

**A REVISED CHECKLIST OF THE PENAEOIDEA
(CRUSTACEA: DECAPODA)
FROM THE WATERS AROUND TAIWAN**

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ABSTRACT. - Five families, 35 genera and 107 species of Penaeoidea prawns occurring in the waters around Taiwan are listed, including 43 of them being new records of the area and four exotic *Penaeus* species introduced for aquaculture purpose. The species recorded are found from the estuaries to about 2,000m deep. The number of penaeoid species now reported from Taiwan and adjacent areas is almost doubled than previous records. With the advance in deep-water fishing gear and the use of new research vessels, it is highly likely that further records in this area will be made as exploration continues.

KEY WORDS. - Penaeoidea, Checklist, Taiwan.

INTRODUCTION

Penaeoid prawns are widely distributed in tropical and subtropical waters, from estuarine areas to the bathyal zone of several thousand meters. There are some 400 species of penaeoid shrimps now known in the world (Holthuis, 1980; Dall et al., 1990; Pérez Farfante & Kensley, 1997; Chan, 1998). They are generally of high economic importance and also form the major basis of the commercial fisheries in Taiwan (Lee & Yu, 1977; Yu & Chan, 1986). The annual world catch of shrimps and prawns in 1995 was 3.19 million metric tons, with penaeoid prawns consisting of 1.81 million metric tons or 56.8% of the total catch (FAO Yearbook,

1997). In Taiwan, the total production of shrimps and prawns in 1996 (including fisheries and aquaculture) were 57,082 metric tons, amongst them 24,080 metric tons or 42.2% of the total catch were penaeoid prawns and this worth some NT\$ 5.6 billion dollars (Taiwan Fisheries Bureau, 1997).

The penaeoid prawn fauna of Taiwan was firstly reported by Maki & Tsuchiya (1923), which recorded 1 family and 15 species. Chang (1965) later reported four more penaeoid species in his guide to the edible crustaceans of Taiwan. Lee & Yu (1977) was the first serious taxonomic report on the penaeoid prawns of Taiwan and they described one family, 13 genera and 41 species in details. The most recent account on the penaeoid fauna of Taiwan was by Yu & Chan (1986), which illustrated in color four families, 15 genera and 54 species. However, the use of new research vessels and more fishing gears (mainly deep-sea mid-water and bottom trawls) by the Taiwan Fisheries Research Institute in the last few years have discovered many more unrecorded penaeoid species from Taiwan and Dungsha Dao (Pratas) in the South China Sea. The present report lists all the species of penaeoids that have been collected from Taiwan and Dungsha Dao. Following the classification scheme proposed by Pérez Farfante & Kensley (1997), the list now comprises of five families, 35 genera and 107 species. Amongst them 43 species are new records of the area. The list also includes four exotic *Penaeus* species that have been introduced to Taiwan from mainland China and Central America for aquaculture purpose.

MATERIALS AND METHODS

The collecting gears mainly used by the research vessels of the Taiwan Fisheries Research Institute were three different types of coarse-meshed bottom trawl (i.e. type A-35, A-10, and beam-trawl). Additionally, two types of biological dredges (i.e. Kahlscio No. 215WA100

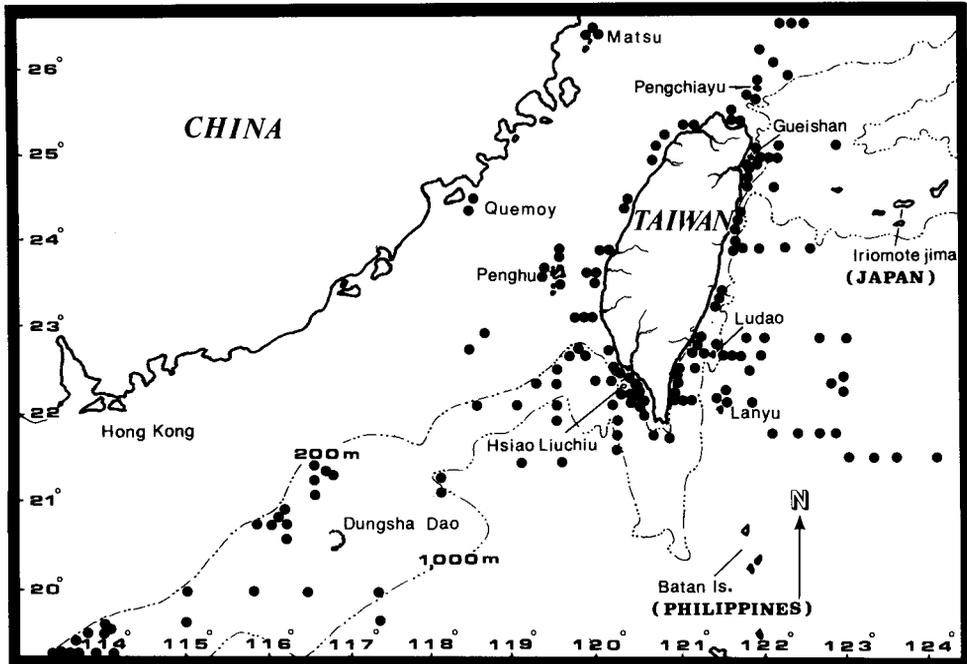


Fig. 1. The sampling stations of the research vessels of the Taiwan Fisheries Research Institute for collecting penaeoids.

