

ANNALES

Anali za istrske in mediteranske študije
Annali di Studi istriani e mediterranee
Annals for Istrian and Mediterranean Studies
Series Historia Naturalis, 29, 2019, 1





ANNALES

Anali za istrske in mediteranske študije
Annali di Studi istriani e mediterraneei
Annals for Istrian and Mediterranean Studies

Series Historia Naturalis, 29, 2019, 1

ISSN 1408-533X (Tiskana izd.)

UDK 5

Letnik 29, leto 2019, številka 1

ISSN 2591-1783 (Spletna izd.)

**UREDNIŠKI ODBOR/
COMITATO DI REDAZIONE/
BOARD OF EDITORS:**

Nicola Bettoso (IT), Christian Capapé (FR), Darko Darovec, Dušan Devetak, Jakov Dulčić (HR), Serena Fonda Umani (IT), Andrej Gogala, Daniel Golani (IL), Danijel Ivajnsič, Mitja Kaligarič, Marcelo Kovačič (HR), Andrej Kranjc, Lovrenc Lipej, Vesna Mačić (ME), Alenka Malej, Patricija Mozetič, Martina Orlando-Bonaca, Michael Stachowitsch (AT), Tom Turk, Al Vrezec

**Glavni urednik/Redattore capo/
Editor in chief:**

Darko Darovec

**Odgovorni urednik naravoslovja/
Redattore responsabile per le scienze
naturali/Natural Science Editor:**

Lovrenc Lipej

Urednica/Redattrice/Editor:

Martina Orlando-Bonaca

Lektor/Supervisione/Language editor:

Polona Šergon (sl.), Petra Berlot Kužner (angl.)

Prevajalci/Traduttori/Translators:

Martina Orlando-Bonaca (sl./it.)

**Oblikovalec/Progetto grafico/
Graphic design:**

Dušan Podgornik, Lovrenc Lipej

Prelom/Composizione/Typesetting:

Grafis trade d.o.o.

Tisk/Stampa/Print:

Grafis trade d.o.o.

Izdajatelj/Editori/Published by:Zgodovinsko društvo za južno Primorsko - Koper / Società storica del Litorale - Capodistria®
Inštitut IRRIS za raziskave, razvoj in strategije družbe, kulture in okolja / Institute IRRIS for Research, Development and Strategies of Society, Culture and Environment / Istituto IRRIS di ricerca, sviluppo e strategie della società, cultura e ambiente®**Sedež uredništva/Sede della redazione/
Address of Editorial Board:**Nacionalni inštitut za biologijo, Morska biološka postaja Piran / Istituto nazionale di biologia, Stazione di biologia marina di Pirano / National Institute of Biology, Marine Biology Station Piran
SI-6330 Piran / Pirano, Fornače/Fornace 41, tel.: +386 5 671 2900, fax 671 2901;
e-mail: annales@mbss.org, **internet:** www.zdjp.si

Redakcija te številke je bila zaključena 21. 6. 2019.

**Sofinancirajo/Supporto finanziario/
Financially supported by:**

Javna agencija za raziskovalno dejavnost Republike Slovenije (ARRS), Luka Koper in Mestna občina Koper

Annales - Series Historia Naturalis izhaja dvakrat letno.**Naklada/Tiratura/Circulation:** 300 izvodov/copie/copiesRevija *Annales, Series Historia Naturalis* je vključena v naslednje podatkovne baze / *La rivista Annales, series Historia Naturalis* è inserita nei seguenti data base / *Articles appearing in this journal are abstracted and indexed in:* BIOSIS-Zoological Record (UK); Aquatic Sciences and Fisheries Abstracts (ASFA); Elsevier B.V.: SCOPUS (NL).Vsi članki so v barvni verziji prosto dostopni na spletni strani: <http://zdjp.si/p/annalesshn/>
All articles are freely available in color via website: <http://zdjp.si/en/p/annalesshn/>

VSEBINA / INDICE GENERALE / CONTENTS 2019(1)

