

BLENNIOIDS (BLENNIOIDEA) OF THE SLOVENIAN COASTAL WATERS

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ABSTRACT

Although the research of Blennioidea (blennies and their relatives) has a long-standing tradition in the Adriatic, only a few data exist on the occurrence of this littoral fish assemblage in the Gulf of Trieste. The paper presents the checklist of blennioids in the Slovenian coastal sea. Altogether 18 blennioids were recorded in the studied area. 14 of them were blennies (fam. Blenniidae), 3 threefin blennies (gen. Tripterygion) and 1 blennioid species from the family Clinidae. The authors are discussing the factors determining the high blennioid diversity in the Slovenian coastal sea.

Key words: Blennies, Blennioidea, distribution, Slovenian sea

INTRODUCTION

Blennies and their relatives (Blennioidea) of the Mediterranean and Adriatic sea are considered typical rocky littoral fishes (Gibson, 1969, 1982). The research on this group in the Adriatic has a long-standing tradition (e.g. Graeffe, 1888; Steidachner & Kolombatović, 1883; Kolombatović, 1892a, b; Ninni, 1912; Šoljan, 1932, 1948; Zander, 1972; Pallaoro, 1989; Pallaoro & Števcic, 1989; Jardas & Dulčić, 1998). Although several articles exist on the northern Adriatic blennies (e.g. Seganin, 1968; Koppel, 1988; Illich & Kotschal, 1990; Kotschal *et al.*, 1990; Zander, 1980), there is still a lack of knowledge regarding the species inhabiting the Slovenian coastal waters and the Gulf of Trieste as a whole. The only report has come from Matjašič *et al.* (1975), although only 6 blennioids were recorded in their report.

The aim of this study is to establish the species of blennies and their relatives occurring in the Slovenian coastal sea. It is a part of the biodiversity project entitled *Mapping and monitoring the fauna, flora and habitat types in the Slovenian sea*.

STUDY AREA

The study was conducted in the coastal zone of Slovenia in the areas close to Piran, Strunjan and Debeli rtič (Fig. 1). The coastline within the sites studied in the Piran area consists mainly of allochthonous limestone jetty (sites 1, 3, 4, 5, 6, 7) or concrete paths (sites 2 and 8); only site 9 is located on natural coastline, consisting of eocene flysch sandstone and limestone breccia boulders. The other sites in the Strunjan (site 10) and Debeli rtič area (sites 11 and 12) consist of sandstone boulders as well, although the inclination of the coast is not as steep as in the Piran area. On all studied sites small blocks predominated in the mediolittoral and infralittoral zones, whereas in the Strunjan and Debeli rtič areas sandstone terraces and large boulders were also numerous.

METHODS

Sampling was carried out by snorkeling and SCUBA diving at different sites in the Piran area from July to the end of September 1998 (app. 5 visits per site). At the other three sites (10, 11 and 12), linear transects were

