# Invasive species in the Black Sea and surrounding inland waters

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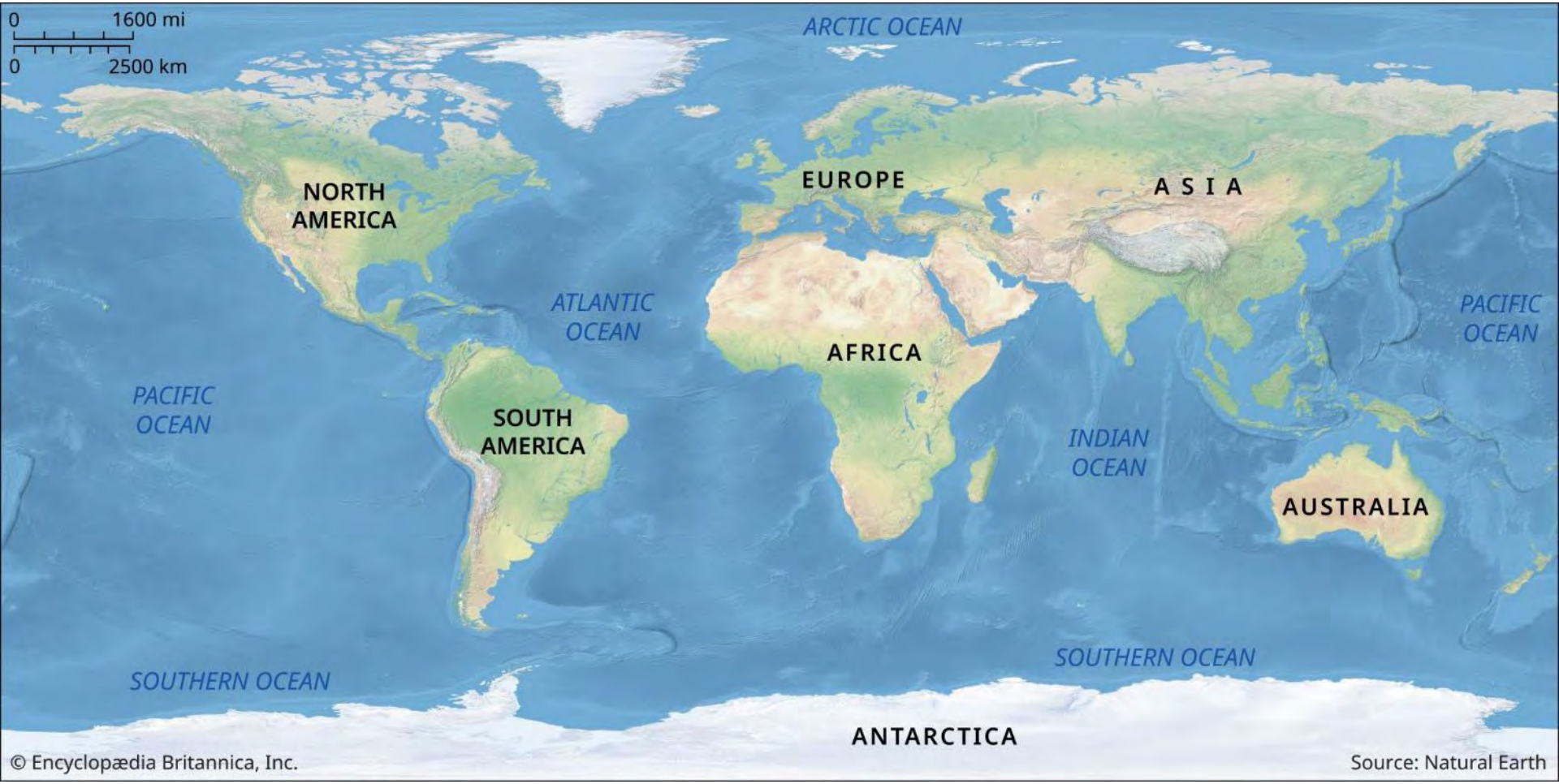
## How do invasive alien species spread into the Black Sea?

