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REPORT ON A COLLECTION OF LORICATA FROM MANORA ISLAND, KARACHI, WITH DESCRIPTIONS OF THREE NEW SPECIES AND A NEW VARIETY

by

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The Hague [1])

In June 1951 Dr. A. R. Ranjha of the Zoological Survey Department, Government of Pakistan, at Karachi, sent me 26 samples of Loricata, together 46 specimens, preserved in 75% rectified spirit, all, except one, from the rockey beach of Manora Island, about two miles West off the Karachi coast, where they had been collected from the tidal area at low tide. The samples were taken at different dates and by several collectors or collecting parties.

There are four species and one variety among the material, of which three species and the variety are supposed to be new.

Chiton iatricus Winckworth, 1930

Winckworth, R., 1930. Description of a new Chiton from Karachi. Proc. Malac. Soc. London, vol. 19, pp. 78-80, pl. 8b.

Material examined:

200 yards W. of Mandir, Manora Island, rocky beach, 26-IV-1950, coll. Sufi, Taher & Qadri, 11 specimens.

Manora Creek, W. of Mandir, rocky beach, 11-V-1950, coll. Taher & Sufi,

1) I wish to express my thanks to Prof. H. Boschma, Director of the Rijksmuseum van Natuurlijke Historie at Leiden, through whose kindness it was made possible to illustrate the present paper with the beautiful drawings prepared by Mr. H. Heijn, the artist of the Museum, and to Dr. C. O. van Regteren Altena and Mrs. W. S. S. van der Feen-van Benthem Jutting, keepers of the sections Mollusca, respectively of the Rijksmuseum at Leiden, and the Zoologisch Museum at Amsterdam, who have been very helpful to me.

5 specimens.
Manora Creek, Karachi, 16-V-1951, coll. Departmental Survey Party, 12 specimens.
Manora Island, rocky beach, 6-X-1950, coll. S. Taher, 5 specimens.
Manora Creek, 22-IX-1949, coll. Dr. A. R. Ranjha, 6 specimens.

Winckworth gave an excellent description of this species. His specimens were collected near the end of the East Pier at Karachi. The type measures 54 × 36 mm, the largest specimen 66 × 41 mm.

The 39 specimens from Manora Island are of a smaller size, the largest measuring 43 × 31, the smallest 8 × 6 mm. A few additional characters are given here:

The valves are distinctly beaked, especially in the younger shells. Winckworth does not mention the rather strong ribs accompanying the posterior margin of the intermediate valves, a character which is also visible in the photograph of the type specimen on plate 8b. The 3-4 obsolete radials on the lateral areas are not always conspicuous. Also the thread-like radial at the pleural side of the diagonal rib often disappears.

The number of gill plumes increases with the length of the shell, though their number is not constant and varies rather widely in specimens of about the same length:

Length of shell	Pairs of gills	Length of shell	Pairs of gills
12	38	22	39
14	39	23	41
15	37	24	41
15	40	40	46
20	41	43	51

The animals are white, but there is one sample of three specimens of which the animals are of a brick red, possibly as a result of originally having been preserved in another liquid. One specimen has 14 slits in the tail valve, all others 13.

Chiton iatricus var. **winckworthi** var. nov. [1])

Material examined:

Beach, 2½ miles N. of Bhuleji abb., 20 miles W. of Karachi, 14-X-1950, coll. A. M. Qureshi, 1 specimen.

The only specimen not collected at Manora Island differs so markedly from typical specimens that I do not hesitate to call it a new variety. It is characterized by its finer granulation of the tegmentum and the much more prominent four intermediate radials on the lateral areas. The back is more strongly keeled, the side slopes are a little concave. The specimen is of a dark bluish green colour, much darker than in the specimens from

1) In honour of the late R. Winckworth, M. A.

Manora Island. It measures 31 × 22 mm. Gills 47-47. Slitting of the insertion plates: 8-1-13. The unique type specimen is in the collection of P. Kaas & A. N. Ch. ten Broek, reg. no. 3416.

Ischnochiton karachiensis spec. nov. (figs. 1-6)

Material examined:

Manora Creek, Karachi, 16-V-1951, coll. Departmental Survey Party, 2 specimens.

