

Rapid Communication

First record of *Ophioblennius atlanticus* (Valenciennes, 1836) in Italian waters, with considerations on effective NIS monitoring in Mediterranean Marine Protected Areas

Ernesto Azzurro^{1,2,*}, Kassandra Zannaki^{3,4}, Franco Andaloro^{1,2}, Fabio Giardina⁵ and Francesco Tiralongo^{6,7}

¹Institute for Environmental Protection and Research (ISPRA), Rome, Italy

²Stazione Zoologica Anton Dohrn (SZN), Villa Comunale, Napoli, Italy

³University of the Aegean, Departments of Marine Sciences, Lesvos Island, Greece

⁴ISMAR-Istituto Scienze Marine (as an Erasmus Student), la Spezia, Italy

⁵Marine Protected Area of Pelagie Islands, Lampedusa, Italy

⁶Department of Biological, Geological and Environmental Sciences, University of Catania, Italy

⁷Ente Fauna Marina Mediterranea, Avola, Italy

Author e-mails: eazzurr@gmail.com (EA), mar13021@mar.aegean.gr (KZ), fabiogiardina2@gmail.com (FG), franco.andaloro@isprambiente.it (FA), fra.tiralongo@hotmail.it (FT)

*Corresponding author

Received: 27 July 2018 / Accepted: 17 September 2018 / Published online: 16 October 2018

Handling editor: Michel Bariche

Abstract

On July 2017 during a scientific survey, a single individual of *Ophioblennius atlanticus* (Valenciennes, 1836) was caught at the entrance of Lampedusa harbour, in proximity to the Marine Protected Area of the Pelagie Islands. This record confirms the introduction of this fish into Mediterranean waters, adding a new species to the list of Italian NIS. Possible pathways of introduction and the relevance of this finding for Mediterranean MPAs are briefly discussed.

Key words: ship transport, Blenniidae, Mediterranean Sea, non-indigenous species, climate change

Introduction

Fishes of the family Blenniidae, commonly known as combtooth blennies, are distributed worldwide, reaching their highest diversity in tropical and subtropical waters (Nelson 1994). This family currently includes 406 valid species, distributed in two subfamilies (Blenniinae and Salariinae) and 58 genera (Eschmeyer et al. 2018). To date, a total of 19 species have been recorded from Italian seas (Relini and Lanteri 2010), most of which inhabit very shallow waters (Tiralongo et al. 2016).

The redlip blenny *Ophioblennius atlanticus* (Valenciennes, 1836), is an eastern Atlantic fish, distributed in oceanic islands and along the west coast of Africa, from Senegal to Angola (Dooley et

al. 1985; Almada et al. 2001; Carneiro et al. 2014; Williams and Craig 2014). A closely related species is *O. macclurei* (Silvester, 1915) (Eschmeyer et al. 2018), whose distribution is limited to the western Atlantic coasts, from New York and Bermuda to northern South America (McEachran and Feckhelm 2005; Williams and Craig 2014).

The redlip blenny feeds mainly on detritus and algae (Froese and Pauly 2018). During the breeding season, nesting males develop anal glands and select a small crevice among rocks or coral reefs as a nest site (Giacomello et al. 2006). In 2014, based on underwater pictures taken along the Maltese coasts, *O. atlanticus* was detected for the first time in the Mediterranean Sea (Falzon 2015). Here we provide a new record of this species and its first documented capture in this basin.



Figure 1. The redlip blenny *Ophioblennius atlanticus* caught from Lampedusa Island (Italy) on 20th July 2017 at a depth of about 1 metre. Photograph by E. Azzurro.

