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## OPISTHOBANCH MOLLUSCS (MOLLUSCA: GASTROPODA) FROM SLOVENIAN COASTAL WATERS (NORTHERN ADRIATIC)

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### ABSTRACT

*The present paper reports on the checklist of opisthobranch molluscs, found to inhabit Slovenian part of the Adriatic Sea. At least 66 opisthobranchs were recorded in the studied area and 74 in the entire Gulf of Trieste. To date, only a single non-indigenous species, Bursatella leachii, has been recorded in Slovenian coastal waters. The majority of species have been registered only in sporadic cases, and only few species have been found to be relatively common. Since only a small number of habitat types were investigated, the list of sea slugs of the Slovenian part of the Gulf of Trieste is to our opinion still far from complete.*

**Key words:** opisthobranch molluscs, checklist, Slovenia, Gulf of Trieste, Adriatic Sea

## MOLLUSCHI OPISTOBANCHI (MOLLUSCA: GASTROPODA) IN ACQUE COSTIERE SLOVENE (ADRIATICO SETTENTRIONALE)

### SINTESI

*L'articolo riporta l'inventario dei molluschi opistobranchi ritrovati nella parte slovena del mare Adriatico. Nell'area studiata sono state identificate almeno 66 specie di opistobranchi, mentre 74 specie sono conosciute per l'intero Golfo di Trieste. Fino ad oggi una sola specie alloctona, Bursatella leachii, è stata segnalata in acque costiere slovene. La maggioranza delle specie è stata ritrovata solo in pochi casi, mentre poche specie sono risultate essere relativamente comuni. Durante lo studio solo un basso numero di habitat è stato perlustrato, pertanto gli autori sono convinti che la lista di molluschi opistobranchi del mare sloveno è tutt'altro che completa.*

**Parole chiave:** molluschi opistobranchi, inventario, Slovenia, Golfo di Trieste, mare Adriatico

## INTRODUCTION

To date, the opisthobranch fauna of the Slovenian coastal sea has been poorly investigated. Detailed data on the mollusc fauna of the Gulf of Trieste and the Slovenian part of this gulf were presented by Vio & de Min (1996) and De Min & Vio (1997), respectively. Unfortunately, some opisthobranch orders such as Notaspidea, Anaspidea and Nudibranchia were underestimated in terms of their numbers, since the authors have clearly used the basic malacological sampling techniques (such as Van Veen grabs, Petersen grabs), which are not appropriate for the study of sea slugs. To this end, only few representatives of the above orders were mentioned in their checklists. The first attempt to prepare a Slovenian opisthobranch catalogue was made by Turk (2000), who presented a checklist based on record and photographs made during his SCUBA diving excursions. In that particular work, the author presented a survey of opisthobranch fauna of the Adriatic Sea with particular reference to Slovenian coastal waters. Five years later, the same author (Turk, 2005a, b) reported on the very first record of nudibranch *Cumanotus beaumonti* for the Mediterranean sea.

Recent developments in underwater sampling techniques have improved considerably the knowledge of marine biodiversity in many areas of the Mediterranean Sea. Through use of *in vivo* sampling of marine fauna with non-destructive techniques, an impressive number of new species for the Slovenian coastal sea has been detected. Among them, some opisthobranch species have also been recorded.

The aim of this work is to present some new data regarding the opisthobranch molluscs in the Slovenian coastal sea.

## MATERIAL AND METHODS

## Study area

Slovenian coastal waters are located in the southern part of the Gulf of Trieste. The Gulf covers approximately 600 km<sup>2</sup> with a water volume of about 9.5 km<sup>3</sup>. It is a shallow semi-enclosed gulf influenced by freshwater inflow, bottom sediment resuspensions and different sources of pollution. The Slovenian coastline is approximately 46 km long and was once composed exclusively of sandstone (flysch), which is the major source of detrital material. The maximum depth of 33 m was measured in a depression close to Piran.

The area is characterized by high habitat type diversity. The shallower areas are covered by the biocoenosis of photophilous algae, characterized by the association *Cystoseiretum crinitum*, and sea grass meadows of *Cymodocea nodosa*. The samplings were performed also in a sea grass meadow of *Posidonia oceanica*, situated

between the coastal towns of Izola and Koper. The deeper areas are characterized by sandy and muddy habitat types.

## Material and methods

The collection of opisthobranch molluscs is fairly difficult. Although the majority of species are characterized by vivid aposematic coloration, sea slugs are normally small-sized animals, present in low densities and usually inhabiting peculiar habitat types. The information of opisthobranch fauna, which is the basis of the present work, was gathered with different sampling methods and approaches. The majority of data originate from:

- (i) visual transects: during the decade from 1998 to 2008, numerous marine biodiversity sampling have been performed in Slovenian coastal waters (Lipej *et al.*, 2003);
- (ii) selective samplings: the collection of opisthobranch data was particularly intense during the sampling for the BSc Thesis by one of the authors (S. Šamu) in the period from July 2003 to September 2004;
- (iii) dredging: few specimens have been recorded by sampling ichthyofauna with special dredge adopted for sampling in seagrass meadows;
- (iv) random samplings: many opisthobranch molluscs have been detected accidentally by studying other components of biodiversity;
- (v) underwater photography: many specimens have been occasionally photographed.