- Natural
- Maritime
- Aquaculture

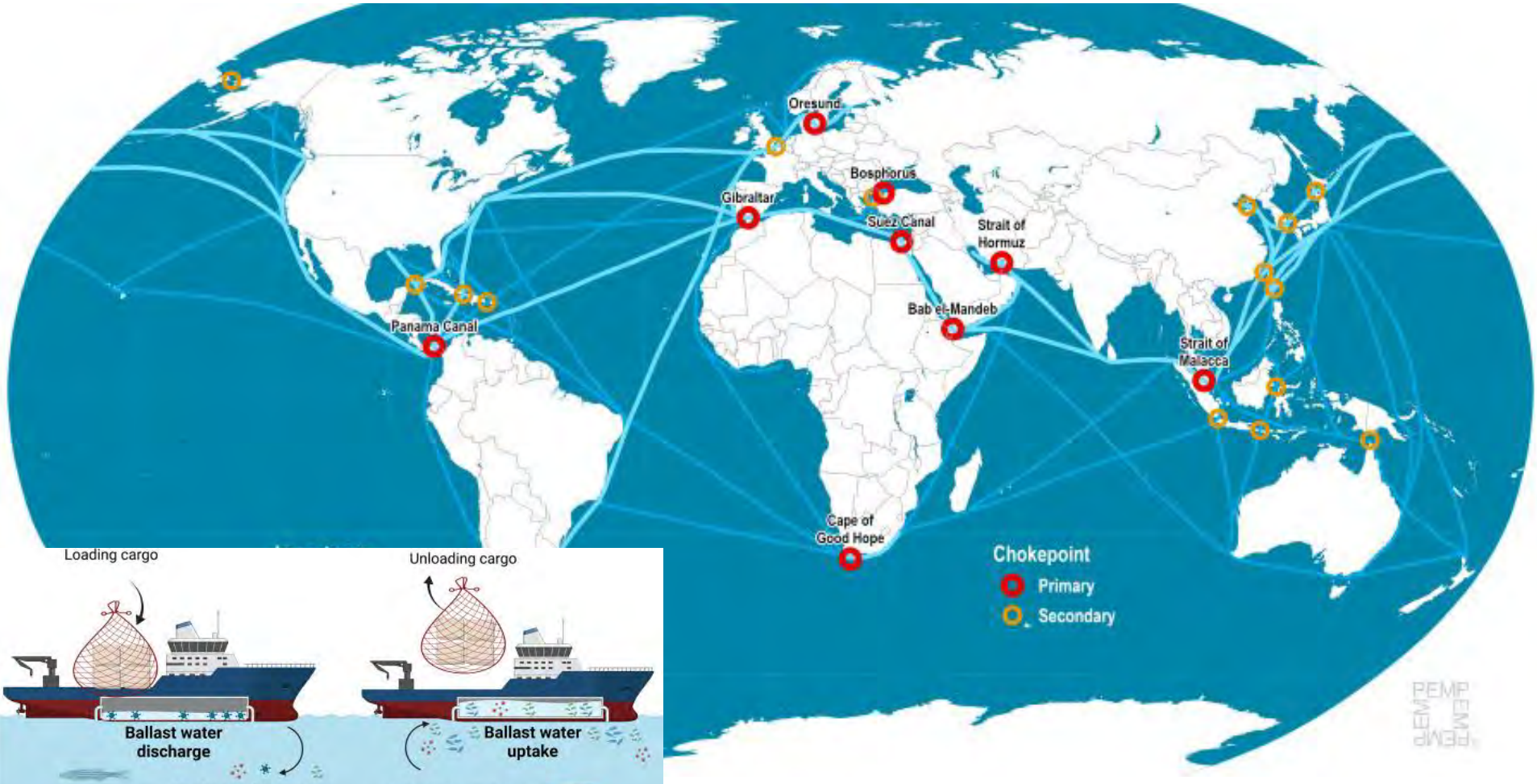
# Natural ways

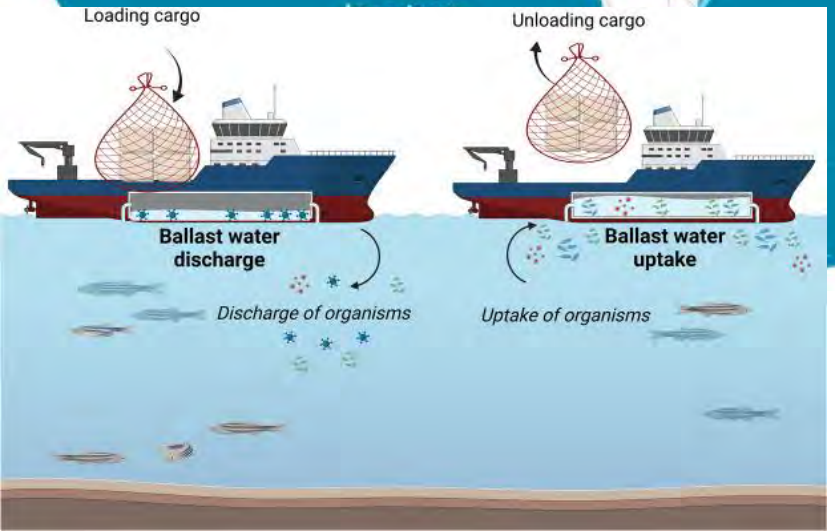


Long way → **Straits of Gibraltar**

Short way → Suez Canal

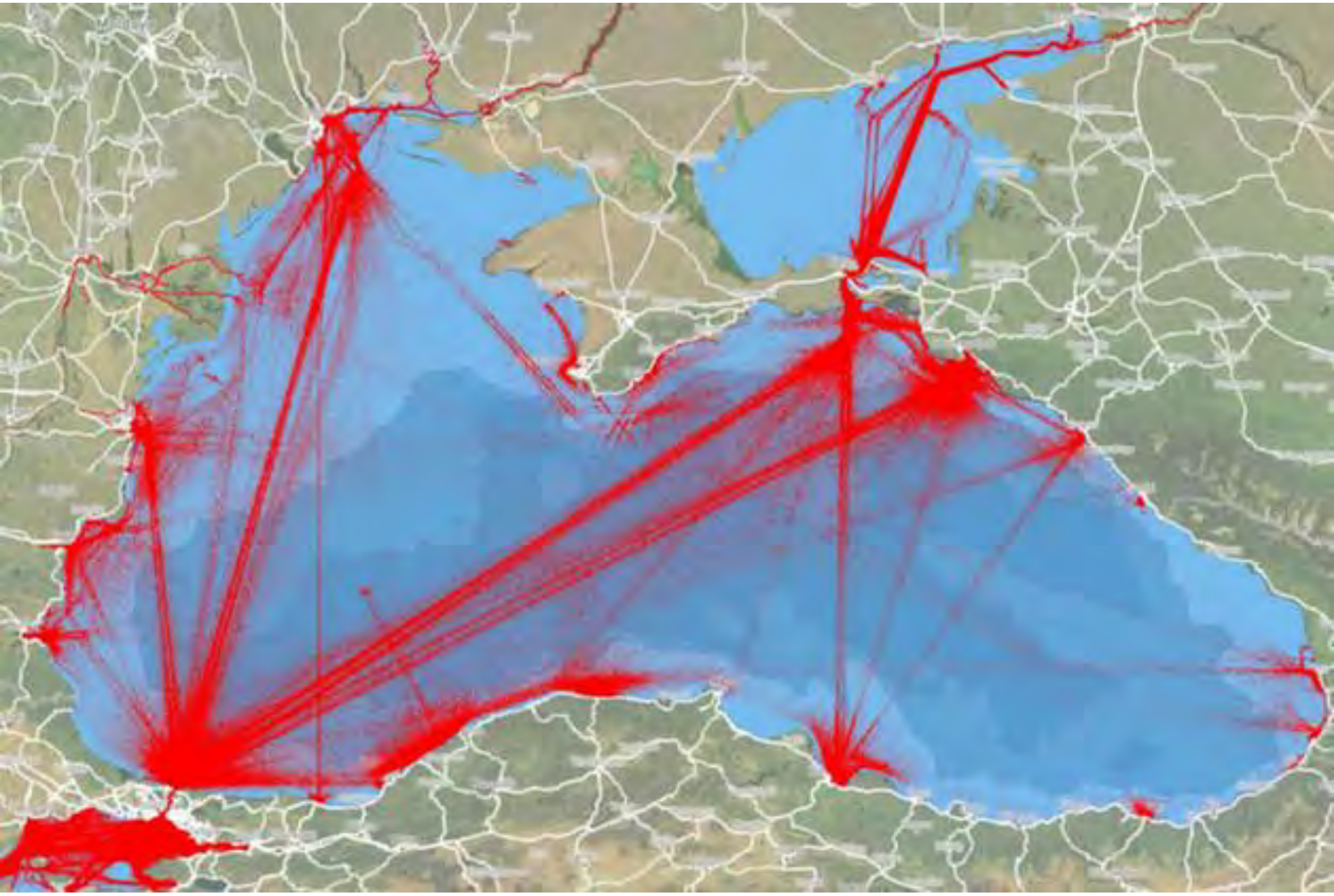
# Maritime transportation



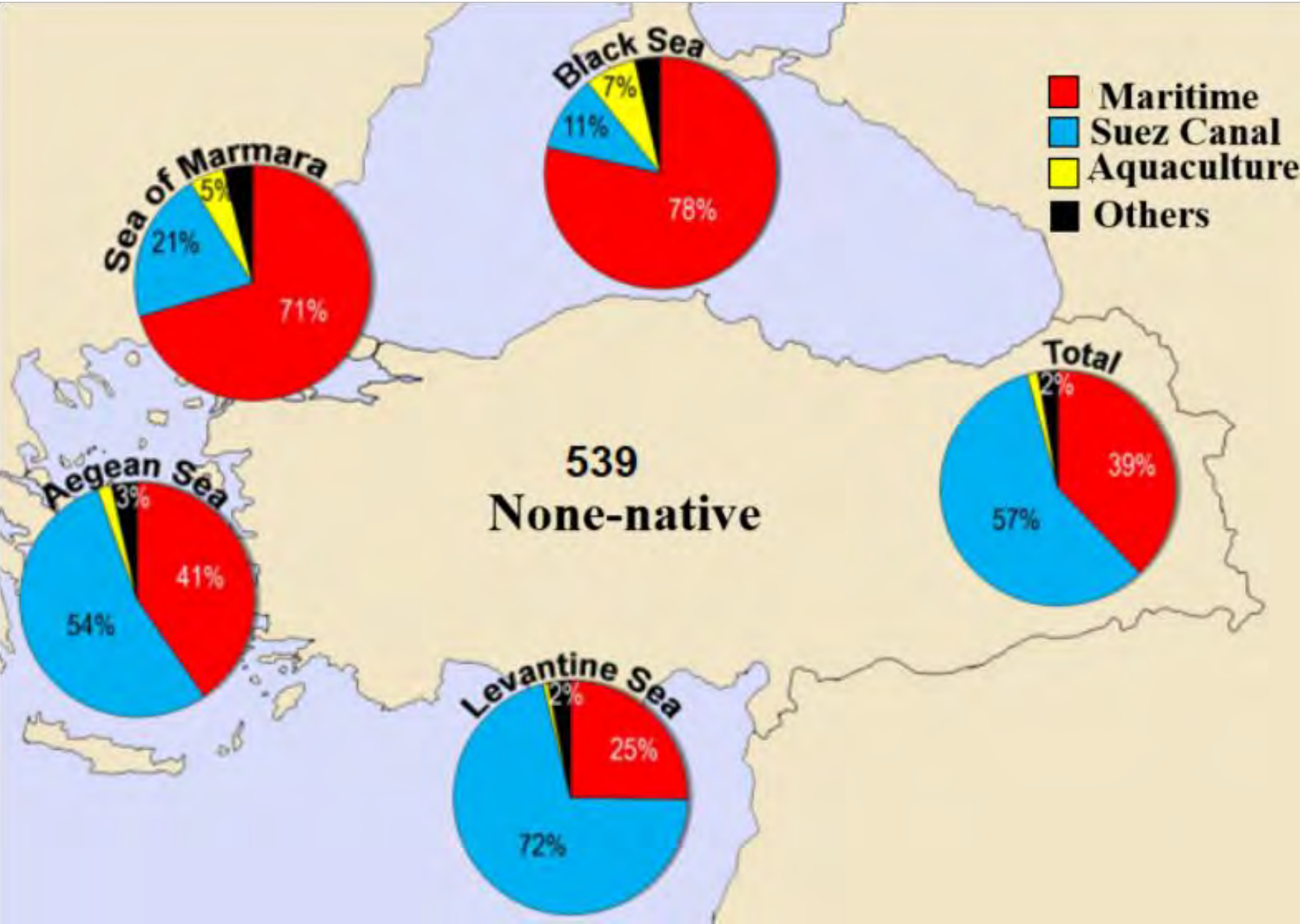




**Ballast water and Biofauling**

# Maritime activity in the Black Sea

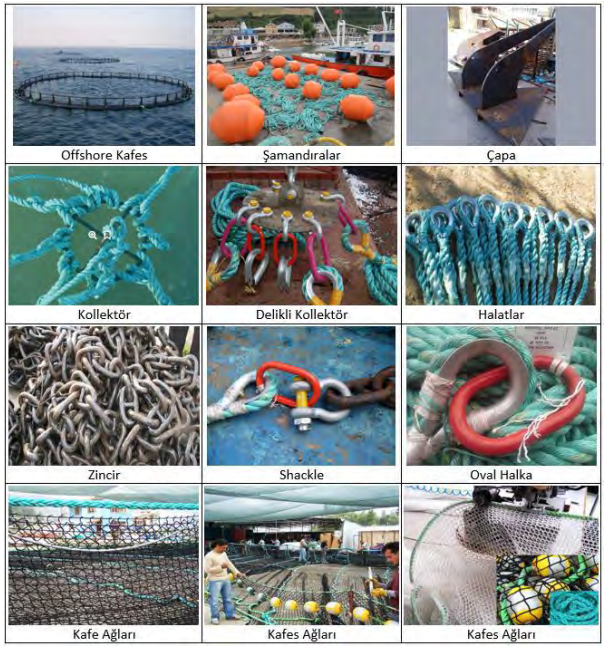


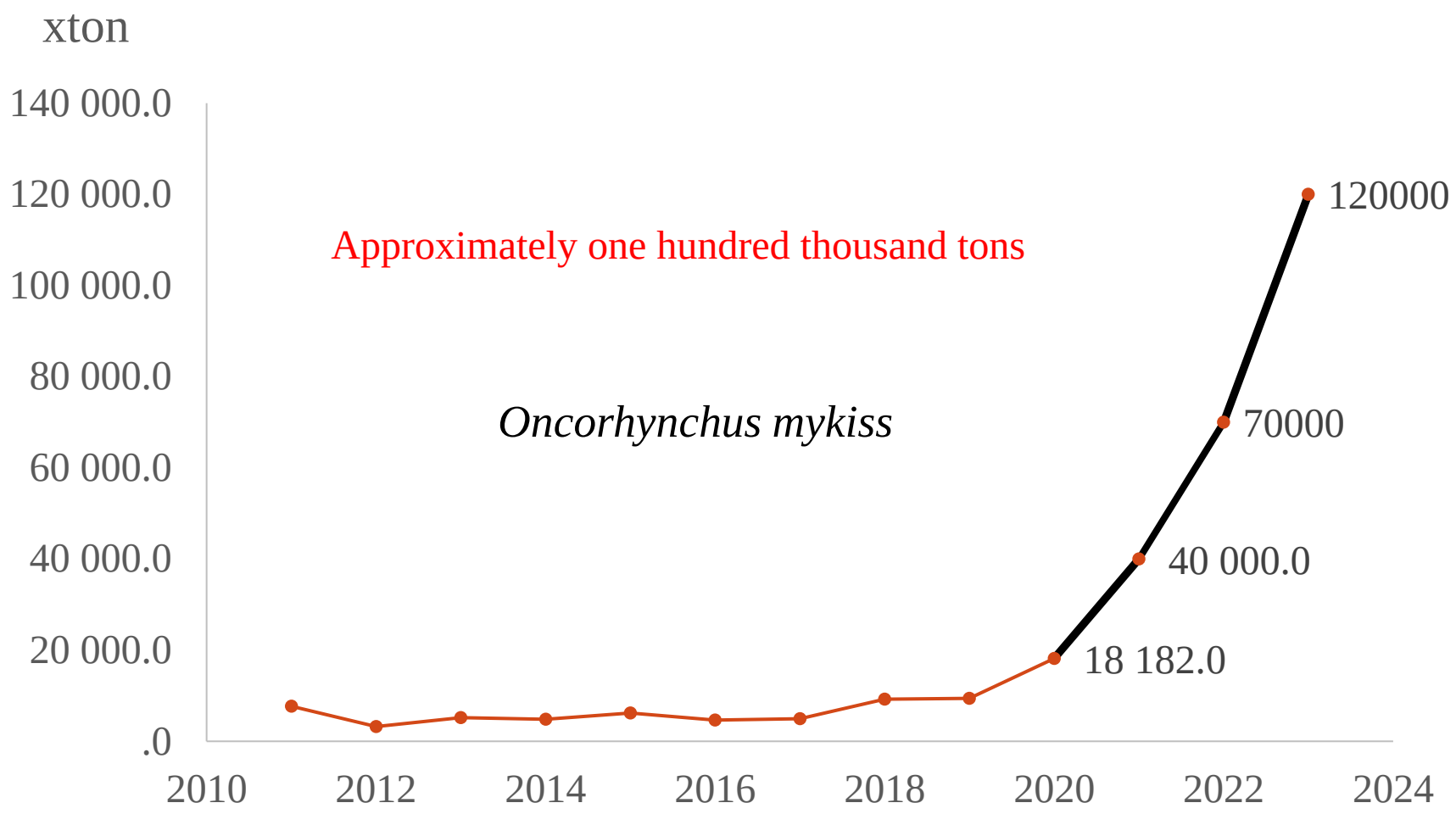
There are approximately 539 marine alien species  Turkey's seas.