Methods

On 19th July 2017, during a scientific survey in the Marine Protected Area of Pelagic Islands (Strait of Sicily), a single individual of the redlip blenny *Ophioblennius atlanticus* was photographed and filmed. The fish was observed at the entrance of the harbour of Lampedusa, among the pillars of the eastern dock, at a depth of about 1 meter (35.49602°N; 12.60368°E). The day after, the same individual was spearfished by one of the authors (EA), photographed, measured (to the nearest millimetre), weighted (to the nearest gram) and preserved in alcohol for subsequent study (Figure 1). Morphological analyses were carried out with the help of a stereomicroscope. Taxonomic identification followed Carpenter and De Angelis (2016).

Results

The Lampedusa specimen had a total length (TL) of 159 mm and a weight of 39 g and it is described as follows: body relatively elongated and laterally compressed with elongated dorsal and anal fins; head with a vertical profile in front of eyes; a typical eye-like spot behind the eye; prominent sets of comb teeth; cirri on head present: simple and relatively elongated on the eyes, branched on anterior nostrils and bifid on the nape; lateral line discontinuous. Body uniformly dark-brown; lower lip, lower part of the pectoral fins and upper and lower margin of the caudal fin bright pink. Meristic and morphometric characters are reported in Table 1.

Table 1. Morphometric and meristic characters of the specimen of *O. atlanticus* caught from Lampedusa island.

Morphometric characters	mm
Total length	159
Standard length	131
Pre-dorsal distance	127
Pre-anal distance	58
Body depth	31
Head length	30
Eye diameter	7
Meristic characters	count
Dorsal-fin spines	12
Dorsal-fin rays	22
Pectoral-fin rays	15
Anal-fin spines	2
Anal-fin rays	24
Caudal-fin rays	14

Discussion

Morphological features and meristic counts perfectly matched the description of *O. atlanticus* (Springer 1962) and clearly distinguished this species from other congeners, including *O. macchurei*, which has 19–21 segmented dorsal-fin rays and 20–22 segmented anal-fin rays (vs 21–23 and 24–25 in *O. atlanticus*, respectively) (Hankins and Baldwin 2002; McEachran and Fechhelm 2005; Rangel and Mendes 2009).

The capture of *O. atlanticus* in Lampedusa confirms its introduction in the Mediterranean Sea (Falzon 2015) and provides a first documented record of this species for Italian waters (Tiralongo 2015). So far, and to our best knowledge, other three

species of exotic blennies have been reported from the Mediterranean Sea. These are *Omobranchus punctatus* (Valenciennes, 1836), recorded only once by Golani (2004) within the harbour of Ashod in Israel; *Parablennius thysanius* (Jordan and Seale, 1907), recorded only once in the harbour of Antalya, Turkey by Ozbek et al. (2014), and *Petroscirtes ancylodon* Rüppell, 1835, firstly reported from Nizzanim, Israel by Goren and Galil (1989) and later detected by other authors in the Levantine basin (Taskavak et al. 2000; Corsini et al. 2005). Finally, Ben Soussi et al. (2011), within an unpublished congress communication, reported the occurrence of *Istiblennius edentulus* (Forster and Schneider, 1801) in Tunisian waters, but this finding has still to be validated. None of these species has established successful populations in the Mediterranean Sea, and biotic resistance is theoretically considered to be very high for this family (Azzurro et al. 2014). Nevertheless, *O. atlanticus* may reach very high abundances along the subtropical shallow rocky shores of the Atlantic Ocean and in the Canary Islands (Azzurro, pers. observation). Being a species of subtropical origin, rising water temperatures are expected to increase habitat suitability for *O. atlanticus*, as probably happened for other native combtooth blennies, such as *Parablennius pilicornis* (Cuvier, 1829) and *Scartella cristata* (Linnaeus, 1758) (Nieder et al. 2000; Pastor and Francour 2010). As for other exotic blennies (Wonham et al. 2000), *O. atlanticus* might be easily transported through ballast waters or directly by ships, which are known to be one of the main vectors for marine bio-invasions (Galil 2009). Both, the Lampedusa (present finding) and the Malta (Falzon 2015) individuals, were detected in proximity of harbours, supporting the hypothesis of a ship-mediated introduction. On the contrary, other means of arrival, such as natural transport through the Strait of Gibraltar, due to the aquarium trade or a secondary spread from an established population seems to be less probable.

