

# A NEW GENUS AND SPECIES OF GONEPLACID (CRUSTACEA : BRACHYURA) FROM QUEENSLAND, AUSTRALIA

P.J.F. DAVIE

Davie, P.J.F. 1988 11 7: A new genus and species of goneplacid (Crustacea : Brachyura) from Queensland, Australia. *Mem. Qd Mus.* 25(2): 259-264. Brisbane. ISSN 0079-8835.

*Australocarcinus riparius* gen. nov., sp. nov. is described from estuarine habitats in north Queensland. It resembles *Speocarcinus* species in overall facies but differs from them by the shape of the third maxilliped; pleopods one and two being subequal in length; and the second pair of legs being the longest not the third pair. It appears likely that this species broods its young until the megalopal or juvenile stage.

□Crustacea, Brachyura, Goneplacidae, *Australocarcinus riparius*, estuary, ecology, reproduction, abbreviated development.

P.J.F. Davie, Queensland Museum, PO Box 300, South Brisbane, Queensland, 4101, Australia; 28 August, 1987.

In late 1986 the Mangrove Research Unit of the Australian Institute of Marine Science (A.I.M.S.), at Townsville, sent to the Museum specimens of a goneplacid crab they collected from a soft mud bank of the Murray River, NE.Q. This crab was remarkable in two ways: firstly, it did not appear to fit any previously described genus; and secondly the mature female was accompanied by 18 fully formed juveniles. These juveniles were apparently closely associated with the adult at the time of capture although they weren't detected until they were found, separated from the female, when she was washed from the 'handful of mud we threw into the bottle'. A subsequent trip to the area in January 1987 yielded several ovigerous females which were brought back to the laboratory alive but which later died. To the author's knowledge direct development is rare among brachyura and has not previously been found in members of the family Goneplacidae. The Museum mounted an expedition to north Queensland in March 1987 with one aim being to collect more specimens, and hopefully, to find either females with juveniles or ovigerous females which could be kept alive while the eggs developed. Unfortunately although a large number of specimens were collected none showed any egg development.

Queensland Museum is abbreviated in the text as QM. Measurements given, where not otherwise indicated, are of carapace breadth (c.b.).

***Australocarcinus* gen. nov.**

## DIAGNOSIS

Carapace smooth and glabrous, regions poorly defined; anterolateral margins rounded and dentate, posterolateral margins subparallel. Front about  $\frac{1}{3}$  of the total carapace width, formed of two rounded lobes, moderately deflexed, and without preorbital lobes or teeth. Orbits small, unarmed, with slightly raised rim. Eystalks short, moveable, and with well developed corneas; completely retractable within orbit. Chelae robust, not markedly dissimilar although one slightly larger than the other. Legs long and slender, hirsute, second pair the longest. Male abdomen with segments three to five fused, segment three expanded laterally, slightly wider than segment one, neither segments one or three cover the sternum between the last pair of legs. Sternal segment eight in the male formed of two discrete plates; in female of normal form. First male pleopod stout, straight, and tapering to a simple apex; second male pleopod as long as first, slender but with reduction in width at about the middle, also ending in a simple apex.

## REMARKS

The type species is *Australocarcinus riparius*.

In overall appearance, this genus appears closest to the American genus *Speocarcinus* to which it keys out. It does however differ in a number of important characters. 1) The merus of the 3rd maxilliped is quadrate, subequal in size and shape to the ischium and its anteroexternal angle is not especially prominent. 2) The 2nd ♂ pleopod is fine, and equal in

length to the 1st ♂ pleopod. 3) The epistome is quite broad. 4) The second pair of legs is the longest not the 3rd pair.

I am unable to confidently comment on its relationships to other genera. It clearly does not belong to the Rhizopinae which has recently been redefined and placed in the Pilumnidae (Ng, 1987). The rhizopines have typical pilumnid features, i.e. long, slender and sinuous first male pleopods; very short and sigmoid second male pleopods; and all male abdominal segments free. Because of this definition a number of genera can no longer be considered to belong to the Rhizopinae, but their new affiliations are in doubt. This group is currently under consideration pending a full revision by Dr D. Guinot (pers. comm.). *Australocarcinus* must also lie within this group.

