A survey of the genus *Agaronia* in the West African waters, including the description of a new species

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Family OLIVIDAE Latreille, 1825

Subfamily Agaroniinae Olsson, 1956

Genus ***Agaronia*** **J.E. Gray, 1839**

Typetaxon: *Voluta hiatula* Gmelin, 1791

Species of the genus ***Agaronia*** were living on our planet already 60 million years ago. Fossil remains belonging to this group have been found in sediments of the **Eocene period**.

The genus *Agaronia* was already distinguished by **Adanson** (1757) with the term "***Agaron***". Gray used the name for a separate group of species, with characteristics, different from the many species in the genus *Oliva*.

Olsson (1956) introduced the subfamily Agaroniinae, based upon radular studies.

The animals live on a sandy or muddy bottom at a depth from a few metres to 60-70 m.
The geographic distribution is rather extensive but discontinuous in the equatorial zone between 15° N and 15° S.

Species of the genera ***Agaronia*** and ***Olivancillaria*** are different from all other OLIVIDAE by a striking detail: the **columellar folds in the anterior part** are separated into two different zones separated by a groove or a ridge.

Seven species, **one subspecies** and a **new species** are found in the **equatorial Eastern Atlantic waters**. Anatomical and morphological differences between all these species are not always completely clear.

From a **conchological** point of view, the following **grouping** can be used:

Genus ***Agaronia***:
Agaronia bernardi sp. nov
Agaronia hiatula (Gmelin, 1791)
Agaronia maltzani (von Martens, 1897)
Agaronia razetoi Terzer, 1992

Genus ***Anazola***:
Anazola acuminata acuminata (Lamarck, 1811)
Anazola acuminata boavistensis (Burnay & Conceição, 1986)
Anazola ancillarioides (Reeve, 1850)
Anazola annotata (Marrat, 1871)
Anazola biraghii (P.A. Bernard & Nicolay, 1984)

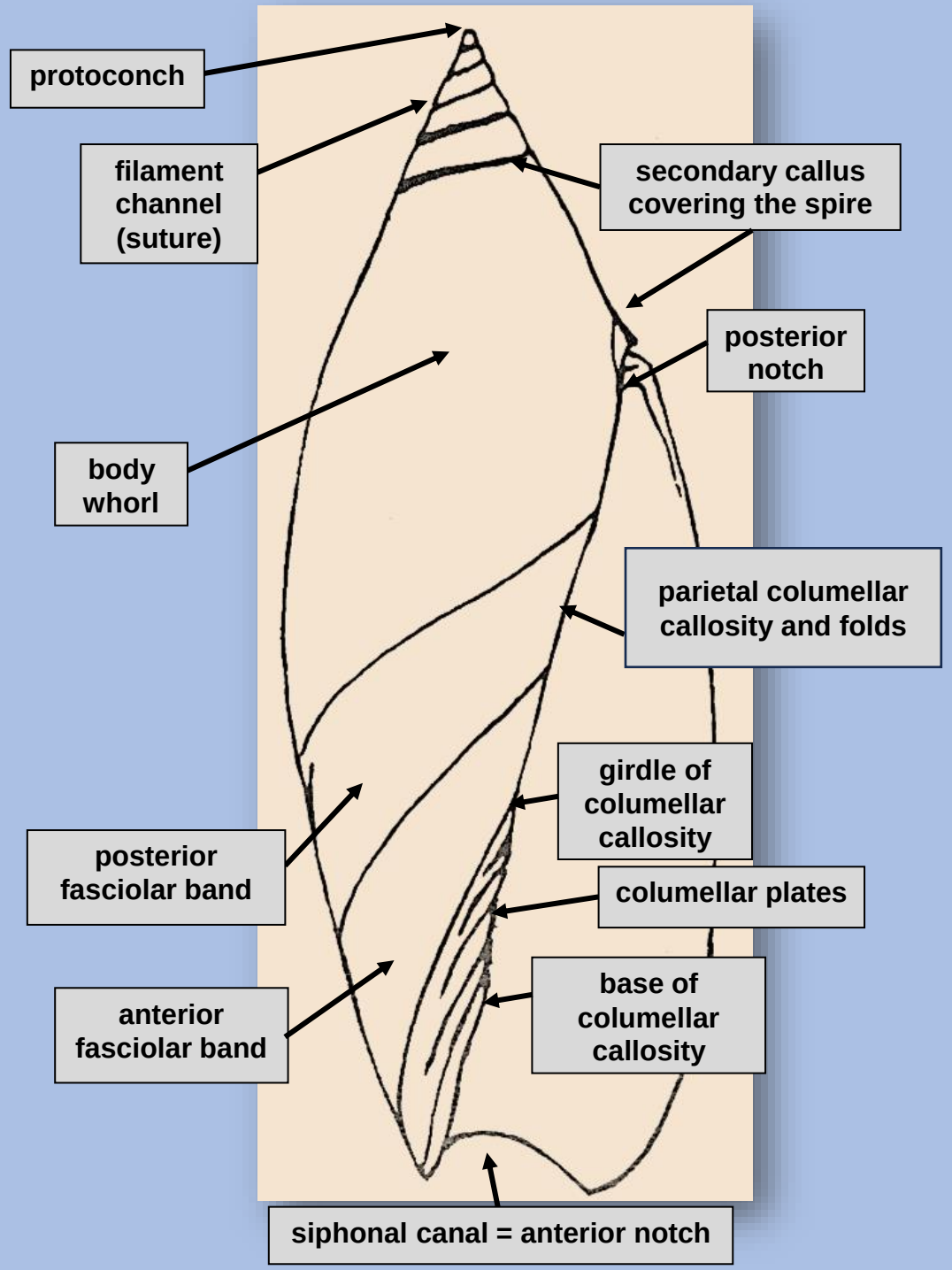
Generally ***Agaronia*-species** are **light-weighted and a little shining**. **The aperture is wide**, **especially downwards the siphonal canal**. The distinction between both the anterior and the posterior fasciolar band (called ‘ancillar band’ in the subfamily Ancillinae) is not very evident and even appears in some species to be missing. The columellar folds are thin and long, slightly tilted with respect to the columellar axis.

