

**ORCOVITA SALTATRIX, A NEW GENUS AND SPECIES OF
ANCHIALINE VARUNINE CRAB
(CRUSTACEA: DECAPODA: BRACHYURA: GRAPSIDAE)
FROM KAKABAN ISLAND, INDONESIA**

Peter K. L. Ng and Tomas Tomascik

ABSTRACT. - A new genus and species of varunine crab (Grapsidae), *Orcovita saltatrix*, is described from an anchialine lake on the raised atoll island of Kakaban in Indonesia. *Orcovita* differs from its closest relative, *Ptychognathus* in carapace morphology as well as gonopodal features.

INTRODUCTION

Recently, the second author collected specimens of an interesting brachyuran crab from an anchialine lake (sensu Holthuis, 1973) in the atoll island of Kakaban, Indonesia (Figs. 1, 2). The crab, while bearing a superficial resemblance to grapsid genera like *Ptychognathus* Stimpson, 1858, and *Acmaeopleura* Stimpson, 1858 (Varuninae), differs markedly in the shape and structure of the carapace. The specimens belong not only to a new varunine species, but a new genus as well.

The description of these specimens, here named *Orcovita saltatrix*, new genus and new species, forms the context of the present paper. The terms G1 and G2 are used for the male first and second pleopods respectively. Measurements provided are of the carapace width and length respectively. Specimens are deposited in the Zoological Reference Collection (ZRC), Department of Zoology, National University of Singapore; Museum Zoologicum Bogoriense (MZB), Bogor, Indonesia; Muséum national d'Histoire naturelle (MNHN), Paris, France; and the Nationaal Natuurhistorisch Museum (NNM), Leiden, The Netherlands.

Peter K. L. Ng - Department of Zoology, National University of Singapore, Kent Ridge, Singapore 0511, Republic of Singapore. **Tomas Tomascik** - Environmental Management Development in Indonesia (EMDI) Project, Arthaloka Building, Lantai 12, Jl. Jendral Sudirman 2, Jakarta 10220, Indonesia.

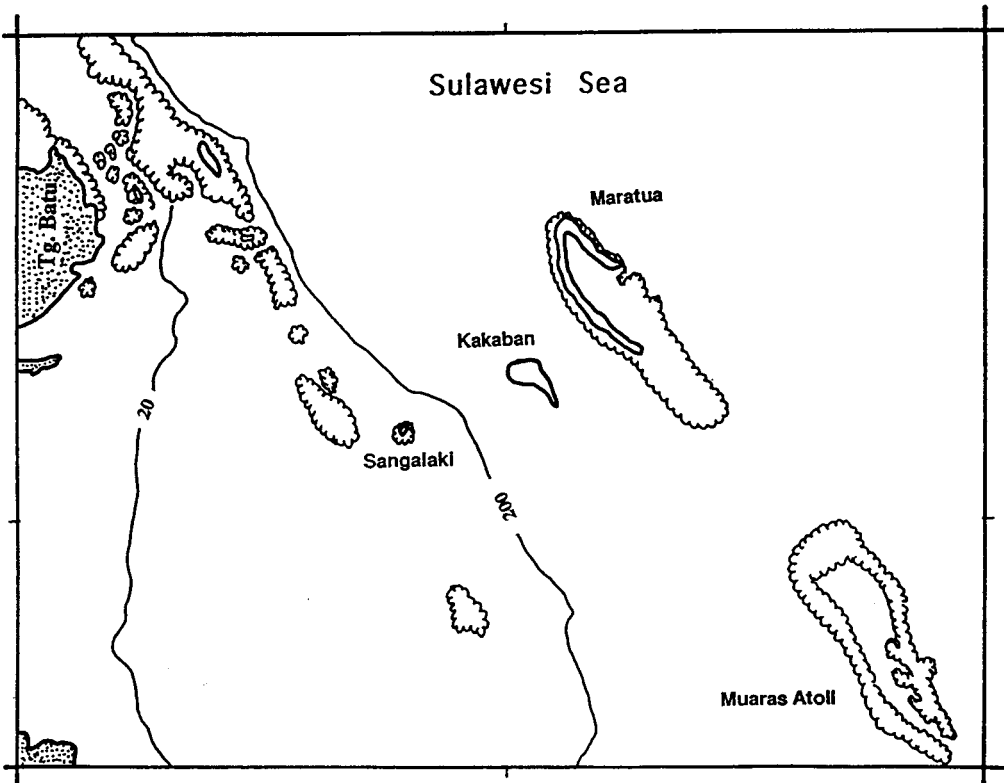
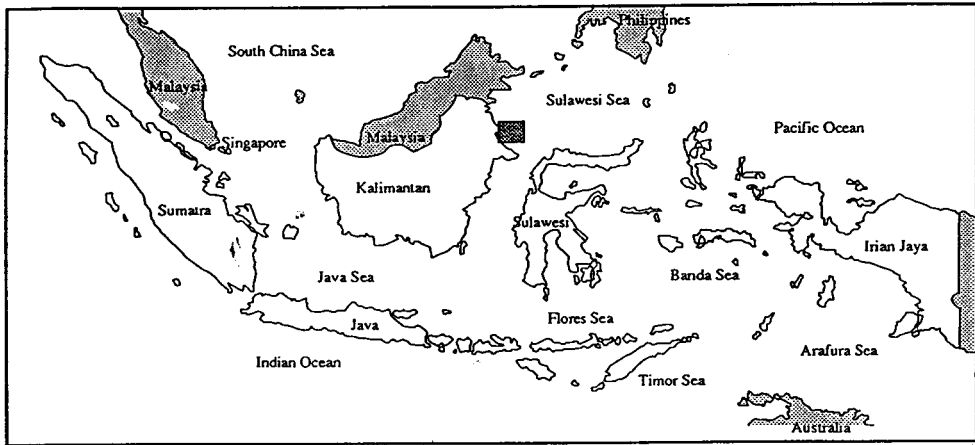


