

Living Seashells of the Tropical Indo-Pacific



Reef ID Books



Andrey Ryanskiy

Living Seashells of the Tropical Indo-Pacific



Photographic guide with 1500+
species covered

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INTRODUCTION Seashell or sea shells are the hard exoskeleton of mollusks such as snails, clams, chitons. For most people, acquaintance with mollusks began with empty shells. These shells often delight the eye with a variety of shapes and colors. Conchology studies the mollusk shells and this science dates back to the 17th century. However, modern science - malacology is the study of mollusks as whole organisms. Today more and more people are interacting with ocean - divers, snorkelers, beach goers - all of them often find in the seas not empty shells, but live mollusks - living shells, whose appearance is significantly different from museum specimens. This book serves as a tool for identifying such animals.

The book covers the region from the Red Sea to Hawaii, Marshall Islands and Guam. Inside the book:

- Photographs of 1500+ species, including one hundred cowries (Cypraeidae) and more than one hundred twenty allied cowries (Ovulidae) of the region;
- Live photo of hundreds of species have never before appeared in field guides or popular books;
- Convenient pictorial guide at the beginning and index at the end of the book

ACKNOWLEDGMENTS

The significant part of photographs in this book were made by Jeanette Johnson and Scott Johnson during the decades of diving and exploring the beautiful reefs of Indo-Pacific from Indonesia and Philippines to Hawaii and Solomons. They provided to readers not only the great photos but also in-depth knowledge of the fascinating world of living seashells.

Sincere thanks to Philippe Bouchet, National Museum of Natural History (Paris), for inviting the author to participate in the La Planete Revisitee expedition program and permission to use some of the NMNH photos.

Special thanks to Alexander Fedosov, Max Marrow, Richard Salisbury, Yasunori Kano, Tsuyoshi Takano, Boris Sirenko, Malcolm Tait Sanders, whose scientific support helped to identify many species from this photo guide. Sue Churchill and Rogan Draper, authors of the brilliant book about ovulids "The Invisibility Cloak", supported a project with deep first-hand knowledge and excellent photos.

I was lucky to receive ongoing support in my book projects from Philippe and Guido Poppe. Jacky and Evelyn Guillot de Suduiraut are kindly acknowledged for permission to use photos of Emmanuel Guillot de Suduiraut. Sven Kahlbrock knows Red Sea ovulids as no one else and his photos enriched the book. Massimo Scali shared with readers his photos of the rare Indian Ocean cowries. Jake Adams, Josina Tivaouane and Jocelyn Senia helped to make Tridacna pages successfully finalized. Bob Abela helped with some rare species, photographed in Guam, Charles E. Rawlings contributed unique volutidae photos from the Indian Ocean. Brian Mayes kindly shared with readers his outstanding collection of superb living ovulidae images.

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I would like to thank my wife Irina Khlopunova for patient support during the work on this book.

ABBREVIATIONS

Principal photo contributors: ©JJ: Jeanette Johnson ©SJ: Scott Johnson

IT - Identification Tentative; sp. - used when the actual specific name cannot or need not be specified

cf. - used to indicate undescribed species assumed related to, but distinct from a described species

WIO, IO, IP, IWP, WP, WCP, PO, SP - West Indian Ocean, Indian Ocean, Indo-Pacific, Indo-West Pacific, West Pacific, Western Central Pacific, Pacific Ocean, South Pacific accordingly.

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Front cover photos: upper left: *Dentiovula eizoi* (Igor Bogachenko), upper right: *Vexillum jeanetteae* (Jeanette Johnson, yes, it is not a coincidence of names!), bottom left: *Cribrarula cribraria* (Jeanette Johnson), b. right: *Limaria fragilis*.



MARINE GASTROPODS (SNAILS AND SLUGS)

- the most diversified class in the phylum Mollusca
- gastropods mostly have a one-piece, often coiled shell
- they have a well-defined head with two sensory tentacles with eyes
- they have a ventral foot, which gives them their name (stomach and foot, from Greek “gaster” and “pous”)
- they are distinguished by an anatomical process known as torsion which occurs in all gastropods during larval development.
- torsion is the rotation of the visceral mass, mantle, and shell 180° with respect to the head and foot
- many gastropods can seal the entrance to their shell with a tough corneous or calcareous operculum
- snails are gastropods with an external shell, slug has no shell or a very reduced shell (in loose terms). We are dealing with marine snails in this book, look for slugs in the “Nudibranchs of the Coral Triangle” book.

BIVALVES - BIVALVIA

- majority of bivalves consist of two identical valves that are connected to one another by a flexible hinge
- bivalves have no head
- some bivalves have eyes
- the gills have evolved into specialized organs for feeding and breathing - ctenidia
- some bivalves have a retractable foot, enabling the animal to burrow in the sand or to move, often with jumps.
- bivalves range in size from from about one millimeter to over a meter in length
- bivalves are mostly filter feeders, they lack the radular rasping organ typical of most mollusks
- in giant clams (subfamily Tridacnidae) symbiotic zooxanthellae are kept within the mantle tissue, providing additional nutrition
- near three million metric tons of bivalves are harvested throughout the world each year
- bivalves were rare in the oceans before Permian–Triassic extinction event (approximately 252 million years ago) but became numerous and diverse after it



CHITONS - POLYPLACOPHORA

- the chitons are **exclusively marine**, unlike gastropods and bivalves
- all living chitons have **eight shell plates** surrounded by chitinous girdle and large adhesive **foot**
- it allows chitons to roll into a **protective ball** when dislodged
- live in **intertidal/subtidal waters** along rocky coastlines worldwide
- most chitons are herbivorous grazers, with some omnivorous and some carnivorous species
- chitons are **slowly moving animals**, but several species can move much faster