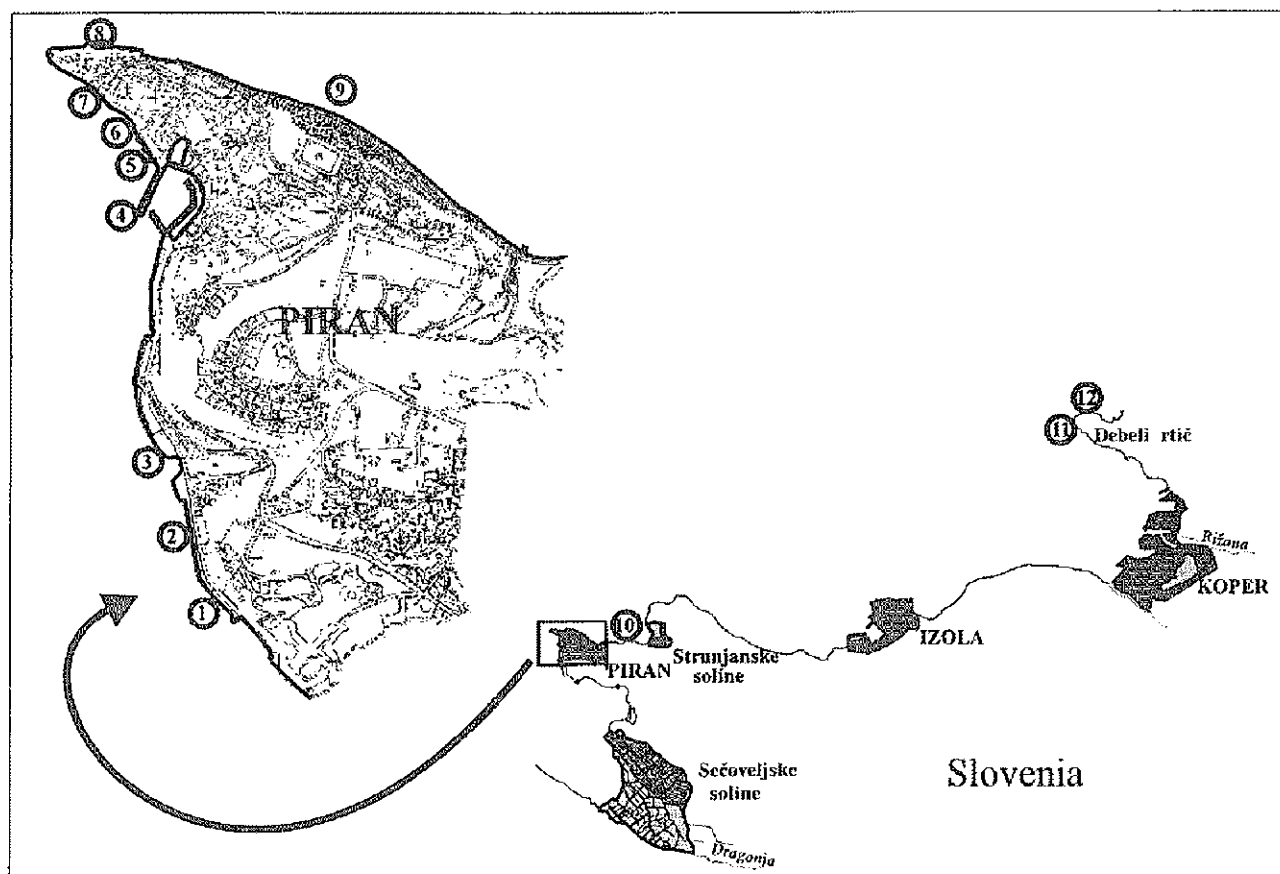


Fig. 1: Study area with sampling stations of the Slovenian coastal sea.

Sl. 1: Zemljevid obravnavanega območja z vzorčevalnimi postajami v slovenskem obalnem morju.

Sites (lokalitete): 1 - Bernardin, 2 - Marine Biological Station, 3 - Morgan Sailing Club, 4 - Harbour pier, 5 - Hotel Piran, 6 - Pavla, 7 - Punta 1, 8 - Punta 2, 9 - Piran-Fiesa, 10 - Pacug, 11 - Debeli rtič 1 and 12 - Debeli rtič 2.

carried out in August on three sampling days. In this work only qualitative data are presented.

With the exceptions of *Clinitrachus argentatus*, *Tripterygion melanurus* and *T. delaisi xanthosoma*, all the observed species were photographed in the studied area. Some species were caught and are housed in the collection of the Marine Biological Station. Species were considered to be stenobathic when more than 90% of all individuals were observed within 1 m of depth and eurybathic when they exceeded this narrow depth range (Illich & Kotrschal, 1990).

RESULTS

List of species

Fam. Blenniidae

1. *Aidablennius sphyinx* (Valenciennes, 1836)

Aidablennius sphyinx was very abundant throughout the entire studied area. This species prefers mediolittoral horizontal terraces, densely covered with green algae (genera *Enteromorpha*, *Cladophora*) and exposed to the sun. It can be found also on big flat rocks as well as in bore holes excavated by the endolithic bivalve *Lithophaga lithophaga*. At station 3 we counted 27 blennies/ 5 m².

2. *Blennius ocellaris* Linnaeus, 1758

This species inhabit deeper waters than other blennies. Three butterfly blennies were observed in the lower infralittoral zone on the muddy bottom in the Gulf of Piran. In one case it was found in a shell of a dead bivalve of the genus *Glycimeris*, which provides shelter for this blenny. It was recorded at the depth of 12-20 m. Marčeta (1996) caught two specimens of this species in spring 1995 with the bottom trawling gear.

Tab. 1: Occurrence of blennioids (Blennioidea) at 9 stations in Piran (see Fig. 1 for locations).

Tab. 1: Pojavljanje babic in sorodnikov (Blennioidea) na 9 postajah pri Piranu (glej sl. 1 glede lokacije postaj).