Fig. 1. Map of Indonesia showing location of Kakaban Island.

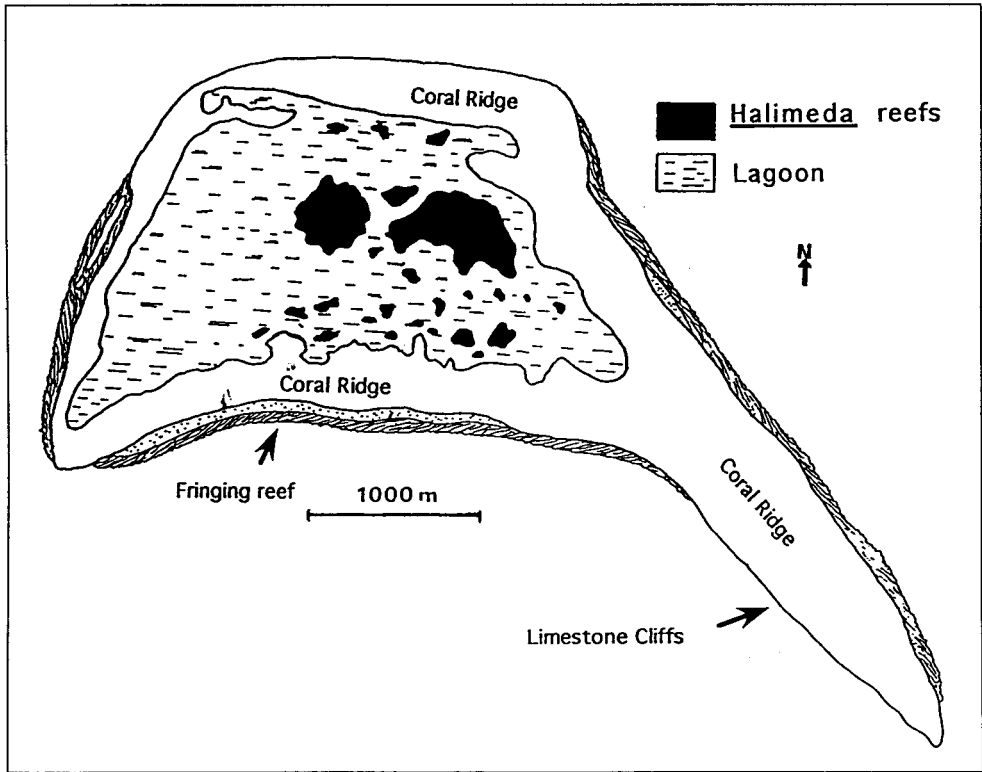


Fig. 2. Map of Kakaban Island (after oblique aerial photographs and video by R. Holland).

TAXONOMY

FAMILY GRAPSIDAE MACLEAY, 1838

Subfamily Varuninae H. Milne Edwards, 1853

Orcovita, new genus

Type species. - *Orcovita saltatrix*, new species, by present designation.

