First valid record of *Astacilla* Cordiner, 1793 in Australia, with
description of a new species (Crustacea: Isopoda: Arcturidae)

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Abstract - A new species of arcturid isopod, *Astacilla lewtonae*, is described
from Western Australia. Although other Australian species have been
attributed previously to this genus, this is the first record for the genus as
currently diagnosed.

INTRODUCTION

The Arcturidae Dana, 1849 are a specialised
group of marine isopods, which use the anterior
four pairs of pereopods as a setose filtering complex
extending from a cylindrical body usually elevated
above the substrate. The family belongs to the
isopod suborder Valvifera, which has recently been
restricted by Poore (2001) who removed many
genera traditionally placed in it to other families,
Antarcturidae Poore, 2001 in particular.

The first description of an Australian arcturid
isopod was of *Arcturus breviceornis* Haswell, 1881
from New South Wales. The types of this species
are lost but it is probably a species of *Neastacilla*.
Further species of *Arcturus* were described from
New South Wales by Whitelegge (1904), *Arcturus
alcicornis*, *A. dentatus*, *A. nodosus*, *A. serratus*, *A.
simplicissimus*, the types of all of which are also lost.
All probably belong in the Antarcturidae.

The first review of Australian arcturid taxa was
that of Hale (1924), who examined many specimens
and established the endemic genus *Parastaeilla* for
two very distinctive species. He also described two
other species and placed them in *Neastacilla*
(Tattersall 1921, and *Parastaeilla* Hale, 1924, only the last being endemic (King, 2000;
Poore et al., 2002)

All southern Pacific species of *Astacilla* were
removed to *Neastacilla* by Kussakin (1972) who
published a new diagnosis of *Neastacilla*. A
thorough review of 18 Australian species of
*Neastacilla* (Lew Ton, 1980) concurred with
Kussakin's conclusions, finding that *Neastacilla*
was a valid Pacific genus clearly separated from
*Astacilla*, which had no known representatives in
Australia. So, until now the family has been
represented in Australia by *Amesopous* Stebbing,
1905, *Neastacilla* Tattersall, 1921, and
*Parastaeilla* Hale, 1924, only the last being endemic (King, 2000;
Poore et al., 2002)

Although *Astacilla* is almost certainly paraphyletic
(King, 2001), a useful diagnosis can be written. *Astacilla* currently comprises 32 species distributed
in the northern and central North Atlantic, Mediterranean, northern North Pacific, southern
Africa, and in India (Table 1). The new species
described here extends the range of the genus to the
eastern Indian Ocean and is the first record from
Australia.

Material is deposited in the Western Australian
Museum, Perth (WAM) and Museum Victoria,
Melbourne (NMV).

SYSTEMATICS

*Astacilla* Cordiner, 1793

*Astacilla* Cordiner, 1793. —Sars, 1897: 87. —Monod,
Table 1  The species of *Astacilla* and their distributions.

