

THE MARKET VALUE OF RARE AND COMMON MOLLUSCS, PHUKET ISLAND, THAILAND

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ABSTRACT

A total of 225 species of molluscs from 56 families, were marketed in 1994. Gastropods dominated (174 spp) followed by bivalves (47 spp.), cephalopods (3 spp.) and scaphopods (1 sp.). A total of 57 % of the gastropods, 87 % of the bivalves, one cephalopod and the scaphopod were sold at prices from 0.1-4 US\$ per shell. These species reflect low market demand and abundance in nature. A total of 24 % of the gastropods, 11 % of the bivalves, and 2 cephalopod species would cost 4-40 US\$ per shell reflecting high market demand and a certain degree of rarity in nature. Some rare gastropods carried price tags of 4.000 US\$ or more per shell. This price group presumably contained the endangered species, but few facts are available. Unsolved problems in regard of sustainable yields and management plans are discussed.

INTRODUCTION

Mollusc flesh provides cheap protein for coastal people. Quantities of shells are used for lime production and for making decorative items. A number of species are considered to have magical, sacred or medicinal properties. Collection of shells as a hobby is popular among amateur conchologists and tourists. A parallel revival is the shell craft industry and the use of natural materials such as shells for jewellery has also become apparent (Wells 1981). In consequence, the demand for molluscs is ever increasing. Mollusc resources from all marine coastal habitats, and some offshore taxa, are utilized. The latter comprises bycatch from trawlers.

The purpose of this paper is to give information on mollusc species currently marketed in Phuket province. The environmental impact and management of mollusc resources are also discussed.

MATERIALS AND METHODS

Information was obtained from shell shops, shell dealers, fishermen and the customs in Phuket province during March and April 1994. Photographs were taken of shells which could not be readily identified, and subsequently identified at Phuket Marine Biological Center, using the following literature: Tantanasiwong

1978, 1979; Nielsen 1976; Nateewathana *et al.* 1981; Abbott 1991; Abbott & Dance 1986; Dance 1990; Springsteen & Leobrera 1986; Da Motta & Lenavat 1979; Dharma 1988, 1992; Burgess 1985.

RESULTS

A total of 225 species representing 56 families were found. Gastropods dominated (174 spp.) followed by bivalves (47 spp.), cephalopods (3 spp.) and scaphopods (1 sp.). Table 1 shows the value of shells divided into the 3 classes: expensive shells, medium price level, and cheap shells. Most shells are cheap, sold at 0.1 to 4 US\$ per shell (57 % of the gastropods, 87 % of the bivalves, one cephalopod and the scaphopods). The medium price level is also dominated by gastropods (24 %, followed by 11 % of the bivalves, and the remaining 2 cephalopods). Only one bivalve can be considered expensive. The rest of the expensive shells were gastropods, of which a few were really expensive with a price tag of 4.000 US\$ or more per shell. The expensive species are sold to amateur conchologists for personal use or to museum collections. Previous studies about this trade have been carried out by Sudara & Nateekarnchanalarp (1988); Aungtonya & Tantichodok (1991); Aungtonya & Khokiattiwong (1992), and Aungtonya & Hylleberg (1992).

Table 1. Mollusc species sold in Phuket Province in 1994. The material is listed according to decreasing commercial value. Taxa are shown alphabetically at the levels of class (bold), family (capital letters), and species.

Value of >1,000-200,000 Baht (> 40-8,000 US\$)

Bivalvia

SPONDYLIDAE *Spondylus regius*

Gastropoda

CASSIDAE *Cypraeassis rufa*

CONIDAE *Conus abonatalis*, *C. aurisianus*, *C. bengalensis*; *C. bullatus*, *C. cervus*, *C. culubrinus*, *C. gloriamaris*, *C. moluccensis*, *C. pennaceus*, *C. phuketensis*, *C. ranonganus*, *C. samasensis*; *C. thailandis*, *C. vicweei*

CYPRAEIDAE *Cypraea amadis*, *C. auratium*, *C. cylindrica*,

C. eglantina, *C. guttata*, *C. leucodon*, *C. marginata*, *C. mus*

HARPIDAE *Harpa articularis*

VOLUTIDAE *Volutoconus bednalli*

Value of >100-1,000 Baht (> 4-40 US\$)

