

FOUR NEW RECORDS OF MARINE GASTROPOD (FAMILIES IRAVADIIDAE AND EPITONIIDAE) FROM PAKISTAN

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ABSTRACT

This paper reports four species of marine gastropod for the first time from Pakistan. Two species, *Iravadia quadrasi* (O. Boettger, 1893) and *I. bombayana* (Stoliczka, 1868) belong to family Iravadiidae and the other two species, *Epitonium lyra* (G. B. Sowerby II, 1844) and *E. viaderi* (Fenaux, 1938) belong to family Epitoniidae. These gastropods were collected from intertidal mud flats of Korangi Creek and Russian beach in Karachi, during an ecological survey of macrobenthic invertebrates.

KEY WORDS: Marine gastropods, *Iravadia quadrasi*, *Iravadia bombayana*, *Epitonium lyra*, *Epitonium viaderi*, Pakistan

INTRODUCTION

Family Iravadiidae Blanford, 1867 is a diverse group of small-sized gastropods found in tropical and temperate Indian Ocean and in west Pacific Ocean. Ponder (1984) reviewed the family Iravadiidae and recognized nine genera (eight recent and a fossil) and provided characters and keys for genera and subgenera based on morphological characters. Starobogatov *et al.* (1989) removed all genera, except genus *Iravadia*, from the family and placed them in other groups but this arrangement is not widely recognized. Golding (2014) documented the molecular phylogeny and systematics of Australian Iravadiidae and discusses the confused state of its taxonomy.

Family Epitoniidae Berry, 1910 is a large family of small to medium-sized caenogastropods found throughout the world oceans. The family contains more than 40 genera and more than 700 species (Bonfitto, 2018). Members of this family are commonly known as wentletrap and they occur from intertidal to abyssal region, on a variety of substrata (Lima *et al.*, 2012). The genus *Epitonium* Röding, 1798 is the most diverse with more than 380 species. For characters of family Epitoniidae and genus *Epitonium* Kilburn (1985) should be consulted.

The marine gastropods belonging to families Iravadiidae and Epitoniidae are little studied from the coast of Pakistan. Only two species of Iravadiidae, *Pseudonoba ictriella* (Melvill, 1910) and *Pellamora densilabrum* (Melvill, 1912) were described by Melvill (1910, 1912) from Karachi (then in British India, now in Pakistan) as *Rissoa (Scrobs) ictriella*, sp. n. and *R. (Amphithalamus) densilabrum* sp. n., respectively. Since then, these two species have not been reported from Karachi. The two species of Iravadiidae, which are reported herein for the first time from Pakistan are: *Iravadia quadrasi* (O. Boettger, 1893) and *I. bombayana* (Stoliczka, 1868).

Family Epitoniidae in Pakistani waters is represented by 7 genera and 24 species, out of which 17 species are in genus *Epitonium* (Kazmi, 2018). Of these 17 *Epitonium* species, 13 species were described by Melvill and Standen (1903) and Melvill (1910) under the genus *Scala*. Since then, these 13 species have not been reported from Pakistani coast. The small size of *Iravadia* and *Epitonium* species is one of the factors which make them inconspicuous from the casual observer. The two species of *Epitonium* hitherto unreported from Pakistan are: *Epitonium lyra* (G. B. Sowerby II, 1844) and *E. viaderi* (Fenaux, 1938), which are described in this paper.

MATERIALS AND METHODS

The gastropod shells were collected from Korangi Creek (24°81'39" N: 67°20'43"E) and Russian beach (24°46'01"N: 67°23'47"E) in Karachi, Pakistan (Fig. 1). These two sampling sites are northernmost part of the Indus deltaic creek system (Ramsar Site 1284) and inhabited by mangroves (*Avicenna marina*). Sediment samples were collected from intertidal mud flats, during low tide, from January 2017 to December 2018. The sediment samples were sieved through 1mm mesh on the spot and the material retained on the sieve were transported to the laboratory. In laboratory small-sized gastropods were sorted out under stereomicroscope (Olympus SZX9) and were fixed in 8% formaldehyde, at least for 24 hours, then stored in 70% ethanol. Species of Iravadiidae and Epitoniidae were identified with the help of following publications; Ponder (1984), Kilburn (1985), Bosch *et al.* (1995), Neubert

(1998), Weil *et al.* (1999), Robba *et al.* (2007), Ghosh and Mukhopadhyay (2015), and Ghosh *et al.* (2017). Photographs of the shells were taken by Olympus camera fitted with close-up lens. Measurements were taken to the nearest 0.01 mm by micrometer fitted in a compound microscope (Olympus CX21). All the specimens are housed in Centre of Excellence in Marine Biology, University of Karachi, Karachi-75270, Pakistan.