200 yards W. of Mandir, Manora Island, rocky beach, coll. Sufi, Taher & Qadri, 1 specimen.

Shell elliptical-oblong, elevated, the dorsal ridge sub-angular, the side slopes convex. Angle of divergence 100°. The tegmentum is lustreless, somewhat transparent.

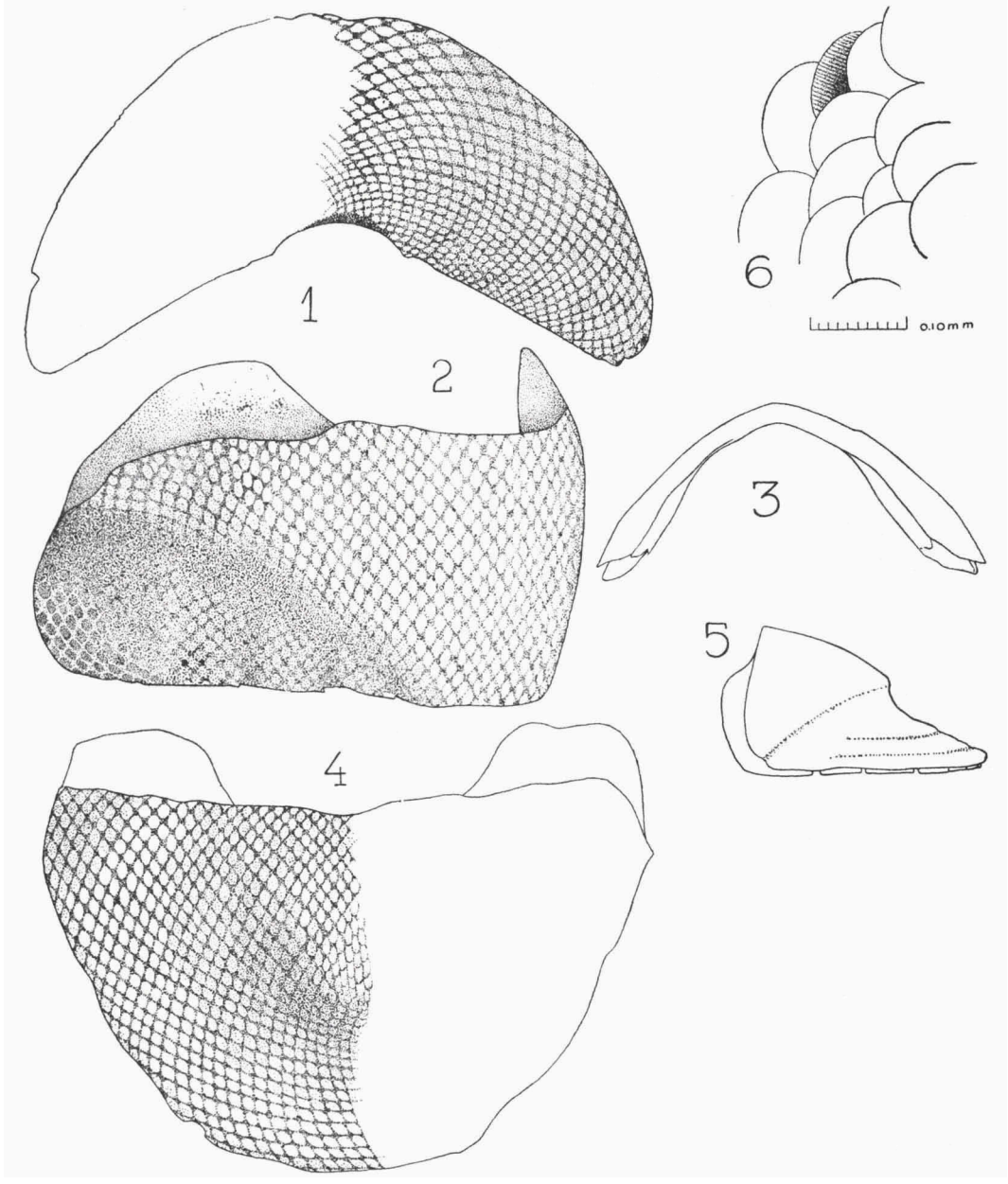
Anterior valve semi-circular, evenly granulose (fig. 1). Insertion plate moderately wide, with 10 slits. Teeth thin, sharp and smooth, eaves solid.

