Special Issue on the Occasion of the 80th Birthday of A. J. (Sandy) Bruce — 50 Years of Shrimping in the Indo-West Pacific

A NEW SPECIES OF *JOEROPSIS* KOEHLER, 1885 (ISOPODA, ASELLOTA, JOEROPSIDIDAE) FROM THE GREAT BARRIER REEF, AUSTRALIA

BY

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ABSTRACT

Joeropsis sandybrucei sp. nov., is described from shallow-water habitats (intertidal to 3 metres) on the Great Barrier Reef, Queensland, the second record of the genus from Australia and the first from Australian coral reefs. The species is identified by the relatively wide body (less than 3.0 times as long as wide), serration and shape of the pleotelson, quadrate coxal shape, relatively closely spaced pereonites and anteriorly concave pseudorostrum; in life *J. sandybrucei* is white with a broad dark-brown band across the head.

RÉSUMÉ

Joeropsis sandybrucei sp. nov. est décrit des eaux peu profondes (jusqu'à 3 mètres) de la Grande Barrière de Corail, au Queensland. C'est le deuxième signalement de ce genre en Australie et le premier concernant les récifs australiens. L'espèce est identifiée par le corps relativement large (moins de 3,0 fois plus long que large), la forme et la dentelure du pléotelson, la forme carrée du coxa, des péreonites plutôt étroitement espacés et le pseudorostre de forme antérieure concave. Vivant, *J. sandybrucei* est blanc, avec une large bande brun foncé sur la tête.

INTRODUCTION

Just (2001) reviewed the family Joeropsididae Nordenstam, 1933 for Australia, the first record of the family from Australian mainland territory except for a mention of an unidentified *Joeropsis* from Port Phillip Bay (Poore et al., 1975). The family is represented in Australia by five species in three genera (Poore & Lew

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Ton, 2002). *Joeropsis* Koehler, 1885 is represented by two species, one of which is from sub-littoral continental Australian waters, the other having been recorded from the sub-Antarctic Australian territory of Macquarie Island (Hale, 1937).

The genus is ubiquitous in coral-reef habitats world wide and has been recorded throughout the Indo-West Pacific (see Kensley, 1984; Müller, 1989, 1991a, b; Kensley & Schotte, 2002). Museum collections and my own collections indicate that the genus is common, at times abundant, and speciose in Australian coral-reef habitats; recent collections made under the CReefs project (a Census of Marine Life project, see *http://www.aims.gov.au/creefs/index.html*) indicate that more than 20 species occur on Australia's coral reefs.

METHODS AND TERMINOLOGY

The description loosely follows that of Just (2001) with the following differences: scale and cuticular setae are here termed scale-setae; setal terminology follows Watling (1989); antenna 2 peduncle articles 1-4, mandible, maxilla 1 and maxilla 2, pereopods 2-6, and pleopods 4 and 5 display generic-level (or higher) characters, and are not described in detail, though all are illustrated with the exception of pereopods 2-6. The description is intended to be restricted to species-specific characters, and those which will be used in identification, but with the caveat that so many species of *Joeropsis* are incompletely described that it is likely that some generic characters have been included and some potentially species-specific characters excluded.

Only pereopods 1 and 7 are described here; the numerous figures of pereopods given by Just (2001) and Müller (1989, 1991a, b) indicate that pereopods 2-7 scarcely differ from each other, with Just (2001), stating in his family diagnosis "All pereopods similar ..."; pereopod details to date have not been used to characterize species.

The colour pattern illustrated is based on observation and photographs of the freshly caught specimens.

Abbreviations. — MTQ, Museum of Tropical Queensland, Townsville; RS, robust setae.

TAXONOMY

Family JOEROPSIDIDAE Nordenstam, 1933

Genus **Joeropsis** Koehler, 1885

Restricted synonymy. — Wilson, 1997: 86. — Kussakin, 1999: 12. — Just, 2001: 304; Kensley & Schotte, 2002: 1428.

Type species. — *Joeropsis curvicornis* Koehler, 1885; by monotypy.

Remarks. — *Joeropsis* is a large genus, currently with 69 species (Just, 2001; Schotte et al., 2008), most of which are similar in appearance. Kensley & Schotte (2002: 1428-1429) offered the opinion that species of *Joeropsis* are "morphologically very similar, with mouthparts, pereonal and pleonal appendages showing little variation". Kensley & Schotte (2002) went on to list five characters by which species can be separated: "degree of setation of the body; serration of the lateral margins of the cephalon; shape of the rostrum; presence or absence of a strong mesiodistal tooth on the uropodal protopod; serration of the lateral margins of the pleon".

