MINISTRY OF AGRICULTURE, RURAL DEVELOPMENT AND ENVIRONMENT

DEPARTMENT OF FISHERIES AND MARINE RESEARCH

NON-INDIGENOUS SPECIES OF THE "NATURA 2000" AREAS CY3000005 CAVO GRECO AND CY3000006 NISIA, SOUTH EAST COAST OF CYPRUS

This pocket guide has been prepared in the framework of the project

"Baseline Survey and Monitoring of Non-Indigenous Species in Cavo Greco and Nisia Marine Protected Areas in Cyprus"

Tender No. 26/2016

by the contractors

Marine & Environmental Research (MER) Lab Ltd
&
AP Marine Environmental Consultancy Ltd

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Introduction

This pocket guide serves as an illustrated identification guide of the non-indigenous/alien species recorded in the Natura 2000 sites Cavo Greco (CY3000005) and Nisia (CY3000006), during a two-year project (2016–2018) named 'Baseline survey and monitoring of non-indigenous species in Cavo Greco and Nisia Marine Protected Areas in Cyprus'.

Non-indigenous or alien species are species living outside their native distributional ranges, which arrived there by human-driven activities, either deliberately or accidentally. The number of non-indigenous species in the Mediterranean Sea is growing rapidly in the recent decades. There are at least 821 multicellular alien species in the Mediterranean Sea of which more than 600 are currently established (Zenetos et al. 2017).

International shipping, aquaculture, and aquarium releases are considered as major introduction pathways of alien species in the Mediterranean basin, but the majority of the introductions in the eastern Basin (Levantine) are attributed to a single introduction pathway, the Suez Canal (Katsanevakis et al. 2014). The Mediterranean marine ecosystems face multiple anthropogenic threats such as climate change, overfishing, and alien invasions, which have led to community shifts and 'tropicalization' of the Mediterranean (Bianchi 2007). Taking into account the recent enlargement of the Suez Canal, there is a great need for continuous monitoring and assessment of the Mediterranean Sea marine biota (Galil et al. 2015).

This guide represents a preliminary identification guide of the alien species recorded during underwater surveys that were conducted for two years in the Natura 2000 sites. Additional references are provided at the end of the pocket guide for those who want to further identify species using scientific identification keys. The nomenclature of the species was based on the most recent (2018) taxonomic classifications provided by scientific literature and valid scientific databases such as WoRMS, AlgaeBase, and FishBase.

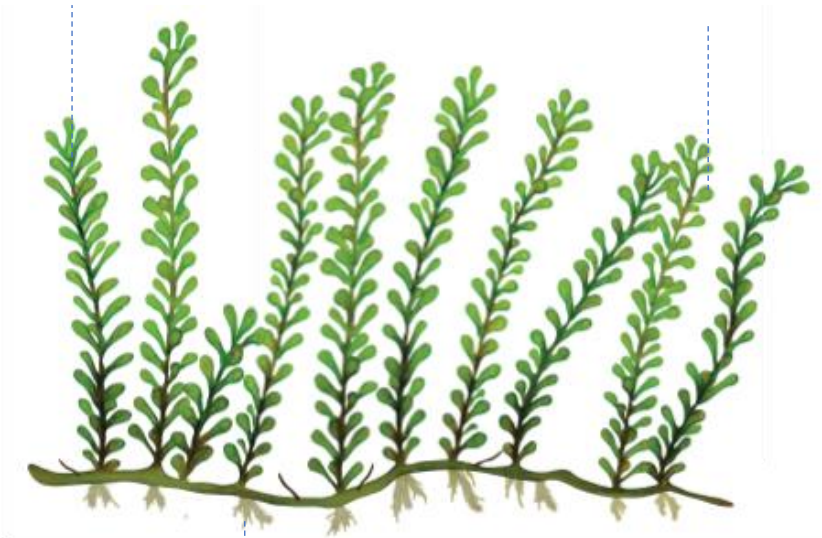
Caulerpa cylindracea Sonder

Common name: Sea grape

Defining characteristics:

Thallus with creeping cylindrical stolons up to 2.2 mm in diameter, which bear erect fronds.

Fronds with branchlets upwards directed and clavate in shape, giving a grape-like appearance.



Stolons anchored in sediment through colorless rhizoids.

Cartilaginous in texture.

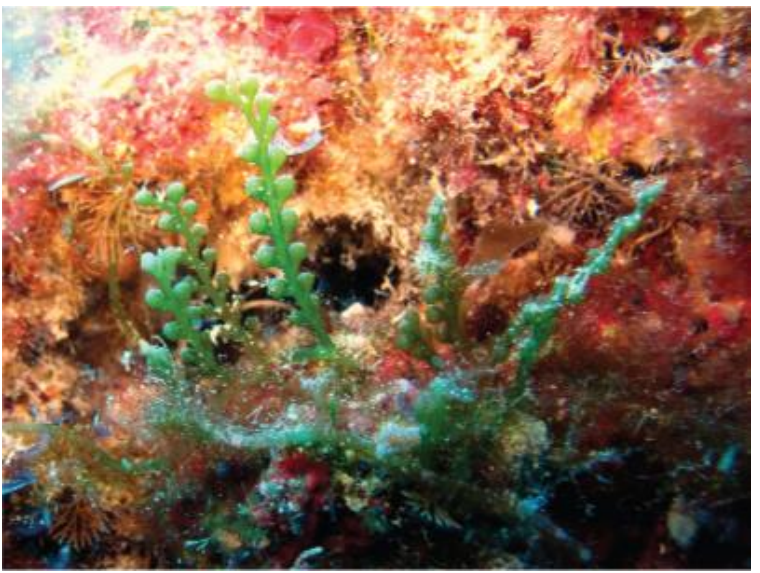
Family: Caulerpaceae Kützing, 1843.

Origin: South-Western Australia. The species entered the Mediterranean Sea possibly through aquarium release, but the mean of introduction is still to be determined. First record in Cyprus dates to 1991.

Depth / Substrate: Soft and hard substrates up to 100 m deep.

Size: Usually up to 10 cm high.

Color: Bright green.



Caulerpa taxifolia var. *distichophylla* (Sonder) Verlaque, Huisman & Procaccini

Common name: Killer algae

Defining characteristics:

Thallus with erect fronds, usually unbranched, or branched up to 3 times. Fronds with opposite and distichously arranged upwards pinnules (never overlapping).

Pinnules slightly constricted at their base and gradually tapering into a pointed tip.

Prostrate creeping slender stolons, anchored on the substrate through short rhizoids.

Family: Caulerpaceae Kützing, 1843.

Origin: Australia. The species entered the Mediterranean Sea possibly through aquarium release, but the mean of introduction is still to be determined. Shipping is the most likely pathway of secondary dispersal. First record in Cyprus dates to 2009.

Depth / Substrate: Variety of substrates (hard / soft / biogenic) down to 100m.

Size: Usually up to 15 cm high.

Color: Light to dark green.

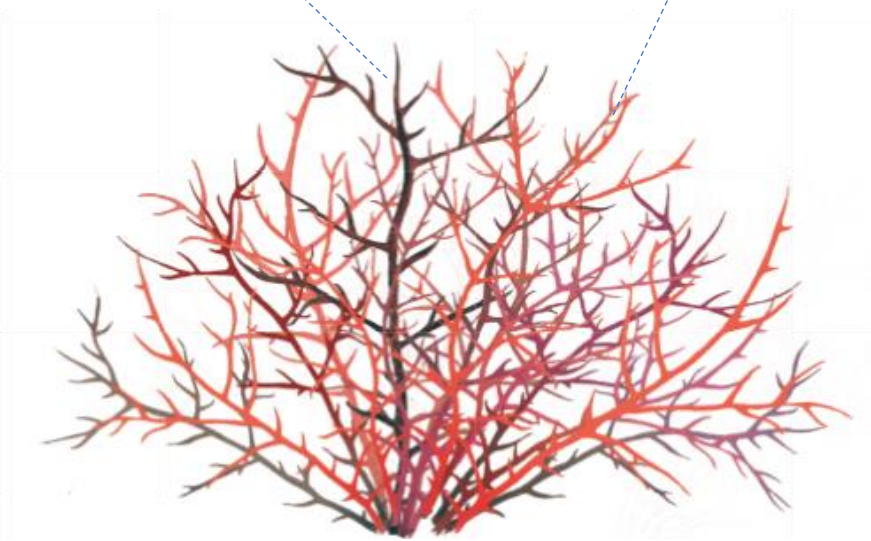
Hypnea spinella (C.Agardh) Kützing

Common name: Carrageenophyte

Defining characteristics:

Erect thalli, forming bushy mats of cylindrical axes. Sparse spines along the axes.

Axes frequently branched in all directions. No main axis. Cartilaginous in texture.



Family: Cystocloniaceae Kützing, 1843.

Origin: Widespread species of pantropical origin. The species entered the Mediterranean Sea probably through the Suez Canal or shipping. First record in Cyprus dates to 2012.

Depth / Substrate: Rocky substrate of the shallow infralittoral zone.

Size: Bushy thallus up to 10 cm high.

Color: Yellowish-brown.

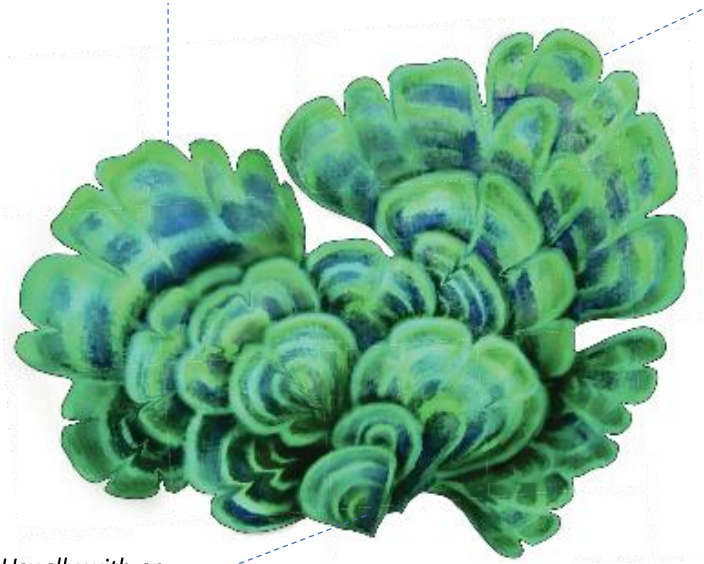
Stypopodium schimperi (Kützing) M.Verlaque & Boudouresque

Common name: Thalli

Defining characteristics:

Erect thallus, fan-like appearance.
Concentric lines evident along the surface.

The margin of the fans is never curled.



Usually with an evident holdfast.

Membranous texture.

Family: Dictyotaceae Lamouroux ex Dumortier, 1822.

Origin: Indo-Pacific. The species entered the Mediterranean Sea through the Suez Canal. First record in Cyprus dates to 1990.

Depth / Substrate: Rocky substrate up to 80 m deep.

Size: Usually between 10–30 cm high.

Color: Phosphorescent azure color when underwater, sometimes turquoise or blue. Brown when out of water.

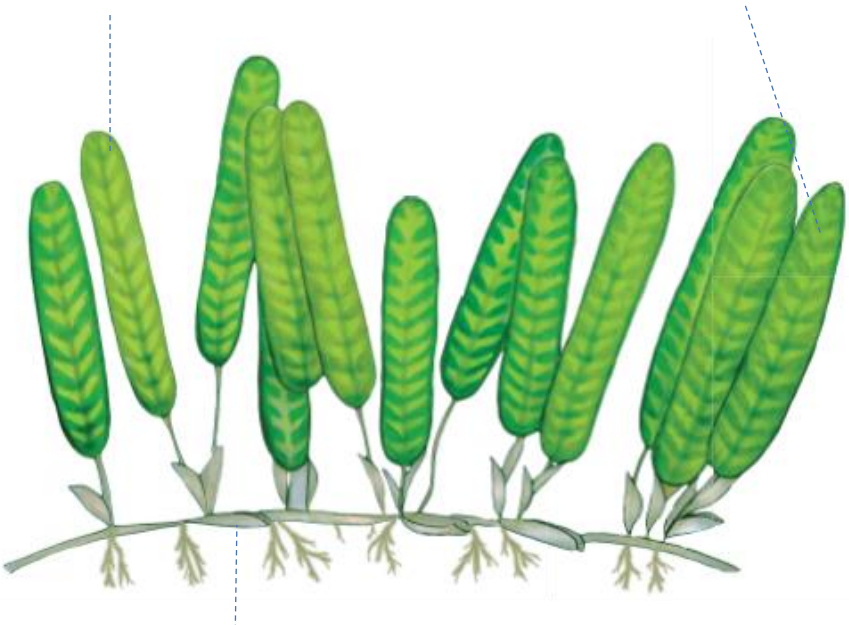
Halophila stipulacea (Forsskål) Ascherson

Common name: Broadleaf seagrass

Defining characteristics:

Erect blades of leaf-like appearance, oblong to elliptic, cartilaginous to membranous.

Surface of leaves with characteristic veins.



Creeping stolons bearing rhizoids and erect shoots.

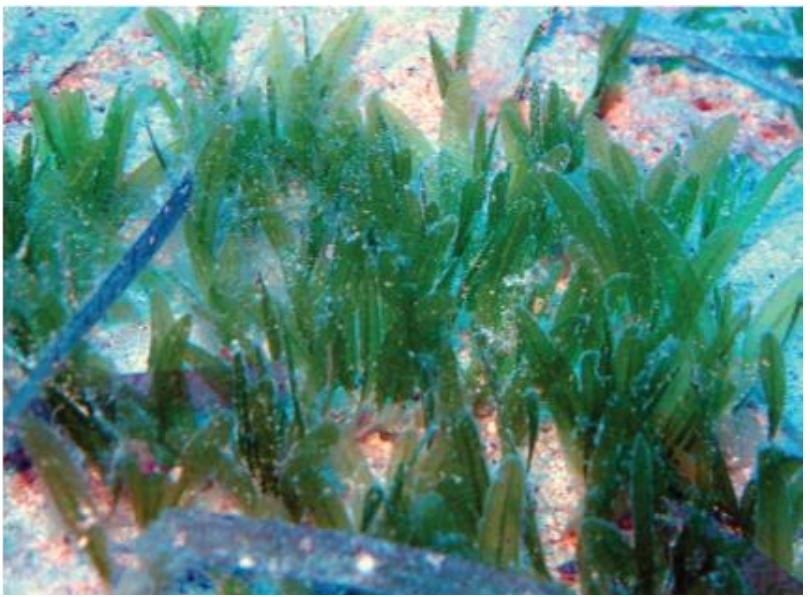
Family: Hydrocharitaceae Jussieu 1789.

Origin: Red Sea. The species entered the Mediterranean Sea through the Suez Canal. First record in Cyprus dates to 1967.

Depth / Substrate: Sandy and muddy bottoms up to 65 m deep.

Size: Leaf blades 3–6 cm high.

Color: Green.



