

# First record from the Italian coasts of the overlooked chiton *Acanthochitona pilosa* Schmidt-Petersen, Schwabe et Haszprunar, 2015 (Mollusca Polyplacophora Acanthochitonidae)

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## ABSTRACT

Within a general overview of the malacological samples deposited in the collection of the Benthic Ecology Laboratory of Messina, numerous specimens of the recently described *Acanthochitona pilosa* Schmidt-Petersen, Schwabe et Haszprunar, 2015 (Mollusca Polyplacophora Acanthochitonidae) were found. The new material, together with further specimens of private collections and literature data allowed a better definition of the *A. pilosa* distributional pattern and some autoecological and biogeographic considerations.

## KEY WORDS

Mollusc; Mediterranean; Polyplacophora; Biogeography; *Acanthochitona*.

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## INTRODUCTION

Four species belonging to the genus *Acanthochitona* Gray, 1821 have been reported to date from the Mediterranean Sea: *A. crinita* (Pennant, 1777), *A. fascicularis* (Linnaeus, 1767), *A. oblonga* Leloup, 1981 and *A. pilosa* Schmidt-Petersen, Schwabe et Haszprunar, 2015 (Kaas, 1985; Dell’Angelo & Smriglio, 1999; Bonfitto et al., 2011).

The most recently described species *A. pilosa*, based on specimens collected in Banyuls sur Mer, south France (Schmidt-Petersen et al., 2015), has been later reported from the Algerian port of Oran and from the Spanish Mediterranean coasts (Amati & Oliverio, 2019).

This species, apparently similar to the congeners *A. crinita* and *A. fascicularis*, may be easily recognized by the peculiar morphology of the aesthetes, which also bear microscopic specific characters. It

is therefore surprising that a so peculiar species has remained unknown until nowadays, as well as subsequent reports remained scattered and localized.

In this paper, the finding of numerous specimens collected in different Italian sites is reported, as a contribution to the better understand intraspecific morphological variability, of this overlooked species, further than Mediterranean distribution and habitat.

## MATERIALS AND METHODS

All specimens utilized for the present study were collected in two different geographical areas along the Italian coasts (Fig. 1). The most relevant lot is constituted by living specimens hand-collected on lava cliff of eastern Sicily, between August 1980 and September 2019. A second less abundant lot was collected on 2006 in the north-western Tyrrhenian, along the rocky coast of Tuscany.

Both the lots were obtained by scraping hard substratum, which was subsequently picked up under a stereoscope. For morphological studies, specimens were measured, the shape and sculpture of valves were studied and a photographic documentation was provided. Some specimens have been disarticulated to better compare the apophyses and the jugal sinus of some valves and photographed under the binocular microscope to put in evidence shape and size of macro and micraesthetes (Figs. 2–14).

A morphological comparison between three most similar congeneric Mediterranean species has been also carried out (Figs. 2–4).

ACRONYMS AND ABBREVIATIONS. BEL: Benthic Ecology Laboratory, University of Messina, Italy. DSC: Danilo Scuderi Collection (Catania, Italy); WRC: Walter Renda collection (Amantea, Cosenza, Italy).

## RESULTS

### Systematics

Classis POLYPLACOPHORA Gray, 1821  
Subclassis NEOLORICATA Bergenhayn, 1955  
Ordo CHITONIDA Thiele, 1909

Superfamilia CRYPTOPLACOIDEA H. Adams & A. Adams, 1858

Familia ACANTHOCHITONIDAE Pilsbry, 1893

Subfamilia ACANTHOCHITONINAE Pilsbry, 1893

Genus ACANTHOCHITONA Gray, 1821

Type-species: *Chiton fascicularis* Linnaeus, 1767 (by monotypy)

*Acanthochitona pilosa* Schmidt-Petersen, Schwabe et Haszprunar, 2015 - Figs. 2, 5–8, 9–11, 13

