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Remarks on the Indo-Pacific ostracode genus *Loxoconchella*

Communicated by Prof. C. W. Drooger at the meeting of January 28, 1978

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ABSTRACT

A compilation is presented of the stratigraphic and geographic distribution of the six presently known species of the Indo-Pacific genus *Loxoconchella* Triebel, 1954. Two new taxa are introduced, i.e. *Loxoconchella ishizakii* n.sp. from the Quaternary of the Ryukyu Islands, Japan, and *Loxoconchella anomala* (Brady) *malaysiana* n.subsp. from the Holocene of the Singapore and South China Sea area.

INTRODUCTION

Triebel (1954) introduced the ostracode genus *Loxoconchella* for an Australian species found at Melbourne and Adelaide, which he (erroneously, as explained below) believed to be conspecific with *Loxoconcha honoluliensis* Brady, 1880, originally described from Hawaii. The outline, adont hinge and complex marginal pore canals are the distinctive characters in which the carapaces of the species of the new genus differ from the cosely allied, ubiquitous genus *Loxoconcha* Sars, 1866.

The original figures of *Loxoconcha honoluliensis* (Brady, 1880, p. 28, figs. 6 a-f) show seemingly two morphotypes (figs. 6 a-d and 6 e-f), which differ mainly in the ornamentation. The carapace allocated by Brady to the male (figs. 6 a-d) shows a pitted surface, whereas that of the supposed female (figs. 6 e-f) is figured with a faint reticulate ornamentation. A lectotype was recently choosen by Puri & Hulings (1976, p. 297, pl. 19, figs. 5-6), which clearly belongs to Brady's "male" type. One of the topotypes (Fig. 3 c) shows faint, irregular striae on its surface and this may

have inspired the illustrator to draw a neat network. This Hawaiian species differs in many aspects from the Australian species which Triebel mistook for *L. honoluliensis*.

Loxoconcha anomala was introduced in the same publication by Brady in 1880, and this species appeared also to belong to *Loxoconchella*. Scott (1905) mentioned this species from Sri Lanka.

The third species allocated to *Loxoconchella* was described by Hartmann (1964), who introduced *L. dorsobullata* from the Gulf of Suez. The soft parts were described as well, showing a close relationship to those of *Loxoconcha*. Maddocks (1966) found this species at Nosy Bé, Malagasy.

McKenzie (1967, p. 76, textfig. 4c) described the new species *Loxoconchella pulchra* from Port Philip Bay, Victoria, the same area from which Triebel derived his material. McKenzie kindly supplied me with a paratype of *L.pulchra*, and after comparing this with Triebel's photographs it is obvious that we deal with one and the same species. *Loxoconchella pulchra* differs in outline and ornamentation of its carapace from *L. honoluliensis* (Brady). According to the article 30 of the Rules of Zoological Nomenclature *L. honoluliensis* remains the type species of the genus as originally intended by Triebel. Fortunately both species, *L. honoluliensis* and *L. pulchra*, are congeneric and the generic diagnosis does not need to be changed or emended.

Holden (1976) figured a right valve of an unnamed Late Miocene species of Midway.

In this paper a new species from the Quaternary of the Ryukyu Islands is introduced, i.e. *Loxoconchella ishizakii* n.sp., bringing the number of formally introduced species to five: *Loxoconchella honoluliensis* (Brady), *L. anomala* (Brady), *L. dorsobullata* Hartmann, *L. pulchra* McKenzie and *L. ishizakii* n.sp. Moreover, a new Malaysian subspecies of *L. anomala* is introduced here, *L. anomala malaysiana* n.subsp. .

The genus *Loxoconchella* appears to be restricted to the Indo-Pacific area. Van Morkhoven (1963) mentioned *Loxoconchella* from the Persian Gulf, but so far I have not been able to confirm this observation from many pickings made of samples from the Gulf, nor have Bate (1971) or Kwang Ho Paik (1977).

L. dorsobullata Hartmann is restricted to the East African faunal province (Gulf of Suez, Gulf of Aqaba (Bonaduce, pers. comm.), the Red Sea and northern Malagasy (Fig. 1). *L. ishizakii* n.sp. is so far only known from a single locality in the borderzone between the tropical Indo-Pacific and the temperate Sinian provinces. The mainly tropical *L. anomala* gr., on the other hand, ranges from Singapore in the West to the line Hawaii/Bora Bora in the East. The geographical distribution of *L. honoluliensis* and *L. pulchra* is not clear, as these two species probably have been confused in literature. *L. pulchra* is certainly known from around Australia and from the South China Sea, whereas *L. honoluliensis* occurs at Hawaii, Midway and New Caledonia (Apostolescu, 1967). McKenzie informed me that more undescribed species occur along the western and eastern Australian coasts.