The intermediate valves (figs. 2 and 3) are not beaked and have the lateral areas well defined, distinctly raised and produced at the side margins. There are a few ill-defined, concentric growth wrinkles, the granules being arranged in quincunx. On the jugum the granulation is very fine; here the granules are elongated and about diamond-shaped. They become more roundish or oval and much more sharply cut on the pleural fields towards the side margins. On the lateral areas the granules are less prominent and seem to be formed by the intersection of fine, incised, radiating and concentric lines. Insertion plates with 1-1 slits, the sutural laminae small, triangular, abruptly projecting. Sinus very wide.

The tail valve (figs. 4 and 5) is large, semi-elliptical, with the mucro somewhat swollen, slightly behind the centre. Posterior slope with a slight depression directly behind the mucro. The ante-mucronal area is sculptured like the central areas, the post-mucronal area like the head valve and the lateral areas of the intermediate plates. There are 9 slits in the insertion plate.

The colour of the tegmentum is creamy white, with a few small, dark spots on the lateral areas of some plates, near the posterior margins and on some of the pleural fields along the diagonals. Inside porcellaneous, white.

The rather narrow girdle is densely covered with very minute (breadth 109 μ), imbricated, white, glossy scales (fig. 6). These are distally evenly rounded and apparently smooth. Under the microscope (magnification 130 ×), however, a dense and delicate scratching can be observed. The ventral side of the girdle is covered with transverse chains of small, smooth, rectangular scales which are narrowed at their extremities. Margin with a fringe of short, white, torpedo-shaped spicules.



Figs. 1-6. *Ischnochiton karachiensis* spec. nov. 1, plate I of paratype, dorsal view; 2, plate III of paratype, dorsal view; 3, camera lucida sketch of plate III of paratype, posterior elevation; 4, plate VIII of paratype, dorsal view; 5, camera lucida sketch of plate VIII of paratype, in profile; 6, girdle scales, dorsal side (paratype). 1, 2, 4, × 25; 3, × 16; 5, × 15; 6, × 135.

The animal is white. Gill rows merobranchial and pre-anal, extending for about four-fifths the length of the foot, with 16 plumes at both sides.

Length 13.1, breadth 5.4 mm; holotype: in the Rijksmuseum van Natuurlijke Historie at Leiden.

Length 12.8, breadth 5.3 mm; paratype: dried and disarticulated, in the collection of P. Kaas & A. N. Ch. ten Broek, reg. no. 3423.

The single paratype of the second sample is a little damaged, the second plate wanting. It is the collection of the Zoological Survey Department at Karachi.

The large group of true *Ischnochiton* contains many species with simply granulated valves. *I. granulifer* Thiele, *I. sansibarensis* Thiele, and *I. luteoroseus* Suter have the lateral areas of the intermediate plates not or hardly raised. *I. guatemalensis* Thiele and *I. macgillivrayi* Carpenter have the girdle scales strongly lirate; in *I. panamensis* Thiele the scales are smooth. *I. yerburyi* E. A. Smith, from Aden, has been described as a depressed shell. *I. punctulatissimus* (Sowerby), *I. concinnus* (Sowerby), *I. serrerorum* (Rochebrune), and *I. cessaci* (Rochebrune) have the granules arranged in patterns different from our species and are much flatter. *I. atkinsoni* Iredale & May has the mucro of the tail valve antemedian and shows obsolete radiating rays on the anterior valve.

I. karachiensis agrees fairly well with Thiele's description of his West-Indian(?) *I. fraternus,* but differs in being larger and more elevated. *I. fraternus,* moreover, seems to be nearest to *I.* (*Ischnoplax*) *pectinatus* (Sowerby).

