A new extant *Barbatia* species from the Philippines (Bivalvia, Arcidae)

by M.C. van Veen, revision 13 January 2021 (original 2017, first revision 2019)

Abstract

*Barbatia abacus* spec. nov. is described from the Philippines, Camotes Islands, Ponson Island.

Keywords: Arcidae, Barbatia, Bivalvia, Camotes Islands, new taxon, Pelecypoda, Philippines, Pilar, Ponson Island, Visayas.

**Taxon**

Class: Bivalvia  
Superfamily: Arcoidea  
Family: Arcidae Lamarck, 1809  
Genus: *Barbatia* Gray, 1842  
Species: *abacus* spec. nov.

Introduction

The Philippines is well known for its rich biodiversity, and many *Arcidae* species thrive in this archipelago. Currently there are more than 30 extant species of the genus *Barbatia* known worldwide, and a large number of these live in the Indo-Pacific region.

Research regarding *Arcidae* species is limited and taxonomic knowledge can be regarded as highly specialised, because few people have studied this family thoroughly. Also, collected specimens are often found sporadically and with scattered localities, resulting in limited possibilities regarding study. Often publications remain in the domain of taxonomy and morphology, without much information about habitats or about conclusive species distribution ranges for example.

Both geographical and morphological factors were considered when comparing *Barbatia abacus* spec. nov. to a substantial amount of species in predominantly the genus *Barbatia*.

Method

In general, *Arcidae* is perceived to be a rather difficult family to study. One reason of this difficulty is the common habit to use the most recent publications, which regularly contain taxonomic errors because original publications were not consulted. This can cause a repetition of incorrect identifications.

The source and the validation of an initial error is often not obvious because of an accumulation of information clones throughout the literature. If most of the literature presents a false identification as true, and if the most recent literature is regarded as the most relevant, then there is no incentive to search beyond the seemingly obvious.

Combined with the limited number of early publications with often only basic descriptions and low quality depictions, incorrect identifications based on faulty information clones are a significant source of confusion in *Arcidae* species identification.

Therefore it is of the utmost importance to study the earliest publications in which species were originally described.
Additionally, photographs of type specimens and large numbers of collected specimens can provide a large basis of comparison.

With the consultation of original early works, a comparison was made between the type material of *Barbatia abacus* spec. nov. and several closely related species. This procedure gave the best guarantee that *Barbatia abacus* can be regarded as a truly new species.

Some closely related species in the Philippines are:
*Barbatia trapezina* (Lamarck, 1819) syn.: *Barbatia decussata* (G.B. Sowerby I, 1833)
*Barbatia foliata* (Forsskål in Niebuhr, 1775)
*Barbatia amygadaluntostum* (Röding, 1798)
*Barbatia lacerata* (Bruguère, 1789)

Other Arcidae species that were checked in the literature as well:
*Mesocibota bistrigata* (Dunker, 1866) syn: *Arca obtusa duplicostata* Grabau & King, 1928
*Barbatia hiloa* Dall, Bartsch, Rehder, 1938
*Barbatia molokai* Dall, Bartsch, Rehder, 1938
*Barbatia oahu* Dall, Bartsch, Rehder, 1938 (endemic to Hawaii)
*Barbatia revelata* (Deshayes in Maillard, 1863)
*Barbatia solidula* Dunker, 1868
*Barbatia parvivillosa* (Iredale, 1939)
*Barbatia scazon* (Iredale, 1939)
*Barbatia perinesa* Oliver & Chesney, 1994
*Barbatia pyrrothotus* Oliver & Holmes, 2004
*Mimarcaria diphaeonotus* (Oliver & Holmes, 2004) syn.: *Barbatia diphaeonotus*
*Barbatia stearnsii* (Pilsbry, 1895)
*Barbatia cometa* (Reeve, 1844)
*Barbatia obliquata* (Wood, 1828)
*Barbatia revelata* (Deshayes in Maillard, 1863)
*Barbatia setigera* (Reeve, 1844)
*Barbatia virescens* (Reeve, 1844)
*Calloarca tenella* (Reeve, 1844)
*Barbatia parva* (G.B. Sowerby I, 1833)
*Barbatia platei* (Stempell, 1899)

**Material**

Holotype: length 55.0 mm.
Paratype 1: length 42.5 mm.
Paratype 2: length 22.6 mm.

The holotype and paratype 1 were collected in the Philippines, Camotes Islands, Ponson Island (Pilar municipality), at a depth of 9 meters, in 2004. Paratype 2 was collected in the Philippines, Cebu, off Punta Engano, in tangle nets at 60-90 m depth, 1995. All three shells were purchased in 2017.

Even though there are not any more examples available for study at this time, the morphological differences between these specimens and other *Barbatia* species are evident and consistent. The types of this new species do not show any remarkable intraspecific variation.

**Description**

Shell equivale, white, olive brown lamellate periostracum.
The periostracum has irregular desquamation, most loss evident in the center of the shell.
Shape obliquely oval in lateral view, posterior end markedly higher than the anterior; the dorsal view shows a slender pointed oval shape.
Sculpture on the shell shows isometric growth.
The prosogyrate umbones are situated far on the anterior side, broad and shallow in shape, projecting just above the ligamental area. Ligamental area narrow and V-shaped in anteroposterior view, marked with 10 chevrons. Dorsal edge straight; the ventral edge is almost straight, but somewhat contracted in the center because of the presence of a narrow byssal orifice that is situated slightly toward the anterior. The dorsal and ventral edge do not run parallel, but instead converge slightly in the anterior direction. Both the posterior and anterior end are well rounded, fluently conjoining the dorsal edge at the posterior side, but with a slightly angular connection to the dorsal edge at the anterior side. The hinge is taxodont and the holotype has 20 anterior and 32 posterior teeth. Paratype 1 has 17 anterior and 27 posterior teeth.