and Kanda No. 5107-C) were also used for collecting benthic species. For those pelagic species, different types of macroplankton and micronekton samplers were employed, including one multiple rectangular midwater trawl (RMT 1+8M), Isaacs-Kidd mid-water trawls (IKMT's, three models: 6 ft, 10 ft, and 15 ft), one ORI net (ORI-200) and a Bongo net. During net sampling, baited wire traps were often set for catching species dwelling steep and rough sea floor. All the sampling devices mentioned above were equipped with a set of depth-and-height sensors (Scanmar 400, Simrad ITI) to accurately determine the real depth of the gears deployed. The sampling stations are showed in Fig. 1, with the sampling depths ranging from the sea surface to a maximum depth of 2000 meters. Other than using research vessels, specimens were regularly collected by the National Taiwan Ocean University from the fishing ports of coastal trawlers that operated on daily basis and with the fishing areas close to the shore. The specimens are deposited at the Department of Marine Fisheries, Taiwan Fisheries Research Institute, Keelung (TFRI) and the National Taiwan Ocean University, Keelung (NTOU), with the former institution chiefly housing those specimens collected by research vessels while the latter mainly keeping those material obtained from the fishing ports.

A LIST OF PENAEOIDEA FROM TAIWAN AND ADJACENT AREAS

(▲: New record, △: Exotic species introduced for aquaculture)

FAMILY ARISTAEIDAE WOOD-MASON, 1891

Genus *Aristeomorpha* Wood-Mason, 1891

A. foliacea (Risso, 1827)

Genus *Aristaeopsis* Wood-Mason, 1891

▲ *A. edwardsiana* (Johnson, 1867)

Genus *Aristeus* Duvernoy, 1840

▲ *A. mabahissae* Ramadan, 1938

▲ *A. pallidicauda* Komai, 1993

A. virilis (Bate, 1881)

Genus *Hemipenaeus* Bate, 1881

▲ *H. carpenteri* Wood-Mason, 1891

Genus *Hepomadus* Bate, 1881

▲ *H. glacialis* Bate, 1881

Genus *Parahepomadus* Crosnier, 1978

▲ *P. vaubani* Crosnier, 1978

Genus *Plesiopenaeus* Bate, 1881

▲ *P. coruscans* (Wood-Mason, 1891)

Genus *Pseudaristeus* Crosnier, 1978

▲ *P. crassipes* (Wood-Mason, 1891)

FAMILY BENTHESICYMIDAE WOOD-MASON, 1891

Genus *Bentheogennema* Burkenroad, 1936

▲ *B. intermedia* (Bate, 1888)

Genus *Benthesicymus* Bate, 1881

▲ *B. investigatoris* Alcock & Anderson, 1899

Genus *Gennadas* Bate, 1881

▲ *G. bouvieri* Kemp, 1909

▲ *G. capensis* Calman, 1925

- ▲ *G. incertus* (Balss, 1927)
- ▲ *G. parvus* Bate, 1881
- ▲ *G. propinquus* Rathbun, 1906
- ▲ *G. scutatus* Bouvier, 1906
- ▲ *G. tinayrei* Bouvier, 1906

FAMILY SICYONIIDAE ORTMANN, 1898

Genus *Sicyonia* A. Milne-Edwards, 1830

- S. curvirostris* Balss, 1913
- ▲ *S. fallax* De Man, 1907
- S. formosa* Chan and Yu, 1985
- S. inflexa* (Kubo, 1949)
- S. japonica* Balss, 1914
- S. lancifer* (Olivier, 1811)
- ▲ *S. ocellata* Stimpson, 1860
- ▲ *S. sp.1**
- ▲ *S. sp.2**
- ▲ *S. sp.3**
- ▲ *S. sp.4** (*these species are being studied by A. Crosnier in a revision of the genus)

FAMILY SOLENOCERIDAE WOOD-MASON, 1891

Genus *Cryptopenaeus* De Freitas, 1979

- ▲ *C. clevai* Crosnier, 1985

Genus *Hadropenaeus* Prez Farfante, 1977

- ▲ *H. lucasii* (Bate, 1888)

Genus *Haliporoides* Stebbing, 1914

- H. sibogae* (De Man, 1907)

Genus *Haliporus* Bate, 1881

- ▲ *H. taprobanensis* Alcock et Anderson, 1899

Genus *Hymenopenaeus* Smith, 1882

- H. aequalis* (Bate, 1888)
- ▲ *H. halli* Bruce, 1966
- ▲ *H. neptunus* (Bate, 1881)
- ▲ *H. propinquus* (De Man, 1907)

