



A new Mediterranean species of the Cornirostridae (Gastropoda, Heterobranchia), with notes on the genus *Tomura*

Una nueva especie mediterránea de Cornirostridae (Gastropoda, Heterobranchia), con notas sobre el género Tomura

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ABSTRACT

A new Mediterranean species of the genus *Tomura* Pilsbry and McGinty, 1946 (Gastropoda, Heterobranchia, Cornirostridae) is described: *Tomura rubiorolanorum* spec. nov. It is assigned to this genus on conchological characters and it is compared with similar species. Two other species, *Vitrinella urdunica* Bandel, 2010 and *Vitrinella jekelii* Bandel, 2010 are transferred to *Tomura*.

RESUMEN

Se describe una nueva especie mediterránea del género *Tomura* Pilsbry y McGinty, 1946 (Gastropoda, Heterobranchia, Cornirostridae): *Tomura rubiorolanorum* spec. nov. Se asigna a este género en base a caracteres conquiológicos y se compara con especies similares. Otras dos especies, *Vitrinella urdunica* Bandel, 2010 and *Vitrinella jekelii* Bandel, 2010 se transfieren a *Tomura*.

INTRODUCTION

The family Cornirostridae is a group of marine "lower heterobranchs" related to Valvatidae Gray, 1840 and Hyalogyrinidae Warén and Bouchet, 1993 (BOUCHET AND ROCROI, 2005; RUBIO, ROLÁN AND FERNÁNDEZ-GARCÉS, 2013). It was introduced by PONDER (1990) to include two genera: *Cornirostra* Ponder, 1990 and *Tomura* Pilsbry and McGinty, 1946. Later WARÉN, GOFAS AND SCHANDER (1993) added *Noerrevingia*. BIELER, BALL AND MIKKELSEN (1998) redefined the family which currently comprises 14 recent species worldwide. Molecular data have confirmed that Cornirostridae belong in the Heterobranchia (e.g. DI NAPOLI AND KLUSMANN-KOLB, 2010; COLGAN,

PONDER, BEACHAM & MACARANAS, 2007). So far, *Tomura depressa* (GRANATA-GRILLO, 1877) was the only Mediterranean representative of the family; in this work we describe a second species of this genus from the Mediterranean Sea.

MATERIAL AND METHODS

Abbreviations and acronyms

MNHN: Muséum National d'Histoire Naturelle, Paris,
H: maximum height (in mm),
SEM: scanning electron microscope,
W: maximum width (in mm),
APC: Attilio Pagli collection (Lari),

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ARC: Alessandro Raveggi collection (Firenze),
CBC: Cesare Bogi collection (Livorno),
CSC: Carlo Sbrana collection (Livorno),
FGC: Francesco Giusti collection (Livorno),
SBC: Stefano Bartolini collection (Firenze),
legit: collector.

Material examined

Tomura rubiorolanorum spec. nov. (see below for details), 9 shells and one damaged shell.

Tomura depressa (Granata-Grillo, 1877): Elba Island (Livorno, Italy), 40 m depth, 58 shells; Krk Island (Croatia), 40 m depth, 23 shells; Île-Rousse (Corsica, France) 30 m depth, 38 shells; Pantelleria Island (Trapani, Italy), 40 m depth, 30 shells, all in SBC. Sidi Youssef (Kerkennah, Tunisia), 0.5 m depth, 6 shells; Scilla (Reggio Calabria, Italy) 50

m depth, 6 shells, in APC. Rosh Hanikra (Israel), 8 m depth, 8 shells, in CBC.

Xenoskenea pellucida (Monterosato, 1874): Aci Castello (Catania, Italy), 45 m depth, 5 shells, in APC.

Hyalogyra zibrowii Warén, 1997: Palinuro (Salerno, Italy), 20 m depth, 1 shell, in APC, 3 shells in CSC; Krk Island (Croatia), 30 m depth, 2 shells, in CBC.

Hyalogyra amphorae Warén, Carrozza and Rocchini, 1997: off Cap Corse (Corsica, France), 600 m depth, 3 shells, in FGC.