<table>
<thead>
<tr>
<th>Species</th>
<th>Distribution</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>A. amblyura</em> Stebbing, 1905</td>
<td>Southern India (Pillai, 1963).</td>
</tr>
<tr>
<td><em>A. arieona</em> Sars, 1882</td>
<td>Norway, North Atlantic (Sars, 1897; Kussakin, 1982).</td>
</tr>
<tr>
<td><em>A. axeli</em> Castelló, 1992</td>
<td>Western Mediterranean (Castelló, 1997).</td>
</tr>
<tr>
<td><em>A. bispinata</em> (Menzies &amp; Kruczynski, 1983)</td>
<td>Gulf of Mexico.</td>
</tr>
<tr>
<td><em>A. bocagei</em> Nobre, 1903</td>
<td>Portugal.</td>
</tr>
<tr>
<td><em>A. bonnierii</em> Stephensen, 1915</td>
<td>Straits of Gibraltar; Mediterranean.</td>
</tr>
<tr>
<td><em>A. caeca</em> Benedict, 1898</td>
<td>North Atlantic (Richardson, 1905; Schultz, 1969; Kussakin, 1982).</td>
</tr>
<tr>
<td><em>A. cinguicula</em> Castelló &amp; Carballo, 2000</td>
<td>Western Mediterranean.</td>
</tr>
<tr>
<td><em>A. cymodocea</em> Menzies &amp; Glynn, 1968</td>
<td>Gulf of Mexico, Caribbean (Kensley &amp; Schotte, 1989).</td>
</tr>
<tr>
<td><em>A. deshayesi</em> Lucas, 1849</td>
<td>Europe.</td>
</tr>
<tr>
<td><em>A. eminentia</em> Kensley, 1984</td>
<td>South Africa.</td>
</tr>
<tr>
<td><em>A. gibbossa</em> Pillai, 1954</td>
<td>India (Pillai, 1963).</td>
</tr>
<tr>
<td><em>A. glabrus</em> (Benedict, 1898)</td>
<td>Bering Sea, north western Pacific Ocean (Richardson, 1899, 1905, 1909; Birstein, 1963; Schultz, 1969; Kussakin, 1982).</td>
</tr>
<tr>
<td><em>A. gorgonophila</em> Monod, 1925</td>
<td>north Africa; Mediterranean.</td>
</tr>
<tr>
<td><em>A. granulata</em> (Sars, 1877)</td>
<td>eastern USA, United Kingdom, Norwegian Sea (Harger, 1880); Benedict, 1898; Richardson, 1905; Schultz, 1969; Kussakin, 1982).</td>
</tr>
<tr>
<td><em>A. intermedia</em> (Goodsir, 1841)</td>
<td>United Kingdom, Scandinavia (Sars, 1897; Stephensen, 1948; Gruner, 1965; Naylor, 1972; Kussakin, 1982).</td>
</tr>
<tr>
<td><em>A. lasallae</em> Paul &amp; Menzies, 1971</td>
<td>United Kingdom; Scandinavia (Sars, 1897; Stephensen, 1948; Gruner, 1965; Naylor, 1972; Kussakin, 1982).</td>
</tr>
<tr>
<td><em>A. marna</em> Kensley &amp; Schotte, 1994</td>
<td>Dominica.</td>
</tr>
<tr>
<td><em>A. monodi</em> Tattersall, 1925</td>
<td>Mauritania.</td>
</tr>
<tr>
<td><em>A. paucisetosa</em> Castelló &amp; Caballo, 2000</td>
<td>Western Mediterranean.</td>
</tr>
<tr>
<td><em>A. pusilla</em> (Sars, 1873)</td>
<td>Scandinavia (Sars, 1897; Kussakin, 1982).</td>
</tr>
<tr>
<td><em>A. serrata</em> Nunomura, 1998</td>
<td>Japan.</td>
</tr>
<tr>
<td><em>A. spinata</em> (Menzies &amp; Kruczynski, 1983)</td>
<td>Belize, Barbados, St Lucia.</td>
</tr>
<tr>
<td><em>A. tayronae</em> Müller, 1993</td>
<td>Columbia.</td>
</tr>
</tbody>
</table>

Species transferred to other genera:

- *A. anophthalmus* Birstein, 1963  
- *A. attentuata* Hale, 1946  
- *A. bacillus* Barnard, 1920  
- *A. californica* Boone, 1918  
- *A. dilatata* Richardson, 1909  
- *A. dilatata* Sars, 1882  
- *A. diomedeeae* Benedict, 1898  
- *A. estaodoensis* Schultz, 1981  
- *A. falclandica* Ohlin, 1901  
- *A. fusiformis* Hale, 1946  

- *Arcturus.*  
- *Neastacilla.*  
- *Neastacilla.*  
- *Neastacilla.*  

preoccupied, replacement name: *Neastacilla richardsonae.*  

*Arcturella.*  

*Neastacilla.*  

*Neastacilla.*  

type species of *Neastacilla richardsonae.*  

*Neastacilla.*  

*Neastacilla.*  

*Neastacilla.*
### Table 1 (cont.)

<table>
<thead>
<tr>
<th>Species</th>
<th>Distribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. giardi Bonnier, 1896</td>
<td>Arctureopsis.</td>
</tr>
<tr>
<td>A. inaequispinosa Guiler, 1949</td>
<td>Neastacilla.</td>
</tr>
<tr>
<td>A. keruquensis Vanhöffen, 1914</td>
<td>Neastacilla.</td>
</tr>
<tr>
<td>A. levis Thomson &amp; Anderton, 1921</td>
<td>Neastacilla.</td>
</tr>
<tr>
<td>A. macilenta Hale, 1946</td>
<td>Neastacilla.</td>
</tr>
<tr>
<td>A. magellanica Ohlin, 1901</td>
<td>Neastacilla.</td>
</tr>
<tr>
<td>A. marionensis Beddard, 1886</td>
<td>Neastacilla.</td>
</tr>
<tr>
<td>A. monoseta Guiler, 1949</td>
<td>Neastacilla.</td>
</tr>
<tr>
<td>A. polita Gujánova, 1936</td>
<td>Neastacilla.</td>
</tr>
<tr>
<td>A. setosa Vanhöffen, 1914</td>
<td>junior synonym of Astacilla corniger.</td>
</tr>
<tr>
<td>A. sheardi Hale, 1946</td>
<td>Neastacilla.</td>
</tr>
<tr>
<td>A. vicaria Hale, 1946</td>
<td>Neastacilla.</td>
</tr>
<tr>
<td>Leachia gracilis Goodsr, 1841</td>
<td>Astacilla.</td>
</tr>
<tr>
<td>L. granulata Sars, 1877</td>
<td>Astacilla.</td>
</tr>
<tr>
<td>L. intermedia Goodsr, 1841</td>
<td>Arcturella.</td>
</tr>
<tr>
<td>L. nodosa Dana, 1849</td>
<td>Astacilla.</td>
</tr>
<tr>
<td>Leacia lacertosa Johnston, 1825</td>
<td>junior synonym of Astacilla intermedia.</td>
</tr>
</tbody>
</table>

