The URL to the IHSN is below and pages 1 to 4 of that URL will provide links to the three sections of the current and three prior months in both Acrobat and HTML versions:

http://home.att.net/~w.thorsson/index.html

Please enter it as one of your bookmarks or favorites.

Living Mitridae Chapter 01 Group *Mitra*, Part 9

Return to General Index for links to other sections
This article continues a lengthy series of articles that will eventually form a CD-book, *Living Mitridae*.

As we now have additional photos, in the next months we will add illustrations of additional species to groups already covered.

This article will add to Chapter 1, group *Mitra* and will include a number of recently described species, species of questionable affiliation with group *Mitra* and species, which probably do not belong in this group. Following established taxonomy and lacking a better group, these species are lumped with in group *Mitra*.

Animals are known for *Mitra catalinae*, *Mitra cornea*, and *Mitra (Dibaphimitra) florida*. In many cases the animals differ greatly from the milky white or yellow animals of group *Mitra* which we have defined as having a primarily all white or yellowish animal.

Any information or photos that will increase the usefulness of these articles and the later CD to readers and scientific value of that book are requested from readers. (All endeavors of HMS and IHSN are nonprofit activities and are not copyrighted.)

**Standard practices for this series of articles.**

**Dimensions**
All dimensions and scales are in millimeters unless specifically stated otherwise.

**Definition of relative width terms**
In describing mitrids, we use the following definitions of width based on the ratio of width to length. It applies only to mitrids, not to other families.

- W/L below 0.2: extremely narrow to very narrow;
- W/L from 0.21 to 0.29: narrow;
- W/L 0.3 to 0.35: moderately wide;
- W/L 0.36 to 0.4: wide;
- W/L 0.41 to 0.45: very wide;
- W/L above 0.5: extremely wide.

Most mitrids fit into a relatively small range of width to length ratios compared to many other families and this allows differentiation within the family. This has been applied throughout this series of articles.

General terms used for parts of a shell, directions on a shell, and the animal are defined and roughly illustrated in the IHSN portal reference section “Terms and Taxonomy” with a link to that section on page 5 of the portal [the opening pages of IHSN that provides links to current issues and references].

**Illustrations used**
We use the best photos available to us to exhibit the range of variation of species. We provide details of important parts of a specimen where possible from original photos of the detail. Where original photos of the details are not available, we enlarge the photo and crop to obtain a detail illustration.
that is not as clear as possible, but provides additional information and calls attention to the detail.

We would appreciate receiving pictures of better quality.

References

References' details such as page and figure are given in the text rather than in the references section which apply to all chapters in this series. References specific to this article are also given in the Reference Section.
Plate 354.  *Mitra (Mitra) belcheri* Hinds, 1843

Andy Adams photos of a 121.7 mm specimen from western Mexico found in sand at 25 fathoms.
Plate 355.  *Mitra (Mitra) belcheri* Hinds, 1843

R. Salisbury photos of a 111.2 mm specimen from Perlas Island, Panama with periostracum.  Found in sand.

This is one of the larger Miters growing to at least 130 mm and is found from the Panamic or Eastern Pacific faunal zone.  For illustrated specimens W/L = 0.28 and 0.3.1 and S/L = 0.59 and 0.57.  The sculpture consists of 6 flat spiral cords on the penultimate whorl reducing to 4 on early whorls.  There are also hints of spiral grooves on the two subsutural cords.  Cords are separated by deep squarish grooves.  Axial sculpture is lacking.  The suture is prominent.  On the body whorl cords continue to the slightly bulging fasciole.  The dorsal notch is slight.  There are 3 prominent, sharp spiral folds on the columnella.  The aperture is fairly wide and sub-quadrate.  The outer lip is indented by the spiral grooves.  The exterior of the shell is creamy yellow to white.  The aperture is similarly colored.  The periostracum is thick and black.  Due to its sculpture and size, this is a quite unique species.

The radula of *M. belcheri* differs from that of the type species of *Mitra*, which is *Mitra mitra* (Linnaeus, 1758), in having a central rachidian which is elongated and narrow, lacking a greatly enlarged central cusp.  The lateral rachidians are similar to Mitra, but have more numerous cusps, which are evenly spaced and do not become sparse toward the exterior end.