SREDOZEMSKI MORSKI PSI <i>SQUALI MEDITERRANEI</i> MEDITERRANEAN SHARKS		Aytaç ÖZGÜL & Okan AKYOL Occurrence of a Lessepsian Swimming Crab, <i>Portunus segnis</i> (Crustacea: Decapoda), in Southern Aegean Sea, Turkey 43 <i>Pojavljanje lesepske plavajoče rakovice,</i> <i>Portunus segnis</i> (Crustacea: Decapoda), <i>v južnem Egejskem morju, Turčija</i>	
Hakan KABASAKAL A Review of Shark Research in Turkish Waters 1 <i>Pregled raziskav o morskih psih v turških vodah</i>		Moez SHAIK, Sihem RAFRAFI-NOUIRA & Christian CAPAPÉ Occurrence and Unusual Abundance of Reticulated Leatherjack <i>Stephanolepis</i> <i>diaspros</i> (Osteichthyes: Monacanthidae) from the Lagoon of Bizerte (Northern Tunisia, Central Mediterranean Sea) 49 <i>Pojavljanje in nenavadna številčnost afriškega</i> <i>kostoroga, Stephanolepis diaspros</i> (Osteichthyes: <i>Monacanthidae</i>) <i>iz lagune pri Bizerti</i> (severna <i>Tunizija, osrednje Sredozemsko morje)</i>	
Hakan KABASAKAL Finally Under Protection! Status of the Angel Shark, <i>Squatina squatina</i> (Linnaeus, 1758) in Turkish Seas, with Notes on a Recent Sighting and Incidental Captures 17 <i>Končno zavarovan! Status navadnega sklata,</i> <i>Squatina squatina</i> (Linnaeus, 1758) <i>v turških morjih s posebnim poudarkom</i> <i>na novejša opazovanja in naključne ulove</i>		IHTIOLOGIJA ITTIOLOGIA ICHTHYOLOGY	
Sihem RAFRAFI-NOUIRA, Youssouph DIATTA, Almamy DIABY & Christian CAPAPÉ Additional Records of Rare Sharks from Northern Tunisia (Central Mediterranean Sea) 25 <i>Dodatni zapisi o pojavljanju redkih morskih psov</i> <i>iz severne Tunizije (osrednje Sredozemsko morje)</i>		Domen TRKOV, Borut MAVRIČ, Martina ORLANDO-BONACA & Lovrenc LIPEJ Marine Cryptobenthic Fish Fauna of Slovenia (Northern Adriatic Sea) 59 <i>Morska kriptobentoška ribja favna Slovenije</i> <i>(severni Jadran)</i>	
RECENTNE SPREMEMBE V SREDOZEMSKI BIODIVERZITETI <i>CAMBIAMENTI RECENTI NELLA BIODIVERSITÀ</i> <i>MEDITERRANEA</i> RECENT CHANGES IN MEDITERRANEAN BIODIVERSITY		Polona PENGAL, Eva HORVAT & Mihael J. TOMAN Spatial and Temporal Distribution of Anchovy (<i>Engraulis encrasicolus</i>) and Sardine (<i>Sardina pilchardus</i>) Eggs in Slovenian Territorial Waters (Northern Adriatic) 73 <i>Prostorsko in časovno pojavljanje iker sardele</i> <i>in sardona v slovenskem teritorialnem morju</i>	
Thodoros E. KAMPOURIS, Costas CONSTANTINOU & Ioannis E. BATJAKAS Establishment of the Non-Indigenous Prawn <i>Penaeus pulchricaudatus</i> Stebbing, 1914 in the Marine Area of Cyprus 37 <i>Tujerodna kozica Penaeus pulchricaudatus</i> <i>Stebbing, 1914, ustaljena vrsta v vodah Cipra</i>			