***Anazola*-species** are **heavy**, **massive** and **very glossy**. The **aperture** is **rather narrow and not widening**. The anterior band is raised towards the posterior fasciolar band and separated by a clear bump. The columellar folds are squat and short.

Formerly, distinction was made between ***Agaronia*** J.E. Gray, 1839 and ***Anazola*** J.E. Gray, 1858 as distinct related genera or subgenera.

Both should be distinguished from each other by a few conchological characteristics, for instance *Agaronia* has a **concave** columella and *Anazola* a **convex** columella.

In this revision, *Anazola* is treated as **a junior synonym** of *Agaronia*, until further studies will elucidate the eventual anatomical and molecular differences and the relation with the morphological characteristics.


protoconch
filament channel (suture)
secondary callus covering the spire
posterior notch
body whorl
parietal columellar callosity and folds
girdle of columellar callosity
posterior fasciolar band
columellar plates
base of columellar callosity
anterior fasciolar band
siphonal canal = anterior notch

Agaronia acuminata acuminata (Lamarck, 1811)

Geographic distribution: Living from Mauritania to Angola, up to a depth of 50-60 m on a sandy bottom.

Discussion: This species can only be confused with ***Agaronia biraghii***. It differs mainly by its **higher spire** and the presence of **tent markings just below the filament channel (suture)**. The **aperture is cream-white** coloured instead of bluish-grey.
A. acuminata becomes larger and **more solid with a higher gloss**.

***Agaronia acuminata* (Lamarck, 1811)**

Principe Island, Gulf of Guinea. In sand. Dived at a depth of 4 m. December 2009. CFN.

left: 42.26 mm; right: 50.88 mm.

***Agaronia acuminata* (Lamarck, 1811)**
São Tomé, Gulf of Guinea. In sand. Dived at a depth of 5 m. CFN.
left: 43.84 mm; right: 47.16 mm.

***Agaronia acuminata* (Lamarck, 1811)**
Port Gentil, Gabon. In sand. CFN.
left: 51.65 mm; right: 59.68 mm.

***Agaronia acuminata* (Lamarck, 1811)**
Ile Banié, Gabon. 00°49’ N/ 09°25’ E.
Intertidal in fine sand of sandbar. 1985. CFN.
left: 53.21 mm; right: 55.08 mm.

***Agaronia acuminata* (Lamarck, 1811)**
Ile Banié, Gabon. 00°49’ N/ 09°25’ E. Intertidal in fine sand of sandbar. 1985. CFN.
left: 57.70 mm; right: 63.76 mm.

***Agaronia acuminata* (Lamarck, 1811)**
Ile Banié, Gabon. 00°49’ N/ 09°25’ E. Intertidal in fine sand of sandbar. 1985. CFN.
left: 68.42 mm; right: 71.62 mm.

***Agaronia acuminata* (Lamarck, 1811)**
Ambriz, Angola. Trawled by Belgian fishermen (PEMARCO). In sand. 1968. CFN.
left: 74.75 mm; right: 78.42 mm.

Agaronia acuminata boavistensis (Burnay & Conceição, 1986)

Geographic distribution: This subspecies is endemic from the **Cape Verde Islands**.
Known from Boavista and Praia Gamboa, São Tiago.

Discussion: This subspecies differs from the nominal subspecies by its **smaller size** and **lighter colour**. **It lacks the brown band in the middle of the shell**.

Left: ***Agaronia acuminata*** **(Lamarck, 1811)**
Shenge, Sierra Leone. In sand. 48.06 mm.
CFN.

Right: ***Agaronia acuminata boavistensis***
Burnay & Conceição, 1986
Sal-Rei, Boavista Island, Cape Verde Islands.
Snorkeled at a depth of 3 m. In sand. 2000.
29.11 mm. CFN.

