

ON A COLLECTION OF ECHINODERMATA FROM KARNATAKA COAST, INDIA

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INTRODUCTION

The Karnataka State of India has a 270 km long coast line bordering Arabian Sea. The habitats are mainly sandy with scattered rocks and rocky islands. The echinoderm fauna of the coast is poorly known. There are several scattered reports of echinoderms from Karnataka (see Sastry, 2007). However, the report of Patil (1953) includes the marine fauna exclusively of Karnataka and only *Temnopleurus* sp. of echinoderms from Karwar coast of Karnataka. Recently Sastry (2007) gave an account of Echinodermata reported from the Indian coast including 27 species mainly from the offshore locations along the Karnataka coast collected years back chiefly by the R. I. M. S. Investigator. The collections made during the recent survey of the coast by Dr. M. K. Dev Roy of ZSI along with JGP and SM of us included seven species. The asteroid *Asterina burtoni* is from the intertidal rocks at St. Mary Island and all the other six species are from the trash collections of the offshore fishing trawlers left on the beach. Of the seven species, the asteroid *Luidia hardwicki* and the two echinoids were reported earlier from the Karnataka. The other four species are additions to the fauna of the State. Further, the finding extends the known distribution of *Comatella stelligera* westward into Arabian Sea. Brief description of the material is given under remarks. The distribution along the Indian coast is from Sastry (2007) and elsewhere is mainly from Clark and Rowe (1971). A list of all the echinoderm species known from Karnataka is appended.

SYSTEMATIC ACCOUNT

Phylum Echinodermata

Class CRINOIDEA

Order COMATULIDA

Family COMATULIDAE

1. *Comatella stelligera* (P. H. Carpenter)
(Pl. I. Fig. 1)

1880. *Actinometra stelligera* P. H. Carpenter, *J. Linn. Soc. (Zool.)*, 15: 198.

1971. *Comatella stelligera*: Clark, A. M. and Rowe, F. W. E. *Monograph of shallow-water Indo-West Pacific echinoderms*, 6-7 (distribution) and 15 (key).

2007. *Comatella stelligera*: Sastry, D. R. K. *Rec. zool. Surv. India, Occ. Paper No. 271*: 9

Material : Murudeshwar beach, 17.3.2009, one specimen.

Remarks : Some of the division series are lost or broken. All the division series present are of only two ossicles and without a syzygy. II Br series with two III Br series, or III Br only on the outer side. First brachial syzygy at 3+4.

Distribution : India- Lakshadweep, Tamil Nadu, Andamans. The species newly recorded from Karnataka coast.

Elsewhere : Bay of Bengal to South China Sea and North Australia.

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Class ASTEROIDEA
Order PAXILLOSIDA
Family LUIDIIDAE

2. *Luidia hardwicki* (Gray)
(Pl. I, Fig. 4)

1840. *Petalaster hardwicki* Gray, *Ann. Mag. Nat. Hist.* 6: 183.
1910. *Luidia limbata*: Koehler, R. *Echinoderma of the Indian Museum*, Part VI: 10. Karnataka: 8 miles WSW of Honawar; Tamil Nadu: Gulf of Mannar (Palk Strait), 22 m (12 fms.); Orissa: Gopalpore, 46-51m (25-28 fms.); Andaman Islands, 13-16 m (7-9 fms.); South Andamans: Little Andaman Island. [non. *Luidia limbata* Sladen, 1889 = *Luidia quinaria* von Martens, 1865]
1920. *Petalaster hardwicki* Gray, 1840: Döderlein, L. *Siboga Exped. Monog.* 46b: 246, *indeterminata*
1920. *Luidia (Quinaster) forficifer*: Döderlein, L. *Siboga Exped. Monog.* 46b: 243, 278, with synonym. *Luidia limbata*: Koehler, R. [non. *Luidia limbata* Sladen, 1889: 251 = *L. quinaria* von Martens, 1865: 352]
1971. *Luidia hardwicki*: Clark, A. M. and Rowe, F. W. E. *Monograph of shallow-water Indo-West Pacific echinoderms*, 30-31 (distribution) and 44 (key).
1989. *Luidia (Luidia) hardwicki*: Clark, A. M. *Echinoderm Studies*, 3: 242. With synonym *L. forficifer* Sladen, 1889: 258. Indian Ocean, South China Sea to Torres Strait, N Australia, 10-94 m.
2001. *Luidia prionota* Fisher, 1913: Clark, A. M. and Mah, C. *Echinoderm Studies*, 6: 329. A synonym of *L. hardwicki* (Gray, 1840) according to Liao and A. M. Clark, 1995 (1996). Extension of range from Philippines and N Australia to Hawaii by Mah, 1998.
2007. *Luidia hardwicki*: Sastry, D. R. K. *Rec. Zool. Surv. India, Occ. Paper No.* 271: 24 [Information on the status of Koehler's *L. limbata* material was not available.]