Diagnosis. - Carapace subrectangular, distinctly broader than long (width ca. 1.4 times length); dorsal surfaces relatively smooth; regions poorly defined; epigastric cristae low; postorbital cristae not discernible. External orbital angle very broad, outer margin long, ca. 5 times length of inner margin, with 1 low epibranchial tooth; frontal median triangle present, formed by 3 granuliform ridges. Third maxilliped with very broad and stout exopod, as wide or slightly wider than ischium; anteroexternal angle of merus strongly auriculiform. Chelipeds relatively long, pulvinus with setose base present at base of fingers of both male chelae. Ambulatory legs subcylindrical in cross-section, segments long and slender. Telson of male abdomen short, ca. 1.4 times length of segment 6. G1 relatively short, stout, tip truncate from lateral view.

Etymology. - The name is derived from the Latin "Orcus" for the nether world, and "vita" for life, alluding to the muddy and dark habitat of the type species. Gender feminine.

Remarks. - *Orcovita*, new genus, is placed in the subfamily Varuninae because its third maxillipeds are broad and completely cover the buccal chamber when closed, without trace of any rhomboidal gap. The carapace of *Orcovita* is subrectangular and distinctly broader than long, and this character alone easily distinguishes it from all other genera in the Varuninae. With regards to its broad and stout exopod of the third maxilliped and cylindrical (cross-section) ambulatory legs, *Orcovita* is closest to *Ptychognathus* Stimpson, 1858, to which the carapace also bears a superficial resemblance. *Orcovita* however, differs markedly from *Ptychognathus* in having a proportionately broader and more rectangular carapace (width about 1.4 times length, against about 1.2 or less for *Ptychognathus*), the supraorbital margin is parallel or subparallel to the frontal margin (against distinctly sinuous or sloping posteriorly), presence of a frontal median triangle (against absent), the outer margin of the external orbital angle is proportionately much longer, the relatively more elongate and slender chelipeds and ambulatory legs, and a proportionately shorter and stouter G1 (against more slender G1) (see Stimpson, 1858, 1907; Crosnier, 1965; Tesch, 1918; unpublished data on *Ptychognathus*).

Some members of the varunine genus *Acmaeopleura* Stimpson, 1858 (e.g. *A. balssi* Shen, 1932) also have a broad carapace (width about 1.4 times length) like *Orcovita*. Like *Orcovita*, the telson of the male abdomen is also relatively short and not elongate like in many other varunine genera (see Crosnier, 1965; Shen, 1932). The carapace in *Acmaeopleura balssi* however, is distinctly oval (not subrectangular), has no trace of any anterolateral teeth, and the third maxilliped is very different (short, with a narrow exopod).

Orcovita saltatrix, new species

(Figs. 3-7)

Material examined. - Holotype - male (MZB), 19.0 by 14.0 mm, ca. 11 m depth, Kakaban, Indonesia, coll. T. Tomascik, 27.ix.1993.

Paratypes - 7 males (ZRC 1994.4220) (largest 23.0 by 16.1 mm), 2 females (19.4 by 14.9 mm, 19.4 by 14.6 mm) (ZRC), 2 males (MNHN), 1 male (NNM), ca. 10 m depth, same locality as holotype, coll. T. Tomascik, 29.ix.1993.

Description of male holotype. - Carapace subrectangular, distinctly broader than long (width ca. 1.4 times length); dorsal surfaces relatively smooth; regions poorly defined; cervical grooves indistinct, very shallow, broad; gastric grooves deep; epigastric cristae rugose, very low, separated by shallow cleft; postorbital cristae absent; low ridge present at region just adjacent to junction between posterolateral margin and posterior margin of carapace. Anterolateral margin lined with small, rounded granules; not clearly demarcated from posterolateral margin; external orbital angle very broad, outer margin arcuate, ca. 5 times length of inner margin; 1 low epibranchial tooth present, separated from external orbital angle by broad, V-shaped cleft; posterolateral margins gently converging towards almost straight posterior margin of carapace; supraorbital margin granulated, gently sinuous, parallel to subparallel with frontal margin; frontal margin gently sinuous, strongly deflexed, with broad shallow sinus between the 2 lobes, broad frontal median triangle present, formed by 3 granuliform ridges; infraorbital margin granulated, incomplete, not confluent with anterolateral margin; a distinct row of rounded granules present just below infraorbital margin on suborbital region, extending to sub-branchial region. Antennal segments entering orbital hiatus. Antennules broad. Eyes well developed, cornea pigmented. Epistome narrow, posterior margin with 2 lateral clefts, median part broadly triangular, margin gently granulated. Third maxilliped with very broad and stout exopod, as wide or slightly wider than ischium, flagellum