*Acanthochitona pilosa* Schmidt-Petersen et al., 2015: 12

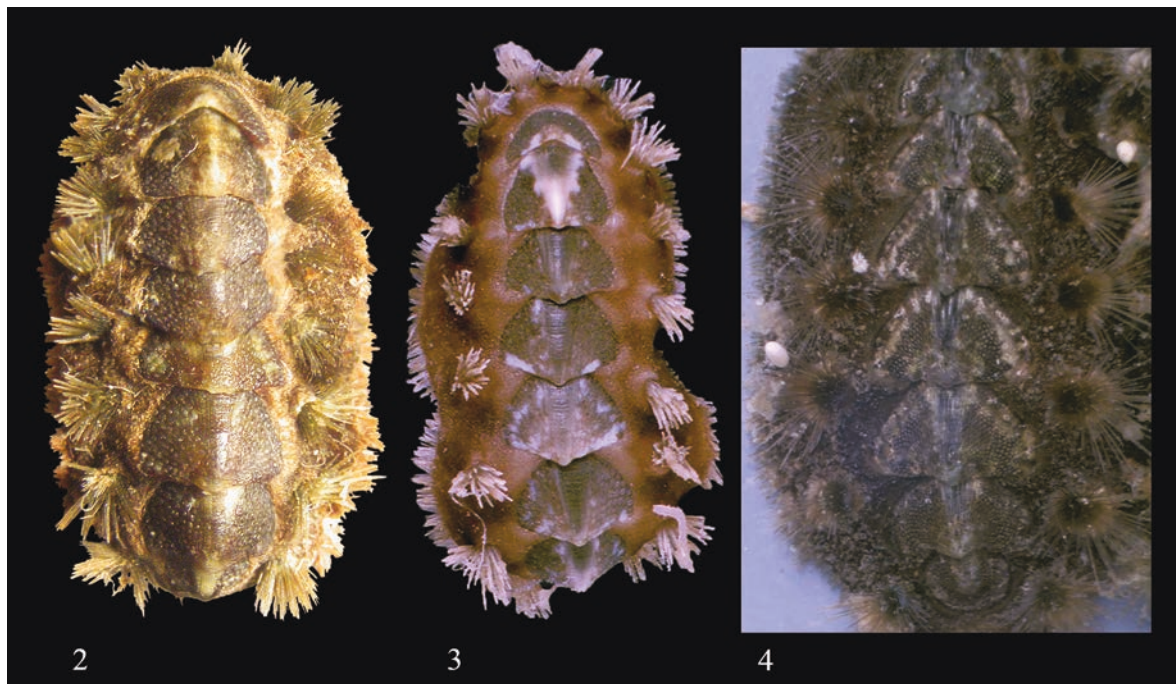
TYPE LOCALITY. France, Banyuls sur Mer (42°28'57" N - 03°08'13" E).

EXAMINED MATERIAL. Italy. Eastern Sicily, Catania, up to 150 specimens collected in December 2002 during BEL sampling campaign (repository code: BEL143FRINGE2002Ap1-140) in the subtidal fringe of lava cliff stretch, -0.1 and -0.2 m, comprised between 37°34'19"N, 15°10'51"E and 37°29'9"N, 15°6'1"E, northern side of Catania, collected by handily scraping hard substrate (see Cosentino & Giacobbe, 2015).

Italy. Eastern Sicily, Catania, 21 specimens from



Figure 1. Sampling localities of *Acanthochitona pilosa*. Yellow circles are from literature: 1. Banyuls sur Mer (Schmidt-Petersen et al., 2015); 2. Cadaqués (Amati & Oliverio, 2019); 3. port of Oran (Amati & Oliverio, 2019). Red circles from the present study: 4. Coast of Catania. 5. Calambrone, Tuscany. White circle for unverified records: Riomaggiore (Schmidt-Petersen et al., 2015 in Dell'Angelo & Smriglio, 1999).



Figures 2–4. Comparison between *Acanthochitona pilosa* from Catania (Italy), 14.6 mm (Fig. 2), *A. crinita* from Messina (Italy), 10 mm (Fig. 3), and *A. fascicularis* from Messina (Italy), 11 mm (Fig. 4).

DSC collected from summer 1980 and summer 2019 at San Giovanni Li Cuti, Catania, eastern Sicily (37°31'14"N, 15°06'48"E), intertidal trottoir of vermetids and coralline algae and 10 specimens from WRC collected in December 2002 in Northern side of Catania, collected by handily scraping hard substrate.

Italy, Tuscan coast, Calambrone (Pisa), 43°34'53"N, 10°17'27"E, 3 specimens collected in 2006, by scraping hard substratum in intertidal fringe.

## DISCUSSION

The remarkable number of specimens available for the present investigation includes both juveniles and adults, ranging in size from 1 mm to 16 mm in specimens from Sicily and reaching a maximum length of 23 mm in specimens from Tuscany.

