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First records of two *Cuthona* species (Gastropoda: Nudibranchia) in the Adriatic Sea

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Abstract. Authors are reporting on the first records of two nudibranch species of the genus *Cuthona* in the Slovenian part of the Adriatic Sea. In the period from September 2014 to March 2015, specimens of *Cuthona genovae* and *C. miniostriata* were found at different localities in the mediolittoral and upper infralittoral belts. The findings of both *Cuthona* species represent the first records in the Adriatic Sea.

Key words: first records, *Cuthona genovae, Cuthona miniostriata,* Gastropoda, Nudibranchia, Adriatic Sea

Izvleček. Prvi zapis o pojavljanju dveh vrst iz rodu *Cuthona* (Gastropoda: Nudibranchia) v Jadranskem morju – Avtorji poročajo o prvi najdbi dveh vrst polžev gološkrgarjev iz rodu *Cuthona* v slovenskem delu Jadranskega morja. V obdobju od septembra 2014 do marca 2015 so bili v mediolitoralu in zgornjem infralitoralu na različnih lokalitetah najdeni primerki vrst *Cuthona genovae* in *C. miniostriata*. To je tudi prvi zapis o pojavljanju obeh vrst iz rodu *Cuthona* v Jadranskem morju.

Ključne besede: prvi zapisi, *Cuthona genovae, Cuthona miniostriata,* Gastropoda, Nudibranchia, Jadransko morje

Introduction

The marine opisthobranch fauna of Slovenia gained increased scientific attention only during the last few decades when first checklists of this particular group were published by De Min & Vio (1997). The first checklist of opisthobranchs in the area was presented by Turk (2000). This list was further complemented by later works of Turk (2005a, b), Lipej et al. (2008, 2012), Mavrič & Lipej (2012), Lipej et al. (2014) and Zenetos et al. (2015a). Certain species, such as *Cumanotus beaumonti* (Turk 2005a, b) and *Piseinothecus sphaerifera* (Mavrič & Lipej 2012), had previously been found only in very few cases in the Mediterranean and other parts of world oceans.

This paper deals with two nudibranch species (Gastropoda: Heterobranchia) found in the coastal waters of Slovenia. They represent new records for the entire Adriatic Sea in general.

Material and methods

The nudibranchs of the genus *Cuthona* were found while inspecting the samples of low vegetation belt (known as turf) in the mediolittoral and infralittoral belts from different localities along the Slovenian coastline (Gulf of Trieste, northern Adriatic) (Fig. 1). The specimens were measured alive and photographed under the stereomicroscope Olympus SZX16. Afterwards, the nudibranchs were identified with the help of the determination keys for opisthobranchs (Pruvot-Fol 1954, Barletta 1980, Schmekel & Portmann 1982, Bielecki 2011, Trainito & Doneddu 2014). Specialized web sites such as www.seaslugforum.net were helpful as well. The taxonomy and nomenclature are in accordance with the World Register of Marine Species (WoRMS; www.marinespecies.org/). Subsequently, the specimens were fixed in 70% alcohol solution and deposited in the collection of the Marine Biology Station (MBS) of the National Institute of Biology.

