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# MIOCENE CRABS FROM MIZORAM, INDIA

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## ABSTRACT

Four genera and five species of decapod crustacea *viz. Calappa protopustulosa* Noetling, *Ebalia tuberculata* Noetling, *Ebalia spinosa* n. sp., *Typilobus granulosus* Stoliczka and *Xantho* sp. are being reported for the first time from the Upper Bhuban Formation of the Surma Group, Mizoram. Based upon the crabs and associated molluscs and foraminifers, the Upper Bhuban Formation has been assigned the Lower Miocene (Aquitanian-Burdigalian to Burdigalian) age.

## INTRODUCTION

Records of crabs from the Miocene of North Eastern India is very poor. Until recently, only specimens of *Portunus* were known (Tiwari and Satsangi, 1988; Tiwari, 1992) from the Upper Bhuban Formation (Lower Miocene) of the Surma Group in Mizoram. Additional specimens so far recorded include a chela of *Callianassa* and other unspecified xanthoid crabs (Satsangi and Patil, 1988), but the details of these are not available.

The present paper describes, for the first time, four genera and five species of crabs *viz., Calappa protopustulosa* Noetling, *Ebalia tuberculata* Noetling, *Ebalia spinosa* n. sp., *Typilobus granulosus* Stoliczka, and *Xantho* sp. from the Upper Bhuban Formation of the Surma Group, Mizoram. The crabs have been found to occur as isolated, incomplete specimens and their preservation is rather not good.

## STRATIGRAPHY

Mizoram, which forms a part of Tripura - Mizoram geosynclinal basin, is a southern extension of the Surma valley. The area comprises a repetitive succession of argillaceous and arenaceous sediments which are thrown into a series of north-south trending, en-echelon anticlines and synclines (GSI, 1974). The generalised stratigraphic succession in Mizoram has been worked out by GSI, 1974; Ganju, 1975; Ganguli, 1975 and Nandy *et al.*, 1983 and is given in short in Table 1.

**Table 1 : Generalised Stratigraphic Succession in Mizoram.**

| Age | Litho | Stratigraphic | Units | Thickness in metres | Generalised Stratigraphy |
|---|---|---|---|---|---|
| | Group | Subgroup | Formation | | |
| Recent | Alluvium | | | | Silt, clay & gravel |
| | | | UNCONFORMITY | | |
| Early Pliocene to Late Miocene | Tipam | | | +950 | Friable sandstones with occasional clay bands. |
| | | | Conformable & transitional contact | | |
| Miocene | | | Boka Bil | +950 | Shales with siltstones and sandstones. |
| | S | | Conformable & transitional contact | | |
| to | | B | Upper Bhuban | +1100 | Arenaceous with sandstones, shales and siltstones. |
| | u | h | | | |
| | | | Conformable & transitional contact | | |
| | r | | | | |
| Upper | | u | Middle Bhuban | | Argillaceous with shales, silt-shale alternations and sandstones. |
| | m | b | | +3000 | |
| | | | Conformable & transitional contact | | |
| Oligocene | a | a | Lower Bhuban | +900 | Arenaceous with sandstones and silty shales. |
| | | n | | | |
| | | | Uncoformity obliterated by fault | | |
| Oligocene | Barail | | | +3000 | Shales, siltstones and sandstones. |
| | | | Lower contact not seen | | |

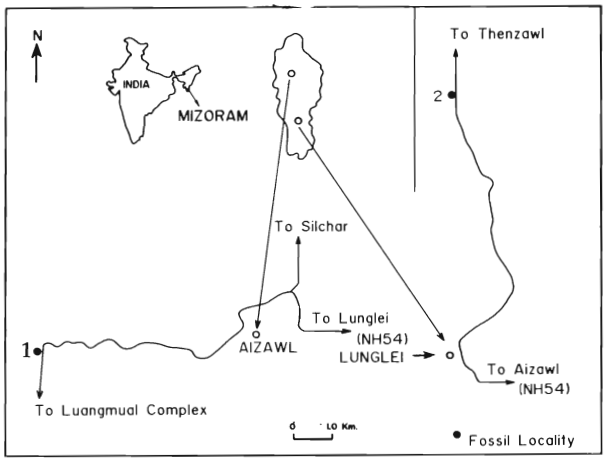


Fig. 1. Map showing the area of study and the fossil- yielding localities.