Cephalopoda

ARGONAUTIDAE *Argonauta argo*

NAUTILIDAE *Nautilus pompilius*

Bivalvia

PTERIIDAE *Pinctada maxima*

SPONDYLIDAE *Spondylus varians*

TRIDACNIDAE *Tridacna crocea*, *T. maxima*, *T. squamosa*

Gastropoda

ANGARIDAE *Angaria vicdani*

CASSIDAE *Cassis cornuta*

CONIDAE *Conus lynceus*, *C. marmoratus*, *C. neptunus*, *C. nobilis*, *C. omaria*, *C. parius*, *C. pertusus*, *C. urashimanus*, *C. virgo*, *C. zonatus*

CYMATIDAE *Distorsio anus*, *Charonia tritonis*

CYPRAEIDAE *Cypraea argus*, *C. lynx*, *C. mappa*, *C. onyx*

EPITONIIDAE *Epitonium scalare*

FASCIOLARIIDAE *Pleuroploca filamentosa*, *P. trapezium*

HALIOTIDAE *Haliotis iris*

HARPIDAE *Harpa harpa*, *H. major*

MELONGENIDAE *Syrinx aruanus*

MITRIDAE *Mitra mitra*, *M. stictica*

MURICIDAE *Chicoreus brunneus*, *C. palmarosae*, *C. ramosus*, *C. torrefactus*, *Haustellum haustellum*, *Homalocantha zamboi*, *Murex pecten*, *Pterynotus elongatus*, *Siratus alabaster*

STROMBIDAE *Lambis crocata*, *L. lambis*; *Strombus latissimus*, *S. listeri*, *Tibia fusus*

TEREBRIDAE *Terebra areolata*, *T. maculata*, *T. subulata*

TRIVIDAE *Trivia radians*

TROCHIDAE *Trochus niloticus*

TURBINIDAE *Turbo marmoratus*

VOLUTIDAE *Cymbiola nobilis*, *Melo amphora*, *M. melo*

Value of 3-100 Baht (0.12-4 US\$)

Cephalopoda

SPIRULIDAE *Spirula spirula*

Bivalvia

ANOMIIDAE *Placuna placenta*

ARCIDAE *Arca ventricosa*, *Barbatia amygdalumtostum*

CARDIIDAE *Corculum cardissa*, *Fragum fragum*, *F. unedo*,

Laevicardium attenuatum, *Trachycardium flavum*, *T. enode*

CHAMIDAE *Chama brasica*, *C. lazarus*

CUCULLAEIDAE *Cucullaea labiata*

DONACIDAE *Hecuba scortum*

LIMIDAE *Lima lima*

MACTRIDAE *Macra violacea*, *Siliqua radiata*

MYTILIDAE *Perna viridis*, *Septifer bilocularis*

OSTREIDAE *Lopha cristagalli*

PECTINIDAE *Amusium pleuronectes*, *Chlamys lentiginosa*,

C. senatoria, *Cryptopecten pallium*, *Lissopecten hyatinus*,

PHOLADIDAE *Pholas orientalis*

PINNIDAE *Atrina pectinata*, *A. vexillum*, *Pinna bicolor*

PTERIIDAE *Pinctada margaritifera*, *Pterea penguin*

SPONDYLIDAE *Spondylus versicolor*

TELLINIDAE *Phyllososa foliacea*

TRIDACNIDAE *Hippopus hippopus*

VENERIDAE *Asaphis violascens*, *Circa scripta*, *Gafrarium*

pectinatum, *G. tumidum*, *Paphia alapapilionis*, *P. gallus*,

Pteryglypta peurpera, *Tapes litterata*

Gastropoda

ACMAEIDAE *Patelloida saccharina*

ANGARIDAE *Angaria delphinus*, *A. nebulosa*

ARCHITECTONICIDAE *Architectonica maxima*, *A. perspectiva*

BUCCINIDAE *Babylonia areolata*, *B. spirata*

BURSIDAE *Bursa elegans*, *B. rana*

CASSIDAE *Phalium bandalum*, *P. bisulcatus*, *P. glaucum*

CERITHIIDAE *Cerithium nodulosum*, *Rhinoclavis vetagus*.