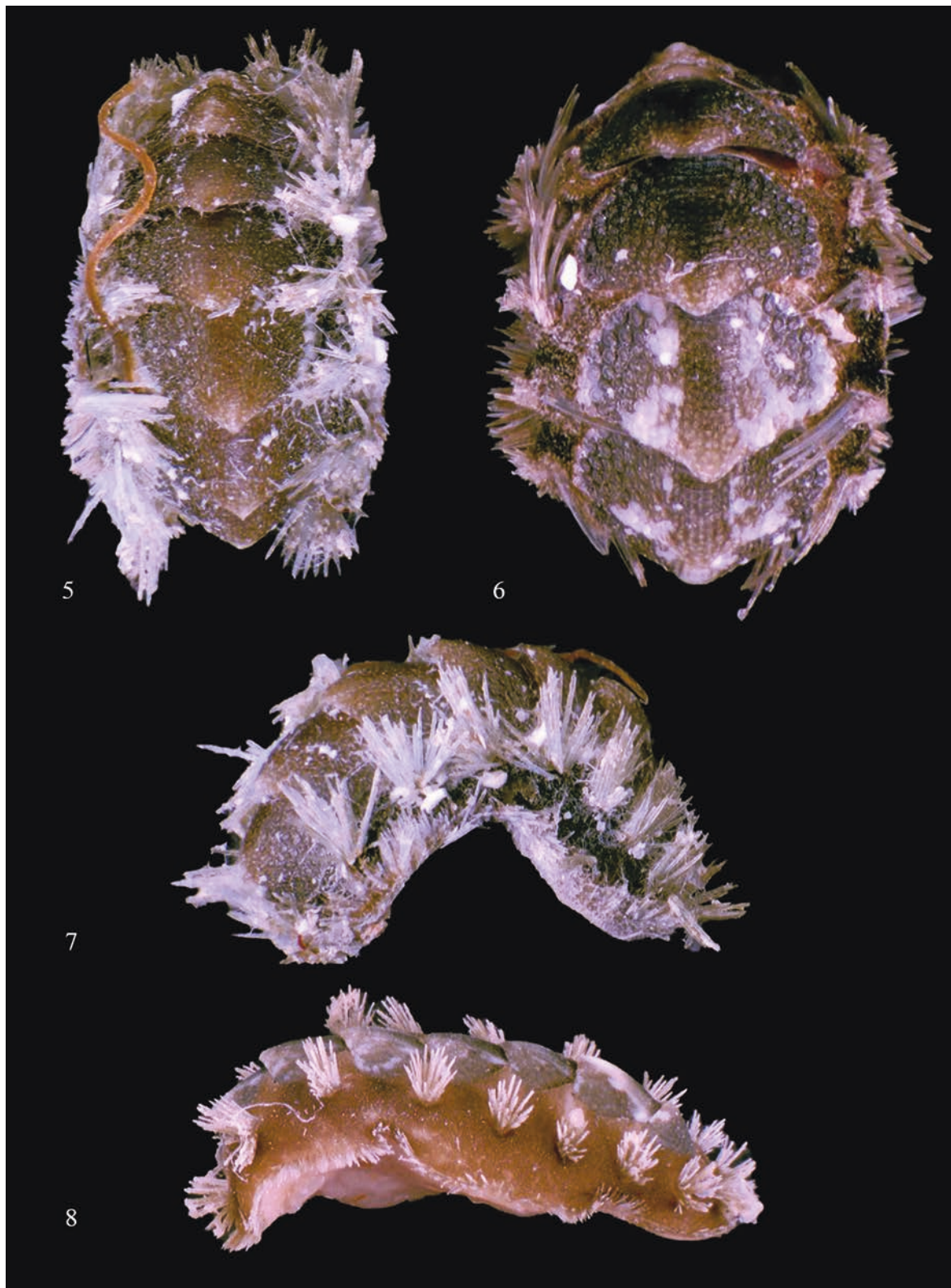
Such material allowed a wider examination of morphological features and diagnostic characters of *A. pilosa*, in comparison with the most similar Mediterranean species, *A. crinita* and *A. fascicularis* (Figs. 2–4). In particular, the peculiar perino-

tum is here shown in lateral view, in comparison with that of the allied *A. crinita* (Fig. 3–8).