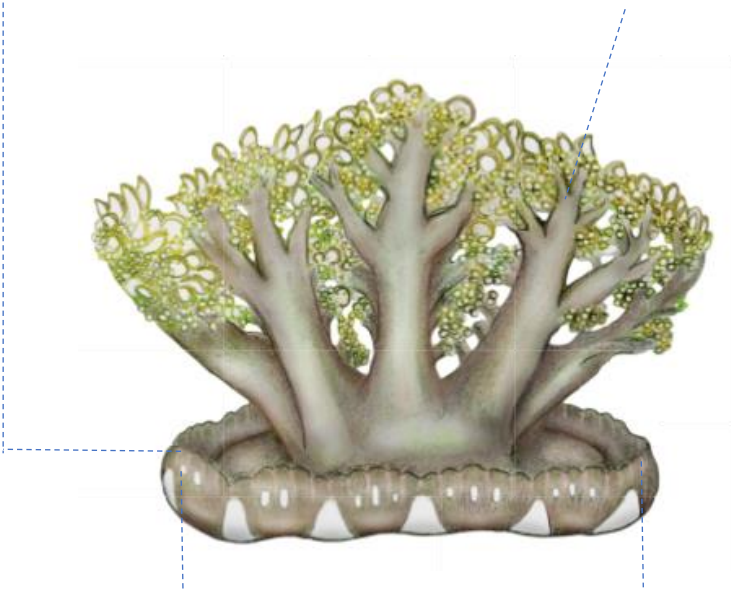
Cassiopea andromeda (Forsskål, 1775)

Common name: Upside-down jellyfish

Defining characteristics:

Umbrella flattened, exumbrella facing downwards.

8–9 Oral arms, branched, bearing zooxanthellate filaments, and 6 club-shaped vesicles.



Subumbrellar surface faces upwards.

Family: Cassiopeidae Agassiz, 1862.

Origin: Indian Ocean. The species entered the Mediterranean Sea through the Suez Canal. First record in Cyprus dates to 1903.

Depth / Substrate: Sandy and muddy bottoms up to 30 m deep.

Size: Umbrella usually between 10–15 cm.

Color: Greenish-brown with white patches on the rim.

Rhopilema nomadica Galil,1990

Common name: Nomadic jellyfish

Defining characteristics:

Large umbrella up to 80 cm in diameter. Scapulets and oral arms densely filamentous, bearing numerous stinging cells.

Eight mouth arms divided mid-length into two ramifications with long filaments.

Canal network forming fine meshes.

Family: Rhizostomatidae Cuvier, 1799.

Origin: Western Indian Ocean. The species entered the Mediterranean Sea through the Suez Canal. First record in Cyprus dates to 1995.

Depth / Substrate: Neritic epipelagic.

Size: Usually umbrella can reach 80 cm.

Color: Light blue.

Brachidontes pharaonis (P. Fischer, 1870)

Common name: Variable mussel

Defining characteristics:

Numerous fine radial bifurcating ribs which become coarser posteriorly.

Lacks septum beneath the beaks.
Hinge with dysodont teeth.

Septum and hinge are only visible on the inner side of the shell.

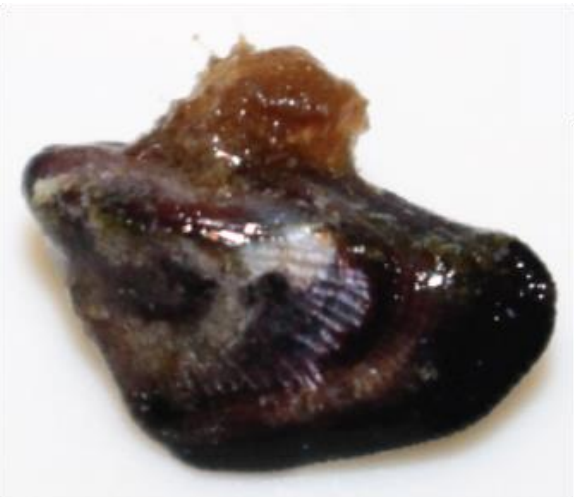
Family: Mytilidae Rafinesque, 1815.

Origin: Indo-Pacific area, including the Red Sea. Specimens belonging to this complex entered the Mediterranean Sea presumably both through the Suez Canal and shipping. There is no general agreement on when it exactly arrived to Cyprus, but presumably in the '60s.

Depth / Substrate: Shallow rocky waters in midlittoral and infralittoral zone.

Shell size: Usually small bivalve that can reach up to 40 mm in length.

Shell color: Externally dark brown-black with tinged purple-black internally.

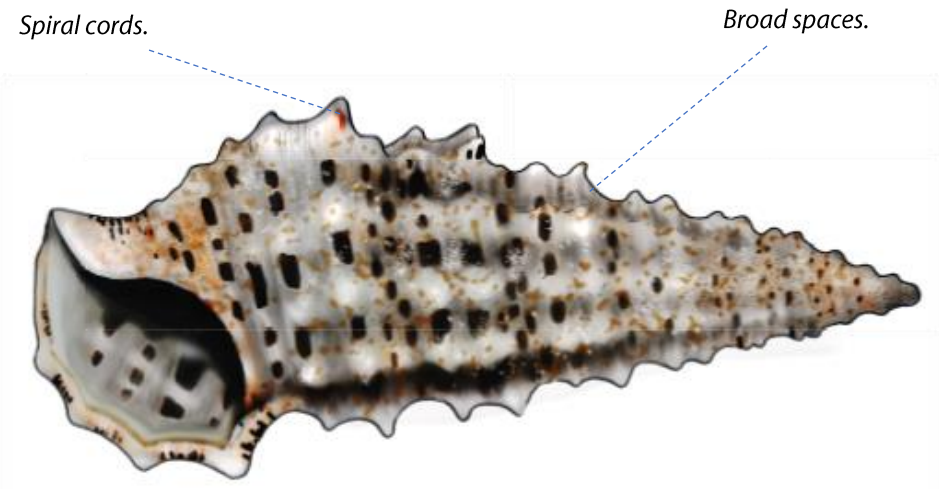


Cerithium scabridum Philippi, 1848

Common name: Indo-Pacific cerithid snail

Defining characteristics:

Very strong cords separated by broad spaces.



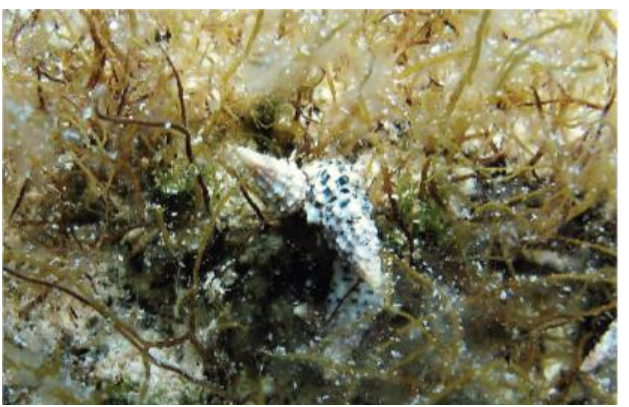
Family: Cerithiidae Fleming, 1822.

Origin: Indian Ocean, including the Arabian Sea, Red Sea and the Persian Gulf. It presumably entered the Mediterranean Sea through the Suez Canal, but subsequently spread in the rest of the Mediterranean via shipping. First record in Cyprus dates to 1983.

Depth / Substrate: Rocky and sandy bottoms, in shallow waters. The maximum depth is not specified in the literature. During this survey it was observed down to 40 m.

Shell size: Usually up to 20 mm in height.

Shell color: Whitish or brownish, with white and/or dark brown mottles on the spiral cords.

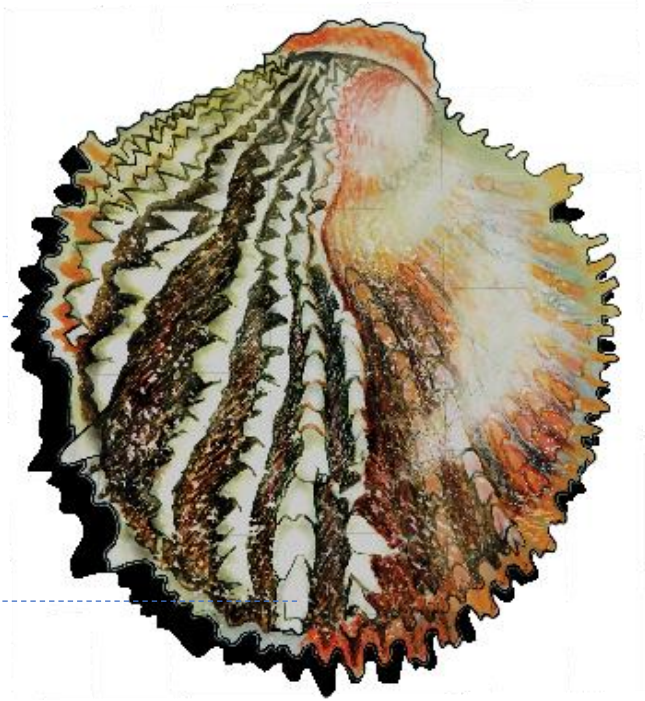


Chama pacifica Broderip, 1835

Common name: Pacific jewel-box

Defining characteristics:

Lower valve bigger and deeper than the upper one.



Sculpture of short to medium-sized spines, often more pronounced on the left side of the valve.

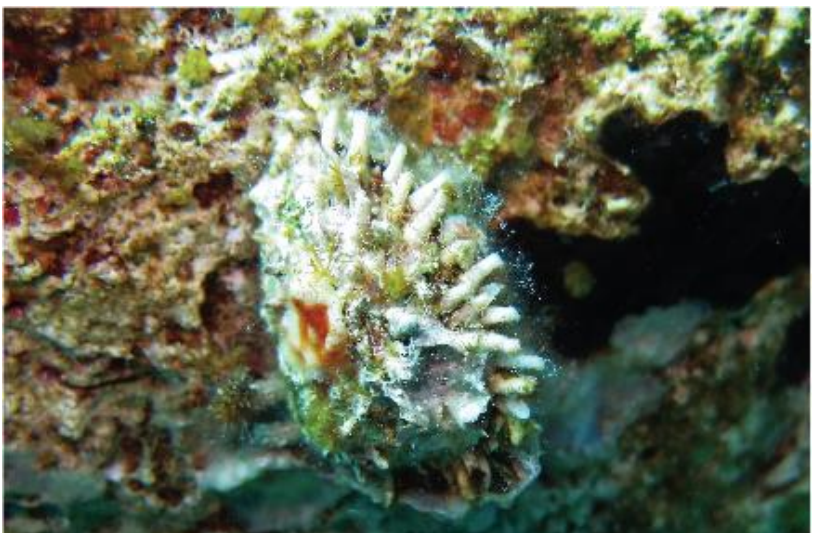
Family: Chamidae Lamarck, 1809.

Origin: Indo-West Pacific. It presumably entered the Mediterranean Sea through the Suez Canal. First record in Cyprus dates to 1998.

Depth / Substrate: Rocky exposed areas, from midlittoral zone up to 50 m depth.

Shell size: Usually up to 100 mm in height.

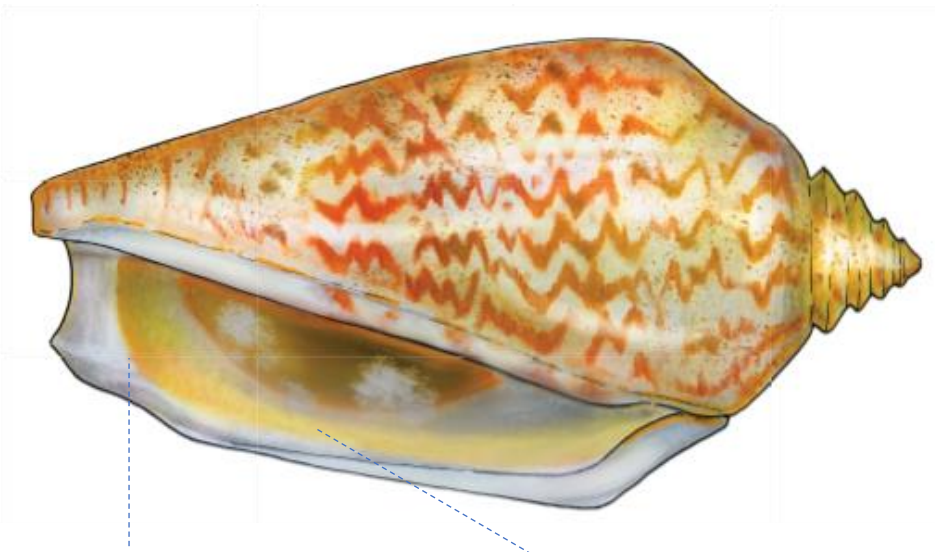
Shell color: Highly variable externally, from white to pink-red, spines often white. Internal color usually half white and half rose-red.



Conomurex persicus (Swainson, 1821)

Common name: Persian conch

Defining characteristics:



Stromboid notch next to the siphonal canal in the shells with well-formed outer lip.

Relatively wide aperture.

Family: Strombidae Rafinesque, 1815.

Origin: Restricted to the Persian Gulf and the Arabian Sea. It presumably entered the Mediterranean Sea through shipping. First record in Cyprus dates to 1985.

Depth / Substrate: Rocky-sandy and sandy/sandy-muddy shallow waters.

Shell size: Usually up to 70 mm in height.

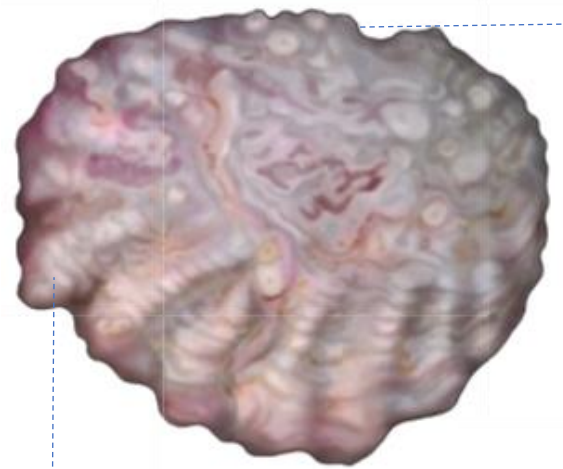
Shell color: Whitish background with brown markings.

Dendostrea cf. *folium* (Linnaeus,1758)

Common name: Leaf oyster

Defining characteristics:

Dorsal view.



Irregular shape, from subcircular to elongate.

Several large and regular/irregular plications.

Lateral view.

Family: Ostreidae Rafinesque, 1815.

Origin: Indo-Pacific area, including the Red Sea. The species presumably entered the Mediterranean Sea through the Suez Canal. First record in Cyprus dates to 2008.

Depth / Substrate: Rocky shallow substrates attached to rocks.

Shell size: Usually up to 60 mm in height.

