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ADDITIONS TO THE AUSTRALIAN FRESHWATER CRAYFISH

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Plate 1.

Since the author's paper (1951),* dealing mainly with Queensland freshwater crayfish, much additional material has been examined. New species are described in the present paper and additional information is given on some other species.

Three new species of *Euastacus* and one of *Cherax* are described from the highlands of eastern New South Wales. A new genus, *Euastacoides*, is erected for three new species from south-east Queensland. Specimens of this new genus are in many ways similar to juvenile *Euastacus* but they lack the characteristic spines of that genus and though of relatively small size are mature as is evidenced by the width of the abdomen in females and the ejection of spermatophores by some males when preserved.

***Euastacus cunninghami* Riek.**

Euastacus cunninghami Riek 1951, Rec. Aust. Mus. XXII:379.

A series of eight specimens was collected at the headwaters of a small creek where it entered the rain-forest at Tarome, Queensland. The specimens range in size up to 120 mm and the largest, a female, is ovigerous (collected 12 October 1953). A colour description of the series is given.

Colour.—Body dark, with reddish hues especially on the branchiostegites; meson of abdomen whitish, particularly on somites 2, 3 and 4; spines and bosses of abdomen white; venter of cephalothorax pale, flesh-coloured with yellowish-red hues, venter of abdomen bluish water-white, venter of antenna red; great chelae coloured as cephalothorax, claws bluish-grey, joints reddish, chelae rather dark below, palm mostly dull-reddish but dark at upper caudal half.

***Euastacus valentulus* Riek.**

Euastacus valentulus Riek 1951, Rec. Aust. Mus. XXII:380.

A series of eleven specimens ranging in size from 50 mm to 130 mm was collected at the type locality. Ten of the series are juvenile ranging in size up to 90 mm. The largest specimen is an ovigerous female (here designated as allotype).

The rostral carinae usually bear four spines, sometimes only three. On the upper part of the branchiostegites there are a number of enlarged, flattened, black tubercles (very obvious even in the smallest specimens). The sixth abdominal somite is without spines.

Colour.—Body all dark above; green-black on chelae and legs, also pleura, telson and uropods; dorsal cephalothorax blackish, dorsal abdomen brownish; chelae below, particularly propodus and dactylus, bright-blue; ventral cephalothorax and bases of legs water-whitish with red hues; joints of legs red; upper, enlarged tubercles of branchiostegites black, lower smaller tubercles all white; ventral spines of chelae white.

Types.—Holotype male and paratype male were deposited in the Queensland Museum (presumed lost). Allotype female (here designated) in the Australian Museum.

Specimens Examined.—Upper reaches of Currumbin Creek, Queensland (1 October 1953, E. F. Riek), a series of eleven specimens, deposited in the Australian Museum, Sydney.

***Euastacus hystricosus* Riek.**

Euastacus hystricosus Riek 1951, Rec. Aust. Mus. XXII:380.

A series of six specimens ranging in size up to 150 mm from Elaman Creek, Maleny, Queensland. The largest specimen is an ovigerous female.

The types appear to have been gerontic specimens. In the series from Maleny there are generally four spines on each rostral carina, the branchiostegite bears an irregular zone of enlarged, black tubercles dorso-laterally, some of the tubercles being spined and the rostrum shows only a slight tendency to be U-shaped. There is no marginal pleural spine on the sixth somite of the abdomen.

* REC. AUSTR. MUS. XXII:368.

Colour.—Body dark-green above, chelae with fingers paler than rest of dorsal surface, brownish; spines of abdomen reddish or whitish with darkened tips; joints of legs dull-reddish; body ventrally flesh-coloured but legs including ischium dark below; great chelae all pale below.

Types.—The types in the Queensland Museum were not available for study. If they should prove to be lost the largest female of the above series and the larger of the two males could be considered as holotype and allotype respectively.

Specimens Examined.—Elaman Creek, Maleny, Queensland (8 October 1953, E. F. Riek), a series of six specimens (2 males, 4 females), deposited in the Australian Museum, Sydney.

***Euastacus spinosus*, sp. nov.**

Diagnosis.—Similar to *hystricosus* and *spinifer* in possessing sharp spines on the dorsal surface of the sixth abdominal somite, telson and uropods; branchiostegites strongly tuberculate, with a dorso-lateral zone of large rather spine-like tubercles; rostrum almost twice as long as broad, somewhat U-shaped, with three or four spines on each rostral carina; great chela below with a large, dark, almost square zone over the basal half or so of the propodus, the zone not extending to the ventral margin; sternal keel blunt and rounded. The basal segment of the protopodite of antenna produced into a sharp spine on anterior margin but mesal margin rounded.