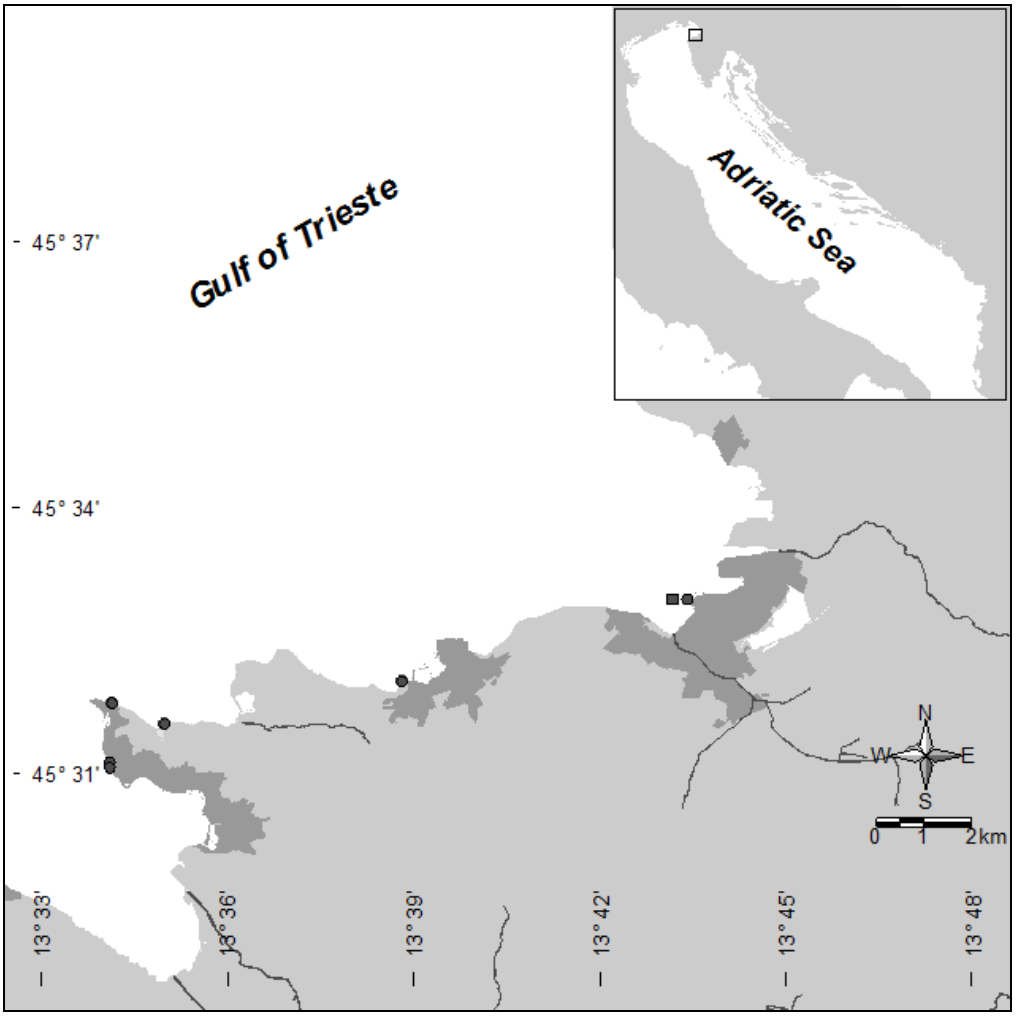

Figure 1. Study area with localities where nudibranchs *Cuthona genovae* (black circles) and *C. miniostriata* (black square) were recorded for the first time in the Adriatic Sea.
Slika 1. Zemljevid obravnavanega območja z lokalitetami, na katerih so bili prvič v Jadranskem morju najdeni gološkrgarji *Cuthona genovae* (črni krogci) in *C. miniostriata* (črni kvadrat).

Results

Cuthona genovae (O'Donoghue, 1928)

Material:

- 24. 9. 2014, 2 specimens, Fiesa, 1 m depth, on *Cystoseira barbata*;
- 5. 10. 2014, 2 specimens, Atlantida – Izola, 1 m depth, on turf;
- 19. 1. 2015, 2 specimens, under Piran church, Piran, 1 m depth, algal belt;
- 3. 2. 2015, 1 specimen, Port of Koper, Koper, 1 m depth, algal belt;
- 19. 2. 2015, 1 specimen, Morgan, Piran, 1 m depth, turf on rocks;
- 3. 3. 2015, 2 specimens at 2 m depth and 7 specimens at 3 m depth, in front of the Marine Biology Station of the National Institute of Biology, Piran.

The specimens were recognized by parallel orange lines running from oral tentacles to rhinophores and to the base of the first cerata, forming a rhomboid shape on the head. Additional orange line is evident between the oral tentacles. Another characteristic is a yellow band running from rhinophores back to the heart (Schmekel & Portmann 1982, Rudman 2008, Trainito & Doneddu 2014). The body is more or less transparent, whereas up to seven groups of cerata are brownish.

Up to date, the species has been recorded in the entire Mediterranean Sea and British waters (Picton & Morrow 2010), Portugal (Calado et al. 1999), in waters off the Canarian Archipelago and in the Caribbean (Ballesteros et al. 2012-2015). In the Mediterranean Sea, it has been recorded in Genoa (locus typicus), more or less along the whole Mediterranean coast of Spain and along the Balearic Islands (Cervera et al. 2004) and in the waters off Malta (Sammut & Perrone 1998, Sammut 2011-2014a).

Cuthona miniostriata Schmeckel, 1968

Material:

- 3. 2. 2015, 1 specimen, Port of Koper, Koper, 1 m depth, algal belt.

