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Paraleptopentacta, a new Mediterranean and north-west Atlantic sea cucumber genus, with the first record of *P. tergestina* n. comb. (Echinodermata: Dendrochirotida: Cucumariidae) from the north-western Algerian coast

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Abstract

The genus *Leptopentacta* H.L. Clark, 1938 is here reviewed and restricted to include only the type species and related tropical Pacific forms, while a new genus *Paraleptopentacta* is erected to accommodate the Mediterranean and some north-west Atlantic species, formerly assigned to *Leptopentacta*. *Paraleptopentacta* **n. gen.** is characterized by a calcareous ring usually without posteriorly forked radial plates, in combination with body wall ossicles as an external layer of baskets (sometimes absent) and an inner layer of smooth (in one species knobbed), single-layered, multilocular plates, without a reticulum, as opposed to *Leptopentacta* H.L. Clark, 1938, which always has forked tails to the radial plates and ossicles as an external layer of rosettes and/or baskets and an inner layer of multi-layered or often reticulated scales/plates. A key separating both the genera and their species is provided. In addition, a first record of *P. tergestina* **n. comb.** (Sars, 1859), based on individuals collected as bycatch by a commercial benthic trawler in the Mostaganem region, north-west Algeria, is briefly described and its *in vitro* behavior noted.

Key words: *Leptopentacta*, new genus, Mostaganem, Algeria, north-west Atlantic, bycatch

Introduction

Of the approximately 1700 species of sea cucumbers known worldwide, only eight species have been recorded from Algeria. These include the synaptid *Oestergrenia digitata* (Montagu, 1815) by Mezali & Semroud (1997); six holothuriids, namely *Holothuria (Holothuria) tubulosa* Gmelin,1791, *Holothuria (Holothuria) stellati* Delle Chiaje, 1824, *Holothuria (Platyperona) sanctori* Delle Chiaje, 1823, *Holothuria (Panningothuria) forskali* Delle Chiaje, 1823, *Holothuria (Roweothuria) poli* Delle Chiaje, 1824, all by Mezali (1998) and Mezali & Francour (2012), *Holothuria (Roweothuria) arguinensis* Koehler & Vaney, 1906 by Mezali & Thandar (2014); and the stichopodid *Parastichopus regalis* (Cuvier, 1817) by Benzait *et al.* (2020). Thus far not a single dendrochirotid has been recorded from Algerian waters. Herein, we describe a new dendrochirotid genus based on new material from the north-west coast of Algeria.

Materials and methods

Five individuals of *P. tergestina* **n. comb.** were caught in the net of a commercial benthic trawl as bycatch in the Mostaganem region, west of the Algerian coast (36° 6.38374’N, 0° 8.34821’E) at a depth of 60 m in March 2020 (Figure 1). Four individuals were transported to the PVCMRMS (Protection, Valorization of Coastal Marine Resources and Molecular Systematics laboratory, Algeria) anesthetized and stored in ethanol while a single individual was

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placed in aquarium containing fresh sea-water and a thin layer of sediment, in order to observe its external morphology and behavior in a living state. The specimens were identified from the descriptions of the species given by Sars (1859) and the excellent one provided by Koehler (1921).

The ossicles were extracted from several parts of the body, according to the method of Samyn *et al.* (2006). These regions included the oral end, the dorsal body wall, the ventral body wall, the anal region, podia, tentacles and the introvert. The excised part was placed in a tube with a few drops of household bleach, left to stand until most of the soft parts were digested and a white precipitate appeared. All superfluous tissue was discarded and the sediment was then rinsed with distilled water several times. Wet mounts were then prepared on glass slides, observed under a light microscope at various magnifications, and photographed using the Optika View Lite software. Ossicle measurements were carried out using the ImageJ software.

