A New Species of the Freshwater Crayfish Genus *Euastacus* (Decapoda: Parastacidae) from Northeastern New South Wales, Australia

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ABSTRACT. A new species of the freshwater crayfish genus *Euastacus*, *E. mirangudjin*, is described from northeastern New South Wales. The species most closely resembles *E. reductus* Riek 1969, differing in spination of the chelae and in colouration. The species is recorded only from the type locality, in Toonumbar National Park, where it inhabits the rocky edges of Iron Pot Creek.


The genus *Euastacus* was erected by Clark (1936), separating the spiny crayfishes of the Australian mainland from those of the Tasmanian genus *Astacopsis*. Species of *Euastacus* have been described by a number of authors, the main taxonomic works having been undertaken by Clark (1936, 1941), Riek (1951, 1956, 1969) and Morgan (1986, 1988, 1997). The genus *Euastacoides* Riek was synonymised with *Euastacus* by Morgan (1988).

Five specimens of *Euastacus mirangudjin* n.sp. were caught on 6 September 2000 during a research project on *Euastacus gumar* Morgan 1997, on the eastern side of the Richmond Range in northeastern New South Wales (Fig. 1). The new species was not found at 27 other locations sampled (all within ±50 km of the type locality), although the majority of these were on the western side of the Richmond Range. The specimens were caught in an area within the known distribution of two other species of *Euastacus*, *E. sulcatus* Riek 1951 and *E. valentulus* Riek 1951. However, no other species of crayfish was captured at the site where the new species was found. The specimens of this new species were immediately recognisable as being different from the above species in both morphology and colouration. Two specimens were retained and preserved, and the other three released alive at the site of capture. Morphological details were recorded for the two specimens preserved and two of the three specimens released. The third specimen released was much smaller than the others (<15 mm occipital carapace length [OCL]) and was not subjected to the same detailed examination. The four specimens examined in detail were between 26 mm and 37 mm OCL. The largest specimen collected (37 mm OCL), a berried female, was released.

The specimens collected could not be identified with the most recent key to the genus (Morgan, 1997), either collectively or individually. The large number of distinguishing features, including several features integral to the identification of species in the genus *Euastacus*, warrant the recognition of the specimens as a new species of this genus. This species most closely resembles *E. reductus* (from central eastern New South Wales). The species is easily distinguished from other species of *Euastacus* from northeastern New South Wales, which are generally larger and/or spinier. Character states and ratios are as used by Morgan (1986, 1997).

**Euastacus mirangudjin n.sp.**

**Type material.** **Holotype:** female (30 mm OCL); Iron Pot Creek, Toonumbar National Park, rainforest; 28°28'30"S 152°45'E; elevation 560 m; 6 September 2000; collected by Jason Coughran and Benjamin Black, lodged with the Australian Museum (AM P61072). **Paratype:** male (34.5 mm OCL), lodged with the Australian Museum (AM P61073).

**Type locality.** The type locality is in Iron Pot Creek, an upper tributary of the Richmond River, approximately 30 km NW of Kyogle (28°28'30"S 152°45'E). The site is approximately 500m upstream of the junction of Murray Scrub Management Trail and Iron Pot Creek. The site is in the rainforest of Toonumbar National Park, at an elevation of 560m. The stream where the specimens were collected was up to 10 metres in width and 1 metre in depth. Water temperature was 9°C and pH 6.65 (recorded at 3:00 PM on 6 September 2000).

**Other specimens examined.** Two other specimens (26 mm OCL ♂; 37 mm OCL ♀) caught at the type locality were also examined before being released. Ratios used in the description are based on the retained specimens only.