All material was sorted from bioclastic sediment samples collected by SCUBA diving or trawled by local fishermen. Shells were studied with a stereomicroscope. Images were taken with a digital photcamera or Scanning Electron Microscope (SEM). The protoconch whorls were counted according to the method of VERDUIN (1977).

SYSTEMATICS

Class GASTROPODA Cuvier, 1795

Subclass HETEROBRANCHIA Gray, 1840

Superfamily VALVATOIDEA Gray, 1840

Family CORNIROSTRIDAE Ponder, 1990

Genus *Tomura* Pilsbry and McGinty, 1946

Tomura Pilsbry and McGinty, 1946. Type Species: *Vitrinella (Tomura) bicaudata* Pilsbry and McGinty, 1946, *Nautilus*, 60: p.15 (by original designation); Holocene, Florida.

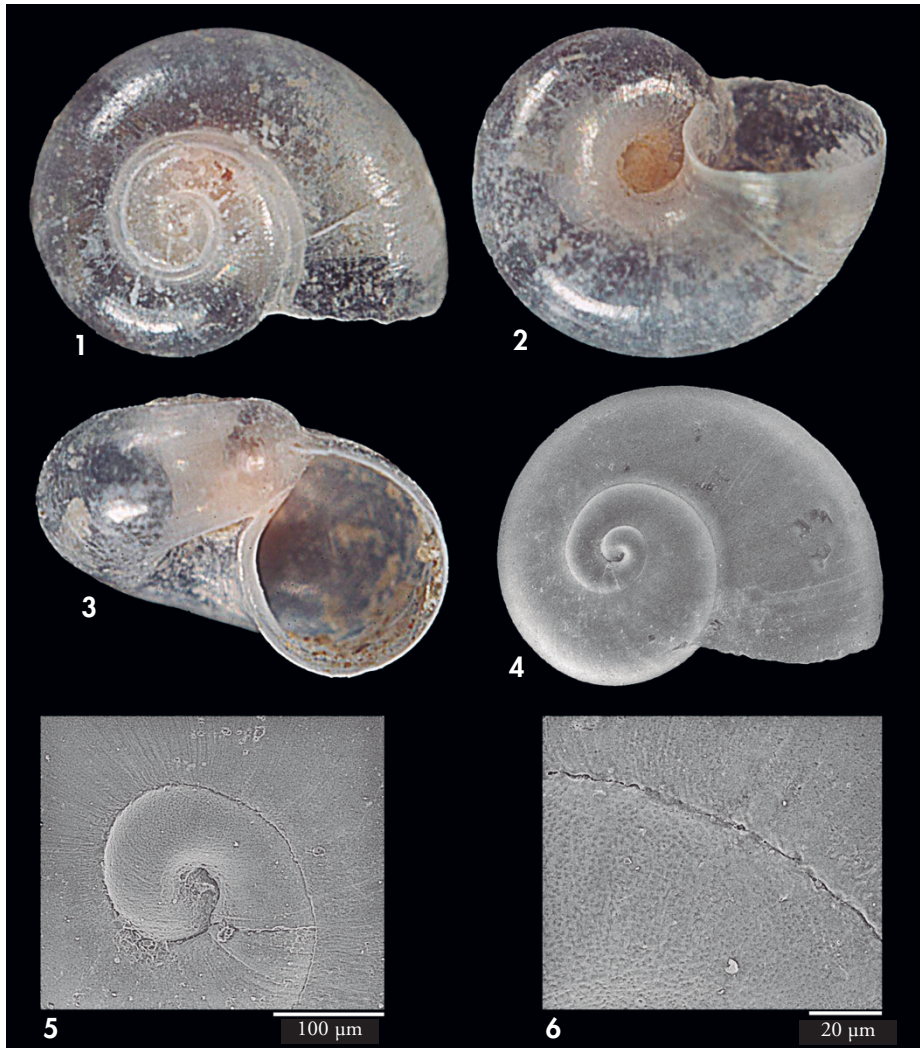
Tomura rubiorolanorum new species (Figs. 1-8)