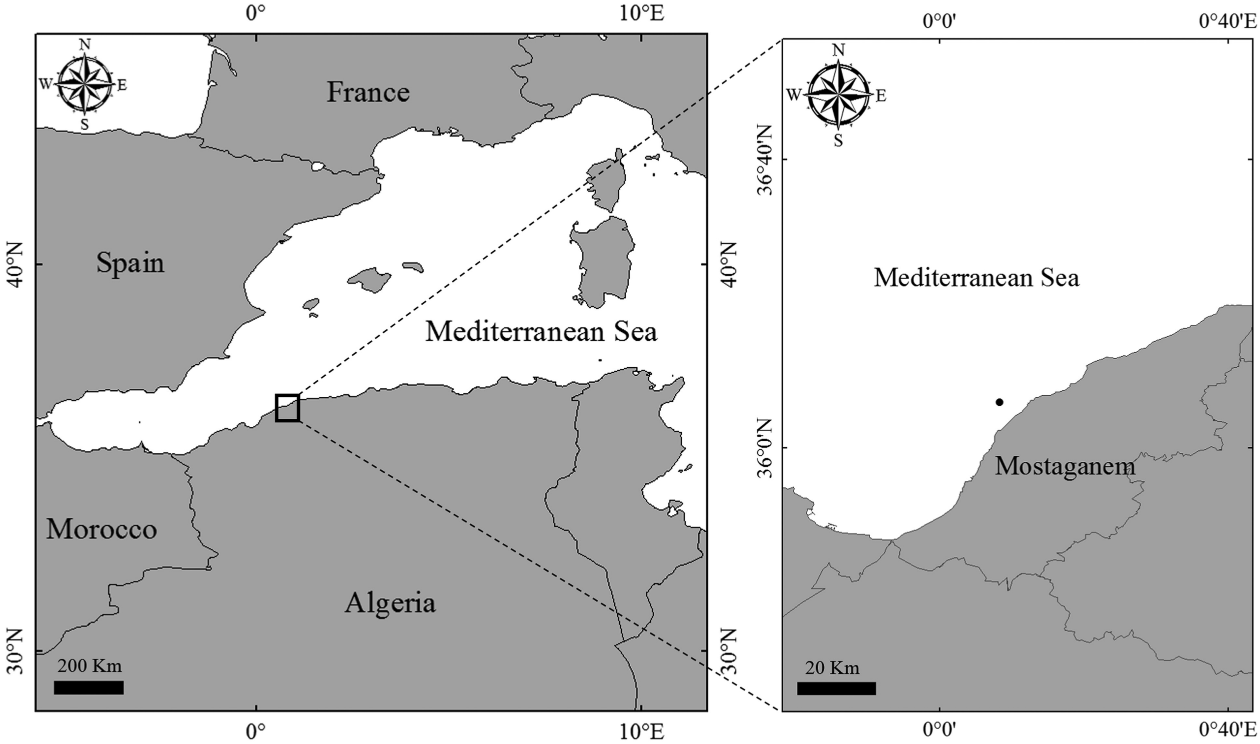

FIGURE 1. Geographical location of the *Paraleptopentacta* (**n. gen.**) *tergestina* **n. comb.** sampling area (actual area indicated by the black square).

Taxonomic background

The discovery of *Paraleptopentacta tergestina* **n. comb.** in the Algerian waters provided us an opportunity to review the genus *Leptopentacta*, critically looking at its geographical distribution, the validity of all species currently assigned to it, and to determine whether the genus can be subdivided based on geographical distribution and morphology of the species it contains.

Herein we critically review the genus *Leptopentacta*, dividing it into two genera and provide a key to separate them and the species assigned to each. Table 1 sets out the distribution and the most pertinent morphological characters of all species currently included in *Leptopentacta* by WoRMS (2020).

Deichmann (1941) attempted to divide the genus *Leptopentacta* into two groups: the first group *Leptopentacta*, containing only *L. grisea* H.L. Clark, 1938 (the type species), *L. panamica* Deichmann, 1941 and *L. nina* Deichmann, 1941; and the second group containing *Cucumaria imbricata* Semper, 1867, *Ocnus typicus* Théel, 1886, *O. javanicus* Sluiter, 1880 and *L. nova* Deichmann, 1941. For the second group she proposed the name *Parocnus*, with *C. imbricata* as the type species. However, she did not realize that *Parocnus* was preoccupied nor did she consider the other current *Leptopentacta* congeners which, at that time, were misplaced under different names within the Cucumariidae. Further, she made no mention on how these two genera should be differentiated but only illustrated the calcareous rings of those species she considered to be the true *Leptopentacta*, drawing attention to the differences in

TABLE 1. Comparative table of distribution and some pertinent morphological characters of species currently assigned to *Leptopentacta*.

