

NEW RECORDS OF TEREDINIDAE (BIVALVIA: PHOLADACEA) FROM NORTHERN SULAWESI, INDONESIA

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ABSTRACT

Five species of Teredinidae were collected in Likupang waters, northern Sulawesi: *Bankia martensi*, *Nototeredo edax*, *Teredothyra matocotana*, *Teredothyra excavata* and *Teredothyra smithi*. They are all new records. They are described and illustrated.

INTRODUCTION

Important taxonomic studies of teredinids from Indonesian waters and adjacent areas have been done by Roch (1955, 1961) and Roch & Moll (1931). Another contribution came from the Siboga Expedition, which took place in eastern Indonesia. Three specimens were obtained in the Sulawesi Sea. Unfortunately, the pallets were not present and the shells were incomplete (Prashad 1931). Therefore, the names of those specimens remain doubtful. Furthermore, Suhirman & Eaton (1984) and Yulianda (1996, 1997) have studied teredinids and their impact on economical interests of human installations in the sea. In North Sulawesi, a descriptive and illustrative work on shipworms was carried out by Boneka & Mamangkey (1997). They collected eighteen species from experimental panels and natural woods. Nevertheless, many questions concerning teredinids from Indonesian waters remain unanswered. We studied teredinids in three different kinds of woods submersed in the sea at the Wet Laboratory of Marine Science, Likupang-Minahasa for six months. The aim of this paper is to describe 5 new records obtained during that study. Temperature and salinity varied from 27-30 °C and 30-32 ‰ respectively. The bottom sediment consisted of muddy sand.

MATERIALS AND METHODS

We used three kinds of economically

important wood; "gofasa" (*Vitex coffasus* Roinw), "dansa" (*Nauclea celebica* Hav), and "gofasa batu" (*Vitex* sp.) obtained from the local shipping industry. Fourteen 20x20x3 cm panels of each type of wood were placed at two depths: one half of the panels 0.5 m below the surface and the other half 0.5 m above the bottom.

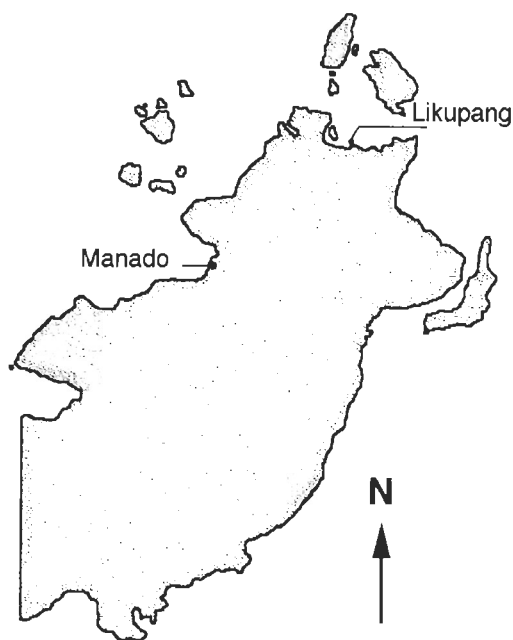


Figure 1. The study area north-east of Manado.

Specimens were collected from the panels after six months following the method described by Boneka & Mamangkey (1997). Characters of the pallets were used for identification of the species. Pallets were examined and illustrated with the aid of a camera lucida and a computer programme for image processing (Photoshop).

SYSTEMATIC ACCOUNT

Teredothyra matocotana (Bartsch, 1927)

Synonyms from Turner (1971):

Teredo (*Ungoteredo*) *chamberlaini* Bartsch, 1927

Teredo (*Ungoteredo*) *pujadana* Bartsch, 1927

Teredo uniguiculata Roch, 1935

Material examined : 1 pair of pallets from "dansa".

Locality: Likupang, North Sulawesi

Diagnosis: Basal cup with a second medially divided cup inserted, stalk of pallet extending into blade only at the base of the inner cup. Blade wider than long (Turner

1971).

Description : Blade triangular, white. The distal portion is covered with periostracum, more concave on the outer face than the inner one. A cleft dividing the cup. Inner face has a ridge from the basal blade to the distal portion; concave surface on both sides of the ridge; it is clear in adult specimens. Stalk of pallet extending into blade only to the base of the inner cup. Border between blade and stalk unclear.

Remarks: *D. manni* has a triangular blade like *T. matocotana* but it does not have a cleft dividing the cup at the distal portion. Distal lips of blade on the outer face of young specimen is more depressed and makes it different from *Teredo johnsoni* Clapp. The cleft on the young specimens will be narrower when they become adult.