Description of Adult.—Carapace slightly shorter than abdomen; areola wide, about twice as long as wide; cephalic region of cephalothorax slightly more than twice as long as areola; carapace coarsely punctate dorsally; branchiostegites prominently tuberculate, with an irregular zone of large, rather spine-like tubercles dorso-laterally, gradually changing to spines at the margin of the cervical groove; rostrum almost twice as long as broad, pointed, tending to be U-shaped as the rostral carinae are slightly convex; carinae of rostrum with three or four spines, the apical one prominent and directed rather dorsally; post-orbital ridge ending anteriorly in a sharp spine; antenna reaching to the third or fourth somite of the abdomen; abdomen spinose, with three rows of spines and a row of large bosses mesally, except on the first and second somites, first somite with only a marginal spine, second with a marginal series of spines and one mesally, sixth abdominal somite without the marginal spine; the mesally situated boss of the fifth somite is rather spine-like, sixth somite with at least a few, scattered, prominent spines on the dorsal surface; telson with numerous scattered spines similar to those of the sixth somite; inner rami of the uropods with two longitudinal rows of a few prominent spines, outer rami with a single row towards the outer margin (in some cases the rows are reduced to a single spine); great chelae stout, not inflated.

Colour.—Blackish-green above, with the chelae a brighter green, legs pale in part below; great chela below mostly bright green but ischium mostly pale, dull yellowish, dactylus green except at extreme base; propodus with finger green and with a large, almost square green zone over more than the basal half but not extending to the outer margin, in some cases connected with the dark finger, carpus and merus pale in parts laterally; legs mostly dark except for basal portions; sternal keel with the median carina dark and the mesal portions of the lateral processes dark; uropods below somewhat paler than on dorsal surface; joints red; pleural spines mostly red; great chelae with the outer spines, such as propodus below, yellowish; spines of telson, sixth abdominal somite and branchiostegites, dark; tubercles of lower branchiostegites whitish.

Length of holotype male, 200 mm; length of allotype female, 185 mm.

Types.—Holotype male, allotype female and paratype female in the Australian Museum.

Type Locality.—Upper reaches of Hastings River, N.S.W. (October 1953, B. H. Dick).

The species is known only from the type series. The paratype female is gerontic, with reduced, flattened tubercles on the dorso-lateral branchiostegites and more U-shaped rostrum. It has a body length of 240 mm.

The species resembles most closely *hystricosus* Riek from the Maleny plateau of Queensland but can be distinguished most readily on the colour of the propodus of the great chela and on the processes of the basal segment of the protopodite of the antenna.

***Euastacus simplex*, sp. nov.**

Diagnosis.—Resembling *fleckeri* (Watson) in the very reduced abdominal spines but with more obvious tubercles on the branchiostegites and with the rostrum, though short, still bluntly pointed at apex. Sternal keel sharper and lateral processes closer together than in *fleckeri*.

Description of Adult.—Carapace slightly shorter than abdomen; areola wide, a little more than twice as long as wide; cephalic region of cephalothorax slightly more than twice as long as areola; carapace coarsely punctate dorsally; branchiostegites finely tuberculate and with scattered fine hairs, with an irregular double row of somewhat enlarged bosses dorso-laterally; rostrum short and broad, tending strongly to be U-shaped but bluntly pointed at apex, not twice as long as broad; carinae of rostrum without distinct spines, but irregularly raised; post-orbital ridge low, rounded, ending anteriorly in a slight boss, spines below post-orbital ridge reduced to a single small boss; antenna reaching to first or second somite of the abdomen; abdomen with spines very reduced, normally limited to a marginal row of 4-5 on the second somite, occasionally with one spine on the third; a small boss or blunt spine above on the second somite; telson and uropods without additional spines dorsally; great chelae stout, the fingers short and constricted.

Colour.—Almost black above; abdominal spines and tubercles of branchiostegite bright red; lower half of propodus of first pereopods red, fading to blackish dorsally; spines on merus and carpus red at apex; antennal scale white over outer half, greenish-black over inner half.

Ventrally, body whitish tinged with red at the bases of the legs; great chelae with propodus, except at ventral margin, bright, almost pillar-box, red, so too, to some extent is the dactylus.