Agaronia ancillarioides (Reeve, 1850)

- Gilbert **Lhaumet** (1999) (Le genre *Agaronia* en Ouest Afrique: découverte d'une nouvelle forme sur les côtes du Ghana. *Xenophora*, **88**: 24-27) recognized *Agaronia ancillarioides* as coming from Ghana based on material from P. Ryall;
- redescribed and re-classified (*Anazola*) by **Terzer & Ryall (2005)** as *Agaronia* (*Anazola*) *ancillarioides* (Reeve, 1850): Riscoperta e posizione sistematica di *Oliva ancillarioides* Reeve, 1850 ed *Oliva zenopira* Duclos, 1835 (Gastropoda: Olividae). *Bollettino Malacologico,* **41**(9-12): 111-113;
- **Peter Ryall** (Ghana, Austria) collected in 30 years about 20 specimens (any condition) along a 25 km long coastline around Princess Town (Bay of Mundrachmi, Ghana) by dredging in 12-22 m depth in fine muddy blackish-grey sand (river Nyang);
- lives together with a.o. species of *Agaronia* (unspecified);
- measurements: 22-33 mm

Species 55. (Fig. *a*, *b*, Mus. Metcalfe.)

OLIVA ANCILLARIOIDES. *Oliv. testâ oblongâ, crassâ, spirâ exsertâ, acuminatâ, plicis columellaribus callosocontortis; sordidè carneolâ, immaculatâ, nisi infra suturas evanidè strigatâ, zonâ basali pallidiore, columellâ et aperturæ fauce albidis.*

THE ANCILLARIA-LIKE OLIVE. Shell oblong, thick, spire exserted, acuminated, columellar plaits callously twisted; dull carnelion, unspotted save beneath the sutures, where it is faintly streaked, basal zone paler, columella and interior of the aperture whitish.

Hab. Kurrachee, Mouth of the Indus.

The colour and general aspect of this species is very similar to that which prevails among the *Ancillariæ*. The only specimen known to me, in addition to the one here figured from Mr. Metcalfe's collection, belongs to Mr. Cuming, with the above-named locality attached to it.

***Oliva ancillarioides* (Reeve, L. A., 1850)**
Monograph of the genus *Oliva*.
In: *Conchologia Iconica, or illustrations of the shells of molluscous animals*, vol. 6, pls 1-30 and unpaginated text.
L. Reeve & Co., London

Originally described from Karachi, Pakistan

Distribution range: Most specimens come from the Bay of Mudrachmi, Ghana over a coastal area of 25 km.

The seabed of Mudrachmi Bay is covered by a sediment of fine, almost muddy, grey-black sand. Furthermore, the area is subject to the influence of the nearby Nyang River, with a strong contribution of sediment.

Populations of *Agaronia ancellarioides* live together with other species of the genus *Agaronia*, as well as NASSARIIDAE, TEREBRIDAE and TURRIDAE (s.l.).

Discussion: It should be noted that the **location data** of at least 1/3 of the species, described by Reeve (1850), is **incorrect**. Probably he relied too much on the labels that accompanied the shells. Sowerby (1880), illustrating the only specimen of *Oliva ancillarioides*, present in the British Museum of Natural History, also indicates as origin the **mouth of the Indus River**, copying Cuming's label. However, up to now no species of *Agaronia* have been found in the western part of India, the Gulf of Oman, and neither in the Arabian Sea.

Agaronia ancillarioides can be easily distinguished from *A. acuminata, A. biraghii* and *A. annotata* by its **squat form** instead of being cylindrical, the **bluish-grey colour of the narrow aperture and the body whorl**, the columellar area bordered by a **brown furrow**, and at last the **decurrent row of brown dots just beneath the filament channel**.
Agaronia hiatula, *A. maltzani*, and *A. razetoi* have a lighter shell with a wide gaping aperture.

A. ancillarioides shows some similarities with some specimens of *A. adamii* Terzer, 1992 from Brunei, a species living far beyond the area concerned.

***Agaronia ancillarioides* (Reeve, 1850)**
From: The Olivoidea Scratchpad (Voskuil R.)
https://olivirv.myspecies.info/en/taxon-pages/anazola-ancillarioides

***Agaronia ancillarioides* (Reeve, 1850)**
Bay of Mudrachmi, Ghana. Off Nyang River.
In fine muddy, grey-black sand. CFN. 25.32 mm

Agaronia annotata (Marrat, 1871)

Geographic distribution: Along the West African coasts from Gambia to Angola in shallow water up to a depth of 30 m.

Discussion: *A. annotata* differs from *A. ancillarioides* by its **very slender, elongate form**, the **narrow aperture**, the **pointed spire** with slightly concave first whorls and the dark blue-grey aperture. The latter is more bulbous and heavier.
A. acuminata has a larger shell with typical white tents beyond the filament channel, while *A. annotata* shows a series of **dark, brown dots beneath the suture**.