Species	Locality/ distribution	Tube feet	Calcareous ring	Body wall Ossicles
grisea H.L. Clark, 1938	N.W. Australia	papilliform, double rows, restricted to ambulacra, better developed at ends	radial plates posteriorly forked	**plates**—large, lenticular, reticulate; other plates small to large, simple; **buttons**—often knobbed; **baskets**—large, deep
imbricata (Semper, 1867)	Bay of Bengal, Java, Philippines, Hong Kong	single rows, rigid, restricted to ambulacra	radial plates posteriorly forked	**plates**—reticulate, large, oval; **rosettes**—present; developing form **baskets**—which may be absent
bacilliformis (Koehler & Vaney, 1908)	Andaman Islands	single rows, rigid, small, restricted to ambulacra	radial plates posteriorly forked	**plates**—reticulate; **buttons**—small, knobbed; **baskets**—absent
punctabipedia Cherbonnier, 1961	Vietnam	single rows, rigid, restricted to ambulacra	radial plates posteriorly forked	**plates**—reticulate, various forms; **buttons**—with small holes; **baskets**—deep, some rosette-like
?***nina*** Deichmann, 1941	Equador	single rows, retractile	radial plates posteriorly forked	**plates**—reticulate; **buttons**—knobbed; **baskets**—absent
panamica Deichmann, 1941	Panama	scattered, in double rows, becoming single in both directions	radial plates posteriorly forked	**plates**—concave, reticulate, some with protruding spine; **buttons**—strongly knobbed, regular; **baskets—**some with a small spine
cucumis (Risso, 1826)	Adriatic	two rows, conical, pointed, restricted to ambulacra	radial plates without posterior bifurcations	**plates**—of all sizes, usually smooth, rarely one/two reticulate; **baskets—**flat, with trabeculae, margins only slightly knobbed

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TABLE 1. (Cointinued)

Species	Locality/ distribution	Tube feet	Calcareous ring	Body wall Ossicles
elongata (Düben & Koren, 1846)	N.W. Atl. & Medit.	two rows, restricted to ambulacra	radial plates without posterior bifurcations	**plates**—smooth, imbricating; simple **baskets**—with small projections, some with multi-locular base
tergestina (Sars, 1859)	N.W. Atl. & Medit.	single, zigzag rows, restricted to ambulacra	both radial and interradial plates posteriorly forked, forks appear to link	**plates**—simple, elongated, smooth, various sizes; holes usually in paired series **baskets**—cup-like, projections numerous; **rosettes**—always present
djakonovi Baranova & Savel'eva, 1972	Black & Azov Seas	1-2 rows, restricted to ambulacra	radial plates with posterior bifurcations	**plates—**simple, imbricating, knobbed, holes minute; **buttons—**tiny, knobbed; **baskets—**with numerous projections
?*nova* Deichmann, 1941	Lower California	very few, 6-19, conical	radial plates without posterior bifurcations	**plates—**cobble or grain-like, some reticulate; **biscuit-like deposits—**externally, some with spine; **baskets—**absent

the posterior aspect of the radial plates of the calcareous ring of each species, where known, but was careful not to synonymise any species since Semper's (1867) description of the calcareous ring of his species did not correspond to his illustration and that of *O. typicus* was not illustrated.

Subsequently, Panning (1949) assembled the Mediterranean and north-west Atlantic species in the genus *Trachythyone* and declared *Parocnus* a synonym of *Trachythyone*, also without noticing its unavailability. Concurrently Cherbonnier (1949) inadvertently assigned his two West African species (viz. *P. cabindaensis* and *P. ransoni*) to *Parocnus,* thus making the same error. It must here be emphasised the both Panning's (1949) and Cherbonnier's (1949) papers were contemporary. Since then Panning (1966), in his revision of *Leptopentacta,* considered it to comprise two groups, the *grisea* group and the *elongata* group, the former with the type species *L. grisea* and *L. imbricata* (with synonyms *Ocnus typicus* and *O. javanicus*) and *O. ignavus* Ludwig, the latter species has since been transferred to *Plesiocolochirus*. Whether *L. imbricata* is really congeneric with *L. grisea* is questioned by Rowe (pers. comm.) and needs to be proven, but Panning (1966) is the only writer to have examined Semper's paratypes (the holotype is lost) and thus we are compelled for now to accept his conclusions.