The characters that Kensley & Schotte (2002) listed are ones that have traditionally been used to differentiate species of the genus but other characters may be usefully diagnostic in such a conservative genus. The remarks for the new species described here demonstrate some of these characters. In addition to those enumerated by Kensley & Schotte (2002), characters varying between species include relative body proportions (length to width ratio); dorsal ornamentation (ridges, nodules or carinae); position of the eyes (marginal or submarginal); shape of the lateral margins of the head; relative dorsal separation of the coxae and shape of the coxae; ornamentation of antenna 1 article 1 (serration); maxilliped morphology, particularly the shape and setation of the distal margin of the endite; number of 'claws' on the dactylus of pereopods 1-7; shape of male pleopod 1; and the shape of the female operculum.

A detailed generic diagnosis has been provided by Just (2001). Wilson (1997: 88) mentioned the presence of 'distinctive ridges on the ventral midline', though these are not discussed by Just (2001). The new species below has such ridges in males and non-ovigerous females, but they are low and difficult to observe even after removal of the pereopods.

Joeropsis sandybrucei sp. nov. (figs. 1-3)

Material examined. — All Heron Island, Capricorn Group, Great Barrier Reef, Queensland. Holotype: ♂ (3.5 mm), 23.4354°S 151.9224°E, 4 December 1979, 'Blue Pools', northern reef edge, intertidal, coll. N. L. Bruce (MTQ W13802). Paratypes: ♂ (2.9 mm), same data as holotype (MTQ W13803). ♀ (non-ovig. 3.5 mm), 23.4354°S 151.9224°E, 17 December 1979, 'Blue Pools', northern reef edge, intertidal, coll. N. L. Bruce (MTQ W13804).

Additional material. — All Lizard Island, CReefs Expedition I, 2008: 2 ♂♂ (2.3, 2.1 mm), 8 ♀♀ (ovig. 3.9, 3.6, 3.5, 3.2, 3.2, 2.8 mm; non-ovig. 3.2, 3.1 mm), imm. (1.2 mm), 14.6890°S 145.4671°E, patch reef, lagoon entrance in from Bird Islet, 11 April 2008, dead coral heads, 1.0-2.0 m, stn CGLI018A, coll. N. L. Bruce and M. Błażewicz-Paszkowycz (MTQ W13805). ♀ (imm. 1.6 mm), patch reef, in lagoon entrance from Bird Islet, 14.6890°S 145.4671°E, 19 April 2008, medium small rubble, 1.0-3.0 m, CGLI041B, coll. N. L. Bruce (MTQ W13806). ♂ (1.6 mm), ♀ (ovig. 2.6 mm), North Point, 14.64553°S 145.45335°E, 12 April 2008, dead coral heads, 1.0-1.5 m, CGLI20A, coll. N. L. Bruce (MTQ W13807). ♂ (2.0 mm), ♀ (ovig. 2.9 mm), patch reef off Casuarina

Beach, 14.68039°S 145.44530°E, 15 April 2008, dead corals, 1.0 m, CGLI031B, coll. N. L. Bruce (MTQ W13808).

Description of male. — Body 2.9 times as long as greatest width; laterally with setae. Head width 1.8 times maximum length; pseudorostrum medially 0.4 as long as wide, anterior margin weakly concave. Sternites 2-7 with weak median keels, that of pereonite 7 obscure. Pleotelson width 1.3 times length, lateral margins evenly convex, with 5 or 6 fine teeth; dorsally with 1 median and 2 narrow sublateral low longitudinal ridges, distal margin apex narrowly rounded.

Antenna 1 article 1, 1.1 times as long as wide, distomesial angle weakly lobed, without serrations; article 2, 0.5 as long as article 1, about as long and wide; article 3, 0.5 as long as article 2; article 4, 0.6 as long as article 3; article 5, 1.5 times as long as 3, 1.9 as long as proximal width; distally with 3 aesthetascs; lateral margins of articles 1 and 2 with cuticular scales. Antenna 2 peduncle article 5, 1.5 times as long as articles 1-4 combined, 1.7 times as long as wide, lateral margin strongly convex, fringed with prominent cuticular scales, mesial margin weakly convex; article 6, 1.6 times as long as maximum width, distally expanded, distal width 2.1 times proximal, 0.8 times as long as article 5, lateral margin fringed with cuticular scales, mesial margin with 8 simple setae, distal dorsal surface with scattered simple setae; flagellum with 6 articles, article 1, 1.6 times as long as peduncle article 6, 3.4 times combined lengths of remaining articles.