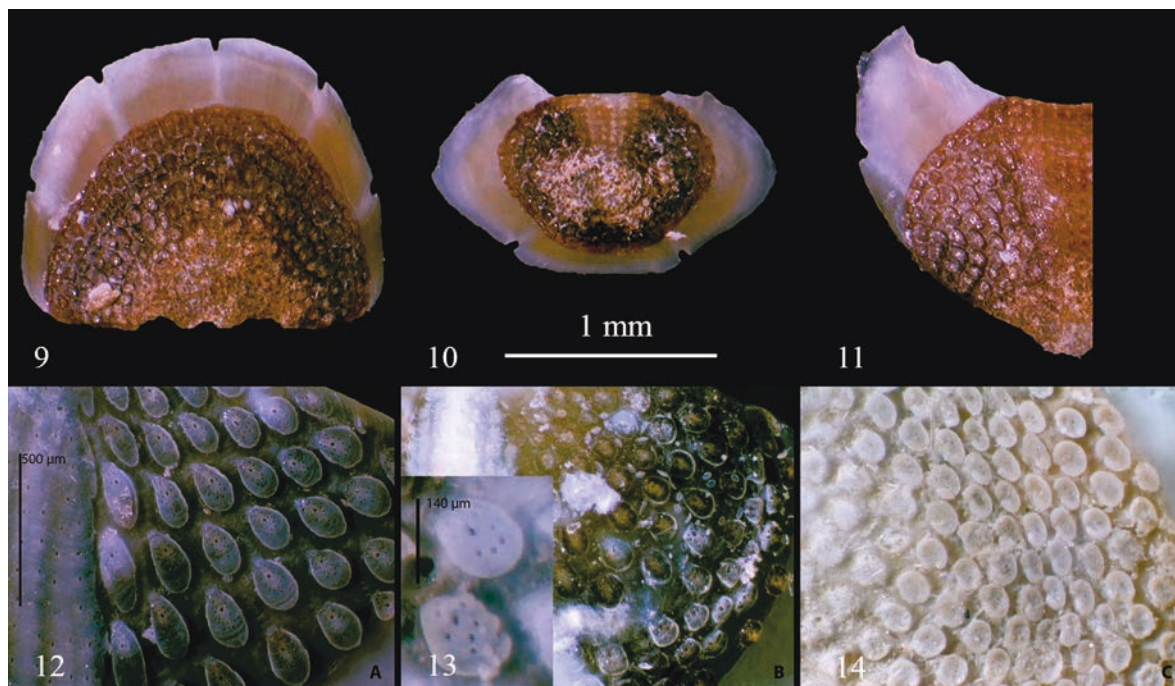
The studied specimens have been all collected in very shallow environments (less than 1 m depth) ranging from the intertidal zone to the sublittoral fringe. The specimens from Sicily, found in the subtidal fringe of lava cliff nearby Catania, have been collected in a rough hard substrates, characterized by crustose red algae covering. In some cases, the specimens have been recorded inside a biogenic intertidal/subtidal ledge formed by encrusting calcareous algae, mussels, *Mytilaster minimus* (Poli, 1795) and *M. galloprovincialis* (Lamarck, 1819), and vermetid gastropods, *Dendropoma cristatum* (Biondi, 1859) and *Vermetus triquetrus* Bivona, 1832. Less data are available for the Tuscan records, which however were found in intertidal hard substrate.

Such new data on the *A. pilosa* habitat agree with early information given by Schmidt-Petersen et al., 2015, which indicated formations of the coralline red alga *Lithophyllum tortuosum* (Esper) Foslie, 1900 as peculiar environment (“trottoir”) claimed by the ecological niche of this species. Nevertheless, according to us a sufficiently rough substratum with red-algae covering in the same hy-





Figures 5–8. Dorsal view of *Acanthochitona pilosa* both from Catania (Italy), 6 mm (Fig. 5) and 4 mm (Fig. 6). Specimen A in lateral view (Fig. 7), in comparison with *A. crinita* (Fig. 8) from Messina (Italy), 10 mm.