Fig. 1. Map of Karachi coastal area showing collection sites: 1, Korangi Creek and 2, Russian beach in the North Western part of the Indus Delta.

RESULTS AND DISCUSSION

A total of 200 specimens belonging to family Irvadiidae (115 *I. quadrasi* + 85 *I. bombayana*) and 35 belonging to family Epitoniidae (6 *E. lyra* + 29 *E. viaderi*) were found during ecological survey of mud flats of Korangi Creek and Russian beach in Karachi. Brief descriptions of the species are given below.

Family Irvadiidae

Iravadia quadrasi (O. Boettger, 1893)

Pravadia quadrasi O. Boettger, 1893, p. 101.

Rissoa garretti Tate, 1899, p. 236.

Rissoa (Alvania) alveata Melvill and Standen, 1901, p. 366, pl. XXII, fig. 10.

Iravadia reticulata Brandt, 1968, p. 270.

Iravadia quadrasi, Bosch *et al.* 1995, p. 46, pl.121; Neubert, 1998, p. 349, fig. 35; Ghosh *et al.* 2017, p. 183, fig. 5 & 6

Description: Shell white, solid, height 2.28 to 3.86 mm, ovate conic and without umbilicus. Protoconch small, depressed dome-shaped (not planorbid), of about 1.5 to 2 convex whorls, surface smooth without sculpture. Teleconch of 4 to 5 convex whorls, with predominant spiral sculpture crossed by strong axial ribs (12 to 22 ribs per whorl) giving a reticulate appearance (Fig. 2A, B), suture moderately deep. Aperture obliquely oval, usually angled anteriorly; outer lip thickened with a varix, which may be broad and strong in some specimens. Operculum oval, nucleus marginal, situated towards inner lip, growth lines concentric, peg and calcareous material absent.

Habitat: Collected from mud flats near mangroves at mid tide and low tide levels. It was common at both the sites, Korangi Creek (60 specimens) and Russian beach (55 specimens).

Distribution: Oman and UAE (Neubert, 1998); India, west coast (Melvill and Standen, 1901; Ghosh *et al.*, 2017), Southeast Asia (Ponder, 1984), Thailand (Brandt, 1968), Japan (Sasaki, 2008), Philippines (Boettger, 1893), Australia (Tate, 1899), and now from Pakistan.

Iravadia bombayana (Stoliczka, 1868)

Fairbankia bombayana Stoliczka, 1868, p. 274.

Iravadia (Fairbankia) bombayana, Robba *et al.* 2007, p. 29, fig. 12 f-i.

Description: Shell greyish white to whitish grey, solid, 4.35 to 8.68 mm high, elongate-oval (Fig. 2C, D), protoconch of 2 to 2.5 whorls, smooth and dome-shaped. Teleconch of 6 convex whorls with spiral sculpture and fine axial growth lines, which may diminish on some whorls, body whorl oval with tapering base, suture deep. Aperture obliquely oval, anteriorly angled weakly or roundish, outer lip slightly thickened into a varix. Operculum thin, oval with a lateral nucleus near the internal edge, interior surface with a raised rib, growth lines concentric.

Habitat: Collected from mangrove swamps from high tide to low tide levels. It was more common at Korangi Creek (80 specimens) than Russian beach (5 specimens).

Distribution: South and southeast Asia, Sumatra, South China, Philippines (Ponder, 1984), Hong Kong (Walthew, 1995), India to Myanmar, Thailand, Sumatra and Vietnam (Robba *et al.*, 2007), and now from Pakistan.

Family Epitoniidae

Epitonium lyra (Sowerby, 1844)

Scalaria lyra Sowerby, 1844, p. 89, pl.32, figs. 38-39, pl. 34, figs. 81-82.

Epitonium (Limiscala) lyra, Kilburn, 1985, p. 308, figs. 122, 123; Weil *et al.*, 1999, p.98, fig. 308.

Epitonium lyra, Bosch *et al.*, 1995, p. 109, fig. 425; Gosh and Mukhopadhyay, 2015, p. 93, figs.5 & 6.