105 species are invasive..



Biofauling

# AQUACULTURE






Accidentally, tons of salmon introduced the Black Sea and inland ecosystem every year

# *Oncorhynchus mykiss*

It is a Pacific-origin species that is used in all our waters for aquaculture

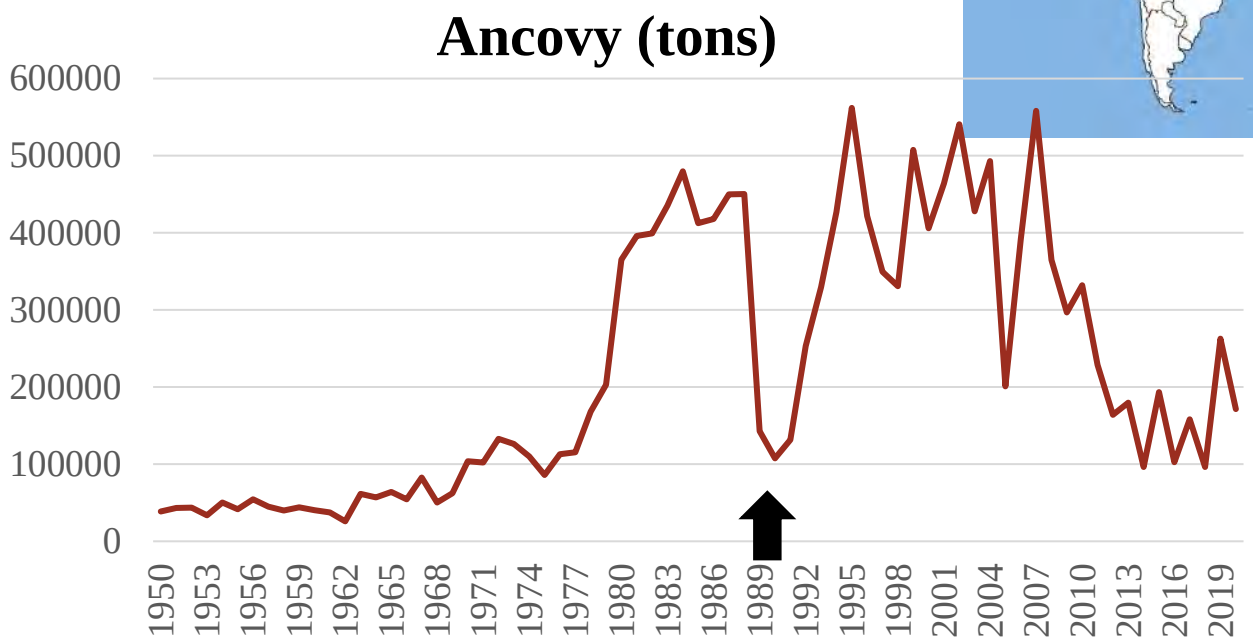
Therefore, it is somehow spreading into natural habitats

Being a carnivorous species, it is known to harm biodiversity and the ecosystem

There is no information available indicating that it reproduces in the natural environment