In his *elongata* group Panning (1966) included the Mediterranean *L. elongata*, *L. cucumis*, *L. tergestina* and *Cucumaria vicaria* Sluiter, 1910 (the latter species is now recognized with its original name) and a *Leptopentacta* sp. indet. Panning (1966) commented that, on the basis of distribution and the presence of smooth, single-layered scales, this group may require a separate genus, which he left for consideration by future workers, but retained *Parocnus*, now as a synonym of *Leptopentacta* but still unaware of Cherbonnier's (1949) paper. The status of *Parocnus* thus went unnoticed until Thandar (in Thandar & Mjobo 2014) erected the genus *Cherbocnus* to replace the preoccupied *Parocnus,* for Cherbonnier's (1949) west African species thus making *Parocnus* unacceptable (WoRMS, 2020). Rowe (pers. comm.) has communicated that the Mediterranean and North-West Atlantic species of *Leptopentacta* must be separated from the other *Leptopentacta* spp. since *Leptopentacta* should strictly be considered a warm-water, tropical Indo-West Pacific genus. Thus, we investigated, on biogeographical and morphological grounds alone, all species currently ascribed to it, in order to see whether the genus could be subdivided. We agree with Rowe (pers. comm.) that *Trachythyone* is a southern genus best used for cold-water species while the Mediterranean and North-West Atlantic species of *Leptopentacta* should be separated from the Indo-West Pacific forms. If *L. imbricata* does not prove to be congeneric with *L. grisea* a new name will be needed to replace *Parocnus* (still with *imbricatus* as its type species) as a 'nom. nov. pro.' (Rowe, pers. comm.) but this is beyond the scope of this paper.

Aside from their geographical distributions, we found clear morphological differences, with a few exceptions, amongst all the species. All six tropical species (those from the tropical Indo-West Pacific and one from the East Pacific) are characterized by a combination of forked tails to the radial plates of the calcareous ring and reticulated, multi-layered plates amongst the major body wall deposits. In the remaining species (i.e. those coming from the Mediterranean and/or North-West Atlantic), besides one from the tropical East Pacific, the radial plates are forked in only two species (*L. tergestina* and ?*L. djakonovi*) and rarely reticulated in just one species (*L. cucumis*).

We therefore, unlike Deichmann (1941), but following Panning (1966), subdivide the genus into two genera: *Leptopentacta* H.L. Clark, 1938 and *Paraleptopentacta* **n. gen.** In the first genus, we include the Indo-West Pacific *L. grisea* (the type species by original designation), *L. imbricata*, *L. bacilliformis*, *L. punctabipedia*, *L. panamica* and hesitantly the East Pacific *L. nina*. In *Paraleptopentacta* **n. gen.** we include the Mediterranean and North-West Atlantic *L. elongata* (as the type species), *L. cucumis*, *L. tergestina* and ?*L. djakonovi.* As far as *L. nina* is concerned, although it has forked tails to the radial plates, we are hesitant in including it under *Leptopentacta* because its tube feet were described as being retractile (not a character of *Leptopentacta* (s.l.) nor of *Paraleptopentacta*, **n. gen.** and it lacks baskets or any other form of external deposits. In addition, we exclude Deichmann's *L. nova* from inclusion in the new genus as it was described as a form with finger-like tentacles and cobble- or grain-like deposits in association with a superficial layer of biscuit-like deposits sometimes provided with a spine-like process. It perhaps belongs to a genus within the former Dactylochirotida or to another genus.

Phylogenetic Trends

It has been suggested that the tropics are the source of many evolutionary novelties and have provided a species pool, from which many temperate species originated (Williams 2007, ao). We therefore hypothesise that at least some Mediterranean dendrochirotids could have been of tropical Indo-West origin. As mentioned above species of

Leptopentacta (s.s.) and *Paraleptopentacta* **n. gen.** differ primarily on their geographical distribution, structure of the calcareous ring of some species, and their chief body wall ossicles.

