

**A new genus and species of deep water wood-boring bivalve
(Mollusca, Pholadidae, Xylophaginae)**

by

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The Xylophaginae are marine wood-boring bivalves which are largely confined to depths greater than 150 meters. They are not found in the intertidal zone, occur in the sublittoral only in higher latitudes, and are the sole wood-borers in depths over 200 meters. The greatest known depth for the invasion of test wood by Terediniidae is 200 meters (Tipper, 1968). The known depth range for the Xylophaginae extends from two meters below low tide in Millport, Scotland, to 7290 meters in the Banda Trench, off Ceram. Only occasionally are they found in drift wood, and this is usually after storms, the water logged wood having been lifted off the bottom and carried ashore by strong waves.

The discovery of the new genus and species described here is the result of a world-wide study of the Xylophaginae, a subfamily of the Pholadidae characterized by teredinid-like shells and a small, divided mesoplax. They lack apophyses (as do the Jouannetiinae) and do not produce a callum in the adult stage (as in the Pholadinae). They are unique among the Pholadidae in having a wood-storing caecum.

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Genus *Xylopholas*,¹ new genus

Type species. *Xylopholas altenai*, new species.

Description. Valves typical of subfamily Xylophagainae and indistinguishable from valves of species in *Xylophaga*. Mesoplax of single known species composed of two flat, elongate, triangular, lightly calcified plates held in place by a periostracal membrane. Chimney lacking.

Animal long, not capable of retraction within the valves; that portion of the animal posterior to the valves covered by a periostracal sheath which terminates in a pair of suboval, slightly calcified lateral plates bounded anteriorly by two dorsoventral, collar-like plates. Siphons short, extending between the siphonal plates.

Visceral mass and gills anterior, similar to *Xylophaga*, and contained entirely between the valves (Purchon, 1941; Turner 1969, 1971); the portion of the animal extending beyond the valves composed of a dorsal excurrent canal and a ventral incurrent canal.

Range. The single known species occurs off the Florida Keys in the western Atlantic and off Gabon, Africa, in the eastern Atlantic. The depth ranges from 250 to 2550 meters (see also under the species).

Remarks. The elongation of the animal and the presence of siphonal plates differentiates *Xylopholas* from *Xylophaga*. On the basis of the material at hand, it is impossible to state definitely to what the siphonal plates are related. They appear to function similarly to the siphonoplax in other genera of the Pholadidae (subfamily Martesiinae). With the posterior elongation of the mantle in *Xylopholas* to form the incurrent and excurrent canals, the plates have been carried posteriorly with the periostracal sheath. The siphonoplax in all genera is produced by the mantle margin and is contiguous with the periostracum covering the shell. In *Xylopholas*, as in other genera of the Pholadidae such as *Penitella* and *Pholadidea*, the periostracal covering of the inner surface of the plates is continuous with that covering the siphons, while the periostracum on the outer surface is continuous with the periostracal covering of the valves. The extension of muscular tissue of the mantle into the siphonal plates in *Xylopholas* is unique. In *Penitella* and *Pholadidea* the siphonoplax is attached directly to the valves and does not need special musculature.

The teredo-like appearance of *Xylopholas* suggests that the siphonal plates might be homologous with the pallets of the Teredinidae. This, however, is not the case, as the complicated musculature which operates the siphons and pallets of the Teredinidae is lacking in *Xylopholas*. The burrow in *Xylopholas* is not lined with calcium and the siphonal retractor muscles insert on the inner surface of the anterior, collar-like portion of the siphonal plates, rather than on the lining of the burrow as in the Teredinidae. The siphonal plates are analogous to the pallets of the Teredinidae in that they function to close the burrow when the siphons are retracted.