Species / stations	1	2	3	4	5	6	7	8	9	n
<i>Aidablennius sphynx</i>	+	+	+	+	+	+	+	+	+	9
<i>Blennius ocellaris</i>	-	-	-	-	-	-	-	+	+	2
<i>Coryphoblennius galerita</i>	+	-	+	+	+	-	-	-	+	5
<i>Lipophrys adriaticus</i>	+	-	+	+	+	+	+	+	+	8
<i>Lipophrys dalmatinus</i>	+	+	+	+	+	+	+	+	+	9
<i>Lipophrys canevai</i>	+	-	+	+	+	+	+	+	+	8
<i>Lipophrys nigriceps</i>	+	-	-	-	-	-	+	-	-	2
<i>Lipophrys pavo</i>	+	+	+	-	-	+	+	+	+	7
<i>Lipophrys trigloides</i>	+	+	+	+	+	+	+	+	+	9
<i>Parablennius gattorugine</i>	+	+	+	+	+	+	+	+	-	8
<i>Parablennius incognitus</i>	+	+	+	+	+	+	+	+	-	8
<i>Parablennius rouxi</i>	-	-	-	+	+	+	+	+	+	6
<i>Parablennius sanguinolentus</i>	+	+	+	+	+	+	+	+	+	9
<i>Parablennius tentacularis</i>	-	+	+	+	+	+	+	+	+	8
<i>Clinitrachus argentatus</i>	-	-	-	-	-	+	-	+	-	2
<i>Tripterygion delaisi</i>	-	-	-	+	-	-	-	-	-	1
<i>Tripterygion tripteronotus</i>	+	+	+	-	+	+	+	+	+	8
Number of species	12	9	12	12	12	13	13	14	12	

Stations: 1-Bernardin, 2-Marine Biological Station, 3-Morgan Sailing Club, 4-Harbour pier, 5-Hotel Piran, 6-Pavla, 7-Punta 1, 8-Punta 2, 9-Piran-Fiesa.

3. *Coryphoblennius galerita* (Linnaeus, 1758)

This typical mediolittoral blenny inhabits the vertical rocky walls in the uppermost part. This species can spend some time above the water line searching for food, mostly cirripeds *Chthamalus stellatum*. It was always observed in the first 20 cm. *Coryphoblennius galerita* is able to withstand limited periodic exposure outside the water.

4. *Lipophrys adriaticus* (Steindachner & Kolombatovic, 1883)

We found this species in the entire studied area but only at the depth interval of 0.1 to 0.5 m. It prefers mostly rocks, covered with a carpet of small juvenile bivalves *Mytilus galloprovincialis*.

5. *Lipophrys canevai* (Vinciguerra, 1880)

We regularly observed this species close to the surface. It prefers mostly rocks, covered with a carpet of small juvenile bivalves *Mytilus galloprovincialis*. It was observed also in the bore holes of endolithic bivalves. The specimens inhabiting rocks densely covered with *Mytilus* bivalves are black.

6. *Lipophrys dalmatinus* (Steindachner & Kolombatovic, 1883)

Lipophrys dalmatinus preferred the plane rocky terrace, covered with low vegetation carpet, but it can be found also in holes of the steep wall. It was found at the depth range of 0.1 to 0.5 m.

Although it was observed almost everywhere, it was never abundant.

7. *Lipophrys nigriceps* (Vinciguerra, 1883)

Two specimens of *Lipophrys nigriceps* were recorded in the study area; one in the rocky littoral of the Bernardin beach and the other at the Piran Punta natural sanctuary. *Lipophrys nigriceps* is a typical cave dweller, inhabiting dimly lit biotopes (Zander, 1980). Both specimens were observed under overhanging rocks, the first one at a depth of 1.5 m and the other at a depth of 4 m.

8. *Lipophrys pavo* (Risso, 1810)

Lipophrys pavo is a common stenobathic blenny, inhabiting the depth ranging from 0 to 0.5 m. It was observed under small stones in the mediolittoral rocky lit