Yet, further monitoring activities needs to be regularly conducted, especially in proximity of Marine Protected Areas (MPAs), which do not escape the consequences of global warming and biological invasions (Otero et al. 2013; Simard et al. 2016; Galil 2017). Furthermore, many Mediterranean MPAs are located in proximity to major ports and experience similar challenges, including the scarcity of information on management practices and a lack of trained local staff to effectively detect new introductions (Otero et al. 2013). It is therefore advisable to train MPA teams to identify non-indigenous organisms. This will improve our potential for early detection and rapid response, which is a desired

approach for managing the issue of biological invasions in European seas and beyond (Genovesi et al. 2010; Katsanevakis et al. 2015; Giakoumi et al. 2016). A more direct action concerning marine bio-invasions is also requested globally, as stated by the Aichi Target 9 of the Convention on Biological Diversity (CBD 2015) and regionally, by the “Descriptor 2” of the European Union Marine Strategy Framework Directive (EU 2008). For these reasons, and in consideration of the rapidity and magnitude of biotic changes, NIS species should be taken into serious consideration in monitoring activities and management plans of Mediterranean MPAs.

Acknowledgements

This study and the costs related to this publication have been supported by the Interreg Med Programme (Grant number Pr MPA-Adapt IMED15_3.2_M2_337) 85% co-funded by the European Regional Development Fund. We kindly acknowledge Joachim Langeneck for preliminary analysis of the Lampedusa specimen and Gianpaolo Rampini and Alessandra Raichi for documenting on video the capture of this species during field activities. We also acknowledge the support received by the other project partners: the Spanish National Research Council (CSIC), Italian National Institute for Environmental Protection and Research (ISPRA), IUCN Centre for Mediterranean Cooperation, Public Institution Brijuni National Park (Croatia), MPA Pelagie Islands – Management Body Municipality of Lampedusa and Linosa (Italy), Consortium of Management of Portofino MPA (Italy), National Park of Port-Cros (France), and the Corsican Agency for Environment (France).

The publication of this article is partly supported by the Open Access Publishing Fund of the International Association for Open Knowledge on Invasive Alien Species (INVASIVESNET).

References

- Almada VC, Oliveira RF, Gonçalves EJ, Almeida AJ, Santos RS, Wirtz P (2001) Patterns of diversity of the North-eastern Atlantic blenniid fish fauna (Pisces: Blenniidae). *Global Ecology and Biogeography* 10: 411–422, <https://doi.org/10.1046/j.1466-822X.2001.00244.x>
- Azzurro E, Tuset V, Lombarte A, Maynou F, Simberloff D, Pérez A, Sole R (2014) External morphology explains the success of biological invasions. *Ecology Letters* 17: 1455–1463, <https://doi.org/10.1111/ele.12351>
- Ben Soussi J, Boughedir W, Zaouali J (2011) The Gulf of Tunis: a biological melting pot. VII ICMB International Congress on Marine Biological Invasion, Barcelona 22–25 August, 2011
- Carneiro M, Martinis R, Landi M, Costa FO (2014) Updated checklist of marine fishes (Chordata: Craniata) from Portugal and proposed extension of the Portuguese continental shelf. *European Journal of Taxonomy* 73: 1–73, <https://doi.org/10.5852/ejt.2014.73>
- Carpenter KE, De Angelis N (2016) The living marine resources of the Eastern Central Atlantic. Volume 2: Bivalves, gastropods, hagfishes, sharks, batoid fishes, and chimaeras. FAO Species Identification Guide for Fishery Purposes, Rome, FAO, pp 665–1509
- CBD (2015) Convention on Biological Diversity. Aichi biodiversity targets. Available at: <https://www.cbd.int/sp/targets/> (accessed 6 November 2015)