***Agaronia annotata* (Marrat, 1871)**
Off Denton Bridge, Banjul, mouth of the Gambia River, Gambia. Dived. In sand. July 1999. 31.49 mm. CFN.

***Agaronia annotata* (Marrat, 1871)**
Ile Banié, Gabon. 00°49’ N/ 09°25’ E. Intertidal in fine sand of sandbar. February 1985. 23.88 mm. CFN.

***Agaronia annotata* (Marrat, 1871)**
Ile Banié, Gabon. 00°49’ N/ 09°25’ E. Intertidal in fine sand of sandbar. February 1985.
left: 24.10 mm; right: 30.56 mm. CFN.

Agaronia biraghii P.A. Bernard & Nicolay, 1984

Geographic distribution: Originally described from both coasts of the estuary of the Komo River and around the Isle of Banié, Gabon (locus typicus), but also known from Congo-Brazzaville, Equatorial Guinea, Ghana and even from Senegal. The species lives in shallow water and leaves very large tracks in the particularly fine sand which forms its habitat.

Discussion: This species can only be confused with *A. acuminata*. It can easily be distinguished by its **less lower acuminate and relatively weak callous spire**, the presence of the **regular dark-greyish flecks both on the spire and the fasciolar area**, sometimes ending with two darker and larger spots respectively one near the end of the suture and the other at the siphonal notch. The most striking difference is the presence of **axial decurrent wavy stripes** and the **absence of irregular white tents** below the filament channel typical for specimens of *A. acuminata*.

***Agaronia biraghii* P.A. Bernard & Nicolay, 1984**
Adyembra, Western Region, Ghana. Dredged at 13 m.
In sand. Augustus 1997.
left: 44.45 mm. CSH; right: 47.84 mm. CFN.

***Agaronia biraghii* P.A. Bernard & Nicolay, 1984**
Rio Muni, Equatorial Guinea. In sand. October 1964. CFN.
left: 23.57 mm; right: 26.67 mm. CFN.
Juvenile/subadult specimens.

***Agaronia biraghii* P.A. Bernard & Nicolay, 1984**
Rio Muni, Equatorial Guinea. In sand. October 1964.
47.79 mm. CFN.

***Agaronia biraghii* P.A. Bernard & Nicolay, 1984**
North of Pointe Noire. Congo-Brazzaville.
In sand. Dived at a depth of 4 m.
40.22 mm. CSH.

***Agaronia biraghii* P.A. Bernard & Nicolay, 1984**
Ile Banié, Gabon. 00°49’ N/ 09°25’ E. Intertidal in fine sand of sandbar.
February 1985.
left: 45.53 mm; right: 54.68 mm. CFN.

***Agaronia biraghii* P.A. Bernard & Nicolay, 1984**
Ile Banié, Gabon. 00°49’ N/ 09°25’ E. Intertidal in fine sand of sandbar. February 1985.
59.15 mm. CFN.

***Agaronia biraghii* P.A. Bernard & Nicolay, 1984**
Southern Senegal. Trawled by fishermen. 2000.
76.12 mm. CFN.

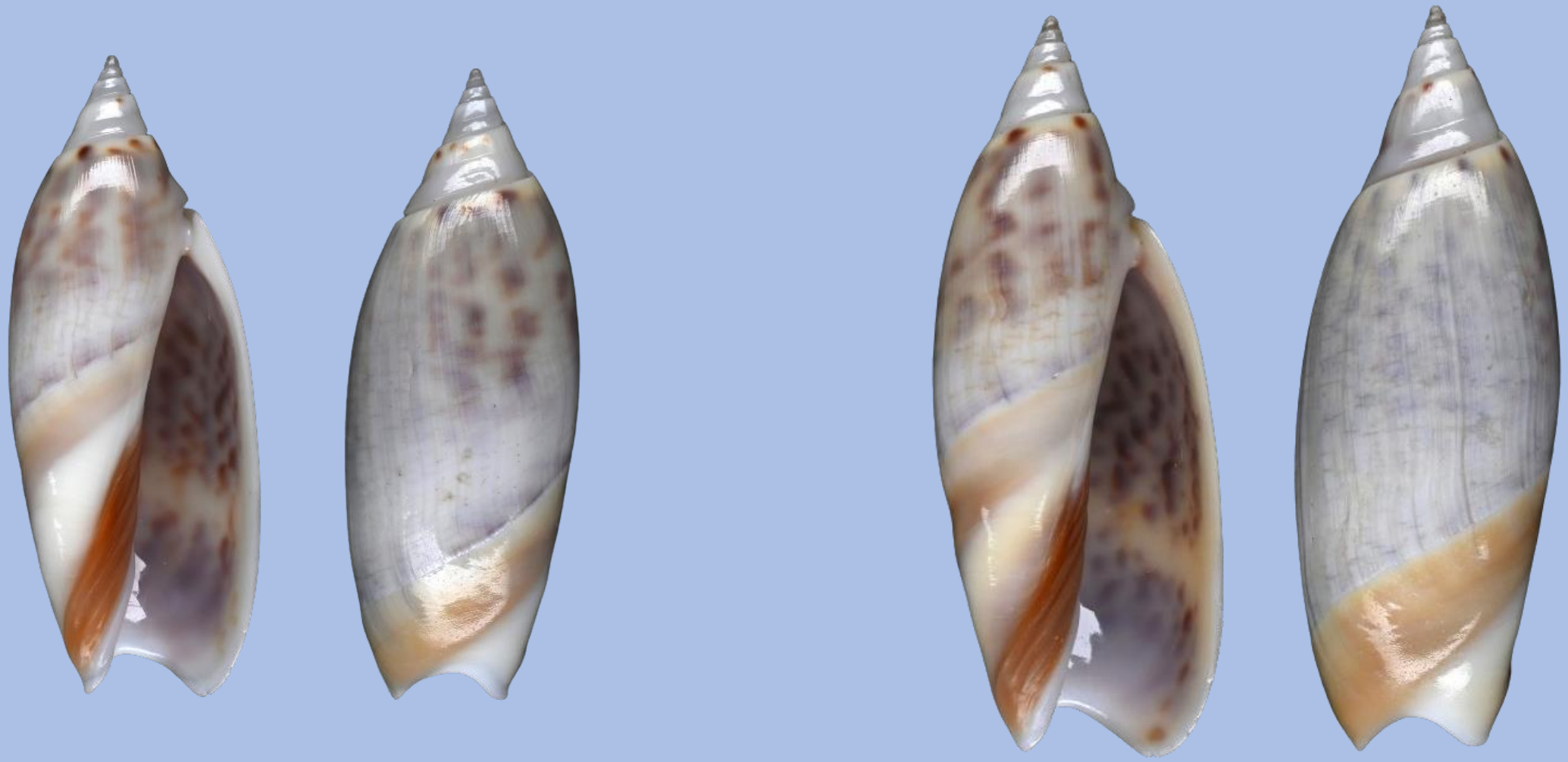
Agaronia hiatula (Gmelin, 1791)