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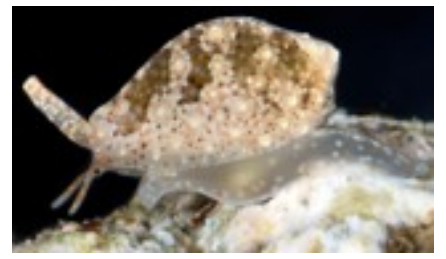
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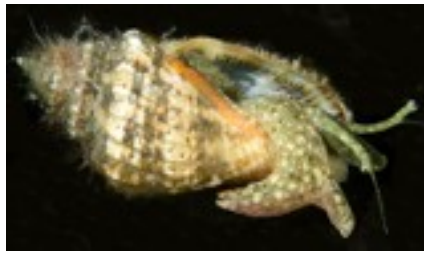
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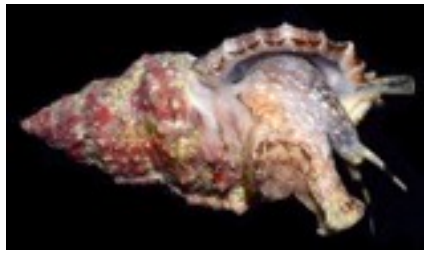
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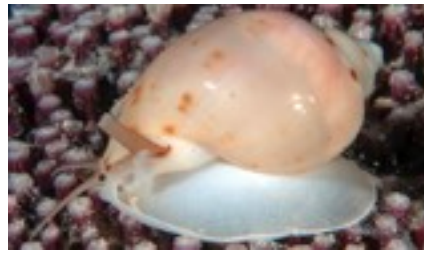
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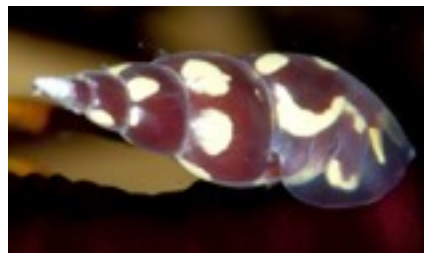
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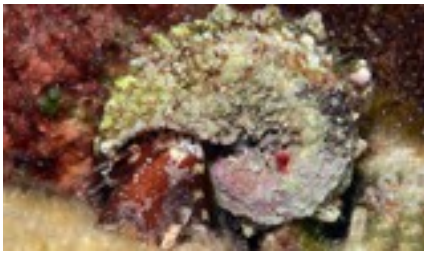
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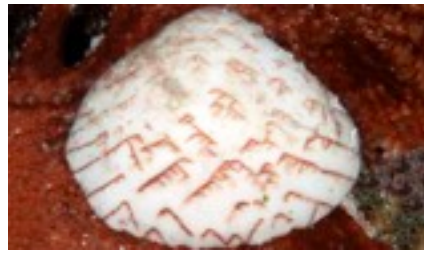
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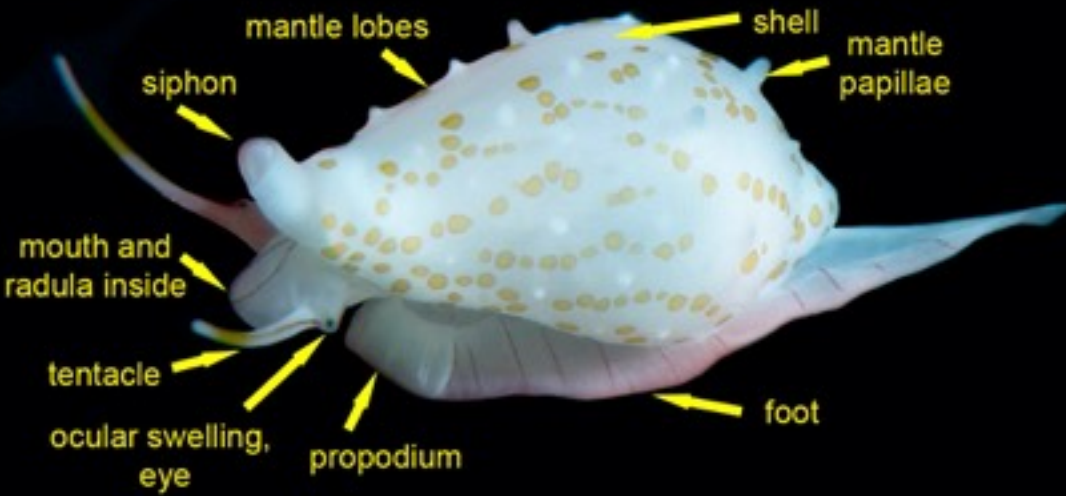
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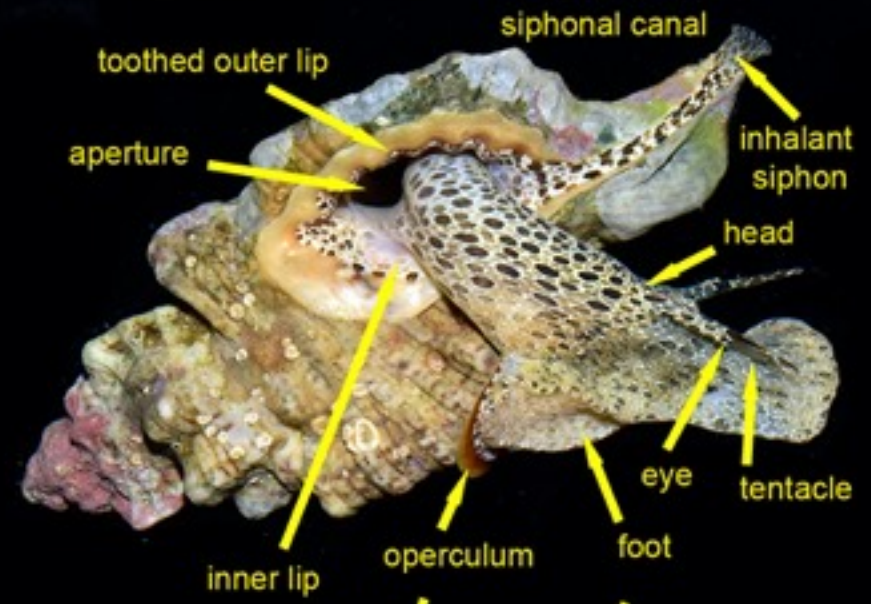
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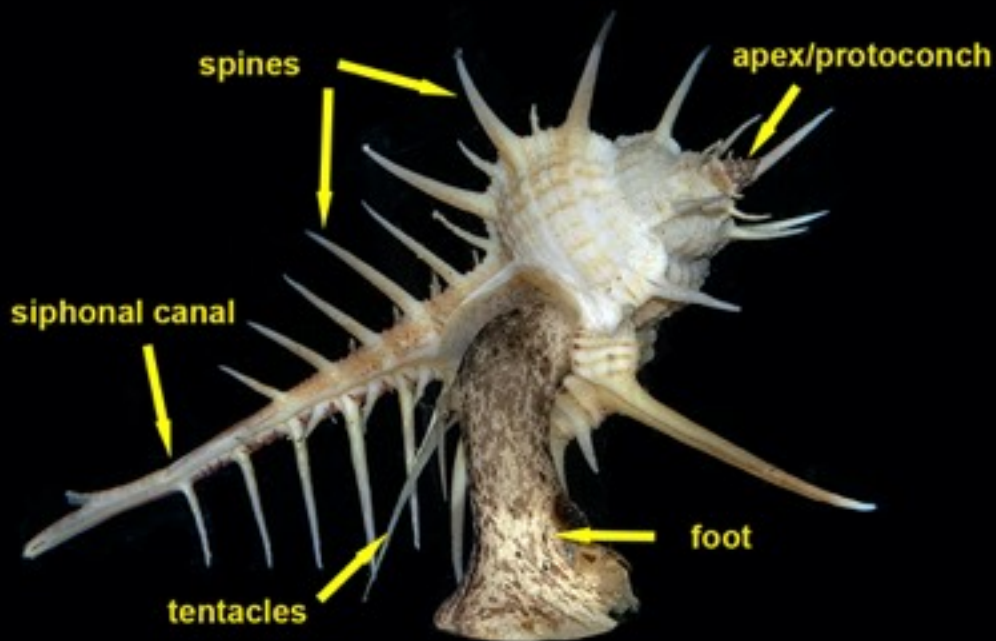
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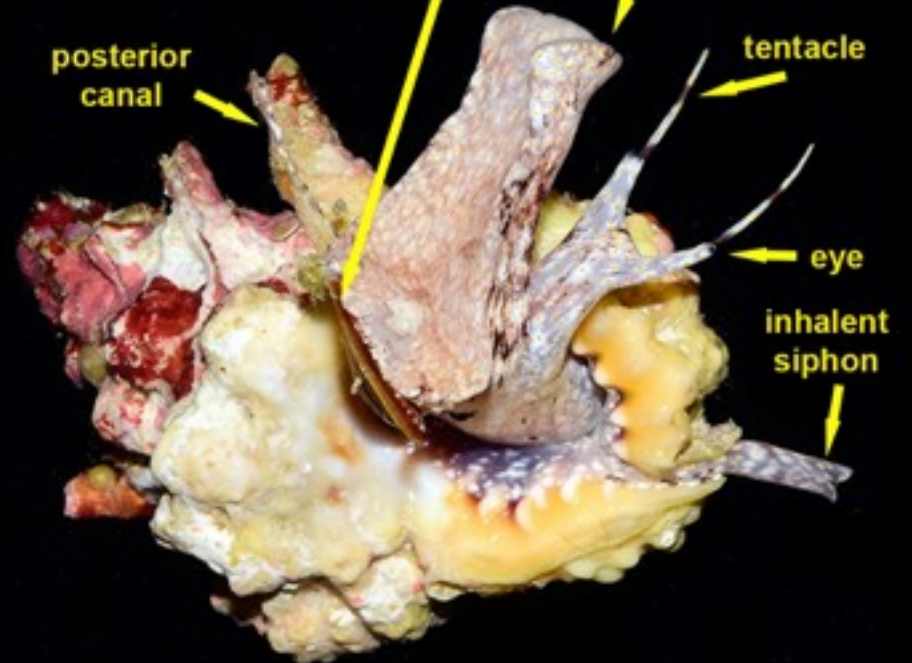
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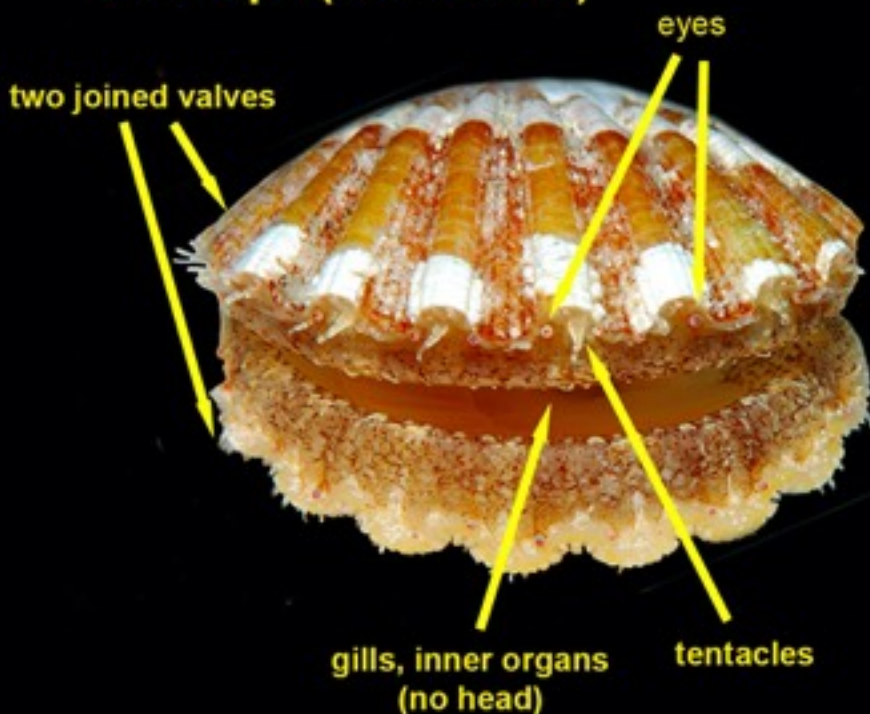