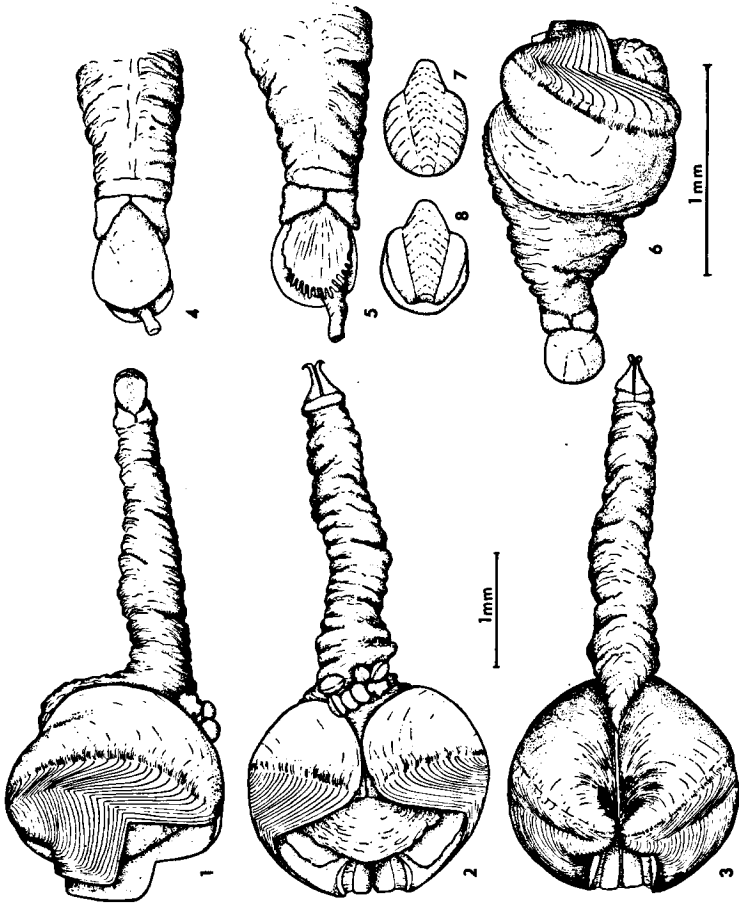
Xylopholas altenai,² new species
figs. 1-12

Holotype. MCZ 279315, R/V *Gerda*, station 66, about 13 miles SE of Fowey Rocks, Florida (25°25'N 79°59'W in 200 fathoms [366 meters]). Five paratypes from the same locality.

Description. Animal elongate with teredinid-like valves and plates at the base of the siphons. Shell globose, reaching 2.5 mm in length and 2.5 mm in height, thin, fragile and with light straw-yellow periostracum. Pedal gape angle about 90°. Beaked portion of anterior slope with numerous, rather evenly spaced, denticulated ridges; anterior margin truncated (fig. 1). Posterior portion of anterior slope about one-half width of beaked portion. Umbonal-ventral sulcus narrow, only slightly impressed. Disc and posterior slope sculptured with fine growth lines.

Inner surface of valves smooth and glistening. Umbonal-ventral ridge low, slightly segmented and rather indistinct, except near ventral margin. Ventral condyle small. Chondrophore and internal ligament well developed. Posterior adductor muscle scar large, only slightly impressed, marked with transverse striations and best seen by locating the muscle on an entire animal. Pedal retractor scar suboval and located just anterior to the posterior adductor scar. Anterior adductor muscle scar covering the small reflection anterior to the umbos. Mesoplax of two flat, elongate-triangular, slightly calcified plates lying on dorsal surface of anterior adductor muscle. Siphonal plates lateral, paddle-shaped, faintly sculptured, slightly calcified and fitting anteriorly against the dorso-ventral collar plates. Siphonal retractors inserting on the basal portion of the siphonal plates (fig. 4).

² Named for Carel O. van Regteren Altena, Rijksmuseum van Natuurlijke Historie, Leiden, in recognition of his many contributions to malacology.



Figs. 1-8. *Xylopholas altenai* new species, *Gerda* station 66, about 13 miles SE of Fowey Rocks, Florida. 1-3. Holotype, 1 - lateral view of entire animal showing siphonal plates and young carried on ventral surface. 2 - ventral view showing the mesoplax held in place by periostracum, the ventrally carried young and the recurving of the siphonal plates. 3 - dorsal view showing the mesoplax in place and the umbonal reflection. 4. Enlargement of posterior end with the incurrent siphon projecting beyond the siphonal plate. 5. Posterior end with left plate removed to show the muscle which extends into the cavity of the plate and the collar-like plate at the proximal end to which the siphonal retractor muscles attach. 6. Lateral view of a very small specimen, contracted anteriorly so that the plates of the mesoplax are folded upward. 7. Outer view of siphonal plate. 8. Inner view of do., showing narrow recurved edge which covers the fringed edge of the muscle.

Measurements.	length	height	
(valves)	2.5 mm	2.5 mm	<i>Gerda</i> , station 266
	2.0 mm	2.1 mm	<i>Gerda</i> , station 266
	1.9 mm	1.8 mm	<i>Gerda</i> , station 66
	1.8 mm	1.8 mm	<i>Gerda</i> , station 66 (holotype)
	1.5 mm	1.4 mm	<i>Galathea</i> , station 52
	1.0 mm	1.0 mm	<i>Atlantique Sud</i> , station 147