- Corsini M, Margies P, Kondilatos G, Economids P (2005) Lessepsian migration of fishes to the Aegean Sea: First record of *Tylerius spinosissimus* (Tetraodontidae) from the Mediterranean, and six more fish records from Rhodes. *Cybium* 29(4): 347–354
- Dooley JK, Van Tasselli J, Brito A (1985) An annotated checklist of the shorefishes of the Canary Islands. *American Museum Novitates* 2824: 1–49
- Eschmeyer WN, Fricke R, Van Der Laan R (2018) Catalog of fishes: genera, species, references. <http://researcharchive.calacademy.org/research/ichthyology/catalog/fishcatmain.asp>
- EU (2008) Directive of the European Parliament and the Council Establishing a Framework for Community Action in the Field of Marine Environmental Policy (Marine Strategy Framework Directive), European Commission Directive 2008/56/EC, OJ L 164
- Falzon MA (2015) First record of the redlip blenny *Ophioblennius atlanticus* (Osteichthyes: Blenniidae) in the Mediterranean. *Marine Biodiversity Records* 8: e80, <https://doi.org/10.1017/S1755267215000640>
- Froese R, Pauly D (2018) FishBase. <https://www.fishbase.de/summary/ophioblennius-atlanticus>
- Galil BS (2009) Taking stock: inventory of alien species in the Mediterranean Sea. *Biological Invasions* 11: 359–372, <https://doi.org/10.1007/s10530-008-9253-y>
- Galil BS (2017) Eyes wide shut: managing bio-invasions in Mediterranean marine protected areas. In: Goriup PD (ed), Management of Marine Protected Areas: A Network Perspective, Chapter: 10. John Wiley & Son, pp 187–206
- Genovesi P, Scalera R, Brunel S, Solarz W, Roy D (2010) Towards an early warning and information system for invasive alien species (IAS) threatening biodiversity in Europe. European Environment Agency, Technical Report 5/2010, 52 pp
- Giacomello E, Marchini D, Rasotto MB (2006) A male sexually dimorphic trait provides antimicrobials to eggs in blenny fish. *Biology Letters* 2: 330–333, <https://doi.org/10.1098/rsbl.2006.0492>
- Giakoumi S, Guilhaumon F, Kark S, Terlizzi A, Claudet J, Felline S, Cerrano C, Coll M, Danovaro R, Frascchetti S, Koutsoubas D, Ledoux JB, Mazor T, Mérigot B, Micheli F, Katsanevakis S (2016) Space invaders; biological invasions in marine conservation planning. *Diversity and Distributions* 22: 1220–1231, <https://doi.org/10.1111/ddi.12491>
- Golani D (2004) First record of the muzzled blenny (Osteichthyes: Blenniidae: *Omobranchus punctatus*) from the Mediterranean, with remarks on ship-mediated fish introduction. *Journal of the Marine Biological Association UK* 84: 851–852, <https://doi.org/10.1017/S0025315404010057h>
- Goren M, Galil B (1989) *Petroscirtes ancylodon*: first Lessepsian migrant blenny in the eastern Mediterranean. *Israel Journal of Zoology* 36: 125–128, <https://doi.org/10.1080/00212210.1989.10688630>
- Hankins A, Baldwin CC (2002) How many blennies is the Redlip Blenny? Research Training Program, Poster Session, Smithsonian Museum. Available from http://www.nmnh.si.edu/rtp/students/2002/virtualposterinfo/poster_2002_hankins.htm (accessed 8 May 2008)
- Katsanevakis S, Deriu I, D'Amico F, Nunes AL, Pelaez Sanchez S, Crocetta F, Arianoutsou M, Bazos I, Christopoulou A, Curto G, Delipetrou P, Kokkoris Y, Panov VE, Rabitsch W, Roques A, Scalera R, Shirley SM, Tricarico E, Vannini A, Zenetos A, Zervou S, Zikos A, Cardoso AC (2015) European alien species information network (EASIN): supporting European policies and scientific research. *Management of Biological Invasions* 6: 147–157, <https://doi.org/10.3391/mbi.2015.6.2.05>