CONIDAE *Conus glaucus*, *C. memiae*, *C. textile*

CYMATIIDAE *Cymatium caudatum*, *C. hepaticum*, *C.*

lоторium, *C. muricinum*, *C. peryi*, *C. pyrum*, *C. rubeculum*, *Distorsio reticulatus*

CYPRAEIDAE *Cypraea arabica*, *C. chinensis*, *C. cicercula*,

C. gangranosa, *C. mauritiana*, *C. moneta*, *C. nivosa*, *C. nu-*

cleus, *C. stolidus*, *C. teres*, *C. tigris*, *C. walkeri*

FASCIOLARIIDAE *Fusinus colus*, *F. nicobaricus*

FICIDAE *Ficus gracilis*, *P. subintermedius*

HALIOTIDAE *Haliotis asinina*, *H. ovina*, *H. varia*

MARGINELLIDAE *Marginella elegans*, *M. striagata*, *M. tricineta*, *M. ventricosa*

MELONGENIDAE *Hemifusus ternatanu*, *Pugilina cochlidium*

MURICIDAE *Drupa morum*, *Mancinella mancinella*, *Murex occa*, *M. trapa*, *Rapana rapiformis*, *Thais hippocas-tantum*

NATICIDAE *Natica vitellus*, *Polinices didyma*

NERITIDAE *Neritina communis*, *Nerita albicilla*, *N. chaemaeleon*, *N. maxima*, *N. polita*, *N. undata*

OLIVIDAE *Oliva annulata*, *O. oliva*, *O. carneola*, *O. tessellata*, *O. reticulata*, *O. sericea*

OVULIDAE *Phenacovolva birostris*, *P. longirostrata*, *Ovula ovum*, *Volva volva*

POTAMIDAE *Telescopium telescopium*

PATELLIDAE *Cellana testudinaria*

STROMBIDAE *Strombus canarium*, *S. decorus*, *S. luhuanus*, *S. marginatus*, *S. vittatus*, *Lambis chiragra*, *L. scorpius*

TROCHIDAE *Clanculus margaritarius*, *Monodonta canalicifera*, *M. labio*, *Trochus maculatus*, *Tectus pyramis*

TURBINIDAE *Guildfordia triumphans*, *Stellaria solaris*, *Turbo argyrostomus*, *T. bruneus*, *T. petholatus*

TURRITELLIDAE *Turritella terebra*

VASSIDAE *Vasum turbinellum*

XENOPHORIDAE *Stellaria solaris*, *Xenophora chinensis*, *X. pallidula*

Scaphopoda

DENTALIDAE *Dentalium apricum*, *D. octangulatum*

DISCUSSION

Identification of tropical sea shells is fraught with difficulties because of unknown and wide variation between individuals of many species. In addition, systematic revision of most sea shell families is highly needed. The exporters and importers use trade names, so the species lists can not be trusted for scientific purposes. This limits the information on the exported and imported species. Furthermore, the species sold in Phuket encompassed both Thai and imported shells, so it is difficult to be specific about the quantity obtained from local areas.

Specific mollusc research

Status and protection strategy of Phuket's coral reefs, their uses and economic significance have been studied by Lemay and Chansang (1989), and management plans for the exploitation of coral reef resources have been drafted for Thailand (OEPP 1992). However, very little information exists on the coral reef inhabitants. Hence, possible environmental impact of shell collecting will remain somewhat speculative until biologists have addressed the problems. The selective removal of certain species of molluscs can have indirect effects on other animals and plants within the coral reef although these effects may not be immediately obvious. The balance of communities within the coral reefs may be tipped if an organism responsible for main-

taining that balance is removed by intensive fishing. Along this line of thinking, it has been hypothesized that removal of triton snails, *Charonia tritonis*, which feed on *Acanthaster planci*, may lead to outbreaks of the latter species.

There is a need for inventory work on mollusc diversity of Thailand. Although there is no evidence that commercial collection has yet caused extinction of any marine mollusc species, the current heavy demand and the considerable number of reports on depleted populations give cause for concern. For example the bivalves *Tridacna gigas*, harvested for food (Brownell & Berg 1978), and *Trochus niloticus*, harvested for mother-of-pearl (Rao 1937), can illustrate the case with which even very fecund species can be over-exploited. But generally, by virtue of their high potentials for reproduction and spreading, marine molluscs are able to withstand high levels of harvest by man. Therefore, it is very unlikely that mollusc species could be collected to total extinction in general, but this could certainly happen to local genetic forms. And it should be noted that species which are unable to disperse by planktonic larvae, may go extinct when over-exploited. A conservation plan for endangered, threatened and/or vulnerable species should be considered as well as broodstocks should be maintained in sanctuaries.

Molluscs are important natural resources in many developing countries and contribute significantly to local economies. But it remains to determine sustainable yields for precious and semi-precious sea shells of Thailand. Quotas and minimum size limits for collection have not been established. The establishment of marine reserves may play an important role in the management of shell resources by ensuring protection of breeding populations. The main priority, however should be the provision of basic data on taxonomy, ecology and population biology of molluscs so proposals for proper management plans can be drafted.

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