Mandible palp article 2 with 6 long pectinate setae, article 3 with 4 long pectinate setae; molar process distal one-third finely serrate; spine row with 10 spines. Maxilla 1 lateral lobe with 12 strongly serrate and 2 short, simple RS; mesial lobe with 2 long, simple RS and many long scale-setae. Maxilla 2 with lateral lobe with 3 long, curved, finely serrate setae, middle lobe with 3 long serrate setae; mesial lobe with 4 long simple setae and many long setules mesially. Maxilliped endite 2.1 as long as greatest width, extending to middle of palp article 4; distal half with scattered simple setae on ventral surface and dorsal field of slender, plumose scale-setae inside medial margin; mediodistal concavity of endite with 4 medial tubercular RS and a few short spearhead-shaped setae, apical and lateral margins evenly rounded, finely serrate; distomesial margin with 3 coupling setae. Maxilliped palp article 2, 3.7 times longer than 1, with bluntly triangular medial lobe not extending to distal margin article 3, mesial and distomesial margin with 3 simple setae; article 3, 0.5 as long as article 2, distomesial margin with 3 simple setae; article 4, 3.3 times as long as wide, mesial margin weakly concave, often covered with short scale-setae, distal margin with row of 4 simple setae; article 5 about 0.2 (0.17) as long as 4, with 6 terminal simple setae. Maxilliped epipod 5.3 times as long as basal width, distally narrowed and acute, 0.9 as long as palp, 0.5 as long as endite.

