CHAPTER 8

Asteroidea of Vietnam with some notes on their symbionts

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ABSTRACT. Asteroidea and their symbionts represent an important and diverse, but poorly explored component of the biodiversity of coastal ecosystems of Vietnam. We studied data from 8 years of collecting sea stars and their symbionts by schnorkelling, scuba-diving and trawling in the Bay of Nhatrang and other coastal areas of Vietnam. A total 47 species of asteroids and 24 species of their symbionts have been found. These species of asteroids belong to 13 families, with the most diverse families Ophidiasteridae and Oreasteridae, comprising 15 and 10 species respectively. Two species of asteroids, *Nardoa novaecaledoniae* and *Stellasteropsis colubrinus* are new for the coastal waters of Vietnam. The most diverse groups of symbionts of asteroid were copepods with 8 species (33.3% of all symbiotic species found), polychaetes with 7 species (29.2%) and gastropods with 5 species (20.8%). The other groups – decapods, fishes and ctenophorans, were substantially less diverse and included 1 or 2 species only. Our study revealed a rather rich fauna of asteroids and their symbionts in the coastal waters of Vietnam in comparison to some other areas of the Indo-West Pacific. We suggest that a further increase in the asteroid and their symbionts diversity might be expected from trawling on soft grounds, especially in deeper areas of Vietnamese coast.

The South China Sea (SCS) is located in the Indo-Malayan region and partially belongs to the Coral Triangle, the area recognized as a centre of maximum biodiversity of marine species, especially corals, mollusks and marine fishes [Veron 1994, 1995; Roberts *et al*. 2002; Mora *et al*. 2003; Allen 2002, 2003; Hoeksema 2007]. SCS has a rich echinoderm fauna with close to thousand species known, of which about 12% are endemic [Lane *et al*. 2000]. However echinoderm diversity in the South China Sea probably underestimated since much of this large marine ecosystem remains unexplored. For comparison, in the better studied Australian waters 1154 echinoderm species have been recorded [Rowe, Gates 1995]. Due to the fact that the SCS borders the Coral Triangle and is a partially enclosed basin its fauna is of a special interest for biodiversity research [Lane *et al*. 2000; Ng, Tan 2000].

The recorded number of Asteroidea species in the SCS is 236 of which ~ 24% are endemic [Lane *et al*. 2000; Ho 2002; Chao 2000; Purwati, Lane 2004; Liu *et al*. 2006]. The regional faunas included in the SCS are significantly less diverse. For example, in the coastal waters of Vietnam only 56 species of asteroids have been recorded [Lane *et al*. 2000; Ho 2002]. Our previous paper [Antokhina, Britayev 2012] provided a checklist of 39 asteroids for the Bay of Nhatrang revealed new records for this area and underlined the gaps in our knowledge.

In this extended paper we provided a checklist of Asteroidea of Vietnam based on the material collected in the coastal waters of Vietnam (excluding the Bay of Tonkin) in the

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Choriaster granulatus Lütken, 1869
(Pl. 61 G)

Choriaster granulatus Lütken 1869: 35; Fisher 1919: 369; Domantay, Roxas 1938: 217; Guille *et al*. 1986: 124; Colin, Arneson 1995: 244; Gosliner *et al*. 1996: 254; Moosleitner 1997: 6; Purwati, Lane 2004: 93.

Material examined. Nhatrang Bay, Mot Island, 3–10 m, corals, rocks, coll. Antokhina, 8 April 2006 – 1 specimen; 10 April 2006 – 5 specimens; 15 April 2006 – 3 specimens; 18 April 2006 – 6 specimens; Dung Island, 10–15 m, corals, rocks, coll. Antokhina, 26 April 2006 – 1 specimen; 3 May 2006 – 1 specimen; Nok Island, 15–20 m, rocks, coll. Antokhina, 28 April 2006 – 1 specimen.

Measurements. R/r (max) = 160/60 mm; R/r (min) = 105/40 mm.