Recent phylogenetic analysis based on morphological characters (Kerr & Kim 2001; Smirnov 2012) and the more recent molecular analyses of Miller *et al*. (2017), are all silent on the origin and transformation of the holothuroid calcareous ring and rather brief on their ossicle assemblages. We therefore have to rely on the works of earlier writers. Pawson & Fell (1965) proposed a new classificatory system based on the tentacles, calcareous ring and ossicles, supporting the premise of Fell (1965) that the calcareous ring of holothuroids is probably homologous with the ambulacral plate system of extinct edrioasteroids. They speculated that such a plate system was lost as a consequence of holothuroid evolution but parts of it persist as the calcareous ring. Hence, they predicted that the greater the reduction of the calcareous ring the more advanced the holothuroid. On this basis they regrouped the different subfamilies of dendrochirotid holothuroids that existed at that time and considered forms with plated skeletons to be the most primitive. Although recent workers (Kerr & Kim 2001, Smirnov 2012 and Miller *et al.* 2017) have shown that such plated skeletons arose more than once in holothuroid evolution, Pawson & Fell's (1965) system is still widely used by most workers and also partially supported by Rowe (in Clark & Rowe 1971). Thandar (1989, 1990) also used it extensively for his assessment of the southern African sclerodactylids and phyllophorids respectively. We, therefore, surmise that, in the two genera under consideration here, the retention of the forked tails to the radial plates associated with a skeleton of complex reticulated plates as the major body wall deposits in *Leptopentacta* (s.s.) is the more primitive condition, and in the *Paraleptopentacta* **n. gen.**, in which the radial prolongations are lost or reduced and the body wall ossicles made up of non- reticulate, simple plates to be derived condition.

We therefore conclude that *Paraleptopentacta* **n. gen.** evolved from *Leptopentacta* (s.s.) via the gradual reduction of the calcareous ring and the simplification of the body wall plates, with some species like *P. tergestina* **n. comb.** (Figure 3H) and *P. djakonovi*, retaining a slight posterior bifurcation of the radial plates but a loss of reticulated, multi-layered plates and their transformation to smooth multilocular deposits, which perhaps later developed knobs, at least in one species (*P. djakonovi*). In *P. cucumis*, on the other hand, some reticulated plates are sometimes retained or newly developed. Buttons, often present in many species of *Leptopentacta* (s.s.), are also sometimes lost in the new genus. These we believe are transitional forms which retain some ancestral characters while developing new ones. We, therefore found it expedient to separate the Mediterranean forms from the truly Indo-West Pacific species, not only on geographical grounds but also in combination with the structure of their calcareous ring (where pertinent) and their most characteristic ossicles. We, further believe that the East Pacific forms (except for *L. nova*) are different from *Leptopentacta* (s.s.) and *Paraleptopentacta* **n. gen.** and are perhaps referable to another genus/genera, once new materials come to light as one of them have peculiar biscuit-like, superficial deposits while in another some plates are often provided with a spine-like process. These therefore will require re-assessment based on new materials.

The two genera are diagnosed below, followed by a key to distinguish them and the species each contains.

Genus *Leptopentacta* H.L. Clark, 1938

Cucumaria (partim) Sars, 1859: 132.
Parocnus Deichmann, 1941 (preoccupied)—replaced by *Cherbocnus* Thandar (in Thandar & Mjobo, 2014).
Trachythyone (partim) Panning, 1949:426.
Leptopentacta H.L. Clark, 1938: 453; Panning, 1966 (partim): 56.

Diagnosis. (After H.L. Clark 1938, Deichmann 1941, Panning 1966, amended herein). A genus of Cucumariidae with an elongate, slender, more or less curved body, usually pentagonal in cross-section; tube feet rigid, non-retractile, relatively few, in a straight or zigzag single or double rows, confined to ambulacra, often more or less crowded in each ventral ambulacrum. Tentacles 10, dendritic, small, with ventral pair reduced. Calcareous ring always with posteriorly forked radial plates. Body wall either encased in a firm calcified epidermis comprising scales or enlarged lenticular bodies covered with a course reticulum and often also numerous small, smooth to knobbed buttons beneath these. External layer of ossicles as rosettes only, or baskets only, or both rosettes and baskets, or absent.

Type species. *Leptopentacta grisea* H.L. Clark, 1938 (by original designation).

Other species included herein. *L. imbricata* (Semper, 1867) (with synonyms *O. typicus* Théel, 1886; *O. javanicus* Sluiter,1880); *L. bacilliformis* (Koehler & Vaney, 1908); *L. panamica* Deichmann, 1941; *L. punctabipedia* Cherbonnier, 1961; and hesitantly ?*L. nina* Deichmann, 1941.