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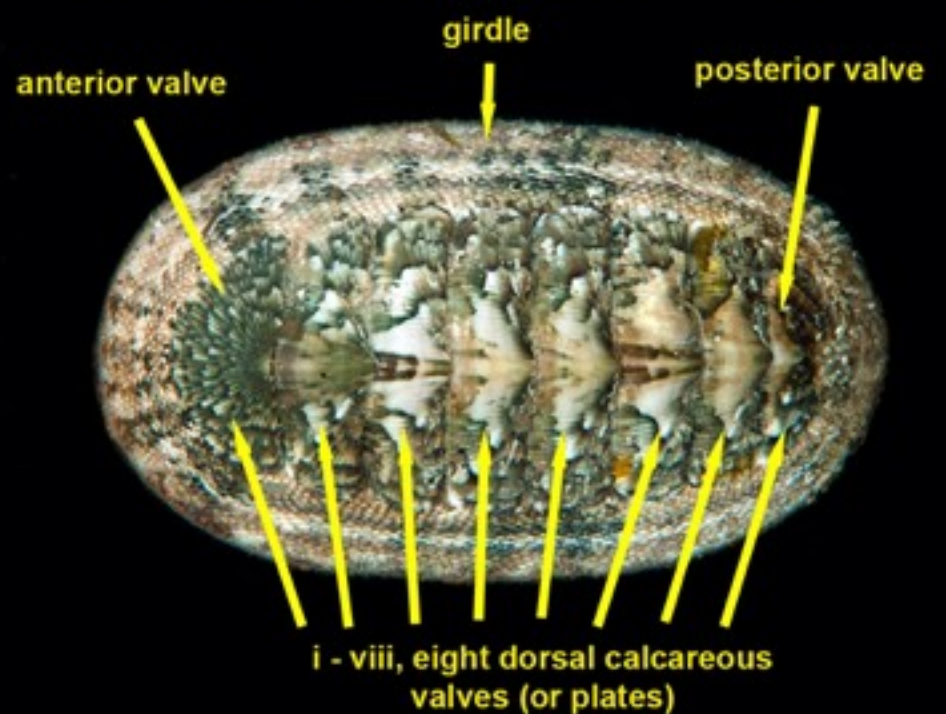


BIVALVIA

Scallops (Pectinidae)



CHITONS - POLYPLACOPHORA





Teulere's Cowry *Barycypraea teulerei* IO: Oman, intertidal mud flats, 67 mm. Transparent mantle with no papillae. Considered extinct due to over-collection, until Massimo Scali found a new population in 2012 at Masirah



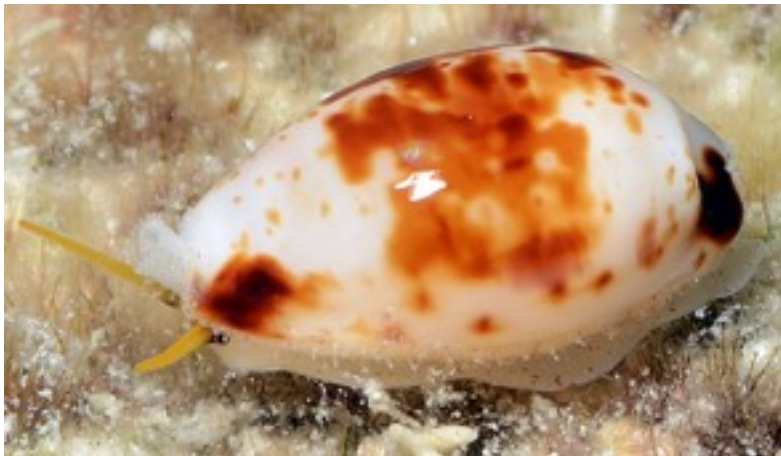
Teulere's Cowry *Barycypraea teulerei* (cont'd) uses shells to nest its eggs. All 3 photos: © Massimo Scali.



Maria's Cowry *Annepona mariae* IP, 21 mm. White with rounded yellow to brown spots. ©JJ.



Hundred-Eyed Cowry *Arestorides argus* IP: East Africa to Marshall Islands, 120 mm. Brownish with wide darker bands and brown ocelli, mantle with raised papillae and depressions that resemble sponge. ©JJ.



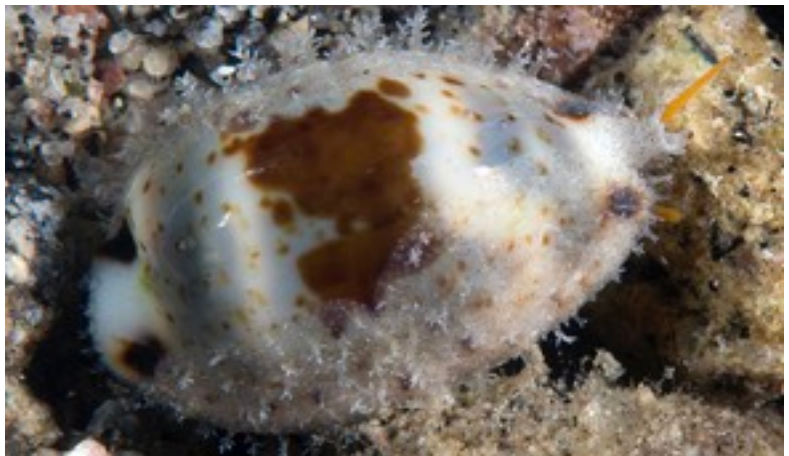
Dark-Blotched Cowry *Bistolida fuscomaculata* WCP, 17 mm. Shell with distinct brown blotches. ©JJ.



Swallow Cowry *Bistolida hirundo* IWP, 24 mm. Anterior white transverse mark in the form of a swallow.



Kiener's Cowry *Bistolida kieneri* IWP, 24 mm. Similar in appearance to *B. hirundo* and *B. ursellus*, but anterior white transverse band is irregular in shape and crosses all the gray-bluish area.





Stolid Cowrie *Bistolida stolidus* IP: East Africa to Marshall Islands, 40 mm. Shell with large brown blotches. Yellow-brown mantle with thin white tree-shaped papillae. Feeds on sponges and algae. ©SJ.



Little Bear Cowrie *Bistolida ursellus* IWP to Marshall Isl, 21 mm. Similar in appearance to *B. hirundo* and *B. kieneri*, but the anterior white dorsal band often shaped like a "W" or just like a white blob.



Palish Cowry *Blasicrura pallidula* WP: Philippines to New Caledonia and Samoa, 32 mm. Brownish reticulated mantle with darker and brighter areas and scattered papillae. Left: © Yves Trenevet, right: ©SJ.



Golden Cowry *Callistocypraea aurantium* WCP, 121 mm. Large nocturnal species with yellow or orange shell. Semi-translucent mantle with areas of brown reticulation. Feeds on a gray sponge. ©JJ.



Turtle Cowry *Chelycypraea testudinaria* IP, 153 mm. Oval or sub-cylindrical shell is yellowish, covered with irregular brown spots. mantle is brownish gray with darker longitudinal lines. Photos: ©JJ (left) and ©SJ (right).



Pretty Cowry *Ficadusta pulchella* IWP, 56 mm.
© Philippe & Guido Poppe www.poppe-images.com



Walker's Cowry *Contradusta walkeri* IP, 56 mm. Shell with a brown transverse band. © Ria Tan.



Breger's Cowry *Contradusta bregeriana* WCP, 34 mm. Similar in appearance to *C. walkeri* but tends to be smaller, brown transverse band generally less distinct. Right - © Yves Thévenet.



Tan and White Cowry *Cribrarula cribraria* IWP, 35 mm. Shell brown or orange with round white spots, bright orange to red mantle with tapering papillae. Found under shallow rocks, where it feeds on red encrusting sponge. ©JJ



Gaskoin's Cowry *Cribrarula gaskoini* Hawaii, possibly Marshall Isl, 30 mm. Orange shell with pale round spots. Orange mantle is densely covered with tapering papillae, feeds on red encrusting sponge, nocturnal. ©SJ.



Pale Sieve Cowry *Cribrarula gaspardi* WCP: Marshall Isl to Guam, 22 mm. Similar in appearance to *C. cribraria*, but generally smaller and paler, found on the outer slopes in the night. ©JJ.





White-Tufted Spindle Shell *Aclyvolva coarctata* IP: East Africa to Marshall Islands, 30 mm. *Hiatavolva rugosa* a junior synonym. Lives on red to yellow-brown whip-like gorgonians in the genus *Ellisella*.



White-Tufted Spindle Shell *Aclyvolva coarctata* (continued) Mantle coloration matches the color of the host gorgonian. Compound tuft-like retractable papillae mimic the polyps of the host. ©JJ.



Lance Spindle Shell *Aclyvolva lanceolata* IP: Red Sea and East Africa to Guam and Marshall Islands, 35 mm. Elongated shell, mantle with rounded compound papillae. Papillae mimic the polyps of the host gorgonian.



Lance Spindle Shell *Aclyvolva lanceolata* (continued) Colour morphs, close to the description of *A. lamyi*, a synonym of *A. lanceolata* now. ©JJ, ©SJ (left, right)



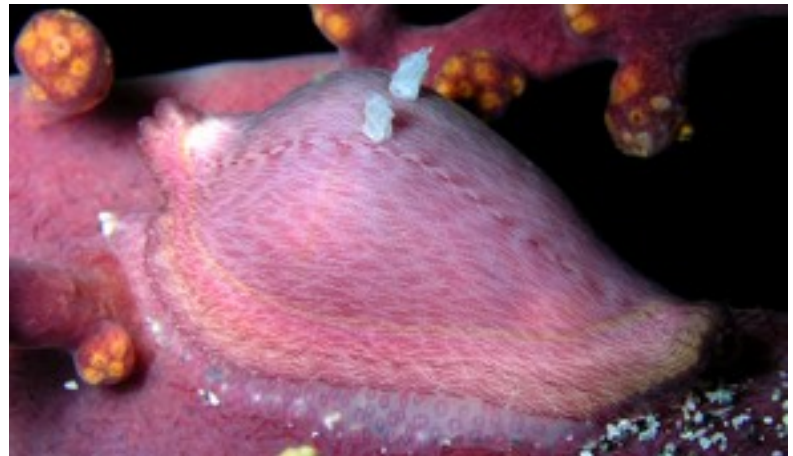
Lance Spindle Shell *Aclyvolva lanceolata* (continued). Colour morph, close to the description of *A. nicolamassierae*, a synonym of *A. lanceolata* now. Left (Red Sea): © Sven Kahlbrock, right (Marshall Isl.): ©JJ.