Sea slugs have been identified by the use of different identification keys such as Barletta (1980) and Schmekel & Portmann (1982). The photographic monograph of opisthobranchs by Trainito (2005) was very helpful for identification based solely on photographs. For certain species, the web sites [www.seaslugforum.org](http://www.seaslugforum.org) (SSF) and [www.medslugs.de](http://www.medslugs.de) were checked and consulted. The photographs of the majority of specimens, which had previously not been reported by Turk (2000) for the Slovenian part of the Adriatic Sea in his checklist, were included in this paper (Plates I–III). The taxonomic categories are arranged according to SSF. Within each family, genera (and species) were arranged in alphabetical order.

## RESULTS

## Subclassis OPISTHOBRANCHIA

## Order CEPHALASPIDEA

## Superfamily Philinoidea

## Family Philidinidae

*Philine aperta* (Linne, 1767)

The only specimen of this species was recorded on May 23, 2003, in a sample taken by benthic dredge. The

sampling was performed on a circalittoral soft bottom at a depth of 22 m, close to the sewage outfall in waters off Piran. This species has been reported by De Min & Vio (1997) for the Slovenian coastal sea as a rare species, present mainly in the Strunjan Nature Reserve. Vio & De Min (1999) referred to this species as occurring along the Istrian coast near Črvar.

**Superfamily Runcinoidea**  
**Family Runcinidae**

***Runcina adriatica* Thompson, 1980**

This tiny, only few mm long sea slug was found in the mediolittoral sand in front of the Marine Biology Station in Piran (MBS) on January 26, 2006 (Fig. 1).

**Order SACOGLOSSA**  
**Superfamily Elysioidea**  
**Family Elysiidae**

***Elysia timida* (Risso, 1818)**

*E. timida* (Fig. 2) is amongst the most common and abundant sea slugs in the studied area. This herbivorous sea slug was found in most of the studied areas, particularly in the shallow water from 1 to 5 m depth on rocks, covered with algal turf.

***Elysia viridis* (Montagu, 1804)**

*E. viridis* is fairly rare in comparison with the previous species, considering that only two specimens have been recorded. The first was found in the nest of the wrasse *Symphodus roissali*, built by different algal remains within Debeli rtič Natural Monument at a depth of 1.2 m. The second specimen has been found crawling on *Cystoseira barbata* in the area between Fiesa and Pačug at a depth of 4 m (Fig. 3).

***Elysia* cf. *gordanae* Thompson & Jaklin, 1988**

A specimen of this elysiid sea slug (Fig. 4) has been found in front of the MBS on March 26, 2005. Due to the diagnostic features such as rather low parapodia (Thompson & Jaklin, 1988), the specimen could be identified as the recently discovered elysiid *E. gordanae*.

***Thuridilla hopei* (Verany, 1853)**

This species was also very abundant at many stations off the Slovenian coast. *T. hopei* was recorded in the depth range from 1 to 12 m. It inhabits different microhabitat types in the biocoenosis of photophilous algae.

**Superfamily Limapontioidea**  
**Family Limapontiidae**

***Ercolania coerulea* Trinchese, 1892**

A single specimen of this species was recorded on March 26, 2005, in front of the MBS. It was found in the

upper rocky infralittoral with patches of sand and gravel at 3 m depth (Fig. 5).

**Order ANASPIDEA**  
**Superfamily Aplysioidea**  
**Family Aplysiidae**

***Aplysia fasciata* Poiret, 1789**

On December 6, 2006, a 250 mm long sea hare was found stranded in front of the MBS. The specimen was still alive, and was therefore placed in the aquarium. It was completely black in colour.

***Aplysia punctata* Cuvier, 1803**

*Aplysia punctata* is a very common sea slug, occurring mostly in spring months when gathering in large numbers. It was recorded in the biocoenosis of photophilous algae in the majority of such localities. It seems to prefer the rocky bottom with a dense algal belt in the depth range from 2 to 4 m. The observed specimens ranged from 50 to 80 mm in size and were very variable in colour pattern.

***Bursatella leachii* de Blainville, 1817**

The non-indigenous sea slug *B. leachii* (Fig. 6) was found on numerous occasions in the studied area. It was found already in 2001 in front of the MBS as well as two years later (November 27, 2003) at the very same location. During the survey of cryptobenthic species, *B. leachii* was found on the algae *Padina pavonica* at a depth of 2.2 m at Seča on October 9, 2006. The majority of data originate from 2007. In March 2007, two specimens were recorded in the Piran harbour in front of the Piran Aquarium. A specimen was also recorded in a fish cage in the waters off Sečovlje in August 2007.

On October 1, 2007, an immense density of specimens of this very species was observed in a saltpan channel at Strunjan. At a depth lower than 1 m, approximately 50 sea slugs were counted in an area of a square meter. On January 9, 2008, a single specimen was found in the material, sampled by a special sea-meadow dredge in the sea grass meadow of *Cymodocea nodosa* in Strunjan at a depth of 2 m.