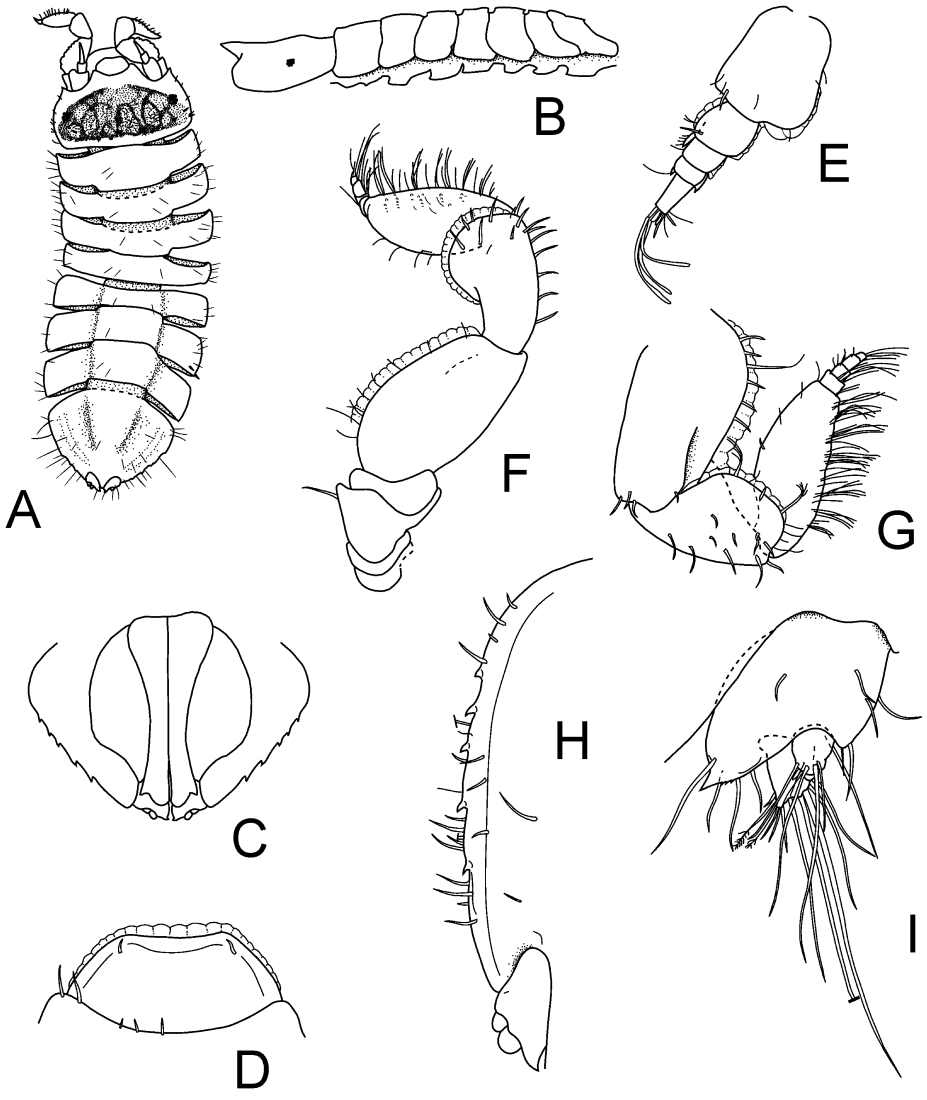

Fig. 1. *Joeropsis sandybrucei* sp. nov. A, C, D, H, holotype, remainder male paratype MTQ W13803. A, dorsal view; B, lateral view (schematic) showing mid-sternal ridges; C, pleopods 1 and 2, in situ; D, pseudorostrum; E, antennule; F, antenna, in situ; G, antenna, distal articles (dissected); H, pleotelson lateral margin; I, uropod. (Not to scale.)

Pereopod 1 basis 2.9 times as long as wide, superior margin with 3 simple setae; ischium 0.7 as long as basis, 2.6 times as long as wide; merus about 0.6 length of ischium, 1.6 times as long as wide; carpus 0.9 as long as ischium, 2.9 times as long as wide, inferior margin with 4 setae and distal two-thirds with dense fringe of scale setae; propodus 0.9 as long as ischium, 3.9 times as long as wide, inferior margin with 4 acute RS and continuous margin of scale-setae, superior margin with