Azuma's Egg Shell *Dentiovula azumai* IWP: South Africa to Japan, 10 mm. Yellow to pale maroon to match host's color, mantle with dark red spots and prominent papillae. © Johji Nishio.



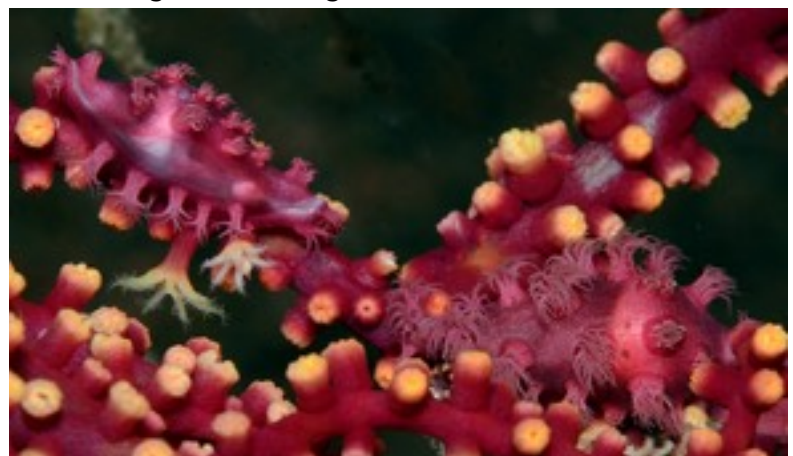
Dorsal Egg Shell *Dentiovula dorsuosa* IP, 18 mm. Feeds on *Siphonogorgia* and *Chironophthya* octocorals. The shell is white in color with yellow lines. Foot with pink rings. © Brian R. Mayes.



Dorsal Egg Shell *Dentiovula dorsuosa* (cont'd) Pink or yellowish mantle with small red dashes and white tapering papillae. Right: © Nick Hobgood, left: © Rokus Groeneveld.



Eizo's Egg Shell *Dentiovula eizoi* IP: East Africa to Central Pacific, 12 mm. Feeds on *Acanthogorgia* sea fan. Mantle with brown dots, prominent branching papillae. Left: © I. Bogachenko, right: © Dave Johnson.



Eizo's Egg Shell *Dentiovula eizoi* (continued) Several color morphs from yellow to maroon are matching the colors of host gorgonians. ©JJ.



Lavender-Mouth Conch *Canarium erythrinum* IP: Red Sea, East Africa to Marshall Islands, 50 mm. Yellow to red shell with striated lips. Like other conchs they use narrow muscular feet for moving in jerks or jumps. ©JJ.



Plicate Conch *Canarium labiatum* IWP: East Africa to West Pacific, 50 mm. Cream to white shell, banded with pale brown. Living animal greenish with opaque white mottling.



Maculated Conch *Canarium maculatum* CP: Marshall Islands to Hawaii, Polynesia, 40 mm. Shell of a dingy white color, with obscure brown spots. Living animal white with green speckles. Good jumper with 1 m+ jumps. ©JJ.



Micro Conch *Canarium microureus* WCP, 32 mm. Smooth cream to white shell with brown maculations. Living animal green with opaque white spots.



Changeable Conch *Canarium mutabile* IP: Red Sea, East Africa to Marshall Islands, 45 mm. Shells are mostly whitish in color, but can be decorated with white and brown bands or longitudinal stripes. ©JJ.



Areolate Moon Snail *Tanea areolata* IWP: Red Sea, East Africa to Philippines and Japan, 18 mm. Yellow-orange shell with pattern of a wavy pale lines.



Lined Moon Snail *Tanea lineata* IWP: Mozambique, S. Africa to Japan, 52 mm. White shell with pattern of axial orange-brown lines. White or pale-brown mantle skirt. © Ria Tan



Undulate Moon Snail *Tanea undulata* IWP: Red Sea, East Africa to Philippines and Japan, 35 mm. This color morph with 3 pointing forward spiral bands was recently treated as a separate species, *T. euzona*. Photo on the left: ©JJ.



Undulate Moon Snail *Tanea undulata* WP, 35 mm. White or creamy shell with pattern of a wavy, axial orange-brown thick lines. Head shield with 3 distinct black bars.



Violet Moon Snail *Tectonatica violacea* WCP: Philippines to Australia and Marshall Islands, 25 mm. Pear-shaped shell covered with red-orange spots, arranged in rows. White mantle skirt with dark red spotting. ©JJ.



Giant Helmet *Cassis cornuta* (cont'd) Ventral side cream, yellow or orange ©SJ



Red Helmet *Cypraecassis rufa* IP, 200 mm. Reddish shell, very thick outer lip. © Philippe Bourjon.



Banded Bonnet *Phalium bandatum* WP: Japan and Philippines to Australia, 140 mm. Shell with upturned siphonal canal, outer lip with 2-3 spines, 5 interrupted brownish spiral bands. Photos: left ©SJ right (eggs!) ©JJ.



Banded Bonnet *Phalium bandatum* (cont'd) Animal light-brown, preys on sea urchins. Nocturnal.



Grey Bonnet *Phalium glaucum* IP: E. Africa and Madagascar to Japan and Melanesia, 147 mm.



Grey Bonnet *Phalium glaucum* (cont-d) Globose grey shell with a low spire, outer lip with 3-4 sharp spines. Animal red-brown, nocturnal. Preys on sea urchins.



Japanese Bonnet *Semicassis bisulcata* IWP: Red Sea, East Africa to Japan, Philippines and Australia, 85 mm. Globular white, cream or fawn shell, usually with 4 to 5 spiral bands of brown spots. Preys on sea urchins.





Triton's Trumpet *Charonia tritonis* IP: Red Sea, East Africa to Japan, Hawaii and Polynesia, 490 mm. Shell with a tall spire, glossy, with purple brown markings.



Triton's Trumpet *Charonia tritonis* (cont'd) Preys on large echinoderms, including ill famous coral-eating Crown of Thorns starfish, *Acanthaster planci*. This juvenile is eating a young cushion star, *Culcita novaeguineae*. ©SJ.



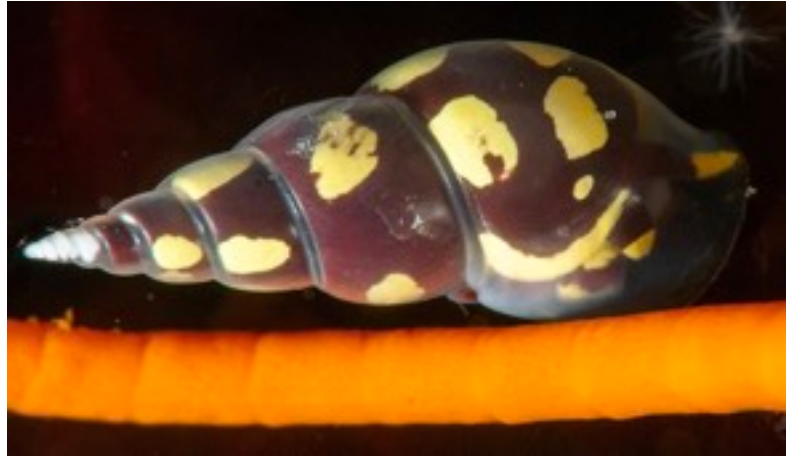
Triton's Trumpet *Charonia tritonis* (cont'd) Frequently over-collected species. Collections and sale of *Charonia tritonis* now banned in some countries (Australia, India).



Lesser Girdled Triton *Gelagna succincta* IWP: Red Sea, East Africa to Central Pacific, 80 mm. Usually hard to recognize due to long paddles of soft periostracum ("coat") that cover the striped shell. Animal red-orange. ©JJ



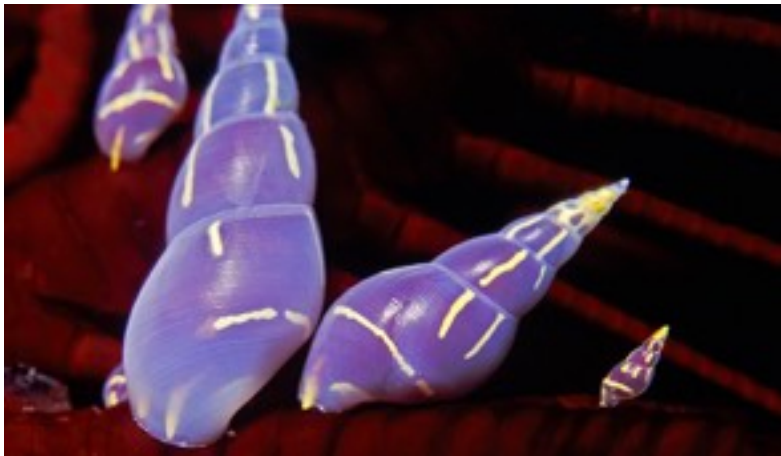
Echinaster's Apicalia *Apicalia echinasteri* WP: Australia to Japan and Solomons, 9 mm. Ovate, solid, transparent gray or white shell. White animal with long retractile proboscis. Ectoparasite on *Echinaster* starfish. ©JJ



Spotted Annulobalcis *Annulobalcis maculatus* WP, 7 mm. Elongated transparent conical-shaped glossy shell. Red-brown body with large yellow spots. Ectoparasite on crinoids. Photo on the left ©JJ.