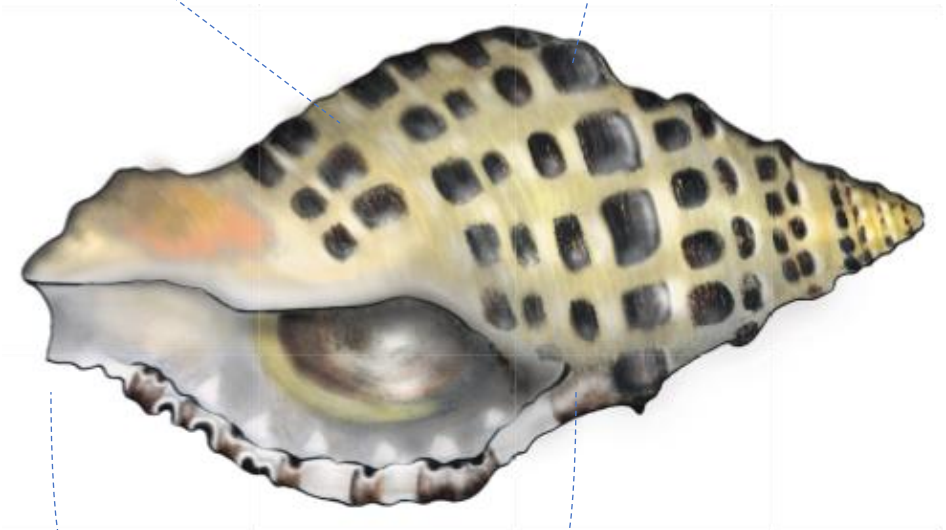
Shell Color: Very variable, externally dark or light reddish, whitish or white with weak reddish lines, internally yellowish-green, whitish or with malachite-green patches.

Ergalatax junionae Houart, 2008

Common name: Junionae rock shell

Defining characteristics:

White / creamy white with dark brown or blackish-brown primary spiral cords.



White aperture with six denticles within (shells with well-formed outer lip).

Family: Muricidae Rafinesque, 1815.

Origin: Restricted to the Persian Gulf and the Gulf of Oman. It presumably entered the Mediterranean Sea through shipping. First record in Cyprus dates to 1993.

Depth / Substrate: Shallow rocky reefs and sandy rubble.

Shell size: Usually up to 30 mm in height.

Shell color: Creamish-whitish background with blackish-brown primary spiral cords.

Malleus regula (Forsskål in Niebuhr, 1775)

Common name: Straight hammer oyster

Defining characteristics:

Irregular spatula shape and lack of wings.

Internal part of the shell partially nacrous.

Family: Malleidae Lamarck, 1818.

Origin: Indo-Pacific. The species presumably entered the Mediterranean Sea through the Suez Canal. First record in Cyprus dates to 1971.

Depth / Substrate: Under rocks and in crevices in rocky substrates of the midlittoral and infralittoral zones.

Shell size: Usually up to 100 mm in height.

Shell color: Very variable, externally from brown-purple to yellowish-grey, internally partially nacreous.

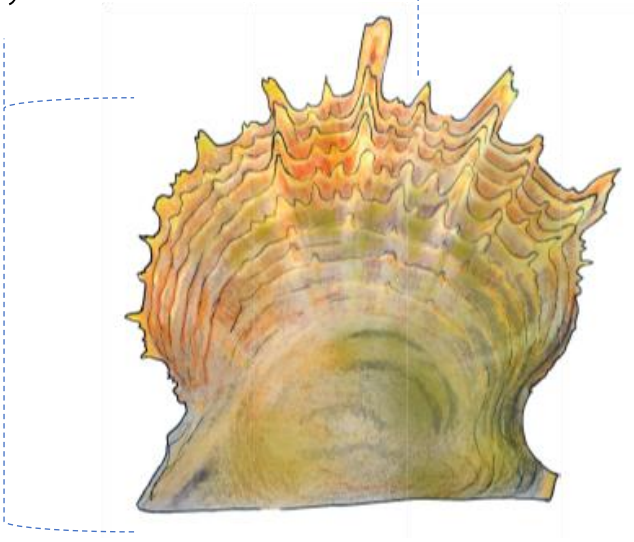
Pinctada imbricata radiata (Leach, 1814)

Common name: Rayed pearl oyster

Defining characteristics:

Outline almost quadrate with dorsal margin longer than the shell body.

Concentric layers of lamellae with rows of flat spines.



Hinge line straight with no teeth
(The hinge teeth is only visible in the inner part of the shell).

Family: Pteriidae Gray, 1847 (1820).

Origin: Worldwide, including the Indo-Pacific and the Atlantic Ocean. It is commonly suggested that Mediterranean specimens entered the basin through the Suez Canal. First record in Cyprus dates to 1899.

Depth / Substrate: Rocky bottoms down to 150 m depth.

Shell size: Usually up to 100 mm in height.

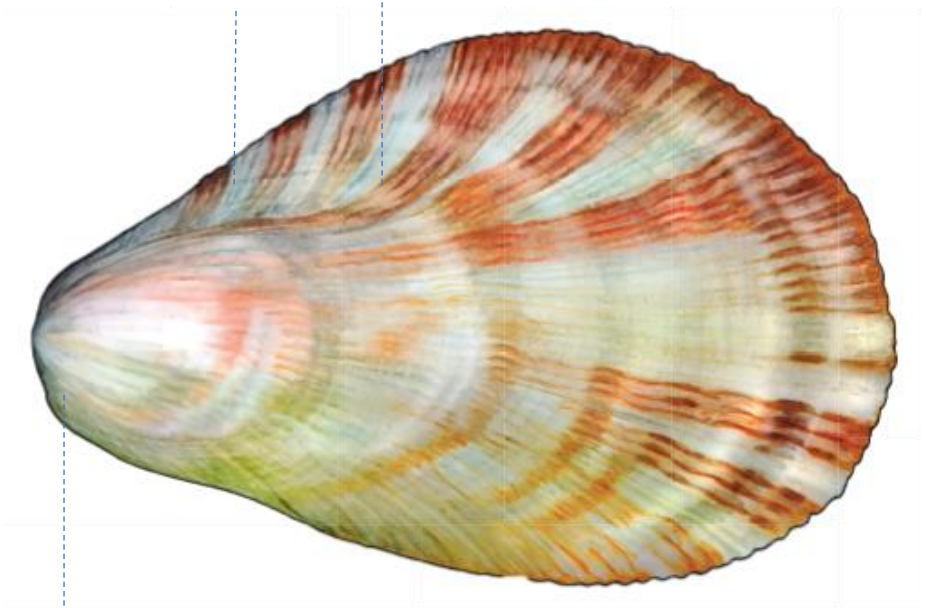
Shell color: Very variable, externally from brownish to greenish, sometimes with reddish radial rays, internally almost entirely nacreous.

Septifer cumingii Recluz, 1849

Common name: Cuming's mussel

Defining characteristics:

Many strong radial/bifurcating ribs crossed by finer concentric lines.



Septum across umbonal cavity.

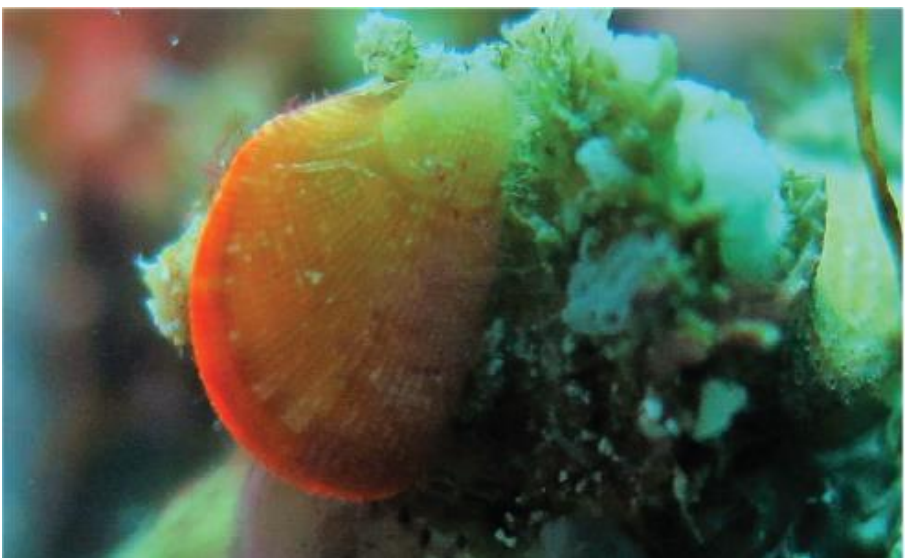
Family: Mytilidae Rafinesque, 1815.

Origin: Indo-Pacific. The species entered the Mediterranean Sea through the Suez Canal. First record in Cyprus dates to 2005.

Depth / Substrate: Rocky substrates in the midlittoral and infralittoral zones.

Shell size: Usually up to 10 mm in height.

Shell color: Usually green or red, sometimes with differently-colored radial stripes.

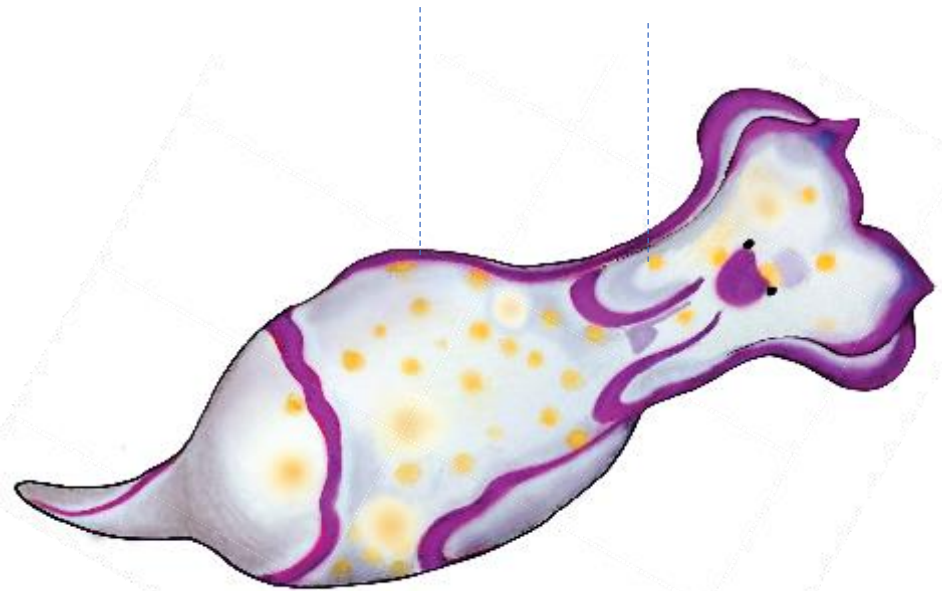


Haminoea cyanomarginata Heller & Thompson, 1983

Common name: Blue-edges bubble snail

Defining characteristics:

Margins of the mantle purple-blue, yellow blotches often present.



Family: Haminoeidae Pilsbry, 1895.

Origin: Red Sea and Gulf of Oman. The species presumably entered the Mediterranean Sea through the Suez Canal. First recorded in Cyprus dates to 2016.

Depth / Substrate: Rocky substrates covered with algae in the midlittoral and infralittoral zones.

Shell size: Usually up to 15 mm in height.

Animal color: Whitish body, with purple-blue margins delimiting cephalic shield, parapodial and infrapallial lobes, and foot. Scattered yellow blotches may be present.

***Branchiomma boholense* (Grube, 1878)**

Common name: Sabellid worm

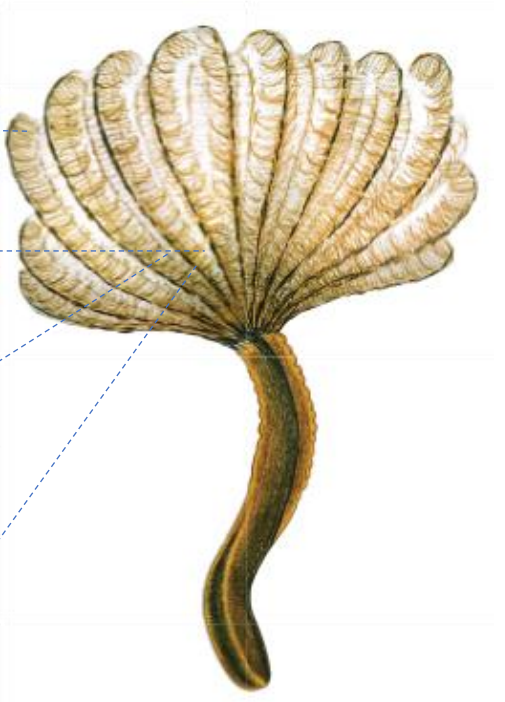
Defining characteristics:

20–25 pairs of radioles.

Basal stylodes are small and unpaired.

Macrostylodes are flattened, tongue-like mainly but also strap-like may present.

Microstylodes are short and tapering.



Family: Sabellidae Latreille, 1825.

Origin: Indo-Pacific. The species entered the Mediterranean Sea probably through the Suez Canal. First record in Cyprus dates to 1972.

Depth / Substrate: Usually at shallow depths on mostly soft substrates.

Size: Usually between 2—3 cm.

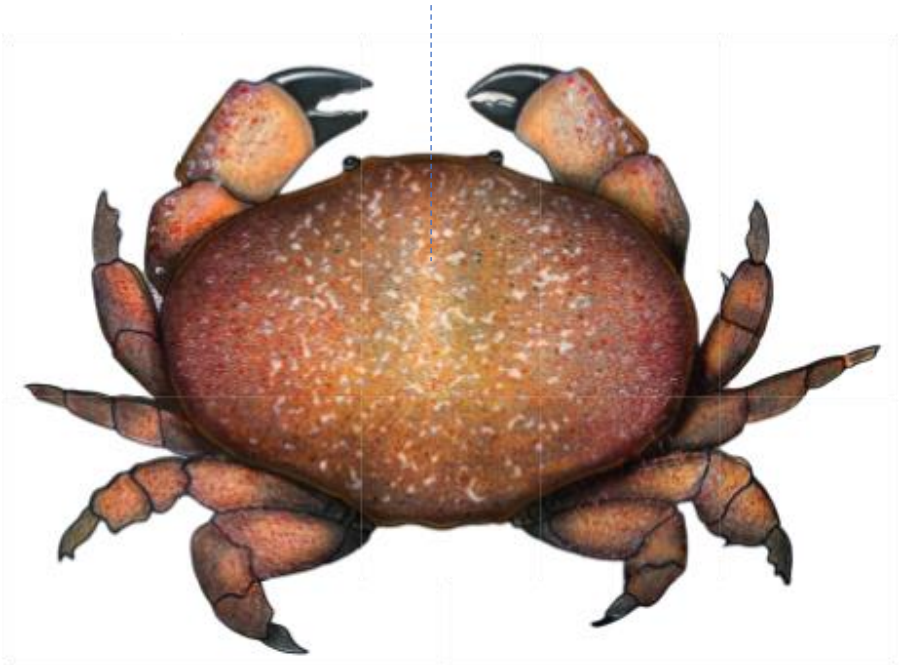
Color: Dark brownish with small dark spots.