**Order NOTASPIDEA**  
**Superfamily Pleurobrancoidea**  
**Family Pleurobranchidae**

***Berthella ocellata* (Delle Chiaje, 1828)**

A specimen of this species was documented at Fiesa on a rocky bottom on July 6, 2003. It was found among algae on big rocks at a depth of 7 m. Another specimen was found in July 2003 under rocks at Cape Ronek at a depth of 5 m. This species had been previously recorded by Turk (2000) at Piran, where a specimen was found under stones at 1 m depth.

**Order NUDIBRANCHIA****Suborder DORIDINA****Family Goniodorididae*****Trapania lineata* Haefelfinger, 1960**

A single specimen of this species (Fig. 7) was found on March 19, 2008, with ascidian *Phallusia mammilata* on the muddy bottom at 8 m depth in front of MBS.

***Trapania maculata* Haefelfinger, 1960**

Four records of this species have been documented. Firstly, the species was recorded on the black sponge *Cacospongia scalaris* at a depth of 3.5 m in front of MBS. Two specimens of *T. maculata* were found on January 21, 2008, again in front of MBS. Another specimen of this species was registered on muddy bottom at a depth of 8.8 m at the very same locality on March 30, 2008.

**Family Onchidorididae*****Onchidoris neapolitana* (Delle Chiaje, 1841)**

On February 27, 2008, a red coloured sea slug was observed on a bryozoan covered stone in front of MBS (Fig. 8). It occurred at a depth of ca. 4 m in the sea grass meadow of *Cymodocea nodosa*. The specimen was about 5 mm in total length. The species was determined as *O. neapolitana*, and B. Rudman, after consulting the Sea slug forum, subsequently confirmed this fact.

**Family Dorididae*****Archidoris pseudoargus* (von Rapp, 1827)**

A specimen of this species was recorded on March 26, 2005, in front of MBS. It was found on rocks in a biocoenosis of photophilic algae at 3 m depth. Since a plethora of photographs of specimens more or less similar to this species were taken in the studied period, the species is probably common.

***Discodoris rosi* Ortea, 1979**

A red dorid sea slug was registered in April 2005 in front of MBS. It was found in phytal zone with muddy patches at a depth of app. 6 m. It was determined as *D. rosi*. The large white rings over the mantle are less evident (Fig. 9).

***Doris cf. berthelotti* (d'Orbigny, 1839)**

At four localities (NM Punta Madonna Piran, Vila Tartini at Strunjan, Fiesa, Belveder), ten specimens of this species were recorded during different seasons. They were found at a depth ranging from 2 to 10 m in different habitats such as mud, sand and rocky bottom. This species had previously been recorded at Fiesa by Turk (2000).

***Geitodoris planata* (Alder & Hancock, 1846)**

The only specimen of this species (Fig. 10) was observed and subsequently photographed in December 2005 in front of MBS. It was recorded under stones at a depth of 1 m. There is still much confusion in the modern scientific literature about the discrimination between *G. planata* and *Discodoris stellifera*. Both have star-shaped pattern on the back, and can be reliably distinguished only on the basis of radula. According to Rudman (2005b), this specimen should be considered as *Geitodoris planata*.

***Jorunna tomentosa* (Cuvier, 1804)**

A specimen of this species, crawling on a sponge *Chondrilla nucula*, was photographed (Fig. 11) in April 2005 in front of MBS. The dense coverage of caryophyllidia gives the species the velvety form.

***Rostanga rubra* (Risso, 1818)**

The only specimen was recorded and photographed (Fig. 12) in April 2005 in front of MBS in the upper infralittoral (3 m depth). In view of the whitish line between the rhinophore pockets, the species has been determined as *R. rubra*.

**Family Chromodorididae*****Chromodoris krohni* (Vérany, 1846)**

This species (Fig. 13) was recorded on several occasions in July and August 2003 and in summer 2008. It was found mainly at depths ranging from 2 to 7 m in a shady, precoralligenous aspect of the coralligenous biocoenosis. In shallower waters (below 3 m), it can be found under stones.

***Chromodoris luteorosea* (Rapp, 1827)**

*Chromodoris luteorosea* was recorded in the area on several occasions. The first specimen was found on August 1, 2000, at Cape Madonna Natural Monument in Piran at 7 m depth in a precoralligenous aspect. Another specimen of this species was documented on October 2, 2006, at a depth of 1.8 m close to the wreck of the ship Rex along the coastline between Izola and Koper. It was found on a stone covered with turf. The third specimen was found on July 19, 2007, in the sea grass meadow of *Posidonia oceanica* between Koper and Izola. The fourth specimen was recorded and photographed in front of MBS on March 12, 2008. It was found in muddy habitat at a depth 3.8 m. In the summer 2008, the species was recorded very frequently at almost every studied site.

***Chromodoris purpurea* (Risso in Guérin, 1831)**

A single specimen of *C. purpurea* (Fig. 14) was found on June 17, 2008, on a stone in the sea grass meadow of *Cymodocea nodosa* in the area of Sv. Jernej close to Debeli rtič Natural monument.

