each of sternites 6, 8, 10, 11.

Paratergites: Paratergal plates (Fig. 5c) present on abdominal segments 1–8. All plates differentially sclerotized. Paratergal plate I small and offset medially. Paratergal plates II–VI each with 2 posterior lobes. Paratergal plate II with 1 small medial seta, 2 large posterior setae, and acuminate posterior lobes. Paratergal plate III with 2 large setae and 2 serrated posterior lobes. Paratergal plates IV–VI each with 1 large seta and 1 tiny seta. Paratergal plates VII, VIII each with 2 large setae. Paratergal plate VI with 2 acuminate posterior lobes. Paratergal plate VII with 1 posterior lobe dorsally. Paratergal plate VIII lacks posterior lobes. Paratergal plates I, II, VIII without spiracles. Spiracles on paratergal plates III–VII, medium in size, spiracle of paratergal plate V 13.3–17.4 (15.4) in diameter.

Genitalia (Fig. 5d): Subgenital plate with narrow anterolateral extension on each side and 6 lacunae; 4 anterior lacunae slightly smaller than 2 posterior lacunae. Basal apodeme much longer than parameres. Parameres uniformly sclerotized, tapering posteriorly with pseudopenis tapering to point extending well beyond apices of parameres.

Female: [n = 5; Fig. 6a] Body length 973–1173 (1089).

Head: Head longer than wide, distinctly narrower in anterior half, with 4 ApHS and 4 AnMHS. Pre-antennal region short, rounded anterolaterally. Antenna with 5 segments with relative sizes as in male, distal seta on dorsal surface of antennal segment 3 not sexually dimorphic. Antennal angle not well developed. Dorsally, head with 4 SuHS, 2 DacHS, 2 DAnCHS, 2 DPoCHS, 2 DPHS, and 8 DMHS; 2nd, 3rd, and 4th DMHS offset medially on each side. Ventrally, head with 2 VPoHS.

Thorax: Wider than long, with 1 pair of DPTS dorsally, DPTS length 93.1–102.4 (97.7). Thoracic sternal plate shield shaped with short anterior process and elongate posterior process (Fig. 6b). Forelegs small, with small acuminate claws; midlegs and hindlegs progressively larger with correspondingly more robust tibio-tarsal claws.

Abdomen: Wider than thorax. Dorsally, 3 tergites per segment except for segments 1, 2, 8 each with 1 tergite. All tergites narrow. Tergite 1 with 1 pair of TeAS postolaterally. Tergite 2 with 2 pairs of TeAS postolaterally, equal in length. Tergites 3, 4, 6, 15, 16 each with 5 TeAS. Tergites 5, 7, 9, 10, 12–14 each with 3 pairs of TeAS. Tergite 8 with 7 TeAS. Tergites 9, 12, 13, 15, 16. Ventrally, 3 sternites on each segment except for segment 2 with 1 sternite, and segments 1, 8 with no sternites. Sternite 1 extended laterally to articulate with paratergal plate II and with 4 pairs of StAS. Sternite 2 extended laterally to articulate with paratergal plate III and with 7 StAS, lateral 2 pairs long and stout, 3rd pair setae short, medial StAS longer than 3rd pair. Stermites 3, 9, 12, 15 each with 3 pairs of StAS. Stermites 4–6, 8, 11, 14 each with 7 StAS. Stermites 7, 10, 13 each with 4 pairs of StAS. Stermite 16 with 4 pairs of StAS, lateral two pairs much longer than medial 2 pairs. One pair of VLAS adjacent to each of sternites 8, 9, 11–13, 15, 16.

Paratergites: Paratergal plates (Fig. 6c) present on abdominal segments 1–8. All plates differentially sclerotized. Paratergal plate I small and offset medially. Paratergal plates II–VI each with 2

Genitalia (Fig. 6d): Subtriangular subgenital plate with 5 small mediolateral setae. Gonopods VIII, IX distinct; gonopods VIII with 3 posterior setae of differing lengths, lateral seta longest and medial seta shortest. Vulvar fimbriae indistinct. Three small setae on each side medial to posterior setae on paratergal plate III, whereas Hoplopleura mastacomydis n.sp. has one posterior lobe but lack posterior setae on H. mastacomydis, H. notomydis, and H. zyzomydis. Paratergal plates IV–VII of H. forrestima n.sp. each have one large posterior and one tiny posterior seta. Paratergal plates IV–VI of H. villoissima, H. setosa, H. conilurudis, and H. leggadinadis have one large posterior seta but lack posterior setae on H. notomydis and H. villoissima. Paratergal plate VII of H. forrestima n.sp. has one posterior lobe dorsally, whereas in H. mastacomydis and H. calabyi this plate has two posterior lobes. Hoplopleura forrestima, H. gyomydis, H. irritans, H. uromydis, H. villoissima, H. bidentata, H. conilurudis, H. pacifica, H. mastacomydis, and H. calabyi all lack a posterior lobe on paratergal plate VII. Hoplopleura forrestima n.sp. has two posterior setae on paratergal plate III, whereas H. mastacomydis has one short, stout seta. The spiracle diameter on paratergal plate V of H. forrestima n.sp. (male 15.4, female 19.1) is smaller than in H. uromydis (34–37), H. bidentata (25–28), H. melomydis (male 25, female 25.8), and H. conilurudis (male 25.1, female 27.6), but larger than in H. gyomydis (7–9). The male of H. forrestima n.sp. has one pair of DLAS adjacent to abdominal segments IV–VI and one pair of VLAS adjacent to segments IV–VII, whereas males of H. uromydis, H. calabyi, and H. mastacomydis have no DLAS on these segments. The female of H. forrestima n.sp. has three sternites on segments 3–6, whereas H. bidentata has two sternites on the corresponding segments. The female of H. forrestima n.sp. has 12 pairs of DLAS, whereas H. leggadinadis has eight pairs.

Hoplopleura forrestima

Type host. Leggadina forresti (Thomas, 1906) (Rodentia: Muridae), forrest’s mouse.

Type locality. Blair Athol Coal Mine, Queensland, Australia (22° 42′ S, 147° 30′ E).

Type material. Holotype male and allotype female ex Leggadina forresti (QM, JM 12692): holotype, ♂, allotype, ♀. Paratypes: 1 ♂ and 2 ♀, same data as for the holotype. Museum accession numbers are linked to the ZooBank record.

Additional material examined. 2 ♂ and 1 ♀ ex Leggadina forresti (MV, C4518), Mulka, South Australia (28° 21′ S, 138° 39′ E); 1 ♀ ex Leggadina forresti (MV, C4514), Mulka, South Australia (28° 21′ S, 138° 39′ E).

Distribution. Australia: Queensland and South Australia.

Etymology. The species epithet is a noun in apposition referring to the specific name of the host, Leggadina forresti.

Remarks. The pre-antennal region of H. forrestima n.sp. is rounded anteriorly, which is different from that in H. uromydis, H. mastacomydis, H. leggadinadis, and H. bidentata. The anterior pre-antennal region is truncate in H. uromydis and H. leggadinadis, less rounded in H. mastacomydis, and narrow and prominent in H. bidentata. The third antennal segment of the male of H. forrestima n.sp. is not sexually dimorphic, which is different from H. irritans. The DMHS of H. forrestima n.sp. are not aligned in a row, whereas in H. gyomydis and H. mastacomydis, the DMHS are all aligned in a row. The sternal plate of H. forrestima n.sp. is shield shaped with a small anterior and a longer posterior process, whereas in H. uromydis, it is less rounded in shape and has long anterior and posterior processes. Hoplopleura forrestima n.sp. has a small central seta on paratergal plate II, which is absent in H. pacifica, H. bidentata, H. cornata, H. zyzomydis, and H. notomydis. Paratergal plates IV–VI of H. forrestima n.sp. each have one large posterior and one tiny posterior seta. Paratergal plates IV–VI of H. villoissima, H. setosa, H. conilurudis, and H. leggadinadis have one large posterior seta but lack posterior setae on H. notomydis and H. villoissima. Paratergal plate VII of H. forrestima n.sp. has one posterior lobe dorsally, whereas in H. mastacomydis and H. calabyi this plate has two posterior lobes. Hoplopleura forrestiana, H. gyomydis, H. irritans, H. uromydis, H. villoissima, H. bidentata, H. conilurudis, H. pacifica, H. mastacomydis, and H. calabyi all lack a posterior lobe on paratergal plate VII. Hoplopleura forrestiana n.sp. has two posterior setae on paratergal plate III, whereas H. mastacomydis has one short, stout seta. The spiracle diameter on paratergal plate V of H. forrestiana n.sp. (male 15.4, female 19.1) is smaller than in H. uromydis (34–37), H. bidentata (25–28), H. melomydis (male 25, female 25.8), and H. conilurudis (male 25.1, female 27.6), but larger than in H. gyomydis (7–9). The male of H. forrestiana n.sp. has one pair of DPTS dorsally, DPTS length 93.1–97.2 (98.1). Thoracic sternal plate sub-hexagonal with slightly elongated anterior and posterior processes (Fig. 7c). Forelegs small, with small acuminate claws; midlegs and hindlegs progressively larger with correspondingly more robust tibio-tarsal claws, midlegs almost two times longer than forelegs.