Atergatis roseus (Rüppell, 1830)

Common name: Rose rock crab

Defining characteristics:

Carapace oval, wider than long, minutely pitted; heavy armed with black claws.



Family: Xanthidae MacLeay, 1838.

Origin: Widespread from the Fiji Islands to the Red Sea. The species entered the Mediterranean Sea through the Suez Canal. First record in Cyprus dates to 2015.

Depth / Substrate: Under rocks and rubble, in intertidal and subtidal zone down to 12 m.

Size: Usually the carapace length is about 6 cm.

Color: Carapace in adults is dark red-brown while in young individuals is more red-orange.

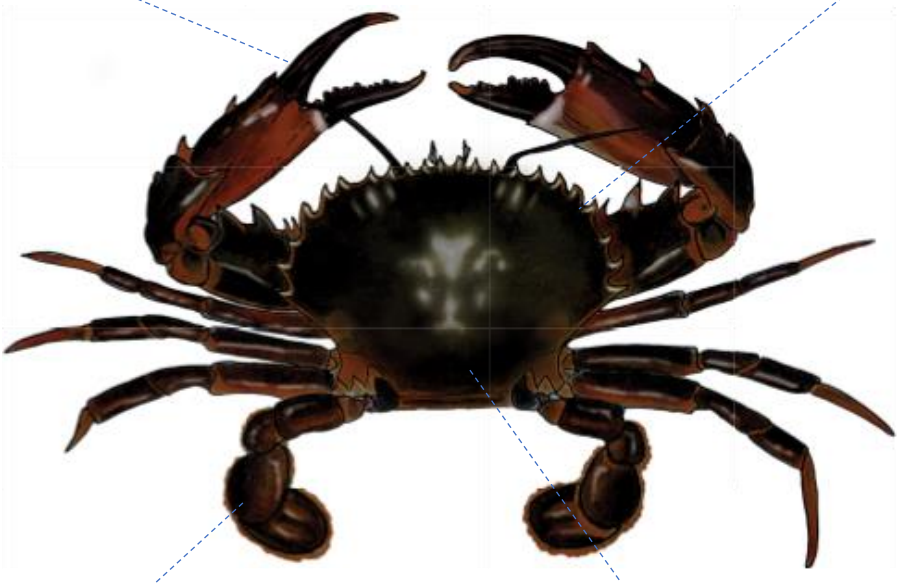
Charybdis (Charybdis) hellerii (A. Milne-Edwards, 1867)

Common name: Indo-Pacific swimming crab

Defining characteristics:

Lower surface of chela smooth.

Anterolateral margin bearing six teeth.



Carpus of fifth leg bearing posterior spine.

Hexagonal convex carapace with granulate transverse ridges. Fronal margin bearing 6 rounded teeth.

Family: Portunidae Rafinesque, 1815.

Origin: Indo-Pacific. The species entered the Mediterranean Sea through the Suez Canal. First record in Cyprus dates to 1999.

Depth / Substrate: Rocky habitats (under stones) from the intertidal zone up to 50 m deep.

Size: Males can reach 4.6 cm of carapace length.

Color: Dull brownish-grey with pale and dark patches.

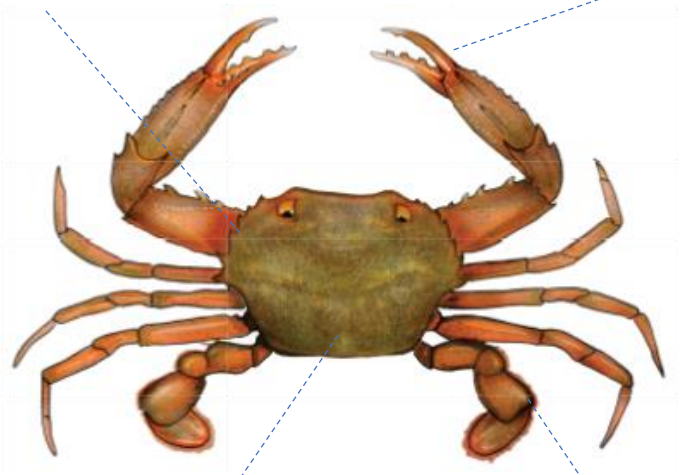
Charybdis (Coniohellenus) longicollis Leene, 1938

Common name: Lesser swimming crab

Defining characteristics:

Anterolateral margin bearing six teeth, the first four are serrated, square cut with deep notches between them.

The lower surface of chela has squamiform granules.



Hexagonal convex carapace with granulate transverse ridges.

It differs from C. hellerii in lacking the carpal spine on the last leg.

Family: Portunidae Rafinesque, 1815.

Origin: Persian Gulf and Red Sea. The species entered the Mediterranean Sea through the Suez Canal. First record in Cyprus dates to 1986.

Depth / Substrate: Soft bottom substrates from the intertidal zone up to 250 m deep.

Size: Males can reach 3 cm of carapace length and females 2.5 cm.

Color: Dull brownish-grey.

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Aquilonastra burtoni (Gray, 1840)

Common name: Asterinid sea star

Defining characteristics:

Small specimens are asymmetrical due to fissiparus division, usually with 7 or up to 8 rays.

Larger specimens often symmetrical with 5 rays.

The rays narrow basally, tapering to a narrow rounded distally, digiform.

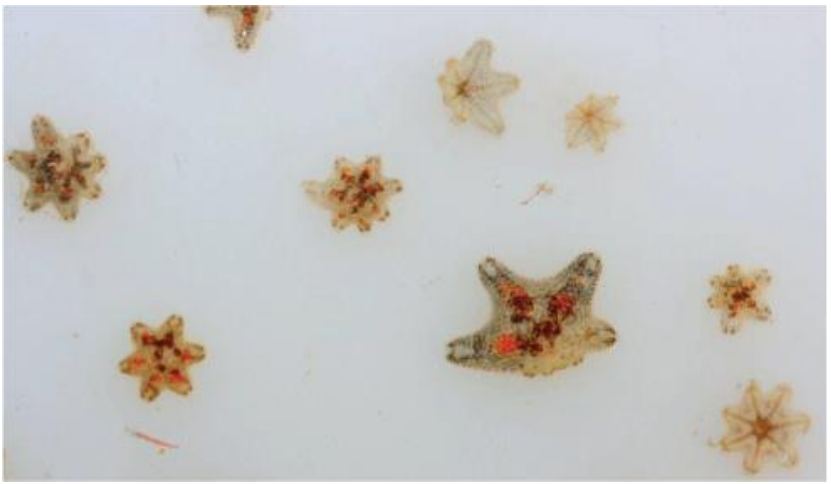
Family: Asterinidae Gray, 1840.

Origin: Indo-Pacific. The species entered the Mediterranean Sea through the Suez Canal. First record in Cyprus dates to 2003.

Depth / Substrate: Under rocks and boulders in shallow waters up to 10 m deep.

Size: Variable. There are two known morphological forms one with 5 equal arms and one of 3—8 unequal arms, depending on their reproductive strategy.

Color: Greenish-grey, purplish brown blotch is on the center.



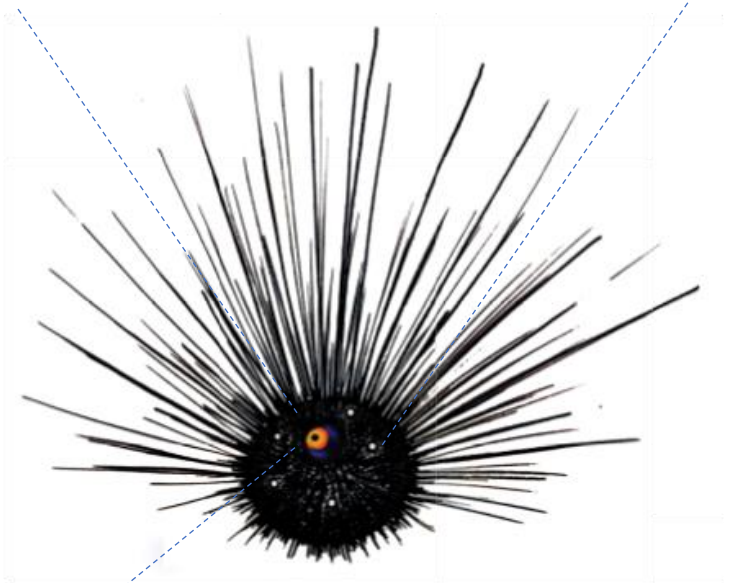
Diadema setosum (Leske, 1778)

Common name: Black, long-spined urchin

Defining characteristics:

Apical system hemicyclic.

Blue- green "spot-markings".



Orange anal ring.

Family: Diadematidae Gray, 1855.

Origin: Indo-West Pacific and the Arabian Peninsula. The species entered the Mediterranean Sea in 2006 but the introduction pathway is yet to be determined. First record in Cyprus dates to 2012.

Depth / Substrate: Reefs and shallow rocky substrates.

Size: Usually up to (horizontal diameter) 84 mm and (vertical diameter) 48 mm.

Color: Spines are black or a combination of black and grey.

Synaptula reciprocans (Forsskål, 1775)

Common name: Indo-Pacific holothurian

Defining characteristics:

The body is cylindrical with sticky rough and warty surface.

11 tentacles.

Each tentacle has 15—17 pairs of digits webbed together.

Family: Synaptidae Burmeister, 1837.

Origin: Indo-Pacific. The species entered the Mediterranean Sea through the Suez Canal. First record in Cyprus dates to 1986 and it was also the first record for the Mediterranean Sea.

Depth / Substrate: Rocky and sandy substrates up to 20 m deep.

Size: Usually up to 20 cm in length.

Color: Dark brown-black.

Herdmania momus (Savigny, 1816)

Common name: Giant pink ascidian

Defining characteristics:

The siphons are turned away from each other.

The test is smooth, rosy pink in colour.

Almost spherical with cylindrical or trumpet-shape siphons.

Family: Pyuridae Hartmeyer, 1908.

Origin: Indo-Pacific. The species entered the Mediterranean Sea through the Suez Canal. First record in Cyprus dates to 2002.

Depth / Substrate: Rocky and artificial hard substrate, from 0 to 100 m deep.

Size: Usually up to 8 cm.

Color: Red-pink and white bands.

Microcosmus exasperatus Heller, 1878

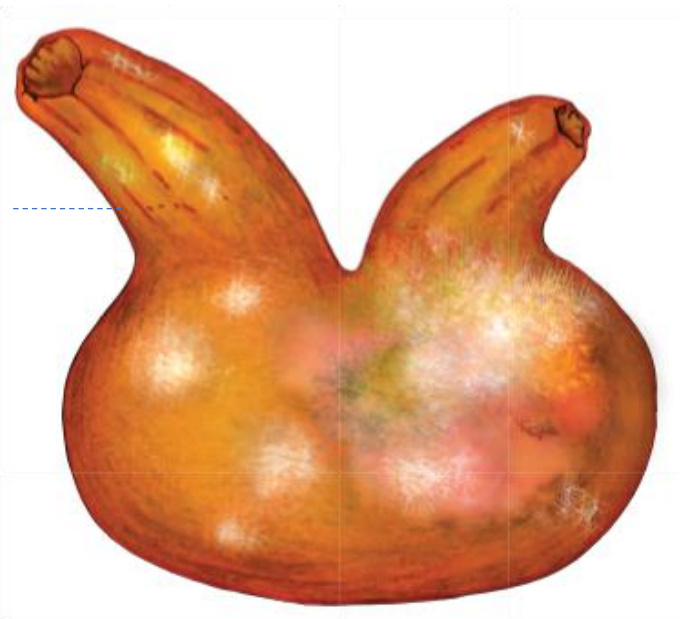
Common name: Pyurid ascidian

Defining characteristics:

Precise identification requires microscopic examination of the siphonal spines as this species closely resembles Microcosmus squamiger.

Solitary globular species with long siphons.

Leathery bright orange tunic.



Family: Pyuridae Hartmeyer, 1908.

Origin: Widespread tropical distribution. The species entered the Mediterranean Sea through the Suez Canal. First record in Cyprus dates to 2015.

Depth / Substrate: Rocky and artificial hard substrates, up to 100 m deep.

Size: Usually up to 4 cm.

Color: Orange.

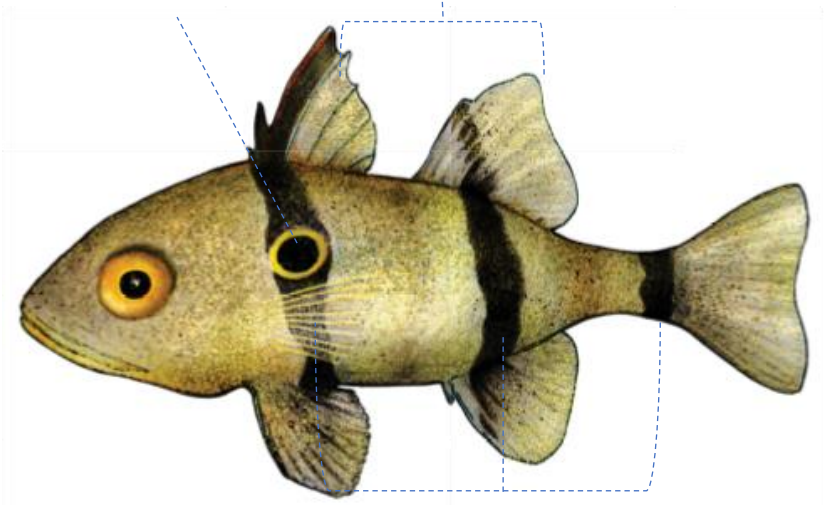
Apogonichthyoides pharaonis (Bellotti, 1874)

Common name: Pharaoh cardinalfish

Defining characteristics:

One "eye-spot" (black with yellow edge, not always visible) on the anterior dark bar.

Two separated dorsal fins.



Three black bars along the body, the anterior one extends until the anterior part of the first dorsal fin, the central one extends until the second dorsal and anal fin.

Family: Apogonidae Günther, 1859.

Origin: Indo-Pacific. The species entered the Mediterranean Sea through the Suez Canal. First record in Cyprus dates to 1987.

Depth / Substrate: Rocky bottoms in cave and crevices down to 50 m deep, but it can also be observed in seagrass beds.

Size: Usually between 6–8 cm.

Color: Grey-brown with three vertical black bars on body. Sometimes speckled with small brown dots.

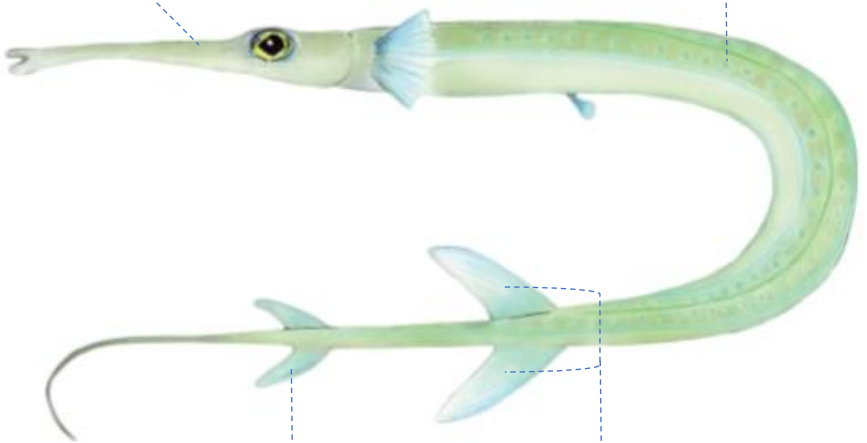
Fistularia commersonii Rüppell, 1838

Common name: Bluespotted cornetfish

Defining characteristics:

Body elongated, becoming slightly depressed (dorso-ventrally) behind the head.