Material : Bhatkal Fishing Harbor, 17.3.2009, one spec; Gangoli Fishing Harbor, Kundapura, 20.3.2009, one spec.

Remarks : The specimens are from a trawl waste and not properly preserved. Disc and arms are separate with the armament on oral side completely rubbed off and could not be identified. It appears from the nature of paxillar arrangement that the specimens belong to *Luidia hardwicki* among the five armed species.

Distribution : India- Maharashtra, Karnataka, Tamil Nadu, Andhra Pradesh, West Bengal and Andaman Islands. Earlier the species was collected by RIMS Investigator from Karnataka coast at 8 miles WSW of Honawar and reported by Koehler (1910) as *L. limbata*.

Elsewhere : SE Arabia, Persian Gulf, Islands of Western Indian Ocean, Bay of Bengal, East Indies, South China Sea, North Australia and Hawaii.

Family ASTROPECTINIDAE

3. *Astropecten hemprichi* Müller and Troschel
(Pl. I, Fig. 2, 3)

1842. *Astropecten hemprichi* Müller, J. and Troschel, F. H. *System der Asteriden*, 1. Asteriae, p. 71.
1971. *Astropecten hemprichi*: Clark, A. M. and Rowe, F. W. E. *Monograph of shallow-water Indo-West Pacific echinoderms*, 30-31 (distribution) and 45 (key).
1989. *Astropecten hemprichi*: Clark, A. M. *Echinoderm Studies*, 3: 259. Red Sea, Arabian Gulf S to Natal.
2007. *Astropecten hemprichi*: Sastry, D. R. K. *Rec. Zool. Surv. India, Occ. Paper No.* 271: 28

Material : Karwar coast, fish trawl collection, 13.3.2009, one spec, R = 23 mm; Bhatkal, 17.3.2009, 13 specs, R = 18-34 mm, R/r of the largest is 34/10 mm; Mangalore coast, Ullal beach, 24.3.2009, 22 specs, R = 20-32 mm.

Remarks : Actinal plates one or two. Superomarginals vertically aligned at the interradius and wider beyond third or fourth plate. Short spinelets not prominent, extending till end of arm, proximally on the inner margin, shifting to outer margin beyond third or fourth plate, two series of spines from third to sixth plates. Inferomarginals with one pointed spine marginally and two unequal spines below it, the smaller is half the length of the other, actinal surface with pointed spinelets. Adambulacrals with three spines in the furrow and two unequal spines in the subambulacral area. About half dozen specimens contained two to eight small gastropods in the stomach.

Distribution : India- Andhra Pradesh and Tamil Nadu. The species newly recorded from Karnataka coast.

Elsewhere : Persian Gulf to Natal coast of South Africa and Bay of Bengal.

Order VALVATIDA

Family ASTERINIDAE

4. *Asterina burtoni* Gray

(Pl. I. Fig. 5)

1840. *Asterina burtoni* Gray, J. E. *Ann. Mag. nat. Hist.* 6 (37): 289.1971. *Asterina burtoni*: Clark, A. M. and Rowe, F. W. E. *Monograph of shallow-water Indo-West Pacific echinoderms*, 38-39 (distribution) and 68 (key).2007. *Asterina burtoni*: Sastry, D. R. K. *Rec. zool. Surv. India, Occ. Paper No. 271*: 42**Material** : St. Mary Island, 22.3.2009, one specimen.**Remarks** : The specimen measures 5 mm in R and 2.5 mm in r. arms five and thick radially, madreporite single. Abactinal plates with up to four short spines. Pore series confluent interradially. Actinal plates with one to three spines. Furrow spines three, subambulacral spines two.**Distribution** : India- Gujarat, Lakshadweep, Tamil Nadu, Andaman and Nicobar Islands. The species is newly recorded from Karnataka coast.**Elsewhere** : Red Sea and East coast of Africa to north Australia.