Abdomen: Wider than thorax. Dorsally, 1 tergite per segment except for segment 3 with 2 tergites. All tergites broad and wide with no adjacent DLAS. Tergite 1 with 1 pair of long, narrow TeAS posterolaterally. Tergite 2 with 2 pairs of narrow TeAS...
posteriorly, all equal in length. Tergite 3 with 2 pairs of narrow setae posterolaterally, lateral pair very long, nearly twice as long as medial pair. Tergite 4 with 7 TeAS, lateral pair of TeAS long and stout, second lateral pair of TeAS longer than lateral pair, other TeAS on tergite 4 very short. Tergites 5–7 each with 7 narrow TeAS. Middle TeAS on tergite 5 short. Tergite 8 with 5 narrow TeAS, with middle TeAS shorter. Tegite 9 with 1 pair of TeAS. Ventrally, 2 sternites per segment except for segment 4 with 3 sternites, segment 2 with 1 sternite, but segments 1, 8 without sternites. All sternites broad and wide with no adjacent VLAS. Sternte 1 with 8 StAS, gradually increasing in length laterally to medially. Sternte 1 extended laterally to articulate with paratergal plate II. Sternte 2 with 7 StAS, lateral 2 pairs longer and stoutet, 3rd pair of StAS shorter than medial StAS. Sternte 3 with 7 StAS, equal in length. Sternte 4, 6, 8, 10 each with 5 StAS. Sternte 5, 7, 9 each with 3 pairs of StAS. Sternte 11 with 2 pairs of StAS. Sternte 12 with 1 pair of StAS.

Paratergites: Paratergal plates (Fig. 7d) present on abdominal segments 1–8. All plates differentially sclerotized. Paratergal plate I small and offset medially. Paratergal plates II–V each with 2 posterior acuminate lobes. Paratergal plate II with 1 small medial seta and 2 large posterior setae. Paratergal plate III with 2 large setae. Paratergal plates IV–VI each with 1 large seta dorsally. Paratergal plates VII, VIII each with 2 long setae and lacking posterior lobe. Paratergal plates I, II without spiracles. Spiracle on paratergal plate V 16.4–24.6 (20.5) in diameter. Spiracle on paratergal plate VIII in small size.

Genitalia (Fig. 7e): Subgenital plate with narrow anterolateral extension on each side. Basal apodeme about twice as long as parameres. Parameres uniformly sclerotized, with broad pseudopenis tapering to broad apex extending slightly beyond apices of parameres. Female: [n = 5; Fig. 8a] Body length 1146–1276 (1215). Head: Head slightly longer than wide, with 4 ApHS and 4 AnMHS. Pre-antennal region short, truncated anteriorly. Antenna with 5 segments. Distal seta on 3rd segment of antenna narrow and short (Fig. 7b). Antennal angle well developed. Dorsally, head with 4 SuHS, 2 DaChS, 2 DaAnCHS, 2 DpOCHS, 2 DPHS, and 8 DMHS. DMHS aligned in row and offset medially. Ventrally, head with 2 VPHS.

Thorax: Wider than long, with 1 DPTS on each side, DPTS length 86–100.3 (95.2). Thoracic sternal plate sub-hexagonal with elongate anterior and posterior processes (Fig. 8b). Forelegs small, with small acuminate claws; midlegs and hindlegs progressively larger with correspondingly more robust tibio-tarsal claws, midlegs almost two times longer than forelegs.

Abdomen: Wider than thorax. Dorsally, 3 tergites per segment except for segments 1, 2, 8 each with 1 tergite. All tergites broad and wide with no adjacent VLAS. Sternte 1 with 1 pair of long TeAS posterolaterally. Sternte 2 with 2 pairs of TeAS posterolaterally, equal in length. Tergite 3 with 2 pairs of TeAS posterolaterally. Tergites 4, 6, 7, 9 10, 12, 13, 16 each with 5 TeAS. Tergites 5, 8, 11, 14, 15, 17, 18 each with 2 pairs of TeAS. Ventrally, 3 sternites per segment, except for segment 2 with 1 sternite, and segments 1, 8 no sternites. Sternte 1 with 4 pairs of StAS and extended laterally to articulate with paratergal plate II. Sternte 2 with 7 setae, lateral 2 pairs long and stout, middle StAS longer than 3rd pair of StAS. Sternte 3, 4, 7, 9, 10, 12, 13, 15 each with 3 pairs of StAS, equal in length. Sternte 5, 8, 11, 14 each with 5 StAS. Sternte 6 with 7 StAS. Sternte 16 with 4 pairs of StAS, of varying lengths, lateral 2 pairs of StAS longest. One pair of VLAS adjacent to sternite 15.

Paratergites: Paratergal plates (Fig. 8c) present on abdominal segments 1–8. All plates differentially sclerotized. Paratergal plate I small and offset medially. Paratergal plates II–V each with 2 posterior acuminate lobes. Paratergal plate II with 1 small medial seta and 2 large posterior setae. Paratergal plate III with 2 large setae. Paratergal plates IV–VI each with 1 large seta dorsally. Paratergal plates VII, VIII each with 2 long setae and lacking posterior lobe. Paratergal plates I, II without spiracles. Spiracle on paratergal plate V 18.4–22.5 (22.5) in diameter. Spiracle on paratergal plate VIII in small size.

Head: Head slightly longer than wide, with 4 ApHS and 4 AnMHS. Pre-antennal region short, truncated anteriorly. Antenna with 5 segments. Distal seta on 3rd segment of antenna narrow and short (Fig. 7b). Antennal angle well developed. Dorsally, head with 4 SuHS, 2 DaChS, 2 DaAnCHS, 2 DpOCHS, 2 DPHS, and 8 DMHS. DMHS aligned in row and offset medially. Ventrally, head with 2 VPHS.

Thorax: Wider than long, with 1 DPTS on each side, DPTS length 86–100.3 (95.2). Thoracic sternal plate sub-hexagonal with elongate anterior and posterior processes (Fig. 8b). Forelegs small, with small acuminate claws; midlegs and hindlegs progressively larger with correspondingly more robust tibio-tarsal claws, midlegs almost two times longer than forelegs.

Abdomen: Wider than thorax. Dorsally, 3 tergites per segment except for segments 1, 2, 8 each with 1 tergite. All tergites broad and wide with no adjacent VLAS. Sternte 1 with 1 pair of long TeAS posterolaterally. Sternte 2 with 2 pairs of TeAS posterolaterally, equal in length. Tergite 3 with 2 pairs of TeAS posterolaterally. Tergites 4, 6, 7, 9 10, 12, 13, 16 each with 5 TeAS. Tergites 5, 8, 11, 14, 15, 17, 18 each with 2 pairs of TeAS. Ventrally, 3 sternites per segment, except for segment 2 with 1 sternite, and segments 1, 8 no sternites. Sternte 1 with 4 pairs of StAS and extended laterally to articulate with paratergal plate II. Sternte 2 with 7 setae, lateral 2 pairs long and stout, middle StAS longer than 3rd pair of StAS. Sternte 3, 4, 7, 9, 10, 12, 13, 15 each with 3 pairs of StAS, equal in length. Sternte 5, 8, 11, 14 each with 5 StAS. Sternte 6 with 7 StAS. Sternte 16 with 4 pairs of StAS, of varying lengths, lateral 2 pairs of StAS longest. One pair of VLAS adjacent to sternite 15.

Paratergites: Paratergal plates (Fig. 8c) present on abdominal segments 1–8. All plates differentially sclerotized. Paratergal plate I small and offset medially. Paratergal plates II–V each with 2 posterior acuminate lobes. Paratergal plate II with 1 small medial seta and 2 large posterior setae. Paratergal plate III with 2 large setae. Paratergal plates IV–VI each with 1 large seta dorsally. Paratergal plates VII, VIII each with 2 long setae and lacking posterior lobe. Paratergal plates I, II without spiracles. Spiracle on paratergal plate V 18.4–22.5 (22.5) in diameter. Spiracle on paratergal plate VIII in small size.

Fig. 8. *Hoplopleura leporilludis* n. sp. Female. (a) Habitus (dorsal morphology to the left of the midline, ventral morphology to the right). (b) Thoracic sternal plate. (c) Paratergal plates. (d) Genitalia.
Remarks. The pre-antennal region of *H. leporilludis* n. sp. is truncated anterolaterally, which differentiates it from *H. irritans*, *H. calabyi*, *H. forrestima* n. sp., and *H. bidentata*. The anterolateral pre-antennal region is rounded in *H. irritans*, *H. calabyi*, and *H. forrestima* n. sp., and narrow and pointed in *H. bidentata*. The third antennal segment of *H. leporilludis* is sexually dimorphic, which is seen in *H. irritans* but not in other *Hoplopleura* species in Australia. The DMHS of *H. leporilludis* n. sp. are aligned in a row and offset medially, whereas in *H. uromydis*, *H. villosissima*, *H. irritans*, *H. leggadinaidis*, and *H. conilurudis* they are not aligned in a row. *Hoplopleura leporilludis* n. sp. has four pairs of DMHS, which is different from *H. zyzomydis* (two pairs), and *H. notomydis* and *H. setosa* (three pairs). The sternal plate of *H. leporilludis* n. sp. is sub-hexagonal; however, the sternal plate is shield shaped in *H. gyomydis*, *H. irritans*, *H. mastacomydis*, *H. villosissima*, *H. zyzomydis*, *H. melomydis*, *H. conilurudis*, and *H. forrestima*. *Hoplopla leporilludis* n. sp. has a small central seta on paratergal plate II, which is not present in *H. pacifica*, *H. bidentata*, *H. cornata*, *H. zyzomydis*, and *H. notomydis*. Paratergal plates IV–VI have one large posterior seta in *H. leporilludis* n. sp. These three paratergal plates have two posterior setae in *H. uromydis* n. sp. but only one in *H. villosissima* and *H. conilurudis*. The spiracle on paratergal plate V of *H. leporilludis* n. sp. is smaller than in *H. uromydis* (34–37), *H. bidentata* (25–28), *H. melomydis* (male 25, female 25.8), and *H. conilurudis* (male 25.1, female 27.6) but larger than in *H. gyomydis* (7–9). *Hoplopleura leporilludis* n. sp. lacks posterior lobes on paratergal plate VII. *Hoplopleura setosa*, *H. melomydis*, and *H. zyzomydis* have one posterior lobe on this paratergal plate, whereas *H. mastacomydis*, *H. leggadinaidis*, and *H. calabyi* have two posterior lobes on this plate. *Hoplopleura leporilludis* n. sp. has two posterior setae on paratergal plate III, whereas *H. mastacomydis* has one short, stout seta posteriorly. *Hoplopleura leporilludis* n. sp. does not have DLAS or VLAS, except for the segment 7 of female, which has 1 pair of VLAS. *Hoplopleura gyomydis*, *H. irritans*, *H. melomydis*, *H. forrestima*, *H. leggadinaidis*, and *H. villosissima* have both DLAS and VLAS on segments 4–7; however, *H. calabyi* and *H. zyzomydis* have VLAS on those segments, whereas *H. setosa* has VLAS on small plates next to the tergites. The female of *H. leporilludis* n. sp. has three sternites on segments 3–7, whereas *H. bidentata* has two sternites on the corresponding segments.