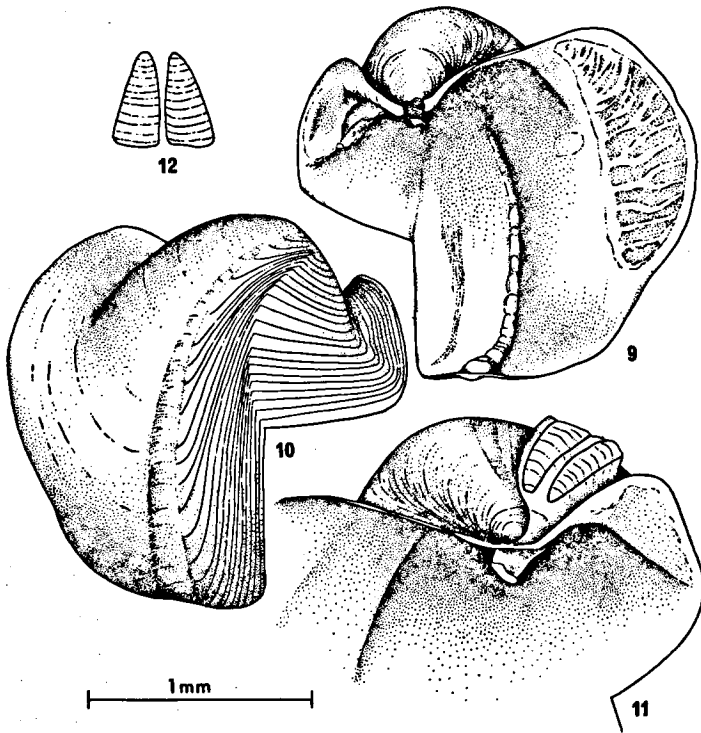
Remarks. The total of 69 specimens obtained were distributed as follows:

<i>Gerda</i> , station 220 - 30	(in wood)
<i>Gerda</i> , station 266 - 23	(in wood)
<i>Gerda</i> , station 66 - 6	(in wood)
<i>Atlantique Sud</i> , station 147 - 6	(in wood)
<i>Atlantique Sud</i> , station 154 - 2	(in wood)
<i>Galathea</i> , station 52 - 2	(in coconut shell)

The valves of many of the specimens were in very poor condition because of the acidity of the wood and fixation in formalin. In addition, several years had elapsed between the time the wood was collected and the time the specimens were removed for study. Though the valves of many of the specimens had partially dissolved, the characteristic elongation of the animal and the siphonal plates readily differentiated them.

On the basis of the valves alone it is difficult to distinguish *Xylopholas altenai* from many species of *Xylophaga*. The simple, flat plates of the mesoplax somewhat resemble those of *Xylophaga concava* Knudsen and *Xylophaga erecta* Knudsen. They differ, however, in being narrow and triangular and in lying flat on the surface of the anterior adductor muscle rather than being semi-circular, curved and standing nearly erect, posterior to the muscle. The posterior adductor muscle scars of the three species are similar in shape and in having transverse striations. *Xylopholas altenai* differs from Knudsen's species in having a heavy periostracal sheath covering the posterior portion of the animal, short siphons and siphonal plates. In addition the young are attached to the ventral surface of the animal just posterior to the valves (figs. 1-2).

As with many species of *Xylophaga*, it appears that the young of *Xylopholas altenai* remain within the burrow of the parent at least to the pediveliger stage. The young attached to the holotype measure 0.5 mm in length.



Figs. 9-12. *Xylopholas altenai* new species, *Gerda* station 66, about 13 miles SE of Fowey Rocks, Florida. 9. Inner view of right valve showing the large posterior adductor scar, the pedal retractor scar, prodissoconch and the ligament. 10. Outer view of do. 11. Inner view of upper part of left valve of a larger specimen to show the chondrophore, the mesoplax in its periostracal membrane, and the attachment area of the anterior adductor muscle. 12. Dorsal view of the two plates of the mesoplax.

Range. Known only from two widely separated localities, off the lower Florida Keys in the western Atlantic, and from off Gabon and São Tome Island, Africa, in the eastern Atlantic. The depth ranges from 250 to 342 meters, with one lot coming from 2550 meters. The specimens from 2550 meters were alive at the time the coconut from which they were taken was dredged, but, as the shelf on São

Tome Island is very narrow, it is possible that the coconut was carried off the shelf into deep water subsequent to infestation.

Specimens examined. Western Atlantic. FLORIDA: *Gerda*, station 266, about 16 miles SE of Miami (25°39'N 79°58'W) in 187 fathoms [342.2 meters]; *Gerda*, station 66, about 13 miles SE of Fowey Rocks (25°25'N 79°59'W) in 200 fathoms [366 meters]; *Gerda*, station 220, about 30 miles S of Alligator Reef (24°25'N 80°33.5'W) in 170 fathoms [311 meters].

Eastern Atlantic. GABON: *Galathea*, station 52 off Port Victoria, São Tome Island (1°42'N 7°51'E) in 2550 meters; *Atlantique Sud*, station 147, about 45 miles N of Port Gentil (0°S 8°58'E) in 250 meters; *Atlantique Sud*, station 154, about 35 miles NE of Port Gentil (0°15'S 8°47'E) in 239 meters.

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