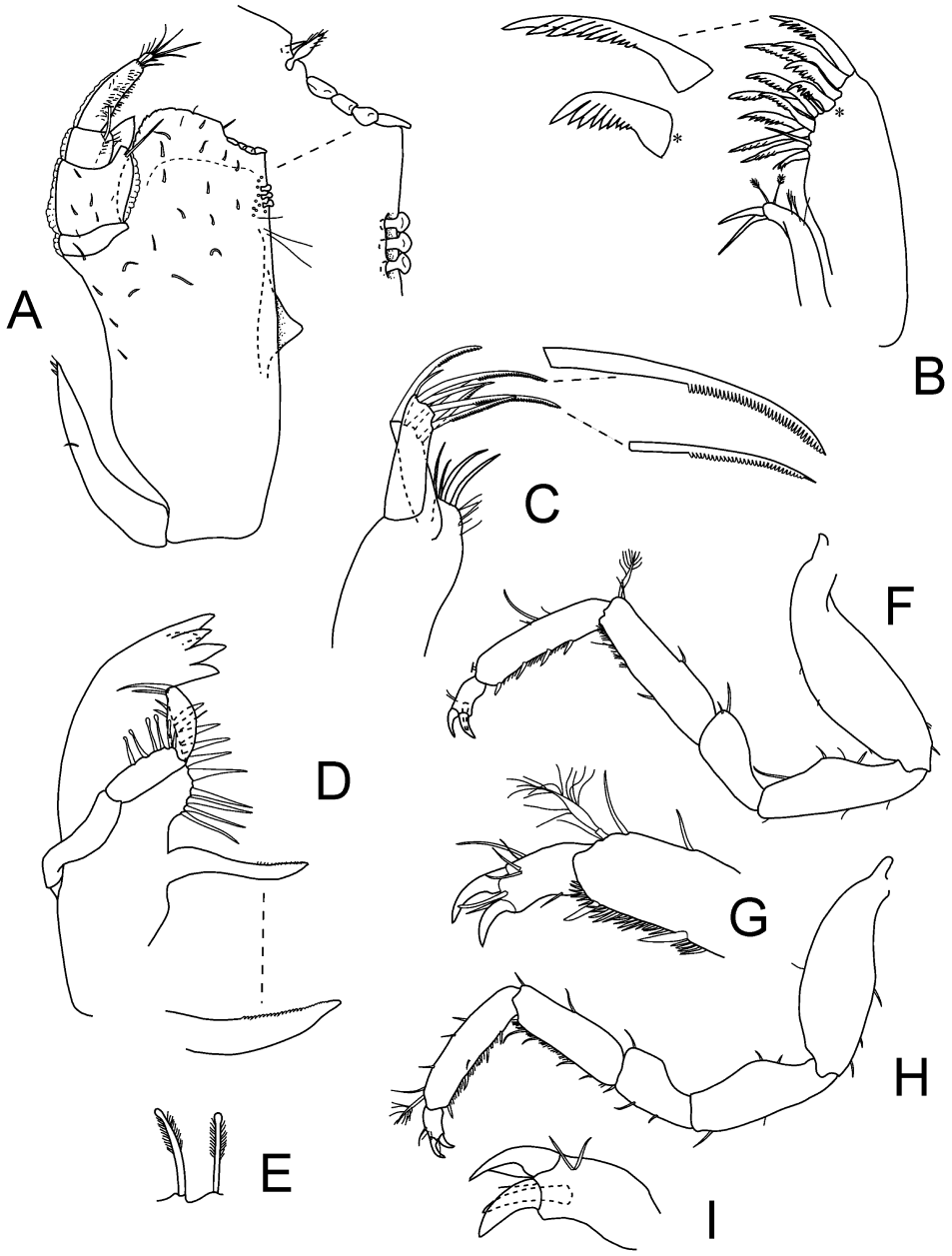

Fig. 2. *Joeropsis sandybrucei* sp. nov. Male paratype MTQ W13803. A, maxilliped, and endite detail; B, maxilla 1; C, maxilla 2; D, mandible; E, setae from mandibular palp article 2; F, pereopod 1; G, pereopod 1, dactylus and distal propodus; H, pereopod 7; I, pereopod 7, dactylus. (Not to scale.)

4 simple setae and prominent pappose seta at distal angle; dactylus 0.3 as long as propodus, with 2 claws. Pereopods 2-7 sub-similar, each with 3 claws, more

elongate than pereopod 1. Pereopod 7 basis 3.0 times as long as wide, superior margin distally with 2 short simple setae; ischium 0.8 length of basis, 3.4 times as long as wide, superior margin with 4 simple setae, convex at mid-length; merus about 0.5 length of ischium, 1.8 times as long as wide, distal angle with 2 simple setae; carpus 0.8 as long as ischium, 3.4 times as long as wide, inferior margin with 2 setae and distal one-third with fringe of scale setae, superior distal angle with prominent pappose seta; propodus 0.8 as long as ischium, 4.6 times as long as wide, inferior margin with 4 acute RS and margin of scale-setae from first RS, superior margin with 3 simple setae at mid-length; dactylus 0.4 as long as propodus.

Pleopod 1, 2.3 times as long as greatest width, lateral margins strongly concave; apical lobes broadly rounded, fringed with short, simple setae; distomesial lobe acute, not extending to distal margin; ventral surface with scattered tiny setae. Pleopod 2, protopod 2.3 times as long as midwidth, lateral margin mid-half scarcely convex, without setae, distal margin concave, without setae or scale-setae, apex narrowly rounded; stylet evenly curved, in retracted position reaching to apex of protopod. Pleopod 3 endopod ramus 1.3 times midwidth, fused to protopod; exopod article 1 about 3.2 times as long as wide, not extending beyond endopod apex, lateral margin densely fringed with scale-setae; exopod article 2, 0.5 as long as article 1, distally tapering to narrowly rounded apex, lateral and mesial margins with long scale-setae. Pleopods 4 and 5 as for other species of the genus.

Uropodal peduncle extending slightly beyond margin of pleotelson, mediodistal corner weakly produced, with acute point, distal margin laterally with 5 simple submarginal setae, mesial and lateral margins smooth; exopod 0.7 as wide as endopod, 1.2 times as long as wide, with apical row of long, simple setae; endopod 1.4 times as long as wide, 0.5 as long as peduncle lateral margin, with distal row of long, simple setae and several apical penicillate setae.

Female. — Operculum (pleopod 2) 1.2 times as long as wide, lateral margins weakly convex, distal margin concave, with fringe of cuticular scales, apex broadly rounded, ventral surface distally with scattered short, simple setae including a couple at apex. Non-ovigerous females with obscure median keels at least on sternites 3-6.