*Hoplopleura mesembriomydis* Wang n. sp. (urn:lsid:zoobank.org:act:4E420990-E8D0-4BE1-9B65-BBCED51FE7D6). Male: \(|n = 3; \) Fig. 9a] Body length 1011–1232 (1067). Head: Head longer than wide, with 4 APHS and 4 AnMHS. Pre-antennal region long with pointed anterolateral apex. Antenna with 5 segments, distal seta on dorsal surface of antennal segment 3 not sexually dimorphic. Antennal angle not well developed. Dorsally, head with 4 SuHS, 2 DacHS, 2 DAnCHS, 2 DPoCHS, 2 DPHS, and 8 DMHS. DMHS not aligned in row, 2nd, 3rd, and 4th DMHS offset medially. Ventrally, head with 2 VPHS.

Thorax: Wider than long, with 1 pair of DPTS dorsally, DPTS length 80.9–124.96 (102.3). Thoracic sternal plate shield shaped with elongated anterior and posterior processes (Fig. 9b). Forelegs small, with small acuminate claws; midlegs and hindlegs progressively larger with correspondingly more robust tibio-tarsal claws.

Abdomen: Wider than thorax. Dorsally, 1 tergite per segment except for segment 3 with 2 tergites. Tergite 1 with 1 pair of TeAS posterolaterally. Tergite 2 with 2 pairs of TeAS posterolaterally, lateral pair shorter. Tergite 3 with 2 pairs of TeAS posterolaterally, lateral pair very long, twice as long as medial pair. Tergites 4–6 each with 5 TeAS, middle TeAS shorter than others on tergite 4. Tergites 7, 8 each with 3 pairs of TeAS. One pair of DLAS adjacent to each of tergites 5–8. Ventrally, 2 sternites per segment except for segment 3 with 3 sternites, and segments 2, 7, 8 each with 1 sternite. Sternite 1 extended laterally to articulate with paratergal plate II and with 4 pairs of StAS. Sternite 2 partially articulating with paratergal plate III and with 7 StAS, lateral 2 pairs long and stout, 3rd pair of setae short, middle StAS longer than 3rd pair. Stermites 3, 7 each with 3 pairs of StAS. Stermites 4–6 and 8–10 each with 5 StAS, sternite 11 with 2 pairs of StAS, sternite 12 with 1 pair of StAS. One pair of VLAS adjacent to each of sternites 8, 10, 11.

Paratergites: Paratergal plates (Fig. 9c) present on abdominal segments 1–8. All plates differentially sclerotized. Paratergal plate I small and offset medially. Paratergal plate II with 1 small medial seta, 2 large posterior setae and acuminate posterior lobes. Paratergal plate III with 2 large setae and 2 serrated posterior lobes. Paratergal plates IV–VI each with 2 large setae, equal in length. Paratergal plates IV–VI with 2 serrated posterior lobes. Paratergal plate VII with pointed posterior lobe dorsally. Paratergal plates VIII each with 2 long setae. Paratergal plate VIII lacking posterior lobe. Paratergal plates I, II with no spiracle. Spiracles on paratergal

![Fig. 9. Hoplopleura mesembriomydis n. sp. Male. (a) Habitus (dorsal morphology to the left of the midline, ventral morphology to the right). (b) Thoracic sternal plate. (c) Paratergal plates. (d) Genitalia.](https://academic.oup.com/jme/advance-article/doi/10.1093/jme/tjaa206/5962924)
plates III–VII large in size, spiracle on paratergal plate V 25.6–34.8 (31.7) in diameter. Spiracle on paratergal plate VIII much smaller in size than those on other plates.

**Genitalia** (Fig. 9d): Subgenital plate with narrow anterolateral extension on each side and 3 lacunae; 2 anterior lacunae smaller than posterior lacuna. Basal apodeme slightly longer than parameres. Parameres uniformly sclerotized, with pseudopenis tapering to point extending slightly beyond apices of parameres.

**Female:** \(n = 3\) [Fig. 10a] Body length 1354–1509 (1460). **Head:** Head longer than wide, with 4 ApHS and 4 AnMHS. Pre-antennal region short with rounded anterior apex. Antenna with 5 segments, distal seta on dorsal surface of antennal segment 3 not sexually dimorphic. Antennal angle weak. Dorsally, head with 4 SuHS, 2 DacHS, 2 DAnCHS, 2 DPoCHS, 2 DPHS, and 8 DMHS. Second, 3rd, and 4th DMHS offset medially on each side. Ventrally, head with 2 VPHS.

**Thorax:** Wider than long, with 1 pair of DPTS dorsally, DPTS length 124.9–140.2 (130.7). Thoracic sternal plate shield shaped with elongate anterior and posterior processes (Fig. 10b). Forelegs small, with small acuminate claws; midlegs and hindlegs progressively larger with correspondingly more robust tibio-tarsal claws.

**Abdomen:** Wider than thorax. Dorsally, 3 tergites per segment except for segments 1, 2, 8 with 1 tergite each; all tergites narrow. Tergite 1 with 1 pair of TeAS posterolaterally. Tergite 2 with 2 pairs of TeAS posterolaterally, lateral pair shorter than other pair. Tergites 3, 5, 17, 18 each with 2 pairs of TeAS. Tergites 4, 6, 8, 15 each with 5 TeAS. Tergites 7, 9, 11–14, and 16 with 3 pairs of TeAS. Tergite 10 with 7 TeAS. One pair of DLAS adjacent to each of tergites 10, 12, 13, 15, 16. Ventrally, 3 sternites per segment except for segment 2 with 1 sternite and segments 1, 8 with no sternites. Sternite 1 extended laterally to articulate with paratergal plate II and with 4 pairs of StAS. Sternite 2 extended laterally to articulate with paratergal plate III and with 7 StAS, lateral 2 pairs long and stout, 3rd pair of setae short, medial StAS longer than 3rd pair. Stermites 3, 5, 8 each with 7 StAS; sternites 4, 7, 9, 10, 16 each with 4 pairs of StAS; sternites 6, 11–14 each with 3 pairs of StAS; sternite 15 with 2 pairs of StAS. Sternite 16 with 4 pairs of StAS varying in size, lateral 2 pairs much longer than medial 2 pairs. One pair of VLAS adjacent to each of sternites 10, 12, 13, 15, 16.

**Paratergites:** Paratergal plates (Fig. 10c) present on abdominal segments 1–8. All plates differentially sclerotized. Paratergal plate I small and offset medially. Paratergal plates II–VI each with 2 posterior lobes. Paratergal plate II with 1 small medial seta, 2 large posterior setae, and acuminate posterior lobes. Paratergal plates III with 2 large setae and 2 serrated posterior lobes. Paratergal plates IV–VI each with 2 large setae, equal in length. Posterior lobes on paratergal plates IV–VI serrated. Paratergal plate VII with pointed posterior lobe dorsally. Paratergal plates VII, VIII each with 2 long setae. Paratergal plate VIII lacking posterior lobe. Paratergal plates I, II with no spiracle. Spiracle on paratergal plate V 35.8–43 (38.4) in diameter. Spiracle on paratergal plate VIII much smaller in size than those on other plates.

**Genitalia** (Fig. 10d): Subtriangular subgenital plate with 5 small mediolateral setae. Gonopods VIII, IX distinct; gonopods VIII with 3 posterior setae with medial seta shorter than 2 lateral setae; gonopods IX with 3 posterior setae of differing lengths, lateral seta longest and medial seta shortest. Vulvar fimbriae indistinct. Three small setae on each side medial to gonopods IX.

**Type host:** *Mesembriomys gouldii* (Gray, 1843) (Rodentia: Muridae), black-footed tree rat.

**Type locality:** Caledon Bay, Northern Territory, Australia (12° 51′ S, 136° 33′ E).

**Type material.** Holotype male and allotype female ex *Mesembriomys gouldii* (MV, DTC349): holotype, \(\sigma\), allotype, \(\varphi\). Paratypes: 2 \(\sigma\) and 2 \(\varphi\), same data as for the holotype. Museum accession numbers are linked to the ZooBank record.