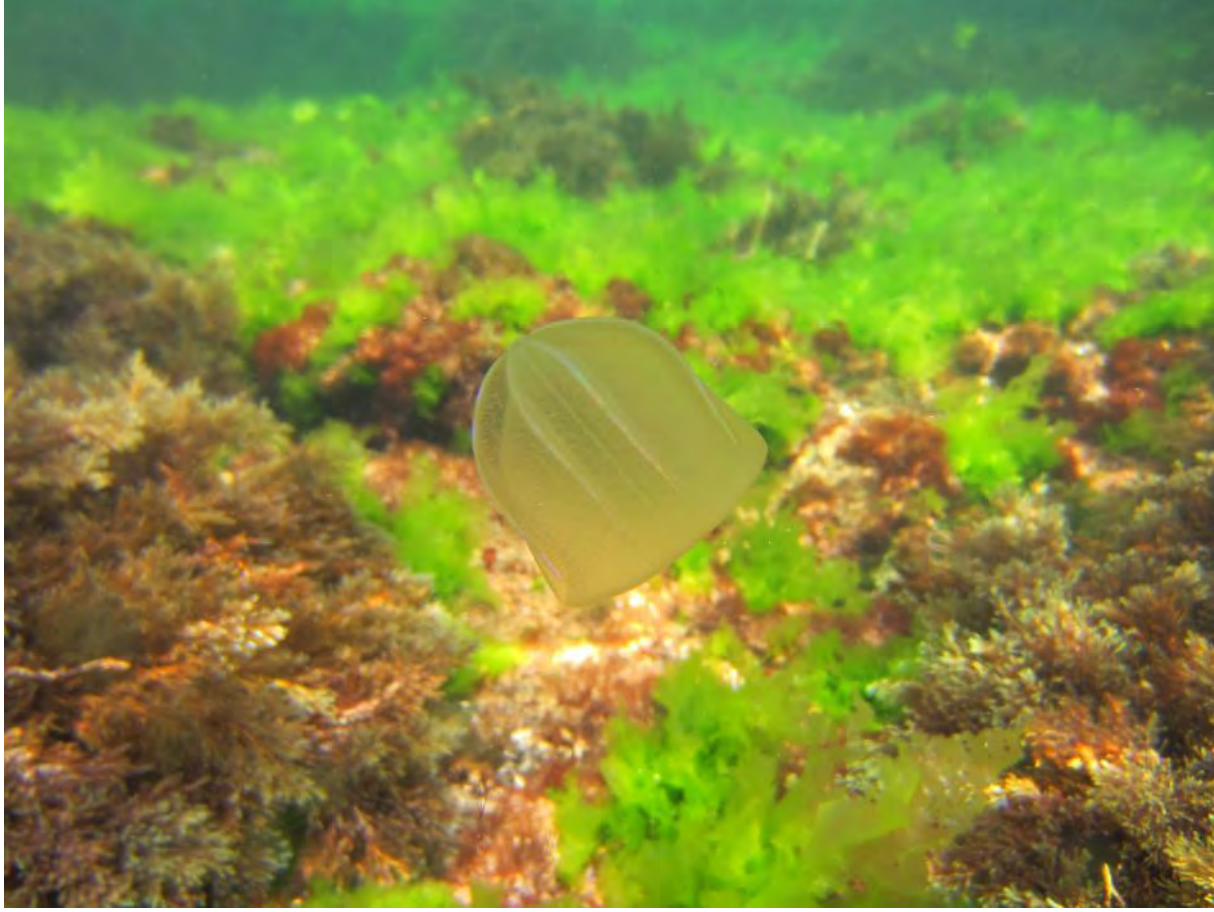
# Major invasive species in the Black Sea

# *Mnemiopsis leidyi*




The invasive jellyfish species *Mnemiopsis leidyi*, originating from North America, was first seen in the Black Sea ecosystem in 1982. *M. leidyi* consumes the eggs and larvae and food of pelagic fish such as anchovy and horse mackerel.

## *Borea ovata*



It is an originating from the Atlantic and entered the Black Sea ecosystem through maritime activities. This species, which is a predator of the invasive *Mnemiopsis leidyi* species that proliferated excessively in the 1990s, has proliferated in the Black Sea ecosystem and caused the invasive *M. leidyi* species to decline. Since it consumes the *M. leidyi* species as food, it has caused the planktonic community in the Black Sea to recover after the 1990s. The result of this new invasion has had a positive effect on the recovery of the Black Sea ecosystem.

# *Rapana venosa*

Pacific origin species.

It entered the Black Sea in the **1940s** via ballast water.

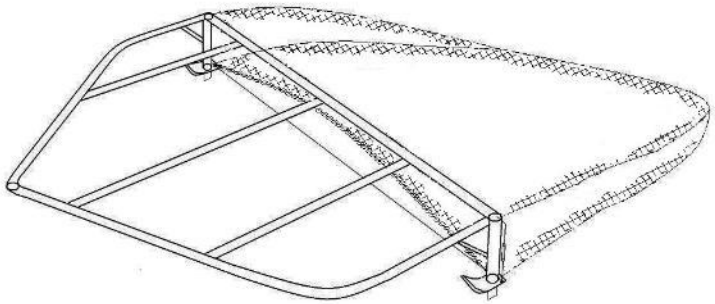
This carnivorous species, which primarily feeds on Mediterranean mussels (*Mytilus galloprovincialis*), has depleted all mussel stocks in the Black Sea.

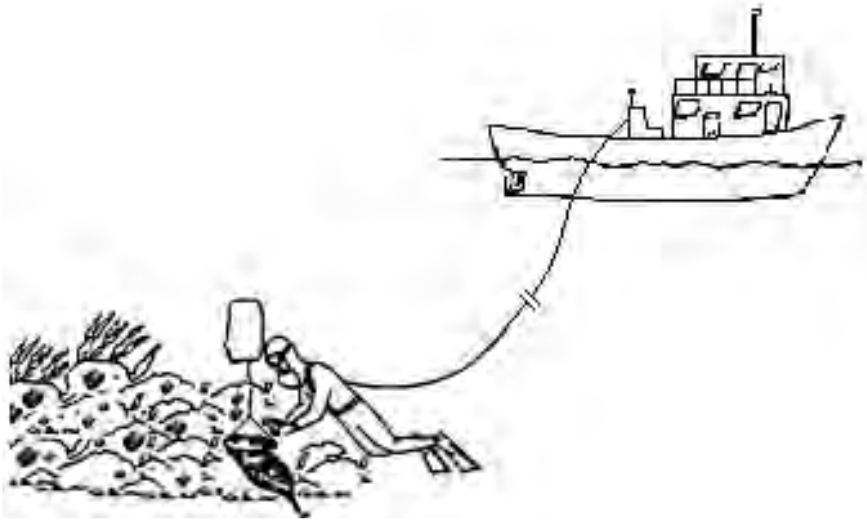
It causes serious habitat loss and disrupts the health of the ecosystem.