The animal of this Miter, to our knowledge, has not been reported.
There are shells of similar size and sculpture from West Africa and the Western Pacific. It is odd that the Caribbean seems to lack a related species. There is some doubt as to its proper placement within the Mitridae. Keen (1971) placed it in the subgenus Atrimitra Dall, 1918. The type species of Atrimitra is Mitra idae Melvill, 1893. The radulae of these two species are very similar.

Cernohorsky (1976) page 458 to 459 describes this species and illustrates the holotype in fig. 408. Keen (1971) illustrates this species on page 641, species 1419 as Mitra (Atrimitra) belcheri.
Plate 356. *Mitra (Mitra) idae* Melvill, 1893

Andy Adams photos of a 55.7 mm specimen from Santa Barbara, California found in rocky sand at 30 feet in 1970.

This species was covered in IHSN February 2001. It is also illustrated here for comparison with *M. catakubae*. See discussion on that species on next page.

W/L = 0.34, S/L = 0.55
Plate 357.  *Mitra (Mitra) catalinae* (Dall, 1919)

R. Salisbury photos of the 28.4 mm lectotype USNM 219648.
This species was originally named in *Mitra* (*Strigatella*). This is a species with the spire shorter than the aperture and relatively wide (Illustrated lectotype has W/L = 0.43 and S/L= 0.47). Suture is not prominent and dorsal notch is lacking. Sculpture is negligible on the body whorl and very faint on early spiral whorls with about 5 spiral cords separated by narrow, shallow spiral grooves. The aperture is relatively wide and lenticular in shape. There are 3 prominent, raised, convex spiral cords on the columella. Shell surface and aperture are brown-pink with a dark brown to black periostracum.

This species has been synonymized with *Mitra idae* Melvill, 1893 by Cernohorsky (1976). The two species are quite similar and are illustrated in Cernohorsky (1976) plate 315, with *M. idea* holotype in fig. 9 and *M. catalinae* lectotype in fig. 13 along with other synonymized species having different relative widths. Mitridae often exhibit wide variations but significant differences in spire to length ratio usually indicate different species. We agree with West (1979) who found radular and anatomical differences that justifies *M. catalinae* as a valid species.

Terry Lynn West (1979) in an unpublished thesis paper compared *Mitra idae* to *Mitra catalinae*. This work is superb and clearly distinguishes between the two species. The radula of *Mitra catalinae* is radically different from that of *Mitra idae*. The radula consists solely of a central rachidian with 11 cusps, which are nearly all the same size. As Dr. West points out, a similar radula pattern is found in *Pterygia*. Detailed anatomical differences were also diagnosed by Dr. West.

In the Californian Faunal Zone we have two black-shelled Miter species, living congruently in the same or similar habitat. Both species have white animals. The sculpture of the shells is fairly similar and immature or juvenile shells of the two species can hardly be told apart. This is quite clearly an example of mimicry in nature, similar to the well known Monarch and Viceroy Butterfly examples of the insect world.

### Comparisons of

*Mitra catalinae*, *Mitra idae* and *Pterygia crenulata* and their genera

<table>
<thead>
<tr>
<th>Current Taxonomic Placement and radulae formulae</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Mitra mitra</em></td>
</tr>
<tr>
<td>Subfamily: Mitrinae</td>
</tr>
<tr>
<td><strong>Radula formula</strong></td>
</tr>
<tr>
<td>1--1--1</td>
</tr>
<tr>
<td><em>Mitra idae</em></td>
</tr>
<tr>
<td>Subfamily: Mitrinae</td>
</tr>
<tr>
<td><strong>Radula formula</strong></td>
</tr>
<tr>
<td>1--1--1</td>
</tr>
<tr>
<td><em>Mitra catalinae</em></td>
</tr>
<tr>
<td>Subfamily: Cylindromitrinae</td>
</tr>
<tr>
<td><strong>Radula formula</strong></td>
</tr>
<tr>
<td>0--1--0</td>
</tr>
<tr>
<td><em>Pterygia crenulata</em></td>
</tr>
<tr>
<td>Subfamily: Cylindromitrinae</td>
</tr>
<tr>
<td><strong>Radula formula</strong></td>
</tr>
<tr>
<td>0--1--0</td>
</tr>
</tbody>
</table>