Geographic distribution: From Mauritania to Nigeria into the Gulf of Guinea (Principe Island) except the Cape Verde Islands. It lives in shallow water at depths from 1 to 10 m.

Rolán (2005) mentioned this species from the Cape Verde Islands without detailed locality data and an adequate illustration. The figure on Plate 42 only shows a juvenile specimen from Senegal. We don’t know any shell collector who has ever found specimens of this species on the Cape Verde Islands.

Discussion: This species can only be confused with the less cylindrical ***A. razetoi*** **Terzer, 1992**, which has a **wider aperture**. For more comments we refer to the latter.

The new species ***Agaronia bernardi*** **Nolf & Hubrecht, 2024** is **smaller, very slender and more cylindrical**, without an overlapping secondary callus and with constant greyish colour and no darker waving streaks covering the whole surface of the last whorl like in *A. hiatula*.



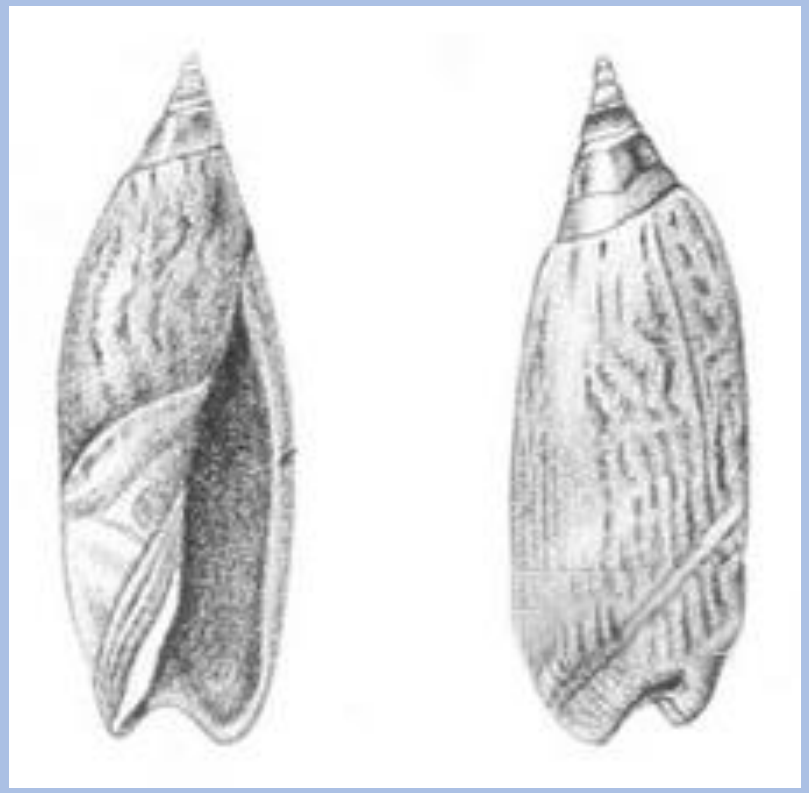
***Agaronia hiatula* (Gmelin, 1791)**
Petite Côte, Senegal. Trawled by fishermen. 2000.
left: 29.91 mm; right: 35.99 mm. CFN.