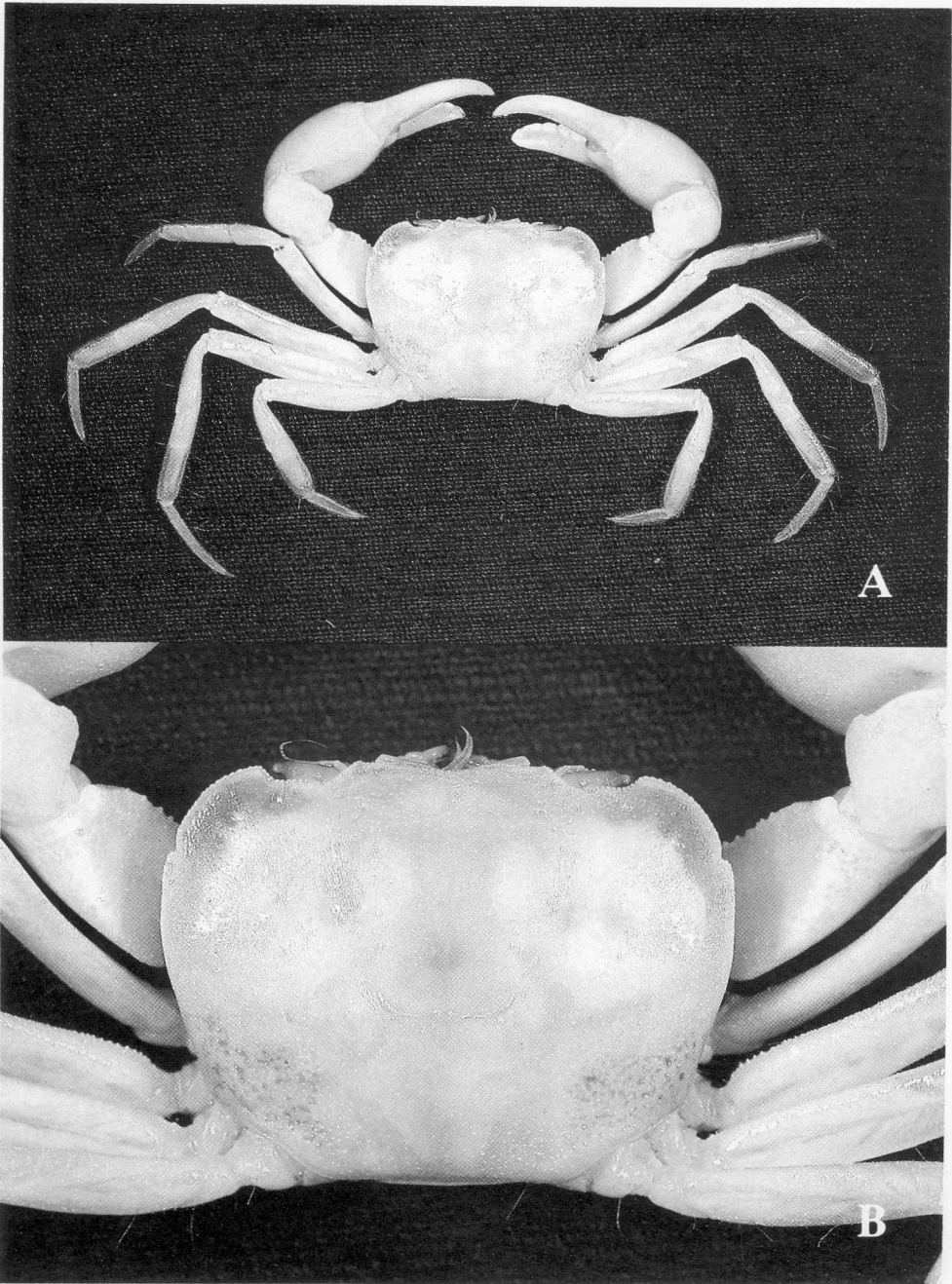


Fig. 3. *Orcovita saltatrix*, new genus and new species. Holotype male (MZB), 19.0 by 14.0 mm. A, dorsal view; B, carapace.



Fig. 4. *Orcovita saltatrix*, new genus and new species. Holotype male (MZB), 19.0 by 14.0 mm. A, frontal view; B, ventral view.

well developed; ischium with deep oblique sulcus, outer half (including margin) distinctly granulated; merus broad, anteroexternal angle strongly auriculiform.

Chelipeds relatively long, surfaces of segments smooth. Posterior margin of merus lined with low granules, anterior margin smooth, unarmed. Carpus rounded, smooth, inner distal angle with very low, obtuse tooth. Chelae swollen, subequal; fingers slightly shorter than palm; cutting edges of fingers with large teeth; base of fingers with well developed pulvinus (swollen area with very thin cuticle), the base and adjacent areas of which are setose.