The main distinguishing character of this species is the orange line on the backside of rhinophores, which extends to the eyes. Rhinophores are smooth and somehow longer than oral tentacles. The body is whitish and translucent, whereas the 5 or 6 groups of thin cerata are brownish at the base and white on the top. The distal part of the cerata is rounded. According to Sammut & Perrone (1998), some specimens have a large amount of white pigment, especially on the cerata.

This species was found within a turf microhabitat in the mediolittoral belt (< 1 m depth). Samut & Perrone (1998) mentioned this species as fairly common on algae in shallow waters. Up to date, the *C. miniostriata* has been considered an endemic species in the Mediterranean Sea. It has been recorded in waters off the eastern Spanish coast (Cervera et al. 2004), Maltese Islands (Sammut & Perrone 1998, Sammut 2011-2014b) and in the Gulf of Naples (Schmekel & Portmann 1982), where it was described from.

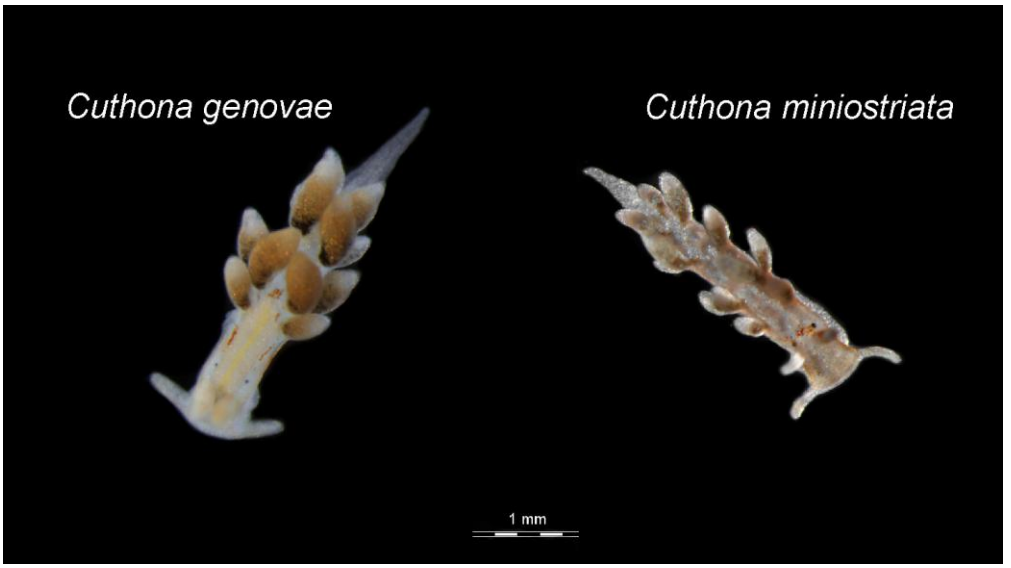

Figure 2. Nudibranchs *Cuthona genovae* and *C. miniostriata,* both recorded in the algal belt of the mediolittoral zone on 3. 2. 2015 in the Port of Koper (photo: B. Mavrič).
Slika 2. Polža gološkrgarja *Cuthona genovae* in *C. miniostriata,* najdena v algalni zarasti bibavičnega pasu v koprskem pristanišču 3. 2. 2015 (foto: B. Mavrič).

Discussion

Both species of the genus *Cuthona* were found in mediolittoral and infralittoral zones on turf or algal belts. Their small size (both species ± 5 mm in length) and peculiar habitat type in which they are living are probably the main reasons why these species have been overlooked in many Mediterranean areas (*sensu* Sammut 2011-2014a, b). So far, 5 species of the genus *Cuthona* have been recorded in the Adriatic Sea: *C. caerulea*, *C. foliata*, *C. ocellata*, *C. gymnota* and *C. perca* (sensu Zenetos et al. 2015b).

Although the coastal sea of Slovenia constitutes only a very small portion of the Adriatic Sea, at least 75 opisthobranch species (nudibranchs and other seaslug groups) have been recorded in this area (see Lipej et al. 2014). However, the checklist of opisthobranch fauna should be considered far from complete, since many species found in the Italian part of the Gulf of Trieste have not yet been confirmed in the Slovenian part of the Gulf (see Graeffe 1902, Zenetos et al. 2015b). In addition, certain habitat and microhabitat types were poorly studied. Interstitial habitats have not been studied at all, while muddy areas are probably hiding many not yet recorded fossorial opisthobranchs. Among the poorly studied habitats is also the low vegetation in shallow coastal areas (known as turf).