**Diagnosis.** Male cuticle partition present. Rostrum short, just reaching base of third antennal segment. 3 rostral spines per side, extending beyond midlength of rostrum. Antennal squame without marginal spines. Suborbital spine small to medium. Dorsal thoracic spines absent/barely discernible. Cervical spines barely discernible or small. 1–5 small and sharp Li spines on somite 2, 1 barely discernible or absent on other somites. D spines and abdominal boss absent. Telsonic and uropodal marginal spines absent. 4–7 spines above the propodal cutting edges extending to base of chela gape, and 3–4 spines above the dactylar cutting edges. 3–4 dorsal apical propodal spines. 1 apical mesial dactylar spine. Dactylar basal spines absent. Ventrolateral propodal spine row either absent or poorly developed into a single, blunt spine at midlength. Usually 3 mesial carpal spines. 1 poorly developed lateral carpal spine at distal edge of carpus (rarely two spines). Ventral carpal spine large. One ventromesial carpal spine.

**Description.** Maximum OCL 37 mm. **Rostrum**—short, just reaching base of third antennal segment, with a distinct and deep longitudinal groove; rostral margins parallel at sides and divergent at base; rostral carinae short; 3 marginal rostral spines per side, extending beyond midlength of rostrum (paratype with 2 spines on one side); acumen spine similar in size to marginal spines; OCL/carapace length = 0.88; rostral width/OCL = 0.14–0.17. **Cephalon**—weakly spinose; antennal squame marginal spines absent; 1st postorbital ridge spine small to medium, 2nd postorbital ridge spine barely discernible (ridge reduced to a subtle bump on carapace); numerous small to medium, blunt cephalic spines ventral to postorbital ridges; suborbital spine small to medium in size; interantennal scale of medium width and scalloped; basipodite spine absent or small; coxopodite spine small to medium and occasionally bifid; interantennal scale length/OCL = 0.09–0.1. **Thorax**—1–5 cervical spines per side, barely discernible or very small; thoracic spines absent or barely discernible; general tubercles dense and small; areola length/OCL = 0.35; areola width/OCL = 0.13–0.14; carapace width/OCL = 0.53–0.55; carapace depth/OCL = 0.47–0.54. **Abdomen**—1–5 Li spines on somite 2, 1 barely discernible or absent on other somites;
Coughran: a new species of Euastacus

Figure 3. Euastacus mirangudjin n.sp. Dorsal view of chela (paratype) showing 4 mesial carpal spines. All other specimens examined bore 3 mesial carpal spines. Photograph by Max Egan.

2 Lii spines on somite 2 of large female specimen (released) (OCL 37 mm); D-L spines absent on most specimens, although present and minute on large female; D spines and abdominal boss absent; abdomen width/OCL = 0.5–0.52; OCL/total length = 0.42. Tailfan—telsonic and uropodal marginal spines absent; telson length/OCL = 0.33. Chelae—elongate. Dactylus—dactylar basal spines absent; 1 apical mesial dactylar spine; 3–4 medium to large and blunt spines above dactylar cutting edge, extending to midlength of chela gape (apical on paratype); dactylar length/propodal length = 0.55. Propodus—5 mesial propodal spines; ventrolateral propodal spines absent or poorly developed into a single blunt spine at midlength of propodus; dorsolateral propodal spines reaching apex but not base of propodus; 3–4 apical propodal spines; 4–7 small to large and blunt spines above propodal cutting edge, extending to base of chela gape; few to numerous protuberances lateral to dactylar base dorsally, two specimens also with 1 or 2 spines (on one chela only); usually 1 (rarely 2) spines lateral to dactylar base ventrally; 2 spines ventral to propodal cutting edge proximal to midlength; spines posterior to dactylar articulation absent; 2 spines at dactylar articulation both dorsally and ventrally; propodal length/OCL = 1.0–1.03; propodal width/propodal length = 0.42; propodal depth/propodal length = 0.27–0.28. Carpus—dorsal groove deep; lateral carpal spination poorly developed into a single blunt spine at distal edge of carpus (one specimen with two discernible spines on one chela); usually 3 mesial carpal spines, paratype with 4 large and distinct spines on one chela and 2 large and 2 small (but distinct) spines on other chela (Fig. 3); dorsal carpal spines absent; ventral carpal spine large; ventromesial carpal spine as large as, or larger than, ventral spine on specimens >30 mm OCL, smaller than ventral spine on specimens 30 mm OCL and smaller; dorsal carpal groove present. Merus—7–8 small to large dorsal spines. Keel—Pr.1, close and parallel; Pr.2, apart and parallel to slightly closed; Pr.3, apart and of narrow to moderate breadth, scoops absent; Pr.4, apart and very broad, anterior margin rounded, posterior margin convex. Setation—moderate. Punctation—moderate on cephalon, denser on thorax.