Colour. — Males and females opaque white with broad (long) reticulated dark-brown band across head, anterior margin of which is bi-concave with median indentation (‘bow-shaped’); band occupies 0.67-0.83 (mean 0.77) length of head (not including pseudorostrum).

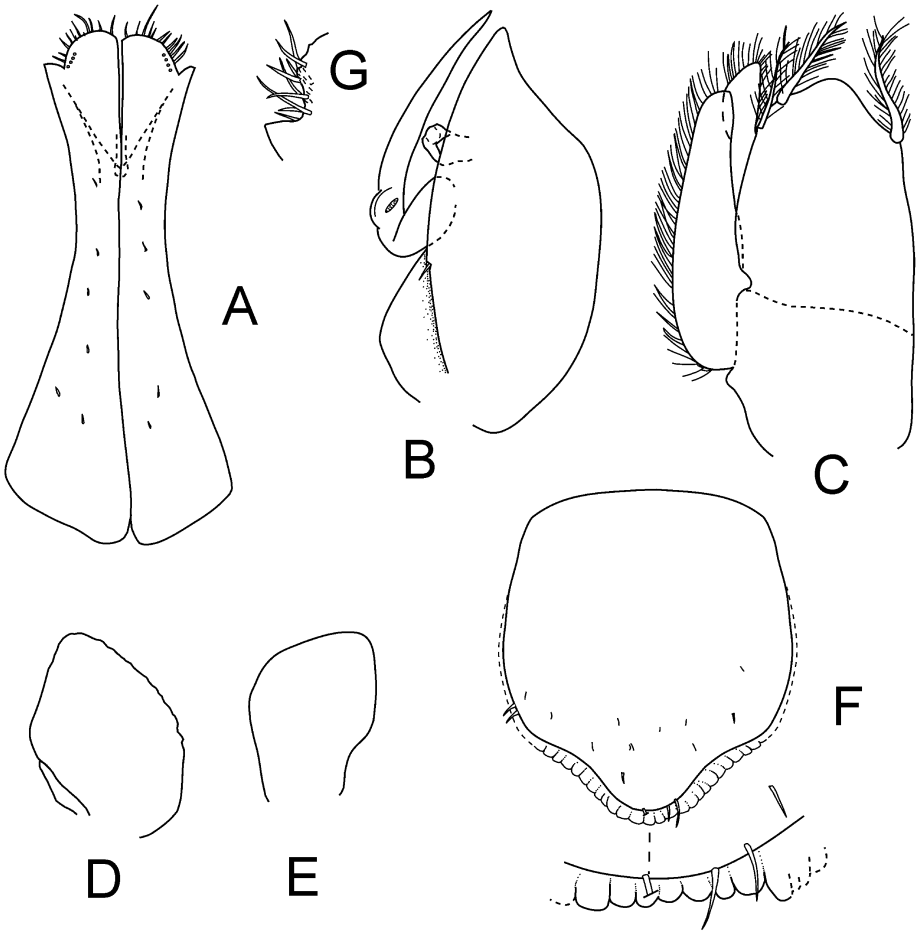

Fig. 3. *Joeropsis sandybrucei* sp. nov. Male paratype MTQ W13803, except F, female paratype MTQ W13804. A–E, pleopods 1-5, respectively; F, female pleopod 2 (operculum) (some setae missing); G, distolateral apex, male pleopod 1. (Not to scale.)

Size. — Males 1.6-3.5 mm, mean 2.4 mm; ovigerous females 2.6-3.9 mm, mean 3.3 mm; non-ovigerous females 3.1-3.5 mm, mean 3.3 mm; immatures 1.2-1.6 mm.

Remarks. — *Joeropsis sandybrucei* sp. nov. can be identified by the following combination of characters: robust body shape (less than three times as long as wide), with compact somites, coxae laterally truncate; body margins laterally setose; pleotelson lateral margins evenly convex with four or five fine serrations; pseudorostrum 0.4 as wide as long, anteriorly weakly concave; pereopod 1 dactylus with two claws, pereopods 2-7 dactyli each with three claws; anteromesial margin of maxilliped endite with row of four tubercular robust setae, and uropodal

peduncle with mesial tooth. The shape of the distal margin of male pleopod 1 can be used to further confirm identity.

Live and fresh specimens can be identified by the colour pattern: opaque white with a broad reticulated dark-brown band across the head, the anterior margin of which is medially indented. This pattern appears to be unique only within the Great Barrier Reef as a similar pattern is shown by species elsewhere (e.g., *Joeropsis indica*; Kensley & Schotte, 2002, fig. 7G).