During sampling in specific habitat and microhabitat types in different seasons, certain rare or less known opisthobranchs were detected for the very first time in Slovenian coastal waters and adjacent areas along the west Istrian coasts. For instance, recent findings of *Aplysiopsis elegans* (Mavrič et al. 2014) and *Thordisa filix* (Zenetos et al. 2015a) represent the first Adriatic records for both species. Taking into consideration such records of small and thus easily overlooked opisthobranch species, it seems possible that the list of seaslugs will probably be enlarged even more in the near future.

Povzetek

Avtorji poročajo o prvi najdbi dveh vrst polžev gološkrgarjev iz rodu *Cuthona* v slovenskem delu Jadranskega morja. Vrste iz tega rodu so navadno majhne, zato jih je v njihovem okolju težko opaziti. V obdobju od septembra 2014 do marca 2015 so bili v različnih predelih slovenskega dela Jadrana najdeni primerki vrst *Cuthona genovae* in *C. miniostriata*. Prva vrsta je bila najdena na šestih različnih lokalitetah (Bernardin, Piran, med Piranom in Fieso, Fiesa, Izola, pristanišče Koper) v mediolitoralu (bibavičnem pasu) in infralitoralu do 3 m globine. Vsi primerki te vrste so bili najdeni v blazinasti algalni obrasti (turf) in na manjših algah. Druga vrsta, *C. miniostriata*, je bila najdena le v enem primeru februarja 2015 v koprskem pristanišču, in sicer v algalni zarasti bibavičnega pasu (±1 m globine).

Pričujoči prispevek je prvi zapis o pojavljanju obeh vrst iz rodu *Cuthona* v Jadranskem morju. Tudi sicer ni veliko znanih zapisov o pojavljanju teh vrst v Sredozemskem morju, prav vsi pa izvirajo iz njegovega zahodnega dela. Vrsta *C. genovae* se poleg Sredozemskega morja pojavlja še v severnem delu vzhodnega Atlantika in v Karibskem morju, vrsta *C. miniostriata* pa je endemit Sredozemskega morja.

References

Ballesteros M., Madrenas E., Pontes M. et al. (2012-2015): »*Cuthona genovae*« in OPK Opistobranquis, Published 17.5.2012. http://opistobranquis.info/ca/jIMNS [accessed on 6. 3. 2015]

Barletta G. (1980): 3. Gasteropodi nudi. Guide per il riconoscimento delle specie animali delle acque lagunari e costiere italiane. Consiglio nazionale per le ricerche, 124 pp.

Bielecki S. (2011): Des Limaces de Reve. Opisthobranches de Méditerranée. Auto édition, Saint Laurent du Var, 250 pp.

Calado G., Urgorri V., Gasper R., Cristobo F.J. (1999): Catálogo de los molluscos opistobranquios bentónicos de las costas de Setùbal-Espichel (Portugal). NACC (Bioloxía) 9: 285-294.

Cervera J.-L., Calado G., Gavaia C., Malaquias M.A.E., Templado J., Ballesteros M., García-Gómez J.C., Megina C. (2004): An annotated and updated checklist of the opisthobranchs (Mollusca: Gastropoda) from Spain and Portugal (including islands and archipelagos). Boletín Instituto Español De Oceanografía 20(1-4): 1-122.

De Min R., Vio E. (1997): Molluschi conchiferi del litorale sloveno. Annales, Ser. Hist. Nat. 4: 241-258.

Graeffe E. (1902): Übersicht der Fauna des Golfes von Triest nebst Notizen über Vorkommen, Lebensweise, Erscheinungs- und Laichzeit der einzelnen Arten. VI. Mollusca. In: Arbeiten aus den Zoologischen Instituten der Universität Wien und der Zoologischen Station in Triest 14, Wien, pp. 89-136.

Lipej L., Dobrajc Ž., Mavrič B., Šamu S., Alajbegović S. (2008): Opisthobranch molluscs (Mollusca: Gastropoda) from Slovenian coastal waters (Northern Adriatic). Annales, Ser. Hist. Nat. 18 (2): 213-226.

Lipej L., Moškon S., Mavrič B. (2012): New recordings of opisthobranch mollusks (Mollusca: Opisthobranchia) in the Slovenian portion of the Adriatic Sea. Annales, Ser. Hist. Nat. 22(2): 133-136.