Within the genus *Loxoconchella* two groups of species can be distinguished. The first group consists of *L. honoluliensis* and *L. pulchra*, both species with valves with a pitted ornamentation. The second group consists of *L. anomala*, *L. dorsobullata*, *L.* n.sp. Holden and *L. ishizakii* n.sp., all species characterised by a mediodorsal tubercle. The "honoluliensis" lineage can be traced back to the Early Miocene (Guha 1975, Holden 1976), whereas the "anomala" lineage goes back to the Late Miocene. The subdivision of the genus in two subgenera based on these two lineages is taxonomically tempting, but I feel that it is still somewhat premature, as so little is known of the soft parts and the Neogene history of the various species. The origin of *Loxoconchella*, as of most other ostracod genera, remains a matter of speculation. Van Morkhoven (1963, p. 393) proposed a possible relationship between *Loxoconchella* and *Phlyctocythere* Keij, 1958, an Eocene to Holocene loxoconchid genus, which species possess thin, inflated, smooth carapaces with an adont hinge. Especially the type species *P. eocaenica* Keij from the Middle Eocene of western Europe shows quite some resemblance in the shape of its carapace to that of *Loxoconchella* species. *Phlyctocythere* species are still extant in the Mediterranean (*P. pellucida*) and the Indomalaysian area.

The age of the genus *Loxoconchella* makes it theoretically possible that species migrated from the Indo-Pacific region to the Mediterranean before it was cut off from the Indian Ocean. Bonaduce (pers. comm.) assured me that no species of *Loxoconchella* has been found by him living in the Meterranean, nor have any fossil species been mentioned from the Neogene deposits of this area. No *Loxoconchella* species are apparently living along the western coasts of the American continents, nor have any been mentioned in the literature dealing with the Caribbean or Antillean regions.

The species always appear to be rare to very elements in my Holocene material.

MATERIAL

Loxoconchella anomala malaysiana			
South China Sea-sample DD 7	N 5°47′ –E 112°36′	472 m	8 ex.
DG 8	N 5°59′ –E 112°35′	424 m	3
DD 54	N 6°40′ –E 109°34′30″	677 m	8
Ms 8526	N 6°52′14″–E 116°18′40″	54 m	1
Singapore – Pulau Hantu	N 1°13′30″–E 103°45′	1 m	4
Pulau Salu	N 1°13′ –E 103°42′30″	1 m	4
Loxoconchella dorsobullata			
Saudi Arabia – Jeddah anchorage	N21°45′ –E 38°32′	?	1
– creek N of Jeddah		2 m	24
Loxoconchella ishizakii			
Japan – Ryukyu Islands	N29°15′51″–E 128°54′18″	95 m	37
Loxoconchella pulchra			
Australia–Port Philip Bay	S 37°55′ –E 145°	beach	1
South China Sea	N 6°58′10″–E 116°07′10″	28 m	3

Loxoconchella species live in normal or somewhat supersaline (Red Sea), shallow water, probably on or between Algae and coarse bioclastic debris, in accordance with the habitat of the majority of *Loxoconcha* species.

ACKNOWLEDGEMENTS

The help of my colleagues R. H. Bate (London), G. Bonaduce (Napoli), G. Hartmann (Hamburg), K. G. McKenzie (Wagga-Wagga) and J. G. Moltzer (Jeddah) is gratefully acknowledged. My special thanks go to H. J. Oertli (Pau), who again supplied to fine SEM photographs illustrating this article, and to G. A. Boxshall (Brit. Mus., London), who kindly made the "Challenger" material available for study.

DEPOSITION OF MATERIAL

The slides with *Loxoconchella* specimens are housed in the collections of the Micropaleontological Department of the Geological Institute, State University at Utrecht, Netherlands (coll. nos. T 304–313 and CH 4039–4041).

SYSTEMATICS

Order Podocopida G. W. Müller, 1894
Family Loxoconchidae Sars, 1925
Genus *Loxoconchella* Triebel, 1954

Type species: *Loxoconcha honoluliensis* Brady, 1880
Diagnosis: A genus of the Loxoconchidae characterised by carapaces with nearly equal valves with dorsal caudal process and punctate surface and eye tubercle; some species possess a dorsomedial tubercle; hinge adont with smooth bar in LV* which fits in groove of RV; sieve-type normal pore canals; shallow anterior and posterior vestibula, line of concrescence scalloped; marginal pore canals wide-based, ending in two or more narrow pores and one or more sieve type, false radial pore canals; central muscle scar with four adductor scars, decreasing in size downwards, two frontal scars, one crescent-shaped, the other small and subcircular. Sexual dimorphism developed.
Stratigraphic range: Miocene to Holocene.
Geographic distribution: Pacific and Indian Oceans and Red Sea with adjacent gulfs (Fig. 1).

Remarks: The carapace of *Loxoconchella* resembles in shape that of *Phlyctocythere* Keij, 1958, but differs in being thick-shelled and ornamented, in the construction of the marginal zone, whereas *Phlyctocythere* is thin-shelled and almost smooth and possesses long, thing, unbranched radial pore canals.

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* : RV is right valve and LV left valve.