Remarks. This genus was established only for the type species by H.L. Clark (1938). Since then various other species were included in it or described as new, raising the figure to 11. The fate of some of these species is considered above and some are now transferred to the new genus *Paraleptopentacta*. Hence, only six species now remain in the genus, which appears to be clearly tropical Indo-Pacific in distribution.

Genus *Paraleptopentacta* n. gen.

Cucumaria (partim) Sars, 1859: 132.
Trachythyone (partim) Panning, 1949: 426.
Leptopentacta (partim) Panning, 1966: 56.

Type species. *Cucumaria elongata* Düben & Koren, 1846 (herein designated).

Other species included herein. *L. cucumis* (Risso, 1826); *L. tergestina* (Sars, 1859); ?*L. djakonovi* Baronova & Savel'eva, 1972; (?*L. nova* Deichmann, 1941 is excluded from further consideration—see above).

Diagnosis. A genus of Cucumariidae with an elongated, usually curved body. Tentacles and tube feet as in *Leptopentacta* above. Calcareous ring usually without posteriorly forked radial plates in combination with body wall ossicles as an external layer of baskets (sometimes absent) and an inner layer of smooth or slightly knobbed single-layered multilocular plates, rarely one or two plates reticulate (in *P. cucumis*).

Etymology (Gk). para—along side or parallel to.

Remarks. This genus is here erected to accommodate all Mediterranean species (sometimes extending into the North-West Atlantic) of the former *Leptopentacta* group. It is clearly differentiated from the tropical genus *Leptopentacta* (s.s.) on the basis of the presence of nearly always smooth plates in the body wall, usually accompanied by baskets of various forms. In one species (*P. djakonovi*) large plates secondarily knobbed.

Key to the genera *Leptopentacta* (s.s.) and *Paraleptopentacta* n. gen and their species

1. Calcareous ring with posteriorly forked radial plates always in combination with large multi-layered, reticulated plates or lens-like bodies as major body wall deposits; Indo-Pacific forms. . . . . *Leptopentacta* ... 2
\- Calcareous ring usually with unforked radial plates in combination with usually large unreticulated, smooth plates made up of a single layer of calcareous material, as major body wall deposits; Mediterranean and North-West Atlantic forms . . . .*Paraleptopentacta* **n. gen.** ... 7
2. External layer of deposits exclude baskets or rosettes of any form 3
\- External layer of deposits include baskets or rosettes or both 4
3. Tube feet rigid, non-retractile; only small knobbed buttons present in addition to reticulated plates . . . .*L. bacilliformis*
\- Tube feet retractile; knobbed buttons present; plates complex with reticulated bars (species known only from juveniles) . . . . *L. nina*
4. External layer of ossicles as rosettes developed from baskets, complete baskets often present in addition to rosettes, perhaps in juveniles only . . . . *L. imbricata*
\- External layer of ossicles only as baskets. 5
5. Baskets deep, cup-like; plates as lens-like, reticulated bodies; smaller, smooth plates and knobbed buttons with large holes also present. . . . . *L. grisea*
\- Baskets also deep, cup-like; large plates reticulated but not appearing as lenticular or lens-like bodies; other plates also present but also non-lenticular; buttons present 6
6. Some baskets rosette-like; buttons knobbed with small holes; reticulate plates never with a protruding spine . . . .*L. punctabipedia*
\- Baskets deep, cup-like; sometimes both baskets and plates provided with a protruding spine . . . . *L. panamica*
7. Plates smooth, simple, multilocular, of several sizes, rarely imbricating; baskets numerous, variable. 8
\- Plates of various forms, rarely one or two reticulate; baskets flat, with trabeculae, margins slightly knobbed . . . . . .*P. cucumis*
8. Baskets large, with numerous marginal projections, buttons absent from body wall; large plates smooth 9
\- Baskets tiny but also with numerous projections; buttons also tiny, knobbed, holes minute; large plates knobbed . . . . *P. djakonovi*
9. Plates smooth, imbricating; baskets with tiny projections and sometimes multilocular base; plates of various sizes but never narrow and elongate, holes large; rosettes absent. . . . . *P. elongata*
\- Plates not imbricating, smooth, of various sizes, often narrow with usually two series of small holes; baskets cup-like, with numerous projections in various directions; rosettes also present . . . . *P. tergestina* **n. comb.**

Taxonomic account

Paraleptopentacta tergestina **n. comb. (Sars, 1859)**
Figures 1–3

Cucumaria tergestina Sars, 1859: 127; Koehler, 1921: 158–160.
Trachythyone tergestina Tortonese*,* 1965: 83–85.
Leptopentacta tergestina Panning, 1966: 62 (passim).