**Distribution.** Australia: Northern Territory.

**Etymology.** The species epithet is a noun in apposition referring to the name of the host genus, *Mesembriomys*.

**Remarks.** The pre-antennal region of *H. mesembriomydis* n. sp. is not sexually dimorphic, which differentiates it from *H. irritans, H. calabyi,* and *H. uromydis*. The anterior pre-antennal region is rounded in *H. irritans* and *H. calabyi*, and truncated in *H. uromydis*. The third antennal segment of *H. mesembriomydis* n. sp. is not sexually dimorphic, which differentiates it from *H. irritans* and *H. leporilludis*. The DMHS are not aligned in a row in *H. mesembriomydis* n. sp. but are aligned in *H. gyomysis, H. mastacomydis, H. melomydis,* and *H. leporilludis*. The sternal plate of *H. mesembriomydis* n. sp. is shield shaped, different from *H. uromydis* (less rounded) and *H. leporilludis* (sub-hexagonal). Paratergal plate II of *H. mesembriomydis* n. sp. has a small central seta, which is not present in *H. pacifica, H. bidentata, H. cornuta, H. zyzomydis,* or *H. notomydis*. Paratergal plates IV–VI of *H. mesembriomydis* n. sp. have two posterior setae and two pointed posterior lobes. These three paratergal plates all have one large seta and one small/minute posterior setae in *H. uromydis, H. gyomysis, H. irritans, H. mastacomydis, H. forrestima,* and *H. melomydis,* and have one posterior seta in *H. setosa, H. villosissimus, H. comiludus, H. leggadinae,* and *H. leporilludis,* but lack posterior setae in...
H. notomydis and H. zyzomydis. The spiracle on paratergal plate V of H. mesembriomydis n. sp. is larger than in H. irritans (12–16), H. mastacomydis (11–14), H. conilurudis (male 25.1, female 27.6), H. leporilludis (male 20.5, female 22.5), H. villosissima (male 18.4, female 20), H. zyzomydis (male 15.8, female 17.6), H. notomydis, H. setosa, H. forrestima (male 15.4, female 19.1), H. leggadinadis (male 14.8, female 19.9), H. gyroomydis (7–9), and H. calabyi. Paratergal plate VII of H. mesembriomydis n. sp. has one posterior lobe dorsally. Hoplopleura mastacomydis and H. calabyi both have two posterior lobes on this plate, whereas H. cornata, H. gyroomydis, H. irritans, H. uromydis, H. villosissima, H. bidentata, H. pacifica, H. conilurudis, and H. leporilludis lack posterior lobes on paratergal plate VII. Hoploplura mesembriomydis n. sp. has two posterior setae on paratergal plate III, which differentiate it from H. mastacomydis, which has one short, stout seta posteriorly. The male of H. mesembriomydis n. sp. has both posterior lobes on paratergal plate III, which differentiate it from H. mastacomydis, H. mastacomydis, H. notomydis, and H. leporilludis have no VLAS. In comparison with H. mesembriomydis n. sp., H. setosa has VLAS only on the small plates next to tergites on those segments. The female of H. mesembriomydis n. sp. has three sternites on abdominal segments 3–6, whereas H. bidentata has two sternites on the corresponding segments.


Male: [n = 3; Fig. 11a] Body length 880–1125 (965).

Head: Head longer than wide, with 4 ApHS and 4 AnMHS. Premandibular region long and rounded anterolaterally. Antenna with 5 segments, distal seta on dorsal surface of antennal segment 3 not sexually dimorphic. Antennal angle well developed. Dorsally, head with 4 SuHS, 2 DacHS, 2 DAnCHS, 2 DPoCHS, 2 DPHS, and 8 DMHS. DMHS all aligned in row. Ventrally, head with 2 VPHS.

Thorax: Wider than long, with 1 pair of DPTS dorsally, DPTS length 101.6–123.5 (115.7). Thoracic sternal plate broadly rounded anteriorly with elongated posterior process (Fig. 11b). Forelegs small, with small acuminate claws; midlegs and hindlegs progressively larger with corresponding more robust tibio-tarsal claws.

Abdomen: Wider than thorax. Dorsally, 1 tergite per segment except for segment 3 with 2 tergites. Tergite 1 with 1 pair of TeAS posterolaterally. Tergite 2 with 2 pairs of TeAS posterolaterally, all equal in length. Tergite 3 with 2 pairs of TeAS posterolaterally, lateral pair distinctly longer than medial pair. Tergite 4 with 7 TeAS, lateral pair of setae very long. Tergites 5–8 each with 9 TeAS. One pair of DLAS adjacent to tergite 8. Ventrally, 2 sternites per segment except for segment 3 with 3 sternites, segment 2 with 1 sternite, and segment 1 with no sternites. Sternite 1 extended laterally to articulate with paratergal plate II and with 4 pairs of StAS. Sternite 2 extended laterally to articulate with paratergal plate III and with 7 StAS, lateral 2 pairs long and stout, medial StAS longer than 3rd pair of StAS. Sternites 3, 6, 8 each with 3 pairs of StAS. Sternites 4, 5, 7, 9, 10 each with 7 StAS. Lateral 3rd pair of StAS short on sternite 4, Sternite 11 with 2 pairs of StAS. Sternite 12 with 1 pair of StAS. One pair of VLAS adjacent to each of sternites 6, 8, 9, 11.

Fig. 11. Hoplopleura macrurusa n. sp. Male. (a) Habitus (dorsal morphology to the left of the midline, ventral morphology to the right). (b) Thoracic sternal plate. (c) Paratergal plates. (d) Genitalia.

Fig. 12. Hoplopleura macrurusa n. sp. Female. (a) Habitus (dorsal morphology to the left of the midline, ventral morphology to the right). (b) Thoracic sternal plate. (c) Paratergal plates. (d) Genitalia.
Paratergites: Paratergal plates (Fig. 11c) present on abdominal segments 1–8. All plates differentially sclerotized. Paratergal plate I small and offset medially. Paratergal plate II with 1 small medial seta, 2 large posterior setae and acuminate posterior lobes. Paratergal plate III with 2 large setae and 2 acuminate posterior lobes. Paratergal plates IV–VI each with 1 large seta posterovertrally. Paratergal plates IV, V each with 2 serrated posterior lobes. Paratergal plate VI with 1 acuminate posterior lobe dorsally. Paratergal plates VII, VIII each with 2 long setae and lacking posterior lobes. Paratergal plates I, II with no spiracle. Spiracles on paratergal plates III–VII large. Spiracle on paratergal plate V 18.5–22.3 (20.9) in diameter. Spiracle on paratergal plate VIII much smaller than those on other plates.

Genitalia (Fig. 11d): Subgenital plate with narrow anterolateral extension and 1 lacuna. Basal apodeme almost twice as long as parameres. Parameres uniformly sclerotized, with pseudopenis tapering to point extending slightly beyond apices of parameres. Female: [n = 2; Fig. 12a] Body length 1320–1452 (1386).

Genitalia. Male: [n = 2; Fig. 12b] Body length 1320–1452 (1386). Head: Head longer than wide, with 4 ApHS and 4 AnMHS. Antennal segment 3 not sexually dimorphic. Antenna well developed. Dorsally, head with 4 SuHS, 2 DacHS, 2 DAnCHS, 2 DPoCHS, 2 DPHS, and 8 DMHS. DMHS all aligned in row. Ventrally, head with 2 VPHS. Thorax: Wider than long, with 1 pair of DPTS dorsally, DPTS length 115.5–135.6 (125.5). Thoracic sternite broadly rounded anteriorly and with elongated posterior process (Fig. 12b). Forelegs small, with small acuminate claws; midlegs and hindlegs progressively larger with correspondingly more robust tibio-tarsal claws.

Abdomen: Wider than thorax. Dorsally, 3 tergites per segment except for segments 1, 2, 8 with 1 tergite each. Tergite 1 with 1 pair of TeAS posterolaterally. Tergite 2 with 2 pairs of TeAS posterolaterally, equal in length. Tergite 3 with 2 pairs of TeAS posterolaterally, medial pair twice as long as lateral pair. Tergites 4, 7, 9, 10, 15 each with 3 pairs of TeAS. Tergites 5, 8, 14, 17, 18 each with 2 pairs of TeAS. Tergites 6, 11, 13, 16 each with 5 TeAS. Tergite 12 with 7 TeAS. One pair of DLAS adjacent to each of tergites 10, 12, 13, 15, 16. Ventrally, 3 sternites per segment except for segment 3 with 4 sternites, segments 2, 7 each with 1 sternite, and segments 1, 8 each with no sternites. Sternite 1 extended laterally to articulate with paratergal plate II and with 4 pairs of StAS. Sternite 2 extended laterally to articulate with paratergal plate III and with 7 StAS, lateral 2 pairs long and stout, 3rd pair of StAS short, medial StAS twice as long as 3rd pair of StAS. Sternites 3, 6, 7, 9, 10, 12, 13, 15 each with 3 pairs of StAS. Sternites 4, 5, 8 each with 7 setae. Third pair of StAS on sternite 5 short. Sternites 11, 14 each with 5 StAS. Sternite 16 with 4 pairs of StAS varying in size, lateral 2 pairs of StAS long, medial 2 pairs very small. One pair of VLAS adjacent to each of sternites 8, 10, 13, 15, 16.

Paratergites: Paratergal plates (Fig. 12c) present on abdominal segments 1–8. All plates differentially sclerotized. Paratergal plate I small and offset medially. Paratergal plates II–V each with 2 posterior lobes. Paratergal plate II with 1 small medial seta, 2 large posterior setae and acuminate posterior lobes. Paratergal plate III with 2 large posterior setae and 2 acuminate posterior lobes. Paratergal plates IV–VI each with 1 large seta posterovertrally. Paratergal plates IV, V each with 2 serrated posterior lobes. Paratergal plate VI with 1 acuminate posterior lobe dorsally. Paratergal plates VII, VIII each with 2 long posterior setae and lacking posterior lobes. Paratergal plates I, II with no spiracle. Spiracle on paratergal plate V 20.2–25.3 (22.7) in diameter. Spiracle on paratergal plate VIII small in size.