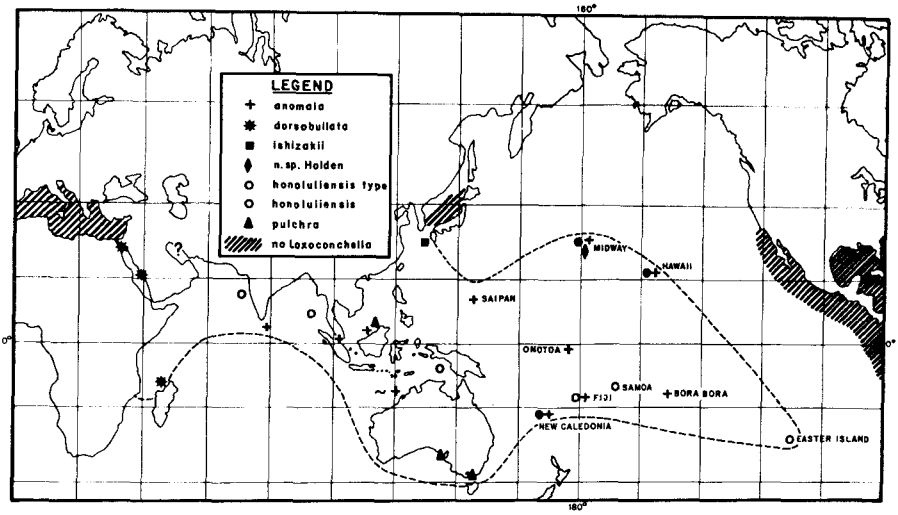

Fig. 1. Distribution of *Loxoconchella* species during Neogene to Holocene.

With *Loxoconcha* and *Loxocorniculum* it shares the thick-shelled, punctate carapace, but differs in hinge and marginal area construction. These two genera also never possess the characteristic dorsomedial tubercle as found in some of the *Loxoconchella* species.

Hartmann (1964) studied the soft parts of *Loxoconchella dorsobullata* Hartmann from the Red Sea area and found close affinities with *Loxoconcha*.

Loxoconchella species have "B" type (Puri & Dickau, 1969) sieve-type normal pore canals (Pl. 1, fig. 3 b).

Loxoconchella anomala (Brady), 1880

Loxoconcha anomala Brady, 1880, p. 123, pl. 27, fig. 5; Brady, 1890, p. 507; Scott, 1905, p. 376; Puri & Hulings, 1976, p. 297, pl. 18, figs. 6–9.
Loxoconchella anomala, Holden, 1967, p. 34, figs. 25 a-f; Holden, 1976, p. 33, pl. 6, fig. 13.
Stratigraphic range: ?Pliocene- Holocene.
Geographic distribution: Between Hawaii and Bora-Bora in the East and Singapore (or Sri Lanka?) in the West.
Diagnosis: A species of the genus *Loxoconchella* with mediodorsal tubercle, the surface reticulate, a distinct eye-tubercle and a short radial, marginal posteroventral carina.

Remarks: The type material of this species consists of only three, well-preserved detached valves. I therefore refrained from a detailed study of the marginal zone and the central muscle-scar, as this would necessitate immersion in fluids. These details can be better studied at a later date when more abundant topotypes become available. The dimensions of the "Challenger" valves are:

	length	height	
RV	0.60 mm	0.41 mm	lectotype
LV	0.57 mm	0.415 mm	lectotype
RV	0.61 mm	0.42 mm	

L. anomala stands quite part within the genus, as it is the only species which possesses a reticulate ornamentation. All other species are punctate or nearly smooth.

After comparison of the Singapore and South China Sea specimens with the lectotype from Hawaii, it appears that the Malaysian specimens are covered with a loose meshwork of rounded depressions, whereas the typical *L. anomala* has reticulation consisting of horizontally drawn-out, subquadrate depressions arranged in rows. We distinguish now within *L. anomala* two subspecies, i.e. *Loxoconchella anomala anomala* and *L. anomala malaysiana* n.subsp. The nominate subspecies can be diagnosed as: reticulate ornamentation consisting of elongate, subquadrate fossae arranged in rows parallel to the ventral, anterior and dorsal margins.

Loxoconchella anomala (Brady) *malaysiana* n.subsp.

Pl. 1, figs. 1–5.

Name: after the Federation of Malaysia.
Holotype: right valve (coll. no. T 304).
Paratypes: 26 valves and 1 carapace (coll. nos. T 305–310).
Type locality: Pulau Salu (N 1°13′–E 103°42′30″) near Singapore; intertidal zone of reefflat.
Stratigraphic range: Holocene.
Geographic distribution: Pulau Hantu and P.Salu near Singapore and South China Sea offshore Malaysian Borneo (see sample list on p. 4)
Diagnosis: A subspecies of *Loxoconchella anomala* characterised by a surface ornamentation consisting of rounded fossae or punctae, not arranged in rows parallel to the outer margin.

Remarks: This subspecies was found in the intertidal zone of the Singapore islands and also offshore Sarawak and Sabah in the South China Sea. The intertidal specimens are somewhat larger than the shelf specimens from the South China Sea. The three bathyal localities contain a mixture of shelf and slope faunas and we assume that *Loxoconhella* belongs to the downward transported elements.