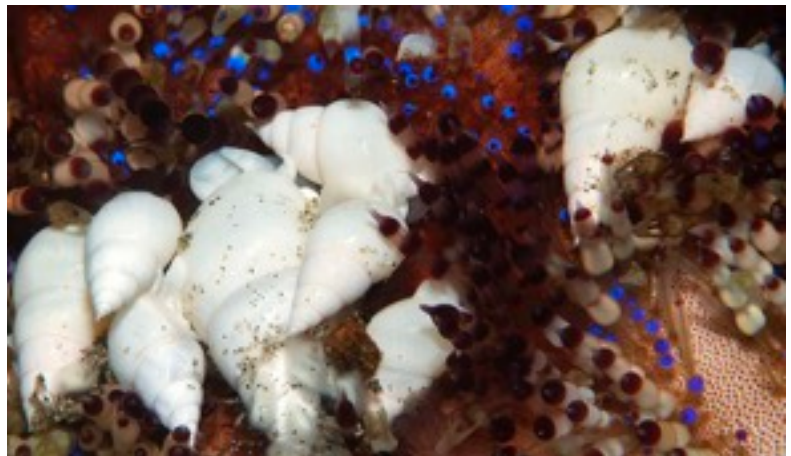


Capillaster Goodingia *Goodingia capillastericola* IWP: Red Sea (Aqaba Bay), Indonesia, 7 mm. Short transparent glossy shell. Animal with white, brown-striped body. Ectoparasite on crinoids. Photos: ©SJ, ©JJ (left, right).



Purple Annulobalcis *Annulobalcis yamamotoi* WP, 8 mm. Found on crinoids. © Stephen D. A. Smith.

Wine Annulobalcis *Annulobalcis vinarius* WP, 8 mm. Parasite on crinoids. Animal red with white dots. ©SJ.



Fire Urchin Snail *Echineulima asthenosomae* WP: Australia, Indonesia, Philippines, 12 mm. Semitransparent conical-shaped shell. Parasitic on *Asthenosoma* sea urchins. Photo on the left: with eggs.



Bailey Cone *Conasprella baileyi* IWP, 32 mm. MNHN Kanacono 2016. © David Massemin.



Hopwood's Cone *Conasprella hopwoodi* WP, 32 mm. © Philippe & Guido Poppe www.poppe-images.com



Tirard's Cone *Conasprella tirardi* SP, 31 mm. MNHN Koumac 2018. © David Massemin.



Guided Cone *Conus aulicus* IP: Madagascar to Japan, F. Polynesia, 163 mm. Preys on gastropods.



Sharp-Angled Cone *Conus acutangulus* IWP, 46 mm. Shell with high spire and strong spiral ribbons. Mostly brown with white spots. Live animal white, patterned with brown.



Admiral Cone *Conus ammiralis* IP: Red Sea to Marshall Islands, 109 mm. White shell with a complex pattern of brown spiral bands and white tents. Animal white, patterned with black and brown. Right photo: ©JJ.



Sand-Dusted Cone *Conus arenatus* IP: Red Sea, E. Africa to Tuamotu, 90 mm. White with spiral rows of dark brown dots. Foot cream, mottled with brown. Preys on worms: eunicids, nereids, capitellids. Right photo: ©JJ.





Gilded Cone *Conus auratinus* WCP, 120 mm. Foot white with brown blotches and lines. ©SJ



Gold-Leaf Cone *Conus auricomus* IP: E. Africa to Japan, Hawaii and F. Polynesia, 69 mm. ©JJ.



Gold-Leaf Cone *Conus auricomus* (cont'd) Shell with high spire, white to pale yellow, patterned with brown and numerous white or yellow tents. Foot white with brown dots. ©JJ



Golden Cone *Conus aureus* IP: E. Africa to Maldives, Japan and Tuamotu, 80 mm. White to pale yellow with a network of fine brown lines and brown blotches. ©JJ. Photo on the right: juvenile, 15mm.



Banded Marble Cone *Conus bandanus* IP: E. Africa to Philippines and Hawaii, 150 mm. ©SJ.



Captain Cone *Conus capitaneus* IP: E. Africa to Hawaii, Japan and Australia, 98 mm. ©JJ



Captain Cone *Conus capitaneus* (cont'd) Shell with a low spire and 2 pale yellow bands: on the shoulder and in the centre. Animal greenish yellow dotted with black. Preys on gastropods. Photos: (left, right) © Bob Abela, ©JJ.





Boetian Cone *Conus boeticus* IWP: E. Africa to Japan and Fiji, 40 mm. Yellowish low-spire shell with blackish brown markings. Live animal yellowish with brown mottling. Photos: (left, right) ©JJ, © Bob Abela.



Bubble Cone *Conus bullatus* IP: E. Africa to Marquesas and Hawaii, 82 mm. Shell variable in color: orange to fawn, with fine white axial lines. Foot white with brown lines and blotches. Photos: (left, right) ©SJ, © Bob Abela.



Cathy's Cone *Conus cathyae* WCP, 135 mm. Reddish brown shell with small white tents. © Bob Abela.

Vermiculate Cone *Conus chaldaeus* IP: E. Africa to Japan and Central America, 59 mm. ©JJ.



Cat Cone *Conus catus* IP: E. Africa to Japan and Hawaii, 52 mm. Low-spire shell, variable in color: from yellow-brown to dark brown or red, some with brown clouds. Foot white with brown pigment. Photo: (left, right) ©SJ, ©JJ



Celine's Cone *Conus coelinae* WCP: Australia, N. Caledonia to Hawaii, 128 mm. Shell yellowish, covered by brown periostracum. Foot brown with black spot anterior. Photo: (left, right) ©JJ, © D. Massemin.



Cropped Cone *Conus circumcissus* WCP: Philippines to Australia, Fiji and Marshalls, 100 mm. Shell yellowish orange or yellow, some with dark brown blotches. Preys on fishes. ©SJ



Brazier Cone *Conus brazieri* WCP, 100 mm. Pale shell, without dark brown spots. Deep species, usually below 35 m. Was synonymized with *C. circumcissus* by some experts. Species delimitation awaits DNA analysis. ©SJ



Sunburnt Cone *Conus cinereus* WP: Japan to Indonesia and Vanuatu, 57 mm. Beige foot spotted with black.

Singed Cone *Conus consors* IP: E. Africa to Marshalls, 118 mm. Yellow, 2 orange bands. © R. Groeneveld



Coffee Cone *Conus coffeae* WCP: Philippines, Indonesia to Marshalls and F. Polynesia, 51 mm. White shell with violet aperture. Periostracum yellow to brown. Animal body red with white dots. Photo on the right: ©JJ



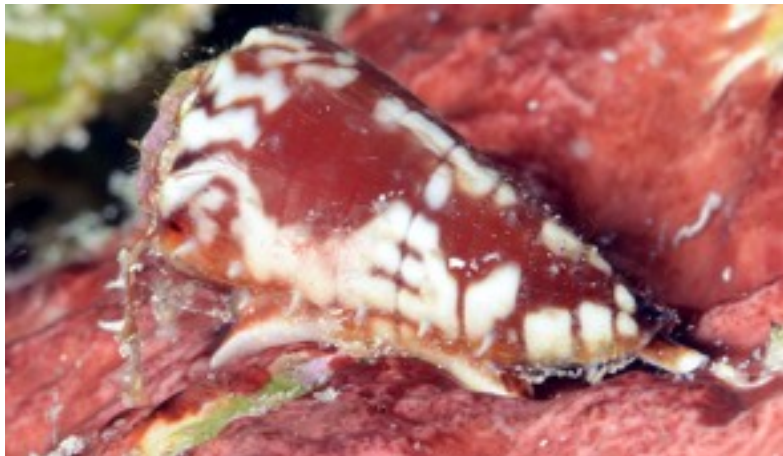
Papal Cone *Pygmaeonus papalis* IP: Red Sea, E. Africa to Hawaii, 47 mm. Formerly *C. coronatus*. Gray to beige, spiral rows of alternating white and dark dots. Foot reddish with dark brown mottling. Right photo: ©JJ.



Saffron Cone *Conus crocatus* IP: E. Africa, Thailand to Marshalls and Samoa, 82 mm. Shell with rounded shoulder, orange with white or yellow tents. Foot yellow or orange, with black spots. ©JJ.



Cylindrical Cone *Conus cylindraceus* IP: E. Africa to Hawaii and Marshalls, 59 mm. Ovate shell with high spire and indistinct shoulder. White with pattern of brown or purple-brown. Photos: (left, right) ©SJ, ©JJ.