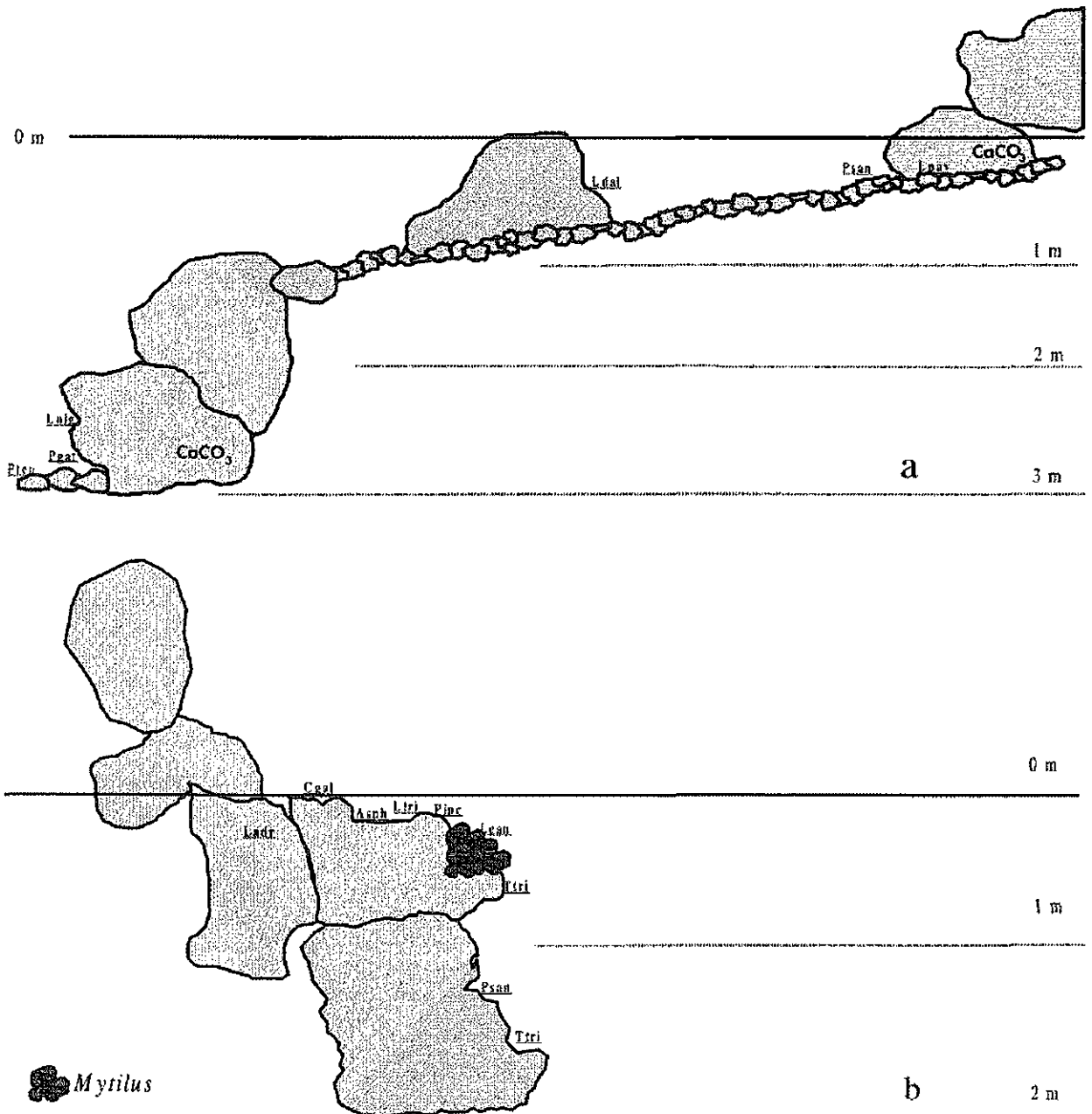


Fig. 2: Transect sections of two sites (a and b) in the Piran Punta area.

Sl. 2: Skica transekta na dveh postajah (a in b) na piranski punti.

Abbreviations (Okrajšave): *Asph* - *Aidablennius sphynx*, *Cgal* - *Coryphoblennius galerita*, *Ladr* - *Lipophrys adriaticus*, *Lcan* - *L. canevai*, *Ldal* - *L. dalmatinus*, *Lnig* - *L. nigriceps*, *Lpav* - *L. pavo*, *Ltri* - *L. trigloides*, *Psan* - *Parablennius sanguinolentus*, *Pinc* - *P. incognitus*, *Pgat* - *P. gatforugine*, *Pten* - *P. tentacularis*, *Ttri* - *Tripterygion tripteronotus*.

toral, but it can be also found in rock pools and in soft bottom substrates. It is very frequent also in lagoons as already pointed out by Segantin (1968), as well as in lagoons, brackish waters and in channels of the Sečovlje salina (*pers. observations*).

9. *Lipophrys trigloides* (Valenciennes, 1836)

This species inhabits mediolittoral steep rocks in the area influenced by the strong wave action. It was regularly observed on horizontal terraces, densely covered

with green algae, not deeper than 0.5 m. This species has similar habitat demands as *Coryphoblennius galerita*. We found this species to be common at all stations in the Piran area. According to Bini (1968) this species is considered to be rare in the Adriatic.

10. *Parablennius gattorugine* (Brünnich, 1768)

Parablennius gattorugine lives in the infralittoral belt, mostly below the depth of 2 m. It is frequent on rocky habitats.

11. *Parablennius incognitus* (Bath, 1968)

Parablennius incognitus is very common in the rocky littoral of the studied area. It was found mostly at the depth ranging from 0.5 to 1.5 m, preferably on rocks covered with dense vegetation and bivalves *Mytilus galloprovincialis*. This species exhibits various color combinations, probably associated with the occupied environment as suggested by Abel (1993).