From the published illustrations of *L. anomala* it appears that the typical form occurs at Hawaii and Midway. As no figures are available of specimens from Saipan, Onotoa, Fiji, Bora-Bora, New Caledonia, northern Australia and Sri Lanka, all localities where *L. anomala* has been reported from, the areal distribution of the two (or more) subspecies cannot be delimited.

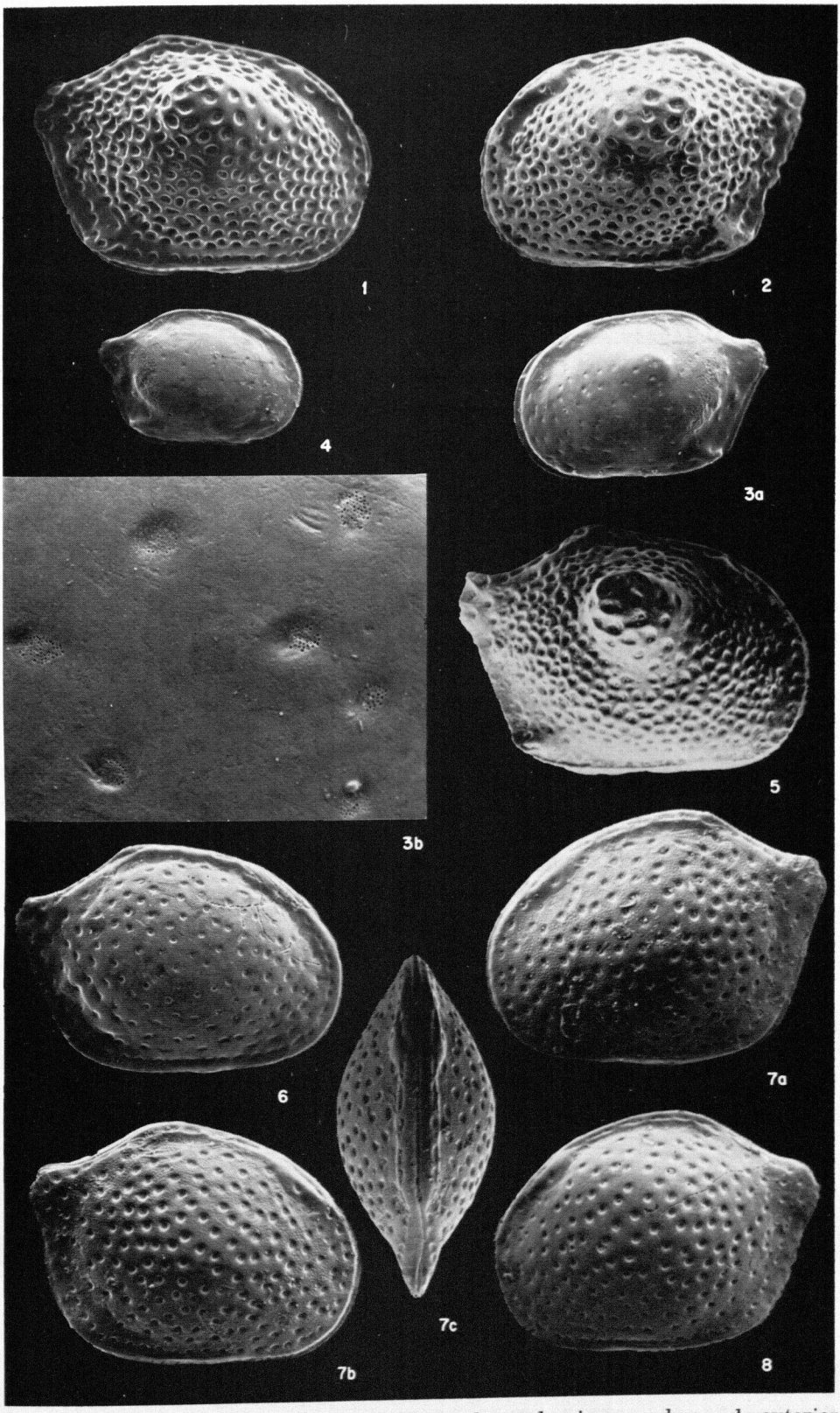

Plate 1. Figs. 1–5. *Loxoconchella anomala* (Brady) *malaysiana* n.subsp. – 1: exterior of RV; 2: exterior of LV; 3a: exterior of juvenile LV, b: magnified area below mediodorsal tubercle, showing six (B-type) sieve type normal pore canals – South China Sea at N 5° 47′–E 112° 36′. 5: exterior of right valve (holotype) – Pulau Salu, Singapore.

Figs. 6–8. *Loxoconchella pulchra* McKenzie – 6: exterior of right valve, Port Philip Bay, Victoria, Australia. 7a: exterior of left valve, b: exterior of right valve, and c: dorsal view of carapace; 8: exterior of left valve – South China Sea, Emerald Shoal at N 6°52′14″–E 116°18′40″.

Magnifications: Fig. 3a: 95×; 3b: 900×. All others 90×.

Loxoconchella dorsobullata Hartmann, 1964

Pl. 2, figs. 6–9.