Distant Cone *Conus distans* IP: Red Sea, E. Africa to Hawaii and F. Polynesia, 150 mm. Shell white or yellowish. Periostracum dark brown, thick. Preys on eunicids. Photos (left, right - 1.5 cm. juvenile): ©SJ, ©JJ.



Coral Cone *Conus corallinus* WCP: Japan to Papua N. Guinea and Marshalls, 38 mm. ©SJ

Ivory Cone *Conus eburneus* IP: E. Africa to F. Polynesia, 79 mm. Preys on eunicids, capitellids.



Ivory Cone *Conus eburneus* (cont'd) White shell with low spire and spiral rows of brown to black squarish spots. White foot with black spots. Photos (left, right - albino form): ©SJ, ©JJ.



Hebrew Cone *Conus ebraeus* IP: E. Africa to Japan, Australia, C. America, 62 mm. White shell with 3-4 spiral rows of black elongate squarish blotches. Black foot with beige margin. Preys on eunicids, nereids. ©JJ.



Magnificent Cone *Conus episcopatus* IP: E. Africa to Japan, Marshalls, F. Polynesia, 115 mm. White shell with light tent-like markings on the brown zones. White foot mottled with brown, black blotch in anterior part. ©JJ.



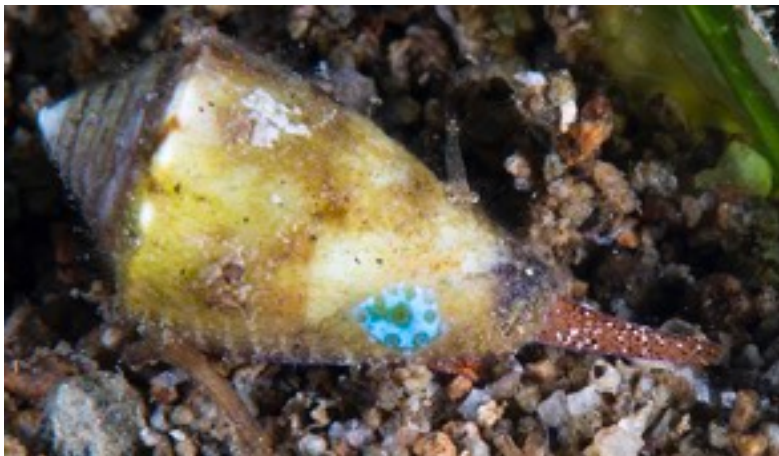
Cabrit's Cone *Conus exiguus* WP: Samoa to New Caledonia, Vietnam, 54 mm. © Yves Trenevet.



Yellow Pacific Cone *Conus flavidus* IP, 75 mm. Yellow shell with thick brownish periostracum. ©JJ



Snowflake Cone *Conus floccatus* WCP: Indonesia to Philippines and Marshalls, 86 mm. White shell with numerous brown blotches, dots and axial lines. Animal white, mottled with brown, black blotch anteriorly. ©JJ.



Flowery Cone *Conus floridulus* IWP: Reunion to Maldives, Japan and N. Caledonia, 59 mm.



Grainy Cone *Conus granum* IWP, 40 mm. © Philippe & Guido Poppe www.poppe-images.com



Geography Cone *Conus geographus* IP: Red Sea, East Africa to Japan and F. Polynesia, 166 mm. White with network of red-brown lines. Foot white with brown in the middle. Preys on fishes. Photo on the left: ©JJ



Acorn Cone *Conus glans* IP: East Africa to Japan and F. Polynesia, 65 mm. White to pale blue shell with rounded shoulder and closely spaced, often granulose spiral ribs. Red foot with white dots. Preys on eunicids. ©JJ



Glory of the Sea Cone *Conus gloriamaris* WCP: Indonesia to the Philippines and Solomons, 162 mm. ©SJ.



Lienard's Cone *Conus lienardi* WP: Philippines to N. Caledonia and Vanuatu, 63 mm. © D. Massemin.



Imperial Cone *Conus imperialis* IP: East Africa to Hawaii, 110 mm. Shell with angulate shoulder, white with 2 brown bands, split into streaks and blotches. Pink foot with brown mottling. Photos: (left, right) ©SJ, ©JJ.



Ambassador Cone *Conus legatus* IP: E. Africa to Japan and F. Polynesia, 63 mm. Pinkish-white shell with a network of fine brown lines and axial rows of white tents. Foot white with brown mottling and black spots. ©JJ.





Leopard Cone *Conus leopardus* IP: E. Africa to Hawaii, 222 mm. Shell white with spiral rows of dark brown spots. Periostracum yellowish or reddish brown. Preys on enteropneusts (acorn worms). ©SJ.



Lithograph Cone *Conus litoglyphus* IP: E. Africa to Hawaii, 75 mm. Brown shell with interrupted white bands at shoulder and below centre. Animal olive, mottled with dark brown. Preys on eunicids. ©JJ



Lettered Cone *Conus litteratus* IP: E. Africa to Japan and Hawaii, 170 mm. White shell with 3 yellowish bands and spiral rows of dark-brown rounded spots. Animal pink, speckled with dark brown. Preys on capitellids. ©JJ



Livid Cone *Conus lividus* IP: Red Sea, East Africa to the Philippines and Hawaii, 81 mm. Yellow shell with white bands at shoulder and below centre, aperture violet, apex pink. Preys on acorn worms, spaghetti worms. ©JJ



Livid Cone *Conus lividus* (cont'd) Animal red with black speckles and white dots.



Yellow Cone *Conus luteus* WCP: Philippines to F. Polynesia and Marshalls, 54 mm. © S. Jazwinski.



Weasel Cone *Conus mustelinus* 107 mm, IP: Maldives to Marshalls. Yellow shell with 2 white bands. ©JJ.



Mariel's Cone *Conus marielae* CP: Marshall Islands to Marquesas and Tuamotus, 60 mm. ©SJ



Magnificent Cone *Conus magnificus* IP: East Africa to F. Polynesia, 114 mm. Similar to *C. episcopatus*, differs in having a finer reticulate pattern, usually higher spire and a larger proportion of tent-like markings. ©JJ



Magical Cone *Conus magus* WCP: Indonesia to Fiji, Marshalls and Japan, 94 mm. White to yellow, low-spire shell, white to yellow, with brown blotches, often dotted spiral lines. Periostracum brown, aperture white. ©JJ



Magical Cone *Conus magus* (cont'd) Animal white, mottled with brown. Preys on fishes.



McBride' Cone *Conus mcbridei* WCP: Philippines, Hawaii, 11 mm. White shell, anterior 1/3 dark brown. ©JJ



Marble Cone *Conus marmoreus* IP: India to Fiji and Marshalls, 150 mm. Shell with a pattern of white or yellow tent-like marks on black background. Photos (left, right - preying on juvenile cowrie) : ©SJ, ©JJ.





Soldier Cone *Conus miles* IP: E. Africa to Hawaii, 136 mm. White shell with 2 dark brown bands, fine brown axial lines and large brown patches. Animal dark gray or black. Preys on eunicids. Photo on the right: ©JJ.



Thousand-Spot Cone *Conus miliaris* IP: Red Sea, E. Africa to F. Polynesia and Marshalls, 43 mm. Pale-apricot shell with white zig-zag lines and spiral rows of brown and white dots. Animal yellow. Preys on eunicids. ©JJ.



Molucca Cone *Conus moluccensis* IP: Reunion to New Caledonia and Marshalls, 60 mm. © D. Massemin.



Minute Cone *Conus nanus* Philippines, Hawaii, 34 mm © Philippe & Guido Poppe www.poppe-images.com



Morelet's Cone *Conus moreleti* IP: E. Africa, Maldives to F. Polynesia and Hawaii, 61 mm. Dark-brown shell, sometimes with a lighter central band. Dark-brown foot with red margin. Preys on terebellids. ©JJ.



Music Cone *Conus musicus* IP: Maldives to Australia, Japan and Marshalls, 30 mm. White or gray shell with a spiral rows of dots and dashes. Animal red with white dashes. Preys on nereids. Photos: (left, right) ©SJ, ©JJ.





Nut Cone *Conus nucleus* IP: Madagascar to Maldives, Japan to Marshalls, 25 mm. Orange to olive-brown shell with lighter central band and pale violet aperture. Animal yellow to orange. Photos: (left, right) ©JJ, ©SJ.



Nussatella Cone *Conus nussatella* IP: Red Sea, East Africa to Hawaii, 95 mm. White or yellow shell with spiral rows of small dark brown spots. Animal white with dark-brown mottling. ©JJ



Obscure Cone *Conus obscurus* IP: E. Africa to Hawaii and F. Polynesia, 44 mm. Violet-brown shell with brown blotches and spiral rows of alternating brown-grey dots&dashes. Pink foot with brown pigment. Preys on fishes. ©JJ



Omaria Cone *Conus omaria* IP: E. Africa to Japan, Marshalls and N. Caledonia, 86 mm. Pale yellow or cream shell with pattern of tent-like marking. White foot with red-brown streaks and black spots. Left: © Bob Abela



Perfect Cone *Conus ochroleucus* WP, 88 mm. © Philippe & Guido Poppe www.poppe-images.com

Parian Cone *Conus parius* WP, 46 mm. White shell with brown periostracum. © Rokus Groeneveld.



Feathered Cone *Conus pennaceus* IP: Indian Ocean from E. Africa to Maldives, Hawaii, 88 mm. Shell with a fine network of brown lines and tents. Animal reddish-brown with white mottling. Preys on gastropods. ©SJ.