12. *Parablennius rouxi* (Cocco, 1833)

It was observed at the depth ranging from 3 to 10 m. According to our observations, this species prefers vertical rocks with crevices and holes. On several occasions it was observed also in the holes excavated by endolithic bivalves *Lithophaga lithophaga*.

13. *Parablennius sanguinolentus* (Pallas, 1814)

Parablennius sanguinolentus was abundant at all stations in the mediolittoral and infralittoral belts. Only rarely it was observed below 3 m. It seems that this species prefers the habitat types with abundant blocks.

14. *Parablennius tentacularis* (Brünnich, 1768)

It was found in different habitats, also associated with *Pinna nobilis* in sea grass meadows. Although it was found from 1 to 25 m deep, it was more numerous at the shallower depths of 1 to 2 m. On several occasions it was observed also in the holes excavated by endolithic bivalves *Lithophaga lithophaga*.

Fam. Tripterygiidae

15. *Tripterygion tripteronotus* (Risso, 1810)

This species was very frequent in the depth range 0.1 to 1 m, but it was also observed deeper at the depth of 3 m. It is a typical rock dweller, which can be found on rock terraces and steep walls as well.

16. *Tripterygion melanurus minor* Guichenot, 1845

The only data on the occurrence of this species in the Slovenian coastal sea was provided by Bojan Marčeta (National Institute of Biology, Ljubljana), who found this species immediately below the roof of an overhanging rock near Fijesa. This totally agrees with the habitat preference described by Zander (1986), i.e. that *T. melanurus minor* is inhabiting sea caves and other dimly lit biotopes, clinging to walls or ceilings.

17. *Tripterygion delaisi xanthosoma* Cadenat & Blanche, 1971

We did not have the opportunity to see this species in the studied area. The yellow triplefin was observed in the dim environment of an overhanging rock of the pier of Piran harbor at the depth of 5 m by our colleague Valter Žiža in May 1998 and April 1999. This species was also recorded in a similar habitat type in the sanctuary of Riserva marina Miramare near Trieste (Roberto Odorico, pers. comm.). This species is inhabiting the sea caves and overhanging rocks of different islands near Rovinj (Zander & Jelinek, 1976; Pallaoro & Števcic, 1989) (front cover).

Fam. Clinidae

18. *Clinitrachus argentatus* (Risso, 1810)

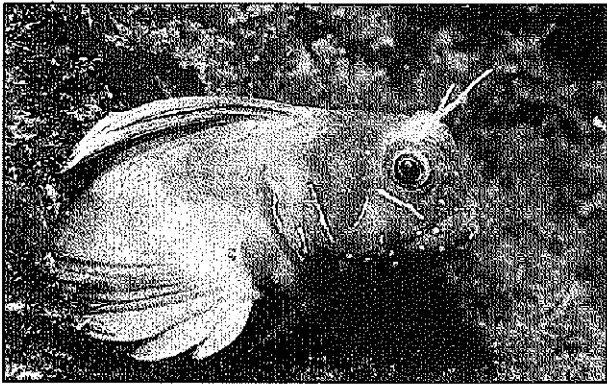
Two specimens were observed at the depth range of 0.1 to 0.5 m. Unfortunately, we failed to take photographs of this species. According to Pallaoro & Števcic (1989) this species prefers habitat types with dense algal cover. Bini (1968) reported that *Clinitrachus argentatus* inhabits the *Posidonia* and *Zostera* seagrass meadows as well.

DISCUSSION

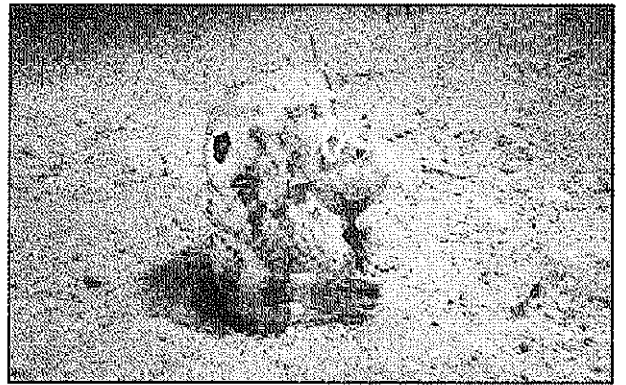
Altogether 18 blennioids were recorded in the studied area. 4 of them were blennies (fam. Blenniidae), 3 threespin blennies (gen. *Tripterygion*) and 1 blennioid

Figs. (slike) 3-18:

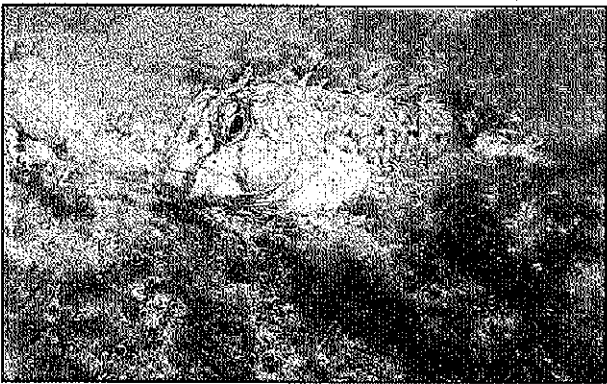
Fig. 3: *Aidablennius sphynx*, Fig. 4: *Blennius ocellaris*, Fig. 5: *Coryphoblennius galerita*, Fig. 6: *Lipophrys adriaticus*, Fig. 7: *Lipophrys canevei*, Fig. 8: *Lipophrys dalmatinus*, Fig. 9: *Lipophrys nigriceps*, Fig. 10: *Lipophrys pavo*, Fig. 11: *Lipophrys trigloides*, Fig. 12: *Parablennius gattorugine*, Fig. 13: *Parablennius incognitus*, Fig. 14: *Parablennius rouxi*, Fig. 15: *Parablennius sanguinolentus*, Fig. 16: *Parablennius tentacularis*, Fig. 17: *Tripterygion tripteronotus*, Fig. 18: *Tripterygion melanurus minor* (Photo: M. Richter).