Loxoconchella dorsobullata Hartmann, 1964, p. 60, pls. 21–22, figs. 101–113.
Loxoconchella sp. (or species OA), Maddocks, 1966, p. 65, fig. 51.
Stratigraphic range: Holocene.
Geographic distribution: Red Sea at al-Ghardaqa, Egypt, the Gulf of Aqaba (Bonaduce, pers. comm.), Jeddah, Saudi Arabia (coll. nos. CH 4039–4040); Nosy Bé, Malagasy.
Diagnosis: A species of the genus *Loxoconchella* characterised by punctate carapace with a dorsomedial, backwardly bent tubercle and a low, posteroventral, short, radial carina.

Remarks: Hartmann found this species on bushy Algae on a subrecent coral reef at al-Ghardaqa in Egypt. The soft parts show a close relationship to those of *Loxoconcha*. The valve surface was described as smooth, in contrast to the punctate surface of *L. honoluliensis* (sensu Triebel). The specimens from Jeddah have a smooth surface covered with widely spaced, small depressions marking the sieve-type normal pore canals. Also Maddock's Fig. 51 shows funnel-shaped openings of the normal pore canals. At Nosy Bé the species was collected from dead coral and on Algae in the intertidal and shallow subtidal zone.

In a bottom sample collected by J. G. Moltzer from 2 m depth near the shore of a 20 m deep tidal creek at some 35 km North of Jeddah, 24 valves and carapaces were found. Amongst the adult valves two size groups were observed, apparently caused by sexual dimorphism (Fig. 2). The smaller males (9 specimens) have an average length of 0.53 mm, height: 0.35 mm and width: 0.33 mm. The larger females (15 specimens) have an average length: 0.56 mm, height: 0.375 mm and width: 0.36 mm. These sizes agree well with those given by Hartmann. At Jeddah the carapaces appear to be wider and those of the females are higher than the Ghardaqa specimens.

Together with the rare *Loxoconchella dorsobullata*, a species of *Neonesidea* and of *Paranesidea*, three species of *Loxoconcha*, a *Ruggieria* species and *Moosella striata* Hartmann are common. The foraminiferal assemblage is dominated by various species belonging to the Miliolacea.

Loxoconchella honoluliensis (Brady), 1880

Fig. 3

Loxoconcha honoluliensis Brady, 1880, p. 117, pl. 28, fig. 6 a-f; Puri & Hulings, 1976, p. 297, pl. 19, figs. 5-6.
Loxoconchella honoluliensis, Apostolescu, 1964, pl. 2, figs. 29–31; Holden, 1967, p. 34, figs. 24 a-c; Holden, 1976, p. F33, pl. 6, figs. 18–20.
Stratigraphic range: Early Miocene – Holocene.
Geographic distribution: Hawaii, Midway, New Caledonia, and probably Samoa, Fiji and Easter Island as well.

Diagnosis: A species of the genus *Loxoconchella* characterised by carapace with nearly straight posterodorsal margin, rounded posterodorsal corner and slightly convex dorsal margin, the ventral margin reinforced by low, rounded rim, surface smooth with widely spaced pits, approx. 25 branching marginal pore canals.

Description: The "Challenger" material consists of four valves, of which one belonged to a juvenile specimen.

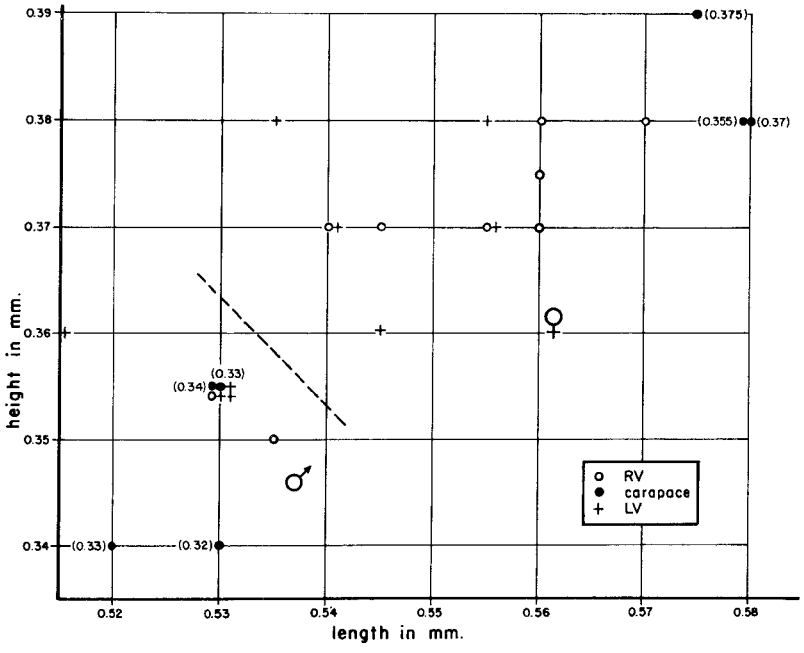

Fig. 2. Length, height and width measurements on valves and carapaces of *L. dorsobullata* Hartmann from Jeddah, Saudi Arabia.