Pertusus Cone *Conus pertusus* IWP, 69 mm. Pinkish shell with red clouds, dotted and dashed spiral lines. Animal yellow with dark brown dots. ©JJ



Pertusus Cone *Conus pertusus* (cont'd) Dotted and dashed spiral lines clearly visible. ©JJ.

Oak Cone *Conus quercinus* IP, 140 mm. Yellow shell, brown spiral lines. Animal gray with brown dots. ©JJ



Ringed Cone *Conus planorbis* IP: East Africa, Japan to Hawaii and F. Polynesia, 82 mm. Shell brown or red-brown with 2 faint pale spiral bands. Animal yellow with black spots. Photos: (left, right) © Bob Abela, ©JJ.



Flea-Bite Cone *Conus pulicarius* CWP: Indonesia to F. Polynesia and Hawaii, 75 mm. White shell with irregularly scattered small black spots. Preys on capitellids (worms). Photos: (left, right) SJ ©JJ.



Radiant Cone *Conus radiatus* WP, 109 mm.
© Philippe & Guido Poppe www.poppe-images.com



Rat Cone *Conus rattus* IP, 70 mm. Pale bluish shell with yellow to olive periostracum, animal yellow.



Netted Cone *Conus retifer* IP: E. Africa to Hawaii and F. Polynesia, 69 mm. Pale pink shell with rounded shoulder and pattern of black axial lines, fine brown lines and tent-like marks. Photos: (left, right) ©JJ , ©SJ.



Bloodstained Cone *Conus sanguinolentus* IP: E. Africa, Thailand to Polynesia, 65 mm. Close to *C. lividus*. ©JJ



Solomons Cone *Conus solomonensis* WP: Solomons, N. Guinea, 40 mm. Pale bluish with brown spots. ©SJ.



Marriage Cone *Conus sponsalis* IP: E. Africa to Hawaii and F. Polynesia, 34 mm. White shell with red-brown axial blurred bands. Animal pink with fine white stripes. Preys on worms: nereids, eunicids. ©JJ.



Fly-Specked Cone *Conus stercusmuscarum* WP, 64 mm. Pale gray or brown with spiral rows of brown dots and white dashes. Animal white, mottled with brown. Photo on the left ©SJ. Preys on fishes.





Striate Cone *Conus striatus* IP: E. Africa to Hawaii and F. Polynesia, 129 mm. White shell with yellow periostracum and axial streaks of dashed spiral lines. Animal white with red-brown streaks and blotches. Preys on fishes.



Striate Cone *Conus striatus* (cont'd) Juveniles with paler shells, animal pink-orange with black or dark brown dots. ©JJ



Black-Band Cone *Conus sugillatus* CP: Philippines to N. Caledonia and Polynesia, 30 mm. Close to *C. muriculatus*, often treated as a variation. White shell with a dark area around siphon canal. Animal red with b&w speckles. ©JJ.



Thin-Line Cone *Conus tenuistriatus* IP: E. Africa to Philippines, Marshalls and F. Polynesia, 68 mm. Ovate shell, white with brown periostracum and finely granulate spiral bands. Animal red. Preys on polychaetes. ©JJ.



Tulip Cone *Conus tulipa* IP: E. Africa to F. Polynesia, 95 mm. Yellowish shell with red-brown areas and spiral rows of brown and white dots and dashes. Animal white with brown streaks and blotches. Preys on fishes. ©JJ.



Tessellate Cone *Conus tessulatus* IP: Red Sea, E. Africa and F. Polynesia, 82 mm. White shell with spiral bands of orange rectangular spots. Animal white with brown speckles and black spots. Photos: (left, right) SJ, ©JJ.



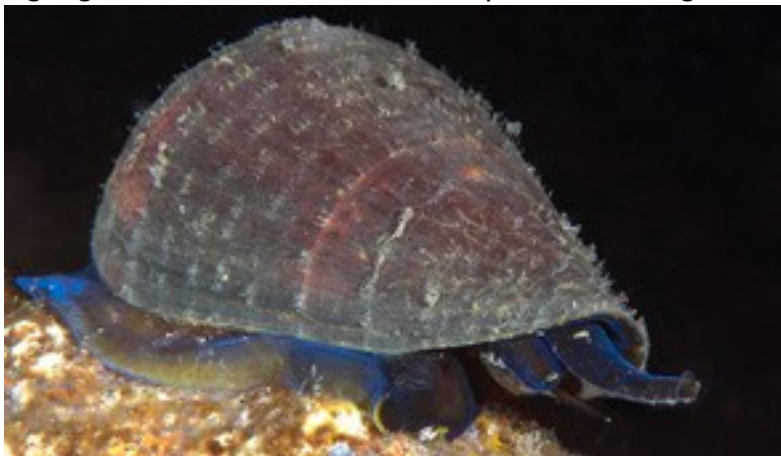
Textile Cone *Conus textile* IP: Red Sea, E. Africa to Hawaii, 150 mm. White shell with a network of brown lines, transforming into numerous tents of different size. Animal white to cream with brown mottling and black spots.



Textile Cone *Conus textile* (cont'd) Nocturnal, preys on gastropods. Photo on the left (©JJ): juvenile. Photo on the right: *Conus textile neovicarius* - Red Sea variation, to 100 mm.



Flag Cone *Conus vexillum* IP: Red Sea, E. Africa to Hawaii and F. Polynesia, 186 mm. Brown shell with white zigzag band at centre and white aperture. Foot green to greenish black. Periostracum yellowish to dark brown.



Flag Cone *Conus vexillum* (cont'd) Nocturnal, preys on eunicid worms.



Terebra Cone *Conus terebra* IP: E. Africa to Australia and Marquesas, 99 mm. Preys on terebellids. ©JJ



Spotted Cone *Conus varius* IP: E. Africa to Marshalls, 61 mm. White shell with brown spots and spiral bands of brown and white granules. Foot white with black-brown spots. Preys on polychaetes. ©JJ



Violet Cone *Conus viola* WP: Thailand to Philippines, Australia and Guam, 54 mm. Long narrow shell, gray to violet or reddish, with 2-3 spiral bands. Aperture violet, creamy foot. Right: © P. Bourjon, left: © Tsu Soo Tan.



Virgin Cone *Conus virgo* IP: E. Africa to F. Polynesia and Marshalls, 151 mm. Yellow to orange shell with dark-blue base, brown periostracum. Preys on terebellids. Foot white with yellow margin and black spot. Photos: ©SJ, ©JJ.



Veal Cone *Conus vitulinus* IP: Red Sea, Madagascar to Philippines and Marshalls, 83 mm. White to yellowish shell with 2 broad brown bands. Animal yellow with dark-brown spots. Preys on polychaetes. ©JJ.



Zapatos Cone *Conus zapatosensis* Philippines, 49 mm. White to cream shell with dark-brown spots, white or pale yellow aperture. White foot with brown pigment.



Snake-Tongue Mitre *Nebularia pellisserpentis* IP: Mauritius, Japan, Philippines to Hawaii, 35 mm. ©SJ.



Chrysalis Mitre *Pseudonebularia chrysalis* IP: Red Sea, E. Africa to Japan and Marshalls, 30 mm. ©JJ.



Armadillo Mitre *Pseudonebularia cf. cingulata* WCP: Marshalls, 50 mm. Orange to brown shell with elevated spiral ridges. Animal translucent with opaque yellow spots. Appears to be undescribed. ©JJ.



Kettle Mitre *Pseudonebularia cucumerina* IP: Red Sea, E. Africa to Hawaii, Polynesia, 26 mm. Yellowish to red-brown in color, often with a white transverse band on the body whorl. Translucent animal with yellow spots. ©JJ.



Barrel Mitre *Pseudonebularia doliolum* IWP: India to Japan, Australia and New Guinea, Marshalls, 30 mm. Yellow, brown or red-brown shell with elevated spiral ridges. ©JJ



Barrel Mitre *Pseudonebularia doliolum* (cont-d) Red-brown color morph.



Strawberry Mitre *Pseudonebularia fraga* IP: Red Sea, to Solomons, N. Guinea and Marshalls, 50 mm. ©JJ.



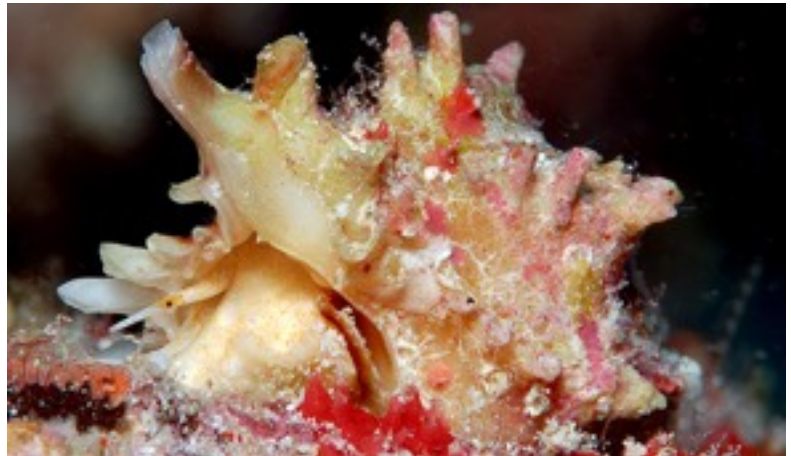
Ponder's Aspella *Aspella ponderi* WCP: Australia to Japan and Marshall Islands, 18 mm. ©JJ.