- McEachran JD, Fechhelm JD (2005) Fishes of the Gulf of Mexico. Vol. 2. Scorpaeniformes to Tetraodontiformes. University of Texas Press, Austin, 1004 pp
- Nelson JS (1994) Fishes of the world. John Wiley & Sons, Inc. New York, 600 pp
- Nieder J, La Mesa G, Vacchi M (2000) Blenniidae along the Italian coasts of the Ligurian and Tyrrhenian Sea: community structure and new records of *Scartella cristata* for northern Italy. *Cybium* 24(4): 359–369
- Otero M, Cebrian E, Francour P, Galil B, Savini D (2013) Monitoring marine invasive species in Mediterranean marine protected areas (MPAs): a strategy and practical guide for managers. Malaga, Spain: IUCN, 136 pp
- Ozbek EO, Ozkaya M, Ozturk B, Golani D (2014) First record of the blenny *Parablennius thysanius* (Jordan & Seale, 1907) in the Mediterranean. *Journal of the Black Sea/Mediterranean Environment* 20(1): 53–59
- Pastor J, Francour P (2010) Occurrence and distribution range of *Parablennius pilicornis* (Actinopterygii: Perciformes: Blenniidae) along the French Mediterranean coast. *Acta Ichthyologica et Piscatoria* 40: 179–185, <https://doi.org/10.3750/AIP2010.40.2.11>
- Rangel CA, Mendes LF (2009) Review of blennioid fishes from Fernando de Noronha Archipelago, Brazil, with description of a new species of *Scartella* (Teleostei: Blenniidae). *Zootaxa* 2006(1): 51–61
- Relini G, Lanteri L (2010) Osteichthyes. *Biologia Marina Mediterranea* 17(1): 649–674
- Simard F, Laffoley D, Baxter JM (2016) Marine Protected Areas and Climate Change: Adaptation and Mitigation Synergies, Opportunities and Challenges. Gland, Switzerland: IUCN, 52 pp, <https://portals.iucn.org/library/sites/library/files/documents/2016-067.pdf>
- Springer VG (1962) A review of the blennioid fishes of the genus *Ophioblennius* Gill (Teleostei: Blenniidae). *Copeia* 2: 426–433
- Taskavak E, Bilecenglu M, Basusta N, Mater S (2000) Occurrence of *Pteragogus pelycus* Randall, 1981 (Teleostei: Labridae) and *Petroscirtes ancylodon* Rüppell, 1838 (Teleostei: Blenniidae) at the eastern Mediterranean coast of Turkey. *Acta Adriatica* 41: 53–58
- Tiralongo F (2015) Blennidi delle acque italiane – guida alla conoscenza e all'identificazione delle specie. Ireco, Roma, 142 pp
- Tiralongo F, Tibullo D, Brundo MV, Paladini De Mendoza F, Melchiorri C, Marcelli M (2016) Habitat preference of combtooth blennies (Actinopterygii: Perciformes: Blenniidae) in very shallow waters of the Ionian Sea, south-eastern Sicily, Italy. *Acta Ichthyologica et Piscatoria* 46: 65–75, <https://doi.org/10.3750/AIP2016.46.2.02>
- Williams JT, Craig MT (2014) *Ophioblennius atlanticus*. The IUCN Red List of Threatened Species 2014: e.T185129A1769289
- Wonham MJ, Carlton JT, Ruiz GM, Smith LD (2000) Fish and ships: relating dispersal frequency to success in biological invasions. *Marine Biology* 136: 1111–1121, <https://doi.org/10.1007/s0022700303>

Supplementary material

Video file 1. First detection of the redlip blenny in Italian waters.

This material is available as part of online article from:

http://www.reabic.net/journals/bir/2018/Supplements/BIR_2018_Azzurro_etal_Video_file.mp4