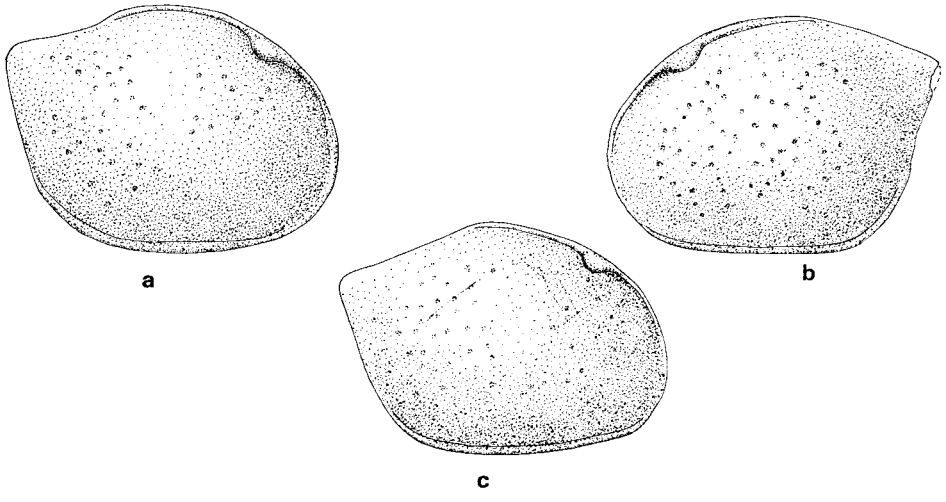

Fig. 3. Outline drawings of *L.honoluliensis* (Brady) – a–b: lectotype, c: topotype. Magn. ± 70×.

The anterior margin is broadly rounded, the ventral one is straight, turning obliquely upwards with a broad swing into the straight lower part of the posterior margin. A caudal process is situated at 3/4 of the height. The dorsal part of the posterior margin is almost straight, merging into the slightly convex, forward sloping dorsal margin by means of the broadly rounded posterior cardinal angle.

The surface is smooth with widely scattered punctae. A low inconspicuous rim is present along the dorsal margin. A low eye tubercle is situated at the anterior cardinal angle. A pronounced, but low rim borders the ventral margin.

The marginal area is moderately broad, with shallow anterior and posterior vestibula. Some 25 branching marginal pore canals are present.

A low but broad eye socket is situated below the anterior hinge element.

Hinge and central muscle scar as for the genus.

Dimensions:

	length	height	
RV	0.585 mm	0.41 mm	lectotype
LV	0.575 mm	0.415 mm	
RV	0.575 mm	0.41 mm	
LV	0.47 mm	0.345 mm	juvenile

Remarks: The interior of *Loxoconchella honoluliensis*, although the type species of the genus, remains inadequately described. Puri & Hulings (1976) figured the lectotype, but these photographs only give an impression of the outline of the valves. Line drawings of the lectotype and a topotype are given in Fig. 3.

L. pulchra resembles *L. honoluliensis*, but differs in outline and punctation, which are coarser in *L. pulchra*.

The honoluliensis group consists of some more, yet undescribed, species which occur around Australia (McKenzie, pers. comm.).

Loxoconchella ishizakii n.sp.

Pl. 2, figs. 1–5.

Name: After Dr Kunihiro Ishizaki, Tohoku University, Sendai, Japan, in recognition of his valuable contributions to the knowledge of the Japanese ostracode faunas.

Holotype: a left valve (coll. no. T 311).

Paratypes: Some 30 valves and 6 carapaces (coll. no. T 312).

Type locality: East China Sea at N 29°15′15″–E 128°54′18″; depth 95 m.

Stratigraphic range: Quaternary.

Diagnosis: A species of the genus *Loxoconchella* characterised by a mediodorsal tubercle at 7/10th of the height of the valve, the dorsal margin