Class ECHINOIDEA

Order TEMNOPLEUROIDA

Family TEMNOPLEURIDAE

5. *Temnopleurus toreumaticus* (Leske)

(Pl. II. Fig. 6)

1778. *Cidaris toreumaticus* Klein In: Leske, N. G. *Additamenta ad Kleinii naturalem dispositionem Echinodermatum*, p. 155.1953. *Temnopleurus* sp. Patil, A. M. J. *Bombay nat. Hist. Soc.* 51: 429-434. Karnataka: Karwar coast. Probably *T. toreumaticus*.1971. *Temnopleurus toreumaticus*: Clark, A. M. and Rowe, F. W. E. *Monograph of shallow-water Indo-West Pacific echinoderms*, 142-143 (distribution) and 154 (key).2007. *Temnopleurus toreumaticus*: Sastry, D. R. K. *Rec. zool. Surv. India, Occ. Paper No. 271*: 176**Material** : Karwar coast, 13.3.2009, 13 specs, D/H = 11/5-34/16 mm, four specimens with darker spines; Mangalore coast, Bhatkal, 17.3.2009, two specs; Mangalore coast, Murudeshwar Beach,

17.3.2009, three specs, D/H = 27/18, 28/15 and 45/24 mm, the latter two with dark spines; Mangalore coast, Ullal Beach, 24.3.2009, one specimen, D/H = 26/16 mm; Mangalore coast, Panambur, 25.3.2009, two specs, D/H = 34/17 and 37/19 mm.

Remarks : Angular pits on the test plates deep and prominent. The anus is subcentral, spines transparent light olive green banded with reddish brown, as long as the horizontal diameter, five specimens as noted above are with dark spines.**Distribution** : India- Gujarat, Maharashtra, Goa, Karnataka, Tamil Nadu, Orissa, Andhra Pradesh, West Bengal and Andaman Islands.**Elsewhere** : Persian Gulf and East coast of Africa to South Pacific Islands.6. *Clypeaster rarispinus* de Meijere

(Pl. II. Figs. 7, 8)

1903. *Clypeaster rarispinus* de Meijere, J. C. H. *Tijdschr. Ned. Dierk. Veeren.* (2) 8: 7.1971. *Clypeaster rarispinus*: Clark, A. M. and Rowe, F. W. E. *Monograph of shallow-water Indo-West Pacific echinoderms*, 144-145 (distribution) and 160 (key).2007. *Temnopleurus toreumaticus*: Sastry, D. R. K. *Rec. Zool. Surv. India, Occ. Paper No. 271*: 176**Material** : Mangalore coast, off Bhatkal, 17.3.2009, 22 specs; Off Mangalore, Fish trawl collection, 24.3.2009, 10 specs.**Remarks** : The specimens measure 20-45 mm in length, l/b = 20/20 in the smallest and 45/42 in the largest. The anus is characteristically abutting the posterior margin.**Distribution** : India- Gujarat, Karnataka, Kerala, Tamil Nadu, Orissa, Andhra Pradesh and West Bengal.**Elsewhere** : Persian Gulf to the Natal coast and to east Indies.

Class Holothuroidea

Order Dendrochirotida

Family CUCUMARIDAE

7. *Leptopentacta javanicus* (Sluiter)

(Pl. II. Fig. 9)

1880. *Oncus javanicus* Sluiter, C. P. *Tijdschr. Ned-Indie*, 40: 9.

2007. *Leptopentacta javanicus* (Sluiter): Sastry, D. R. K. *Rec. zool. Surv. India, Occ. Paper No. 271*: 250

2010. *Leptopentacta javanicus* (Sluiter): Mitra, S.; Chitra, J. And Pattanayak, J.G. *Rec. zool. Surv. India, 110*(Part-4): 250

Material : Karwar Coast, Uttara Kannada Dt, 13.3.2009, 18 specs; Bhatkal, 17.3.2009, 15 specs; Tonka, near Honawar, Uttara Kannada Dt, 18.3.2009, 2 specs; Gangoli, Kundapura, 20.3.20 09, 11 specs.