A blue line and/or a series of blue spots and dashes on each side, dorsally.



Caudal fin forked, with two elongated and filamented middle rays.

Dorsal and anal fins in the posterior part of the body, opposite to each other and of equal size.

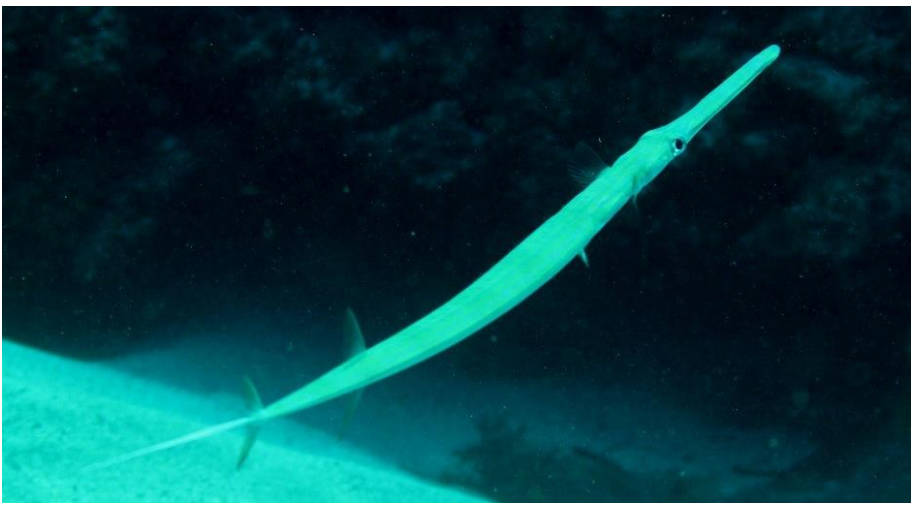
Family: Fistulariidae Stark, 1828.

Origin: Indo-Pacific. The species entered the Mediterranean Sea through the Suez Canal. First record in Cyprus dates to 2003.

Depth / Substrate: Close to reefs, on mixed bottoms.

Size: Usually between 60—100 cm.

Color: Gray to olive-green with blue-violet spots.

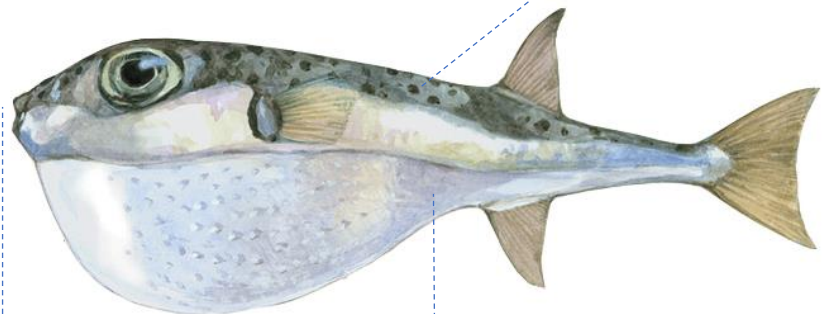


***Lagocephalus sceleratus* (Gmelin, 1789)**
Common name: Silver-cheeked toadfish

Defining characteristics:

Body elongated with a symmetrical caudal fin.

Black dots on the dorsal side.



Heavy jaws forming a beak of two teeth.

Skin had no scales, but the ventral side has minute spines.

Illustration by Juan Varela (Source: IUCN MedMIS App)

Family: Tetraodontidae Bonaparte, 1831

Origin: Indo-Pacific. The species entered the Mediterranean Sea through the Suez Canal. First record in Cyprus dates to 2004.

Depth / Substrate: Mostly on rocky bottoms up to 250 m.

Size: Usually up to 40 cm.

Color: Dorsal body surface grey or brown with darker spots, ventral surface white. A silver band runs along both sides.

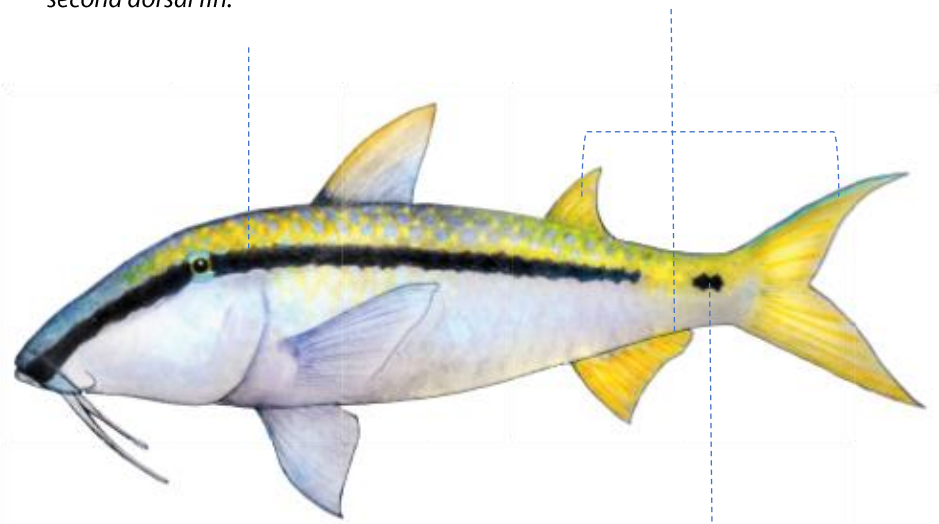
Parupeneus forsskali Fourmanoir & Guézé, 1976

Common name: Red Sea goatfish

Defining characteristics:

Dark longitudinal bar, from the snout to the end of the second dorsal fin.

Second dorsal, anal and caudal fins are yellowish.



A black spot on the upper part of the caudal peduncle.

Family: Mullidae Rafinesque, 1815.

Origin: Red Sea. The species entered the Mediterranean Sea through the Suez Canal. First record in Cyprus dates to 2016.

Depth / Substrate: Sandy and rocky bottoms up to 45 m deep.

Size: Usually between 25—28 cm.

Color: Greyish dorsally, silvery/white ventrally. A yellow patch dorsally on the caudal peduncle, with a distinct black spot on its upper part.

Pempheris rhomboidea Kossmann & Räuber, 1877

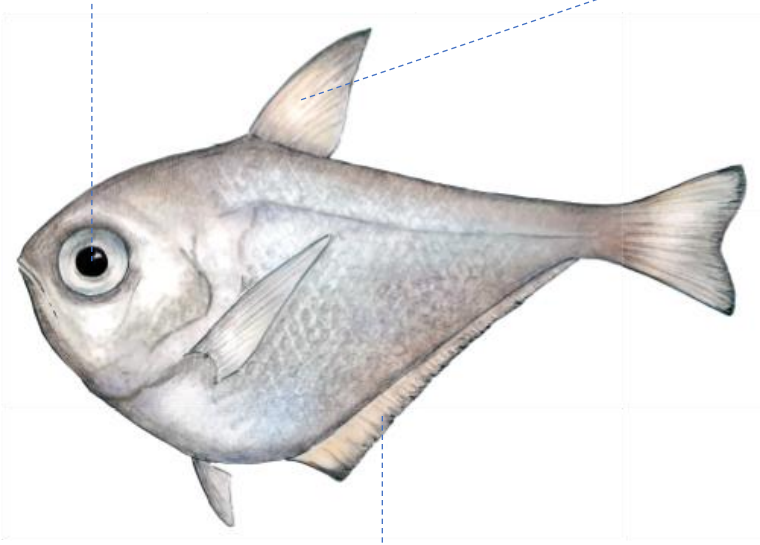
Common name: Sweeper

Defining characteristics:

Big eyes. No broad yellow ring around the eye.

Body strongly compressed, very deep in the anterior part.

Dorsal fin short and high.



Anal fin very long. No obvious black margin along the anal fin.

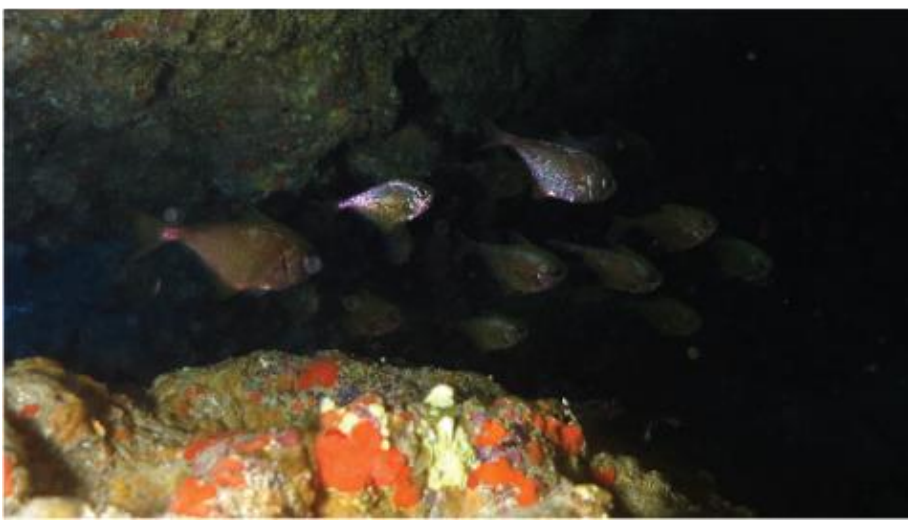
Family: Pempheridae.

Origin: Indo-Pacific. The species entered the Mediterranean Sea through the Suez Canal. First record in Cyprus dates to 1995.

Depth / Substrate: Caves of rocky bottoms up to 30 m.

Size: Usually between 5—18 cm.

Color: Light brown to dark brown, with copper shades. Sides slightly silvery.



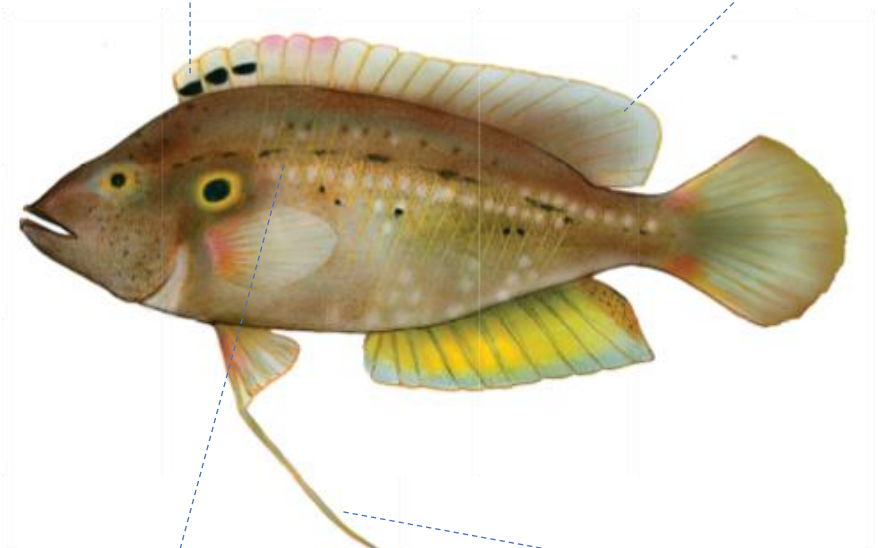
Pteragogus trispilus Randall, 2013

Common name: Dwarf wrasse

Defining characteristics:

Three black spots between the first and the fourth ray of the dorsal fin.

Dorsal fin continuous with rays longer than spines.



Elongated dark blotches along lateral line.

First pelvic fin rays very long.

Family: Labridae Cuvier, 1816.

Origin: Indo-Pacific. The species entered the Mediterranean Sea through the Suez Canal. First record in Cyprus dates to 1997.

Depth / Substrate: Shallow rocky bottoms and near *Posidonia oceanica* meadows to about 30 m deep.

Size: Usually up to 10 cm.

Color: Body overall olive, brown-reddish, green-greyish.

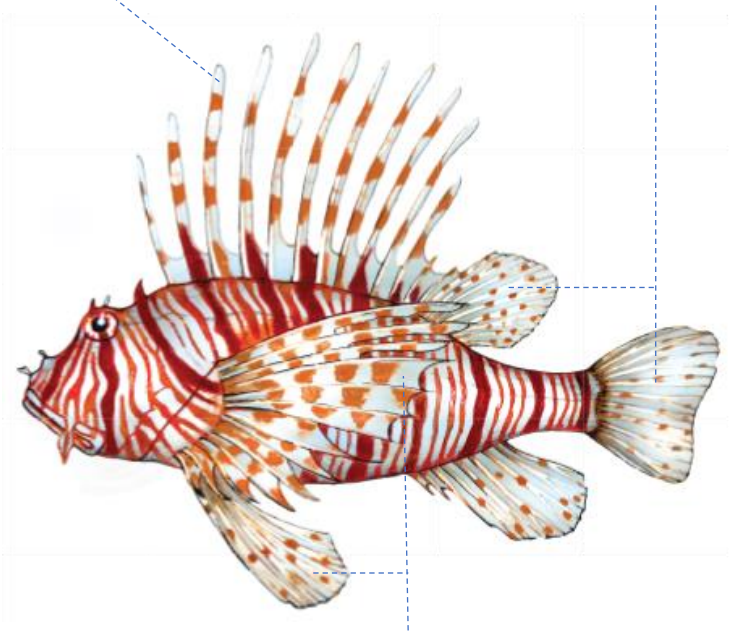
Pterois miles (Bennett, 1828)

Common name: Lionfish

Defining characteristics:

Dorsal rays very long, exceed the body height.

Dorsal soft rays and caudal fin with series of dark spots.



Pectoral and pelvic fins very long.

Family: Scorpaenidae Risso, 1827.

Origin: Indian Ocean. The species entered the Mediterranean Sea through the Suez Canal. First record in Cyprus dates to 2012.

Depth / Substrate: Reefs between 0–85 m deep, but can be found deeper, depending on temperature regimes.

Size: Usually up to 35 cm.