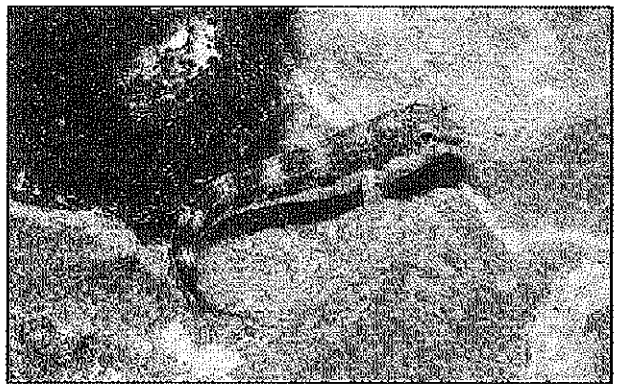
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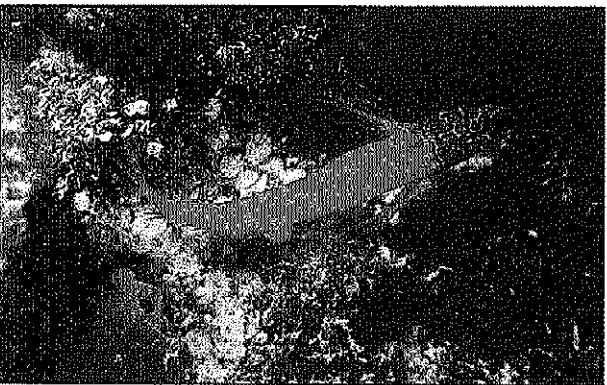
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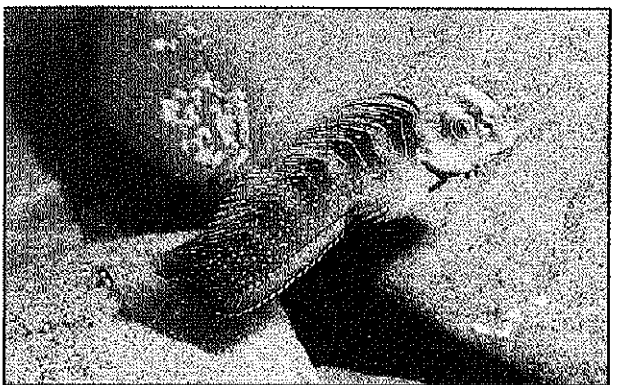
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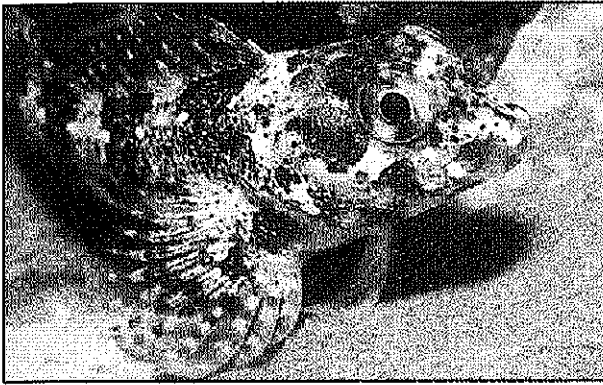
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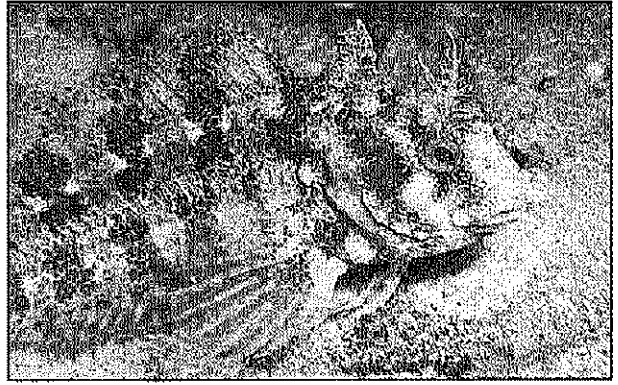
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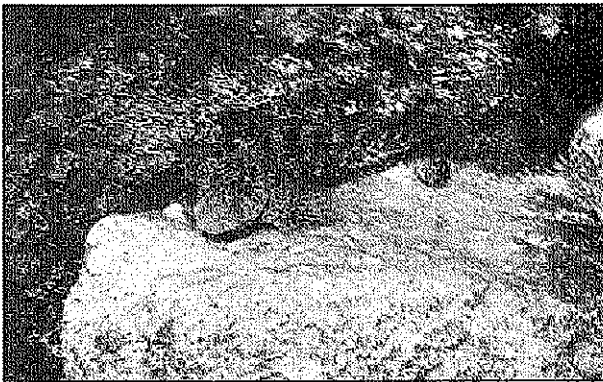
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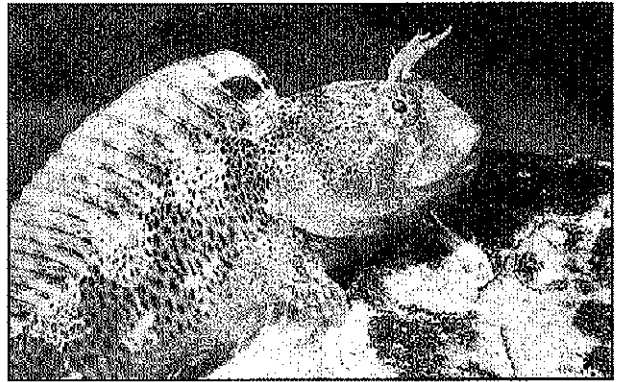
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species from the family Clinidae. In the previous report presented by Matjašič *et al.* (1975) for the Northern Adriatic, five blennies were recorded (*Parablennius gattorugine*, *Blennius ocellaris*, *Coryphoblennius galerita*, *Parablennius rouxi* and *Lipophrys pavo*) and one triplefin blenny (*Tripterygion tripteronotus*). Segantin (1968) reported on the occurrence of 11 species of blennies, whereas Illich & Kotschal (1990) confirmed the presence of 14 blenny species in the Northern Adriatic. In their list *Blennius ocellaris* is missing in comparison with our checklist, while we failed to find *Parablennius zvonimiri*, which appeared in their list.

Considering the fact that according to Pallaoro & Števcic (1989) and Jardas (1996) 21 blennioids are living in the entire Adriatic area, the obtained number of species is surprisingly high. The three species, which were not confirmed for the Slovenian coastal sea by us, are *Parablennius zvonimiri*, *Lipophrys basiliscus* and *L. fluviatilis*. Since *Parablennius zvonimiri* was reported for Venice region by Segantin (1968) and for the Rovinj area by different authors (e.g. Zander, 1980; Kotschal, 1988; Illich & Kotschal, 1990; Kotschal *et al.*, 1990), it is probable that this species will be eventually confirmed in the Slovenian coastal sea as well. This species has similar ecological requirements as *Tripterygion delaisi xanthosoma*, *T. melanurus minor* and *Lipophrys nigriceps*, preferring dim habitats under overhanging rocks, crevices between rocks and entrances to sea caves. We were not able to confirm the presence of *Lipophrys basiliscus*, which is distributed in the studied area according to Zander's (1986) distribution map. Pallaoro & Števcic (1989) expressed some doubts regarding the occurrence of this species in the Adriatic sea, since the only record of this species originates from the 19th century. In recent investigations of the littoral fish assemblage with different methods and fishing gears in the eastern part of the Adriatic sea *L. basiliscus* was not found (Pallaoro, *pers. comm.*).