Ambulatory legs subcylindrical in cross-section, segments long and slender; second leg longest; surfaces smooth, all segments unarmed. Dactylus rectangular in cross-section. Margins of propodus and dactylus and distal part of carpus lined with long and short setae, the latter appearing comb-like in first 3 pairs of legs.

Male abdomen distinctly triangular; segment 1 not reaching bases of coxae of last ambulatory legs; segments 3-6 progressively more trapezoidal; lateral margins of segments 2-4 and 6 gently convex; lateral margins of segment 5 gently concave; lateral margins of telson almost straight along proximal part, becoming gradually more convex towards rounded tip; telson short, ca. 1.4 times length of segment 6.

G1 relatively slender, distal part covered with numerous long, stiff hairs which obscures tip; distal part pectinated, appears truncate from lateral view. G2 very short, distal part cup-shaped.

Etymology. - The name is derived from the Latin for dancer, alluding to the long legs of the species.

Remarks. - The good series of male paratypes of *O. saltatrix*, new species, agree very well with the holotype male in almost aspects. In larger males (e.g. 20.8 by 15.8 mm, ZRC 1994.4220a), one of the chelae becomes slightly larger than the other and the frontal margin is more sinuous. The setation around the base of the pulvinus on the chela varies slightly, although the setae are usually long enough to obscure the pulvinus. The pulvinus is usually not discernible before cleaning due to the mud and debris which gathers on the setae. Only two female specimens (ZRC 1994.4220b-4220c) were obtained but both are mature. Their chelae are equal, not inflated and lack the pulvinus and associated setae. The convexity of the outer margin of the external orbital angle varies slightly, from strongly arcuate to gently convex.

Orcovita saltatrix is not the only species in the genus. Thomas M. Iliffe (Texas A & M University) had previously collected three other undescribed species from anchialine caves in the Philippines, Guam and Niue islands, which are clearly also members of *Orcovita*. In fact, these species from the Philippines, Guam and Niue, as well as the genus *Orcovita*, had been recognised as new much earlier on the basis of studies by Danièle Guinot (MNHN), Thomas Iliffe and the first author. These authors are now in the process of describing these new species and revising the genus. Keys to all the species will be presented then.

Colour. - In life, carapace greyish-brown to dark grey, with blotches of reddish-brown on anterior half, H-shaped central depression white to dirty-white; ambulatory legs grey to brown; chelae in smaller specimens grey with dark grey longitudinal streaks; greyish-white in adults; cutting teeth white; ventral surfaces dull grey to dirty white. Overall colours in freshly preserved specimens generally paler.

Notes on the habitat and biology. - Kakaban (02°N08'35"N, 118°31'13"E) is a raised atoll island approximately 2.5 km wide and 7.5 km long. It is situated on a depositional basin that stretches from the Simporna Peninsula (Sabah, East Malaysia) to the Mangkalihat Peninsula (East Kalimantan, Indonesia) along the northeast coast of Borneo in the Sulawesi Sea (Figs. 1, 2). The atoll was formed during a slow subsidence of the shelf. As this was occurring, the coral growth kept pace with the relative sea level and eventually formed an atoll. At some part of its recent geologic history, the slowly sinking platform under Kakaban must have curved upwards, thus raising Kakaban above the sea level (see Kuenen, 1947).