**Sihem RAFRAFI-NOUIRA, Youssouph DIATTA
& Christian CAPAPÉ**

Overview of Trophic Levels Recorded
in Teleost Species from Northern Tunisian
Waters (Central Mediterranean Sea) 85
*Pregled trofičnih nivojev pri ribah
kostnicah vzdolž severnotunizijskih voda
(osrednje Sredozemsko morje)*

FLORA
FLORA
FLORA

**Nenad JASPRICA, Marija PANDŽA
& Milenko MILOVIĆ**

Spontaneous Vegetation on Slag Heaps
in Southern Croatia 93
Spontana vegetacija na jalovinah v južni Hrvaški

Amelio PEZZETTA

Le Lamiaceae della Flora Italiana: Distribuzione
Regionale e Considerazioni Fitogeografiche 103
*Ustnatice (Lamiaceae) v italijanski flori:
regionalna razširjenost in fitogeografski pomisleki*

FAUNA
FAUNA
FAUNA

Manja ROGELJA & Lovrenc LIPEJ

Occurrence of Giant Tun, *Tonna galea* (Linnaeus,
1758) (Gastropoda: Tonnidae) in the Marine
Waters Off Slovenia (Northern Adriatic Sea) 121
*Pojavljanje velikega sodca, Tonna galea
(Linnaeus, 1758) (Gastropoda: Tonnidae)
v morskih vodah Slovenije (severni Jadran)*

Jure JUGOVIC & Živa MUHIČ

Spatial Distribution of Three Species
of *Palaemon* Shrimp (Crustacea: Decapoda:
Caridea) in Badaševica River (SW Slovenia) 125
*Prostorska razporeditev treh vrst kozic iz rodu
Palaemon (Crustacea: Decapoda: Caridea)
v Badaševici (JZ Slovenija)*

MISCELLANEA

**Khadija OUNIFI BEN AMOR, Mohamed
Mourad BEN AMOR & Jamila BEN SOUISSI**

Abiotic Parameters in Tunis Southern Lagoon
After an Environmental Restoration
and Status of Macrobenthic Biocenosis
(Northern Tunisia, Central Mediterranean Sea) 135
*Abiotiski parametri v tuniški južni laguni
po okoljski obnovi in status makrobentoških
biocenoz (severna Tunizija, osrednje
Sredozemsko morje)*

DELO NAŠIH ZAVODOV IN DRUŠTEV
ATTIVITÀ DEI NOSTRI ISTITUTI E SOCIETÀ
ACTIVITIES BY OUR INSTITUTIONS
AND ASSOCIATIONS

Ana FORTIČ

Protecting Adriatic Biodiversity in Kotor:
The Congress AdriBioPro 2019 143

IN MEMORIAM

In Memoriam of Fabio Perco (1946–2019)
(Lovrenc Lipej) 147

Navodila avtorjem 149
Istruzioni per gli autori 151
Instruction to Authors 153

Kazalo k slikam na ovitku 156
Index to images on the cover 156

OCCURRENCE OF GIANT TUN, *TONNA GALEA* (LINNAEUS, 1758)
(GASTROPODA: TONNIDAE) IN THE MARINE WATERS OFF SLOVENIA
(NORTHERN ADRIATIC SEA)

Manja ROGELJA

Aquarium Piran, Academic, Electronics and Maritime High School, Bolniška ulica 11, 6330 Piran, Slovenia

Lovrenc LIPEJ

Marine Biology Station, National Institute of Biology Piran, Fornače 41, SI-6330 Piran, Slovenia
e-mail: lovrenc.lipej@nib.si

ABSTRACT

On 1st December 2018 a fisherman caught a specimen of the giant tun Tonna galea (Linnaeus, 1758) in the bottom trammel net for flounders, approximately 1 Nm outside the town of Izola. The net was placed on a muddy bottom at 20 m of depth. This is the second record of T. galea in the Slovenian waters (Gulf of Trieste, northern Adriatic Sea). Another specimen (the first one) was previously reported in October 2015 in the waters off Piran. By including T. galea in the checklist of Slovenian marine malacofauna, at least 370 gastropod species were up to date recorded in the Slovenian part of the Adriatic Sea.