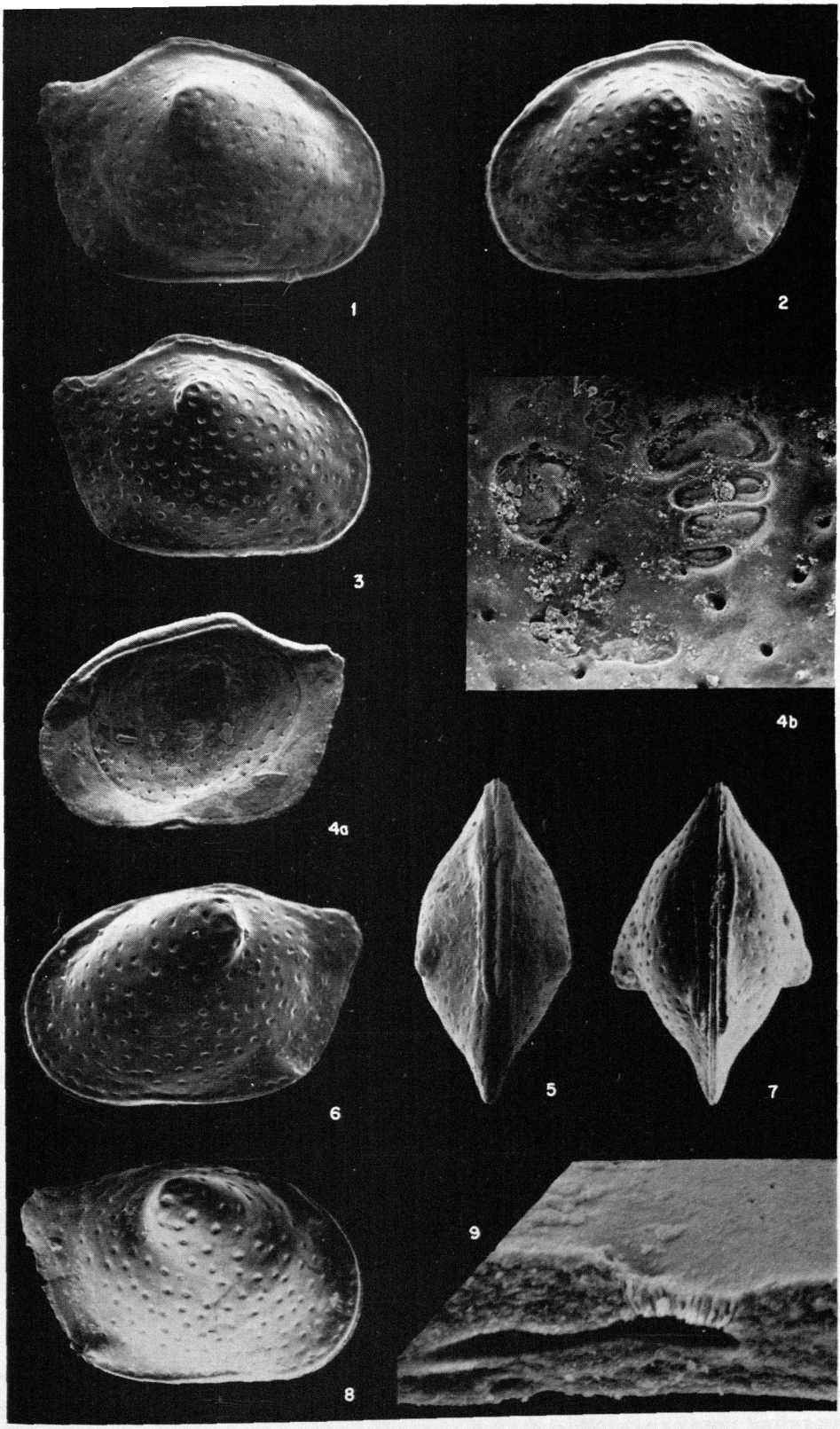

Plate 2. Figs 1–5. *Loxoconchella ishizakii* n.sp. – 1: exterior of right valve (♀); 2: exterior of left valve (♀) (holotype); 3: exterior of right valve (♂); 4a: interior of right valve, and b: central muscle-scar; 5: dorsal view of carapace (♂) – Ryukyu Islands, Japan.

Figs. 6–9: *Loxoconchella dorsobullata* Hartmann – 6: exterior of left valve from Jeddah anchorage; 7: ventral view of carapace (♂); 8: exterior of right valve (♀); 9: detail showing sieve-type normal pore canal originating from invagination of anteroventral line of concrescence – Creek at ± 35 km North of Jeddah, Saudi Arabia.

Magnifications: Fig. 4b: 450×; 9: 2400×. All others 90×.

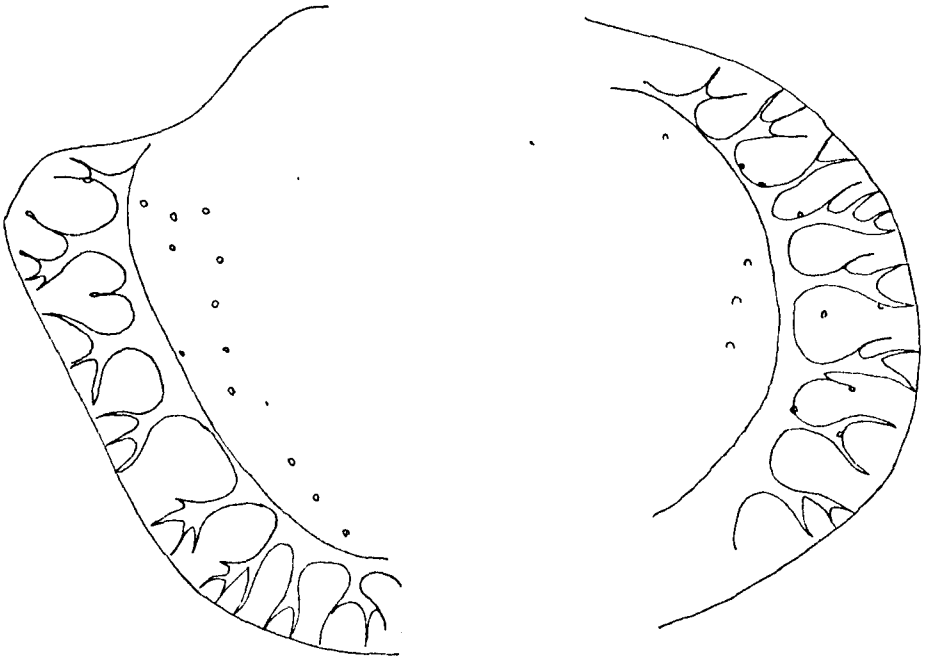

Fig. 4. Marginal zone of *Loxoconchella ishizakii* n.sp. Magn. 160×.

sloping upwards from the anterior cardinal angle to the posterior cardinal angle, a concave posterodorsal margin, and the surface covered with widely separated punctae.