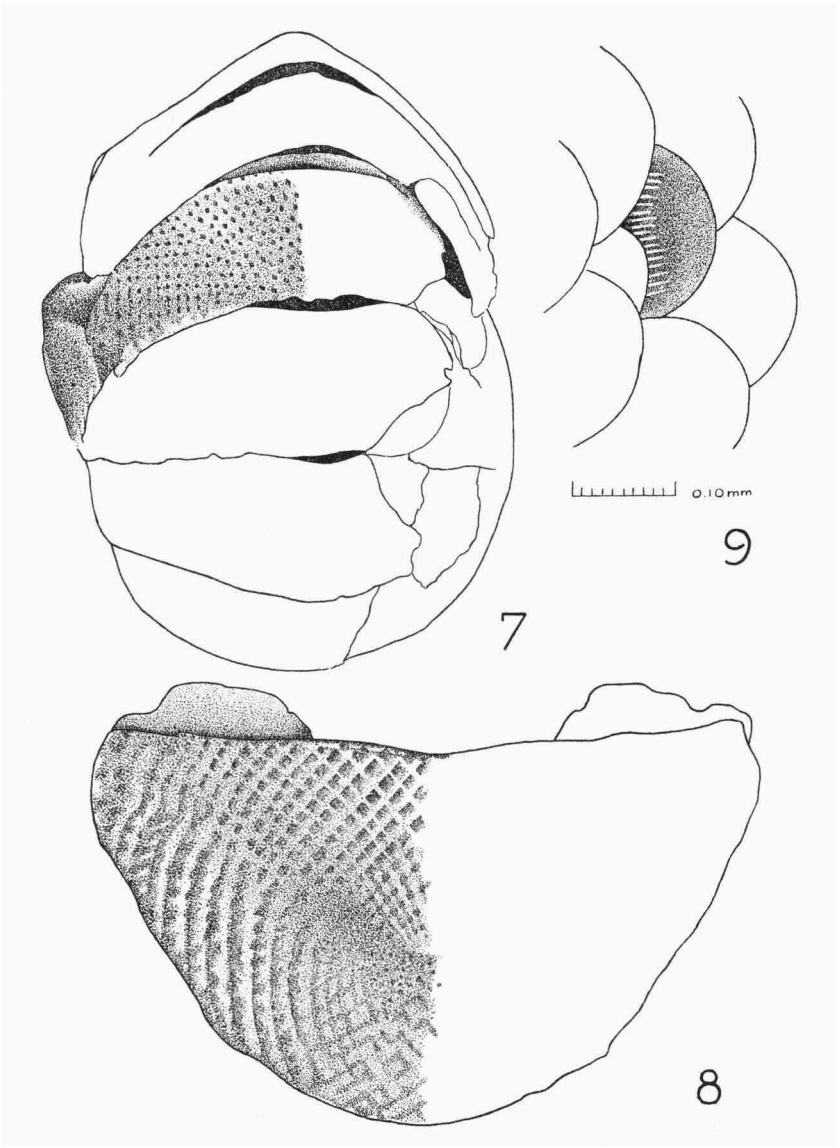
The South African species of the so-called *I. oniscus* group (fide E. Ashby, Ann. S. African Mus., vol. 30, p. 29, 1931), viz., *I. oniscus* (Krauss), *I. elizabethensis* Pilsbry, *I. hewitti* Ashby, and *I. ludwigi* (Krauss MS.) Pilsbry, are all more or less decussate and somewhat longitudinally striolate at the sides. Nevertheless I am inclined to place *I. karachiensis* in this group on account of its girdle covering (the scales are similar to those of *I. elizabethensis*), the abruptly projecting and widely separated sutural laminae, the slitting of the insertion plates, and the well defined lateral areas.

Ischnochiton haersoltei spec. nov. (figs. 7-9) [1])

Material examined:

Manora Creek, Karachi, 16-V-1951, coll. Departmental Survey Party, 1 specimen, dried, curled, plate I and several median plates broken.

1) I take a pleasure in naming this species after my friend, C. W. A. Baron van Haersolte, LL.D.