Genitalia (Fig. 12d): Genitalia with subquadranular subgenital plate with 2 small mediolateral setae on each side. Gonopods VIII, IX distinct; gonopods VIII with 3 posterior setae subequal in size; gonopods IX with 3 posterior setae of differing lengths, lateral seta longest and medial seta shortest. Vulvar fimbiae indistinct. Three small setae on each side medial to gonopods IX.

Type host. Mesembriomydis macrurus (Peters, 1876) (Rodentia: Muridae), golden-backed tree rat.

Type locality. Wyndham-East Kimberley, Western Australia, Australia: Western Australia.

Etymology. The species epithet is a noun in apposition referring to the name of the host species, Mesembriomydis macrurus.

Remarks. The pre-antennal region of H. macrurus n. sp. is rounded anteriorly, which differs from H. uromydis, H. leporillidus, H. conilurudis, H. bidentata, and H. mesembriomydis. The anterior pre-antennal region is truncated in H. uromydis, H. leporillidus, and H. conilurudis, and narrow and pointed in H. bidentata and H. mesembriomydis. The third antennal segment of H. macrurus n. sp. is not sexually dimorphic, which differs from H. irritans and H. leporillidus. The DMHS are aligned in a row in H. macrurus n. sp. but not in H. uromydis, H. villosissima, H. bidentata, H. irritans, H. zyzomydis, H. conilurudis, H. foresterata, H. leggadnidis, or H. mesembriomydis. The sternal plate of H. macrurus n. sp. is rounded anteriorly, which differs from that of H. uromydis (less rounded) and H. leporillidus (sub-hexagonal). Paratergal plate II of H. macrurus n. sp. has a small central seta, which is not present in H. pacifica, H. bidentata, H. conilurata, H. zyzomydis, or H. notomydis. Paratergal plates IV–VI each have one large posterior seta in H. macrurus n. sp. These three paratergal plates each have two posterior setae in H. uromydis, H. gomydis, H. irritans, H. mastacomydis, H. foresterata, H. melomydis, H. notomydis, and H. mesembriomydis, but no posterior seta in H. zyzomydis.

Hoplopleura macrurus n. sp. does not have a posterior lobe on paratergal plate VII, but H. foresterata, H. leggadnidis, H. setosa, H. melomydis, H. zyzomydis, and H. mesembriomydis all have one posterior lobe, and H. mastacomydis and H. calabyi all have two posterior lobes on paratergal plate VII. Hoplopleura macrurus n. sp. has two posterior setae on paratergal plate III, whereas H. mastacomydis has one short, stout posterior seta on that plate. The spiracle on paratergal plate V of H. macrurus n. sp. is medium in size (male 20.9, female 22.7), smaller than in H. uromydis (34–37), H. bidentata (25–28), H. melomydis (male 25, female 25.8), and H. mesembriomydis (male 31.7, female 38.4), but larger than in H. gomydis (7–9). The posterior lobes on paratergal plates III–VII of H. macrurus n. sp. are pointed and unilobate, which is distinct from other Australian Hoplopleura species, except for H. setosa and M. mesembriomydis. The male of H. macrurus n. sp. only has one pair of DLAS on segment 7, which differentiates it from all other Hoplopleura species in Australia. The female of H. macrurus n. sp. has three sternites on segment 3–6, whereas H. bidentata has two sternites on these segments.


Male: [n = 2; Fig. 13a] Body length 735–816 (775.5).

Head: Head slightly longer than wide, with 4 ApHS and 4 AnMHS. Pre-antennal region short, rounded anterolaterally. Antenna with 5
segments, distal seta on dorsal surface of antennal segment 3 not sexually dimorphic. Antennal angle well developed. Dorsally, head with 4 SuHS, 2 DacHS, 2 DAnCHS, 2 DPoCHS, 2 DPHS, and 8 DMHS. Second, 3rd, and 4th DMHS offset medially on each side. Ventrally, head with 2 VPHS.

Thorax: Wider than long, with 1 pair of DPTS dorsally, short in length, DPTS length 67.6–81.9 (74.7). Thoracic sternal plate broadly rounded anteriorly with elongate posterior process (Fig. 13b). Forelegs small, with small acuminate claws; midlegs and hindlegs progressively larger with correspondingly more robust tibio-tarsal claws.

Abdomen: Wider than thorax. Dorsally, 1 tergite per segment except for segment 3 with 2 tergites, and segments 1, 8 each with no tergites. Tergite 1 with 1 pair of TeAS posterolaterally. Tergite 2 with 2 pairs of TeAS posterolaterally, equal in length. Tergite 3 with 2 pairs of TeAS posterolaterally, lateral pair long. Tergite 4 with 4 pairs of TeAS, lateral pair of setae longer than others. Tergites 5–7 each with 9 TeAS. Tergite 8 with 4 pairs of TeAS. One pair of DLAS adjacent to each of tergites 5–8. Ventrally, 2 sternites per segment except for segment 3 with 3 sternites, segment 2 with 1 sternite, and segments 1, 8 each with no sternites. Sternite 1 extended laterally to articulate with paratergal plate II and with 4 pairs of StAS. Sternite 2 extended laterally to articulate with paratergal plate III and with 7 StAS, lateral 2 pairs long and stout. Sternite 3 with 4 pairs of StAS, lateral two pairs longer than others. Stermites 4, 6, 8–10 each with 7 StAS. Stermites 5, 7 each with 4 pairs of StAS. Sternite 11 with 2 pairs of StAS. Sternite 12 with 1 pair of StAS. One pair of VLAS adjacent to each of sternites 6, 7, 9–11.

Paratergites: Paratergal plates (Fig. 13c) present on abdominal segments 1–8. All plates differentially sclerotized. Paratergal plate I small and offset medially. Paratergal plates II–V each with 2 posterior lobes. Paratergal plate II with 1 small medial seta, 2 large posterior setae and 2 acuminate posterior lobes. Paratergal plate III with 2 large posterior setae and 2 serrated posterior lobes. Paratergal plates IV–VI each with 1 large seta posterodorsally. Paratergal plates IV–VI each with 2 serrated posterior lobes. Paratergal plate VII with 2 long posterior setae and 1 posterior lobe dorsally. Paratergal plate VIII with 2 long posterior setae but no posterior lobe. Paratergal plates I, II, VIII with no spiracle. Spiracle on paratergal plate V 13.3–13.7 (13.5) in diameter.

Genitalia (Fig. 13d): Subgenital plate with narrow anterolateral extension and 2 lacunae on each side; anterior lacunae larger than posterior lacunae. Basal apodeme slightly longer than parameres. Parameres uniformly sclerotized, with pseudopenis tapering to pointed apex extending beyond apices of parameres.

Female: \( n = 2; \) Fig. 14a Body length 906–1048 (977).

Head: Head about as long as wide, with 4 ApHS and 4 AnMHS. Pre-antennal region very short, rounded anterolaterally. Antenna with 5 segments. Antennal angle well developed. Dorsally, head with 4 SuHS, 2 DacHS, 2 DAnCHS, 2 DPoCHS, 2 DPHS, and 8 DMHS. Second, 3rd, and 4th DMHS offset medially on each side. Ventrally, head with 2 VPHS.

Thorax: Wider than long, with 1 pair of DPTS dorsally, short in length, DPTS length 78.9–91.1 (85). Thoracic sternal plate broadly rounded anteriorly with elongate posterior process (Fig. 14b). Forelegs small,

Fig. 13. Hoplopleura pogonomydis n. sp. Male. (a) Habitus (dorsal morphology to the left of the midline, ventral morphology to the right). (b) Thoracic sternal plate. (c) Paratergal plates. (d) Genitalia.

Fig. 14. Hoplopleura pogonomydis n. sp. Female. (a) Habitus (dorsal morphology to the left of the midline, ventral morphology to the right). (b) Thoracic sternal plate. (c) Paratergal plates. (d) Genitalia.
with small acuminate claws; midlegs and hindlegs progressively larger with corresponding more robust tibio-tarsal claws.

**Abdomen:** Wider than thorax. Dorsally, 3 tergites per segment, except for segments 1, 2 with 1 tergite each. Tergite 1 with 1 pair of TeAS posterolaterally. Tergite 2 with 2 pairs of TeAS posterolaterally, equal in length. Tergite 3 with 2 pairs of TeAS posterolaterally, lateral pair longer than others. Tergites 4, 11, 14, 15, 17 each with 7 TeAS. Tergites 5–10, 12, 13, 16, 18 each with 3 pairs of TeAS. Tergite 19 with 2 pairs of TeAS; tergite 20 with 1 pair of TeAS; tergite 10 with 4 pairs of TeAS. One pair of DLAS adjacent to each of tergites 11–18. Ventrally, 3 sternites per abdominal segment except for segment 2-w with 1 sternite, and segments 1, 8 each with no sternites. Sternite 1 extended laterally to articulate with paratergal plane II and with 4 pairs of StAS, lateral 2 pairs of StAS long and stout. Stermites 2, 8, 10, 11, 13 each with 7 setae. Stermites 3–5, 7, 9, 12, 14, 16 each with 4 pairs of StAS. StAS on sternite 16 varying in size. Sternite 6 with 9 StAS. Sternite 15 with 3 pairs of StAS. One pair of VLAS adjacent to each of sternites 8–16.