## LOCALITY DESCRIPTION

The stratigraphic and temporal distribution of fossil crabs collected from various localities (fig. 1) are as follows :

*Locality No. 1 :* This lies 7.5 Kms west of Aizawl Town (23$^0$ 44'00''N : 92$^0$ 15'00''E) on the Aizawl - Luangmual Complex Road section in the western side. The section exposes rocks of Upper Bhuban Formation in which two crab-bearing horizons have been observed. The lower horizon comprises about 4.0 m thick, brown the silty sandstones and the upper one is a 0.6 m thick horizon of deep brown pebbly sandstones. Other associated fossils are bivalves, gastropods, echinoids and plates of barnacles.

*Locality No. 2* : It occurs 9.5 Kms north of Lunglei Town (22$^0$ 54'30'' N : 92$^0$ 44' 20'' E) on the left cutting wall of the road under construction between the towns of Lunglei and Aizawl. The two crab-bearing beds in the Upper Bhuban Formation have been noted in this locality too. The lower one is about 1.0 m thick, grey, hard silty sandstones, while the upper one is 1.5m thick, highly weathered, deep brown pebbly sandstones. The associated fossils are plates of barnacles and fragments of bivalve and gastropod shells.

## REPOSITORY

All the described specimens are housed in the Palaeontology Museum of the Department of Geology, Pachhunga University College, North Eastern Hill University, Aizawl-796 001, Mizoram.

## SYSTEMATIC PALAEONTOLOGY

*Order* **Decapoda** Latreille, 1803

*Infraorder* **Brachyura** Latreille, 1803

*Superfamily* **Calappoidea** de Hann, 1833

*Family* **Calappidae** de Hann, 1833

*Subfamily* **Calappinae** de Hann, 1833

*Genus* ***Calappa*** Weber, 1795

*Type species*: *Cancer granulatus* Linné, 1758; SD atreille, 1810. Miocene; Hungary.

*Calappa protopustulosa* Noetling, 1901
(Pl. I, fig. 1; fig. 2 a)

*Calappa protopustulosa* Noetling 1901, p. 369, Pl. XXIV, figs. 6, a-b.

*Material*: A partially preserved carapace; specimen Jo. LT/6/12.

*Horizon and Locality* : Lower horizon (Upper Bhuban ormation) at locality no. 2.

*Measurements* : Length and width of the carapace are . 3.00 mm and 21.00 mm respectively.

*Remarks* : A partially preserved carapace is available in which nearly half of the anterior portion is missing. The specimen is identical to *Calappa Protopustulosa* Noetling (1901) from ? Miocene of Thayetmyo, Myanmar (GSI Type No. 7768). However, it is somewhat elongated due to post-depositional deformation.

*Family* **Leucosiidae** Samouelle, 1819

*Genus* ***Ebalia*** Leach, 1817

*Type species : Cancer tuberosus* Pennat, 1777; SD Rathbun, 1922. Recent.

*Ebalia tuberculata* Noetling, 1901
(Pl. I, fig. 2; fig. 2 b)

*Ebalia tuberculata* Noetling, 1901 p. 370, Pl. XXIV, figs. 7, 7a.

*Material* : A small carapace; Specimen No. A1/7/65.

*Horizon and Locality* : Upper horizon (Upper Bhuban Formation) at locality no. 1.

*Measurements* : The carapace measures 10.00 mm in length and 14.00 mm in width.

*Remarks* : The specimen at hand, though of small size, agrees well with *Ebalia tuberculata* described and figured by Noetling (1901, GSI Type No. 7769) from ? Miocene of Thayetmyo, Myanmar, in overall confirguration, surface sculpture and in the characters of gastric and cardiac regions.