Remarks. *Paraleptopentacta* (**n. gen.**) *tergestina* **n. comb.** is a cucumariid sea cucumber, a fairly well known Mediterranean species. Unlike its sister species *P. elongata*, which has spread into the North-West Atlantic, *P. tergestina* **n. comb.** is restricted to the Mediterranean sea (Tortonese 1965), being reported from France (Koehler 1921), Italy (Tortonese 1965; 1977; Milisenda *et al.* 2017), the Malta Islands (Tanti & Schembri 2006), the Aegean Sea (Voultsiadou *et al.* 2011), the Adriatic Sea (Petovic 2011) and the Marmara Sea (Turkey) (Öztoprak *et al.* 2014). It is often caught by trawlers as a bycatch, frequenting muddy, detrital waters and *Posidonia* and *Caulerpa* bottoms.

The specimens here studied correspond well with the description of the species by Koehler (1921) and require no further comment.

Material examined. LPVCMRMS2020.101, Mostaganem, Algeria, 36º 6.38374'N, 0º 8.34821'E**,** 60 m, March 2020**,** 5 spec.

FIGURE 2. A. *Paraleptopentacta* (**n. gen.**) *tergestina* **n. comb.** individual preserved in ethanol; **B.** Living specimen displaying its clear, dendritic tentacles and elongated podia; **C.** Stretching and twisting of a live specimen in the aquarium. Scale bar = 1 cm.

Description. Contracted individuals 20-50 mm in length and 10-15 mm in breadth. Body somewhat pentagonal, curved, with a broad mid-body and narrower posterior end. Tegument rigid, smooth, dark brown, interradial areas devoid of pedicels (Figure 2A). Pedicels light brown, rigid, non-retractable, in five double rows arranged in a zigzag fashion, elongated, slender in living specimen and short, thorn-shaped in preserved individuals. Tentacles 10, dendritic, ventral two reduced, white, with brown spots (Figure 2B). Each tentacle consists of a central trunk from which lateral branches emerge, giving rise to terminal papillate branches.