Length of holotype male, 115 mm; length of allotype female, 135 mm.

Types.—Holotype male, allotype female and paratype female in the Australian Museum.

Type Locality.—Fifteen miles N. of Armidale, N.S.W. (25 March 1954, E. F. Riek).

The species is described only from the type series but is known to occur also at Bullock Creek, east of Armidale.

***Euastacus neohirsutus*, sp. nov.**

Diagnosis.—Differing from *hirsutus* in the less hirsute body with the dorsum of cephalon smooth, with widely spaced punctures and the chelae and ventral body not densely hirsute.

Description of Adult.—Carapace slightly shorter than abdomen; areola wide, a little more than twice as long as wide; cephalic region slightly more than twice as long as areola; carapace dorsally smooth on cephalic region with the punctures small and widely spaced; branchiostegites, areola and cephalon laterally densely hirsute; rostrum pointed, not twice as long as wide; rostral carinae generally with three teeth; post-orbital ridge ending anteriorly in a spine; spines below post-orbital ridge normal; antenna reaching to the third or fourth somite of the abdomen; abdomen setose, less so at meson, with only the marginal pleural spines, well developed only on 2-4, occasionally with small bosses above on somites 4-6; telson and uropods densely hirsute except at base; great chelae stout, not densely hirsute; ventral surface of body rather smooth, dense hairs only anterior to mouth.

Colour.—Dorsally abdomen dull grey-green, cephalothorax with more brown; great chelae coloured as cephalothorax but spines and fingers blue; apex of merus and most of carpus blue-green; antennal scale blue.

Ventral surface of legs bright red over basal portion (coxopodites and ischium); spines of merus and carpus of great chela yellowish-red, fingers blue; sternal keel with median carina and lateral processes dark.

Abdominal pleura blue, particularly ventrally.

In some specimens the dorsal surface showed more red, as occurs ventrally.

Length of holotype male, 70 mm; length of allotype female, 85 mm.

Types.—Holotype male, allotype female and paratypes in the Australian Museum.

Type Locality.—Twenty miles W. of Dorrigo, N.S.W. (20 March 1954, E. F. Riek), a long series.

Locality Records.—Dorrigo N.S.W. (21 March 1954, E. F. Riek); New England National Park (19 March 1954, E. F. Riek), at top.

Females are mature at a body length of about 4 inches. One specimen from the New England National Park has four genital apertures, the normal two male apertures and a female aperture on the left side of both the third and fourth pereopods so that there are three genital apertures on one side and only one on the other.

Genus *Euastacoides*, gen. nov.Genotype *Euastacoides setosus*, sp. nov.

Resembling a juvenile *Euastacus* but differing as follows. Propodus of great chela below with only a single row of poorly developed spines; abdomen without spines but with dense setae on the pleura. In gill structure and telson the genus resembles *Euastacus*. Male genital papilla calcified as in *Euastacus*.

Although the genus appears to be closely allied to *Euastacus* it forms a well-differentiated group of species, all of small size, occurring in south-east Queensland. At some localities species of the two genera occur in association.

Key to the Species of *Euastacoides*.

1. Squame of antenna expanded in middle, widest at or distad of middle; rostrum almost parallel-sided till close to apex 2
- Squame of antenna not expanded, widest at or near base; rostrum tapering almost regularly (basal spine of antenna reaching at least one third of distance along squame; spine at apex of median carina of inner ramus of uropod ending distinctly before the margin; interantennal spine with smooth sides, at least twice as long as wide) *setosus*, sp. nov.
2. Basal spine of antenna very small, limited to the basal curvature of base of squame; spine at apex of median carina of inner ramus of uropod ending close to margin, with the apex of spine reaching the margin; interantennal spine with wavy margins, at least twice as long as wide *maidae*, sp. nov.
- Basal spine of antenna reaching at least one quarter of distance along squame; spine at apex of median carina of inner ramus of uropod marginal, stout, apex extending well beyond margin; interantennal spine with margins slightly wavy, only slightly longer than wide *urospinosus*, sp. nov.

Euastacoides setosus, sp. nov.

Diagnosis.—Squame of antenna not expanded, widest at or near base; rostrum tapering almost regularly; spine at apex of median carina of inner ramus of uropod ending distinctly before the margin; basal spine of antenna reaching at least one third of distance along squame; interantennal spine with smooth sides, at least twice as long as wide.