Elongate Aspella *Aspella producta* IP: Red Sea, E. Africa to Marshalls and Hawaii, 33 mm. ©JJ.



Caledonia Attiliosa *Attiliosa caledonica* WCP: New Caledonia to Marshall Islands, 31 mm. Shell with 4 or 5 distinct acute spines on the varices of the body whorl (highlighted). Animal cream with orange speckles. ©JJ.



High Murex *Chicomurex excelsus* WCP: Philippines to Fiji and Marshall Islands, 51 mm. ©SJ.



False Superb Murex *Chicomurex pseudosuperbus* IP, 60 mm. MNHN Koumac 2019. © D. Massemin.



Lacinate Murex *Chicomurex laciniatus* WCP: Philippines to Australia and Marshalls, 77 mm. High spired shell, finely dentate outer lip, fleshy ochre or brown in color. Aperture white with deep rosy pink to violet edges. ©JJ.



Tagarua Murex *Chicomurex tagaruae* WP: Philippines, 50 mm. High spired shell, nearly round aperture, dentate outer lip, tan or brown in color.





Jeanetteae's Mitre *Vexillum jeanetteae* WCP: Philippines, Samoa, Marshalls, 15 mm. Shell inflated, biconic in shape. Yellow with transverse brown bands. Black animal with white dots. Photo: ©JJ.



Kathie Way's Mitre *Vexillum kathiewayae* WCP: New Guinea to Japan, Guam and Marshalls, 27 mm. ©JJ.



Kuiper's Mitre *Vexillum kuiperi* WCP: Japan to Guam, Marshalls, 11 mm. Inflated shell with red bands. ©JJ.



Lenhill's Mitre *Vexillum lenhilli* WCP: Philippines to Marshalls and Hawaii, 7 mm. Shell relatively broad in shape. Fawn to brown or orange, with transverse white and narrow black bands. Animal tan with white speckles. ©JJ.



White-Belt Mitre *Vexillum leucozonias* IP, 25 mm. Shell from fawn to dark-brown with white bands. ©JJ.

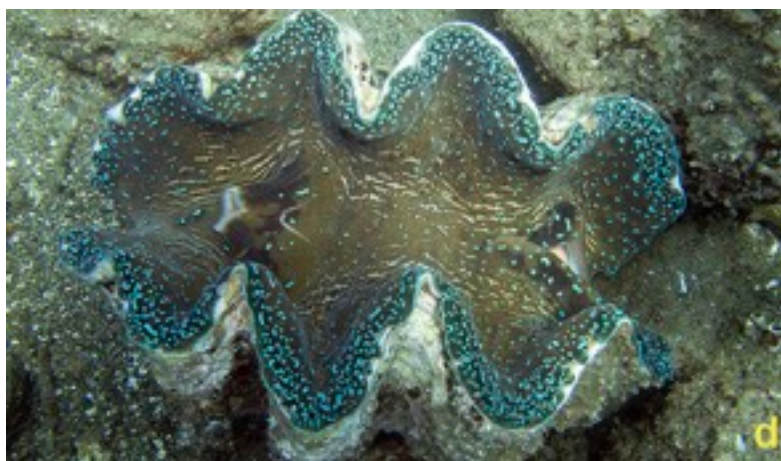
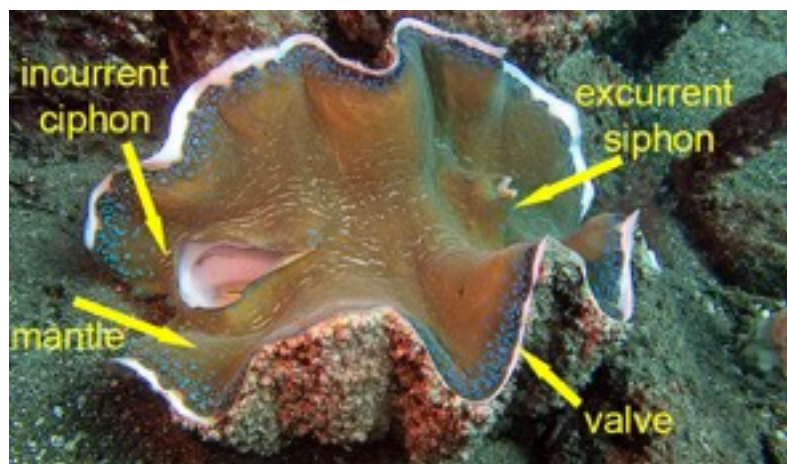


McCausland's Mitre *Vexillum mccauslandi* WP: Indonesia, 24 mm. Slender shell with brown stripes.



Bright Mitre *Vexillum lucidum* IP: Red Sea, E. Africa to Philippines, Australia and Marshalls, 20 mm. White to creamy in color, elongated shell. Pattern of spiral cords, not interrupted on axial ribs. ©JJ.





Giant Clam *Tridacna gigas* IP, 137 cm. Smooth shells with no ribbing and four or five vertical folds. Unlike other *Tridacna* species, **incurrent siphon bears no tentacles**. Areas with no zooxanthellae cells in the central axis are often marked with a white longitudinal lines. Mantle olive-brown or greenish. Iridescent blue ocelli, hyaline light-sensitive organs (“eyes”) are concentrated near the edge of the mantle. In many regions giant clams are becoming endangered due to intensive exploitation. Photo: “f”,”h”,”i” ©JJ, photo “g”: ©SJ.



Scaly Galeommatid *Galeommella utinomii* IP: Reunion to Japan, 7 mm. Shell transparently white, elliptical oval in shape, with distinct radial ribs. Mantle with red-orange spots, covers the shell. © Johji Nishio.



Semper's Galeommatid *Devonia semperi* WP: Japan, Philippines, 20 mm. Symbiotic with holothurians.



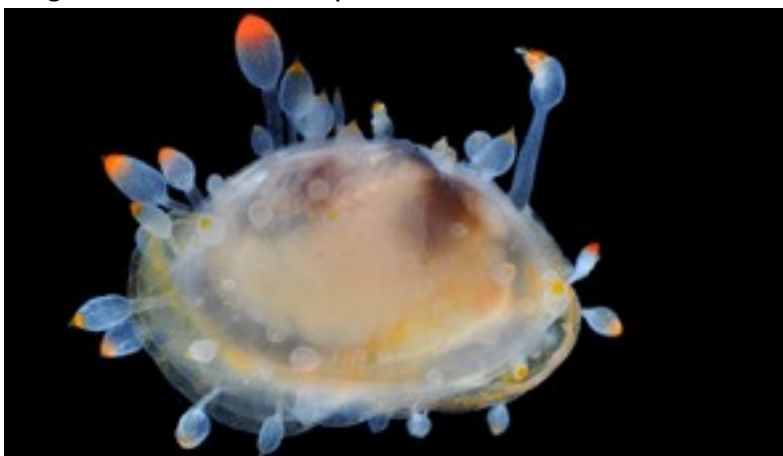
Elegant Galeommatid *Scintilla nitidella* WP: Japan to N. Caledonia, 13 mm. ID tentative.



Cuvier's Galeommatid *Scintilla cuvieri* WP: Philippines, Hong Kong, Indonesia, 19 mm. Inflated shell, bronze to bright yellow in color. Associated with a number of invertebrates, including ophiuroids and alpheid shrimps.



Philippine Galeommatid *Scintilla philippinensis* WP: Philippines to Singapore, 20 mm. Inflated shell with weak hinge. Associated with peanut worms. Mimics 2 kinds of animals: nudibranchs and crabs. © Arthur Anker.



Red-Tipped Galeommatid *Scintilla* sp. WP: Singapore, 8 mm. © Arthur Anker. ID tentative.



Yellowish Galeommatid *Scintilla* sp. WP: Singapore, 9 mm. © Arthur Anker. ID tentative.

CRYPTOPLACIDAE



Slug-Like Chiton *Cryptoplax larvaeformis* IWP: Maldives and Thailand to Philippines, Indonesia, Fiji and Australia. 150 mm. Plates are reduced, flexible fast-moving animal. Nocturnal, hides under rocks during the day.



Eye Chiton *Cryptoplax oculata* WP, 130 mm. Found on hard corals, retreats in the crevices when disturbed.



Caledonian Chiton *Cryptoplax larvaeformis* f. *caledonicus* New Caledonia, 120 mm.



ISCHNOCHITONIDAE



Adorned Chiton *Ischnochiton comptus* WP: Japan, Korea, China, Philippines: 25 mm. Variable in color, girdle scales are smooth and large. Found on intertidal rocks.



Bonin's Chiton *Ischnochiton* cf. *boninensis* WP: Philippines, 30 mm. Close to *I. boninensis* from Japan.



Alata Chiton *Stenoplax alata* IWP: India to Vietnam, Japan, China, 51 mm. Brownish girdle with dark spots.

SCHIZOCHITONIDAE



Swollen Chiton *Schizochiton incisus* IWP: Seychelles, Chagos, Maldives, Philippines to Indonesia, Solomons and Australia, 50 mm. Easily recognizable by the deep V-shaped caudal sinus in the tail valve.



CRYPTOPLACIDAE

ISCHNOCHITONIDAE

SCHIZOCHITONIDAE