The ribs are mostly radial, but some ribs partly developed from the interstices. Some ribs are quasi-radial. The holotype has 33-34 ribs; paratype 1 has 35-36 ribs; paratype 2 has 33-34 ribs. All ribs are covered with small bead-like nodules. The ribs at the posterior end are thickest and look crenulated because of the wide shape of the nodules, and in between are wide interstices from which nodules emerge toward the outer edge. At the anterior end the ribs are also wider than in the central part of the shell, with strong nodules that resemble an abacus. Also here nodules emerge from the interstices. In the central part the ribs are narrower, and towards the posterior some of the central ribs have developed a double or triple row of nodules.

Comparisons

*Barbatia trapezina* ( Lamarck, 1819)
García and Oliver (2008) made a study of several *Barbatia* species, among which *Barbatia decussata*, *Barbatia trapezina* and *Barbatia foliata*. It should be noted that *B. decussata* is officially regarded as a synonym of *B. trapezina*, but there are some differences between the two that might lead to a new definition one day. *Barbatia trapezina* shows great intraspecific variability regarding shape. This variability can result in shells resembling *Barbatia abacus* spec. nov.; especially the *decussata* form tends to have a rounded shape. However, the shells of *Barbatia trapezina* show a different sculpture and different hinge teeth compared to the new species, lacking the characteristic nodules.

Abrard (1941) wrote about Pleistocene fossils that were found in Djibouti, of which five were registered as *Barbatia decussata*. However, the shell depicted in Abrard's book (Muséum National d'Hisoire Naturelle specimen MNHN.F.A26789) shows a sculpture that does not correspond to *Barbatia decussata*. Instead this fossil *Barbatia* specimen closely resembles *Barbatia abacus* spec. nov., even though its hinge teeth seem to have a different configuration. More research would be required to see if this fossil *Barbatia* should be regarded as a new species as well.

*Barbatia foliata* (Forsskål in Niebuhr, 1775)
This species is also variable in shape, but it is quite discernible from *Barbatia trapezina*. *Barbatia foliata* usually has a distinct shape that sets it apart from all other species. Additionally, the ribs and the hinge teeth have a unique configuration.

*Barbatia amygdalumtostum* (Röding, 1798) and 4. *Barbatia lacerata* (Bruguière, 1789) are well known species from the Indo-Pacific region. Both are closely related to *Barbatia abacus* spec. nov., but their shape and sculpture is dissimilar.

The holotype of the Hawaiian *Barbatia hiloa* (USNM 427769) has got a shape that is nearly identical to *Barbatia abacus* spec. nov., but it lacks the nodules on the ribs and it has got far less hinge teeth.
Photographs

All photographs show specimens from my personal collection.

fig. 1 *Barbatia abacus* spec. nov., holotype. 55.0 mm. Different views of the shell.
fig. 2 *Barbatia abacus* spec. nov., holotype. Photo taken without flash.
fig. 3 *Barbatia abacus* spec. nov., holotype. Hinge teeth of both valves.

fig. 4 *Barbatia abacus* spec. nov., paratype 1. 42.5 mm. Different views of the shell.
fig. 5 *Barbatia abacus* spec. nov., paratype 1. Left valve.
fig. 6 *Barbatia abacus* spec. nov., paratype 1. Hinge teeth of the left valve.
fig. 7 *Barbatia abacus* spec. nov., paratype 2. 22.6 mm. Different views of the shell.

fig. 8 *Barbatia trapezina* (Lamarck, 1819), 35 mm. Red Sea, Hurghada, Egypt. Collected/taken in May 1977.
fig. 9 idem. Hinge teeth of right valve.

fig. 10 *Barbatia trapezina* (Lamarck, 1819) form *decussata*. 39 mm. Serui, Yapen, West Papua. Collected in 1958.
fig. 11 idem. Hinge teeth of right valve.

fig. 12 *Barbatia trapezina* (Lamarck, 1819) form *decussata*. 33 mm. Campalabo Islet, Pinamungahan, Cebu, Philippines. Collected in February 2009.
fig. 13 idem. Hinge teeth of the right valve.

fig. 15 idem. Hinge teeth of the right valve.

fig. 16 *Barbatia trapezina* (Lamarck, 1819) form *decussata*. 52 mm. Umldoti, KwaZulu-Natal, South Africa. Collected in Nov. 1982.
fig. 17 idem. Hinge teeth of the right valve.

fig. 18 *Barbatia foliata* (Forsskål in Niebuhr, 1775). 41 mm and 66 mm. Ponson Island, Camotes Islands, Philippines. At 9 m depth in 2004.
fig. 19 idem; 66 mm specimen. Hinge teeth of the right valve.


fig. 21 *Barbatia lacerata* (Bruguière, 1789). 94 mm. Talibon, Bohol, Philippines. At 10-25 m depth in 2016.
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