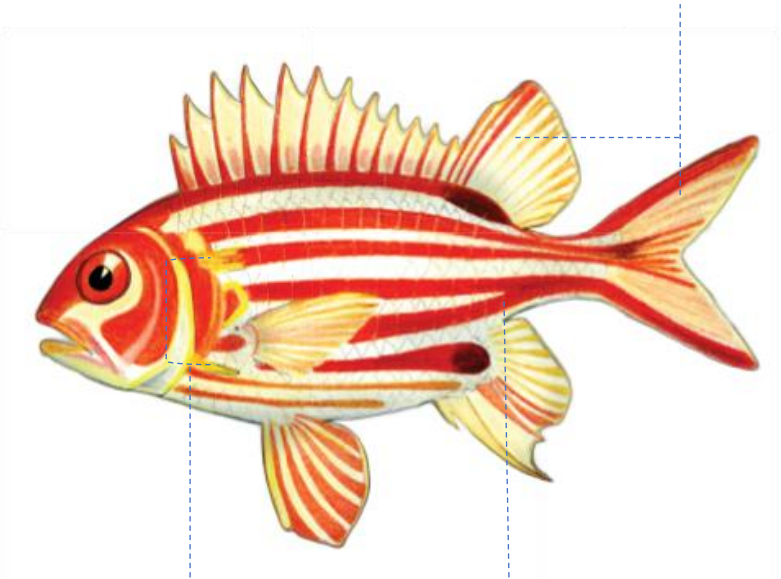
Color: Body with alternating wide dark red and narrow white and reddish vertical bands.

Sargocentron rubrum (Forsskål, 1775)

Common name: Red-coat Squirrelfish / Red Soldier Fish

Defining characteristics:

Dorsal and caudal fins are red with black shades on the edges and white blotch in the interradial membrane.



One strong and two smaller preopercular and opercular spines.

Body with red and white longitudinal stripes of equal width.

Family: Holocentridae Bonaparte, 1833.

Origin: Indo-Pacific. The species entered the Mediterranean through the Suez Canal. First record in Cyprus dates to 1969.

Depth / Substrate: Natural and artificial reefs between 1 and 84 m deep.

Size: Usually ranges between 12—25 cm and can reach a maximum of 32 cm.

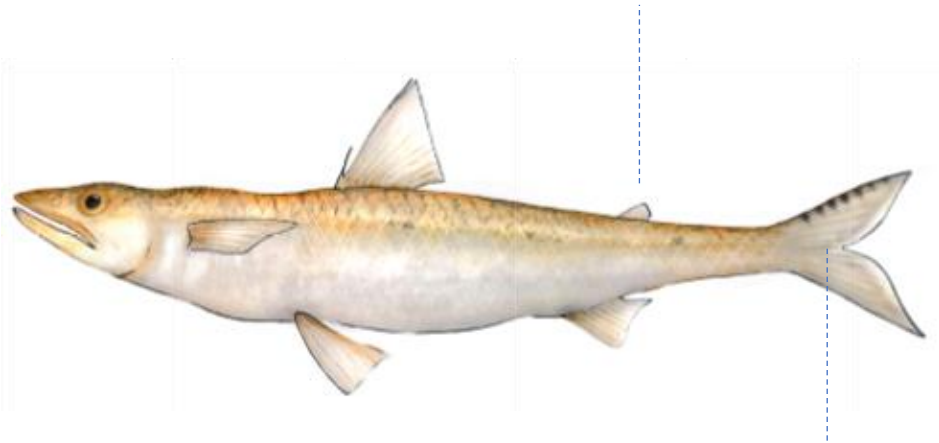
Color: Sub-equal stripes of dark reddish-brown and white.

Saurida lessepsianus Russell, Golani & Tikochinski, 2015

Common name: Lessepsian Lizardfish

Defining characteristics:

Small adipose fin above the anal, in the posterior part of the body.



Upper margin of caudal fin with row of 3–8 (usually 6 or 7) distinct blackish spots.

Family: Synodontidae Gill, 1861.

Origin: Indian Ocean. The species entered the Mediterranean Sea through the Suez Canal. First record in Cyprus dates to 2014.

Depth / Substrate: Sandy and muddy bottoms between 20–30 m deep but can be found up to 100 m deep.

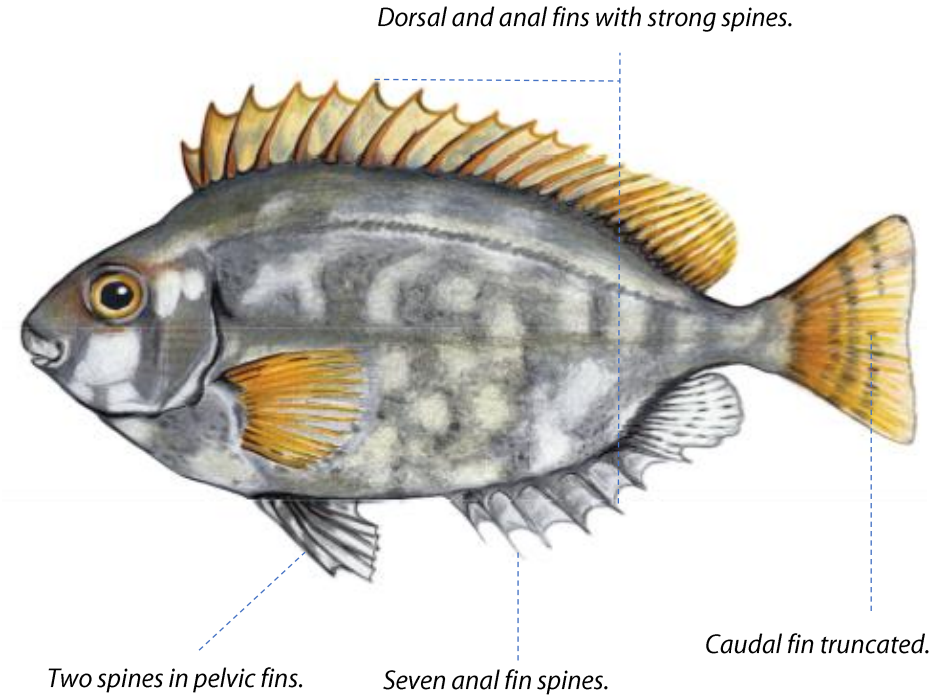
Size: Usually between 15—35 cm.

Color: Dark brown or coppery brown on head and dorsally with silvery white color below the lateral line.

Siganus luridus (Rüppell, 1829)

Common name: Dusky spinefoot

Defining characteristics:



Family: Siganidae Richardson, 1837.

Origin: Indo-Pacific. The species entered the Mediterranean Sea through the Suez Canal. First record in Cyprus dates to 1964.

Depth / Substrate: Rocky substrate up to 40 m deep.

Size: Usually up to 30 cm.

Color: Dark brown to olive green, with yellow shades on fins; sometimes dark dorsally, and light ventrally.

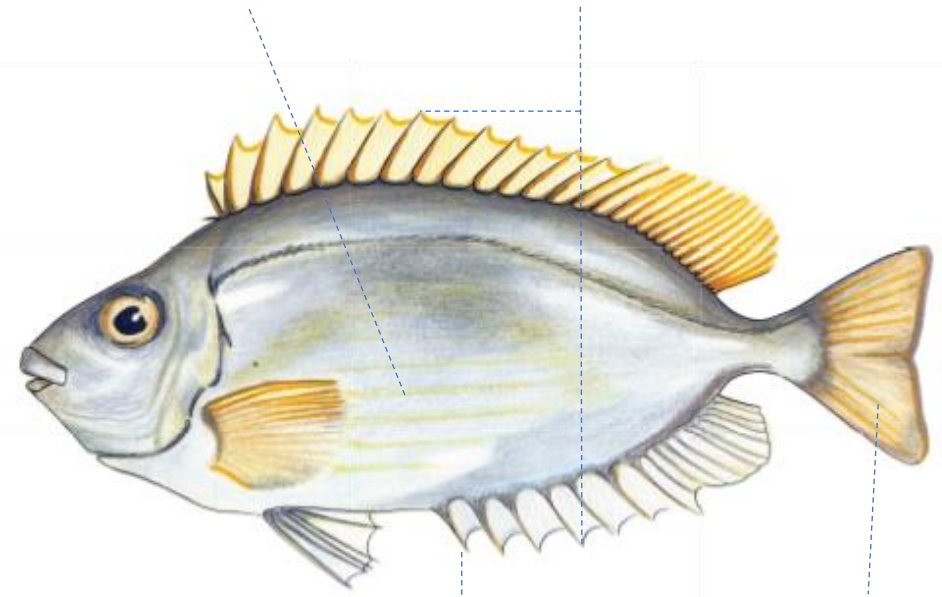
Siganus rivulatus Forsskål & Niebuhr, 1775

Common name: Marbled spinefoot

Defining characteristics:

Yellow lines on the lower part.

Dorsal and anal fins strong with spines.



Seven anal fin spines.

Caudal fin forked.

Family: Siganidae Richardson, 1837.

Origin: Indo-Pacific. The species entered the Mediterranean Sea through the Suez Canal. First record in Cyprus dates to 1928.

Depth / Substrate: Rocky or mixed (sandy-rocky) substrate and among seagrass beds up to 30 m deep.

Size: Usually up to 30 cm.

Color: Grey-green to brown dorsally and light brown to yellow on belly.

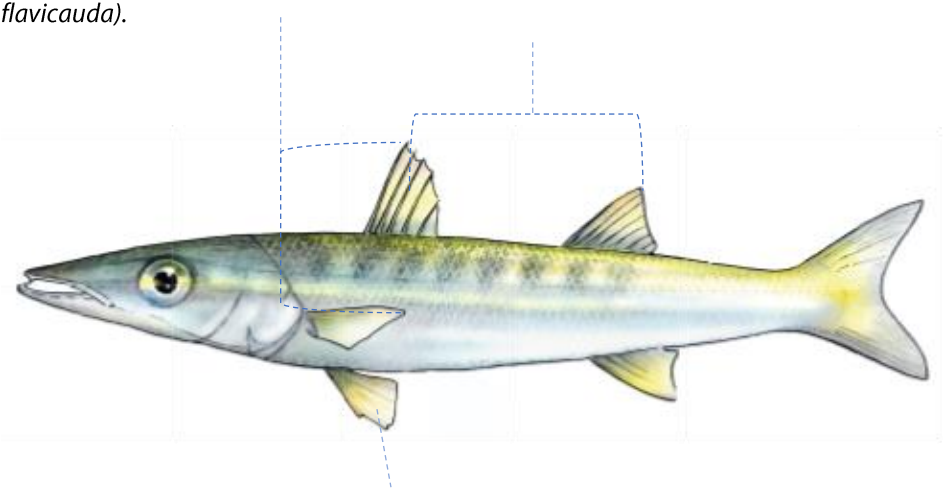
Sphyraena chrysotaenia Klunzinger, 1884

Common name: Yellowstripe barracuda

Defining characteristics:

Pectoral fin tip reaching the vertical of first dorsal origin (unlike S. flavicauda).

Two well-separated dorsal fins, the first with 5 spines, the first spine is the longest, length decrease gradually.



Pelvic fin located below pectoral fin tip (unlike S. sphyraena and S. viridensis).

Family: Sphyraenidae Rafinesque, 1815.

Origin: Indo-Pacific. The species entered the Mediterranean Sea through the Suez Canal. First record in Cyprus dates to 1928.

Depth / Substrate: Benthopelagic up to 50 m deep.

Size: Usually up to 35 cm.

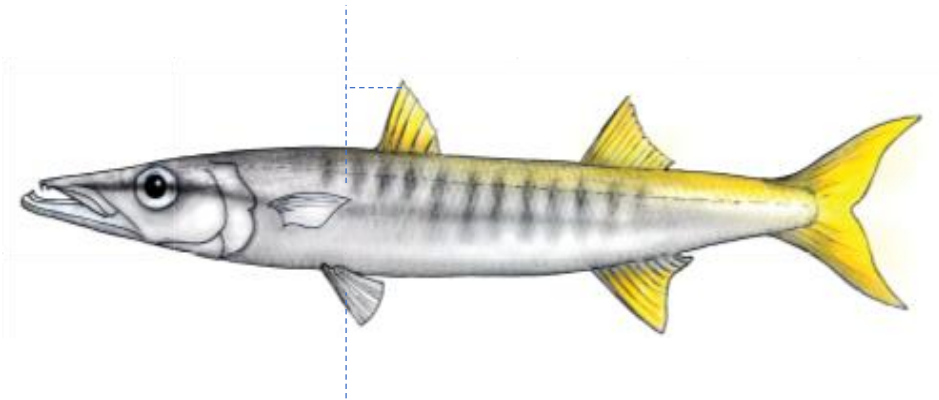
Color: Yellowish grey dorsally and white silver ventrally.

Sphyraena flavicauda Rüppell, 1838

Common name: Yellowtail barracuda

Defining characteristics:

Pectoral fin tip does not reach the vertical of first dorsal fin origin (unlike S. chrysotaenia).



Pelvic fin located below the pectoral fin tip (unlike S. sphyraena and S. viridensis).

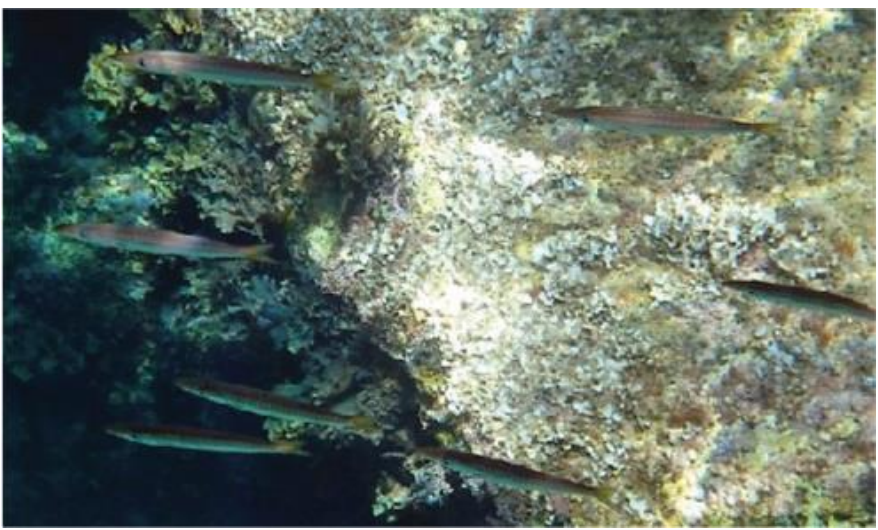
Family: Sphyraenidae Rafinesque, 1815.

Origin: Indo-Pacific. The species entered the Mediterranean Sea through the Suez Canal. First record in Cyprus dates to 1992.

Depth / Substrate: Inshore pelagic.

Size: Usually up to 60 cm.

Color: Grey dorsally and white ventrally. Caudal fin yellow.