The lengthened 2nd ♂ pleopod has been described in specimens identified as '*Typhlocarcinodes piroculatus*' by Serène (1964: 237-9) however these specimens have been placed in a new genus and species by Ng (1987). This new genus also apparently falls into the 'in limbo' group of genera mentioned above. A long second male pleopod is common in the Carcinoplacinae (see Guinot, 1969b) but due to the form of the abdomen *Australocarcinus* cannot be placed in that subfamily. It seems that the elongation of the second ♂ pleopod is a character which has arisen independently a number of times within the Goneplacidae.

The 2nd ♂ pleopods of the Indo-Pacific *Speocarcinus celebensis* Tesch, 1918, and *S. laevimarginatus* Yokoya, 1933, have apparently not been described but according to Guinot (1969c: 706) these species are congeneric, and not true *Speocarcinus* species. The present new species however differs from these in having segments 3-5 of the abdomen fused as in true *Speocarcinus* species and therefore cannot be considered also to be congeneric with those other Indo-Pacific species.

#### *Australocarcinus riparius* sp. nov.

##### MATERIAL EXAMINED

HOLOTYPE: QM W13113, ♂ (13.1 mm), Murray River, riverbank near Tate's Landing, NE.Q., 18.iii.1987, P. Davie, J. Short.

PARATYPES: QM W12915, 5 ♂ (6.8-13.1 mm), 7 ♀ (8.7-11.5 mm), same data as holotype. QM W12891, 1 ♂ (11.8 mm), Murray River, NE.Q., near entrance to Tate's Landing, in mud along bank, 17.iii.1987, P. Davie, J. Short; QM W12895, 12 ♂ (4.4-10.3 mm), 6 ♀

(6.3-11.1 mm), data as for W12891; QM W12916, 8 ♂ (8.1-12.2 mm), 10 ♀ (7.1-12.8 mm), Murray R., NE.Q., upstream of Tate's Landing, in riverbank, 14-16.iii.1987, P. Davie, J. Short; QM W13190, 1 juv. ♂ (4.5 mm) Murray River, NE.Q., edge of bank, low water neap, 15.v.1978, P. Davie; QM W13191, 1 ♀ (7.8 mm), Murray R., NE.Q., on algal mat near low water neap, upper estuary, 15.v.1978, P. Davie, R. Timmins; QM W13192, 1 ovig. ♀ (10.7 mm), Murray R., NE.Q., Jan. 1987, S. Frusher; QM W13193, 1 ♀ (9.7 mm), 18 juvs, Murray R., NE.Q., 26.xi.1986, S. Frusher and R. Giddins; QM W13194, 1 ♂ (10.0 mm), Bowen Creek, Hinchinbrook Is., NE.Q., April 1987, S. Frusher.

##### DESCRIPTION

Carapace: Wider than long (c. 1.25 ×), smooth, sparsely covered with very short hairs, which are most abundant on the posterolateral branchial regions; regions poorly defined but with cardiac and metagastric regions defined by shallow grooves. Protogastric and branchial regions noticeably swollen in large mature males. Carapace flat from side to side except for regional swellings, but fore and aft is strongly deflexed over anterior third. Posterolateral margins almost straight, slightly convex; branchial regions with a posterolateral facet reminiscent of the Varuninae. Anterolateral margins sharp and marked by four strong, slightly upturned, teeth, outer orbital edges without teeth, first anterolateral tooth long, low, truncate, commencing as a ridge a little way behind orbit, second to fourth teeth of similar form, forwardly vaulted, blunt; third tooth the largest; greatest carapace width across last anterolateral teeth.

Front broadly bilobed with no trace of pre-orbital teeth; slightly raised margin continuing smoothly around to encircle orbit. Eyes with corneas well developed, on moveable eyestalks; eyes retractable within orbits but still clearly visible in dorsal view. Antenna (including antennal peduncle) with free access to the orbit; antennal flagellum long extending laterally to a point in line with apex of second anterolateral tooth. Antennules fold transversely and are completely retractable under frontal lobes. Pterygostome adjacent to third maxillipeds and below anterolateral teeth with only short sparse setae but posterior to this are long dense plumose setae distinctly visible in dorsal view below the anterolateral margins.