Figures 9–11. *Acanthochitona pilosa*, dorsal view of head valve (Fig. 9), dorsal view of tail valve (Fig. 10), dorsal view of a median valve (Fig. 11). Figures 12–14. Aesthetes of *A. crinita* (Fig. 12) (specimen of figure 3), *A. pilosa* (Fig. 13) (specimen of figure 2), *A. fascicularis* (Fig. 14) (specimen of figure 4). Microaesthetes of *A. pilosa* are also shown (detail inside figure 13).

drological conditions might simulate the structural characteristic of the intertidal coralline formations, allowing the spread and settlement of *A. pilosa* specimens, in agreement with Schmidt-Petersen et al. (2015), who underline how from literature no typical invertebrate species of the “trottoir” is known. Such Authors, noting that “*these encrustations are commonly found at the Northern coast of the Western Mediterranean*”, de facto suggested the areal of *A. pilosa* might be linked to the *Lithophilum tortuosum* distribution. In this respect, a confirmation was provided by records from Catania, whilst the Oran record of Amati & Oliverio (2019) seems rather to indicate a not exclusive link of the species with algae, since found as epibiontic on a shallow subtidal species which, according to Bouzaza & Mezali (2019), prefers rough, wave exposed substrates.

The present data confirm the occurrence of *A. pilosa* in Italian waters and contribute to enlarge the known areal of *A. pilosa*, which Schmidt-Petersen et al. (2015) hypothesized to be restricted to the Western Mediterranean Basin. The Tuscan record, in fact, together with the unverified Ligurian record of Schmidt-Petersen et al. (2015) agrees with a sug-

gested distributional range “*at least through the Ligurian Sea*”. Finally, the Catania records, inside the western Mediterranean biogeographical boundary (Bianchi & Morri, 2000), perfectly agree with the presumed western distributional range.

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## REFERENCES

- Amati B. & Oliverio M., 2019. First record of *Acanthochitona pilosa* Schmidt-Petersen, Schwabe & Haszprunar, 2015 (Mollusca: Polyplacophora) in Spain and Algeria. *Bollettino Malacologico*, 55: 140–144.
- Bianchi C.N. & Morri C., 2000. Marine Biodiversity of the Mediterranean Sea: Situation, Problems and Prospects for Future Research. *Marine Pollution Bulletin*, 40: 367–376. [https://doi.org/10.1016/S0025-326X\(00\)00027-8](https://doi.org/10.1016/S0025-326X(00)00027-8)

- Bonfitto A., Dell'Angelo B., Evangelisti F. & Sabelli B., 2011. The genus *Acanthochitona* (Mollusca: Polyplacophora) in the Mediterranean Sea: morphological and molecular data. *Scientia Marina*, 75: 171–180. <https://doi.org/10.3989/scimar.2011.75n1171>
- Bouzaza Z. & Mezali K., 2019. Sur la presence de *Cymbula safiana* (Gastropoda: Patellidae) au niveau de la côte algérienne (Méditerranée sud-ouest): structure des populations et nouvelles stations de signalisation. *Ecologia Mediterranea*, 45: 1–13.
- Cosentino A. & Giacobbe S., 2015. Mollusc assemblages of hard bottom subtidal fringe: a comparison between two coastal typologies. Proceedings of the 2nd International Congress “Speciation and Taxonomy”, May 16th-18th 2014, Cefalù-Castelbuono (Italy). *Biodiversity Journal*, 6: 353–364.
- Dell'Angelo B. & Smriglio C., 1999. Chitoni viventi del Mediterraneo. *Evolver*, Roma (English edition, 2001. Living chitons from the Mediterranean Sea). 255 pp., Roma Arti Grafiche La Moderna.
- Kaas P., 1985. The genus *Acanthochitona* Gray, 1821 (Mollusca, Polyplacophora) in the north-eastern Atlantic Ocean and in the Mediterranean Sea, with designation of neotypes of *A. fascicularis* (L., 1767) and of *A. crinita* (Pennant, 1777). *Bulletin du Muséum National d'Histoire Naturelle*, Paris, 4e série, 7, section A, n° 3: 579–609.
- Leloup E., 1981. *Acanthochiton oblongus* sp. nov. *Mémoires de l'Institut Royal des Sciences Naturelles de Belgique*, 53: 1–3.
- Schmidt-Petersen J., Schwabe E. & Haszprunar G., 2015. *Acanthochitona pilosa* spec. nov. A new species of *Acanthochitona* Gray, 1821 from the Mediterranean (Mollusca, Polyplacophora). *Spixiana*, 38: 11–20.