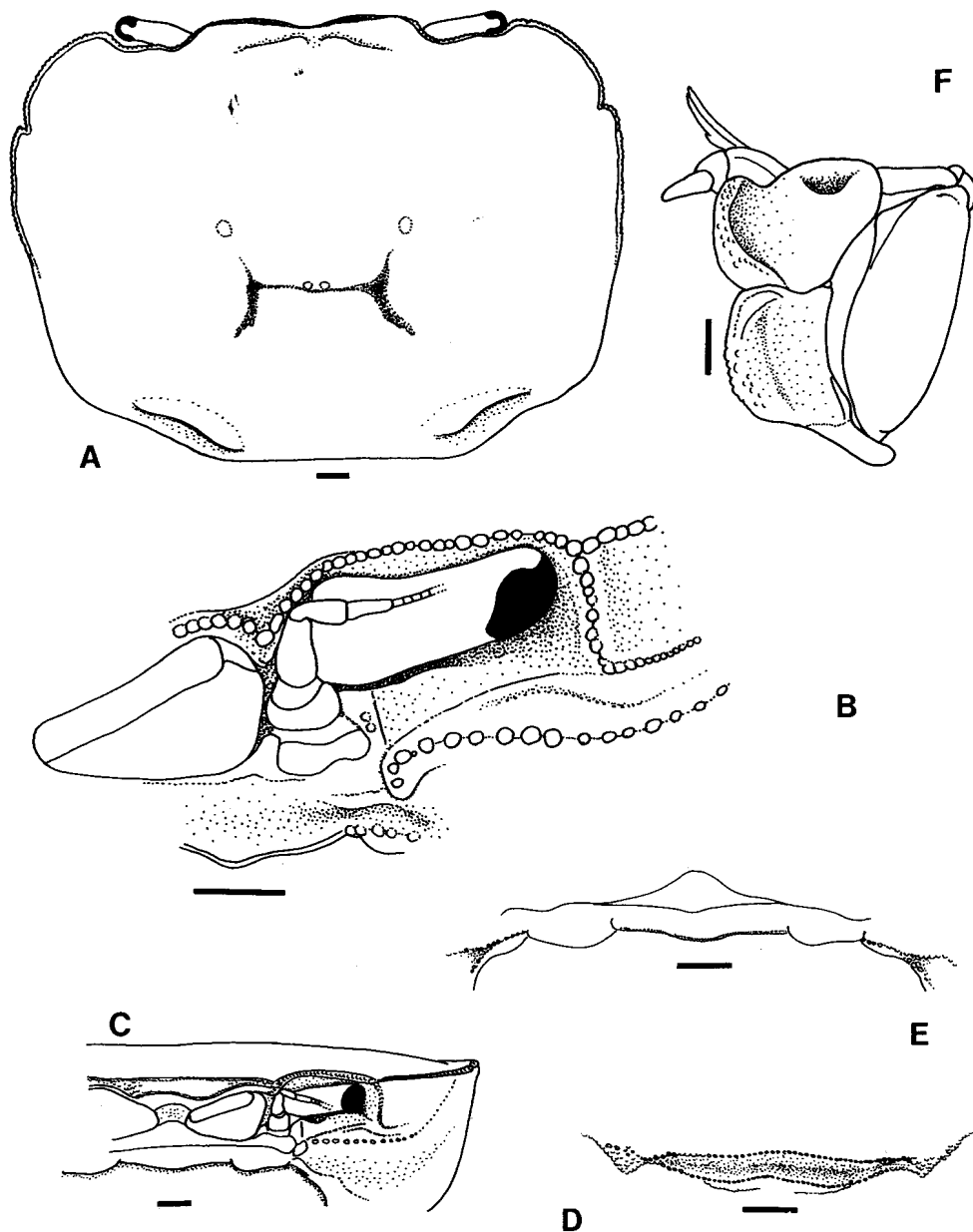


Fig. 5. *Orcovita saltatrix*, new genus and new species. Holotype male (MZB), 19.0 by 14.0 mm. A, carapace; B, antennae, antennules and orbits; C, frontal view of carapace; D, frontal median triangle; E, posterior margin of epistome; F, left third maxillipeds. Scales = 1.0 mm.