### Shell differences

<table>
<thead>
<tr>
<th>W/L</th>
<th>S/L</th>
<th>Penult. whorl sculpture</th>
<th>IHSN ref</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Mitra idae</em></td>
<td>0.34</td>
<td>0.55</td>
<td>About 20 faint spiral cords</td>
</tr>
<tr>
<td><em>Mitra catalinae</em></td>
<td>0.43</td>
<td>0.47</td>
<td>About 10 very faint cords</td>
</tr>
<tr>
<td><em>Pterygia crenulata</em></td>
<td>0.45</td>
<td>0.20</td>
<td>4 noded spiral cords</td>
</tr>
</tbody>
</table>
Living Mitridae  Chapter 01  Group Mitra  Part 9  *Mitra (Mitra) catalinae* (Dall, 1919)

**Salivary Gland Ducts**

<table>
<thead>
<tr>
<th>Species</th>
<th>Description</th>
<th>references</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Mitra mitra</em></td>
<td>Along outside of esophagus</td>
<td>Ponder (1972)</td>
</tr>
<tr>
<td><em>Mitra idae</em></td>
<td>Probably in walls of esophagus</td>
<td>West (1979)</td>
</tr>
<tr>
<td><em>Pterygia crenulata</em></td>
<td>in walls of esophagus</td>
<td>Risbec (1928)</td>
</tr>
<tr>
<td><em>Mitra catalinae</em></td>
<td></td>
<td>West (1979)</td>
</tr>
</tbody>
</table>

**Anatomy**

<table>
<thead>
<tr>
<th>Species</th>
<th>Proboscis (epb) size</th>
<th>epb Pigmentation</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Mitra mitra</em></td>
<td>Mod wide, length equal or larger than shell</td>
<td>epb lacks pig. bodies</td>
<td>Ponder (1972))</td>
</tr>
<tr>
<td><em>Mitra idae</em></td>
<td>Moderately wide, length 1-2 x shell length</td>
<td>epb white pig. cells</td>
<td>West (1979)</td>
</tr>
<tr>
<td><em>Pterygia crenulata</em></td>
<td>Narrow, length 4x shell length</td>
<td>epb lacks pig. bodies</td>
<td>Risbec (1928)</td>
</tr>
<tr>
<td><em>Mitra catalinae</em></td>
<td>Narrow, length 3x shell length</td>
<td>epb lacks pig. bodies</td>
<td>West (1979)</td>
</tr>
</tbody>
</table>

**Anatomy**

<table>
<thead>
<tr>
<th>Species</th>
<th><em>Epi/Odo</em></th>
<th>Peristomial Rim</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Mitra mitra</em></td>
<td>2.0</td>
<td>long to very long</td>
<td>Ponder (1972)</td>
</tr>
<tr>
<td><em>Mitra idae</em></td>
<td>2.0</td>
<td>mod. long ring of papillae</td>
<td>West (1979)</td>
</tr>
<tr>
<td><em>Pterygia crenulata</em></td>
<td>4.0 to 5.0</td>
<td>mod. long, corona of fibers</td>
<td>Risbec (1928)</td>
</tr>
<tr>
<td><em>Mitra catalinae</em></td>
<td>1.0</td>
<td>very long, elaborated 2 pair lips</td>
<td>West (1979)</td>
</tr>
</tbody>
</table>

* Ratio Length of Epiproboscis/ Length Odontophore

**Conclusions:** Although *Mitra catalinae* is very different from *Pterygia* species in shell characteristics, it is similar to *Pterygia* species in many anatomical and radula characteristics, however, it also differs in several aspects as recorded by Dr. West (1979). This species is perhaps best placed in a genus of its own.
Plate 359. *Mitra (Mitra) cornea* Lamarck, 1811

Andy Adams photos of a 27.8 mm specimen from St. Vincent, Cape Verde Islands in rubble at 15 feet.
Plate 360. *Mitra (Mitra) cornea* Lamarck, 1811

Andy Adams photos of a 25.7 mm specimen from Palma Island, Canary Islands in rocks at 15 feet.
This species’ spire is straight sided with about 7 slightly convex teleoconch whorls. Sutures are prominent and the dorsal notch is moderately prominent. The penultimate whorl has about 8 very faint spiral cords separated by a fine groove. Early whorls have about the same number of cords that are more prominent. On the base the cords become prominent above the slightly bulging fasciole. The aperture is wide with the parietal wall area triangular and the remainder fairly uniform in width. There are 3 significant spiral folds on the columella. The shell exterior is gray, white or light brown in color under a brown periostracum that is without dark specks and spots. Shells are to 30 mm in length and are most common along west Africa and into the Eastern Med. It is quite difficult to separate *M. cornea* from *M. corniculata*.