Type material: Holotype (MNHN IM-2000-30243): H: 0.95 mm, W: 1.41 mm, C. Sbrana legit, 24-05-2004 (Fig. 1-3); Capo Palinuro (Palinuro, Salerno, Italy, 40°01'N, 15°16'E), on the bottom of a submarine cave (Grotta Azzurra), 19 m depth. Paratypes A and B (CSC): H: 0.85 mm, W: 1.26 mm and H: 0.91 mm, W: 1.23 mm, C. Sbrana legit, 24-05-2004. Paratypes C and D (SBC): H: 1.01 mm, W: 1.50 mm and H: 0.86 mm, W: 1.43 mm, S. Bartolini legit, 06-2007 (Fig. 7-8). Paratype E (SBC): H: 0.84 mm, W: 1.21 mm, S. Bartolini legit, 07-2008. Paratype F and G (APC): H: 1.06 mm, W: 1.50 mm, and H: 0.87 mm, W: 1.25 mm, F. Cuneo legit, 24-05-2004 (Fig. 4-6).

Material examined: Paratypes A and B: Type locality. Paratypes C and D: Capo Vita (Rio Marina, Elba Island, Livorno, Italy, 42°52'N, 10°24'E), 40 m depth, coralline bottom. Paratypes C and D: Capo Vita (Rio Marina, Elba Island, Livorno, Italy, 42°52'N, 10°24'E), 40 m depth, coralline bottom. Paratype E: Pantelleria Island (Trapani, Italy), 40 m depth, coralline bottom. Paratype F and G: Capo Palinuro (Palinuro, Salerno, Italy, 40°01'N, 15°16'E), on the bottom of a submarine cave (Grotta Cattedrale 2), 18 m depth.

Other material examined: 1 damaged shell, Capo Palinuro (Palinuro, Salerno, Italy, 40°01'N, 15°16'E), on the bottom of a submarine cave (Grotta Cattedrale II), 18 m depth, C. Sbrana legit, 24-05-2004.

Etymology: after Federico Rubio and Emilio Rolán for their outstanding contributions to the knowledge of the microgastropods.