Lipophrys fluviatilis, a freshwater and brackish water species, was found in some lakes and in the mouths of the Middle Adriatic rivers (Pallaoro & Števcic, 1989). Jardas (1996) presumed that this species inhabits the estuaries of the Isonzo and the Adige rivers.

Depth and substratum type were the two determining factors affecting the distribution of blennies (Macpherson, 1994). The abundance and diversity of blennioids were highest in the mediolittoral area and were decreasing towards deeper water, which is in good agreement with the observations of Illich & Kotschal (1990) for the Rovinj area. Only one species - *Blennius ocellaris* - was restricted to deeper waters.

The bulk of the recorded blenny species was associ-

ated with the rocky littoral. Only few blennies such as *Blennius ocellaris* and *Parablennius tentacularis* were found on soft muddy substrates. In our study only *Parablennius tentacularis* was observed in the seagrass meadow of *Cymodocea nodosa*. Even in this case it was associated with large bivalve shells, such as *Pinna nobilis* and *Glycymeris glycymeris*. Although seagrass meadows provide shelter and food for diverse fish communities (Bell & Harmelin-Vivien, 1982), only few blennies can be found in such habitat type. Macpherson (1994) found negative preference of *A. sphynx*, *L. canevai*, *L. trigloides*, *P. incognitus*, *P. rouxi*, *P. sanguinolentus*, *P. gattorugine* and *T. tripteronotus* for *Posidonia oceanica* beds. Most blennies inhabit holes excavated in the rock by the endolithic bivalve *Lithophaga lithophaga* or formed by erosion (e.g. Koppel, 1988).

The sites with high blennioid diversity were the harbour piers, especially the outer rocky margin of the wavebreakers. We believe that the inclination of the slope is also very important factor. Higher number of species were observed in habitats where the coast was steeper. According to Illich & Kotschal (1990), the high blenny diversity is correlated also with the well defined zone of sessile animals and short algal turf in the subsurface littoral.

Numerous large, mainly limestone rocks provide good shelter for various blennies. Such habitat types provide dim habitats for photophobic blennies, such as *Tripterygion delaisi xanthosoma* and *Lipophrys nigriceps*. Autochthonous limestone rocks are found only in the historical town of Izola, whereas in other parts of the Slovenian coastal sea the rocky littoral is made of sand stone boulders. The importance of rocky habitats was already pointed by Segantin (1968) who studied the blennies in the Gulf of Venice. He believes that some species of blennies have settled in the Gulf of Venice only recently.

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BABICE (BLENNIOIDEA) V SLOVENSKEM OBALNEM MORJU

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POVZETEK

Avtorja poročata o pojavljanju 18 vrst babic in njihovih sorodnikov (Blennioidea) v slovenskem morju. Med njimi je 14 vrst pravih babic (Blenniidae), 3 vrste so sprehajalčki (Tripterygion) in 1 vrsta *Clinitrachus argentatus*. Glede na dejstvo, da Pallaoro & Števcic (1989) poročata o 21 vrstah za Jadransko morje, je število najdenih vrst v slovenskem morju presenetljivo veliko. Večina vrst je bila pogosta na vseh vzorčevalnih postajah, predvsem v najbolj plitvem sloju od 0,1 do 0,5 m. Nekatere izmed teh so sposobne kratkih ekskurzij na kopno, v območje pršnega pasu (npr. *Coryphoblennius galerita*, *Lipophrys trigloides*). Okata babica (*Blennius ocellaris*) je bila opažena le v cirkalitoralnem pasu, velika babica (*Parablennius gattorugine*), rogata babica (*Parablennius tentacularis*) in progasta babica (*Parablennius rouxi*) so značilne za infralitoralni pas, druge vrste pa se pojavljajo predvsem v mediolitoralnem (bibavičnem) pasu.

Največ vrst je bilo opaženih na kamniti obali, predvsem na valobranih in ob obrežnem skalovju na piranski Puntji. Kaže, da se babice izogibajo mehkih podlag, še bolj pa morskih travnikov. Avtorja menita, da je vrstna pestrost povezana tudi z naklonom obale, saj je bilo največ vrst babic opaženih tam, kjer se obala strmo spušča v morje. Na Debelem rtiču, kjer se flišna brežina zelo počasi spušča v morje, je bilo najdenih le nekaj vrst babic.

Vrste *Tripterygion delaisi xanthosoma*, *Tripterygion melanurus* in *Lipophrys nigriceps* so bile najdene le v zaklonjenih, temnih špranjah in votlinah skalovja valobrana ter obrežnega skalovja. Kaže, da le okata babica živi izključno na muljastem dnu, na tem tipu podlage pa se pojavljata še rogata in velika babica.

Ključne besede: babice, Blennioidea, razširjenost, slovensko morje

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