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NOTES ON THE FOSSIL *PINNA* (PINNIDAE : PELECYPODA : MOLLUSCA) FROM TRICHINOPOLY CRETACEOUS, SOUTH INDIA, WITH A KEY TO THE IDENTIFICATION OF SPECIES

By

K. V. LAKSHMINARAYANA, N. V SUBBA RAO, and U. SAHA

Zoological Survey of India, Calcutta

(With 3 plates)

INTRODUCTION

Sastry *et al.* (1968) emphasized the importance of the marine Cretaceous succession in south India in the interpretation of the interrelationship of the Indo-Pacific Region in the bygone, which attracted the attention of the geologists all over the world. The Trichinopoly Cretaceous is divided into : Utatur, Trichinopoly, Ariyalur, and Niniyur groups or stages in succession (Krishnan, 1968). The literature on the Trichinopoly Cretaceous shows that our knowledge was mostly confined to the so-called *"Straigraphic indicators* or *zone fossils"* like the foraminifera, ammonoids, etc., and studies on minor families like Pinnidae (Mollusca) were neglected and remained what it was since Stoliczka (1871).

The authors (K.V.L. & U.S.) conducted surveys in the region during 1969-71, and a rich fossil collection was made from a zoogeographic angle. The collections include two species of *Pinna*, viz., *P. arata* Forbes and *P. complanata* Stoliczka (Pelecypoda : Mollusca) found together in the same rock of siliceous shale at nearly 3 km. N.W. of Kulakkalnattam (11° 07′ 0″ N : 78°57′20″ E) (Pl. III). These collections were compared with those of Stoliczka (1871) present in the Geological Survey of India, Calcutta (hereafter referred to as G.S.I.) on the basis of which a key to the known species from Trichinopoly Cretaceous is presented in this paper.

SYSTEMATIC ACCOUNT

Phylum MOLLUSCA

Class PELECYPODA

Subclass *LAMELLIBRANCHIA*

Order ANISOMYARIA

Family PINNIDAE

Genus **Pinna** Linnaeus

1758. *Pinna* Linnaeus, *Syst. Nat.* ed. 10: 707.

The genus *Pinna* apparently dates back to Carboniferous (Cox, 1940) and is characterized as follows:

Shell equi-or sub-equivalve, nearly triangular; outer layer of calcite and inner layer of aragonite; anterior end pointed; symmetrical or asymmetrical; gaping posteriorly; hinge straight, edentulus; ligament linear, long, placed in a groove; adductor scars unequal, anterior small and near the umbo, posterior large, subcentral, rotundate or ovate; pallial line entire.

Pascoe (1959) following Stoliczka (1871) and Warth (1895) listed the following species from Trichinopoly Cretaceous:

Group	Species	Locality
Utaturs	1. *P. laticostata* Stol.	Kumarapalaiyam [Comarapaliam]; Uttathur [Utatur].
	2. *P. intumescens* Stol.	Odhiam [Odium]
Trichinopoly	1. *P. complanata* Stol.	Kulathoor [Kolattur], Anaipadi [Anaippadi], & Alundalippur [Alundanapooram ?].
	2. *P. arata* Forbes	Anaipadi [Anaippadi], Saradamangalam & Kulathoor [Kolattur].
Ariyalurs	1. *P. arata* Forbes	Valudavur beds of Pondicherry.
	2. *P. laticostata* Stol.	-do-

Stoliczka (1871) provided the reproduction of the original figure of *P. consobrina* d'Orbigny, which according to that author, apparently resembled *P. complanata*, and the type was not available at the Paris Museum to give a final say as to its identity. In the absence of either the type or topo-type material, it is felt desirable not to include it in the present discussion.