***Agaronia hiatula* (Gmelin, 1791)**
Petite Côte, Senegal. Trawled by fishermen. 2000.
left: 47.23 mm; right: 63.13 mm. CFN.

***Agaronia hiatula* (Gmelin, 1791)**
Adyembra, Ghana. In fine sand.
Dredged at a depth of 13 m. 1995.
51.78 mm. CFN.

***Agaronia hiatula* (Gmelin, 1791)**
Principe Island, Gulf of Guinea.
Dived at a depth of 4 m. In sand. December 2009.
33.81 mm. CFN.

Agaronia maltzani (von Martens, 1897)



Type figure of *Oliva hiatula* var. *maltzani*. Rufisque, Dakar, Senegal. Martens, E. von, 1897. Conchologische Miscellen II. *Archiv für Naturgeschichte*, 63(1).

Geographic distribution: From Gambia to Cameroon.

Discussion: A small species which has been overlooked after its original description, being considered as a **junior synonym** of ***Agaronia hiatula*** (Gmelin, 1791). It was **resurrected** by Ron Voskuil (The Olivoidea Scratchpad - 17.06.2017) and in *Neptunea***, 17**(2): 17-40.

It differs from *Agaronia hiatula* by remaining much smaller (maximum shell length slightly over 30 mm), having a greyish coloured shell with **longitudinally arranged darker markings**, by having its spire whorls whitish with a **dark protoconch**, and by having its columellar plication light coloured except for the posteriormost one.

More differences: There is a **yellow border just beneath the filament channel** provided with a series of dark brown dots. The **secondary callus is very distinct** and light bluish-grey coloured. The **aperture is narrower** than in *A. razetoi* and *A. hiatula*, but **wider** than in *A. bernardi* sp. nov.

Agaronia maltzani (von Martens, 1897)
Dakar, Senegal. Offshore trawled by local fishermen. December 2015.

Agaronia maltzani (von Martens, 1897)
Kotu Point, Gambia.
Exposed at low tide, trying to bury itself rapidly.

***Agaronia maltzani* (von Martens, 1897)**
Kribi, Cameroon. Dredged between 15-25 m, in muddy bottom.
December 2015.
left: 26.17 mm. Paratype 19; right: 25.94 mm. CSH.

***Agaronia maltzani* (von Martens, 1897)**
Kribi, Cameroon. Collected from prawns of local fishermen.
left: 20.32 mm; right: 25.62 mm. Coll. J. Verstraeten.

Agaronia razetoi Terzer, 1992

Geographic distribution: From Senegal to Ghana (mouth of the Whin River, Busua Beach). Also known from Ivory Coast.

Discussion: ***Agaronia razetoi*** can be compared with *A. hiatula* (Gmelin, 1791). The whole shell of the latter usually has a more slender shape and it is less oval than *A. razetoi*, which has a **prominent flaring aperture anteriorly**. *A. hiatula* possesses a small basal callosity limited to the top of the aperture and a distinct secondary callus. The **protoconch** of *A. razetoi* is **mamillated** and **partly sunken**, the columellar plicae are longer and the anterior one is thin and prominent.
A. razetoi is **more variable in colour, white or yellow** specimens are not unusual.

***Agaronia razetoi* Terzer, 1992**

Abidjan, Ivory Coast. Dredged in deep water.

left: 33.08 mm; middle: 34.09 mm; right: 34.60 mm. CFN.

***Agaronia razetoi* Terzer, 1992**

Busua Beach, Ghana. Snorkeled at a depth of 3 m. In sand. 1995.

left: 32.52 mm; right: 37.29 mm. CFN.

***Agaronia razetoi* Terzer, 1992**
Axim Bay, Ghana. In sand at low tide. 24 December 1980.
left: 37.63 mm; right: 33.57 mm. CFN.

Agaronia bernardi Nolf & Hubrecht, 2024

Type locality: Praia Gamboa, Santiago Island, Cape Verde Islands. In sandy mud, in shallow water.

Distribution: Mainly known from the type locality Praia Gamboa, Santiago, Cape Verde Islands but also from neighbouring islands off the continental West African shelf.

Etymology: The species name *‘bernardi’* refers to the late **Pierre Bernard**, a keen shell collector, author of several papers on West African mollusks and the book ‘*Shells of Gabon*’.
He was Professor of Statistics and Economics at the University of Libreville, Gabon from 1972 to 1989, and lived on the Cape Verde Islands from 1990 to 1992.

Discussion: The new species can be recognized at a glance by some specific characteristics, different of those in *A. hiatula*, *A. maltzani* and *A. razetoi*:

- the **smaller** size;
- the **very slender, subcylindric form**;
- the **narrower aperture**, not gaping at all downwards;
- the secondary callus, which does not cover the filament channel at the top of the aperture;
- the pattern of the last whorl, showing a **white band in the middle**;
- the constant presence of all these features in the population studied, in contrast with the samples investigated from other species in various places.