***Hypselodoris orsinii* (Verany, 1846)**

This hypselodorid sea slug (Fig. 15) was recorded on two occasions only. The first record originates from June 7, 2003, the second from July 2, 2007. In both cases, specimens were found on sponges. It is much smaller than other species of this genus. Although the taxonomical differentiation among species of this genus is somewhat difficult, the dorsal pattern of the observed specimens is so typical that we were able to identify this species as *H. orsinii*.

***Hypselodoris* cf. *tricolor* (Cantraine, 1835)**

Many specimens of this species were recorded in the studied area in different types of rocky bottom. Due to the similarity with other species of the genus *Hypselodoris*, it is still fairly difficult to determine the species with utmost certainty. However, comparing the photographs with the photographic documentation of identification keys (e.g. Trainito, 2005) and photographic evidence in the [www.seaslugforum](http://www.seaslugforum), our specimens' diagnostic features fit close to the *H. tricolor*.

***Hypselodoris villafranca* (Risso, 1818)**

This species is quite common in the Slovenian part of the Gulf of Trieste. Three specimens of this species were recorded on September 9, 2003, in the waters off Villa Tartini at Strunjan. They were found under stones in a sandy environment. Other records originate from samplings carried out in 2008, where few specimens were photographed in seagrass meadow of *Cymodocea nodosa* in front of MBP on February 27, March 12, and March 19, 2008.

**Family Dendrodorididae*****Dendrodoris grandiflora* Rapp, 1827**

A specimen of *D. grandiflora* was found on June 8, 2008, at Fiesa. It was recorded while crawling on a stone in a rocky habitat of the biocoenosis of photophilous algae at a depth of 3 m.

***Dendrodoris limbata* (Cuvier, 1804)**

As a fairly common sea slug, *Dendrodoris limbata* was found at different localities of Slovenian coastal waters. It was recorded at depths ranging from 1 to 8 m. The majority of specimens were hidden under bare stones, while others were found in sandy habitat. They were found in three colour varieties; brown with a yellow notum edge margin, black with a pale notum edge, and a paler variety with many dark patches (Fig. 16).

**Suborder DENDRONOTINA****Family Tethydidae*****Tethys fimbria* Linne, 1767**

This large opisthobranch was recorded on May 23, 2003, in a sample taken by benthic dredge. The sampling was performed on soft bottom at a depth of 22 m, close to the sewage outfall in the waters off Piran. A specimen of *T. fimbria* was photographed in front of MBS on February 21, 2004. The specimen was found crawling in a muddy habitat type at the depth of 26 m.

**Suborder AEOLIDINA****Family Flabellinidae*****Flabellina affinis* (Gmelin, 1791)**

Four specimens of this species were recorded in July and September 2003 at Cape Madona Natural Monument and between Fiesa and Pacug. All specimens were found on hydroid colonies of *Eudendrium* sp. at depths ranging between 9 and 12 m.

***Flabellina ischitana* Hirano & Thompson, 1990**

This species quite resemble the species above, except that the cerata are of distinct orange or red colour. It is a fairly frequent species, occurring in huge numbers at depths ranging from 10 to 12 m at different localities. Generally they were found grazing on colonial hydroid *Eudendrium* sp.

***Flabellina pedata* (Montagu, 1815)**

This species was recorded twice. One specimen was registered on September 4, 2003, in the southern part of Cape Madona Natural monument at a depth of 9.3 m, and the second on a precoralligenous rock in waters off the northern coastline of Piran at 11.1 m depth.

**Family Cumanotidae*****Cumanotus beaumonti* (Eliot, 1906)**

In April 2005, two specimens of this species were recorded at Cape Madona Natural Monument. They were found on a muddy bottom at a depth of 20 m. This was the very first record of such species in the Mediterranean Sea (Turk, 2005a, b). It had previously been reported only from the British Isles and Norway, where it is considered very rare (Rudman, 2005a, b). Afterward it was found also in the waters off Ravenna in the western Adriatic (Magnani, 2006).

In March 2008, a specimen of *C. beaumonti* was found in muddy habitat at a depth of 10 m in front of MBS. It was registered on athecate solitary hydroid *Corymorpha nutans* (Fig. 17).

**Family Eubranchiidae*****Eubranchus farrani* (Alder & Hancock, 1844)**

A specimen of this species (Fig. 18) was recorded in front of MBS in March 2006. It was found in a dense algal belt of *Cystoseira barbata* in the biocoenosis of photophilic algae at a depth of 2 m.

**Family Aeolidiidae*****Berghia coerulescens* (Laurillard, 1830)**

Four specimens of *B. coerulescens* were recorded. The first was found on June 11, 2003, in the algal belt at 5.5 m depth. The second specimen was recorded on precoralligenous aspect or community at 11.4 m in the waters off the northern coast of Piran in September 2003. The third specimen was recorded on March 26, 2005, in front of MBS. The fourth specimen was recorded on July 17, 2008, at 2.5 m depth in the algal belt of *Cystoseira barbata* in the waters along the boundary of Cape Madona Natural Monument in Piran. This species is probably much more common than evident from the samplings. It had previously been recorded also by Turk (2000) at Strunjan.