**Paratergites:** Paratergal plates (Fig. 14c) present on abdominal segments 1–8. All plates differentially sclerotized. Paratergal plate I small and offset medially. Paratergal plates II–V each with 2 posterior lobes. Paratergal plate II with 1 small medial seta, 2 large posterior setae and 2 acuminate posterior lobes. Paratergal plate III with 2 large posterior setae and 2 serrated posterior lobes. Paratergal plates IV–VI each with 1 large seta posterodorsally and 2 serrated posterior lobes. Paratergal plate VII with 2 long posterior setae and 1 posterior lobe dorsally. Paratergal plate VIII with 2 long posterior setae but no posterior lobes. Paratergal plates I, II, VIII with no spiral. Spiracles on paratergal plates III–VII small in size. Spiracle on paratergal plate V 14.3–16.7 (15.4) in diameter.

**Genitalia** (Fig. 7d): Genitalia with subtriangular subgenital plate with 2 small mediolateral setae on each side. Gonopods VIII, IX distinct; gonopods VIII with 3 posterior setae subequal in size; gonopods IX with 3 posterior setae of differing lengths, lateral seta longest and medial seta shortest. Vulvar fimbriae indistinct. Three left setae with correspondingly more robust tibio-tarsal claws.

**Type host:** *Pogonomys mollipilosus* (Peters and Doria, 1881) (Rodentia: Muridae), prehensile-tailed rat.

**Type locality:** Shiptons Flat, Queensland, Australia (15° 48’ S, 145° 00’ E).

**Type material:** Holotype male and allotype female ex *Pogonomys mollipilosus* (QM, JM10590): holotype, σ, allotype, ő. Paratype: 1 ő, same data as for the holotype. Museum accession numbers are linked to the ZooBank record.

**Additional material examined.** 1 & σ ex *Pogonomys mollipilosus* (QM, JM14682), Shiptons Flat, Queensland (15° 48’ S, 145° 00’ E).

**Distribution.** Australia: Queensland.

**Etymology.** The species epithet is a noun in apposition referring to the name of the host genus, *Pogonomys.*

**Remarks.** The pre-antennal region of *H. pogonomydis* n. sp. is rounded anteriorly, which is different from *H. uromydis*, *H. leporillidus*, *H. conilurudis*, *H. leggadinadis*, *H. mastacomymdis*, *H. bidentata*, and *H. mesembriomydis*. The anterior pre-antennal region is truncated in *H. uromydis*, *H. leporillidus*, *H. conilurudis*, and *H. leggadinadis*; it is less rounded in *H. mastacomymdis*, and narrow and pointed in *H. bidentata* and *H. mesembriomydis*. The third antennal segment of *H. pogonomydis* n. sp. is not sexually dimorphic, unlike in *H. irritans* and *H. leporillidus*. The DMHS of *H. pogonomydis* n. sp. are not aligned in a row. The most anterior DMHS is at the top of the post antennal angle, and the other DMHS are offset medially in *H. pogonomydis* n. sp., which differentiates it from *H. uromydis*, *H. villosissima*, *H. irritans*, *H. zyzomydis*, *H. notomydis*, *H. setosa*, *H. gyomydis*, *H. mastacomymdis*, *H. leporillidus*, and *H. melomydis*. The DMHS are aligned in a row in *H. gyomydis*, *H. mastacomymdis*, *H. leporillidus*, and *H. melomydis*. In *H. uromydis*, *H. villosissima*, and *H. irritans*, the 2nd and 3rd DMHS are offset medially. *Hoplopleura zyzomydis* has two pairs of DMHS, whereas *H. notomydis* and *H. setosa* have three pairs of DMHS. The sternal plate of *H. pogonomydis* n. sp. is broadly rounded anteriorly; in *H. uromydis* and *H. leporillidus*, the sternal plate is less rounded anteriorly. Paratergal plate II of *H. pogonomydis* n. sp. has a small central seta, which is not present in *H. pacifica*, *H. bidentata*, *H. cornata*, *H. zyzomydis*, or *H. notomydis*. Paratergal plates IV to VI have one large posterior seta dorsally in *H. pogonomydis* n. sp. These three paratergal plates have two posterior setae in *H. uromydis*, *H. gyomydis*, *H. irritans*, *H. mastacomymdis*, *H. forrestima*, *H. melomydis*, *H. notomydis*, and *H. mesembriomydis*, but lack posterior setae in *H. notomydis* and *H. zyzomydis*. A dorsal posterior lobe is present on paratergal plate VII in *H. pogonomydis* n. sp. but not in *H. cornata*, *H. gyomydis*, *H. irritans*, *H. uromydis*, *H. villosissima*, *H. bidentata*, *H. pacifica*, *H. conilurudis*, *H. leporillidus*, or *H. macrurusa*. However, *H. mastacomymdis* and *H. calabyi* have two posterior lobes on the corresponding plate. *Hoplopleura pogonomydis* n. sp. has two posterior setae on paratergal plate III, whereas *H. mastacomymdis* has one short, stout seta posteriorly on that plate. The spiral on paratergal plate V of *H. pogonomydis* n. sp. is small in size (male 13.5, female 15.4), smaller than in *H. villosissima* (male 18.4, female 20), *H. zyzomydis* (male 15.8, female 17.6), *H. conilurudis* (male 25.1, female 27.6), *H. forrestima* (male 15.4, female 19.1), *H. leggadinadis* (male 14.8, female 19.9), *H. uromydis* (34–37), *H. bidentata* (25–28), *H. melomydis* (male 25, female 25.8), *H. leporillidus* (male 20.5, female 22.5), *H. macrurusa* (male 20.9, female 22.7), and *H. mesembriomydis* (male 31.7, female 38.4). The male of *H. pogonomydis* n. sp. has one pair of DLAS on abdominal segments 4–7; *H. macrurusa*, however, has only one pair of DLAS on segment 7. The male of *H. pogonomydis* n. sp. has one pair of VLAS adjacent to the anterior and posterior sternites of segments 5 and 7 but has no VLAS on segment 6, which is different from all other *Hoplopleura* species in Australia. The female *H. pogonomydis* n. sp. has three sternites on segments 3–6, whereas *H. bidentata* has two sternites on those segments.


**Male:** [n = 1; Fig. 15a] Body length 845.

**Head:** Head about as long as wide, with 4 ApHS and 4 AnMHS. Pre-antennal region long, slightly pointed anterolaterally. Antenna with 5 segments, distal seta on dorsal surface of antennal segment 3 not sexually dimorphic. Antennal angle well developed. Dorsally, head with 4 SuHS, 2 DaCHS, 2 DAnCHS, 2 DPoCHS, 2 DPHS, and 8 DMHS. Second, 3rd and 4th DMHS offset medially on each side. Ventrally, head with 2 VPHS.

**Thorax:** Wider than long, with 1 pair of DPTS dorsally, DPTS length 73. Thoracic sternal plate shield shaped, broadly rounded anteriorly, and with elongated posterior process (Fig. 16b). Forelegs small, with small acuminate claws; midlegs and hindlegs progressively larger with correspondingly more robust tibio-tarsal claws.

**Abdomen:** Wider than thorax. Dorsally, 1 tergite per abdominal segment except for segment 3 with 2 tergites. Tergite 1 with 1 pair of TeAS posterolaterally, short in length. Tergite 2 with 2 pairs of TeAS posterolaterally, lateral pair longer than other TeAS. Tergite 3 with...
2 pairs of TeAS posterolaterally, lateral pair very long. Tergites 4–6 each with 9 TeAS, posterolateral 2 pairs of TeAS longest; other TeAS pairs varying in length with middle TeAS shortest. Tergite 7 with 4 pairs of TeAS, posterolateral pair long and stout, other 3 pairs short and equal in length. Tergite 8 with 3 pairs of TeAS. One pair of DLAS adjacent to tergite 8. Ventrally, 2 sternites per segment except for segments 2, 8 with 1 sternite each, and segment 1 with no sternites. Sternite 1 extended laterally to articulate with paratergal plate II and with 4 pairs of StAS, posterolateral two pairs long and stout. Sternite 2 extended laterally to articulate with paratergal plate III with and 7 StAS, posterolateral 2 pairs and stout, medial StAS longer than 3rd pair of StAS on this sternite. Sternite 3 with 4 pairs of StAS, posterolateral 2 pairs and stout. Sternites 4, 6, 8 each with 7 StAS, posterolateral 2 pairs and stout. Sternite 11 with 2 pairs of StAS; sternite 12 with 1 pair of StAS. One pair of VLAS adjacent to each of sternites 6, 8, 9, 11.

**Paratergites:** Paratergal plates (Fig. 8c) present on abdominal segments 1–8. All plates differentially sclerotized. Paratergal plate I small and offset medially. Paratergal plates II–VI each with 2 posterior lobes. Paratergal plate II with 1 small medial seta, 2 large posterior setae, and 2 acuminate posterior lobes. Paratergal plate III with 2 large posterior setae and 2 serrated posterior lobes. Paratergal plates IV–VI each with 1 large seta posterodorsally, paratergal plates IV, V each with 2 serrated posterior lobes, paratergal plate VI with 2 serrated undivided acuminate posterior lobes. Paratergal plates VII, VIII each with 2 long posterior setae but no posterior lobes. Paratergal plates I, II with no spiracle. Spiracle on paratergal plate V 23.5 in diameter. Spiracle on paratergal plate VIII distinctly smaller than spiracles on plates III–VII.

**Genitalia (Fig. 15d):** Subgenital plate with narrow anterolateral extension on each side and 2 lacunae. Basal apodeme slightly longer than parameres. Parameres uniformly sclerotized with pseudopenis tapering to point slightly beyond apices of parameres.