Genus *Mesopenaeus* Prez Farfante, 1977

- ▲ *M. brucei* Crosnier, 1986
- M. mariae* Prez Farfante and Ivanov, 1982

Genus *Solenocera* Lucas, 1849

- S. alticarinata* Kubo, 1949
- S. comata* Stebbing, 1915
- S. crassicornis* (H. Milne-Edwards, 1837)
- S. faxoni* De Man, 1907
- S. koelbeli* De Man, 1911
- S. melantho* De Man, 1907
- S. pectinata* (Bate, 1888)
- ▲ *S. pectinulata* Kubo, 1949
- ▲ *S. spinajugo* Hall, 1961
- ▲ *S. utinomii* Kubo, 1951

FAMILY PENAEIDAE RAFINESQUE, 1815

Genus *Atypopenaeus* Alcock, 1905

A. stenodactylus (Stimpson, 1860)

Genus *Fenneropenaeus* Prez Farfante, 1969

△ *F. chinensis* (Osbeck, 1765)

F. indicus (H. Milne-Edwards, 1837)

△ *F. merguiensis* (De Man, 1888)

F. penicillatus (Alcock, 1905)

Genus *Funchalia* Johnson, 1867

▲ *F. sagamiensis* Fujino, 1975

▲ *F. taaningi* Burkenroad, 1940

Genus *Litopenaeus* Prez Farfante, 1969

△ *L. stylirostris* (Stimpson, 1847)

△ *L. vannamei* (Boone, 1931)

Genus *Marsupenaeus* Tirmizi, 1971

M. japonicus (Bate, 1888)

Genus *Megokris* Prez Farfante & Kensley, 1997

M. pescadoreensis (Schmitt, 1931)

Genus *Melicertus* Rafinesque-Schmaltz, 1814

M. canaliculatus (Olivier, 1811)

M. latisulcatus (Kishinouye, 1896)

M. longistylus (Kubo, 1943)

M. marginatus (Randall, 1840)

Genus *Metapenaeopsis* Bouvier, 1905

M. acclivis (Rathbun, 1902)

M. barbata (De Haan, 1844)

M. ceylonica Starobogatov, 1972

M. commensalis (Borradaile, 1898)

M. dalei (Rathbun, 1902)

M. dura Kubo, 1949

M. lamellata (De Haan, 1844)

M. lata Kubo, 1949

▲ *M. liui* Crosnier, 1987

M. mogiensis intermedia Crosnier, 1991

M. palmensis (Haswell, 1879)

M. provocatoria longirostris Crosnier, 1987

Genus *Metapenaeus* Wood-Mason, 1891

M. affinis (H. Milne-Edwards, 1837)

▲ *M. elegans* De Man, 1907

M. ensis (De Haan, 1844)

M. intermedius (Kishinouye, 1900)

M. joyneri (Miers, 1880)

M. moyebi (Kishinouye, 1896)

M. tenuipes Kubo, 1949

Genus *Miyadiella* Kubo, 1949

▲ *M. podophthalmus* (Stimpson, 1860)

Genus *Parapenaeopsis* Alcock, 1901

P. cornuta (Kishinouye, 1900)

P. cultrirostris Alcock, 1906

P. hardwickii (Miers, 1878)

- P. hungerfordi* Alcock, 1905
▲ *P. sinica* Liu and Wang, 1987
P. tenella (Bate, 1888)
▲ *P. venusta* De Man, 1902
- Genus *Parapenaeus* Smith, 1885**
▲ *P. australiensis* Dall, 1955
P. fissuroides fissuroides Crosnier, 1986
P. fissurus (Bate, 1881)
P. lanceolatus Kubo, 1949
P. longipes Alcock, 1905
P. murrayi Ramadan, 1938
P. sextuberculatus Kubo, 1949
- Genus *Penaeopsis* Bate, 1881**
P. eduardoi Prez Farfante, 1977
P. rectacuta (Bate, 1881)
- Genus *Penaeus* Weber, 1795**
P. monodon Fabricius, 1798
P. semisulcatus De Haan, 1844
- Genus *Trachypenaeus* Alcock, 1901**
T. anchoralis (Bate, 1881)
- Genus *Trachysalambria* Burkenroad, 1934**
▲ *T. albicomus* (Hayashi & Toriyama, 1980)
T. curvirostris (Stimpson, 1860)
▲ *T. longipes* (Paulson, 1875)

DISCUSSION

At present about 387 species are described in the superfamily Penaeoidea (Pérez Farfante & Kensley, 1997). The number of species now found around the waters of Taiwan is 107, which is 27.6% of that of the world species. This is considerably higher than the 84 species reported from the coast of Mainland China (Liu & Zhong, 1994) and the 86 species recorded in Japan (Hayashi, 1992). Moreover, the number of species in each family is higher in Taiwan than both Mainland China and Japan, except for the family Benthescymidae which the number of species recorded in Japan is slightly higher.

It is highly likely that some more species and genera still await to be discovered from Taiwan. For example, the genera *Heteropenaeus* and *Trachypenaeopsis* are widely distributed in the Indo-West Pacific but have not yet been found from Taiwan. These two genera are small and inhabit reef areas, thereby not easy to notice and collect. On the other hand, several widely distributed genera from very deep waters such as *Benthonectes* and *Gordonella* likely also occur in Taiwanese waters. Undoubtedly further records in this area will be made as exploration continues, but the number of species adding to the present list is likely not high.

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