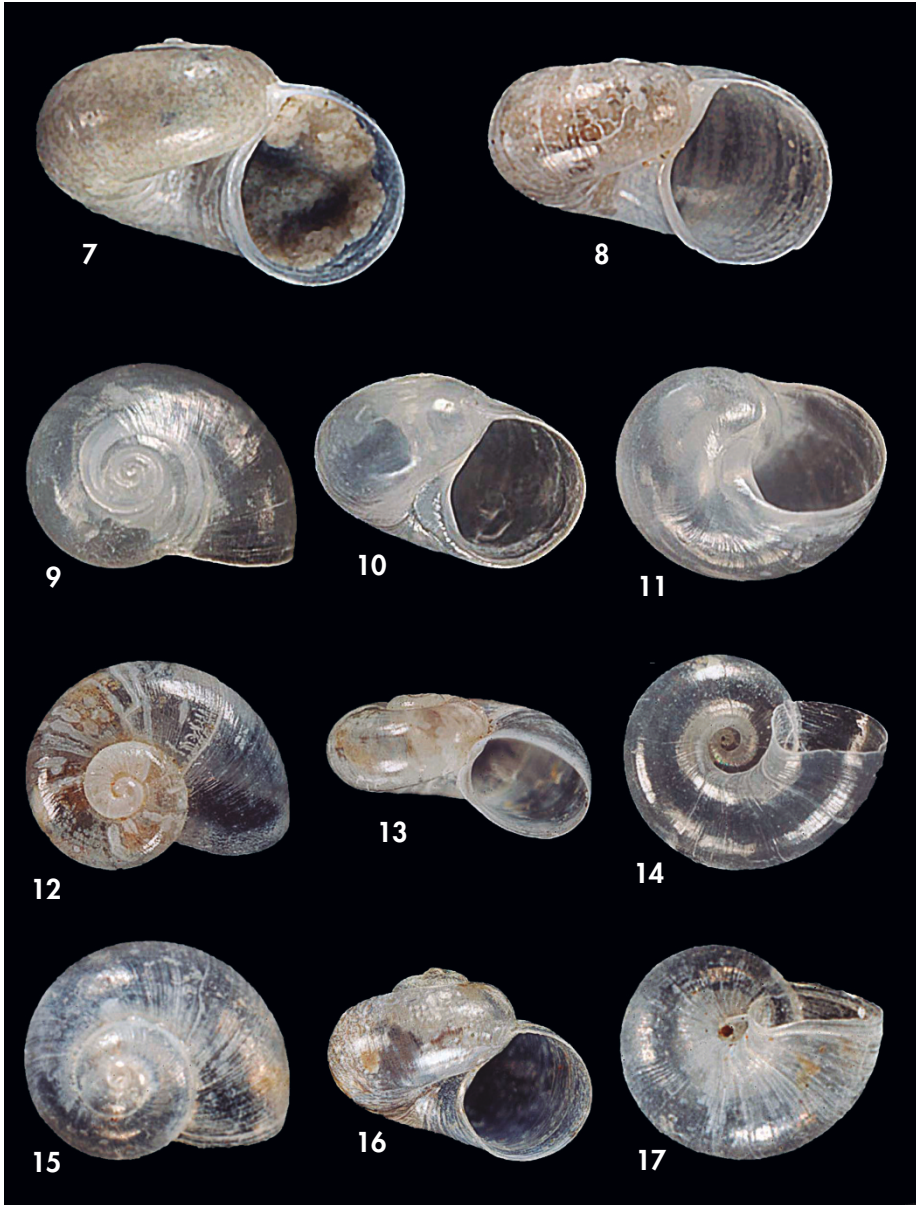


Figures 1-6. *Tomura rubiorolanorum* spec. nov. 1-3: holotype, diameter 1.41 mm, Cape Palinuro (Salerno, Italy), (MNHN IM-2000-30243). 1: shell, apical view; 2: shell, basal view; 3: shell, frontal view. 4-6: paratype G, diameter 1.25 mm, Capo Palinuro (Palinuro, Italy), in APC. 4: shell, apical view; 5: protoconch; 6: detail of the protoconch.

Figuras 1-6. Tomura rubiorolanorum spec. nov. 1-3: holotype, diámetro 1,41 mm, Cabo Palinuro (Salerno, Italia), (MNHN IM-2.000-30.243). 1: Concha, vista apical; 2: concha, vista basal; 3: Concha, vista frontal. 4-6: Paratipo G, diámetro 1.25 mm, Cabo Palinuro (Palinuro, Italia), en APC. 4: concha, vista apical; 5: protoconcha; 6: detalle de la protoconcha.

Description (based on the typical series, holotype measurements in parentheses): Shell (Fig. 1-3, 4, 7, 8) very small, H: 0.84-1.02 (0.95) mm, W: 1.21-1.50 (1.41) mm, H/W: 0.66-0.73 (0.67), globose-depressed, wider

than high, rather thin, transparent and glossy in fresh specimens (opaque-whitish in old shells). Protoconch (Fig. 5) heterostrophic, diameter 200-230 (215) µm, of 0.9-1.2 (1.0) apparently smooth whorls,



Figures 7, 8. *Tomura rubiorolanorum* spec. nov., Elba Island (Livorno, Italy), in SBC. 7: paratype C, diameter 1.50 mm; 8: paratype D, diameter 1.43 mm. Figures 9-11. *Tomura depressa*, Krk Island (Croatia), diameter: 1.40 mm, in SBC. Figures 12-14. *Xenoskenea pellucida*, Castelsardo (Sassari, Italy), 12-13, diameter 1.30 mm, 14, diameter 1.70 mm, in SBC and ARC. Figures 15-17. *Hyalogyra zibrowii*, Krk Island (Croatia), diameter 1.30 mm, in CBC.