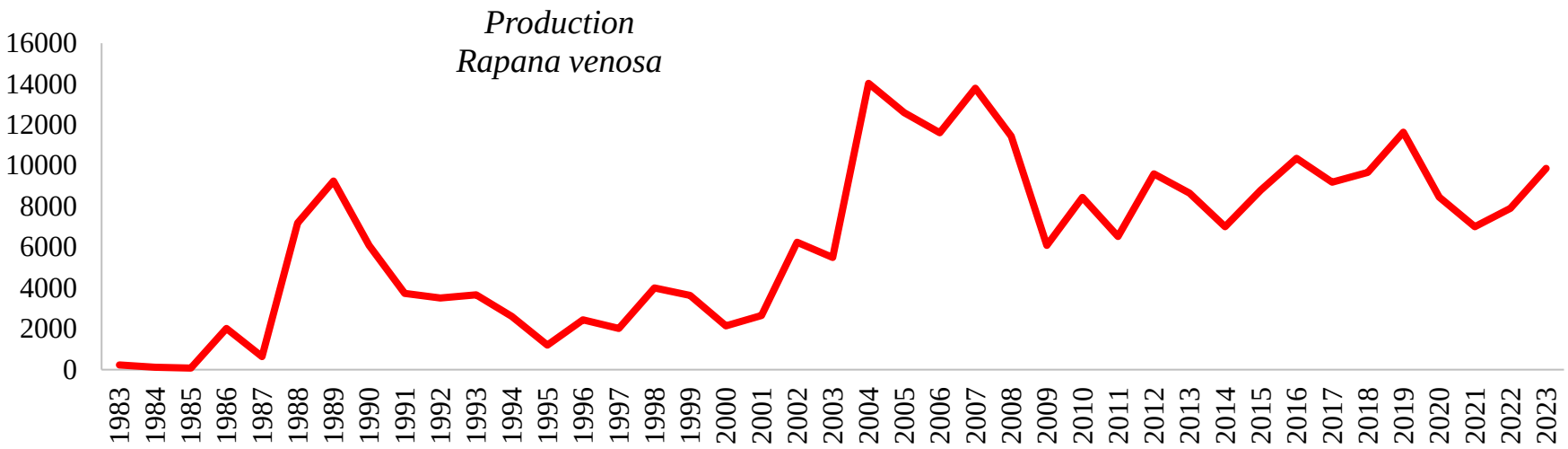
Dead

*Mytilus galloprovincialis*

# Algarnas –SCUBA -Hookah






Production
Rapana venosa
16000
14000
12000
10000
8000
6000
4000
2000
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1983
1984
1985
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1988
1989
1990
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Export
Million Dolars
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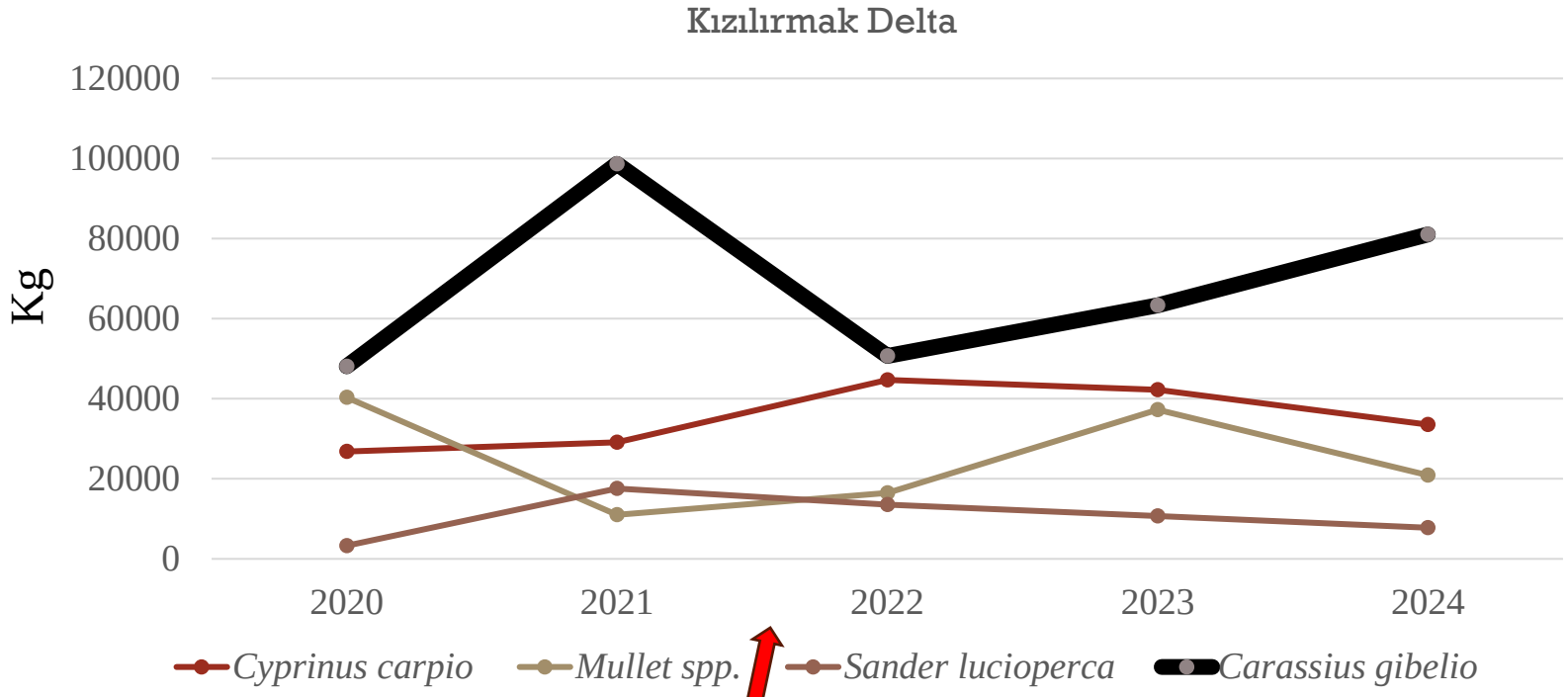
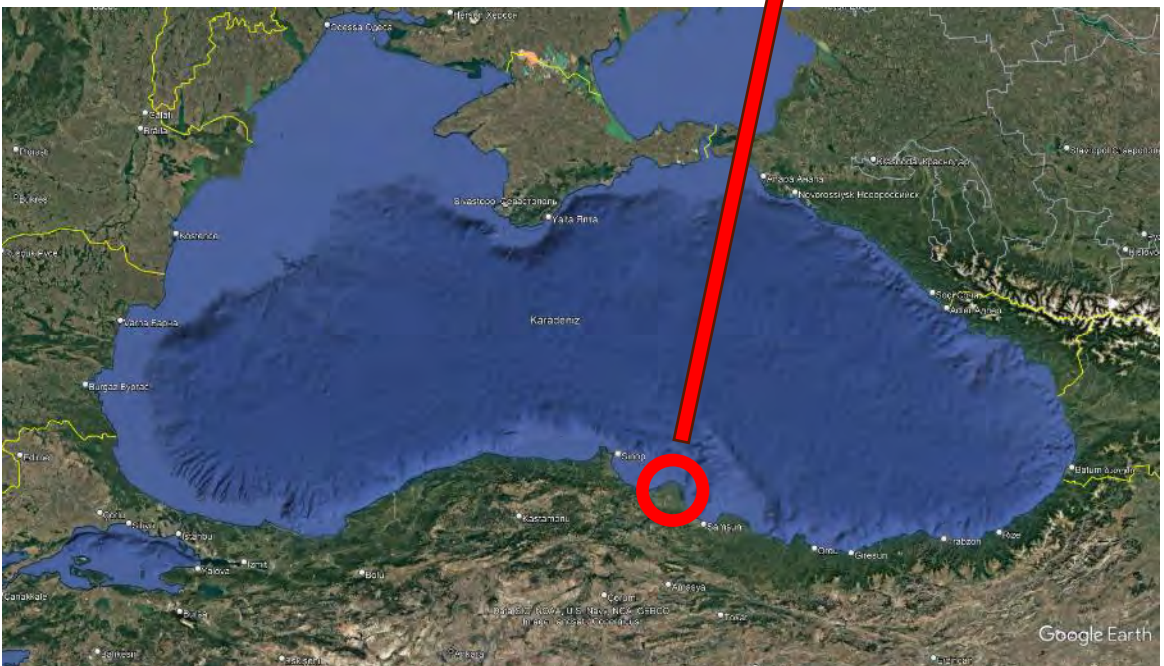
## *Carassius gibelio*

Main invasive species for inland water

It is a species of Pacific origin.
It was introduced into our waters by humans.
Since it primarily feeds on the eggs of other fish, it endangers the survival of fish species and causes a decline in biodiversity.




*Carassius gibelio*

The average of the last 5 years is 70 tons/year

***Gambusia holbrooki***

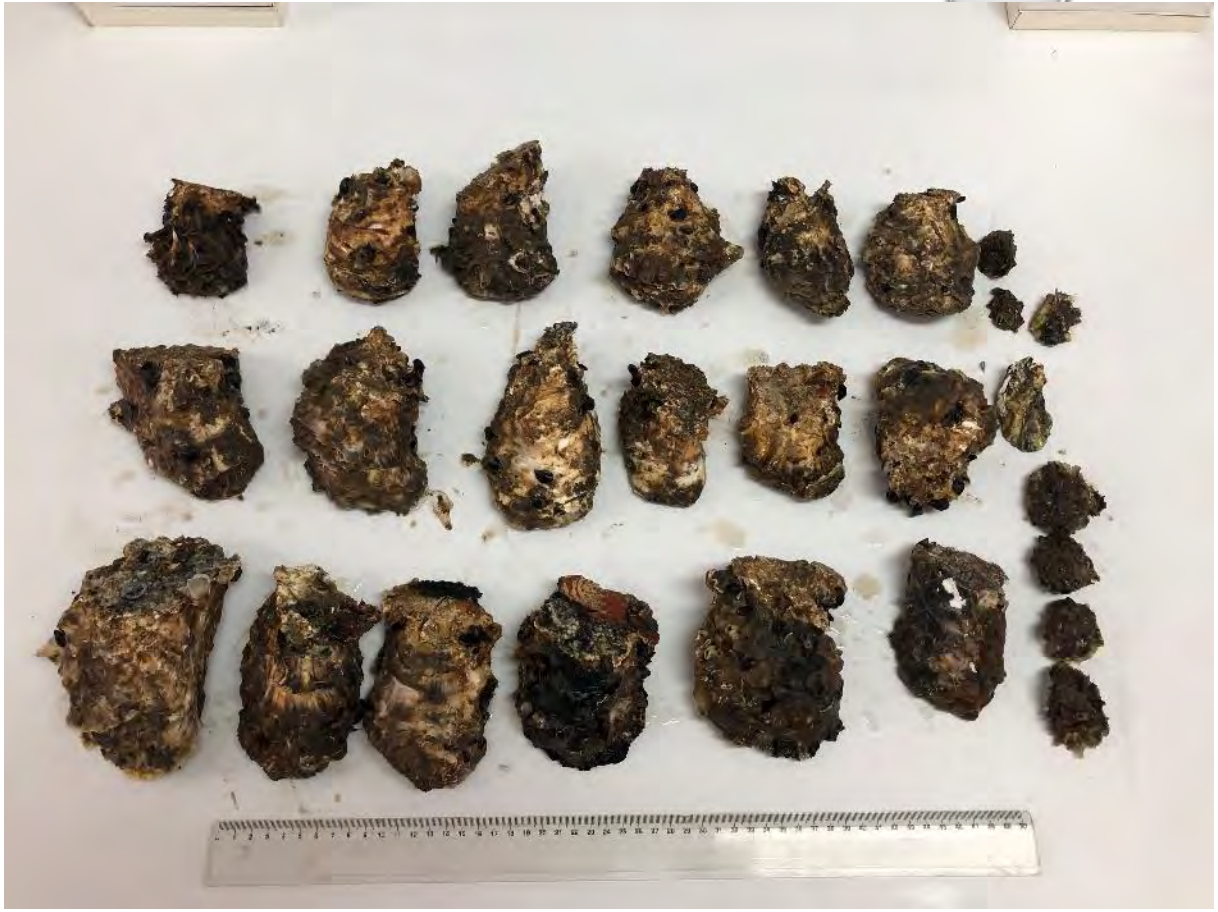
It is a fish species native to Eastern and Northern America, and it has been introduced to many water bodies around the world for **biological control** of mosquitoes. In addition to mosquito eggs, it also feeds on the eggs and larvae of many native fish species, causing serious harm to biodiversity and the ecosystem.