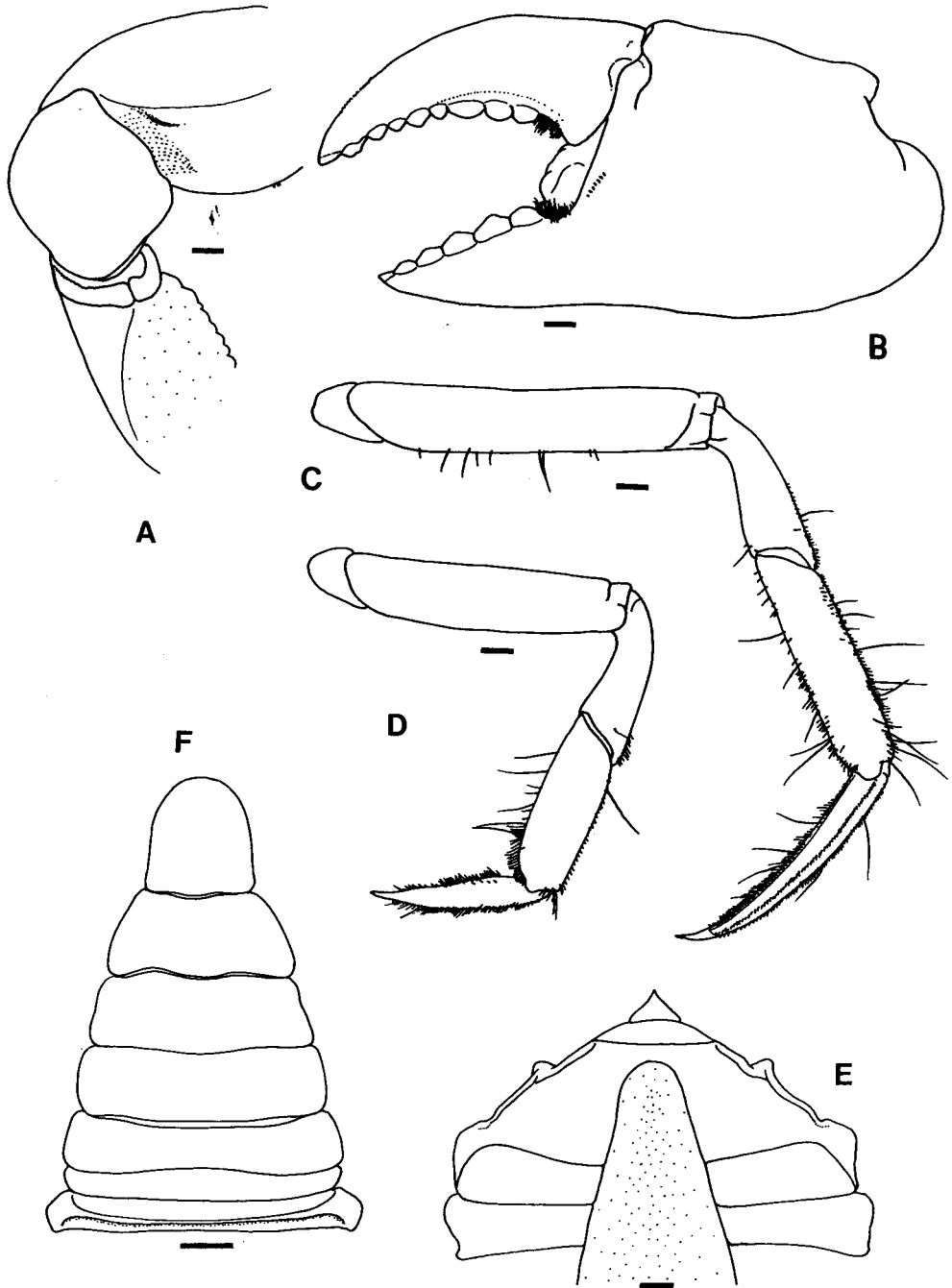


Fig. 6. *Orcovita saltatrix*, new genus and new species. Holotype male (MZB), 19.0 by 14.0 mm. A, distal part of merus, carpus and proximal part of chela (dorsal view); B, left chela; C, right third ambulatory leg; D, left fourth ambulatory leg; E, anterior sternites; F, abdomen. Scales = 1.0 mm.

The former lagoon of the uplifted atoll of Kakaban may be classified as an anchialine lake as it is completely surrounded by a heavily vegetated coral ridge that rises to a height of approximately 50-60 m above sea level. There is no surface connection with the open sea. The lake has an approximate area of 3.9 km², an average depth of 8.5 m and a tidal amplitude of about 0.19 m, with the estimated total tidal flushing (per tidal cycle) less than 2.5% of the total lake volume. The pH and salinity of the lake water is lower than that of the surrounding sea water (pH 7.6-7.8 against average of pH 8.3, salinity 26-28 ppt against 32-35 ppt). The average water temperature is distinctly higher than the surrounding waters (surface