Figuras 7, 8. Tomura rubiorolanorum spec. nov., Isla de Elba (Livorno, Italia), en SBC.. 7: paratipo C, diámetro 1.50 mm; 8: paratipo D, diámetro 1.43 mm. Figuras 9-11. Tomura depressa, Isla de Krk (Croacia), diámetro 1.40 mm, en el SBC. Figuras 12-14. Xenoskenea pellucida, Castelsardo (Sassari, Italia), 12 -13, diámetro 1.30 mm, 14, diámetro 1.70 mm, en SBC y ARC. Figuras 15-17. Hyalogyra zibrowii, Krk Island (Croacia), diámetro 1.30 mm, en CBC.

finely reticulated (Fig. 6). Protoconch I (embryonic shell) partially immersed and Protoconch II (larval shell) not clearly differentiated. Teleoconch of 1.3-1.8 (1.7) whorls almost perfectly smooth, with only weak growth lines. Suture indistinct and shallow; "false suture" visible in fresh specimens. Last whorl regularly rounded and slightly descending. Spire flattened, in some specimens hardly elevated; outline evenly convex. Labrum slightly prosocline, aperture almost circular. Peristome is sharp and free along the parietal wall except for a little area just under the suture. Columella regularly curved, slightly flared and thickened. Umbilicus open, simple, narrow and deep, diameter 160-190 (165) μm .

Variation: the spire elevation varies, even within population (Figs. 7, 8); the protoconch can be more or less tilted.

REMARKS

Marine valvatoideans, although anatomically well defined (PONDER, 1990; BIELER, BALL AND MIKKELSEN, 1998; HASZPRUNAR, SPEIMANN, HAWE AND HESS, 2011), possess quite featureless skeneiform/valvatiform/vitrinelliform shells. The main morphological feature which characterizes the their shells is the slightly heterostrophic protoconch (absent only in few species), which distinguishes them from Vetigastropods and Caenogastropods with very similar shells (BANDEL, 1982; RUBIO, FERNÁNDEZ-GARCÉS AND ROLÁN, 2011). The generic or even familial placement of the species is based mainly on anatomical and radular features. Cornirostrids are no exception to this rule, so in absence of anatomical data *T. rubiorolanorum* is tentatively assigned to this genus based only on conchological characters. The main reasons are: the similarity of the shell in general outline, spire, suture, umbilicus and protoconch with some *Tomura* species. The comparative characters of most cornirostrid species were summarized by Bieler et al. (1998) and RUBIO ET AL. (2013). *Tomura* currently comprises 10 extant species

Soft parts unknown.

Distribution and habitat: currently known from the Tyrrhenian Sea and the Strait of Sicily. The new species has been found at localities hundreds of km apart, it is thus not endemic to a restricted locality in the Mediterranean, and it could be expected to be found also elsewhere. Also other cornirostrids have apparently similar wide intraMediterranean ranges (OLIVIERO, 1983, 1985, 1988). Most shells were found in submarine caves and from typical coralligenous substrates. It may be speculated that the species lives in sciaphilic habitats such as rock crevices, shallow caves or interstitial gravel bottoms, but only with the discovery of live specimens may we provide more accurate information on the biology and ecology of *Tomura rubiorolanorum*.

(Bouchet and Gofas, 2015): *Tomura depressa* (Granata-Grillo, 1877), *Tomura bicaudata* (Pilsbry and McGinty, 1946), *Tomura yashima* Fukuda and Yamashita, 1997, *Tomura himeshima* Fukuda and Yamashita, 1997, *Tomura xenoskeneoides* Rubio and Rolán, 1998, *Tomura abscondita* Rolán and Rubio, 1999, *Tomura sphaerica* Rolán and Rubio, 2008, *Tomura umbiliobsessa* Rolán and Rubio, 2008, *Tomura aqabaensis* Bandel, 2010, *Tomura apextruncatus* Rubio, Rolán and Fernández-Garcés, 2013; only half of them (*T. depressa*, *T. bicaudata*, *T. yashima*, *T. himeshima*, *T. xenoskeneoides*) are known from live-taken specimens. Three fossil species are assigned to *Tomura*: *T. ambatolafiensis*, Kiel 2006, from the Cretaceous of Madagascar; *T. pacheia* Lozouet, Lesport and Renard 2001 from the Miocene of France and *T. bezanconi* (Cossman and Lambert, 1884) from the Oligocene of France.