***Spurilla neapolitana* (Delle Chiaje, 1823)**

Two specimens were found on November 3, 2005, within the culture of clams (*Mytilus galloprovincialis*) at the mariculture platform in Piran Bay. Another specimen was photographed at the very same site on March 2, 2007. According to Turk (2000), this species is considered a quite common sea slug inhabiting shallow waters.

**Family Glaucidae*****Crataena peregrina* (Gmelin, 1791):**

This sea slug is one of the commonest opisthobranch species in the area. The great majority of *C. peregrina* were found to graze the hydrozoan colonies of *Eudendrium* sp. on a precoralligenous belt and solitary rocks on the sandy bottom. They were found at depths ranging from 3 to 12 m.

***Dondice banyulensis* Portmann & Sandmaier, 1960**

A specimen of this species (Fig. 19) was recorded in March 2006 just in front of MBS. It was found in a dense algal belt of *Cystoseira barbata* in a biocoenosis of photophilic algae at 2 m depth.

***Facelina bostoniensis* (Couthouy, 1838)**

The specimen of *F. bostoniensis* (Fig. 20) was recorded on a single occasion in spring 2003 just off MBS. It was recorded on pebbles at 1 m depth in the biocoenosis of photophilous algae (*Cystoseiretum criinitae*).

***Facelina fusca* Schmekel, 1966**

The only specimen of *F. fusca* (Fig. 21) was recorded on September 4, 2008, on rocky bottom with the sponge *Verongia aerophoba* at 6.9 m depth at Pacug. The sea slug has been preserved in our collection. It highly resembles the specimen photographed in the waters off Trieste (Turk, 2005c), tentatively determined by Rudman (2005c) as *F. fusca*.

**DISCUSSION**

In the present work, we are reporting on 40 species of sea slugs recorded in Slovenian coastal waters during the last decade. Taking into account the recent malacological surveys, performed by other authors (De Min & Vio, 1997; Turk, 2000, 2005a, b) in the Slovenian part of the Gulf of Trieste, altogether 66 opisthobranch molluscs have been recorded. If the entire Gulf of Trieste is considered, then the complete number is at least 75 species (Tab. 1). Among 66 species, more than 78% (52 species) are represented by orders Cephalaspidea and Nudibranchia (Tab. 2). In a previous report, Turk (2000) listed 23 opisthobranch species from the very same area in Slovenian part of the Gulf of Trieste. We failed to record 7 of the species mentioned in his checklist, but we have completed the list with 14 species previously not reported, together with *Cumanotus beaumonti*, recorded for the very first time by Turk (2005a, b).

In the Mediterranean Sea, some 400 species of Opisthobranchia were recorded (Cattaneo-Vietti & Thompson, 1989) with an increasing trend, mainly due to the increasing number of reported alien species (Daskos & Zenetos, 2007). The obtained data for the Slovenian part of the Adriatic Sea suggest that only a small portion (16.5%) of opisthobranchs inhabit the studied area. However, as we have found certain doriid species, which we were not able to identify (and are therefore not presented in this manuscript), the obtained number would certainly increase in the nearby future with the solving of actual taxonomical problems. Since we have studied only relatively low number of habitat types and localities as well, the list of sea slugs of the Slovenian part of the Gulf of Trieste is to our opinion still far from complete.

**Tab. 1: Survey of opisthobranch molluscs found in the Italian (ITA) and Slovenian (SLO) parts of the Gulf of Trieste. Legend: 1 – Vio & de Min (1996), 2 – De Min & Vio (1997), 3 – Turk (2000) and 4 – this paper.**

**Tab. 1: Pregled polžev zaškrjarjev (Opisthobranchia) v slovenskem (SLO) in italijanskem (ITA) delu Tržaškega zaliva. Legenda: 1 – Vio & de Min (1996), 2 – De Min & Vio (1997), 3 – Turk (2000) in 4 – to delo.**

No.	Species	Order	Vio & De Min (1996)	De Min & Vio (1997)	Turk (2000)	this work
			ITA	SLO	SLO	SLO
1	<i>Acteon tornatilis</i>	Cephalaspidea	+	+		
2	<i>Retusa mammilata</i>	Cephalaspidea	+	+		
3	<i>Retusa leptoneilema</i>	Cephalaspidea	+			
4	<i>Retusa semisulcata</i>	Cephalaspidea	+			
5	<i>Retusa obtusa</i>	Cephalaspidea		+		
6	<i>Retusa truncatula</i>	Cephalaspidea	+	+		
7	<i>Cylichnina laevisculpta</i>	Cephalaspidea	+	+		
8	<i>Cylichnina multiquadrata</i>	Cephalaspidea		+		
9	<i>Cylichnina umbilicata</i>	Cephalaspidea	+	+		
10	<i>Volvulella acuminata</i>	Cephalaspidea	+	+		
11	<i>Ringicula auriculata</i>	Cephalaspidea	+	+		
12	<i>Bulla striata</i>	Cephalaspidea	+	+		
13	<i>Haminoea hydatis</i>	Cephalaspidea	+	+		
14	<i>Haminoea navicula</i>	Cephalaspidea	+	+		
15	<i>Atys jeffreysi</i>	Cephalaspidea	+	+		
16	<i>Weinkauffia turgidula</i>	Cephalaspidea	+	+		
17	<i>Philinopsis depicta</i>	Cephalaspidea	+		+	
18	<i>Philine aperta</i>	Cephalaspidea	+	+		+
19	<i>Philine catena</i>	Cephalaspidea		+		
20	<i>Philine scabra</i>	Cephalaspidea	+			
21	<i>Laona pruinosa</i>	Cephalaspidea	+			
22	<i>Cylichna crosseii</i>	Cephalaspidea	+			
23	<i>Cylichna cylindracea</i>	Cephalaspidea	+	+		
24	<i>Roxania utriculus</i>	Cephalaspidea	+			
25	<i>Scaphander lignarius</i>	Cephalaspidea	+	+		
26	<i>Runcina adriatica</i>	Cephalaspidea				+
27	<i>Creseis acicula</i>	Thecosomata	+	+		
28	<i>Pleurobranchus membranaceus</i>	Notaspidea	+			
29	<i>Berthella stellata</i>	Notaspidea			+	
30	<i>Berthella aurantiaca</i>	Notaspidea	+			
31	<i>Berthella ocellata</i>	Notaspidea			+	+
32	<i>Elysia timida</i>	Sacoglossa				+
33	<i>Elysia viridis</i>	Sacoglossa				+
34	<i>Elysia cf. gordanae</i>	Sacoglossa				+
35	<i>Thuridilla hopei</i>	Sacoglossa			+	+