Key words: Giant tun, *Tonna galea*, marine malacofauna, Gulf of Trieste, northern Adriatic Sea

PRESENZA DI DOGLIO, *TONNA GALEA* (LINNAEUS, 1758) (GASTROPODA:
TONNIDAE), IN ACQUE MARINE AL LARGO DELLA SLOVENIA (ADRIATICO
SETTENTRIONALE)

SINTESI

Il 1° dicembre 2018 un esemplare del gigantesco doglio Tonna galea (Linnaeus, 1758) è stato catturato con una rete da posta, il tramaglio, a circa 1 Nm dalla cittadina di Izola. La rete è stata posizionata su fondo fangoso a 20 m di profondità. Questo è il secondo ritrovamento di T. galea nelle acque slovene (Golfo di Trieste, Adriatico settentrionale). Un altro esemplare (il primo) è stato segnalato a ottobre 2015 nelle acque di Pirano. Includendo T. galea nella lista della malacofauna marina slovena, almeno 370 specie di gasteropodi sono state registrate nella parte slovena dell'Adriatico.

Parole chiave: Doglio, *Tonna galea*, malacofauna marina, Golfo di Trieste, Adriatico settentrionale

INTRODUCTION

Tonna galea (Linnaeus, 1758) is a large gastropod, widespread in the Atlantic and Pacific Oceans and in the Mediterranean Sea (de Simone, 1995). It is the second largest Mediterranean gastropod, which could reach more than 29 cm in size (Katsanevakis *et al.*, 2008). It mainly inhabits sandy and muddy sediments and sea-grass meadows (Katsanevakis *et al.*, 2008). It is a carnivore which preys on sea cucumbers such as *Holothuria tubulosa*, *H. forskali*, *H. poli* and *H. sanctori* (Toscano *et al.*, 1992; Francour, 1997), other echinoderms and mollusks. The basic life history of this species deserved only scarce scientific interest and many aspects of its biology and ecology still remains unknown (Doxa *et al.*, 2011). Nowadays, this giant gastropod is endangered mostly by artisanal fishermen and collectors (Tunesi *et al.*, 2006). It is a rare and protected species according to Annex II of the Bern convention (Council of Europe, 1979) and the Protocol of the Barcelona convention (Annex II) (European Community, 1999; UL RS, 2002). However, it is still sporadically collected in many Greek areas by divers (Katsanevakis *et al.*, 2008) as a food delicacy or for shell collectors (Tunesi *et al.*, 2006; Russo & Perini, 2016). The aim of this paper is to present data on the occurrence of this giant gastropod in the Slovenian part of the Adriatic Sea.

MATERIAL AND METHODS

Two individual giant tuns were found in recent years in the Slovenian part of the Adriatic Sea. The first was recorded on 24th October 2015 close (200 m distance northward) to the diffuser of the pipeline of the sewage outfall near Piran and the second on 1st December 2018 one Nm outside the town of Izola (45° 33' 20.9" N; 013°



Fig. 1: Specimen of *Tonna galea*, caught in the waters off Izola (Slovenia), kept in the Piran Aquarium (Photo: M. Rogelja).

Sl. 1: Primerek velikega sodca, ujetega v vodah okoli Izole (Slovenija) v piranskem akvariju (Foto: M. Rogelja).

38' 19.6" E). Both individuals were caught accidentally as by-catch in the bottom trammel net. In the first case the giant tun was kept in the Aquarium Piran still alive and then moved to the Shell museum Piran where it is now part of the exhibited collection. A note on this record was mentioned in the Piran municipal bulletin by Simič (2015).

In the second case, the specimen was caught in a trammel net for flounders, placed on muddy bottom at 20 m of depth overnight. The specimen was deposited still alive in the Piran Aquarium into a 3.400 l aquarium tank with sandy bottom (Fig. 1). The giant tun was photographed and the shell measured with a calliper to the nearest millimetre (Fig. 2). The specimen is housed in the collection of the Aquarium Piran.

