

Records of some marine parasitic molluscs from Nha Trang, Vietnam

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During a short survey in the Bay of Nha Trang (Vietnam), various corals and other sessile invertebrates were observed that acted as host for parasitic molluscs and commensal shrimps. To illustrate the research potential in Nha Trang on the evolution and diversity of symbiotic molluscs, we present some examples that appeared to be common due to the availability of host organisms, in this case stony corals (Scleractinia: Fungiidae) and sea cucumbers (Holothuria: Stichopodidae).

Key words: Gastropoda, Caenogastropoda, Coralliophilidae, *Leptoconchus*, Epitoniidae, *Epifungium*, Eulimidae, Bivalvia, Mytilidae, *Fungiacava*, parasitic snails, Vietnam.

INTRODUCTION

Recently, the first author visited Vietnamese and Russian scientists in Vietnam to explore possibilities for collaborative studies on marine biodiversity in Nha Trang Bay, western South China Sea. Although the coral reefs in this bay have been reported as disturbed (Pavlov et al., 2004), recent reports on the invertebrate fauna indicate that species diversity of symbionts is not low (e.g., Lyskin & Britayev, 2004, 2005; Marin, 2006; Marin & Savinkin, 2007; Marin & Spiridonov, 2007). The present report aims to give an indication of the possibilities for studies on molluscs that live in association with corals and other sedentary invertebrates at Nha Trang. The primary focus concerns the species richness of mushroom corals (Scleractinia: Fungiidae) and their role as hosts in such associations.

RESEARCH METHODS AND AREA

In the first half of June 2008, 24 dives were made (one hour each) around the rocky islands off Nha Trang, in the South China Sea. Underwater, corals were seen growing on and between boulders, forming poorly developed shallow reefs with much sediment underneath. Both the rocky substrate and the soft bottom were inventoried to a maximum depth of 25 m for the presence of invertebrates (especially corals) and their associated fauna. Photographs were made with the help of a high-resolution digital camera in underwater housing (Sea&Sea DX-1G). Positions of dive localities were determined with the help of a Garmin e-Trex GPS.



Figs 1-6. Parasitic molluscs at the Bay of Nha Trang. 1. A specimen of *Leptoconchus* sp. in a coral of *Podabacia crustacea*. 2. Boring mussel (*Fungiacava eilatensis*) in the same coral. 3. Another specimen taken out of the coral and placed next to a gall crab excavation (left bottom corner). 4. A specimen of *Epifungium* cf. *nielsi* on top of a *Fungia* cf. *seychellensis* coral. 5-6. Eulimid snails (probably *Melanella*) infesting a specimen of the holothurian *Stichopus naso*.

RESULTS

Mushroom corals (Fungiidae) at Nha Trang were already known to act as hosts for coral gall crabs of the Hapalocarcinidae (Fize & Serene, 1957). During the present survey they appeared to be very abundant, especially in specimens of *Fungia* (*Verrillofungia*) *repanda* Dana, 1846, and *Podabacia crustacea* Pallas, 1766 (for mushroom corals, see Hoeksema, 1989). A single specimen of the latter species was examined 8 m deep at the west side of Tre Island (N 12° 0,931', E 109° 19,772') for its associated molluscan fauna. In addition to gall crabs, it contained hidden specimens of a yet unpublished *Leptoconchus* species (fig. 1; Gastropoda: Coralliophilidae; see Gittenberger & Gittenberger, 2006), and specimens of the boring mussel *Fungiacava eilatensis* Goreau et al., 1968 (figs. 2-3; Bivalvia: Mytilidae; see Hoeksema & Achituv, 1993; Hoeksema & Kleemann, 2002). No boring mussel of the genus *Lithophaga* Röding, 1798, was encountered in this coral, although *P. crustacea* is known to act as host for *L. malaccana* (Reeve, 1857) (see Kleemann & Hoeksema, 2002).

When an overturned coral of *Fungia* (*Pleuractis*) cf. *seychellensis* Hoeksema, 1993 (6 m depth, NE of Mun Island, N 12° 10,253', E 109° 18,703') was checked for its identity, it appeared to harbour a specimen of the epitoniid *Epifungium* cf. *nielsi* (Gittenberger & Gittenberger, 2005) at its upper surface (fig. 4). This is an atypical position, resulting from the habit of the snail to hide underneath its host, which in this case was turned upside down.

Many specimens of an eulimid snail (figs. 5-6) were found on sea cucumbers at the north side of Mot Island (N 12° 10,942', E 109° 16,541'). Based on underwater photographs, the sea cucumbers were identified by Dr Claude Massin (IRSNB / KBIN), who concluded that they belong to *Stichopus naso* Semper, 1868 (Holothuroidea: Stichopodidae) (Massin, 2007). They were found abundantly (up to 3 specimens m⁻²) on soft sediment underneath the reef slope (10-13 m depth) in murky water. The snails most likely belong to *Melanella* Bowdich, 1822, a large eulimid genus known to be associated with *Stichopus* and other holothurian genera (Warén, 1983, 2008). At generic level, eulimids show a high degree of host specificity and their host groups are well known (Warén, 1983), whereas at species level their hosts are usually unknown (Warén, 2008). Since host-specificity in eulimid snails is assumed to be low (Bouchet & Warén, 1986) and because they show few morphologically distinguishing characters, echinoderms should be searched systematically for their associated gastropod fauna, which should be analysed with the help of molecular techniques (cf. Gittenberger & Gittenberger, 2006; Gittenberger et al., 2006). Even the holothurian fauna of Nha Trang itself may not be known completely, since the present host species and several other sea cucumber species encountered during the present survey may not to have been recorded before (Lyskin & Britayev, 2005; Fjukmoen, 2006).

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