***Agaronia bernardi* Nolf & Hubrecht, 2024**
Bijagos Islands, Guinea-Bissau, W Africa.
Buried in sand at low tide.
Paratype 19. Coll. J. Verstraeten. 37.63 mm.

***Agaronia bernardi* Nolf & Hubrecht, 2024**
Praia Gamboa, Santiago Island, Cape Verde Islands.
Dived at a depth of 3 m. In sandy mud under rocks. 1990.
Paratype 2. CFN. 23.76 mm.

***Agaronia bernardi* Nolf & Hubrecht, 2024**
Praia Gamboa, Santiago Island, Cape Verde Islands. Dived at a depth of 3 m. In sandy mud under rocks. 1990.
left: paratype 3. CFN. 27.14 mm; right: paratype 4. CFN. 32.60 mm.

***Agaronia bernardi* Nolf & Hubrecht, 2024**
Praia Gamboa, Santiago Island, Cape Verde Islands. Dived at a depth of 3 m. In sandy mud under rocks. 1990.
left: holotype (RBINS). 33.63 mm; right: paratype 4. CFN. 36.12 mm.

***Agaronia bernardi* Nolf & Hubrecht, 2024**
Praia Gamboa, Santiago Island, Cape Verde Islands. Dived at a depth of 3 m. In sandy mud under rocks. 1990.
left: paratype 7. 37.59 mm; right: paratype 8. 38.35 mm. CFN.