Figure 4. Distinguishing features of the chela of Euastacus mirangudjin n.sp. Dorsal view (A, B) and ventral view (C, D) of chela of holotype (A, C) and paratype (B, D). ad, apical mesial dactylar spine (1 spine); ap, dorsal apical propodal spine row (3–4 spines); dce, spine row above dactylar cutting edge (3–4 spines); ldb, bumps and protuberances lateral to dactylar base; mc, mesial carpal spines (usually 3, paratype with 4); mp, mesial propodal spines (5); pce, spine row above propodal cutting edge (4–7 spines, extending to base of chela gape); v, ventral carpal spine (large); vm, ventromesial carpal spine (1 spine, smaller than or as large as ventral carpal spine). Photographs by Max Egan.
**Table 1.** Morphological traits distinguishing *Euastacus mirangudjin* n.sp. from *E. reductus*, *E. setosus*, *E. urospinosus*, *E. maidae* and *E. jagara*. (Character traits for *E. reductus* taken from Morgan (1997). Character traits for *E. setosus*, *E. urospinosus*, *E. maidae* and *E. jagara* taken from Morgan [1988])

<table>
<thead>
<tr>
<th>feature</th>
<th><em>E. mirangudjin</em></th>
<th><em>E. reductus</em></th>
<th><em>E. setosus</em></th>
<th><em>E. maidae</em></th>
<th><em>E. jagara</em></th>
<th><em>E. urospinosus</em></th>
</tr>
</thead>
<tbody>
<tr>
<td>suborbital spine</td>
<td>small to medium</td>
<td>usually small or very small, medium on some specimens</td>
<td>large or very large</td>
<td>small</td>
<td>very small or small</td>
<td>small to medium</td>
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<tr>
<td>thoracic spines</td>
<td>absent</td>
<td>absent</td>
<td>absent</td>
<td>absent</td>
<td>absent</td>
<td>1–3, small, blunt or moderately sharp</td>
</tr>
<tr>
<td>Li spines on 2nd somite</td>
<td>1–5 spines, moderately sharp</td>
<td>2–3 spines, blunt or very blunt</td>
<td>4–6 spines, moderately pointed to blunt</td>
<td>2–3 very blunt spines on holotype, (largest specimen) absent on others</td>
<td>2–3 spines, moderately pointed to blunt, absent on animals &lt;20 mm OCL</td>
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<tr>
<td>dorsal apical propodal spines</td>
<td>3–4 spines</td>
<td>usually absent, some specimens with 1 or 2 spines</td>
<td>usually 1 apical spine</td>
<td>1–2 spines</td>
<td>absent</td>
<td>absent</td>
</tr>
<tr>
<td>spines above propodal cutting edge</td>
<td>4–7 spines</td>
<td>usually 1–3 spines, 4 on some regenerate chela</td>
<td>usually 1 apical spine</td>
<td>absent</td>
<td>absent</td>
<td>absent</td>
</tr>
<tr>
<td>mesal propodal spines</td>
<td>5 spines</td>
<td>4–7 (usually 5 or 6)</td>
<td>usually 4 spines, sometimes 3 or 5 (esp. on regenerate chelae)</td>
<td>3–4 spines</td>
<td>6–7 spines, 4–5 on animals &lt;20 mm OCL</td>
<td>usually 5 (rarely 6)</td>
</tr>
<tr>
<td>apical dactylar spines</td>
<td>1 (mesal) spine</td>
<td>usually 1, sometimes 2 spines</td>
<td>2 (mesal) spines</td>
<td>1–2 (mesal) spines</td>
<td>1 (mesal) spine</td>
<td>usually 1 (mesal) spine</td>
</tr>
<tr>
<td>spines above dactylar cutting edge</td>
<td>3–4 spines</td>
<td>usually 1–3 spines</td>
<td>usually 1 apical spine</td>
<td>1 spine</td>
<td>1 apical spine on largest specimen, absent on animals &lt;30 mm OCL</td>
<td>1 apical spine, absent on animals &lt;20 mm OCL</td>
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<tr>
<td>mesal carpal spines</td>
<td>usually 3 spines, one specimen with 4 large</td>