## *Astacus leptodactylus*

Crayfish

Originating from Asia, this species has been **introduced by humans** into many freshwater systems. Due to its high commercial value, it has been transported through trade, thereby transmitting certain **diseases to healthy ecosystems** and causing harm to native species.

***Crassostrea (Magallana) gigas***



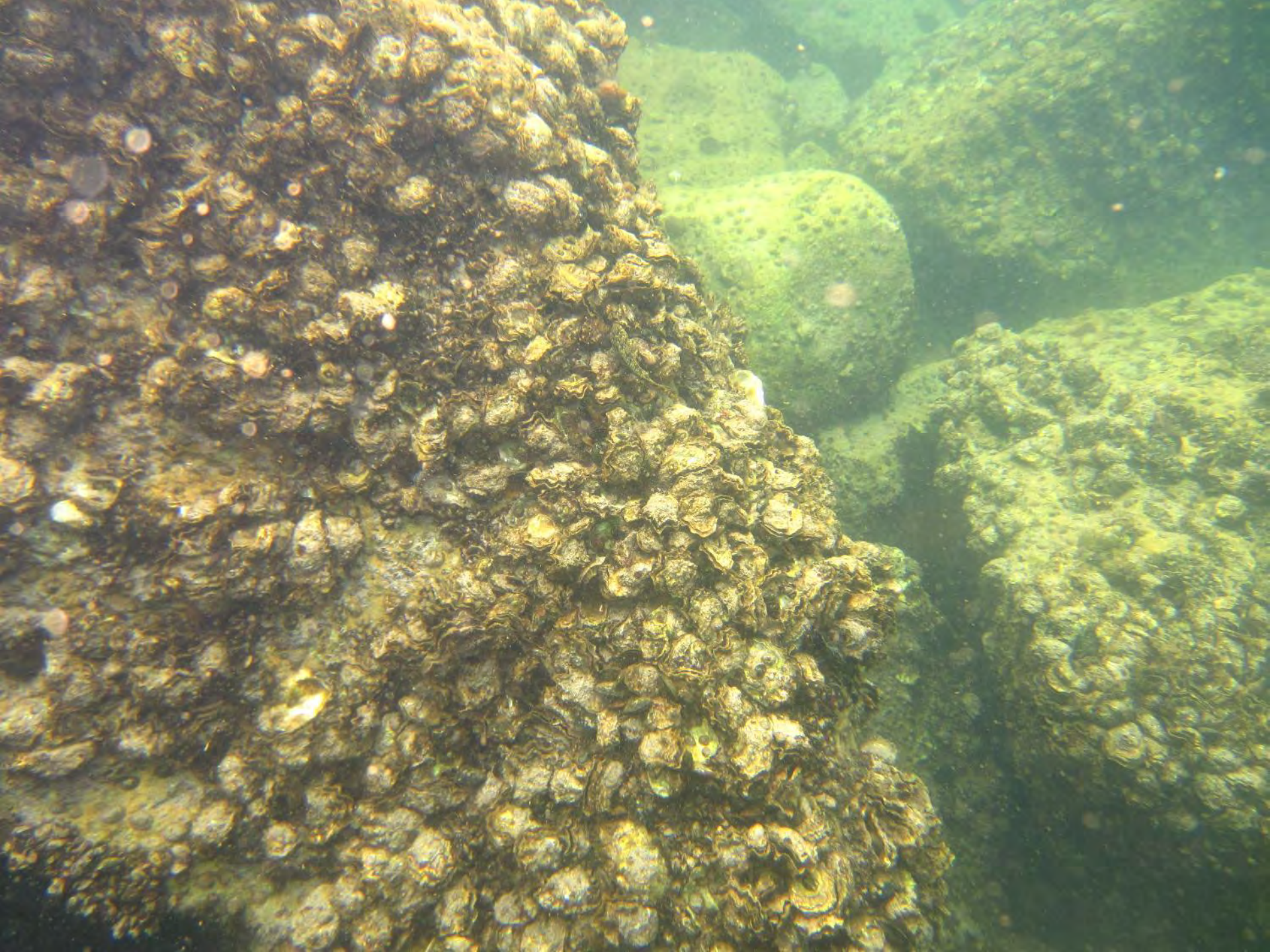
This species originates from the Pacific Ocean. Over the **past few years,** it has entered the Black Sea ecosystem.

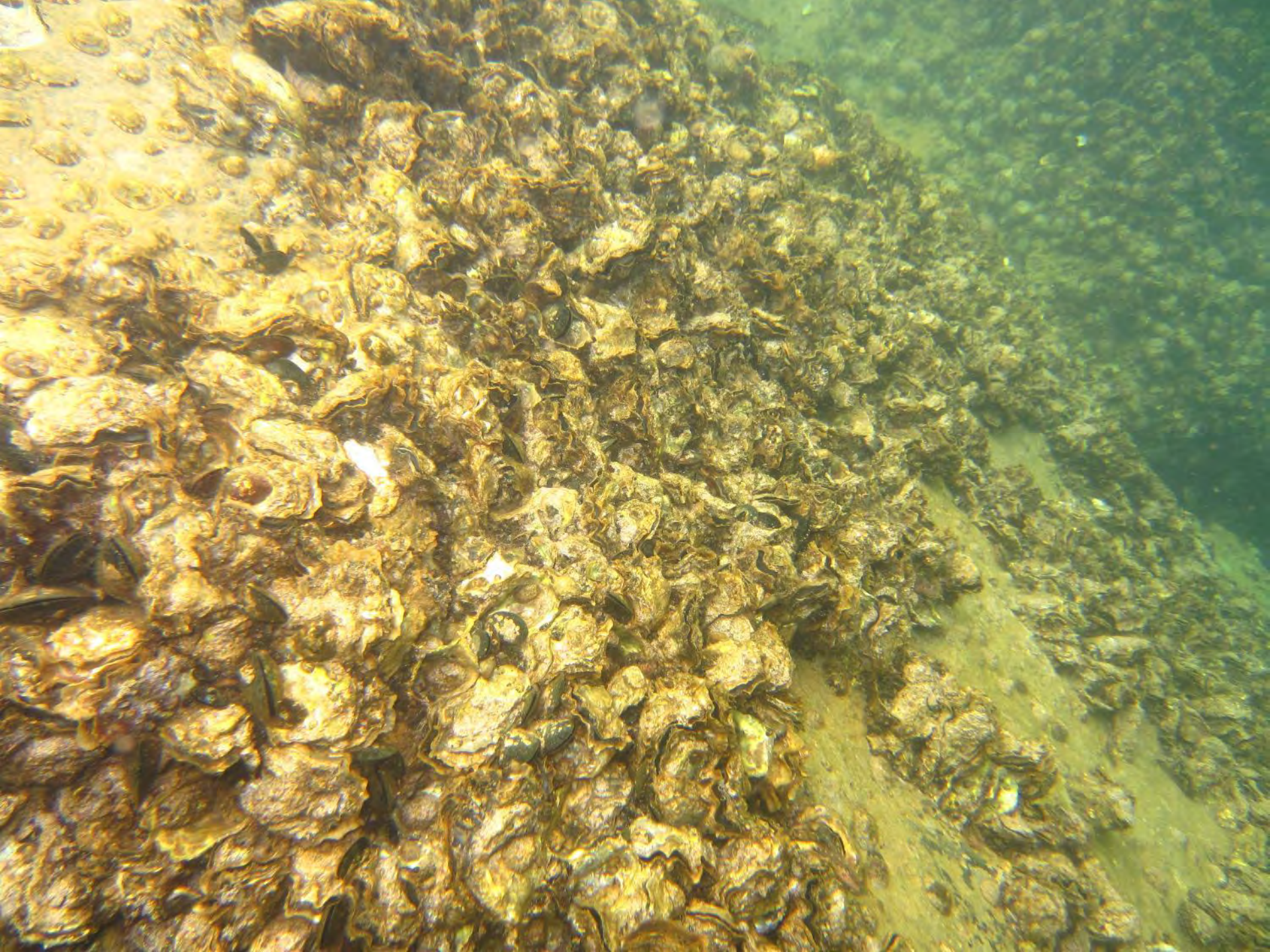
It is occupying the niches previously emptied by the Mediterranean mussel