### Type species


### Diagnosis

Body strongly geniculate between pereonites 4 and 5, cylindrical, with no dorsal ridge. Antenna 2 slender, 2 or 3 flagellar articles, flagellum ending with claw. Maxillipedal palp with all segments free, palp article 3 similar width as article 2. Pereonite 4 elongate, male and female of similar length.

Pereopod 1 setose, with unguis (rarely without). Pereopods 2–4 present and functional as setose appendages, dactylus absent. Pereopods 2–4 cylindrical, held close to the mouthparts, able to extend past the mouthparts, setae in rows, setae as long as segment, flexion between the carpus and the propodus present. Pereopods 5–7 with 2 unguis, secondary unguis robust.

Penial plate narrow, apex simple. Male pleopod 1 with lateral notch, with 3 lateral setae, lateral setae of similar length. Male pleopod 2 with appendix masculina tapered, without ridge, distally not widened, straight, elongated.

Uropodal exopod present, 3 setae on inner ramus. Female functional brood pouch majority made up of pereonite 4 (or 3 and 4). Oostegite 5 absent.

### Remarks

The systematics of the genus Astacilla is currently unresolved, given the similarities of many species to those in the genera Arcturella and Neastacilla. In the past Astacilla has been successively defined by an elongate fifth pereonite (Bate & Westwood, 1868), pereopod 1 with a claw, one pair of oostegites (Sars, 1897), and the loss of dactyls on pereopods 2 to 4 (Kussakin, 1972). Examination of several species of Astacilla has shown that these characters are variable and in the case of the number of oostegites, incorrect. The lack of known synapomorphic character states for many arcturid genera combined with the reluctance of many authors to examine the higher systematics of the genera has lead to much confusion within arcturid taxonomy and much debate (Nordenstam, 1933; Monod, 1970; Kussakin, 1972; Schultz, 1981; Menzies & Kruczynski, 1983; Wägele, 1989; Brandt, 1991).

### Astacilla lewtonae sp. nov.

Figures 1–4

### Material examined

**Holotype**

Male, 7.3 mm, **Western Australia**, between Dampier and Port Hedland, 19°03.00'S; 119°00.00'E, 80 m, WHOI epibenthic sled, CSIRO division of Fisheries, 11 Dec 1982 (WAM C 32344).

**Paratypes**

Female, 6.0 mm, **Western Australia**, between Dampier and Port Hedland, 19°37.00'S; 118°53.00'E, 30 m, WHOI epibenthic sled, CSIRO division of Fisheries, 3 Jun 1983 (WAM C 32345). 2 females; 7.0–7.5 mm, 19°28.40'S; 118°55.10'E, 38 m, WHOI epibenthic sled, CSIRO division of Fisheries, 25 Oct 1983 (WAM C 32346). Immature male, 5 mm,
**Figure 1** *Astacilla lewtonae* n.sp., female holotype (NMV J16900): a, lateral view; b, dorsal view. Male (NMV J16904): c, lateral view; d, dorsal view. Scale = 1.0 mm.

19°29.90'S; 118°52.00'E, 37 m, WHOI epibenthic sled, CSIRO division of Fisheries, 24 Oct 1983 (NMV J16651). Manca 2, 3 mm, 19°50.00'S; 118°57.90'E, 84 m, WHOI epibenthic sled, CSIRO division of Fisheries, 29 Aug 1983 (NMV J16667). 3 females; 6.5-7.0 mm, 19°29.60'S; 118°51.70'E, 40 m, WHOI epibenthic sled, CSIRO division of Fisheries, 25 Oct 1983 (NMV J16648).

**Other material examined**

**Northern Territory**, North West end, Bommies, McCluer Island, 11°02.00'S; 132°58.00'E, 8 m, SCUBA, in sponges, Lowry, J.K., 16 Oct 1982 (NMV J16582). 11°02.00'S; 132°58.00'E, 8 m, SCUBA, in hydroids, Lowry, J.K., 16 Oct 1982 (NMV J16935).

**South Australia**, Spencer Gulf, Douglas Bank, 32°47.18'S; 137°50.00'E, 15 m, South Australia Fisheries, Aug 1986 (NMV J16917).

