

# Ballast water, nekton, and Port Survey Protocols

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# Introductions of fish species attributed to ballast-water vector of species' dispersal reported from the HELCOM area

Two species only  
(representing two families):

1. Grey mullet – earlier reported to be collected from ballast water (Wonham et al., 2000)
2. Round goby – commonly regarded as BW species, but never reported from ballast water sampling studies...



Taxon (family, species)	Area of introduction / year(s) of first record	References
Mugilidae		
<i>Liza ramada</i> (Risso, 1827)	Szczecin Lagoon (Poland) / 2008	Panicz & Keszka, 2016
Gobiidae		
<i>Neogobius melanostomus</i> (Pallas, 1814)	Gulf of Gdańsk (Poland) / 1990 <i>Lake St. Clair, N America</i> / 1990	Skóra & Stolarski, 1993 <i>Crossman, 1991</i>
<i>Proterorhinus semilunaris</i> (Heckel, 1837)	[River Neva Estuary (Russia) / 2006] <i>Lake St. Clair, N America</i> / 1990	[Antsulevich, 2007] <i>Jude et al., 1992</i>

# Introductions of fish species attributed to ballast-water vector of species' dispersal reported from the OSPAR area

The Schledt Estuary (Belgium / the Netherlands) & the Gulf of Cadiz (Spain)

Taxon (family, species)	Area of introduction / year(s) of first record	References
Fundulidae		
<i>Fundulus heteroclitus</i> (L., 1766)	NE Atlantic (Spain and Portugal) / 1970s	Hernando, 1975; Morim et al., 2019
Scorpaenidae		
<i>Sebastes schlegelii</i> Hilgendorf, 1880	the Schledt Estuary (Belgium) / 2008	Kai & Soes, 2009
Carangidae		
<i>Chloroscombrus chrysurus</i> (L., 1766)	Gulf of Cadiz (Spain) / 2006	Acosta et al., 2009
<i>Selene dorsalis</i> (Gill, 1863)	Gulf of Cadiz (Spain) (BW introduction also in Malta) / 2007	Juárez et al. 2008 (Vella & Deidun, 2008)
Sciaenidae		
<i>Cynoscion regalis</i> (Bloch and Schneider, 1801)	the Western Scheldt (Belgium) / 2009 Gulf of Gulf of Cadiz (Spain) / 2011 Sado estuary (Portugal) / 2014 or before Galician waters (Spain) / 2016	Acosta et al., 2013; Béarez et al. 2016; Bañón et al., 2017; Morais et al., 2017
<i>Micropogonias undulatus</i> (L., 1766)	Belgian shelf and the Scheldt Estuary / 1998	Stevens et al., 2004
Chaenopsidae		
<i>Stathmonotus stahli</i> (Evermann & Marsh, 1899)	Irish Sea (mouth of the River Conwy, North Wales) / before 1932	Wheeler, 1958; Carlton et al., 1982

# Introductions of fish species attributed to ballast-water vector of species' dispersal reported from the OSPAR area (cont.)

Gobies and Flounder: proven ballast-water fish... (e.g., Wonham et al. 2000 & Gollasch et al., 2002)

Taxon (family, species)	Area of introduction / year(s) of first record	References
Gobiidae		
<i>Gobiosoma bosc</i> (Lacepède, 1800)	the Weser Estuary (Germany) / 2009 the North Sea Canal (the Netherlands) / 2017	Thiel et al., 2012 Gittenberger et al., 2017
<i>Neogobius melanostomus</i> (Pallas, 1814)	the Rhine Delta (the Netherlands) / 2004 the Western Scheldt (Belgium) / 2011	van Beek, 2006 Verreycken et al., 2011
<i>Proterorhinus semilunaris</i> (Heckel, 1837)	<i>European rivers and coastal areas [??] (France, The Netherlands, Belgium)</i>	<i>Morais et al., 2017</i>
<i>Tridentiger barbatus</i> (Günther, 1861)	the Eastern Scheldt (the Netherlands) / 2016	Gittenberger et al., 2017
Pleuronectidae		
<i>Platichthys flesus</i> (L., 1758)	N Atlantic (Iceland) / 1999	Thorarinsdottir et al., 2014
Achiridae		
<i>Trinectes maculatus</i> (Bloch & Schneider, 1801)	Wadden Sea (the Netherlands) / 1984	(Wolff, 2005); Zieritz et al., 2014; Froese & Pauly, 2006; Gittenberger et al., 2017



<https://www.fishbase.se/summary/Cynoscion-regalis.html>

**Squeteague or Grey weakfish** “could have been introduced into Europe via multiple and independent ballast water introduction events, and not through a point-source introduction event with subsequent dispersion as previously hypothesized.”

(Morais et al., 2017).

- 1) Scheldt estuary, 2009
- 2) Gulf of Cádiz, 2011
- 3) – 6) Sado estuary, Tagus estuary, Mira estuary, Praia da Vieira, 2013 or 2014–2016
- 7) & 8) Ría de Vigo, Ría do Barqueiro, 2016
- 9) – 11) Guadiana estuary, Praia do Barranco das Belharucas, Ria Formosa, 2016–2017

Source: Morais P., Cerveira I., Teodósio M. A., 2017. An Update on the Invasion of Weakfish *Cynoscion regalis* (Bloch & Schneider, 1801) (Actinopterygii: Sciaenidae) into Europe. Diversity 9 (47)



## Fish and ballast water

In some of the ballast water sampling studies, conducted in the past, living [...] fish were found.

(TG BALLAST 9-2018, 3-4 & Gollasch et al. 2020)

”Gill nets and casting nets may also be effective in the collection of fishes within the confines of the port.”

Awad, A., Haag, F., Anil, A.C., Abdulla, A. 2014. GEF-UNDP-IMO GloBallast Partnerships Programme, IOI, CSIR-NIO and IUCN. Guidance on Port Biological Baseline Surveys. GEF-UNDP-IMO GloBallast Partnerships, London, UK. GloBallast Monograph No. 22

Examples from some port surveys has shown that it is possible, indeed.

## Polish proposal: JTG-Ballast 20/03/02(L)

- i. Page 34 JHP [section: Mobile epifauna and fish]: “[...] However, the range of methods that can be used to sample epifauna in the port area is very limited and **in some places** ~~for example it is in most cases it is~~ not possible to use trawls and gillnets. **Standard multi-mesh gillnets used in monitoring of fish fauna should be used in the harbour areas where this does not interfere with shipping traffic (e.g. abandoned basins with quays not in use, other peripheral harbour areas) or outside harbours as close as possible to their entrances.**”
- ii. Page 50 JHP [Sample data sheet (Field data sheet 3)]: add column “Nekton” in the table.
- iii. Other relevant fragments of JHP to be amended accordingly.



# Conclusions

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1

A number of new fish species occurrences in European waters (including HELCOM and especially OSPAR area) have been connected to shipping and ballast water as a vector of dispersal.

2

A broad spectrum of living fish were found in some of the ballast water sampling studies.

3

Fish assemblages could be better addressed in JHP if sampling also with gear designed especially for fish sampling, and other than relatively small gear like crab traps, is not excluded from the Port Survey Protocol.