Until recently, this species has been synonymized with *Mitra cornicula* (Linnaeus, 1758), (Fig. ????). Animal studies done by Rolan, Dantart & Fernandes (1997) have helped to restore the species name as valid. This excellent paper details animal patterns, radula differences, ranges and uses many shell comparisons. In our comparison of this species to *Mitra cornicula* we have been unable to find any significant shell sculptural differences. *Mitra cornicula* appears to be restricted to the Mediterranean Sea while *Mitra cornea* ranges from the eastern Atlantic and west Africa into the western Mediterranean Sea. In the overlap zones of these two species, which is the western Mediterranean, both species coexist. *Mitra cornea* is sometimes gray colored beneath a thin brown periostracum. Outside of the Mediterranean Sea, *Mitra cornea* can reach 30 mm in length.

Cernohorsky (1976), page 370 lists *M. cornea* Lamarck, 1811 as a synonym of *M. Cornicula*. His plate 322 figs. 1 to 6 illustrate *M. cornicula*, and *M. nitida* as *M. cornicula*. In these illustrations, *M. cornea* is a much narrower shell with a distinctly shorter aperture.

Richard Salisbury in an Email to Thorsson said: Differences are very subtle between *Mitra cornea* and *Mitra cornicula*. I am not even sure these differences are accurate across the range of the two species: *Mitra cornicula* is brown in color under a brown periostracum that often has dark specks and spots scattered over surface. Small shells to 20 mm with range possibly restricted to Mediterranean. Sculpture smooth, rounded shoulders, Shape, ovate-fusiform. Animal: milky white with stringy filaments, some animals with brown on foot.

*Mitra cornea* color is gray, white or light brown in color under a brown periostracum without dark specks and spots. Shells large to 30 mm. Most common along west Africa but does range into the eastern Mediterranean. Sculpture smooth, usually rounded shoulders, some rarely with square shoulders. Shape: slightly elongate-fusiform. Animal: transparent white with bright yellow border around foot and eye stalks.

The animals are the real key to the differences, but you won’t see the animal in shells in a collection. The next best way to sort the shells is location, then shell size and color: but all the factors are variable.

Our illustrated specimens show sculpture to be negligible on *M. cornicula* but spiral cords are at least faint on earl whorls of *M. cornea.*
Plate 361. *Mitra cornicula* (Linnaeus, 1758)

Andy Adams photos of a 20.1 mm specimen from Mallorca Islands, Spain.

See page 15 for a discussion of holding *M. cornea*, Lamarck, 1811 to be a separate species and comparison of the two species.

Our illustrated specimen has a straight-sided spire with about 6 teleoconch whorls that are slightly convex with a more convex shoulder making the suture more prominent. The body whorl has no sculpture except for about 4 spiral cords in and above the slightly bulging fasciole. The aperture is wide with a triangular posterior area. Early whorls do not have discernable sculpture. W/L = 0.46, S/L = 0.42.

As indicated in Cernohorsky (1976) pages 369 to 371, this species has had a long history of being variable and subject to variations called new species.
Living Mitridae  Chapter  01   Part 9   References common to all Chapters

For these references, the author, date of publication, and page number or plate are given in the text. Other authors cited or referred to will have as a complete citation as is available. We are presenting references in this way so they can be directly used from a species page, eliminating the requirement to go to a reference page. Some of the following references may not be applicable to this article except in eliminating other species from consideration.


Salisbury, R. & Suduiraut, E. G., 2003  Three new deep water miters (Gastropoda; Prosabranchia; Mitridae) from the Western Indo-Pacific with a new name for *Mitra millepunctata* Schepmann, 1911, Novapex 4(1), pgs. 1 to 9.


Living Mitridae  Chapter 01 Part 9  References specific to this article


(published April 1843)


Melvill, James Cosmo, 1893  Descriptions of a new species of Mitra. The Conchologist 2(6): 140, pl. 1

Rolan, Emilio, Dantart, Luis & Fernandes, Fransisco, 1997  On some dark species of Mitra from the Mediterranean and the Atlantic. La Conchiglia 29(285): pgs. 11-23, figs. 1-17, text figures, 1 table

Suduiraut, Emmanuel Guillot de, 2002  The Marine Malacofauna of the Philippine Islands. Published privately in CD form.