No.	Species	Order	Vio & De Min (1996)	De Min & Vio (1997)	Turk (2000)	this work
			ITA	SLO	SLO	SLO
36	<i>Boselia mimetica</i>	Sacoglossa			+	
37	<i>Calliopaea bellula</i>	Sacoglossa			+	
38	<i>Ercolania coerulea</i>	Sacoglossa				+
39	<i>Akera bullata</i>	Anaspidea	+	+		
40	<i>Aplysia punctata</i>	Anaspidea			+	+
41	<i>Aplysia depilans</i>	Anaspidea	+	+		
42	<i>Aplysia fasciata</i>	Anaspidea	+	+		+
43	<i>Bursatella leachii</i>	Anaspidea	+			+
44	<i>Trapania lineata</i>	Nudibranchia				+
45	<i>Trapania maculata</i>	Nudibranchia			+	+
46	<i>Doris</i> cf. <i>berthelotti</i>	Nudibranchia			+	+
47	<i>Archidoris pseudoargus</i>	Nudibranchia			+	+
48	<i>Jorunna tomentosa</i>	Nudibranchia				+
49	<i>Rostanga rubra</i>	Nudibranchia				+
50	<i>Onchidoris neapolitana</i>	Nudibranchia				+
51	<i>Geitodoris planata</i>	Nudibranchia				+
52	<i>Chromodoris krohni</i>	Nudibranchia				+
53	<i>Chromodoris luteorosea</i>	Nudibranchia			+	+
54	<i>Chromodoris purpurea</i>	Nudibranchia				+
55	<i>Hypselodoris</i> cf. <i>tricolor</i>	Nudibranchia			+	+
56	<i>Hypselodoris orsinii</i>	Nudibranchia				+
57	<i>Hypselodoris villafranca</i>	Nudibranchia				+
58	<i>Platydoris argo</i>	Nudibranchia			+	
59	<i>Discodoris rosi</i>	Nudibranchia				+
60	<i>Dendrodoris grandiflora</i>	Nudibranchia			+	+
61	<i>Dendrodoris limbata</i>	Nudibranchia			+	+
62	<i>Tethys fimbria</i>	Nudibranchia			+	+
63	<i>Cumanotus beaumonti</i>	Nudibranchia				+
64	<i>Eubranchus farrani</i>	Nudibranchia				+
65	<i>Facelina bostoniensis</i>	Nudibranchia				+
66	<i>Facelina fusca</i>	Nudibranchia				+
67	<i>Flabellina affinis</i>	Nudibranchia			+	+
68	<i>Flabellina ischitana</i>	Nudibranchia			+	+
69	<i>Flabellina pedata</i>	Nudibranchia			+	+
70	<i>Berghia verrucicornis</i>	Nudibranchia			+	
71	<i>Berghia coerulescens</i>	Nudibranchia			+	+
72	<i>Spurilla neapolitana</i>	Nudibranchia			+	+
73	<i>Cratena peregrina</i>	Nudibranchia			+	+
74	<i>Dondice banyulensis</i>	Nudibranchia				+
	<b>Total</b>		<b>29</b>	<b>22</b>	<b>23</b>	<b>40</b>



**Tab. 2: The structure of opisthobranch fauna in Slovenian waters and in the entire Gulf of Trieste in terms of different orders. See Table 1 for basic data.**

**Tab. 2: Število vrst v posameznih redovih polžev zaškrGARJEV v slovenskih vodah in v celotnem delu Tržaškega zaliva. Glej Tabelo 1 za osnovne podatke.**

Opisthobranch orders	Slovenian waters	Gulf of Trieste
CEPHALASPIDEA	20	26
SACOGLOSSA	7	7
THECOSOMATA	1	1
NOTASPIDEA	2	4
ANASPIDEA	5	5
NUDIBRANCHIA	31	31
<b>Total</b>	<b>66</b>	<b>74</b>

The majority of species have been recorded only in sporadic cases, while only few species have been found to be relatively common. Among the later we should mention the species such as *Elysia timida*, *Thuridilla hopei*, *Aplysia punctata*, *Flabellina ischitana*, *Cratena peregrina* and *Hypselodoris villafranca*.