Figs. 7-9. *Ischnochiton haersoltei* spec. nov. 7, camera lucida sketch of holotype; 8 plate VIII of holotype, dorsal view; 9, girdle scales, dorsal side (holotype). 7, × 12; 8, × 23; 9, × 135.

Shell oblong oval, solid, not glossy, highly elevated. The dorsal ridge sub-angular, the side slopes convex. Angle of divergence about 90°.

Head valve semi-circular, roughly granulated in inverted V-shaped series, which give the surface near the margin a reticulated appearance. The insertion plate is of medium width, with 8 slits. The teeth are sharp and smooth, the eaves solid.

The intermediate plates (fig. 7) have narrow and not much raised lateral areas, which are roughly granulated; the granules being of different forms and sizes. The central areas are beautifully sculptured with a clearly cut pattern of lozenge-shaped pits, formed by the intersection of forward converging and radially curving, flat riblets. The dorsal ridge is also reticulated, but finer. The sutural laminae are narrow, evenly arched and widely separated. Jugal sinus wide, straight and smooth. Insertion plates with 1-1 slits.

Tail valve (fig. 8) large, semi-elliptical, with the mucro sub-central, somewhat swollen, the hinder slope concave. Post-mucronal area at the sides with longitudinal chains of granules, the chains becoming inverted W-shaped in the middle, directly behind the mucro. Ante-mucronal area sculptured like the central areas of the intermediate valves. There are 8 slits in the insertion plate.

The ground colour is light greenish to ashen, maculated and variegated with small purple and white dots, especially along the posterior margins of the plates. Inside light bluish green.

The narrow girdle is clothed with small (breadth 186 μ), more or less erect scales, alternating light bluish green and whitish. The scales (fig. 9) are distally semi-circular and show about 15-18 very fine grooves, which do not reach the top. The margin has a fringe of short, white, pointed spicules.

The animal is white. Gills holobranchial and pre-anal, with 16 plumes at both sides. The unique type is in the collection of the Rijksmuseum van Natuurlijke Historie at Leiden. Length 8 mm, breadth 5.5 mm (curled).

I. haersoltei has no near relatives. There is only one species of the true *Ischnochiton* group showing a similar reticulation of the central areas, viz., *I. retiporosus* Carpenter, but this Californian species has the lateral areas and end valves distinctly radially ribbed and its sutural laminae are connected by a narrow lamina across the jugal sinus. On the dorsal parts of *Callistochiton pulchellus* (Gray) a similar reticulation can be observed.

The small, somewhat erect girdle scales resemble those of the South African *I. oniscus* (Krauss) and *I. hewitti* Ashby. Our species may be related to the members of the *I. oniscus* group.

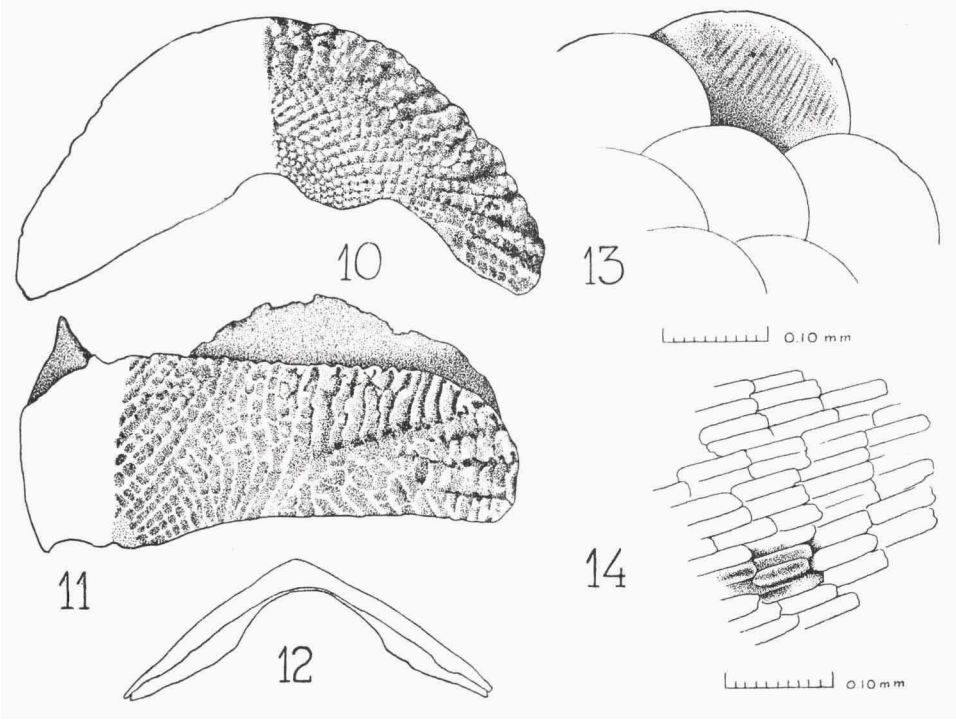
Ischnochiton ranjhai spec. nov. (figs. 10-14) [1])