Third maxillipeds (Fig. 1C). Merus and ischium subequal, both quadrate. Merus with outer margin convex but not strongly produced anterolaterally, inner and lower margins of

ischium and merus lined with fine setae. Palp with bristles, being very long and stout distally; these bristles slightly recurved and bearing on distal half of inner margin a series of short fine comb like teeth.

Male abdomen (Fig. 1E). Segments three to five fused. Telson elongate, rounded triangular. Penultimate segment c.  $0.62 \times$  length of telson, with lateral borders shallowly sinuous. Segments

three to five with straight divergent borders. Segment two constricted. Segment one narrow, laterally expanded but not as wide as base of the fused segments 3–5. Neither the base of segments 3–5, nor segment one cover the sternites between the last pair of walking legs.

Female abdomen (Fig. 2C) relatively narrow, not nearly covering sternal segments.

First male pleopod (Fig. 1B) stout; tapering to

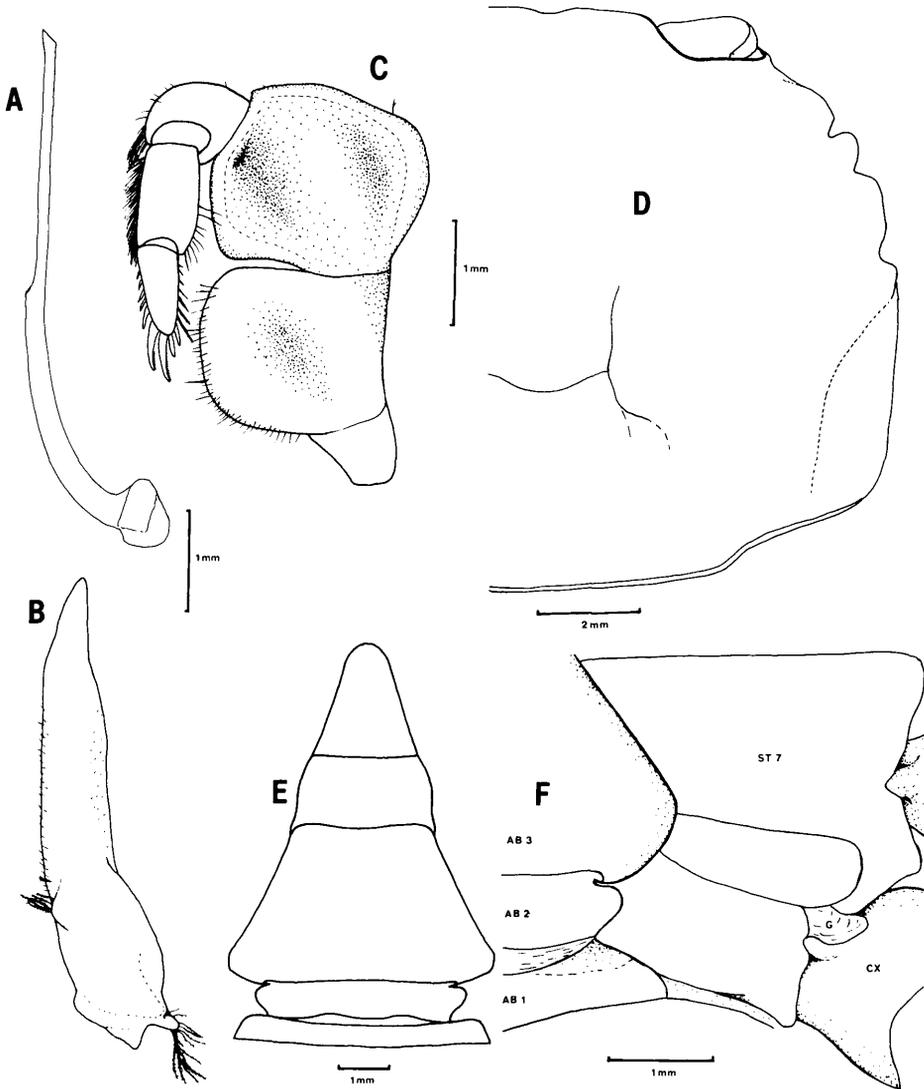


FIG. 1. *Australocarcinus riparius* gen. nov., sp. nov. A. second male pleopod; B. first male pleopod; C. third maxilliped; D. carapace; E. male abdomen; F. sternal segments and disposition of gonopod. AB = abdominal segment; ST = sternal segment; CX = coxa; G = gonopod.