Sampling success is related to different factors, affecting the record of sea slugs. Perhaps the major factor is detectability. Many small species are regularly not detected while performing visual census techniques. The detectability is on the other hand related to the presence of a proper habitat type on a small scale and typical bio-coenosis on a larger scale. Certain zoophagous species are in fact related to specific environment, so their occurrence is affected by the occurrence of proper habitat type in the studied area. On the other hand, certain species such as *Discodoris atromaculata*, which is related to a specific host species, the sponge *Petrosia ficiformis*, was not detected, although this sponge has been found at many sites of the studied area. To our opinion, some species will be recorded in the future while performing

sampling in interstitial habitats. Finally, there are some problems that are related to taxonomy itself. In fact, the taxonomy of certain genera is still rather confusing as it is in the case of genus *Hypselodoris* or many doriid species.

The underwater photography is playing a very important role. Many divers are attracted by the aposematic colour of sea slugs, thus a lot of information could be obtained in this way. The case of *Cumanotus beaumonti* is very informative in that regard. Another interesting species, which has been to date recorded only a couple of times, is *Elysia gordanae*. This elysiid species, recently described by Thompson & Jaklin (1988) in adjacent waters off Rovinj (Croatia), has been to date recorded only few times in the Adriatic Sea and in waters off Spain.

Up to date, only one non-indigenous species, *Bursatella leachi*, has been recorded in Slovenian coastal waters. Since at some sites the density of *B. leachi* reached the impressive number of 50 individuals per square meter, this species should be considered as an established one. This species has been documented already by Jaklin & Vio (1989) and eventually by De Min & Vio (1997, 1998). It is considered to be a lessepsian migrant, originating from the Indian Ocean.

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POLŽI ZAŠKRGARJI (MOLLUSCA: GASTROPODA OPISTHOBRANCHIA)  
IZ SLOVENSKEGA OBREŽNEGA MORJA (SEVERNI JADRAN)

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POVZETEK

Avtorji poročajo o seznamu golih polžev in sorodstva iz skupine polžev zaškrjarjev *Opisthobranchia*, ki nase-ljujejo slovenski del Jadranskega morja. Z različnimi metodami so popisali 40 vrst. Seznam vseh doslej ugotovljenih vrst na podlagi pričujočega vzorčevanja in dosedaj objavljenih pregledov malakofavne preučevanega območja šteje najmanj 66 vrst za slovenski del in skupaj 75 vrst za celotni del Tržaškega zaliva. Med ugotovljenimi vrstami je tudi tujerodna vrsta *Bursatella leachi*. Večina vrst je bila ugotovljena v nekaj primerih in le za nekaj vrst velja, da so v danem območju pogoste. Glede na dejstvo, da so vzorčevali na manjšem številu habitatnih tipov, avtorji pričakujejo, da se bo v prihodnosti število ugotovljenih vrst še povečalo.

**Ključne besede:** polži zaškrjarji, seznam vrst, Slovenija, Tržaški zaliv, Jadransko morje

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**PLATES I–III: Some opisthobranch species, recorded in the Slovenian sea.**

**TABLE I–III: Nekateri polži zaškrjarji, ugotovljeni v slovenskem morju.**

**Photographs credits / Avtorji fotografij:** BM – Borut Mavrič, LL – Lovrenc Lipej, SA – Samo Alajbegović, TM – Tihomir Makovec, ŽD – Žiga Dobrajc.