The type collection in G.S.I., includes a specimen labelled "*P. latisulcata* Stol., Loc. Comarapoliam, Ariyalur Group, pl. XXVI, 4, 4a" (G.S.I. Type No. 1267). Stoliczka (*op. cit.*) figured this specimen, but did not describe it in the text ; and the index relates to the page and the figure reference to what he described as *P. laticostata* (p. 385). We consider that this fragment of a specimen labelled as "*P. latisulcata* Stol.", as *P. laticostata* Stol., and may be a juvenile of the latter species. We have also another reason to come to this conclusion, viz., the author might have thought it apt to name the species as *latisulcata* due to the prominent sulci present on it, but later refrained from doing so, having found that the name is pre-occupied by *P. latisulcata* Woodw., which he cited in the list of known species (p. 385 items 2-24), and therefore, preferred *P. laticostata* in lieu of it. He apparently did not correct it in the manuscript. Thus, *P. latisulcata* Stol., is both a *nomen nudum* and a junior homonym and needs to be rejected under Nomenclatural Rules.

KEY TO THE IDENTIFICATION OF SPECIES

1. Median ridge present .....2.
   Median ridge absent.....*P. laticostata* Stoliczka
2. Valves tumid, apex pointed..... .....*P. intumescens* Stoliczka
   Valves not tumid, apex pointed or broad and blunt..... 3.
3. Valves flattened; median ridge not very prominent; apex sharply pointed; 5-6 distantly placed striae. .....*P. complanata* Stoliczka
   Valves not flattened; median ridge very prominent; apex broadly pointed, blunt; 7-9 prominent and 3-5 thin intermediate striae.....
   P. arata Forbes

The measurements in mm are taken of complete specimens only as follows : Length × width at the broadest part × thickness (gape). The type localities given by Stoliczka (*op. cit.*) are cited in square brackets alongside of their modern equivalents.

1. **Pinna laticostata** Stoliczka

1871. *Pinna laticostata* Stoliczka, *Pal. Indica*, (6) **3** : 385.
1895. *Pinna laticostata* : Warth, *Rec. geol. Surv. India*, **28** (1) : 20.

Shell trigonal, anteriorly tumid ; valves convex ; no median ridge ; 12-24 longitudinal striae with distinct transverse striae.

Material.—Kumarapalaiyam [Comarapalliam ; Comorapoliam; (G.S.I. Type Nos. 1262, 1263, and 1267) in coarse grey stone and Uttathur [Utatur ; Ootatoor] in light brown lime stone ; Ariyalur

group, Upper Cretaceous (No. L 5/40) labelled as *P. laticostata* Stol., in the Indian Museum show case No. 79.

Measurements.— —×95×30 (G.S.I. Type No. 1262)

Group.—Utaturs and Ariyalurs

Remarks.—Specimen reported from Uttathur by Stoliczka (op. cit.) is not, however, available in G.S.I. We include under this species, the specimen labelled as "*P. latisulcata* Stol." (G.S.I. Type No. 1267) for reasons given earlier (*vide* supra). Warth (1895) reported this species from Valudavur [Valudayur] beds of Pondicherry basing on a tentative determination by Kossmat. Thus, it appears the species extends stratigraphically from Utaturs to the uppermost part of Ariyalurs. Its occurrence in Trichinopoly beds, however, remains in dark. Pascoe (1959) quoted that it also occurs in Deola Marl of Bagh beds of Narmada Valley (also Cretaceous). It may be recalled that Bagh beds include several fossils of Trichinopoly Cretaceous. Krishnan (1968) while discussing the faunal affinities of Bagh beds with those of south Indian Cretaceous states that :

> "It would appear that the two areas became connected after the Cenomanian by which time India moved off from Madagascar, leaving an open sea-way by Cape Comorin."

Since the valves show symmetrical nature, it can be inferred that the species might have inhabited steady and shallow waters.

2. **Pinna intumescens** Stoliczka

1871. *Pinna intumescens* Stoliczka, *Pal. Indica,* (6) **3**: 385.

Shell trigonal; valves inflated; apex pointed; median ridge present, prominent; 6-7 striae.

Material.—Odhiam (G.S.I. Type Nos. 1265 and 1266) in calcareous shale.

Measurements.—95 × 65 × 45 (G.S.I. Type No. 1265); 195 × 120 × 55 (G.S.I. Type No. 1266).

Group.—Utaturs.

Remarks.—*P. intumescens* is known so far only from Utaturs. The valves show a tendency of asymmetrical growth as in the living *P. vexillum* Born. The asymmetry or irregular growth of the valves may be due to the regularly shifting sands in which the shell lies anchored or due to strong currents (Winckworth, 1929).