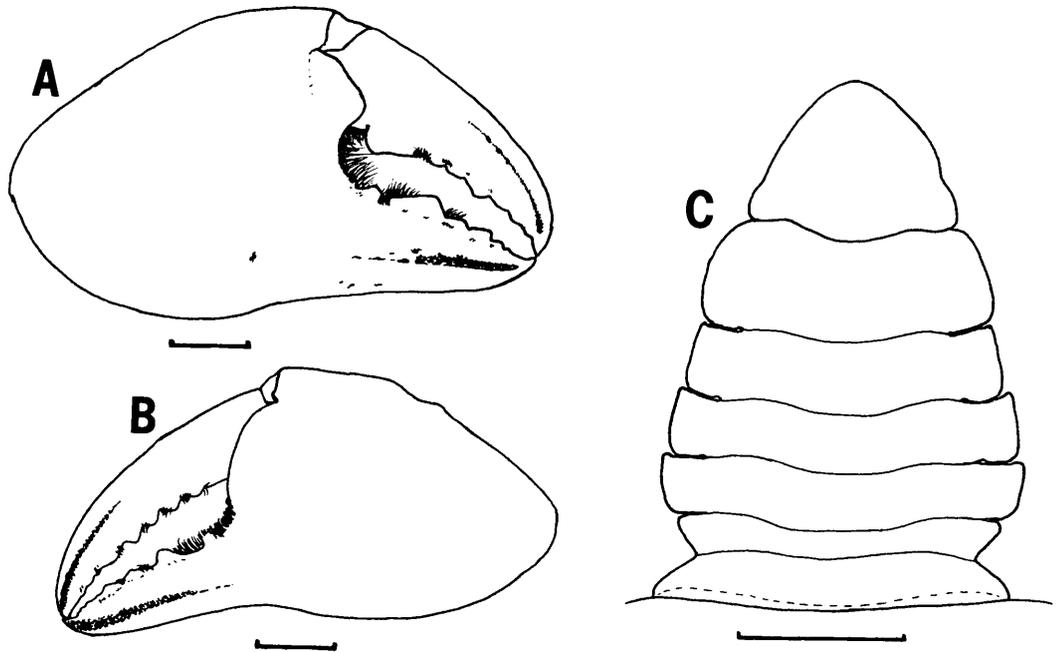


FIG. 2: A. *riparius*. A,B. right and left male chelae; C. female abdomen. Scale lines = 2 mm.

a simple, bluntly pointed tip. Distal quarter naked, medial half with sparse, short, simple hairs laterally. Bluntly rounded 'elbow' about  $\frac{1}{3}$  of distance from base with a few longer, plumose setae. Second male pleopod (Fig. 1A) subequal in length to first, slender; parallel sides but with a median constriction; tip obliquely slanted, with acute tip.

Sternite eight of male (Fig. 1F) with anterior third formed into a separate plate. Coxal gonopod appears to pass below the joint of the two plates of sternite eight. Sternite eight of female is a normal single plate.

Chelae of adult males (Fig. 2A,B) strongly developed, the right slightly the larger. Merus stout, triangular in section, with 6–8 large granules along outer inferior border and 2–3 on inner inferior border. Shaggily hirsute along inner borders of ishium and merus. Carpus subquadrate in dorsal view with strong blunt triangular tooth on inner edge; sparse short hairs present on surface. Palm of chelae swollen, inner and outer faces smooth, 1–3 granules present on inner superior border which is otherwise rounded. Both fingers with median grooves on inner and outer faces which bear short hairs, these run the length of the fixed fingers but are mainly restricted to the distal half of the dactyls.

Additional hair lined grooves present ventrally on fixed fingers, but are most prominent distally. Fingers pointed, with differentiated teeth that are subequal on smaller chela, but enlarged proximally on larger chela. In mature males dactyl of large chela  $0.84 \times$  length of palm (palm measured in mid-line of outer face and excluding fixed finger); fingers of smaller chela relatively longer,  $0.96 \times$  length of palm. Walking legs long, slender, unarmed, second pair the longest (c.  $1.75 \times$  breadth of carapace). First pair with thick, dense clothing of long hairs on ventral and lateral faces of carpus, propodus, and dactylus. Other legs with dense hair confined to a narrow fringe on propodus and dactylus. Short and long hairs scattered sparsely over all segments of all legs.