RESULTS AND DISCUSSION

The species was easily recognized through external morphological characters such as shell, which is spiral in shape and globose, resembling a barrel. The colour is pale brown and homogenous. Shell aperture is large with its outside border damaged. The surface of the shell is covered with wide spiral ribs (Cossignani & Ardovini, 2011). Head and the muscular foot are rather large and beige coloured with irregular dark brown spots. The shell measured 155 mm and the oral aperture is 145 mm wide. The giant tun collected in 2015 measured 190 mm.

Published data on the occurrence of *Tonna galea* are very scarce in the Adriatic Sea. Stefano Chiereghin considered this species as very rare in the northern Adriatic already two centuries ago (Chiereghin, 2001). According to Coen (1933, 1937; in: Russo & Perini, 2016) *T. galea*, a species which used to be rather common, seems to face the threat of extinction.

More recently the giant tun was recorded in Montenegro (Petović *et al.*, 2017), in Croatia (e.g. Zavodnik *et al.*, 2006) and in Italy (Cossignani *et al.*, 1992). Even more rare is considered in its northern part. In fact, the majority of available faunistic surveys on mollusks or invertebrates did not mention this species for areas of northern Adriatic Sea (e.g. Zavodnik & Kovačić, 2000; Zavodnik *et al.*, 2005; Kučić, 2016). In the eastern northern Adriatic, there are only few published records on this species. A specimen of *T. galea*, collected in August 1965 in waters off the island of Lošinj, is housed in the collection of the Natural History Museum of Rijeka (Croatia) (<http://www.prirodoslovni.com/inventarna/>). Another one was mentioned by Zavodnik *et al.* (2006) for the island of Pag. Other available data are known from local newspapers or social media. Those are dealing on cases of illegal hunting of giant tuns in the waters off Novigrad (Klobučar Opačak, 2013) and of finding of a specimen, stranded on a beach in Rovinj (Orlović Radić, 2016) which was after released back into the sea. In their comprehensive survey of mollusks in the Gulf

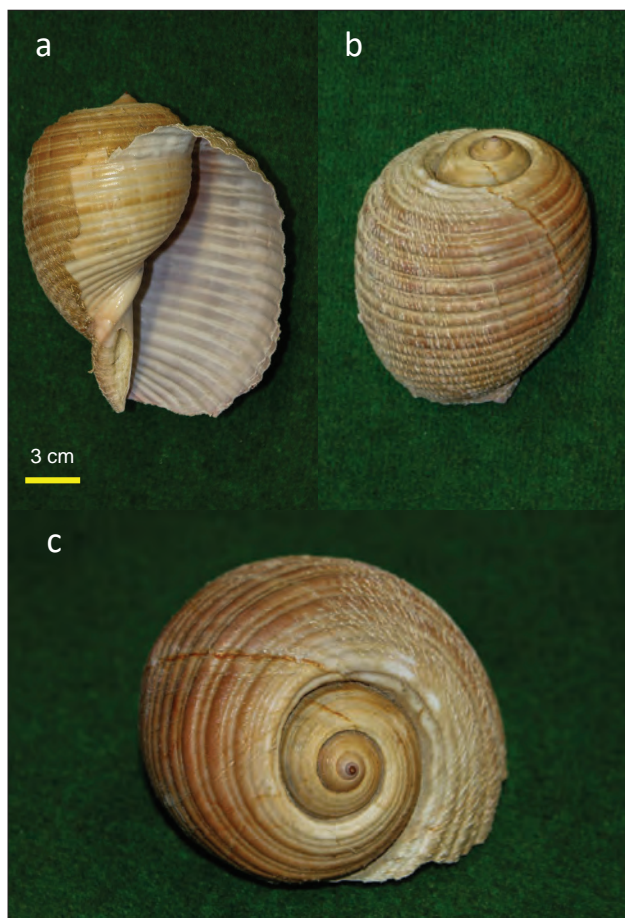


Fig. 2: Shell of the studied specimen of *Tonna galea*, caught in the waters off Slovenia (Photo: M. Rogelja).
Sl. 2: Lupina ujetega primerka velikega sodca, ujetega v vodah okoli Izole (Slovenija) v piranskem akvariju (Foto: M. Rogelja).