Remarks : Body form small and slender. Pedicles in a double row along each side of the ambulacral areas ventrally. Papillae in three rows, along the dorsal ambulacral areas. Aggregations of spicules in inter ambulacral areas make a reticulate appearance. Spicules smooth nodular buttons with four hole baskets and large lenticulate plates also present.

Distribution : India- Kerala, Tamil Nadu and Andhra Pradesh. The species is recently recorded from Karnataka coast.

Elsewhere : SE Arabia, Maldives, Bay of Bengal and East Indies.

SUMMARY

Recent collections from the Karnataka (Arabian Sea) coast of India contained material of seven species of echinoderms. Of these the Crinoid *Comatella stelligera*, the asteroids *Astropecten hemprichi* and *Asterina burtoni* are new to the fauna of Karnataka coast. In addition, the collection included *Luidia hardwicki*, *Temnopleurus toreumaticus* and *Clypeaster rarispinus* already known from the coast and the holothuroid *Leptopentacta javanicus* which was recently reported from this coast. Further the present record of *Comatella stelligera* extends its distribution westward into the Arabian Sea.

ACKNOWLEDGEMENTS

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- Sastry, D. R. K. 2007. Echinodermata of India: An Annotated list. *Rec. zool. Surv. India, Occ. Paper No. 271*: 1-387.

APPENDIX

ECHINODERMATA of KARNATAKA COAST

* species new to Karnataka Coast

Phylum ECHINODERMATA

Class CRINOIDEA

Order COMATULIDA

- | | | |
|-----------------------|---|--|
| Family Comatulidae | 1 | <i>Comatella stelligera</i> (Carpenter)* |
| Family HIMEROMETRIDAE | 2 | <i>Heterometra compta</i> A. H. Clark |
| Family MARIAMETRIDAE | 3 | <i>Lamprometra palmata</i> (J. Müller) |
| Family COLOBOMETRIDAE | 4 | <i>Oligometra serripinna</i> (P. H. Carpenter) |

Order BOURGUETICRINIDA

- | | | |
|------------------------|---|---|
| Family PENTACRINITIDAE | 5 | <i>Comastrocrinus ornatus</i> (A. H. Clark) |
| | 6 | <i>Comastrocrinus springeri</i> (A. H. Clark) |

Class ASTEROIDEA

Order PAXILLOSIDA

- | | | |
|---------------------------|---|---|
| Family LUIDIIDAE | 1 | <i>Luidia (Luidia) hardwicki</i> (Gray) |
| Family ASTROPECTINIDAE | 2 | <i>Astropecten hemprichi</i> Müller and Troschel* |
| | 3 | <i>Astropecten inutilis</i> Döderlein |
| | 4 | <i>Astropecten tamilicus</i> Döderlein |
| Family PORCELLANASTERIDAE | 5 | <i>Sidonaster vaneyi</i> Koehler |

Order Valvatida

- | | | |
|--------------------|---|-------------------------------|
| Family Asterinidae | 6 | <i>Asterina burtoni</i> Gray* |
|--------------------|---|-------------------------------|

Order BRISINGIDA

- | | | |
|--------------------|---|------------------------------|
| Family BRISINGIDAE | 7 | <i>Brisinga gunni</i> Alcock |
|--------------------|---|------------------------------|

Class OPHIUROIDEA

Order OPHIURIDA

Family OPHIURIDAE

- | | | |
|-----------------------|---|-------------------------------------|
| Subfamily OPHIURINAE | 1 | <i>Ophiura undulata</i> (Lyman) |
| Family HEMIEURYALIDAE | 2 | <i>Ophiomoeris tenera</i> (Koehler) |
| Family OPHIOTHRICIDAE | 3 | <i>Ophiothrix</i> sp. |

Class ECHINOIDEA

Order CIDAROIDA

- | | | |
|-------------------|---|--|
| Family CIDARIIDAE | 1 | <i>Stereocidaris alcocki</i> (A. R. S. Anderson) |
|-------------------|---|--|

Order PHYMOSOMATOIDA

- | | | |
|----------------------|---|---|
| Family STOMECHINIDAE | 2 | <i>Stomopneustes variolaris</i> (Lamarck) |
|----------------------|---|---|

Order **TEMNOPLEUROIDA**Family **TEMNOPLEURIDAE**

- 3 *Salmacis bicolor* L. Agassiz
4 *Temnopleurus toreumaticus* (Leske)