#### DISTRIBUTION

Currently only known from the Murray River, NE. Queensland, and Bowen Creek on the nearby Hinchinbrook Island.

#### ECOLOGY

Appears to be restricted to estuaries. It is cryptic, and lives intertidally in the soft mud of river banks. It excavates its own burrows but the entrances to these are not distinguishable from



FIG. 3: *Australocarcinus riparius* gen. nov., sp. nov. Scale divisions in mm.

those of other crabs which inhabit the banks. Burrows may penetrate 20–30 cms into the bank and are typically narrow and meandering. A male and female pair are often found together in the same burrow.

They seem most abundant in the mid- to upper-estuary zone where salinities are greater than 20 p.p.t. only around November/December (pre-summer rains) and the water is almost fresh between February and August (Dr T. Smith, A.I.M.S., pers. comm.).

#### REPRODUCTION

As mentioned earlier it seems probable that this species may show direct development of the young, or at least abbreviated development with the final metamorphoses taking place in the burrow of the adult. The single ovigerous female in the collection had 71 eggs which each measured 1 mm in diameter. There were 18 juveniles associated with the other female already discussed, and these measured c. 1.7 mm c.b. Some of these may however have been lost in the collection process.

Considering that several ovigerous females were observed by the members of A.I.M.S. during December and January even though relatively few specimens were collected, it seems that reproduction may be largely confined to the

spring and early summer months. By March when the author made his large collections none were observed. The period of highest salinities (10–20 p.p.t.) occurs between September and January, and this is probably pertinent.

Goneplacids are an atypical component of estuarine intertidal habitats. Abbreviated development would be a likely adaptation for exploitation of this labile environment. Strategies for reproduction and adaptations for estuarine life have been briefly reviewed by Davie (1985).

#### ETYMOLOGY

The specific name is latin and means frequenting river banks.

#### ACKNOWLEDGEMENTS

I am indebted to Stewart Frusher and the other members of the Australian Institute of Marine Science Mangrove Research Unit who first brought this crab to my attention and donated specimens to the Queensland Museum. Mr John Short is thanked for his field assistance and for his photographic skills. Dr Peter Ng is especially thanked for reading and commenting on the manuscript.

## LITERATURE CITED

- DAVIE, P.J.F. 1985. The biogeography of littoral crabs (Crustacea : Decapoda: Brachyura) associated with tidal wetlands in tropical and sub-tropical Australia. In Bardsley, K.N., Davie, J.D.S. and Woodroffe, C.D., 'Coasts and tidal Wetlands of the Australian Monsoon Region. A Collection of Papers Presented at a Conference held in Darwin 4-11 November 1984'. *Australian National University North Australia Research Unit Mangrove Monogr.* **1**: 259-75.
- GUINOT, D. 1969a. Recherches préliminaires sur les groupements naturels chez les Crustacés Décapodes Brachyours VII. Les Goneplacidae. *Bull. Mus. natn. Hist. nat.* (2)**41**: 241-65.
- 1969b. *ibid.* *Bull. Mus. natn. Hist. nat.* (2)**41**: 507-28.
- 1969c. *ibid.* *Bull. Mus. natn. Hist. nat.* (2)**41**: 688-724.
1978. Principes d'une classification évolutive des crustacés décapodes brachoures. *Bull. Biol. France Belgique* (n.s.) **112**(3): 211-92.
- NG, P.K.L. 1987. A revision of the genus *Rhizopa* Stimpson, 1858 and the status of the Rhizopinæ Stimpson, 1858 (Crustacea, Decapoda, Brachyura). *Indo-Malay Zool.* **4**: 69-111.
- SERÉNE, R. 1964. Papers from Dr Th. Mortensen's Pacific Expedition 1914-1916. 80. Goneplacidae et Pinnotheridae Recoltes par le Dr Mortensen. *Vidensk. Medd. fra Dansk naturh.* **126**: 181-282, pls XVI-XXIV.
- TESCH, J.J. 1918. The Decapoda Brachyura of the Siboga Expedition. II. Goneplacidae and Pinnotheridae. *Siboga Expedite*, Monogr. 39e, livr. **84**: 149-295, pl. VII-XVIII.