**Description**

**Female**

Body geniculate and cylindrical. Anterolateral margins of head sub-truncate with medial indentation, a small rostral point evident. Fusion of head and pereonite 1 indicated by dorsolateral groove incised laterally. Head heavily tuberculate,
with 2 tuberculate dorsal elevations central and posterior to eyes, anterior tubercle with 2 apices. Pereonite 2 wider than pereonite 1, tuberculate with angular lateral margins extended. Pereonite 3 wider than pereonite 2, tuberculate with angular lateral margins extended. Pereonite 4 about 6 times longer than pereonite 3; dorsally wider than pereonite 3, tuberculate, angular lateral margins extended, with small posterior lateral extensions. Pereonites 5 to 7 progressively shorter posteriorly; heavily tuberculate, with lateral extensions. Pleon with evidence of three fused pleonites plus pleotelson; total length longer than combined lengths of pereonites 5 to 7, with small anterior lateral wings, posterior angular lateral wings and rounded apex.

Eyes round, dorsolateral. Antenna 1 reaching past distal edge of second peduncular article of antenna 2; flagellum slender with aesthetascs attached distally. Antenna 2 slender, more than half as long as body; flagellum of 2 articles plus claw, lower margin without scales.

Maxilla 1 inner lobe with 3 terminal setae; outer lobe with 10 robust setae. Maxilla 2 inner lobe with 15 plumose setae; middle lobe with 4 setae; outer lobe with 3 setae. Maxillipedal endite with 10 mesial setae; palp article 2 and 3 with mesial setal rows; article 4 with mesial and lateral setal rows; article 5 with distal setae.

Pereopod 1 propodus smaller than carpus; dactylus about twice as long as wide, bearing unguis, which is longer than dactylus. Pereopods 2-4 merus to propodus with paired rows of long setae; dactylus absent; flexion between carpus and propodus present.

Pereopods 5 to 7 progressively shorter; dactylus denticulate, unguis present with secondary unguis 2/3 length of primary unguis.

Uropod exopod not reaching mid point of endopod, with 2 setae of subequal length.

Oostegites present on pereopods 1 to 4; oostegite 4 thickened, with transverse suture delimiting posterior lobe.

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Figure 2  *Astacilla leutonae* n.sp., female holotype (NMV 116900): left maxilliped; left maxillae 1 and 2; left mandible; antennae 1 and 2. Scales: a (A2) = 0.5 mm; b (A1, A3 A1) = 0.5 mm; c (MP, MX1, MX2, MD) = 0.5 mm.
Figure 3  *Astacilla lewtonae* n.sp., female holotype (NMV J16900): pereopods 1 to 7. Scale = 0.5 mm.

**Male**

Body geniculate and cylindrical. Anterolateral lobes of head rounded with tuberculations, small rostral point evident. Head and pereonite 1 fused and with similar tuberculate ornamentation to female. Pereonite 2 and 3 tuberculate; lateral margins not greatly extended. Pereonite 4 around 8 times length of pereonite 3, tuberculate, lateral margins not extended. Pereonites 5 to 7 tuberculate, anterolateral margins extended. Pleon length greater than combined lengths of pereonites 5 to 7, evidence of 3 fused pleonites plus pleotelson, with small anterior lateral wings, angular posterior lateral wings and rounded apex.

Eyes round and dorsolateral. Antenna 1 extending past distal edge of second peduncular
New species of *Astacilla* from Australia

article of antenna 2; flagellum uniarticulate and with aesthetascs attached distally and laterally along the entire length. Antenna 2 as for female. Mouthparts as for female. Pereopods as for female. Pleopod 1 exopod with lateral notch and 3 plumose setae of similar lengths on posterior face. Pleopod 2 with appendix masculina straight and extending twice the length of the endopod, tapering to two filaments. Penial plate straight and simple.

**Distribution**
Australia: Western Australia, Northern Territory, South Australia; 8 to 84 metres.

**Remarks**
Although morphologically similar to Australian *Neustacilla* species, the possession of a long, straight appendix masculina is the primary reason why this species belongs in *Astacilla*. Other characteristics that support the placement of this species within *Astacilla* are the possession of flexion between the carpus and propodus and the complete lack of dactyli on pereopods 2 to 4, the presence of a dactylus on pereopod 1 and the shape of the female, which is widened and not especially elongate at pereonite 4. The dorsal and lateral sculpture of the body of this species makes it unique among the *Astacilla* species.

**Figure 4** *Astacilla lewtonae* n.sp., male (NMV J16904): pleopods 1 and 2; penial plate. Female holotype (NMV J16900): distal end of uropod; a, ventral view with oostegites. Scales: a (PL1, PL2, Pe) = 0.5 mm; b (U) = 0.5 mm; c (e) = 1.0 mm.
Etymology
This species is named for Helen Lew Ton who detected this 'strange' species in the collections of Museum Victoria.

ACKNOWLEDGEMENTS
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REFERENCES

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