The most similar species appear to be *Joeropsis arpedes* Kensley & Schotte, 2002 (known from coral reefs in the Seychelles), *Joeropsis indica* Müller, 1991 (known from East Africa, Seychelles and Sri Lanka; Kensley & Schotte, 2002) and *Joeropsis salvati* Müller, 1989 (Mooréa, Tahiti), all three species being relatively broad-bodied with five or six serrations ('teeth') on the lateral margin of the pleotelson.

Joeropsis sandybrucei differs from *J. arpedes* in having an anteriorly concave pseudorostrum (vs straight in *J. arpedes*), eyes in a submarginal position (vs eyes marginal), evenly convex pleotelson lateral margins (vs weakly sinuate), more compact somites with truncate coxae (vs coxae posteriorly rounded) and having a brown band only on the head (vs also across pereonites 3, 6 and anterior of pleotelson), with the head bands being differently shaped in the two species, that of *J. arpedes* being shorter, and posteriorly narrowed.

Joeropsis indica is closely similar in appearance to *J. sandybrucei*, both species having an anteriorly concave pseudorostrum, evenly convex pleotelson lateral margins with 4-6 serrations, truncate coxae and a similar colour pattern. *J. sandybrucei* differs from *J. indica* in many details: pleotelson medial lobe narrowly rounded (vs broadly rounded in *J. indica*), pereopods 2-7 with dactyli each with three claws (vs pereopods 2-7 dactyli each with two claws), maxilliped endite distal margin mesial excavation with four tubercular robust setae (vs without tubercular robust setae), distal margin of male pleopod 1 with a broadly rounded mesial lobe (vs narrowly rounded) and prominent and acute lateral lobe, and the head with a dark-brown band (vs red-brown band).

Joeropsis salvati has a body shape generally similar to that of *J. sandybrucei*, and also has an anteriorly concave pseudorostrum, but is less than half the size of *J. sandybrucei* (1.0-1.5 mm, vs 2.8-3.5 mm). Other points of distinction are the pleotelson medial lobe narrowly rounded (vs broadly rounded in *J. salvati*), pereopods slender (vs pereopods more robust, e.g., pereopod 7 length to width, *J. sandybrucei* given first: ischium 3.4 vs 2.5; merus 1.8 vs 1.4; carpus 3.4 vs 3.0; propodus 4.6 vs 3.6), maxilliped endite distal margin mesial excavation with four tubercular robust setae (vs without tubercular robust setae), maxilliped palp articles 2 and 3 broad (vs narrow), distal margin of male pleopod 1 lateral lobe acute (vs blunt) and the uropodal peduncle with a mesial tooth (vs without mesial tooth).

Distribution. — Heron Island, Capricorn Group, southern Great Barrier Reef, and Lizard Island, northern Great Barrier Reef; on the reef at depths from the intertidal to 3 metres; probably occurs throughout the Great Barrier Reef in suitable habitats.

Etymology. — Specimens from Heron Island were collected in the period 1979-1980, during the tenure of Dr A. J. ('Sandy') Bruce as Director of the Heron Island Research Station, and it is fitting that it be named in his honour in recognition of his contribution to knowledge of the Crustacea and coral reef shrimps in particular. The name is a noun in the genitive singular.

Status of *Joeropsis indica*. — There are several differences between Kensley & Schotte's (2002) figures of *Joeropsis indica* (specimens from the reef flat of coral reefs in the Seychelles) and those given by Müller (1991) (specimens from 'sabellid [sic] reef', Sri Lanka) in the original description. Material from the Seychelles was notably figured with a narrower pleotelson apex and male pleopods 1 being laterally more strongly concave and distally less angled than in the Sri Lanka material. The colour pattern illustrated by Kensley & Schotte (2002) corresponds to that shown by *J. sandybrucei* sp. nov. in both the length (77% head length) and in the shape of the anterior margin of the brown band, which is medially indented; in Müller's (1991) illustration the brown band is shorter (46% head length) and scarcely medially indented.

Kensley & Schotte (2002) provided no data on appendage morphology other than male pleopod 1 and uropod, and did not examine the type material. Given the apparent differences in appearance and habitat it is probable that the western Indian Ocean material and the Sri Lanka material are not the same species.

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