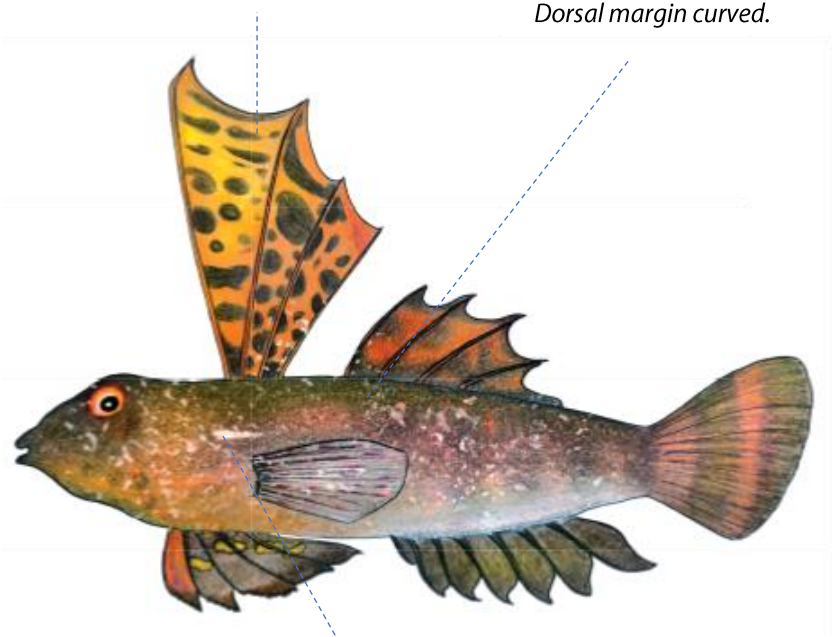
Synchiropus sechellensis Regan, 1908

Common name: Seychelles dragonet

Defining characteristics:

First dorsal fin very high without filaments.

Dorsal margin curved.



Preopercular spine upcurved.

Family: Callionymidae Bonaparte, 1831.

Origin: Indo-Pacific. The species entered the Mediterranean Sea through the Suez Canal. First record in Cyprus dates to 2016.

Depth / Substrate: Sandy, muddy bottoms up to 50 m.

Size: Usually up to 9 cm (one specimen from Cyprus 13 cm).

Color: Brownish-red with white blotches scattered along the whole body. Belly silvery white.

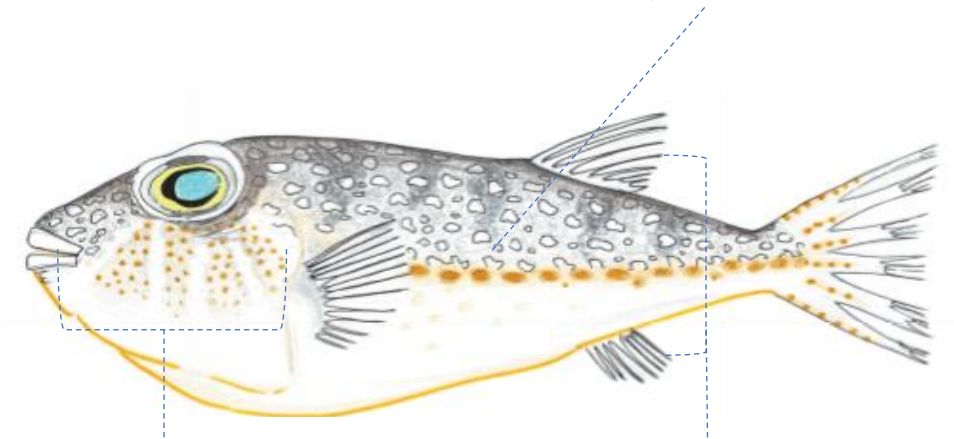
Torquigener flavimaculosus Hardy & Randall, 1983

Common name: Yellow - spotted Puffer

Defining characteristics:

Body inflatable; when not inflated, it is quite elongated.

Small yellow or brownish spots, from pectoral fin base to caudal fin (approximately 20 in number).



Mouth terminal at the level of the upper end of the pectoral fin.

Dorsal and anal fins opposite and posterior.

Family: Tetraodontidae Bonaparte, 1831.

Origin: Western Indian Ocean. The species entered the Mediterranean Sea through the Suez Canal. First record in Cyprus dates to 2010.

Depth / Substrate: Reef associated fish that can be found up to 57 m. Also common in *Posidonia oceanica* meadows and soft bottoms (burrowing behavior in soft bottoms).

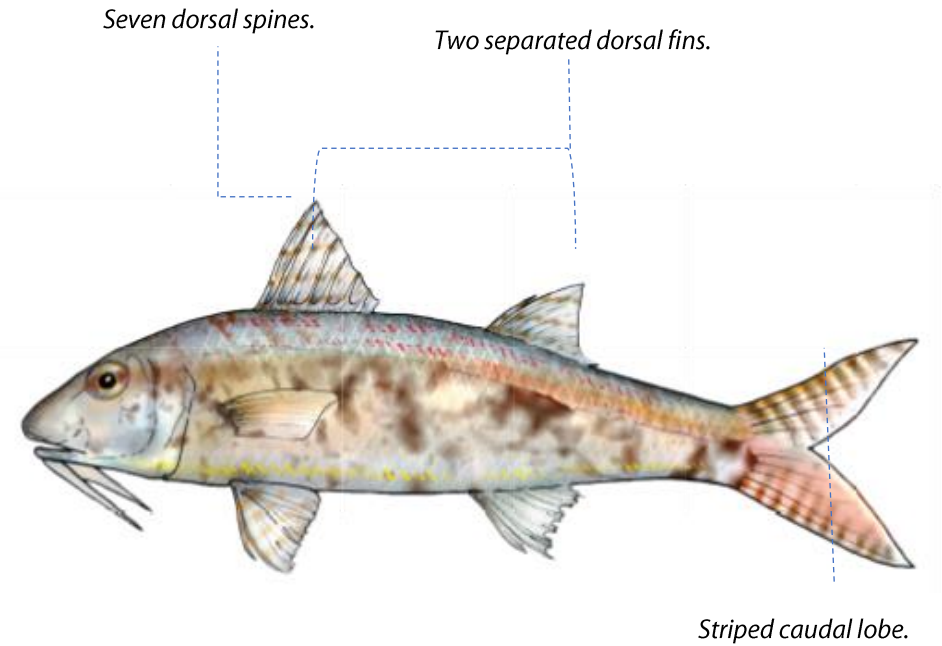
Size: Usually up to 16 cm.

Color: Dorsal body surface brown, light grey to beige with grey-whitish spots and white ventral surface.

Upeneus pori Ben-Tuvia & Golani, 1989

Common name: Por's goatfish

Defining characteristics:



Family: Mullidae Rafinesque, 1815.

Origin: Indo-Pacific. The species entered the Mediterranean Sea through the Suez Canal. First record in Cyprus dates to 2004.

Depth / Substrate: Sandy and muddy bottoms but sometimes also in seagrass beds up to 50 m.

Size: Usually between 5—15 cm.

Color: Mottled brown-reddish dorsally with white belly and light brown spots. Sometimes with a brownish longitudinal line.

References

Ahmed, M.I. (2009) Morphological, ecological and molecular examination of the seacucumber species along the Red Sea coast of Egypt and Gulf of Aqaba: with the investigation of the possibility of using DNA barcoding technique as a standard method for seacucumber ID. Hull UK: The University of Hull.

Ali, M., Alkusairy, H., Saad, A., Reynaud, C. and Capapé, C. (2016) 'First record of Pterois miles (Osteichthyes: Scorpaenidae) in Syrian marine waters: Confirmation of its accordance in the eastern Mediterranean' Tishreen University Journal for Research and Scientific Studies – Biological Sciences Series, 38(4), pp.307-313.

Altamirano, M., Andreakis, N., Souza-Egipsy, V., Zanolla, M. and De la Rosa, J. (2014) 'First record of Caulerpa cylindracea (Caulerpaceae, Chlorophyta) in Andalusia (Southern Spain)' Anales del Jardín Botánico de Madrid, 71 (2), pp.007.

Antoniadou, C. and Vafidis, D. (2009) 'Updated distribution of the holothuroid Synaptula reciprocans (Forskal, 1775) in the Mediterranean: does it follow shallow-water circulation patterns' Aquatic Invasions, 4(2), pp.361-363.

Aplikioti, M., Louizidou, P., Mystikou, A., Marcou, M., Stavrou, P., Kalogirou, S., Tsiamis, K., Panayotidis, P. and Küpper, F.C. (2016) 'Further expansion of the alien seaweed Caulerpa taxifolia var. distichophylla (Sonder) Verlaque, Huisman & Procacini (Ulvophyceae, Bryopsidales) in the Eastern Mediterranean Sea' Aquatic Invasions, 2 (1),pp.11-20.

Bariche, M. (2012) Field identification guide to the living marine resources of the Eastern and Southern Mediterranean. Rome: Food and Agriculture Organisation of the United Nations (FAO).

Ben-Tuvia, A. and Golani, D. (1984) 'A West African fangtooth moray eel Enchelycore anatina from the Mediterranean coast of Israel' Copeia, 1984(2), pp.541-544.

Bitar, G. Ramos-Esplá, A.A. Ocaña, O. Sghaier, Y.R. Forcada, A. Valle-Pérez, C, El Shaer, H. and Verlaque, M. (2017) 'Introduced marine macroflora of Lebanon and its distribution on the Levantine coast' Mediterranean Marine Science, 18 (1),pp.138-155.

Cecalupo, A. (2005) Elenco della famiglia Cerithiidae Férussac, 1822 (Prosobranchia). Nomenclatura delle specie conosciute o poco note e relativa revisione sistematica. Fossili e Attuali. Vol. I. Milano: Acquario Civico e Stazione Idrobiologica.

Chartosia, N. and Michailidis, N. (2016) 'First confirmed presence of the Red Sea goatfish Parupeneus forsskali (Fourmanoir & Guézé, 1976) from Cyprus' Marine Biodiversity Records, 9(1), p.33.

Çiçek, B.A. Kurt, O. Taskin, E. and Öztürk, M. (2013) 'First report of Caulerpa taxifolia var. distichophylla (Sonder) Verlaque, Huisman and Procaccini (Caulerpaceae, Chlorophyta) from Northern Cyprus' Rapport Commission International Mer Mediterranee, 40, p.600.

Çinar, M.E., Arianoutsou, M., Zenetos, A. and Golani, D. (2014) Impacts of invasive alien marine species on ecosystem services and biodiversity: a pan-European review. Aquatic Invasions, 9(4), pp.391-423.

Cinar, M.E. (2005) 'Polychaetes from the coast of northern Cyprus (eastern Mediterranean Sea), with two new records for the Mediterranean Sea' CBM-Cahiers de Biologie Marine, 46(2), pp.143-160.

Cirik, S., Aysel, V., Benli, H.A., Cihangir, B. and Ünlüoglu, A. (2000) 'Preliminary studies on the marine vegetation of Northern Cyprus' Journal of Black Sea/Mediterranean Environment, 6(1),pp.31-40.

Coppard, S.E. and Campbell, A.C. (2006) 'Taxonomic significance of test morphology in the echinoid genera Diadema Gray, 1825 and Echinothrix Peters, 1853 (Echinodermata)' ZOOSYSTEMA-PARIS-, 28(1), p.93.

Corsini, M., Margies, P., Kondilatos, G. and Economidis, P.S. (2005) 'Lessepsian migration of fishes to the Aegean Sea: First record of Tylerius spinosissimus (Tetraodontidae) from the Mediterranean, and six more fish records from Rhodes' Cybium, 29(4), pp.347-354.

Corsini-Foka, M., Margies, P., Kondilatos, G. and Economidis, P.S. (2006) 'Torquigener flavimaculosus Hardy and Randall, 1983 (Pisces: Tetraodontidae) off Rhodes island marine area: a new alien fish in the Hellenic waters' Mediterranean Marine Science, 7(2), pp.73-76.

Corsini-Foka, M., Zenetos, A., Crocetta, F., Çinar, M.E., Koçak, F., Golani, D., Katsanevakis, S., Tsiamis, K., Cook, E., Froglia, C. and Triandaphyllou, M. (2015) 'Inventory of alien and cryptogenic species of the Dodecanese (Aegean Sea, Greece): collaboration through COST action training school' Management of Biological Invasions, 6(4), pp.351-366.

Crocetta, F., Agius, D., Balistreri, P., Bariche, M., Bayhan, Y.K., Çakir, M., Ciriaco, S., Corsini-Foka, M., Deidun, A., El Zrelli, R. and Ergüden, D. (2015) 'New Mediterranean Biodiversity Records (October 2015)' Mediterranean Marine Science, 16(3), pp.682-702.

Crocetta F. & Andreou V. 2018. The alien mollusc Haminoea cyanomarginata Heller & Thompson, 1983 in Cyprus. In: New Mediterranean Biodiversity Records (December 2018). Mediterranean Marine Science.

Crocetta, F., Mariottini, P., Salvi, D. and Oliverio, M. (2015) 'Does GenBank provide a reliable DNA barcode reference to identify small alien oysters invading the Mediterranean Sea?' Journal of the Marine Biological Association of the United Kingdom, 95(1), pp.111-122.

Crocetta, F., and Russo, P. (2013) 'The alien spreading of Chama pacifica Broderip, 1835 (Mollusca: Bivalvia: Chamidae) in the Mediterranean Sea' Turkish Journal of Zoology, 37,pp.92-96.

Einav R. (2007) Seaweeds of the eastern Mediterranean coast. Liechtenstein: Gantner Verlag Press.

Ergüden, D., Uyan, A., Karan, S. and Gürlek, M. (2018) 'The second record of the Seychelles dragonet Synchiropus sechellensis in the Northeastern Mediterranean coasts of the Turkey' Natural and Engineering Sciences, 3(1), pp.54-61.

Evans, J., Borg, J.A. and Schembri, P.J. (2013) 'First record of Herdmania momus (Ascidiacea: Pyuridae) from the central Mediterranean Sea' Marine Biodiversity Records, 6,e134.

Fernández-Vilert, R., Giménez, J., Mas, G., Figueroa, I. and Moles, J. (2018) 'First records of the Red Sea alien mollusc Haminoea cyanomarginata (Gastropoda: Heterobranchia: Cephalaspidea) in the Western Mediterranean' Journal of Natural History, 52(27-28), pp.1817-1823.

Fricke, R. (2006) Two new species and a new record of dragonets from New Caledonia (Teloestei: Callionymidae). Stuttgarter: Museum für Naturkunde.

Garilli V. & Caruso T. (2004) 'Records of Cerithium scabridum Philippi, 1848 (Caenogastropoda, Cerithiidae) from Northwestern Sicily' Bollettino Malacologico, 39 (9-12),pp.157-160.

Galil, B., Boero, F., Fraschetti, S., Piraino, S., Campbell, M., Hewitt, C., Carlton, J., Cook, E., Jelmert, A., Macpherson, E. and Marchini, A. (2015) 'The enlargement of the Suez Canal and introduction of non-indigenous species to the Mediterranean Sea' Limnology and Oceanography Bulletin, 24(2), pp.43-45.

Galil, B., Froglia, C. and Noe¨l, P. (2002) CIESM Atlas of exotic species in the Mediterranean—vol.2. Crustaceans decapods and stomatopods. Monaco: CIESM publishers.

Galil, B.S. (2007) 'Seeing red: alien species along the Mediterranean coast of Israel' Aquatic Invasions, 2(4), pp.281-312.

Galil, B.S., Spanier, E. and Ferguson, W.W. (1990) 'The Scyphomedusae of the Mediterranean coast of Israel, including two Lessepsian migrants new to the Mediterranean' Zoologische Mededelingen, 64(7), pp.95-105.