Order **CLYPESTEROIDA**Family **CLYPEASTERIDAE**

- 5 *Clypeaster rarispinus* de Meijere
6 *Clypeaster reticulatus* (Linnaeus)

Family **FIBULARIIDAE**

- 7 *Echinocyamus crispus* Mazetti

Order **SPATANGOIDA**Family **SPATANGIDAE**

- 8 *Nacospatangus (Pseudomaretia) alta* (A. Agassiz)

Class **HOLOTHUROIDEA**Order **ASPIDOCHIROTIDA**Family **HOLOTHURIIDAE**

- 1 *Holothuria (Halodeima) atra* (A. Agassiz)
2 *Holothuria (Mertensiothuria) leucospilota* Brandt

Order **DENDROCHIROTIDA**Family **Cucumaridae**

- 3 *Leptopentacta javanicus* (Sluiter)*

Order **DACTYLOCHIROTIDA**Family **YPSILOTHURIIDAE**

- 4 *Ypsilothuria bitentaculata* (Ludwig)

Order **APODIDA**Family **MYRIOTROCHIDAE**

- 5 *Ankyloderma musculus* (Risso)

Other Holothurians

- 6 *Bathyzona incerta* Koehler and Vaney
7 *Pseudothuria duplex* Koehler and Vaney

PLATE I



Fig. 1. *Comatella stelligera*

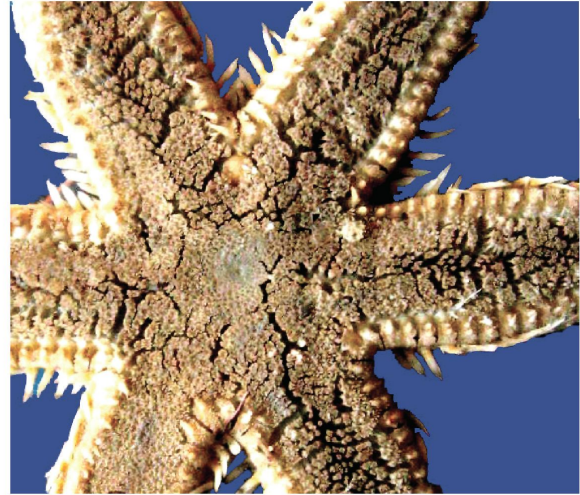


Fig. 2. *Astropecten hemprichi* (6-armed)

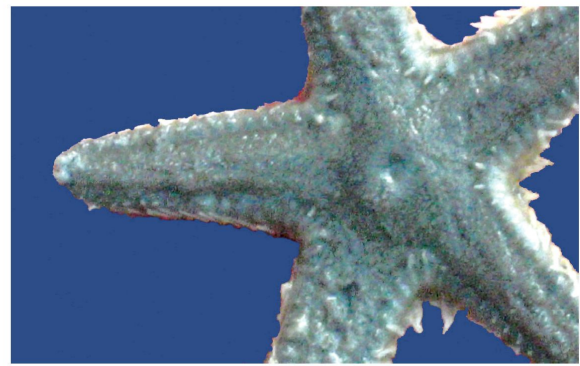


Fig. 3. *Astropectn haemprichi* (5-armed)



Fig. 4. *Luidia hardwicki*

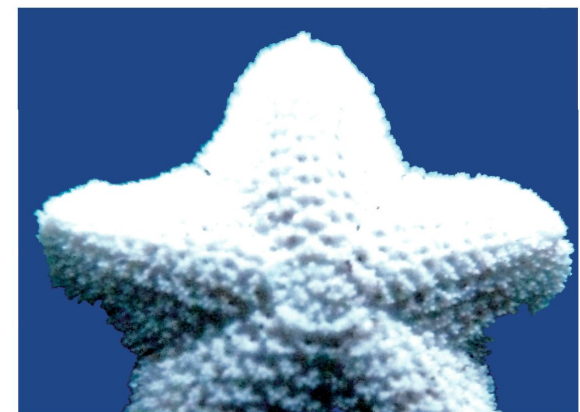


Fig. 5. *Asterina burtoni*

PLATE II



Fig. 6. *Temnopleurus toreumaticus*



Fig. 9. *Leptopentacta javanicus*



Fig. 7. *Clypeaster rarispinus* (aboral)



Fig. 8. *Clypeaster rarispinus* (oral)