Distribution in Nhatrang Bay. Mun, Mot, Dung, Nok Islands.

General distribution. Indo-West Pacific, i.e. E. Africa, Red Sea, Maldive Island, South China Sea, Australia (Ashmore, Cartier, Scott Island, Rowley Shoals), South Pacific Islands.

Symbionts. Polychaetes *Asterophilia culcitae* Britayev et Fauchald, 2005, *Hololepidella millari* Britayev, Doignon et Eeckhaut, 1999 (Polychaeta: Polynoidae), copepods *Stellicola oreastriphilus* Kossmann 1877 (Copepoda: Lichomolgidae), decapods *Periclimenes soror* Nobili, 1914 (Decapoda: Palaemonidae).

Culcita novaeguineae Müller et Troschel, 1842
(Pls. 61 H, 62 A)

Culcita novaeguinea Müller, Troschel 1842: 38; Fisher 1919: 360; H.L. Clark 1921: 32; Livingstone 1932: 250; Guille *et al*. 1986: 124; Colin, Arneson 1995: 245; Gosliner *et al*. 1996: 255; Purwati, Lane 2004: 93.

Material examined. Nhatrang Bay, Mot Island, 4–6 m, corals, rocks, coll. Antokhina, 6 April 2006 – 14 specimens; 8 April 2006 – 14 specimens; 10 April 2006 – 16 specimens; 15 April 2006 – 19 specimens; 18 April 2006 – 13 specimens; 20 April 2006 – 15 specimens; 22 April 2006 – 24 specimens; Dung Island, 5–12 m, corals, rocks, coll. Antokhina, 24 April 2006 – 5 specimens; 26 April 2006 – 1 specimen; 3 May 2006 – 2 specimens; 10 May 2006 – 3 specimens; Nok Island, 3–15 m, rocks, coll. Antokhina, 5 May 2006 – 8 specimens; 28 April 2006 – 6 specimens; Do Island, 3–6 m, rocks, 27 May 2007 – 7 specimens; Tre Island (cape Muy Nam), 6–10 m, rocks, coll. Antokhina, 1 June 2007 – 9 specimens.

Measurements. R (max) = 185 mm; R/r (min) = 34/24 mm.

Distribution in Vietnam. Nhatrang bay: Do, Tre, Mieu, Tam, Mot, Mun, Nok, Dung, Noy Islands. Con Co Island. Con Dao Island. Phu Quoc Island.

General distribution. West Pacific including type locality, New Guinea. Indian Ocean (Andaman Island), Australia (Ashmore, Cartier and Scott reefs and Rowley Shoals).

Symbionts. Polychaetes *Asterophilia culcitae*, *Hololepidella laingensis* Britayev, Doignon et Eeckhaut, 1999, *Hololepidella millari* (Polychaeta: Polynoidae), molluscs *Stilifer variabilis* Boettger, 1893 (Gastropoda: Eulimidae), copepods *Astroxynus culcitae* Humes 1971 (Copepoda: Stellicomitidae), *Stellicola oreastriphilus*, *Stellicola parvuli-*