3. **Pinna complanata** Stoliczka

(Pl. III & IVB)

1871. *Pinna complanata* Stoliczka, *Pal. Indica,* (6) 3 : 384.

Elongately triangular ; apex sharply pointed; valves compressed ; median ridge present, but not very prominent; 5-6 slightly prominent striae. distantly placed.

Material.—Kulathoor [Kolattur; Kolotur], (G.S.I. Type No. 1255, a fragment) ; Anaipadi [Anaippadi; Anapaudy] (G.S.I. Type No. 1256) in brownish sandstone; Alundalippur [Alundanapooram (?)], *Stoliczka* colls. ; Trichinopoly group, Cretaceous (No. L5.42) labelled as *Pinna* ? *complanata* Stol., in the Indian Museum show case No. 76 ; 2 exs., nearly complete, 3 single valves and 2 fragments, c 3 km N.W Kulakkalnattam on the banks of a rivulet of Marudaiyar R., in siliceous shale (Z.S.I. Calcutta), *K. V. Lakshminarayana* colls.

Measurements.—150 × 82 × 35 (G.S.I. Type No. 1256); 128-165 × 56-68 × --14 (Z.S.I. colls.).

Group.—Trichinopoly.

Remarks.—*P. complanata* was described from Trichinopoly group by Stoliczka (*Op. cit.*) in brownish sandstone. His specimens from Alundalippur [Alundanapooram (?)] is not available in G.S.I. The present record by the authors, was from an area 3 km. N.W of Kulakkalnattam on the banks of a rivulet of the River Marudaiyar. Nine examples including three of *P. arata* have been collected in a small rock.

4. **Pinna arata** Forbes

(Pl. IVA & V)

1846. *Pinna arata* Forbes, *Geol. Trans.,* (2) 7 (3) : 153.
1871. *Pinna arata* : Stoliczka, *Pal. Indica,* (6) 3 : 384.

Shell lanceolately triangular; valves not flattened, posteriorly nearly tumid; median ridge very prominent; apex broadly pointed, blunt; 7-9 prominent striae with 3-5 intermediate striae.

Material.—Anaipadi [Anaippadi; Anapaudy] (G.S.I. Type No. 1257); S.E. of Kulathoor [Kolattur; Kolotur] (G.S.I. Type No. 1261) and near Anaipadi [Anaippadi; Anapaudy] (G.S.I. Type No. 1268), Stoliczka colls. ; 2 exs., 3 km. N.W. of Kulakkalnattam on the banks of a rivulet of Marudaiyar R., in siliceous shale (Z.S.I., Calcutta), 1 ex., with the same data (Southern Regional Station, Z.S.I., Madras), *K. V Lakshminarayana* colls.

Measurements.—150 × 95 × 50 (G.S.I. Type No. 1261); 143–160 × 85–97 × –42 (Z.S.I.).

Group.—Trichinopoly and Ariyalurs.

Remarks.—The species was originally described from Pondicherry (Forbes, 1846). Stiliczka (*op. cit.*) besides the two localities given under material, also reported from Sardamangalam [Serdamangalam] of Trichinopoly group. The material is not, however, available in G.S.I. Pascoe (1959) quoted its occurrence in Valudavur [Valudayur] beds of Ariyalur-outcrop of the Pondicherry. We recorded it in association with *P. complanata* (*vide* supra) in the same rock at 3 km. N.W. of Kulakkalnattam. The occurrence of this species in Valudavur beds, an outcrop of Ariyalur, and the original report of Forbes from Pondicherry suggests the extension of its stratigraphic range from Trichinopoly to Ariyalurs.

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SUMMARY

Two species of *Pinna*, viz., *P. complanata* Stol., and *P. arata* Forbes were collected near Kulakkalnattam by the

present authors. These species were recorded nearly after 100 years. They were compared with Stoliczka types present in G.S.I., and a key for the identification of species from Trichinopoly Cretaceous is presented here. "*P. latisulcata* Stol.", is considered as a *nomen nudum* and a junior homonym and as a juvenile of *P. laticostata* Stoliczka.

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