POJAVLJANJE VELIKEGA SODCA, *TONNA GALEA* (LINNAEUS, 1758) (GASTROPODA: TONNIDAE) V MORSKIH VODAH SLOVENIJE (SEVERNI JADRAN)

Manja ROGELJA

Akvarij Piran, Gimnazija, elektro in pomorska šola Piran, Bolniška ulica 11, 6330 Piran, Slovenija

Lovrenc LIPEJ

Morska Biološka Postaja, Nacionalni Inštitut za Biologijo, Piran, Fornače 41, SI-6330 Piran, Slovenija
 e-mail: lovrenc.lipej@nib.si

POVZETEK

Prvega decembra je lokalni ribič približno 1 Nm pred Izolo v ribiško mrežo ujel primerek velikega sodca (*Tonna galea*). Mreža je bila postavljena v globini 20 m nad muljastim dnom. To je drugi zabeležen primer pojavljanja velikega sodca v slovenskih vodah (Tržaški zaliv, severni Jadrán). Pred tem je bil en primerek te vrste (prvi zapis o pojavljanju) ujet v vodah blizu Pirana oktobra 2015. Upošteva je nov podatek je seznam morskih polžev v slovenskem delu Jadranskega morja bogatejši še za eno vrsto in zdaj šteje najmanj 370 vrst.

Ključne besede: veliki sodca, morska malakofavna, drugi zapis o pojavljanju, Tržaški zaliv, Jadransko morje

of Trieste, Vio & De Min (1996) mentioned an empty shell caught by a fisherman in waters off Savudrija (Istria peninsula), but without any precise data. In the western part of the north Adriatic Sea *T. galea* was recently found in waters of Caorle (Venezia), when a juvenile specimen was caught by fishermen in a depth range from 25 to 30 m (Russo & Perini, 2016). Unfortunately, authors did not provide any information about the date of capture.

According to De Min & Vio (1996), at least 232 species of gastropods were recorded in the waters of Slovenia. However, authors focused their research mostly on shelled gastropods, so many seaslugs were not mentioned in their text. In a recently published monography on marine opisthobranchs in Slovenia, Lipej *et al.* (2018) reported 141 species. By analysing both checklists and by including *T. galea* in the list, at least 370 gastropod species were up to date recorded in the Slovenian part of the Adriatic Sea.

ACKNOWLEDGMENTS

Authors wish to express their gratitude to the fisherman Daniel Hrvat for the alert and the donation of the giant tun to the Aquarium Piran and to Jan Simič (Shell museum Piran) for sharing the morphological data of the first specimen.