Female: \(n = 1\); Fig. 16a] Body length 1055.

**Head:** Head about as long as wide, with 4 ApHS and 4 AnMHS. Pre-antennal region long, slightly pointed anterolaterally. Antenna with 5 segments, distal seta on dorsal surface of antennal segment 3 not sexually dimorphic. Antennal angle well developed. Dorsally, head with 4 SuHS, 2 DacHS, 2 DAnCHS, 2 DPoCHS, 2 DPHS and 8 DMHS. Second, 3rd and 4th DMHS shifting medially on each side. Ventrally, head with 2 VPHS.

**Thorax:** Wider than long, with 1 pair of DPTS dorsally, DPTS length 90.1. Thoracic sternal plate shield-shaped, broadly rounded anteriorly and with elongated posterior process. Forelegs small, with small acuminate claws; midlegs and hindlegs progressively larger with correspondingly more robust tibio-tarsal claws, midlegs nearly twice as long as forelegs.

**Abdomen:** Wider than thorax. Dorsally, 3 tergites per segment except for segments 1, 2, 8 each with 1 tergite. All tergites narrow. Tergite 1 with 1 pair of TeAS posterolaterally. Tergite 2 with 2 pairs...
of TeAS posterolaterally, equal in length. Tergite 3 with 2 pairs of long TeAS posterolaterally, equal in length. Tergite 4 with 7 TeAS, 2nd pair of lateral TeAS long. Tergites 5, 7, 10, 13, 15 each with 3 pairs of TeAS. Tergites 6, 8, 9, 12, 14 each with 7 TeAS. Tergites 11, 17, 18 each with 5 TeAS. Tergite 16 with 2 pairs of TeAS. One pair of DLAS adjacent to each of tergites 9, 13, 15. Ventrally, 3 sternites per segment except for segment 2 with 1 sternite, segment 7 with 2 sternites and segments 1, 8 each with no sternite. Sternite 1 extended laterally to articulate with paratergal plate II and with 4 pairs of StAS. Sternite 2 extended laterally to articulate with paratergal plate III and with 7 StAS, lateral 2 pairs long and stout, middle StAS longer than 3rd pair of StAS. Stermites 3–9, 12, 14 each with 3 pairs of StAS. Stermites 10, 11, 13 each with 7 StAS. Sternite 15 with 4 pairs of StAS, varying in size, lateral two pairs much longer than other pairs. One pair of VLAS adjacent to each of sternites 8, 11, 15.

Paratergites: Paratergal plates (Fig. 8c) present on abdominal segments 1–8. All plates differentially sclerotized. Paratergal plate I small and offset medially. Paratergal plates II–VI each with 2 posterior lobes. Paratergal plate II with 1 small medial seta, 2 large posterior setae, and 2 acuminate posterior lobes. Paratergal plate III with 2 large posterior setae and 2 serrated posterior lobes. Paratergal plates IV–VI each with 1 large seta posterodorsally, paratergal plates IV, V each with 2 serrated posterior lobes, paratergal plate VI with 2 serrated undivided acuminate posterior lobes. Paratergal plates VIII, VII each with 2 long posterior setae but no posterior lobe. Paratergal plates I, II with no spiracle. Spiracles on paratergal plates III–VII large in size. Spiracle on paratergal plate V 26.6 in diameter. No spiracle on paratergal plates I, II. Spiracle on plate VIII distinctly smaller than spiracles on plates III–VII.

Genitalia (Fig. 16d): Genitalia with subtriangular subgenital plate with broadly rounded anterolateral and posterior margins and 3 small mediolateral setae on each side. Gonopods VIII, IX distinct; gonopods VIII with 3 posterior setae of differing lengths, lateral seta longest and mediolateral seta shortest. Vulvar fimbriae indistinct. Three small setae on gonopods VIII with 3 posterior setae subequal in size; gonopods IX with 3 posterior setae subequal. Gonopods VIII, IX distinct; with broadly rounded anterolateral and posterior margins and 3 posterior setae each. Genitalia smaller than spiracles on plates III–VII. Spiracle on paratergal plate II 26.6 in diameter. Spiracle on paratergal plate III 26.6 in diameter. Spiracle on paratergal plate IV 26.6 in diameter. Spiracle on paratergal plate V 26.6 in diameter. Spiracle on paratergal plate VI 26.6 in diameter. Spiracle on paratergal plate VII 26.6 in diameter.

Type host. Xeromyza myoides (Thomas, 1889) (Rodentia: Muridae), false water rat.

Type locality. Ramingining Area, Arafura Swamp, East Arnhem, Northern Territory, Australia (12°12′S, 134°59′E).

Type material. Holotype male ex Xeromyza myoides (MAGNT, U4744): holotype, σ. Museum accession number is linked to the ZooBank record.

Additional material examined. 1♂ ex Xeromyza myoides (QM, JM9480), Myora, N Stradbroke Is, Queensland, Australia (27°27′S, 153°25′E).

Distribution. Australia: Northern Territory and Queensland.

Etymology. The species epithet is a noun in apposition referring to the host genus, Xeromys.

Remarks. The pre-antennal region of H. xeromydis n. sp. is slightly pointed anterolaterally. However, H. uromydis, H. leporilludis, H. cornuta, and H. leggadinadis have a truncated pre-antennal region anterolaterally, whereas in H. irritans, H. calabry, H. macrurus, and H. pogonomys, it is rounded. The third antennal segment of H. xeromydis n. sp. is not sexually dimorphic, which is different from H. irritans and H. leporilludis. The DMHS of H. xeromydis n. sp. are not aligned in a row. The most anterior DMHS is on the top of the postantennal angle and the 2nd, 3rd, and 4th DMHS are offset medially in H. xeromydis n. sp. The DMHS are aligned in a row in H. uromydis, H. mastacomys, H. leporilludis, and H. melomysid. In H. uromydis, H. villoissima and H. irritans, only the 2nd and 3rd DMHS are offset medially. Hoploplura xeromydis n. sp. has four DMHS on each side; H. zyzomydis has only two DMHS on each side, whereas H. notomydis and H. setosa each have three DMHS on each side. The sternal plate of H. xeromydis n. sp. is shield shaped which differentiates it from B. uromydis (less rounded) and H. leporilludis (sub hexagonal). Paratergal plate II of H. xeromydis n. sp. has a small central seta, which is not present in H. pacifica, H. bidentata, H. cornuta, H. zyzomydis, or H. notomydis. Paratergal plates IV–VI of H. xeromydis n. sp. each have one large posterior seta. Two posterior setae are adjacent to these plates in H. uromydis, H. glyomydis, H. irritans, H. mastacomys, H. forrestima, H. melomysid, H. notomydis, and H. mesembriomydis, whereas no posterior seta is adjacent to these plates in H. zyzomydis. Paratergal plate VII of H. xeromydis n. sp. has no posterior lobe, compared with one posterior lobe on that plate in H. forrestima, H. setosa, H. melomysid, H. zyzomydis, H. mastacomys, H. leggadinadis, and H. mesembriomydis, and two posterior lobes in H. mastacomys and H. calabry. Hoplopleura xeromydis n. sp. has two setae on paratergal plate III, whereas H. mastacomys has one short, stout seta posteriorly. The spiral on paratergal plate V of H. xeromydis n. sp. is large (male 23.5, female 26.6), larger than those in H. irritans (12–16), H. mastacomys (11–14), H. leporilludis (male 20.5, female 22.5), H. villoissima (male 18.4, female 20), H. zyzomydis (male 15.8, female 17.6), H. forrestima (male 15.4, female 19.1), H. leggadinadis (male 14.8, female 19.9), H. glyomydis (7–9), and H. pogonomys (male 13.5, female 15.4). The male H. xeromydis n. sp. has one DLAS only on segment 7, unlike all other Hoplopleura species in Australia except for H. macrurus. The female of H. xeromydis n. sp. has three sternites on abdominal segments 3–6, whereas H. bidentata has two sternites on these segments.

Discussion

We describe eight new species of sucking lice belonging to the genus Hoplopleura from six genera of Old Endemic rodents in Australia: Conilurus, Leggadina, Leporillus, Mesembriomys, Pogonomys, and Xeromys. The new species of sucking lice, H. cornuta, H. leggadinadis, H. forrestima, H. leporilludis, H. mesembriomydis, H. macrurus, H. pogonomys, and H. xeromydis, are similar in overall morphology to each other and with the 12 Hoplopleura species described previously from endemic rodents in Australia. However, these eight new species are distinct from each other and from other previously described species based on a combination of detailed key morphological characters, which allow us to provide an updated identification key for the Australian Hoplopleura species (Table 3).