*Ebalia spinosa* n. sp.
(Pl. I, fig. 3; fig. 2 c)

*Etymology*: The trivial name is derived after the spinose nature of antero- and postero-lateral borders which are characteristics of the new species.

*Material*: Three small carapaces; Specimen Nos. A1/7/66, A1/7/75 & A1/7/76.

*Horizon and Locality* : Lower Horizon (Upper Bhuban Formation) at locality no. 1.

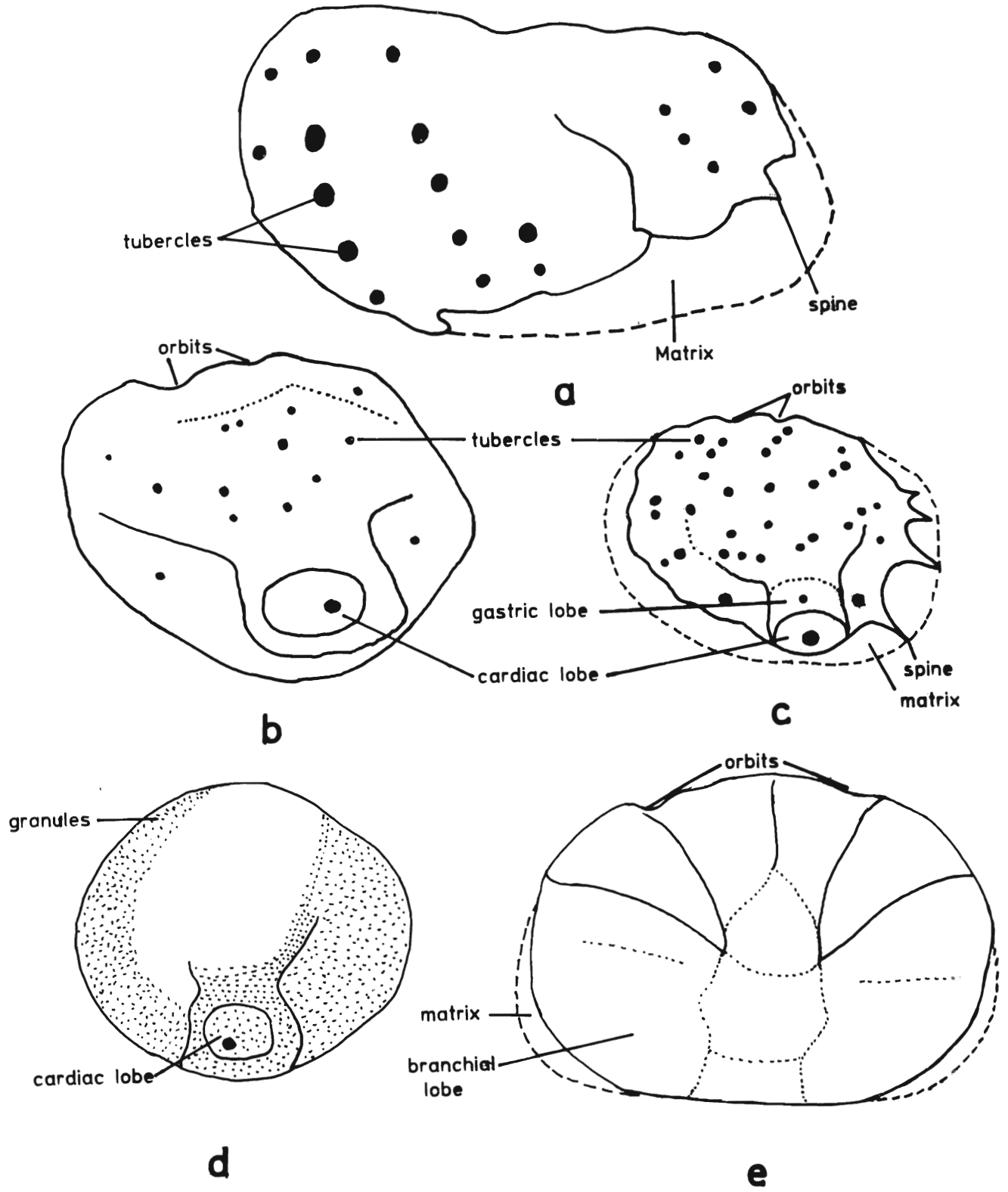


Fig. 2 a. *Calappa protopustulosa* Noetling, *X 4.5.*
b. *Ebalia tuberculata* Noetling, dorsal view of carapace, *X 5.0.*
c. *Ebalia spinosa* n. sp. (Holotype), dorsal view of carapace with postero-lateral spines, X 5.0.
d. *Typilobus granulosus* Stoliczka, *X 6.0.*
e. *Xantho* sp., dorsal view of carapace, *X 5.*

*Measurements (in mm):*

| | Specimen No. | Length of carapace | Width of carapace |
|---|---|---|---|
| Holotype | A1/7/66 | 9.00 | 11.00 |
| Paratype | A1/7/75 | 9.00 | 11.00 |
| Paratype | A1/7/76 | 11.00 | 12.00 |

*Diagnosis:* Four prominent well separated spines on the postero- lateral border and more tuberculate sculpture of the upper surface of the carapace.

*Description:* Carapace ovate, width slightly more than the length, strongly convex longitudinally and moderately so transversely; upper surface of the carapace nodose and covered with small, isolated tubercles. Frontal margin narrow, almost straight and about one-third of the width of the caparace; orbits small, deep and closely spaced. Antero-lateral border semi- circular, dentate with four spines and relatively longer than the distance between the outer angles of the orbits; postero-lateral borders straight with four very prominent well separated spines which converge towards posterior margin making an obtuse angle.

Gastric and cardiac regions well marked by a deep furrow on either side and separated from each other by a transverse furrow; meta-gastric and strongly convex cardiac regions bear a prominent tubercle.