Description: Carapace with nearly equal sized valves, the anterior margin broadly rounded, and the dorsal margin straight and sloping upwards from the anterior – towards the posterior cardinal angle. The ventral margin is straight. A caudal process is situated at approx. 3/4 of the height and divides the posterior margin in a straight, oblique ventral part and a concave dorsal part.

A low marginal rim is present, except along the posteroventral margin. A weakly developed eye tubercle is situated near the anterior cardinal angle.

The surface of the valves is covered with widely spaced, circular, shallow depressions in which the sieve-type normal pore canals are situated. The surface between these larger pits shows a second order, very fine pitting (Pl. 2, figs. 2, 3).

The hinge is adont, with a smooth bar of the LV fitting in a smooth groove of the RV.

The marginal area is rather wide, with shallow anterior and posterior vestibula, a scalloped line of concrescence and some twenty branching marginal pore canals (Fig. 4).

The central muscle scar consists of a vertical row of four adductor scars, of which the upper one is by far the biggest and the bottom one the smallest.

Two mandibular scars and a frontal scar composed of a crescentic scar and a smaller circular one in front, complete the pattern.

Smaller specimens (Pl. 2, figs. 3, 4a) with relatively small tubercles occur next to larger specimens (Pl. 2, figs. 1–2) with a relatively larger tubercle.

Dimensions:

			number	average	range
adult	length	LV	13	0.528 ± 0.005 mm	0.497–0.561 mm
		RV	18	0.524 ± 0.004 mm	0.497–0.567 mm
	height	LV	13	0.383 ± 0.005 mm	0.357–0.402 mm
		RV	18	0.377 ± 0.004 mm	0.357–0.421 mm
	width	LV	6	0.179 ± 0.005 mm	0.166–0.191 mm
		carap.	7	0.282 ± 0.013 mm	0.255–0.351 mm

juvenile L-2 RV: length: 0.357 mm, height: 0.242 mm.

The length/ width ratio for the smaller specimens is 2.0 and for the bigger ones 1.6.

Remarks: The bottom sample contains abundant Bryozoa and *Amphistegina. Heterostegina, Cycloclypeus* and *Sphaerogypsina* and fragments of the codiacean green alga *Halimeda* are present as well.

Part of the foraminiferal tests and ostracod carapaces are completely filled with calcite. They occur together with tests and valves with a perfectly fresh appearance. The rather great depth of 95 m at which these specimens were found makes it likely that we deal here with Late Pleistocene relict specimens admixed with Holocene material, which may have been redeposited at greater depth than where the species lived.

Loxoconchella pulchra McKenzie, 1967

Pl. 1, figs. 6–8.

Loxoconchella honoluliensis Triebel (non Brady), 1954, p. 19, pl 1, figs. 1–6, pl. 2, fig. 7.
Loxoconchella pulchra McKenzie, 1967, p. 76, fig. 4c.
Diagnosis: A species of the genus *Loxoconchella* characterised by carapace with pronounced posterior cardinal angle and concave posterodorsal margin and almost straight dorsal margin and the punctate surface.
Stratigraphic range: Holocene.
Geographical distribution: South coast of Australia and South China Sea.

Remarks: Comparison with Triebel's extensive description and excellent photographs of his Australian *Loxoconchella honoluliensis* from Melbourne and Adelaide, and a paratype of *L. pulchra* McKenzie from Port Phillip Bay unambiguously shows that we deal with one and the same species.

Subsequent publication by Puri & Hulings (1976) of photographs (Pl. 19, figs. 5–6) of the lectotype of *Loxoconcha honoluliensis* Brady, 1880, and the examination of the "Challenger" type material showed that only the specimens from the Lower and Upper Miocene of Midway figured by Holden and Apostolescu's New Caledonian specimens belong to *L. honoluliensis*.

Loxoconchella sp.

Loxoconchella sp., Holden, 1976, p. 33, pl. 15, figs. 1–2.

Remarks: A damaged right valve was found in the Upper Miocene of a borehole on Midway Island. It is the oldest known representative of the species group in possession of a mediodorsal tubercle. This unnamed Midway specimen has a more protruding tubercle, a longer dorsal margin and a somewhat more narrowly rounded anterior margin than the Holocene *Loxoconchella dorsobullata*. It differs in outline and shape of the tubercle from the Japanese tubercular *L.ishizakii* n.sp., which species resembles the Australian non-tuberculate *L. pulchra* in outline.

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