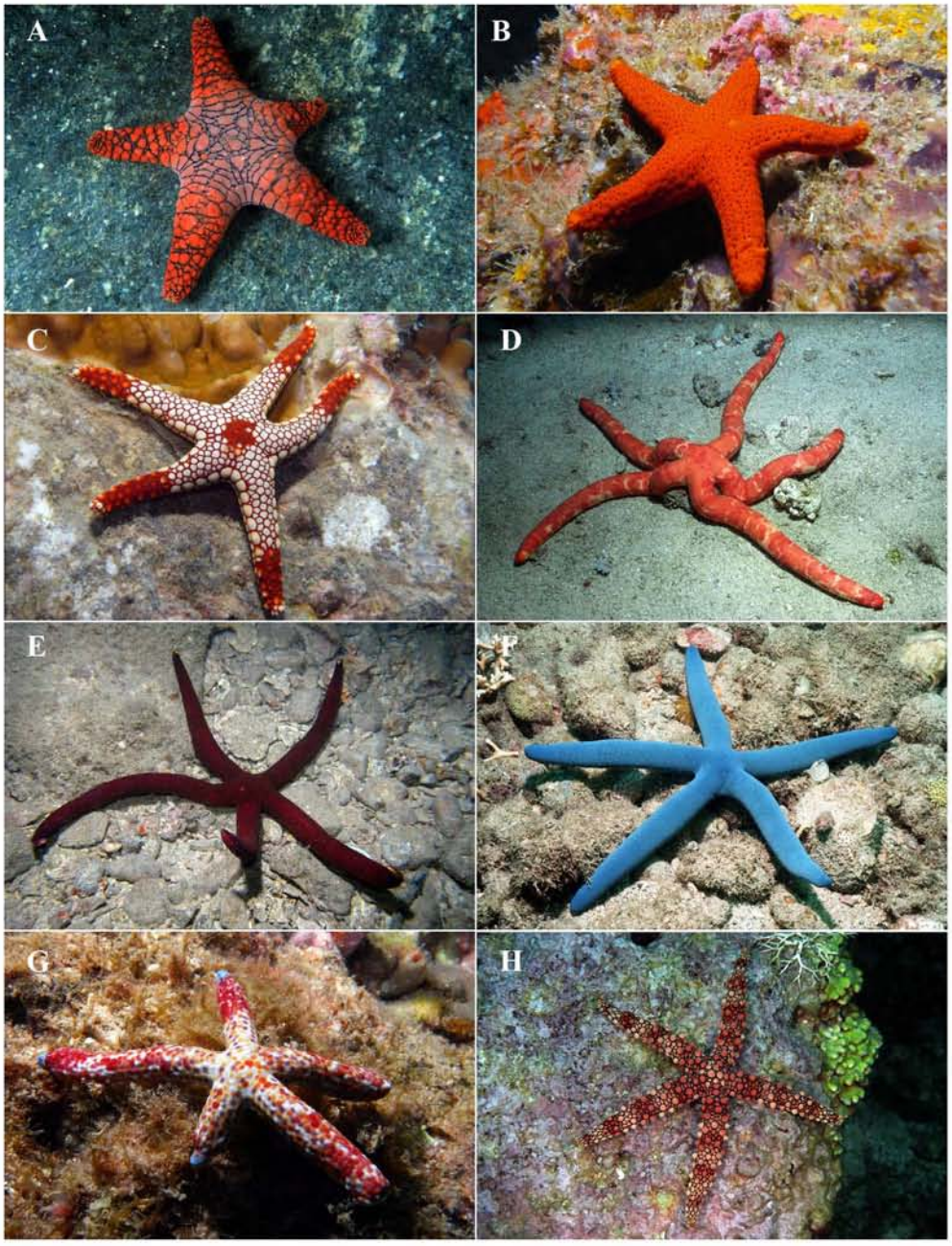

Plate 63. **A** – *Fromia indica*, **B** – *Fromia milleporella*, **C** – *Fromia monilis*, **D** – *Leiaster leachi*, **E** – *Leiaster speciosus*, **F** – *Linckia laevigata*, **G** – *Linckia multifora*, **H** – *Nardoa frianti*.

species of symbiotic animals from three main taxa, gastropods, fishes and copepods (Pl. 66 B). The obviously different taxonomic compositions of associated faunas in these studies (Pl. 66 B) reflects a focus by Jangoux [1990] on parasitic animals. While the symbiotic fauna associated with the more common shallow-water asteroids of the Bay of Nhatrang is relatively well studied now. It is restricted to 13 species of asteroid host only. Further studies of asteroids from other regions of the coastal waters of Vietnam, especially northern and deep-water areas, will increase the known diversity of asteroid associated fauna substantially.

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