*Remarks* : The present specimens differ from the only known fossil species of *Ebalia* from the Indian-Subcontinent, *i.e., Ebalia tuberculata* Noetling (1901, p.370, Pl. XXIV, figs. 7, 7a; GSI Type No. 7769) from ? Miocene of Thayetmyo, Myanmar, in having well-developed spines on the antero- and postero-lateral borders and more tuberculate nature of the upper surface of the carapace.

*Genus* ***Typilobus*** Stocliczka, 1871

*Type species* : *Typilobus granulosus;* OD. Upper Eocene; Hungary.

*Typilobus granulosus* Stocliczka, 1871
(Pl. I, fig. 4; fig. 2d)

*Typilobus granulosus* Stoliczka, 1871, p. 15, Pl. III, figs. 3-5.

*Material* : Single well preserved carapace; specimen No. LT/6/13.

*Horizon and Locality:* Lower horizon (Upper Bhuban Formation) at locality No.2.

*Measurements* : Length of the carapace is 8.00 mm and width is 10.00 mm.

*Remarks* : The carapace is small and well preserved but its frontal region and a part of the middle portion are weathered out. It closely resembles *Typilobus granulosus* Stoliczka, 1871 (GSI Type No. 2280) from the ferruginous clay bed apparantly of Nummulitic age in Sind and from conglomeratic sandstones of the Sahind Hill, west of Egera in Kachchh (Sastri and Mathur, 1970). The present specimen, however, has more granulose surface of the carapace than its western Indian counterpart. *Typilobus* sp. has also been recorded from the Miocene of Hathab, Bhavnagar District, Gujrat (Sastri and Mathur, 1970). However, descriptions and figures of the same are not available for comparison.,

*Superfamily* **Xanthoidea** Dana, 1851

*Family* **Xanthidae** Dana, 1851

*Genus* ***Xantho*** Leach, 1804

*Type species:* ***Cancer incisus;*** OD. Recent.

*Xantho* sp.
(Pl. I, fig. 5; fig. 2 e)

*Material:* Two complete carapaces; Specimen Nos. A1/7/67 and A1/7/68.