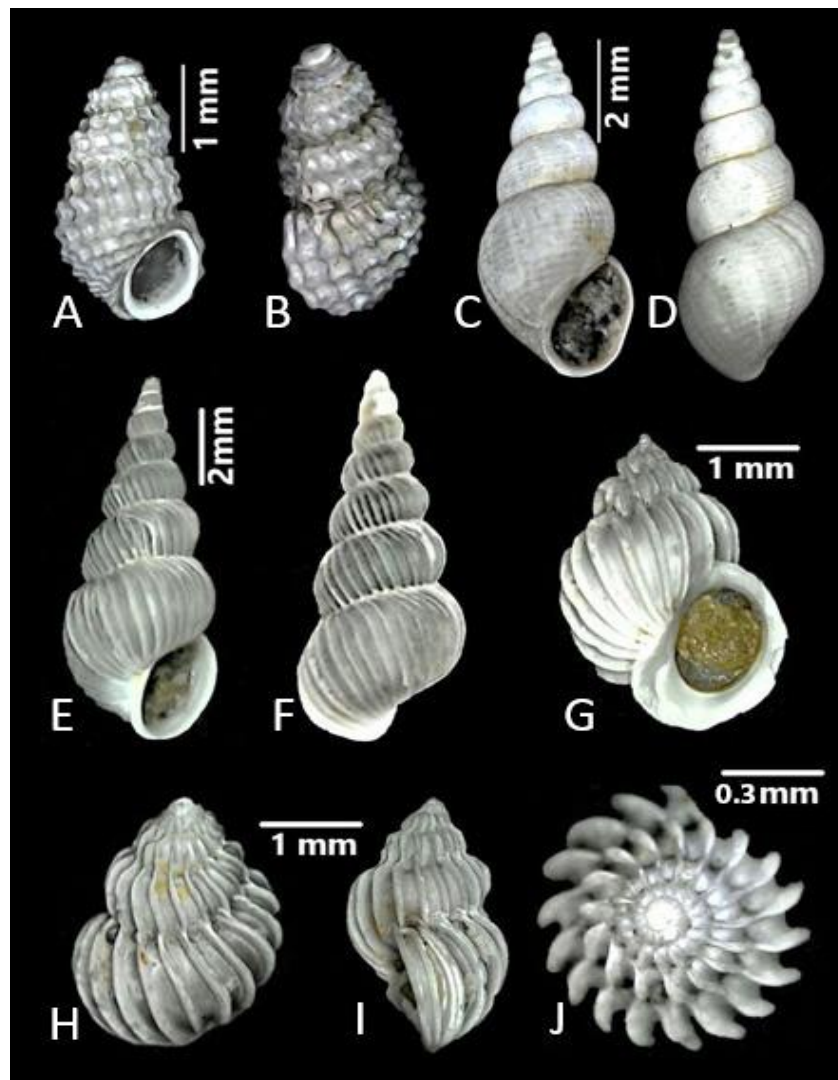


Fig. 2. Apertural and abapertural views of *Iravadia quadrasi* (A and B), *Iravadiabombayana* (C and D), *Epitonium lyra* (E and F), *Epitonium viaderi* (G and H) and side view (I) and top view (J) of *E. viaderi*, collected from Karachi coast.

Description: Shell height 8.25 to 13.88 mm, fragile, high spired, broad based and without basal cord (Fig. 2E, F). Protoconch of 2.5 to 3 convex whorls with microscopic axial lines. Teleconch with deep suture and 5 convex whorls, umbilicus narrow, axial ribs 25 to 30 per whorls, thin, low and erect, space between ribs with fine spiral threads visible under microscope. Aperture oblong-ovate, outer lip thin, inner lip reflected, partially obscures / covers umbilicus. Shell light brown with pale bands, base and axial ribs whitish.

Habitat: Collected from mud flats at Korangi Creek near low tide level. This species is not common and only six specimens were found during 12 months.

Distribution: Philippines (Sowerby, 1844), Japan and Red Sea to Mozambique (Kilburn, 1985), west coast of India (Gosh and Mukhopadhyay, 2015) and now from Pakistan.

***Epitonium viaderi* (Fenaux, 1938)**

Scala viaderi Fenaux, 1938 (cited in World Register of Marine Species).

Epitonium (Nitidiscala) viaderi, Weil et al., 1999, p. 58, fig. 159.

Description: Shell solid, whitish, height 3.58 to 7.86 mm, broadly pyramidal (Fig. 2G, H). Protoconch of 2 to 3 whorls, conical with weak axial lines. Teleconch of 4 convex whorls with strong, thick and low axial ribs (20 to 26 ribs per whorl), align and continue with those of the previous whorl and at shoulder with angular slightly reflexed expansion (Fig. 2H - J), umbilicus closed, aperture oval, lips expanded but not reflected, basal cord absent.

Habitat: Collected from mud flats at mid tide and low tide levels. This species was equally common at both the sites, Korangi Creek (15 specimens) and Russian beach (14 specimens).

Distribution: Mauritius (Drivas and Jay, 1987) and now from Pakistan.

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(Accepted for publication April 2022)