**June 2018**

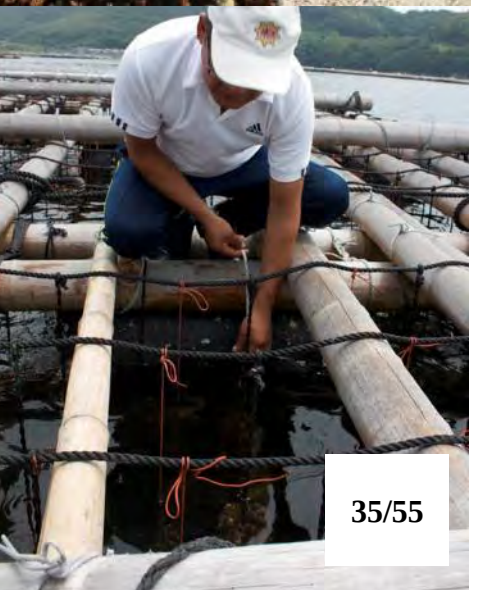

NOKI
HATAS
MADE IN TURKEY
DMO TÜRKIYE CUMHURIYETI HÜKÜMETI

DMO TURKIYE CUMHURIYETI HUKUMETI





If an **appropriate method** is developed for the Black Sea, it could be cultivated



In a thesis study conducted using the Aquatic Species Invasiveness Screening Kit (AS-ISK), the invasiveness risk score (BRA – Basic Risk Assessment) of *C. gigas* for the Black Sea was calculated as high risk (36)

**Özcan, D (2024). Evaluation of The Invasiveness Potential of Five Non -Native Aquatic Species Subjected To Aquaculture in Turkey, Master's Thesis, Hacettepe University, Institute of Science and Technology, Ankara.**

*Scapharca (=Anadara) inaequivalvis*

***Anadara kagoshimensis***

Pacific origin.

It is believed to have been **introduced to the Black Sea in the 1980s** through maritime activities.

Its invasive impact on the Black Sea ecosystem is currently unknown

## *Balanus improvisus*

Originating from the Atlantic and Pacific Oceans as well as the Mediterranean Sea, **has spread to marine environments worldwide through maritime activities**. Present in the Black Sea since 1844, its detrimental impacts on the maritime industry are well known

# *Liza haematocheila*

## *Mugil soiuy*

It is of Pacific origin and **was cultivated in former USSR countries for aquaculture.**

After the collapse of the regime, it was released into the Black Sea environment and adapted to it. Its invasive **impact is unknown**

## *Parablennius incognitus*

It is a species native to the Eastern Atlantic and the Mediterranean. It is a small species, 8–10 cm in length, that lives in coastal rocky areas. Its invasive impact is unknown.

*Chromis chromis*

It has settled in all rocky habitats in the Black Sea

# *Lithognatus mormyrus*

From time to time, it becomes the dominant species in coastal fisheries

## *Gobius cruentatus*

It has settled in rocky habitats with rich biodiversity.
It is a carnivorous and highly aggressive species.

**Aydın, M.** and Bodur, B. **2018**. First record of the red-mouthed goby, *Gobius cruentatus* (Gobiidae) from the Middle Black Sea coast. Turkish Journal of Maritime and Marine Sciences. 4(1):63-67.

# *Callinectes sapidus*

There have been many in the Black Sea in recent years

**Aydın, M**., Karadurmuş, U., Verep, B. Gözler, A.M. **(2024).** Expansion of the Distribution Range and Size of the Invasive Blue Crab on the Turkish Coast of the Black Sea. *J. Anatolian Env. and Anim. Sciences*, ***9***(1), 127-131

**Aydın, M. 2017**. First record of blue crab *Callinectes sapidus* (Rathbun 1896) from the Middle Black Sea coast. Turkish Journal of Maritime and Marine Sciences.3(2):121-124.

# *Zeus faber*

**Aydın, M**., Karadurmuş, U. (**2023**). First record of the benthopelagic fish John dory *Zeus faber* (Linnaeus,1758) in the Black Sea coast of Türkiye. Aquatic Research, 6(2), 159-165

# *Sebastes schlegelii*

*Sebastes schlegelii* is a typical bottom dwelling boreal species, whose native distribution range includes Japan, Korean peninsula and China.

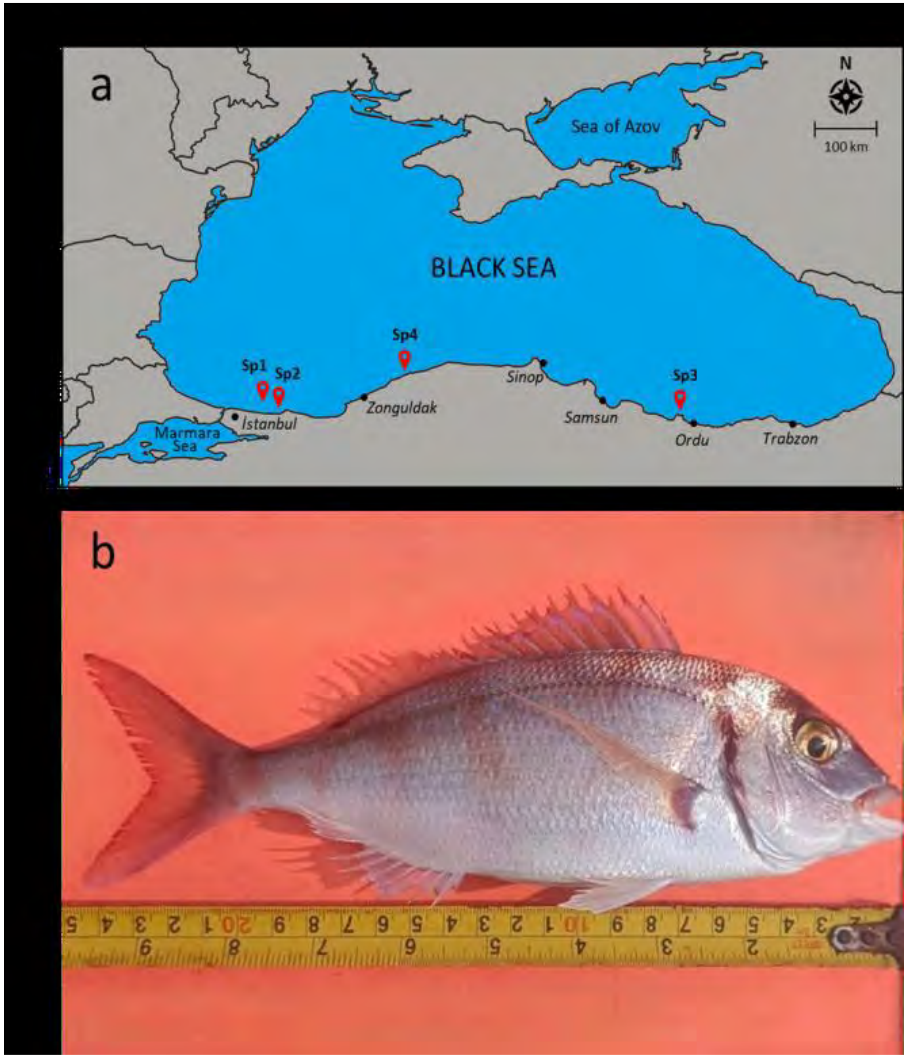
Its preference for rocky reefs, silt, and sand habitats