The most similar species to *T. rubiorolanorum* is *T. bicaudata*, which has a similar outline and a deep and narrow umbilicus, but is distinguished by its periumbilical keel and the smaller protoconch; *T. umbiliobsessa* is also similar

but has a periumbilical keel and a pitted surface; *T. depressa* (Fig. 9-11), *T. sphaerica* and *T. apex truncatus* have the umbilicus occluded by a strong callus and smaller protoconchs; *T. xenoskeneoides*, *T. yashima* and *T. himeshima* have valvatooid shells with a wider umbilicus and deeper suture; *T. abscondita* is more globose, and the surface is totally covered by spiral threads and has the callus; *T. aqabaensis* has a very depressed and discoidal shell, more openly coiled, resembling *Xylodiscula*. *T. bezanconi* has a closed umbilicus and sculptured surface (COSSMANN AND LAMBERT, 1884; LOZOUET AND MAESTRATI, 2012); *T. pacheia* is more globose, robust, with a narrower umbilicus; *T. ambatolafiensis* has a keeled umbilicus and thicker colomellar lip.

We also compared *T. rubiorolanorum* with the other three known Mediterranean marine valvatoideans: *Hyalogyrina amphorae* Warén, Carrozza and Rocchini, 1997 lives in deeper waters, has a high-spired teleoconch and its protoconch has a peculiarly shaped nucleus; *Xenoskenea pellucida* (Monterosato, 1874) and *Hyalogyra zibowii* Warén, 1997 were found sympatric with *T. rubiorolanorum* but have different protoconchs, more convex whorls and deeper suture; moreover *X. pellucida* (Fig. 12-14) has a more flattened spire and wider umbilicus while *H. zibowii* (Fig. 15-17) is more elevated, with a narrower umbilicus (WARÉN, GOFAS AND SCHANDER, 1993; WARÉN, CARROZZA AND ROCCHINI, 1997). *Vitrinella urdunica* Bandel, 2010 from the Red Sea has a smooth umbilical wall (BANDEL, 2015, pers. comm.) like *T. rubiorolanorum* but possesses a very fine spiral ornament of the early teleoconch and a smooth, smaller protoconch.

The family Vitrinellidae Bush, 1897, a junior synonym of Tornidae Sacco, 1896 (BOUCHET AND ROCROI, 2005), is based on *Vitrinella* C. B. Adams, 1850 (type species, *Vitrinella helicoidea* CB Adams, 1850). BANDEL (2010) synonymized Vitrinellidae Bush, 1897 with Cornirostridae Ponder, 1990, relying on the great similarities between the shells

of *Vitrinella* cf. *helicoidea* from the Caribbean Sea and *Cornirostra*. *Vitrinella helicoidea* is characterized by a regularly coiling protoconch, as in typical caenogastropods (PILSBRY, 1946; CLENCH AND TURNER, 1950; RUBIO ET AL., 2011, fig. 94 F-G, 95 D). *Vitrinella* cf. *helicoidea* sensu Bandel is clearly not conspecific with Adams' species; on the contrary it is similar to *Tomura bicaudata*, and it is most probably a member of this genus, sharing essentially the same type of protoconch and other shells characters (BANDEL, 2010, Pl.1, fig. 9, 10).

Vitrinella urdunica Bandel, 2010, recent from the Red Sea and *Vitrinella jekelii* Bandel, 2010 from the Miocene of Romania are also congeneric, so they are more accurately placed in *Tomura*.

Here their new taxonomic status is given:

Class Gastropoda Cuvier, 1795

Subclass Heterobranchia Gray, 1840

Superfamily Valvatoidea Gray, 1840

Family Cornirostridae Ponder, 1990

Tomura urdunica (Bandel, 2010) nov. comb.

Tomura jekelii (Bandel, 2010) nov. comb.

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