Description of Adult.—Carapace above and laterally densely setose, the punctures above deeper, laterally the setae tending to arise from small tubercles; carapace slightly shorter than abdomen, about as high as broad; cervical groove deeply impressed, branchio-cardiac grooves faint, distinct anteriorly; areola two and a half times as long as wide; rostrum only slightly longer than wide at base (measured at the hind margin of the orbital excavation), tapering rather regularly to apex, without distinct rostral carinae but with a row of four spines on each side and several tufts of stout setae continued back beyond the level of the post-orbital spine; post-orbital ridge short, grooved above, ending anteriorly in a sharp spine; eyes large, almost half as wide as the rostrum at its base; antennule with the inner flagellum distinctly shorter and weaker than the outer; antenna reaching only to the fourth or fifth somite of the abdomen; sternal keel blunt, with a slight, rather rounded, median, longitudinal carina, processes between the first three pairs of periopods strongly raised, almost parallel, processes between fourth periopods large, sloping, with a laterally directed carina, fifth periopods wide apart, processes between them stout, laterally strongly raised and tapered; abdomen almost as wide as cephalothorax; telson with apex evenly rounded, but rather tapered, the marginal spine at between the apical third and quarter, inner rami of uropods rather truncate, the median, longitudinal carina produced into a sharp spine clearly ending before the margin, spine of the outer margin stout, almost at outer apex, outer rami with a series of eight or nine spines along the transverse suture, the median spine the largest, outer rami with the median, longitudinal carina weakening beyond the transverse suture and not continued to the margin; telson and uropods densely hirsute; great chelae with dense tufts of stout setae on both upper and lower surfaces, propodus above mesally with a row of from three to five, rarely two, stout spines, a very reduced, single row of spines below; carpus above with a distinct sulcus, with distinct spines, three or four, on the meso-dorsal margin, the second one usually the largest, with several spines below; merus with distinct spines above towards apex.

Colour.—Nondescript colouring; pale flesh below, darker coloured above, slightly red at joints.

Length of holotype male, 68 mm; length of allotype female, 77 mm.

Types.—Holotype male, allotype female and paratype males and females in the Australian Museum.

Type Locality.—Mt. Glorious, Q. (4 October 1953, E. F. Riek), from small stream in rain-forest.

A series of twenty-eight specimens ranging in size from 47 mm to 80 mm from the type locality. Specimens are most probably mature at 60 mm from an examination of the chelae and are certainly so at 70 mm from the shape of the female abdomen.

***Euastacoides maidae*, sp. nov.**

Diagnosis.—Squame of antenna expanded in middle, widest at or distad of middle; rostrum almost parallel-sided till close to apex; spine at apex of median carina of inner ramus of uropod ending close to margin, with the apex of the spine reaching the margin; basal spine of antenna very small, limited to the basal curvature of the base of the squame; interantennal spine at least twice as long as wide, with wavy margins.

Description of Adult.—Carapace above and laterally densely setose; carapace about as high as broad; cervical groove deeply impressed, branchiocardiac grooves faint, distinct anteriorly; areola twice as long as wide; rostrum only slightly longer than wide at base, with almost parallel sides after the basal contraction, contracting rapidly at the rather rounded apex, without distinct rostral carinae but with a row of four or five blunt spines and several tufts of stout setae, spines continued back beyond the orbital excavations almost to the level of the post-orbital spine; post-orbital ridge, grooved above, ending anteriorly in a sharp spine, in some cases with a few tubercles below and one more or less behind the post-orbital ridge; eyes large, almost half as wide as the rostrum at its base; antennule with the inner flagellum distinctly shorter and weaker than the outer; antenna reaching only to the fourth or fifth somite of the abdomen; sternal keel blunt, similar to that of the type species but the raised portion of the processes between the third periopods distinctly diverging; abdomen almost as wide as cephalothorax; telson with apex evenly rounded, but rather tapered, the apical spine at between the apical third and quarter, inner rami of uropods rounded, the median, longitudinal carina produced into a sharp spine which ends at the margin, spine of the outer margin stout, clearly before the level of the median spine, outer rami with a series of eight to ten spines along the transverse suture, the median spine the largest, outer rami with the median, longitudinal carina weakening beyond the transverse suture and not continued to the margin; telson and uropods densely hirsute; great chelae with dense tufts of stout setae on both upper and lower surfaces, propodus above mesally with a row of two or three spines, a very reduced, single row of spines below; carpus above with a distinct sulcus, with four spines on the meso-dorsal margin, the first much the largest, with two or three spines below; merus with distinct spines above towards apex.