Max 65 cm, 3.1 kg 20 years

Sexual maturity at 4 years

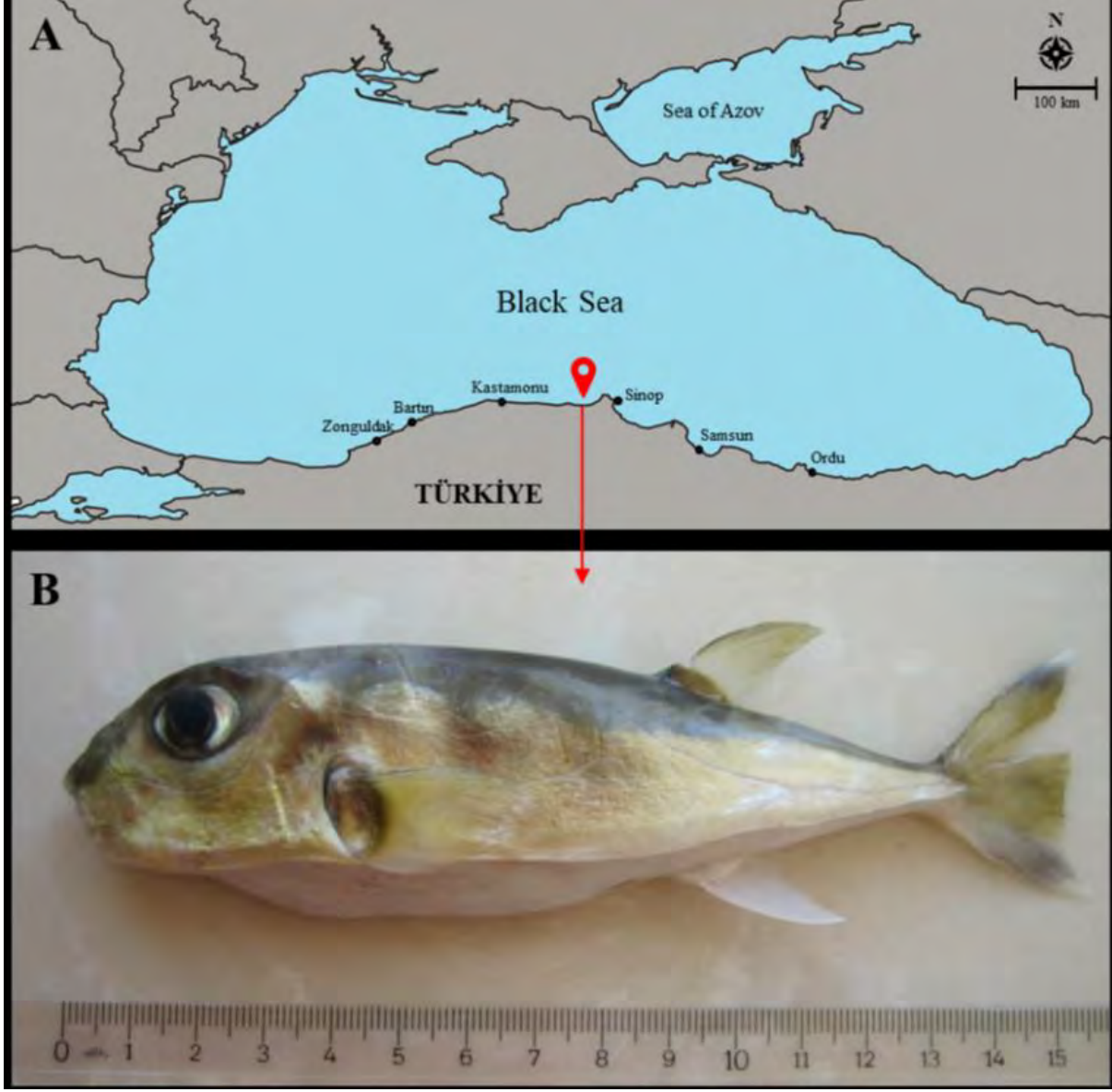
Bilecenoğlu, M., Yokeş, M.B., **Aydın, M.** (**2023**). First record of *Sebastes schlegelii* Hilgendorf, 1880 along the Turkish Black Sea coast – new addition to the alien species inventory, *Turkish Journal of Maritime and Marine Sciences* 9 (2): 119-128

# *Pagellus erythrinus*




**Aydın, M.** & Karadurmuş, U. (**2025**). First Evidence-Based Record of Common Pandora *Pagellus erythrinus* on the Turkish Coast of the Black Sea. J. Anatol. Env. Anim. Sci., 10(2), 139-142.

***Lagocephalus spadiceus***




**Aydin, M.,** Karadurmus, U., & Guner, A. (**2025**). First record of half-smooth golden pufferfish *Lagocephalus spadiceus* (Richardson, 1845) in the Black Sea. *Aquatic Sciences and Engineering*, *40(1)*, 33-36

# *Lophius budegassa*

**Aydın, M**., Karadurmuş, U. **(2024).** Geographic expansion of the blackbellied angler (*Lophius budegassa*) towards the east along the Turkish coast of the Black Sea. *Aquatic Research*, 7(4), 227-231.

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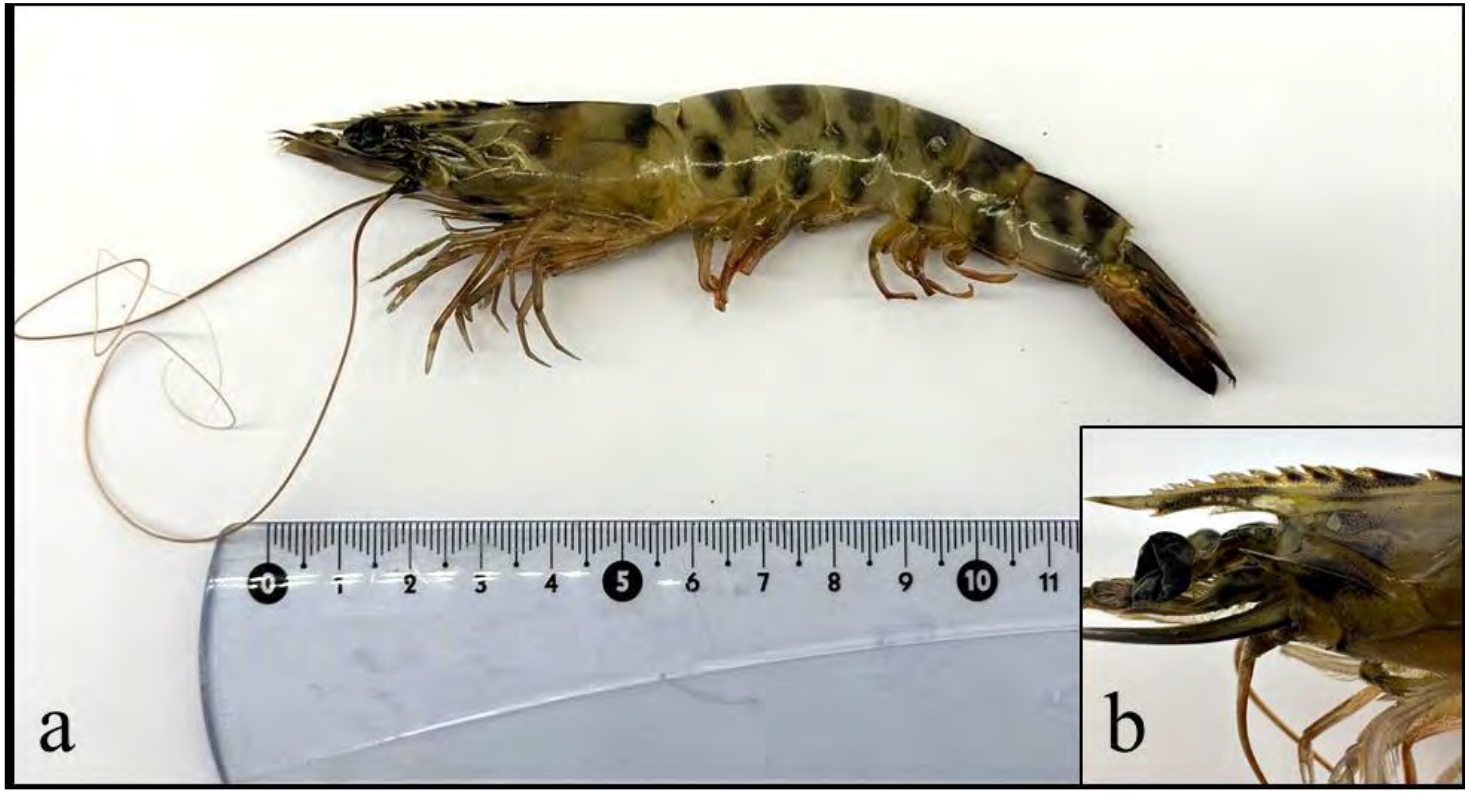
Karadurmuş, U., Güner, A. & **Aydın, M.** (**2024**). First record and geographic expansion of the *Sebastes schlegelii* (Hilgendorf, 1880) in the Sea of Marmara (Türkiye). J. Anatolian Env. and Anim. Sciences, 9(1), 82-86.

# *Penaeus kerathurus*




**Aydın, M.,** Sözer, A., & Karadurmuş, U. **(2025).** Evidence-Based Confirmation of Alien Species Caramote Prawn *Penaeus kerathurus* on the Turkish Coast of the Black Sea. *J. Anatol. Env. Anim. Sci.*, ***10***(3), 247-250.

# Legal regulations regarding invasive species enacted by the Ministry of Agriculture and Forestry (MoAF)

- Live transport of species within or across national borders without permission is prohibited, and their release into marine or freshwater bodies, including for restocking purposes, is not allowed
- All activities such as sale, transport, harvesting, collection, and usage in facilities are subject to official authorization
- Unauthorized aquaculture is forbidden, and all necessary measures must be taken to prevent the escape of cultured species into the wild
- The harvesting of established invasive species may be specially regulated.
  Live baitfish cannot be kept or transferred to other inland waters
- Captured species cannot be transported alive or released into other ecosystems
- The unauthorized and uncontrolled live transfer of ecologically harmful fish, as determined by the Ministry, is prohibited, and sightings must be reported immediately to the Ministry or relevant fishing organizations

# Teşekkürler

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