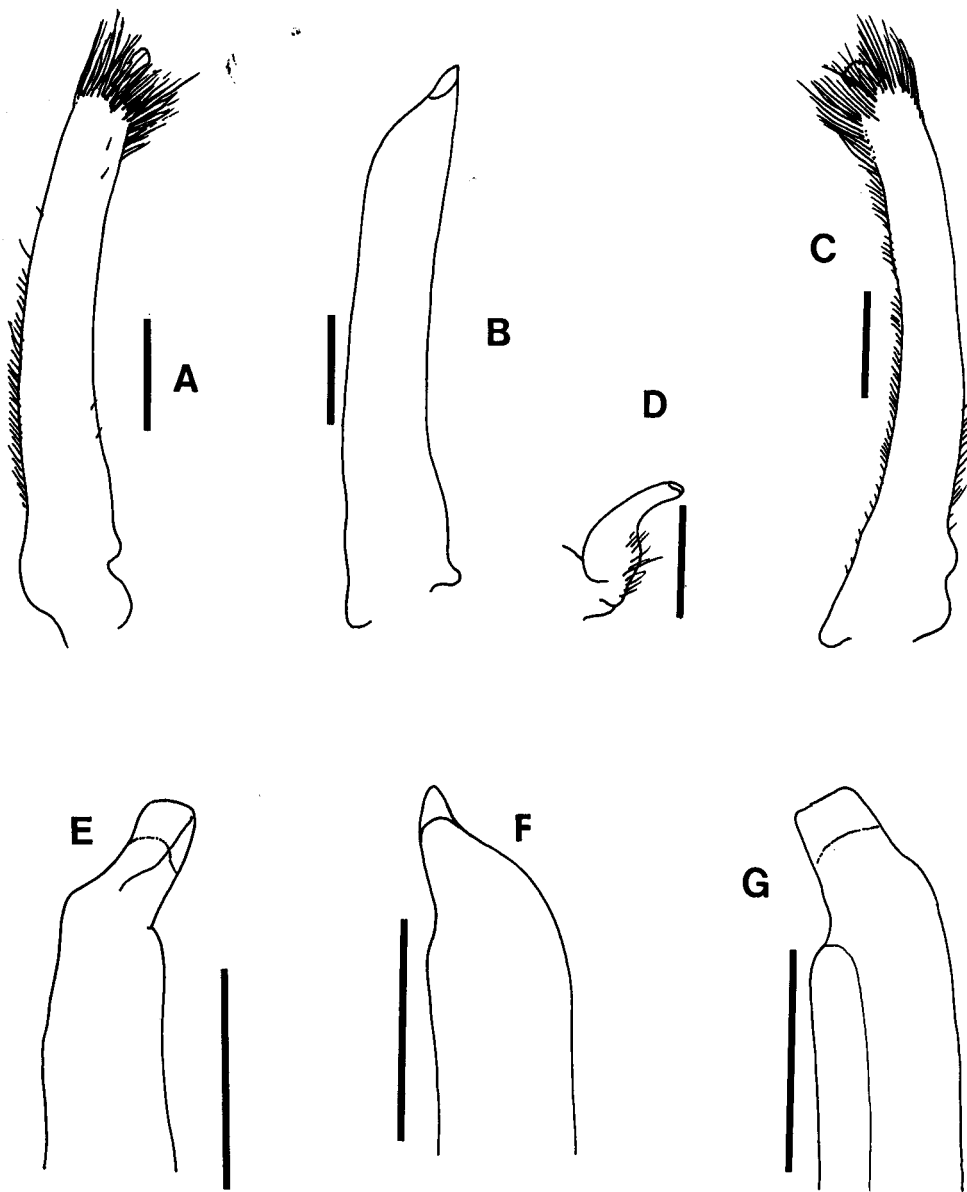


Fig. 7. *Orcovita saltatrix*, new genus and new species. Holotype male (MZB), 19.0 by 14.0 mm. A-C, left G1; E-G, distal part of left G1; D, left G2. A, E, ventral view; B, F, dorso-marginal view; C, G, dorsal view. Scales = 1.0 mm.

32°C, 31°C at a depth of about 10 m, against 26°-28°C). The dissolved oxygen (measured at mid-afternoon) was 6.6 mg/l at the surface and 5.6 mg/l at a depth of about 10 m, against that of seawater which ranges from 6.0-6.4 mg/l.

The lake at Kakaban is fringed by a narrow mangrove belt about 3-5 m wide and consists mainly of *Rhizophora mucronata*, *Bruguiera* sp., *Avicennia* sp. and *Sonneratia* sp. The *Rhizophora* stilt root system constitutes an important intertidal and subtidal habitat which supports a diverse epiphytic and encrusting invertebrate community. The most abundant epiphytes on the stilt roots are *Halimeda tuna*, *Caulerpa racemosa*, *Caulerpa sertularoides* and *Caulerpa lentillifera*. The dominant benthic macrophytes are the green coenocytic calcareous algae *Halimeda oputina* and *Halimeda tuna*. The sediments in the lake can be roughly grouped into three types. Type 1 is a dark sediment found exclusively under the stilt roots of *Rhizophora* and consists mainly of mangrove detritus, some weathered 'beach' rock and fragments from *Halimeda* and the bivalve *Brachydontes variabilis* which are very abundant on the stilt roots. Type 2 sediment is a fine mud covering most of the lake bottom. Type 3 sediment consists mostly of *Halimeda* fragments and is dominant in the lake's extensive *Halimeda* meadows.

Orcovita saltatrix were observed only on Type 1 and Type 2 sediments. Preliminary observations indicate that the crabs are found only at depths greater than 2 m. The crabs move gently over the bottom and when disturbed, swiftly burrow into the soft mud. Another abundant macroinvertebrate found in the same habitat is a new species of burrowing deposit-feeding sea cucumber (Holothuridae) (Cl. Massin, pers. comm. to second author).

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