<td>4 spines (3 on some regenerate chela)</td>
<td>usually 4–5 spines</td>
<td>4 spines</td>
<td>3–6 spines</td>
<td>4 spines</td>
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<tr>
<td>ventral spine size</td>
<td>medium/large to small</td>
<td>small or medium</td>
<td>very small or tiny</td>
<td>small to medium</td>
<td>medium/large to small</td>
<td></td>
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<tr>
<td>ventromesial spines</td>
<td>one spine</td>
<td>3–4 spines</td>
<td>3–7 spines</td>
<td>2–4 spines</td>
<td>“largest” and “other ventromesial spines” mentioned (more than one spine)</td>
<td>usually 3–4 spines</td>
</tr>
<tr>
<td>dorsal carpal spines</td>
<td>absent</td>
<td>absent</td>
<td>usually present</td>
<td>absent (low bumps on largest specimen)</td>
<td>1–2, small</td>
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Traits which can be used to distinguish genus, these species were designated as belonging to a separate complex (Riek 1956). Table 1 outlines morphological urospinosus 1988, the latter three of these species (Clark, 1937; Morgan, 1988), arguing that Euastacus sulcatus or E. valentulus, which both inhabit the area (Leckie, 1999). The broader distribution of E. mirangudjin is unknown, and this should be considered as a significant research gap. Other small species of Euastacus have been found to be restricted to highland areas (Morgan, 1997). For example, the present species was discovered while conducting research on E. gumar, which was found to be restricted to five isolated, highland populations, with a total estimated extent of occurrence of <30 km² (Coughran, 2000). These findings highlight the urgency of undertaking further research on poorly known species of Euastacus, such as the presently described species.

Only two specimens were retained from the type locality as museum voucher specimens. The other three specimens were released because it was apparent that this new species is potentially rare and most likely has a very restricted distribution. Although the present study, based on the western side of the Richmond Range, provides little scope for assessing the distribution of the species, it is significant that Leckie (1999) did not record the species at any of the three sites he sampled directly downstream of the type locality. Rather, Leckie (1999) recorded the relatively common and widespread species E. valentulus and E. sulcatus in his study. At this stage, this new species E. mirangudjin appears to satisfy two criteria for listing as an endangered species under the Commonwealth Environment Protection and Biodiversity Conservation Act 1999. These criteria are:

1. Very restricted geographic distribution.
2. Extremely low estimated total number of mature individuals.

Further research is required to better determine the conservation status of this species.
ACKNOWLEDGMENTS. The study was undertaken at Southern Cross University, Lismore, New South Wales, under the supervision of Dr Don Gartside. Dr Gary Morgan examined the type specimens, and provided advice on the probable systematic position of the species. I thank Dr Gartside, Dr David Pollard and two anonymous reviewers for their constructive comments on the manuscript, Mr Max Egan for the photographs of the species and Mr Benjamin Black for assistance with the field work.

References


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