very large, white high gloss

irregular tent markings below filament channel

Agaronia acuminata

smallller and lighter in colour

lower spire

aperture beige-white

white anterior fasciolar band

Agaronia acuminata boavistensis

slightly concave teleoconch whorls

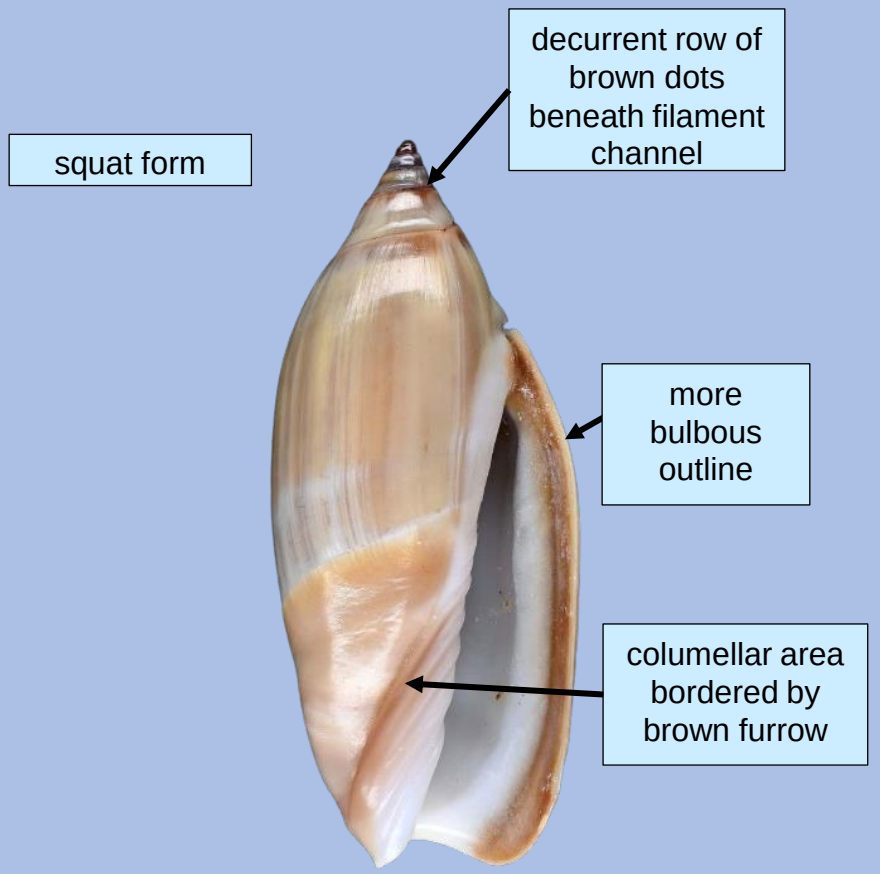
pointed spire

a series of dark brown dots beneath the suture

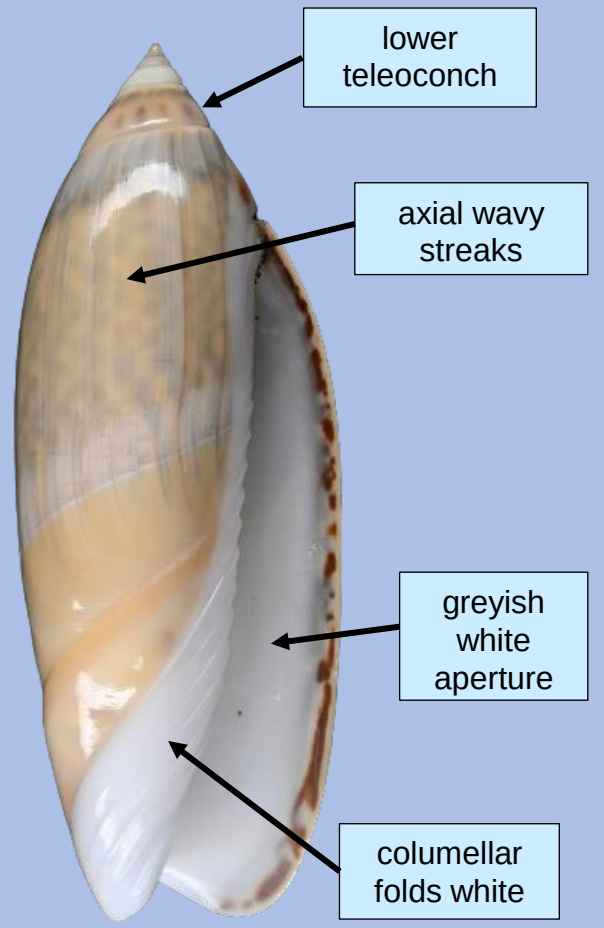
very slender, elongate

mouth dark-grey

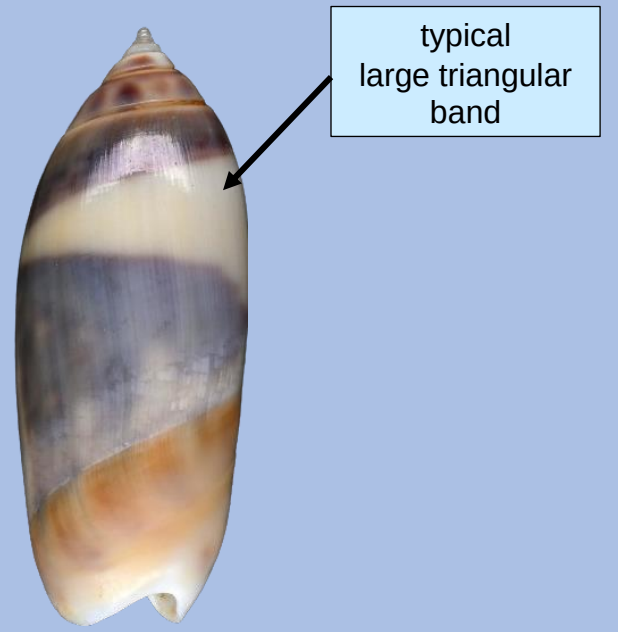
Agaronia annotata



Agaronia ancillarioides



Agaronia biraghii



Agaronia biraghii **(juvenile specimen)**

outline elongate oval

thick secondary callus

posterior columellar folds brown

aperture wide, broader downwards

Agaronia hiatula

protoconch black

conical spire with telescopical profile

greenish grey body whorl

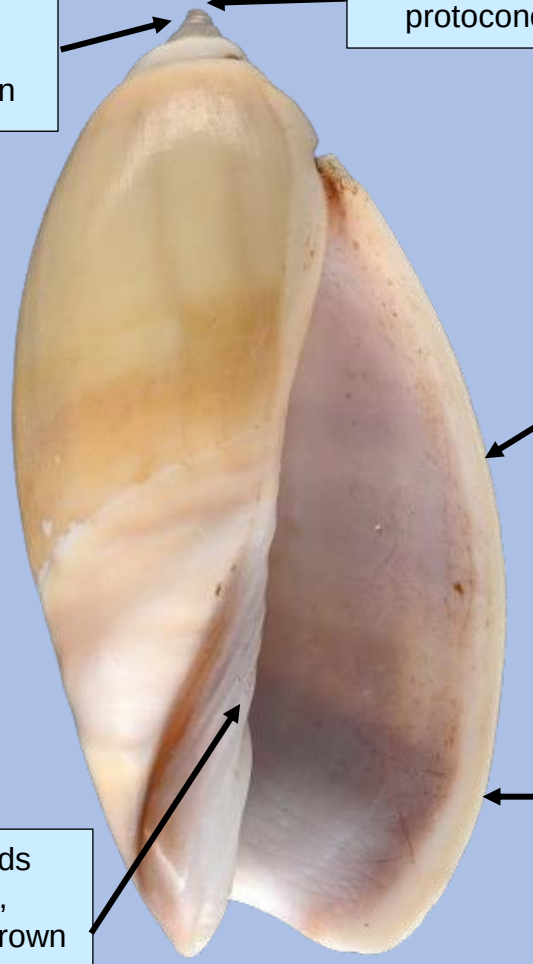
secondary callus very distinct

parallel waving dark-grey streaks

columellar plication light coloured

oval outline; mouth not widened anteriorly

Agaronia maltzani



Agaronia razetoi

Agaronia bernardi