Teredothyra excavata (Jeffreys, 1860)

Synonyms from Turner (1971):

Teredo tritubulate Moll, 1941

Teredo (*Teredothyra*) *linearis* Nair, 1955

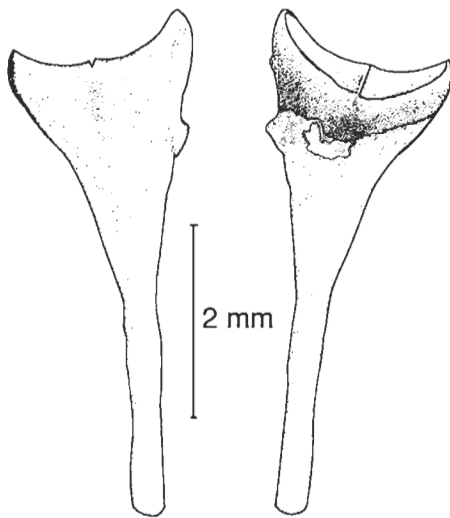


Figure 2. *Teredothyra matocotana* (Bartsch, 1927); A. Inner face of pallet, B. Outer face of pallet.

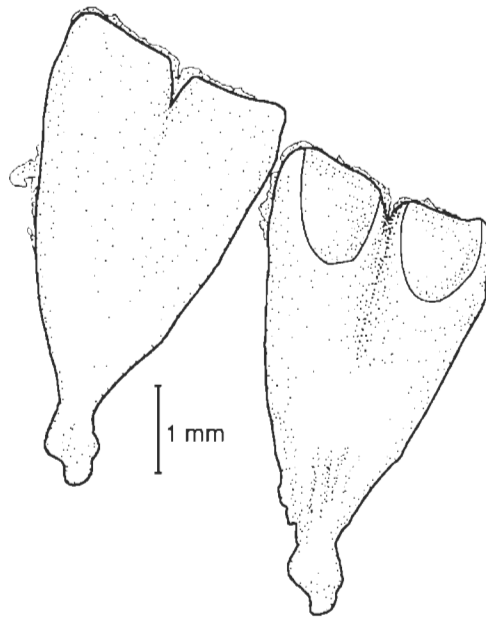


Figure 3. *Teredothyra excavata* (Jeffreys, 1860); A. Inner face of pallet, B. Outer face of pallet.

Teredo (Teredothyra) palauensis

Edmondson, 1959

Teredo (Teredothyra) subicensis

Edmondson, 1959

Teredo (Bitubuloteredo) bitubula Li Kie'-

Min, 1965

Teredo (Teredothyra) remiformis Li Kie'-

Min, 1965

Material examined : 1 pair of pallets from "dansa".

Diagnosis: Distal margin on inner face of pallet nearly straight. Margins of two cups deeply U-shaped on the outer face. Basal cup usually clearly visible, much shorter on outer face (Turner 1971).

Description : Blade triangular, milky-white. Distal portion of blade covered by brown to golden brown periostracum. Radiating ribs on the basal blade. Stalk irregular with ring-like attachment, knobby.

***Teredothyra smithi* (Bartsch, 1927)**

Synonyms from Turner (1971):

Teredo (Teredothyra) radcliffei Bartsch, 1927

Teredo (Teredothyra) tanonensis Bartsch, 1927

Teredo (Phylloteredo) lanceolata Moll, 1937

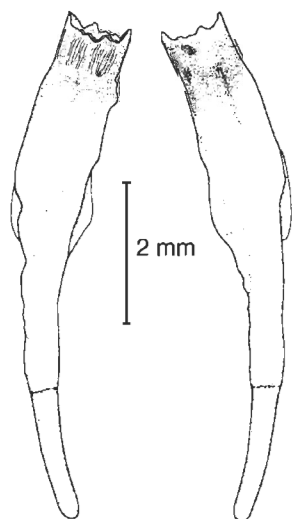


Figure 4. *Teredothyra smithi* (Bartsch, 1927); A, Inner face of pallet, B, Outer face of pallet.

Kuphus (Idioteredo) kiiensis Taki & Habe, 1945

Teredo (Zopoteredo) bengalensis Nair, 1956

Teredo (Nototeredo) nambudalaiensis Nair & Gurumani, 1957

Material examined: 1 pair and 2 pairs of pallets from "gofasa" and "dansa."

Diagnosis: Blade sheathing stalk for a distance about equal to length of the wide portion of blade, stalk thin, curved, tapering. Blade thin, stalk showing as rib, distal margin usually with periostracal border (Turner 1971).