Material examined:

Manora Creek, Karachi, 16-V-1951, coll. Deprtmental Survey Party, 1 specimen.

Manora Beach, Karachi, on rocks at low tide, coll. Dr. A. R. Ranjha, 1 specimen, dried, the plates IV-VIII wanting.

Shell oblong oval, elevated, the dorsal ridge sharp, the side slopes nearly straight. Angle of divergence 110°.



Figs. 10-14. *Inschnochiton ranjhai* spec. nov. 10, plate I of paratype, dorsal view; 11, plate III of paratype, dorsal view; 12, camera lucida sketch of plate III of paratype, posterior elevation; 13, girdle scales, dorsal side (paratype); 14, girdle scales, ventral side (paratype). 10, 11, × 23; 12, × 15; 13, 14 × 135.

Head valve (fig. 10) semi-circular, granulose, the granules becoming larger towards the margin, where they are arranged in radiating riblets (about 36). Insertion plate with 8 slits. The teeth sharp and smooth, the eaves solid.

The intermediate valves (figs. 11 and 12) are slightly beaked and have

1) In honour of Dr. A. R. Ranjha, Karachi, who kindly placed the material at my disposal.

the lateral areas well marked and somewhat raised, with 3-4 inconspicuous, radiating, interrupted riblets, which show a tendency to split or branch near the margin. The surface is granulose. On the central areas the granules are arranged in parallel series, diverging forward from the back. On the pleural fields they run in a longitudinal direction. Here the granules are more sharply cut. The insertion plates have 1-1 slits. The sutural laminae are well developed, moderately wide and evenly arched. The jugal sinus is rather wide.

The tail valve is semi-oval, with the mucro slightly swollen, a little anterior. Posterior slope with an abrupt depression directly behind the mucro. The post-mucronal area is sculptured like the head plate and the lateral areas of the intermediate valves, the ante-mucronal area like the central areas. Insertion plate with 9 slits.

The colour of the tegmentum is light brownish to roseate, marbled with small, dark violet spots, especially near the posterior margins of the valves. The type specimen shows a wide, irregular, white stripe on the back of the valves and a few small, light blue spots near this white field. Inside of the valves light roseate, tinged with violet.

The girdle is moderately wide and covered with small (breadth 234 μ), flat, shining, imbricated scales (fig. 13) alternatingly light blue and white. The scales are broad and blunt, somewhat transparent, and show 12-16 delicate striae. The ventral side of the perinotum is covered with transverse series of narrow, rectangular, smooth scales (fig. 14), measuring 67 $\times$ 20 μ. The margin has a fringe of short, white, torpedo-shaped spicules.

The animal is white. The gills are holobranchial and pre-anal, with 18-18 plumes.

Length 7.4 mm, breadth 4.5 mm. The holotype is in the collection of the Rijksmuseum van Natuurlijke Historie at Leiden. The few valves of the second sample are in the collection of P. Kaas & A. N. Ch. ten Broek, reg. no 3422.

In sculpture this new species resembles *I. comptus* (Gould) which is widely distributed in Indo-Chinese and Japanese seas, but it differs markedly from *I. comptus* in being much smaller and more highly elevated. The girdle scales are similar to those of *I. elizabethensis* Pilsbry, though not so delicately scratched, but sculptured with fine grooves.