Lipej L., Mavrič B., Simić J., Trkov D. (2014): New records of opisthobranch mollusks (Mollusca: Opisthobranchia) in the waters off Slovenia (Gulf of Trieste, northern Adriatic Sea). Annales, Ser. Hist. Nat. 24(2): 123-128.

Mavrič B., Lipej L. (2012): On the rare and less known nudibranch *Piseinotecus sphaeriferus* (Schmekel, 1965) (Gastropoda, Nudibranchia, Piseinotecidae) in the Adriatic Sea. Acta Adriat. 53(2): 473-476.

Mavrič B., Trkov D., Lipej L. (2014): First record of the *Aplysiopsis elegans* (Deshayes, 1853) (Gastropoda Opisthobranchia: Saccoglossa) in the Adriatic Sea. Acta Adriat. 54(2): 245-248.

Picton B.E., Morrow C.C. (2010): *Cuthona genovae* (O'Donoghue, 1926). Encyclopedia of Marine Life of Britain and Ireland. http://www.habitas.org.uk/marinelife/species.asp?item=W14700 [accessed on 16. 6. 2015]

Pruvot-Fol A. (1954): Mollusques opisthobranches. Paris, Lechevalier, 457 pp.

Rudman W.B. (2008): *Cuthona genovae* O'Donoghue, 1926. Sea Slug Forum, Australian Museum, Sydney. http://www.seaslugforum.net/factsheet/cuthgeno [accessed on 16. 6. 2015]

Sammut C. (2011-2014a): *Cuthona genovae*. Natura Malta. http://www.naturamalta.com/Cuthona_genovae.html [accessed on 16. 6. 2015]

Sammut C. (2011-2014b): *Cuthona multistriata*. Natura Malta. http://www.naturamalta.com/Cuthona_miniostriata.html [accessed on 16. 6. 2015]

Sammut C., Perrone A. (1998): A preliminary check-list of Opisthobranchia (Mollusca, Gastropoda) from the Maltese Islands. Basteria 62: 221-240.

Schmekel L., Portmann A. (1982): Opisthobranchia des Mittelmeeres Niudibranchia und Saccoglossa. Berlin, Springer Verlag, 410 pp.

Trainito E., Doneddu M. (2014): Nudibranchi del Mediterraneo. 2ª Edizione, riveduta e ampliata. Il Castello, 190 pp.

Turk T. (2000): The Opistobranch mollusks (Cephalaspidea, Saccoglossa, Notaspidea, Anaspidea and Nudibranchia) of the Adriatic Sea with special reference to Slovenian coast. Annales, Ser. Hist. Nat. 10(2): 161-172.

Turk T. (2005a): *Cumanotus* from Slovenia [2]. Sea Slug Forum, Australian Museum, Sydney. http://www.seaslugforum.net/find.cfm?id=13517 [accessed on 16. 6. 2015]

Turk T. (2005b): Unusual Sea Slug from Cape Madona (Piran, Slovenia) – the first record of *Cumanotus beaumonti* (Eliot, 1906) in the Mediterranean Sea. Annales, Ser. Hist. Nat. 15(1): 1-4.

Zenetos A., Akel E.H.Kh., Apostolidis C., Bilecenoglu M., Bitar G., Buchet V., Chalari N., Corsini-Foka M., Crocetta F., Dogrammatzi A., Drakulić M., Fanelli G., Giglio G., Imsiridou A., Kapiris K., Karachle P.K., Kavadas S., Kondylatos G., Lefkaditou E., Lipej L., Mavrič B., Minos G., Moussa R., Pancucci-Papadopoulou M.A., Prato E., Renda W., Ríos N., Rizkalla S.I., Russo F., Servonnat M., Siapatis A., Sperone E., Theodorou J.A., Tiralongo F., Tzovenis I. (2015a): First record of the discodorid opisthobranch *Thordisa filix* Pruvot-Fol, 1951 in the Adriatic Sea. New Mediterranean Biodiversity Records, Medit. Mar. Sci. 16(1): 266-284.

Zenetos A., Mačić V., Jaklin A., Lipej L., Poursanidis D., Cattaneo-Vietti R., Beqiraj S., Betti F., Poloniato D., Kashta L., Katsanevakis S., Crocetta F. (2015b): Adriatic »Opisthobranchs« (Gastropoda: Heterobranchia): shedding light on biodiversity issues. Mar. Ecol. (in print).