*Horizon and Locality* : Lower horizon (Upper Bhuban Formation) at locality no. 1.

*Measurements* (in mm) :

| Specimen No. | Length of carapace | Width of carapace |
|---|---|---|
| A1/7/67 | 11.50 | 16.00 |
| A1/7/68 | 11.50 | 16.00 |

*Description* : Carapace hexagonal, broader than long, moderately convex longitudinally and nearly flat transversely. Frontal region wide, slightly curved and about half of the width of the carapace; orbits small, and widely separated. Antero-lateral margin smooth, postero-lateral margin straight and converges posteriorly; posterior margin about two-third of maximum width of the carapace.

Proto- and metagastric regions well developed; branchial region bears a prominent transverse ridge.

*Remarks* : The specimens have been tentatively assigned to *Xantho* sp. No specific name has been suggested for want of more and better preserved material. This appears to be the first record of fossil *Xantho* sp. from the Indian Subcontinent.

## DISCUSSION

Tiwari (1992), while working out biozonations within the Surma Group, tentatively considered *Calappa protopustulosa* Noetling as a characteristic form of Burdigalian based on its previous records and also the associated forms of molluscs and shark teeth. He also tentatively assigned the Aquitanian-Burdigalian age for the horizon yielding *Ebalia tuberculata* Noetling as

evidenced by the associated forms of molluscs and echinoids and its earliar occurrences. From the above, it is inferred that the Upper Bhuban Formation of the Surma Group in Mizoram may be of Aquitanian-Burdigalian to Burdigalian age.

The presence of identical species of crabs from western India, North Eastern India and adjoining Myanmar indicates their wide distribution during Lower Miocene. Furthermore, the faunal assemblage indicates a shallow marine environment of deposition.

## ACKNOWLEDGEMENTS

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## EXPLANATION OF PLATE

### Plate I

1. *Calappa protopustulosa* Noetling, dorsal view of carapace X 4.5.
2. *Ebalia tuberculata* Noetling, dorsal view of carapace, x 5.0.
3. *Ebalia spinosa* n. sp. (Holotype), dorsal view of carapace with postero-lateral spines x 5.0.
4. *Typilobus granulosus* Stoliczka, dorsal view of carapace, x 6.05.
5. *Xantho* sp., dorsal view of carapace, X 5.0.

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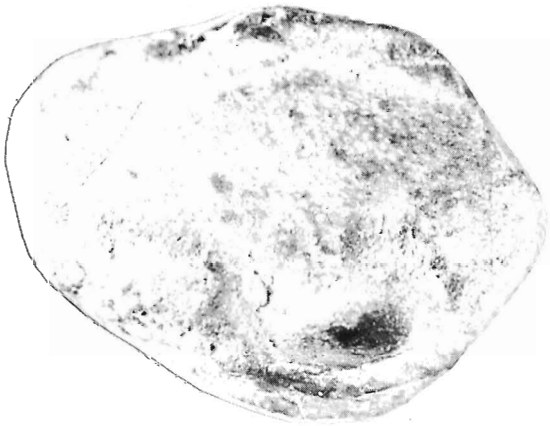

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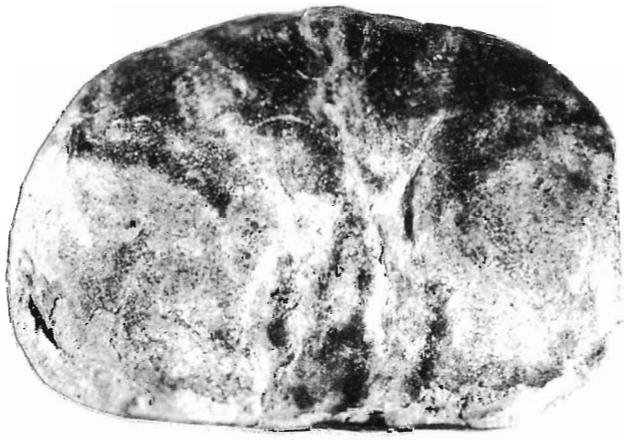

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