Description: Pallet symmetric. Outer face of blade convex but the inner one concave. A longitudinal ridge on the median part, starting from the basal blade, after the sleeve, to the distal part of the inner face; a longitudinal sulcus on the outer face of the blade. Distal part covered by brown periostracum.

Remarks: The periostracal part may be missing in worn pallets; then it will easily be confused with *Teredo fulleri* Clapp.

***Nototeredo edax* (Hedley, 1895)**

Synonyms from Turner (1971a):

Teredo apendiculata Sivickis, 1928

Teredo hydei Sivickis, 1928

Nototeredo remifer Iredale, 1932

Psiloteredo (Phylloteredo) kirai Taki & Habe, 1945

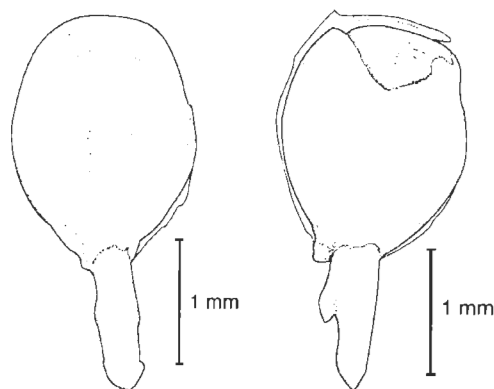


Figure 5. *Nototeredo edax* (Hedley, 1895); A, B, Outer face of pallets.

Psiloteredo (Psiloteredo) pentagonalis Taki & Habe, 1945

Psiloteredo (Phylloteredo) yakushimae Habe, 1952

Teredo (Dactyloteredo) juttingae Roch, 1955

Teredo (Psiloteredo) toniensis Nair & Gurumani, 1956

Material examined : 4 pairs and 3 pairs of pallets from "gofasa" and "dansa".

Diagnosis: Pallet paddle-like, tapering proximally, more elongate and parallel sided. Excurrent siphon with two short, stout tentacles set back from the aperture, and numerous small ones around aperture (Turner 1971).

Description: Pallet milky-white, or slightly brown at distal part, short stalk. Blade slightly tapering proximally, convex at the outer face and concave at the inner one. Outer face with moderate thumbnail-like depression at distal portion of blade. Fused segments can be seen in wet specimen when examined with transmitted light.

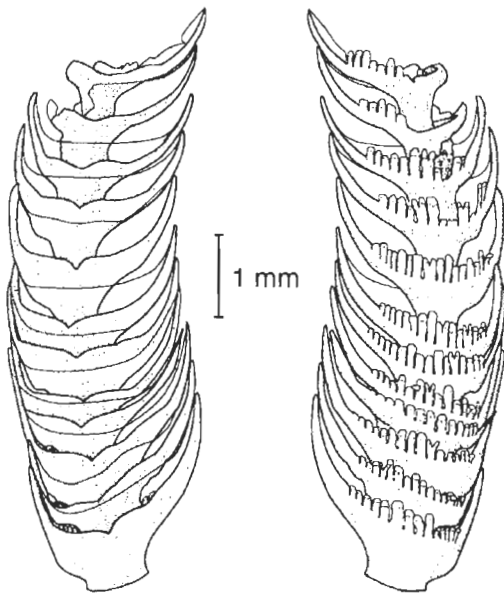


Figure 6. *Bankia martensi* (Stempell, 1899); A. Inner face of distal half portion of pallet, B. Outer face of distal half portion of pallet.

***Bankia martensi* (Stempell, 1899)**

Synonyms from Turner (1971):

Xylotra capensis Calman, 1923

Bankia (Bankia) chiloensis Bartsch, 1923

Bankia odhneri Roch, 1931

Bankia argentinica Moll, 1935

Bankia valparaisensis Moll, 1935

Material examined : 8 pairs and 20 pairs of pallets from "gofasa" and "dansa" respectively.

Diagnosis: Serration fine on outer face; web connecting awns entirely of periostracum (Turner 1971).

Description: Calcareous portion extending into the serrations. Awns of each lateral cone are connected by a web (transparent periostracum) on the inner face, smooth. Stalk smooth or with pustules. Pallet white to golden brown. Growth of cones tend to be wider than long.

DISCUSSION

Bankia martensi had a high number of individuals in both "dansa" (*Nauclea celebica* Hav) and "gofasa" (*Vitex coffasus* Roinw). In general, the new teredinids occurred in *Nauclea celebica*. None of them were found in "gofasa batu" (*Vitex* sp.)

We found three species of the *Teredothyra* in *Nauclea celebica*. These species were not recorded by Boneka & Mamangkey (1997), probably because they used softwood (*Cananga* sp.) instead of hardwood as we used.

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