**PLATE I/ TABLA I**

**Fig. 1/Sl. 1:** *Runcina adriatica* (BM)

**Fig. 2/Sl. 2:** *Elysia timida* (LL)

**Fig. 3/Sl. 3:** *Elysia viridis* (SA)

**Fig. 4/Sl. 4:** *Elysia cf. gordanae* (TM)

**Fig. 5/Sl. 5:** *Ercolania coerulea* (SA)

**Fig. 6/Sl. 6:** *Bursatella leachii* (BM)

**Fig. 7/Sl. 7:** *Trapania lineata* (BM)

**Fig. 8/Sl. 8:** *Onchidoris neapolitana* (BM)

**PLATE II/ TABLA II**

**Fig. 9/Sl. 9:** *Discodoris rosi* (TM)

**Fig. 10/Sl. 10:** *Geitodoris planata* (SA)

**Fig. 11/Sl. 11:** *Jorunna tomentosa* (TM)

**Fig. 12/Sl. 12:** *Rostanga rubra* (TM)

**Fig. 13/Sl. 13:** *Chromodoris krohni* (LL)

**Fig. 14/Sl. 14:** *Chromodoris purpurea* (ŽD)

**Fig. 15/Sl. 15:** *Hypselodoris orsinii* (TM)

**Fig. 16/Sl. 16:** *Dendrodoris limbata* (SA)

**PLATE III/ TABLA III**

**Fig. 17/Sl. 17:** *Cumanotus beaumonti* (ŽD)

**Fig. 18/Sl. 18:** *Eubranchus farrani* (BM)

**Fig. 19/Sl. 19:** *Dondice banyulensis* (BM)

**Fig. 20/Sl. 20:** *Facelina bostoniensis* (TM)

**Fig. 21/Sl. 21:** *Facelina fusca* (LL)



PLATE I/ TABLA I



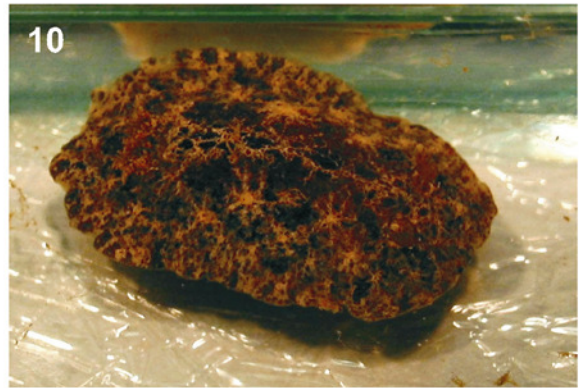


PLATE II/ TABLA II



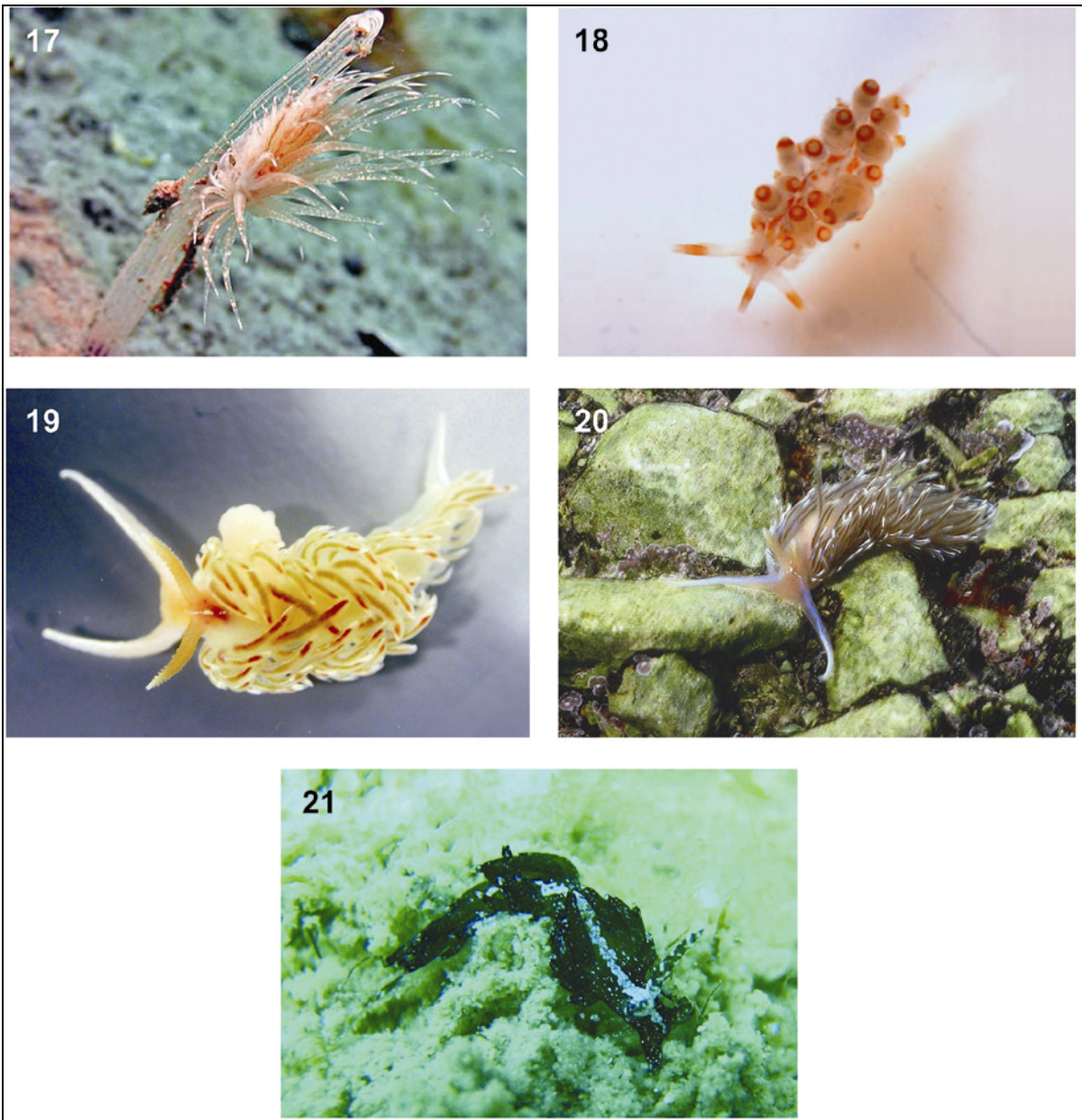


PLATE III/ TABLA III