REFERENCES

- Chiereghin, S. (2001):** Descrizione de' pesci, de' Crostacei e de' Testacei che abitano le Lagune ed il Golfo Veneto. Grafiche Zoppelli, Dosson, 829 pp, XLVIII (prepared in 1778 and 1818, published in 2001).
- Cossignani, T., V. Cossignani, A. Di Nisio & M. Passamonti M. (1992):** Atlante delle conchiglie del Medio Adriatico. [Atlas of the shells in Middle Adriatic]. Ancona: L'Informatore Piceno.
- Cossignani, T. & R. Ardovini (2011):** Malacologia Mediterranea. Atlante delle conchiglie del Mediterraneo. Informatore Piceno, Ancona, Italy: L'Informatore Piceno, Ancona, Italy.
- De Min, R. & E. Vio (1997):** Molluschi conchiferi del litorale sloveno. *Annals, Istr. Med. Studies*, 11: 241-258.
- de Simone, L.R.L. (1995):** Anatomical Study on *Tonna galea* (Linne, 1758) and *Tonna maculosa* (Dillwyn, 1817) (Mesogastropoda, Tonnoidea, Tonnidae) from Brazilian Region. *Malacologia*, 37(1), 23-32.
- Doxa, C.H., A. Steriotti, M. Kentouri & P. Divanach (2011):** Encapsulated development of the marine gastropod *Tonna galea* (Linnaeus, 1758) in captivity. *J. Biol. Res. Thessaloniki*, 16, 304-307.
- Francour, P. (1997):** Predation on Holothurians: A Literature Review. *Invertebrate Biology*, 116(1), 52-60.
- Katsanevakis, S., E. Lefkaditou, S. Galinou-Mitsoudi, D. Koutsoubas & A. Zenetos (2008):** Molluscan species of minor commercial interest in Hellenic seas: Distribution, exploitation and conservation status. *Medit. Mar. Sc.*, 9, 77-118.
- Klobučar Opačak, T. (2013):** U akvatoriju Rovinja izlovljavao zaštićene puževe bačvaše. 7 januar 2013, <https://www.vecernji.hr/vijesti/u-akvatoriju-rovinja-izlovljavao-zasticene-puzeve-bacvase-494745>.
- Kučić, M. (2016):** Inventarizacija favne morskih mehkušceva (Mollusca) Lošinjsko-creškega arhipelaga, Hrvaška. Univerza na Primorskem, Fakulteta za matematiko, naravoslovje in informacijske tehnologije, Magistrsko delo, pp. 1-57.
- Lipej, L., D. Trkov & B. Mavrič (2018):** Polži zaškrjarji slovenskega morja (Opisthobranchs of the Slovenian sea). International Oceanographic Committee, Marine Biology Station, Piran, pp. 1-306.
- Orlović Radić, N. (2016): Puž bačvaš "nasukan" u rovinjskoj luci.
- Petović, S., S. Gvozdrenović & Z. Ikica (2017):** An Annotated Checklist of the Marine Molluscs of the South Adriatic Sea (Montenegro) and a comparison with those of neighbouring areas. *Turk. J. Fish. Aquat. Sci.*, 921-934.
- Russo, P. & L. Perini (2016):** Ritrovamento di un esemplare vivente di *Tonna galea* (Linnaeus, 1758) (Gastropoda: Tonnidae) in Alto Adriatico. *Alleryana*, 34(1), 16-17.
- Simič, J. (2015):** Muzej školjk z zanimivimi najdbami. *Solni cvet* 37 (december 2015), Piran, p. 42.
- Toscano, A., F. Bentivegna & P. Cirino (1992):** Holothurians, response to attack by the tonnid gastropod *Tonna galea*. In: *Echinoderm research*. Scalera-Liaci L. & C. Canicatti, eds., A. A. Balkema Publishers, Rotterdam, Netherlands, p. 204.
- Tunesi, S. Agnesi, S. Clò, T. Di Nora & G. Mo (2006):** La vulnerabilità delle specie protette ai fini della conservazione. *Biol. Mar. Medit.*, 13(1), 446-455.
- UL RS (2002):** https://www.uradni-list.si/_pdf/2002/Mp/m2002102.pdf, no 26, 1-48.
- Zavodnik, D. & M. Kovačić (2000):** Index of marine fauna in Rijeka Bay (Adriatic Sea, Croatia). *Nat. Croatica*, 9(4), 297-379.
- Zavodnik, D., A. Pallaoro, A. Jaklin, M. Kovačić & M. Arko-Pijevac (2005):** Benthos Survey of the Senj Archipelago (North Adriatic Sea, Croatia). *Acta Adriat.*, 46(Suppl. 2), 3-68.
- Zavodnik, D., M. Legac & T. Gluhak (2006):** An account of the marine fauna of Pag Island (Adriatic Sea, Croatia). *Nat. Croatica*, 15(3), 65-107.