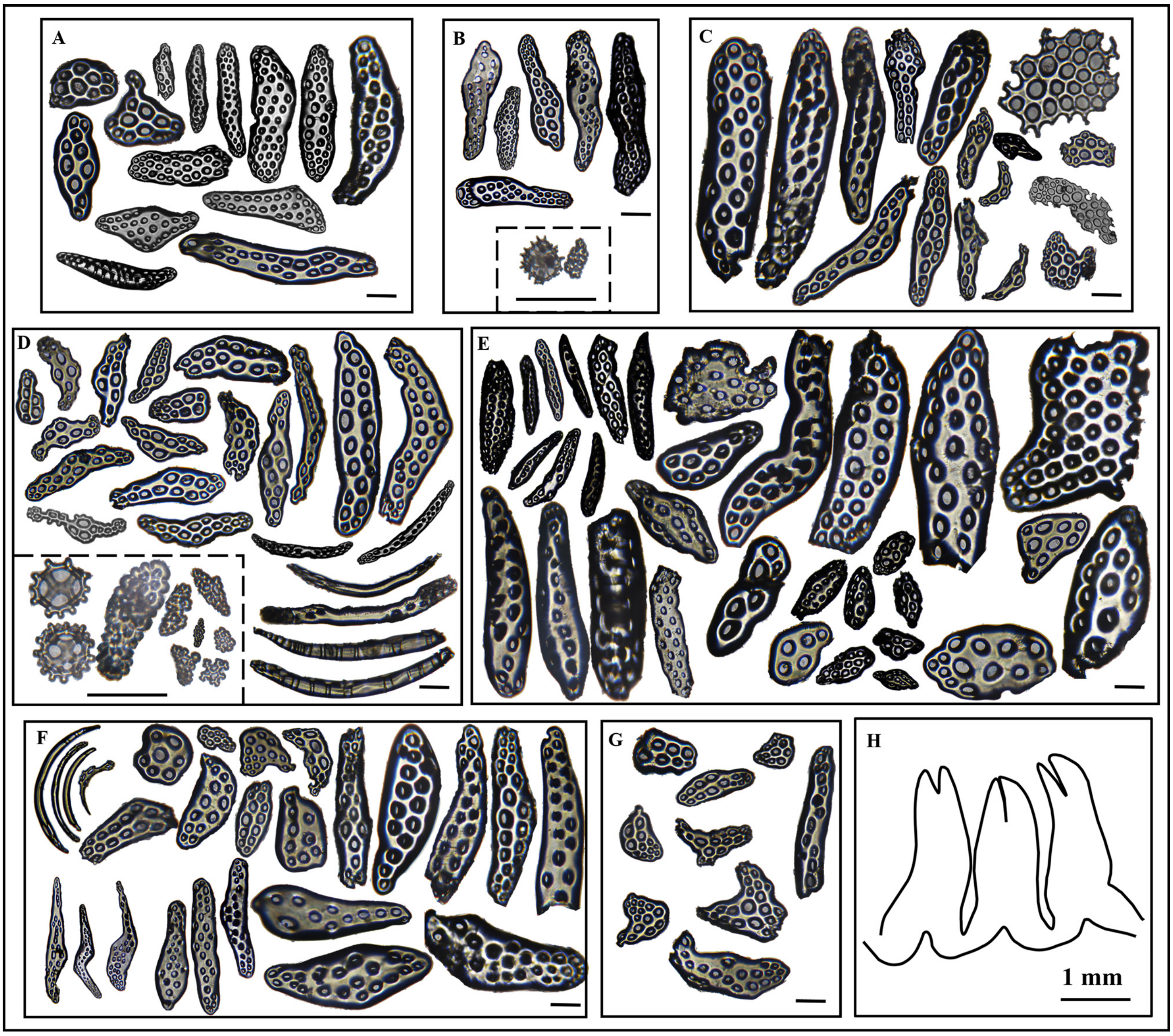

FIGURE 3. Ossicles of different regions of the body of *P. tergestina* **n. comb. A.** Anterior end; **B.** Dorsal surface (inset shows rosette and basket); **C.** Ventral surface; **D.** Anal region (inset shows baskets, small plates and rosettes); **E.** Podia; **F.** Tentacles; **G.** Introvert. Scale bar represents 100 µm. **H.** Calcareous ring (mid-dorsal interrradial and adjoining radial plates).

Ossicles. Ossicles from the anterior end (Figure 3A), dorsal surface (Figure 3B), ventral surface (Figure 3C), anal region (Figure 3D) and podia (Figure 3E) appear identical, without any noticeable differences. They include an external layer of small baskets and an inner layer of thick, multilocular, non-imbricating plates of various sizes, with smooth margins and nearly always with a paired series of small holes, plates of the dorsal surface are smaller and thinner than those of the ventral surface. The plates occur in a variety of shapes, usually elongated, but often rounded or oval, the elongated ones are the most abundant with a maximum length of 844.901 µm and a maximum width of 169.774 µm [according to Koehler (1921), they can reach up to 1.5 mm (1500µm) in length]. The baskets have a quadrilocular base and a rim bordered by numerous thick projections directed outward and inward. The baskets occur dorsally and at the anal end. The rosettes are characteristic of this species and do not occur in the congenerics but are present in at least one species of *Leptopentacta* (s.s.). They occur in the dorsal body wall and in the anal region.

The body wall also contains rods, which are present at the anterior end, in the anal region, the podia and tentacles. The tentacles (Figure 3F) contain plates like those of the body wall and curved, thin rods provided with a few perforations, whereas only perforated plates like those of the body wall characterize the introvert (Figure 3G). The podia also contain plates of different shapes like those of the body wall as well as rods; end plates are reduced.

Behaviour (*in vitro*). The specimen kept alive in a tank usually adheres to the wall of the tank with its posterior end while waving and twisting the unattached end freely in the water column (Figure 2C). This behavior was described by Monticelli (1896) as one of the three autotomy mechanisms in *Ocnus planci* (Brandt, 1835), of fission by constriction and stretching. According to Crozier (1917), sometimes the posterior part, which is glued to the substrate, can divide again. When exposed to intense light the tentacles retract, which may indicate that the species exhibits the "shade-seeking" behavior described by Yoshida (1966).

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