Colour.—Rather nondescript with some bluish tinge on abdomen and great chelae.

Length of holotype male, 62 mm; length of allotype female, 55 mm.

Types.—Holotype male and allotype female in the Australian Museum.

Type Locality.—Upper reaches of Currumbin Creek, south-east Queensland (1 October 1953, E. F. Riek), in rain-forest.

Only the type specimens are known. They were collected in association with *Euastacus sulcatus* Riek and a second species of *Euastacus* of which only juveniles were seen.

***Euastacoides urospinus*, sp. nov.**

Diagnosis.—Squame of antenna expanded, widest in middle; rostrum with almost parallel sides till close to apex; spine at apex of median carina of inner ramus of uropod marginal, stout, apex extending well beyond margin; basal spine of antenna reaching at least one quarter of distance along squame; interantennal spine only slightly longer than wide, with margins slightly wavy.

Description of Adult.—Carapace above and laterally densely setose, carapace slightly shorter than abdomen, about as high as broad; cervical groove deeply impressed, branchiocardiac grooves faint; areola twice as long as wide; rostrum channelled above, with distinct rostral carinae so that rostrum appears relatively longer being twice as long as wide at the rather narrow base, rostrum with almost parallel sides, tapering more rapidly at the apical third, rostral carina with only one distinct, rounded spine towards apex but with two less clearly defined towards base, the rostral carinae not continued back to the level of the post-orbital ridges; post-orbital ridge short, channelled above, ending anteriorly in a sharp spine, a distinct spine behind and somewhat below the post-orbital ridge; eyes large, almost as wide as the rostrum at its base, but relative to other structures rather similar to those in the other two species; antennule with the inner flagellum distinctly shorter and weaker than the

outer; antenna missing; sternal keel blunt, similar to that in *maidae*; abdomen about as wide as cephalothorax; telson with apex evenly rounded, but rather tapered, the marginal spine at the apical third, inner rami of uropods rounded, the median, longitudinal carina produced into a sharp, stout spine at the margin, its apex extending well beyond the margin, spine of the outer margin weak, outer rami with a series of nine to eleven spines along the transverse suture, the median spine slightly the largest, outer rami with the median, longitudinal carina weakening beyond the transverse suture and not continued to the margin; telson and uropods densely hirsute; great chelae with dense tufts of setae on both upper and lower surfaces, propodus above mesally with a row of four spines, a very reduced, single row of spines below; carpus above with a distinct sulcus, with three distinct spines on the meso-dorsal margin, the first much the largest, with one or two spines below; merus with distinct spine above towards apex.

Colour.—Nondescript colouring with the fingers of the great chelae black.

Length of holotype male, 36 mm.

Type.—Holotype male in the Australian Museum.

Type Locality.—Obi Obi Creek, Maleny, Q. (8 October 1953, E. F. Riek), from cleared rain-forest section of the creek which is now open grazing country.

Only the holotype is known and though possibly not fully mature it shows many distinctive characters. The species occurred in association with *Euastacus* sp. (juvenile only) and *Cherax rotundus* Clark.

***Cherax esculus*, sp. nov.**

Diagnosis.—Sternal keel with lateral processes to third and fourth periopods rounded below as in *destructor* and *albidus*; areola narrow, four to six times as long as broad, sides converging in middle; post-orbital ridges rounded, anteriorly with a rounded spine not connected with the remainder of the ridge; telson with apical portion rounded, semi-circular; branchiostegites obviously tuberculate.

Description of Adult.—Other characters much as in *destructor*, the rostrum tapering gradually, the rostral carinae not produced into spines.

Colour.—The normal grey-green of most species.

Length of holotype male, 78 mm; length of allotype female, 80 mm.

Types.—Holotype male, allotype female and five paratypes in the Australian Museum.

Type Locality.—Peel River at Nundle, N.S.W. (27 March 1954, E. F. Riek).

The species is known only from the type locality.

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The excellent photographs for Plate 1 were prepared by Mr. Howard Hughes, official photographer of the Australian Museum.

EXPLANATION OF PLATE 1.

Euastacus spinosus, sp. nov. Two views from life of allotype ♀; length of specimen, 185 mm.