We collected only two adult louse specimens from the false water rat, Xeromyza myoides: a male from a rat specimen collected in the East Arnhem, Northern Territory, and a female from a rat specimen collected on North Stradbroke Island, Queensland (Table 2). The false water rat is a vulnerable species with only 34 specimens stored in museums across Australia (from https://www.ala.org.au). These two louse specimens from different localities (>3,000 km apart) share six morphological characters (Figs. 15 and 16): 1) the head pre-antennal region slightly pointed anterolaterally; 2) the position of DMHS on each side of head not aligned in a row with the 2nd, 3rd, and 4th DMHS offset medially; 3) the thoracic sternal plate shield-shaped, broadly rounded anteriorly with elongated posterior process; 4) only one posterior seta each on paratergal plates IV–VI; 5) the posterior lobes are serrated on paratergal plates IV and V; 6) the posterior lobe is pointed on paratergal plate VI; and 7) no posterior lobes on paratergal plates VII–VIII. We describe these two specimens as the same species, Hoplopleura xeromydis, based on these
Table 3. Key for the identification of sucking lice in the genus Hopopleura parasitizing native rodents in Australia

<table>
<thead>
<tr>
<th>No.</th>
<th>Key characters</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Distal seta on dorsal surface of antennal segment 3 markedly sexually dimorphic; tergites and sternites narrow.</td>
</tr>
<tr>
<td>2</td>
<td>Abdominal segments without DLAS and VLAS; tergites and sternites narrow; on Rattus lutreolus and Rattus fusipes.</td>
</tr>
<tr>
<td>3</td>
<td>No DLAS on abdominal segments except 1 pair of VLAS present on segment 7 in female; tergites and sternites wide; on Leopilillus conditor.</td>
</tr>
<tr>
<td>4</td>
<td>Paratergites of abdominal segments 4 to 6 each with 2 large posterior setae and 2 pointed posterior lobes; on Notomys alexis.</td>
</tr>
<tr>
<td>5</td>
<td>Paratergites of abdominal segments 4 and 5 each with 2 serrated posterior lobes; paratergite of abdominal segment 6 with 2 pointed posterior lobes; on Notomys alexis.</td>
</tr>
<tr>
<td>6</td>
<td>Thoracic sternal plate with an elongated anterior and posterior process.</td>
</tr>
<tr>
<td>7</td>
<td>Abdominal segments with 1 pair of DLAS in σ; on Mesembrinomys macrurus.</td>
</tr>
<tr>
<td>8</td>
<td>Paratergite of abdominal segment 2 without central setae.</td>
</tr>
<tr>
<td>9</td>
<td>Abdominal segments without DLAS and VLAS, except 1 pair of VLAS present on segment 7 in female; tergites and sternites narrow.</td>
</tr>
<tr>
<td>10</td>
<td>Paratergite of abdominal segment 8 without distinct posterior lobe.</td>
</tr>
<tr>
<td>11</td>
<td>Abdominal spiracles large, diameter greater than 0.030 mm.</td>
</tr>
<tr>
<td>12</td>
<td>Paratergites of abdominal segments 4 to 6 each with 2 large posterior setae and 2 pointed posterior lobes; on Mesembrinomys gouldii.</td>
</tr>
<tr>
<td>13</td>
<td>Thoracic sternal plate heart shaped and with reduced posterior process; DMHS aligned in a row; on Pseudomys gyoymys.</td>
</tr>
<tr>
<td>14</td>
<td>Thoracic sternal plate not heart shaped with elongate anterior and posterior process.</td>
</tr>
<tr>
<td>15</td>
<td>Paratergite of abdominal segments 6 with 2 posterior lobes.</td>
</tr>
<tr>
<td>16</td>
<td>Paratergite of abdominal segments 4 and 5 each with 2 serrated posterior lobes; segment 6 with 2 pointed posterior lobes; paratergites of abdominal segments 4 to 6 each with 1 large posterior seta dorsally; only segment 8 with 1 pair of DLAS in σ; on Xeromys myoides.</td>
</tr>
<tr>
<td>17</td>
<td>Paratergites of abdominal segments 4 and 5 each with 2 serrated posterior lobes.</td>
</tr>
<tr>
<td>18</td>
<td>Paratergites of abdominal segments 4 to 6 each with 1 large posterior lobe dorsally; DMHS not aligned in a row; on Leggadina lakedownensis.</td>
</tr>
<tr>
<td>19</td>
<td>Paratergite of abdominal segment 7 with 1 posterior lobe dorsally; paratergite of segment 3 with 1 short apical seta; on Mastacomys fuscus.</td>
</tr>
<tr>
<td>20</td>
<td>Thoracic sternal plate heart shaped and with reduced posterior process; DMHS not aligned in a row.</td>
</tr>
</tbody>
</table>

Species

- H. irritans Kuhn & Ludwig, 1967
- H. leporilladis n. sp.
- H. notomydis Weaver 2017
- H. zyzomysis Weaver and Barton 2008
- H. setosa Weaver 2017
- H. macrurus n. sp.
- H. pogonomydis n. sp.
- H. bidentata (Neumann 1909)
- H. cornata Kim 1972
- H. mastacomysis Kuhn & Ludwig, 1967
- H. hylomydis n. sp.
- H. uromydis Kuhn & Ludwig, 1967
- H. gyoymys Kuhn & Ludwig, 1967
- H. xeromydis n. sp.
- H. leggadindis n. sp.
- H. calabyi Johnson 1960
- H. melomydis Weaver 2017
- H. forrestima n. sp.
- H. conilarudis n. sp.
- H. villosissima Wang 2018
shared morphological characters. We designated the male louse specimen as the holotype and the female louse specimen as additional material, not as the allotype, due to the fact that the male and the female specimens were collected from two different rat specimens in different localities. As stated earlier, DNA for genetic comparisons could not be recovered from these specimens due to previous exposure of the host rodents to formalin.

Among the eight *Hoplopleura* species described in the present study, *H. leggadinadis* and *H. forrestima* are morphologically most similar to each other but still have sufficient differences that allow us to recognize them as separate species (Figs. 3–6): 1) the posterior abdomen is wide and blunt in *H. leggadinadis* but narrow and pointed in *H. forrestima*; 2) males of *H. leggadinadis* have one pair of DLAS, whereas males of *H. forrestima* have four pairs of DLAS; 3) females of *H. leggadinadis* have five pairs of DLAS, whereas females of *H. forrestima* have six pairs of DLAS; 4) *H. leggadinadis* has one large posterior seta on paratergal plates IV–VI, whereas *H. forrestima* has one large seta and one tiny seta on these paratergal plates; and 5) *H. leggadinadis* has a small spiracle on paratergal plate VIII, whereas *H. forrestima* has no spiracle on this paratergal plate. The hosts of these two lice, *Leggadina lakedownensis* and *Leggadina forrestii*, diverged 0.4 MYA (Rowe et al. 2016) and differ in ecology and distribution (Lee 1995, Van Dyck and Strahan 2008) (Fig. 17), which explains the differences in morphology between *H. leggadinadis* and *H. forrestima*, assuming these two species of lice have co-specified and co-evolved with their hosts.

*Hoplopleura mesembriomydis* and *H. macrurusa* are also similar to each other in overall morphology but have more obvious differences than the pair of lice from *Leggadina* spp. These two lice are found on *Mesembriomyus gouldii* and *M. macrurusa* respectively, which diverged 2.39 MYA (Smissen and Rowe 2018). The differences between *H. mesembriomydis* and *H. macrurusa* are (Figs. 9–12): 1) dorsal marginal head seta (DMHS) not aligned in a row in *H. mesembriomydis* but aligned in a row in *H. macrurusa*; 2) thoracic sternal plate elongated both anteriorly and posteriorly into processes in *H. mesembriomydis* but elongated only posteriorly into a process in *H. macrurusa*; 3) tergites 5–8 each with one pair of adjacent DLAS in male *H. mesembriomydis*, whereas only tergite 8 has a pair of adjacent DLAS in male *H. macrurusa*; 4) VLAS adjacent to sternites 8, 10, and 11 in male *H. mesembriomydis* but adjacent to sternites 6, 8, 9, and 11 in male *H. macrurusa*; 5) DLAS adjacent to tergites 10, 12, 13, 15, and 16 in female *H. mesembriomydis* but adjacent to tergites 10, 12, 13, 15, 16, and 17 in female *H. macrurusa*; 6) VLAS adjacent to sternites 10, 12, 13, 15, and 16 in female *H. mesembriomydis* but adjacent to sternites 8, 10, 13, 15, and 16 in female *H. macrurusa*; 7) paratergal plates IV–VI each with two equally long posterior setae in *H. mesembriomydis* but only one seta in *H. macrurusa*; 8) paratergal plate VI with two posterior lobes in *H. mesembriomydis* but one acuminate posterior lobe dorsally in *H. macrurusa*; and 9) spiracle on paratergal plate V in *H. mesembriomydis* larger (31.7 for male, 38.4 for female) than in *H. macrurusa* (male 20.9, female 22.7). The current study increases the number of Australian *Hoplopleura* species from 12 to 20 and extends the records of sucking lice to all of the 14 genera of endemic rodents in Australia. Overall, the Australian *Hoplopleura* species show a higher host specificity than those in other parts of the world. Eighteen of the 20 Australian *Hoplopleura* species have been found only on a single host species; the two exceptions, *H. irritans* and *H. melomydis*, each parasitize two host species (Kuhn and Ludwig 1966, Weaver 2017). Worldwide, ~54% of the 140 *Hoplopleura* species recorded are found on a single host species (Durden and Musser 1994b, Light et al. 2010). The high host specificity of Australian *Hoplopleura* species could be the result of louse-rat co-speciation and co-evolution, which should be investigated in future studies when more samples are available. Our results show that the presence of sucking lice on endemic Australian rodents is much more diverse than previously recorded. The 20 Australian *Hoplopleura* species are found on 21 endemic rodent species; it is unknown whether or not the other 42 species of Australian endemic rodents (including 10 extinct species) are/were hosts to sucking lice except that two of the 42 species—*Pseudomys occidentalis* Tate, 1951 (Rodentia: Muridae) and *Rattus tunneyi* Thomas,
1904 (Rodentia: Muridae) are hosts to the introduced spiny rat louse, *Polyplax spinulosa* (Wang et al. 2020). If co-speciation and co-evolution are indeed a common pattern between Australian endemic rodents and their sucking lice, we can expect more species of sucking lice to be discovered in Australia as ectoparasites of more endemic rodent species are studied.

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**References Cited**