Gallardo, B. Clavero, M. Sánchez, M.I. and Vilà, M. (2016) 'Global ecological impacts of invasive species in aquatic ecosystems' Global change biology, 22(1), pp.151-163.

Gerovasileiou, V., Akel, E.H.KH., Akyol, O., Azevedo, F., Bababli, N., Bakiu, R., Bariche, M., Bennoui, A., Castriota, L., Chintiroglou, C.C., Crocetta, F., Deidun, A., Galinou-Mitsoudi, S., Giovos, I., Gokoglu, M., Golemaj, A., Hadjioannou, L., Hartingerova, J., Insacco, G., Katsanevakis, S., Kleitou, P., Koroun, J., Lipej, L., Malegue, M., Michaelidis, N., Mouzaitifoura, A., Ovalis, P., Petovic, S., Piraino, S., Rizkalla, S.I. , Rousou, A., Sava, I., Sen, H., Spinelli, A., Vougioukalou, K.G., Xharahi, E., Zava, B., Zenetos, A. (2017) 'New Mediterranean Biodiversity Records (July 2017)' Mediterranean Marine Science, 18 (2), pp.355-384.

Gewing, M.T., Bronstein, O., Nagar, L.R., Granot, I., Frid, O. and Shenkar, N. (2016) 'First record of the non-indigenous ascidian Microcosmus exasperatus, Heller 1878, in Cyprus' Marine Biodiversity, 46(4), pp.937-941.

Gewing, M.T., Rothman, S., Raijman Nagar, L. and Shenkar, N. (2014) 'Early stages of establishment of the non-indigenous ascidian Herdmania momus (Savigny, 1816) in shallow and deep-water environments on natural substrates in the Mediterranean Sea' BioInvasions Records, 3(2), pp.77-81.

Gökoğlu, M., Özvarol, Y. and Fricke, R. (2014) 'Synchiropus sechellensis Regan, 1908 (Teleostei: Callionymidae), a new Lessepsian migrant in the Mediterranean Sea' Mediterranean Marine Science, 15(2), pp.440-442.

Golani, D. (1992) 'Rhabdosargus haffara (Forsskål, 1775) and Sphyraena flavicauda Rüppell, 1833—new Red Sea immigrants in the Mediterranean' Journal of Fish biology, 40(1), pp.139-140.

Golani, D. and Sonin, O. (1992) 'New records of the Red Sea fishes, Pterois miles (Scorpaenidae) and Pteragogus pelycus (Labridae) from the eastern Mediterranean Sea' Japanese Journal of Ichthyology, 39(2), pp.167-169.

Golani, D., Orsi-Relini, L., Massutı´, E. and Quignard, JP. (2002) CIESM Atlas of exotic species in the Mediterranean—vol.1. fishes. Monaco: CIESM publishers.

Hamed, O., Miled-Fathalli, N. and Chakroun-Marzouk, N. (2018) 'First record of the Lessepsian migrant Pteragogus trispilus Randall, 2013 (Osteichthyes: Labridae) off the Tunisian coasts, Central Mediterranean Sea' Cahiers de Biologie Marine, 59, pp.115-119.

Hardy, G.S. and Randall, J.E. (1983) 'Description of a new species of pufferfish (Tetraodontiformes: Tetraodontidae) from the Red Sea and adjacent waters' Israel journal of zoology, 32(1), pp.13-20.

Houavt, R. (2008) 'Rehabilitation of Ergalatax martensi (Schepman, 1892) (Gastropoda: Muricidae), senior synonym of Ergalatax obscura Houart, 1996, and description of Ergalatax junionae, new name for Morula martensi Dall, 1923' Nautilus, 122(2), pp.99-106.

Huber, M. (2010) Compendium of bivalves. A full-color guide to 3,300 of the world's marine bivalves. A status on Bivalvia after 250 years of research. Hackenheim: ConchBooks, 901.

James, D.B. and Pearse, J.S. (1971) 'Echinoderms from the Gulf of Suez and the northern Red Sea' Journal of the marine biological Association of India, 11(1&2), pp.78-125.

Karako, S., Achituv, Y., Perl-Treves, R. and Katcoff, D. (2002) 'Asterina burtoni (Asteroidea; Echinodermata) in the Mediterranean and the Red Sea: Does asexual reproduction facilitate colonization?' Marine Ecology Progress Series, 234, pp.139-145.

Katsanevakis, S., Coll, M., Piroddi, C., Steenbeek, J., Ben Rais Lasram, F., Zenetos, A. and Cardoso, A.C. (2014) 'Invading the Mediterranean Sea: biodiversity patterns shaped by human activities' Frontiers in Marine Science, 1, p.32.

Katsanevakis, S., Poursanidis, D., Yokes, M.B., Mačić, V., Beqiraj, S., Kashta, L., Sghaier, Y.R., Zakhama-Sraieb, R., Benamer, I., Bitar, G. and Bouzaza, Z. (2011) 'Twelve years after the first report of the crab Percnon gibbesi (H. Milne Edwards, 1853) in the Mediterranean: current distribution and invasion rates' Journal of Biological Research-Thessaloniki, 16,pp.224-236.

Katsanevakis, S., Tsiamis, K., Ioannou, G., Michailidis, N. and Zenetos, A. (2009) 'Inventory of alien marine species of Cyprus (2009)' Mediterranean Marine Science, 10(2), pp.109-133.

Kondylatos, G., Corsini-Foka, M., Apostolopoulos, G. and Zenetos, A. (2016) 'Synchiropus sechellensis (Actinopterygii: Perciformes: Callionymidae), a new alien in the Aegean Sea and Hellenic waters' Acta Adriatica, 57(1), pp.187-191.

Louisy, P., Louisy, S. and James, R. (2015) Europe and mediterranean marine fish identification guide. Paris: Ulmer.

Michailidis, N. and Chartosia, N. (2016) 'New record of the Seychelles dragonet Synchiropus sechellensis Regan, 1908 from the Mediterranean: accidental entrance or Lessepsian immigration' BioInvasions Records, 5(4), pp.291-294.

Morris Jr, J.A., Akins, J.L., Barse, A., Cerino, D., Freshwater, D.W., Green, S.J., Muñoz, R.C., Paris, C. and Whitfield, P.E. (2009) 'Biology and ecology of the invasive lionfishes, Pterois miles and Pterois volitans', Proceedings of the 61st Gulf and Caribbean Fisheries Institute. Gosier, November 10-14. Guadalupe: Gulf and Caribbean Fisheries Institute.

Nader, M.R. and El Indary, S. (2011) 'First record of Diadema setosum (Leske, 1778) (Echinodermata, Echinoidea, Diadematidae) from Lebanon, Eastern Mediterranean' Aquatic Invasions, 6(1), pp.23-25.

Nagar, L.R. and Shenkar, N. (2016) Temperature and salinity sensitivity of the invasive ascidian Microcosmus exasperatus Heller, 1878. Aquatic Invasions, 11(1), pp.33-43.

Oliver, P.G. (1992) Bivalved seashells of the red sea. Hemmen: Verlag Christa Hemmen and National Museum of Wales, Wiesbaden and Cardiff.

Oliverio M. (1995) 'The status of the living Mediterranean Strombus, or: What is a lessepsian migrant?' Notiziario del CISMA,16, pp.35-40.

O'Loughlin, P.M. and Rowe, F.W. (2006) 'A systematic revision of the asterinid genus Aquilonastra O'Loughlin, 2004 (Echinodermata: Asteroidea)' Memoirs of Museum Victoria, 63(2), pp.257-287.

Otero, M., Cebrian, E., Francour, P., Galil, B. and Savini, D. (2013) Monitoring marine invasive species in Mediterranean marine protected areas (MPAs): a strategy and practical guide for managers. Malaga, Spain: IUCN.

Özgür, E. and Öztürk, B. (2008) 'A population of the alien jellyfish, Cassiopea andromeda (Forsskål, 1775) [Cnidaria: Scyphozoa: Rhizostomea] in the Ölüdeniz Lagoon, Turkey' Aquatic Invasions, 3(4), pp.423-428.

Özvarol, Y. and Tatlises, A. (2017) 'Some Biological Aspects of lessepsian Sargocentron rubrum (FORSSKÅL, 1775) in the north Cyprus, Mediterranean Sea' Scientific Papers: Series D, Animal Science-The International Session of Scientific Communications of the Faculty of Animal Science, 60, pp.359-361.

Del Pasqua, M., Schulze, A., Tovar-Hernández, M.A., Keppel, E., Lezzi, M., Gambi, M.C. and Giangrande, A. (2018) 'Clarifying the taxonomic status of the alien species Branchiomma bairdi and Branchiomma boholense (Annelida: Sabellidae) using molecular and morphological evidence' PloS one, 13(5), p. e0197104.

Prasade, A., Nagale, P. and Apte, D. (2016) 'Cassiopea andromeda (Forsskål, 1775) in the Gulf of Kutch, India: initial discovery of the scyphistoma, and a record of the medusa in nearly a century' Marine Biodiversity Records, 9(1), p.36.

Raitsos, D.E., Beaugrand, G., Georgopoulos, D., Zenetos, A., Pancucci-Papadopoulou, A.M., Theocharis, A. and Papathanassiou, E. (2010) 'Global climate change amplifies the entry of tropical species into the Eastern Mediterranean Sea' Limnology and Oceanography, 55(4), pp.1478-1484.

Ramos-Esplá, A.A., Izquierdo, A. and Çinar, M.E. (2013) 'Microcosmus exasperatus (Ascidiacea: Pyuridae), current distribution in the Mediterranean Sea' Marine Biodiversity Records, 6, E89. doi:10.1017/S1755267213000663

Randall, J.E., Victor, B.C., Alpermann, T.J., Bogorodsky, S.V., Mal, A.O., Satapoomin, U. and Bineesh, K.K. (2014) 'Rebuttal to Koeda et al. (2014) on the Red Sea fishes of the perciform genus Pempheris' Zootaxa, 3887(3), pp.377-392.

Relini, G. and Ryland, J. (ed) (2007) Biodiversity in Enclosed Seas and Artificial Marine Habitats: Proceedings of the 39th European Marine Biology Symposium, Held in Genoa, Italy, 21-24 July 2004. Netherlands: Springer Science & Business Media.

Rodríguez-Prieto, C., Ballesteros, E., Boisset, F. and Afonso-Carrillo, J. (2013) Macroalgas y fanerógamas marinas del Mediterráneo Occidental. (1st edn.). Madrid: Omega. pp. 1 - 656.

Ruiz, H. and Ballantine, D.L. (2004) 'Occurrence of the seagrass Halophila stipulacea in the tropical west Atlantic' Bulletin of Marine Science, 75(1), pp.131-135.

Russell, B.C., Golani, D. and Tikochinski, Y. (2015) 'Saurida lessepsianus a new species of lizardfish (Pisces: Synodontidae) from the Red Sea and Mediterranean Sea, with a key to Saurida species in the Red Sea' Zootaxa, 3956(4), pp.559-568.

Sansón, M., Reyes, J., Afonso-Carrillo, J. and Muñoz, E. (2002) 'Sublittoral and deep-water red and brown algae new from the Canary Islands' Botanica marina, 45(1), pp.35-49.

Schembri, P.J., Deidun, A. and Vella, P.J. (2010) 'First record of Cassiopea andromeda (Scyphozoa: Rhizostomeae: Cassiopeidae) from the central Mediterranean Sea' Marine Biodiversity Records, 3, E6. doi:10.1017/S1755267209990625

Shenkar, N. and Loya, Y. (2008) 'The solitary ascidian Herdmania momus: native (Red Sea) versus non-indigenous (Mediterranean) populations' Biological invasions, 10(8), pp.1431-1439.

Shenkar, N. and Loya, Y. (2009) 'Non-indigenous ascidians (Chordata: Tunicata) along the Mediterranean coast of Israel' Marine Biodiversity Records, 2, E166. doi:10.1017/S1755267209990753

Short, F.T. and Coles, R.G. (ed.) (2001) Global seagrass research methods. Netherlands: Elsevier.

Terranova, M.S., Lo Brutto, S., Arculeo, M. and Mitton, J.B., (2007) 'A mitochondrial phylogeography of Brachidontes variabilis (Bivalvia: Mytilidae) reveals three cryptic species' Journal of Zoological Systematics and Evolutionary Research, 45(4), pp.289-298.

Tsiamis, K. and Verlaque, M. (2011) 'A new contribution to the alien red macroalgal flora of Greece (Eastern Mediterranean) with emphasis on Hypnea species' Cryptogamie, algologie, 32(4), pp.393-410.

Tsiamis, K., Aydogan, O., Bailly, N., Balistreri, P., Bariche, M., Carden-Noad, S., Corsini-Foka, M., Crocetta, F., Davidov, B., Dimitriadis, C. and Dragičević, B. (2016) 'New Mediterranean Biodiversity Records (July 2015)' Mediterranean Marine Science, 16(2), pp.472-488.

Tsiamis, K., Taşkın, E., Orfanidis, S., Stavrou, P., Argyrou, M., Panayotidis, P., Tsioli, T., Cicek, B.A., Marcou, M. and Küpper, F.C. (2014) 'Checklist of seaweeds of Cyprus (Mediterranean Sea)' Botanica marina, 57(3), pp.153-166.

Verlaque, M., Afonso-Carrillo, J., Gil-Rodriguez, M.C., Durand, C., Boudouresque, C.F. and Le Parco, Y. (2004) 'Blitzkrieg in a marine invasion: Caulerpa racemosa var. cylindracea (Bryopsidales, Chlorophyta) reaches the Canary Islands (north-east Atlantic)' Biological Invasions, 6(3), pp.269-281.

Yokes, B. and Galil, B.S. (2006) 'The first record of the needle-spined urchin Diadema setosum (Leske, 1778) (Echinodermata: Echinoidea: Diadematidae) from the Mediterranean Sea' Aquatic Invasions, 1(3), pp.188-190.

Zenetos, A., Gofas S., Russo, GF. and Templado, J. (2004) CIESM Atlas of exotic species in the Mediterranean—vol 3 Molluscs. Monaco: CIESM publishers.

Zenetos, A., Çinar, M.E., Crocetta, F., Golani, D., Rosso, A., Servello, G., Shenkar, N., Turon, X. and Verlaque, M. (2017) 'Uncertainties and validation of alien species catalogues: the Mediterranean as an example' Estuarine, Coastal and Shelf Science, 191, pp.171-187.

Zenetos, A., Çinar, M.E., Pancucci-Papadopoulou, M.A., Harmelin, J.G., Furnari, G., Andaloro, F., Bellou, N., Streftaris, N. and Zibrowius, H. (2005) 'Annotated list of marine alien species in the Mediterranean with records of the worst invasive species' Mediterranean marine science, 6(2), pp.63-118.

Zenetos, A., Konstantinou, F. and Konstantinou, G. (2009) 'Towards homogenization of the Levantine alien biota: additions to the alien molluscan fauna along the Cypriot coast' Marine Biodiversity Records, 2, E156. doi:10.1017/S1755267209990832.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