

TUBENOSE GOBY

Overview

The tubenose goby (*Proterorhinus semilunaris*)[†] is a bottom-dwelling fish from the rivers and estuaries of Eurasia, including tributaries of the Black and Caspian Seas. Both the tubenose and the closely-related round gobies were first detected in the St. Clair River of the Great Lakes region in 1990. While the population growth of the round goby quickly escalated, the tubenose goby, smaller and less aggressive, has experienced a limited range expansion. As a result, the tubenose has caused minimal impacts in the Great Lakes in comparison with the round goby.

The tubenose goby prefers shallow-water habitats with abundant vegetation within the range of slightly brackish to fresh water. Male tubenose gobies guard their nesting sites defending the eggs and young. Females spawn multiple times during the warmer months of the year and as a result are rather prolific. The species can live up to five years; however, the males die after spawning. Tubenose gobies generally feed on aquatic insects and other benthic invertebrates, but also have been known to consume the larvae and fry of other fish. Their diet overlaps with that of rainbow darters and northern madtoms, and, thus, the tubenose may compete with these species for resources. Unlike round gobies, tubenose gobies do not feed on zebra mussels.

Photo: David Jude, Center for Great Lake and Aquatic Sciences



Identification

The tubenose goby has thick lips and protruding eyes. It is generally smaller than the round goby, and, unlike its relative, has long, tube-shaped anterior nostrils from which it derives its name. Due to their lack of a swim bladder, the tubenose gobies have difficulty regulating their buoyancy and are better adapted to a bottom-dwelling lifestyle. They have large pectoral fins, and a single, fused pelvic fin, shaped like a suction cup. This feature allows them to cling to hard substrates in stream- and riverbeds such as rocks, woody debris, and/or shells.

Size: Rarely exceeds 4.3 inches in length

Native range: Eurasia, including rivers and estuaries of Black and Caspian seas and Sea of Azov, and rivers of the northern Aegean and Aral Seas

[†] **Taxonomy:** While all tubenose gobies originated from a single, brackish water species (*Proterorhinus marmoratus*), several distinctions have been made, resulting in the creation of separate classifications for freshwater species. While these names are often used interchangeably, *Proterorhinus semilunaris* is the only species that has been introduced to North America.

Photo: John Lyons, Wisconsin Department of Natural Resources



Occurrences in the Great Lakes Basin

The tubenose goby was detected in the St. Clair River in Michigan in 1990. It also has been found at the north end of Lake St. Clair at Anchor Bay and in Lake Erie at Port Glasgow, Canada. It is believed to be established on the northwestern shore of Lake Erie, and it is possible that the species has spread into Ohio without detection. In 2000, the tubenose goby was reported in Lake Huron, and in 2001, was collected in western Lake Superior near Duluth.

Means of Introduction and spread: The tubenose goby was initially introduced via ballast water discharges from trans-Atlantic cargo vessels. Investigation of its spread to new habitats in western Lake Erie in 2007 indicate that human assistance (*i.e.*, bait bucket transport) and vegetation corridors provide dispersal pathways for the tubenose gobies through the rest of Lake Erie and perhaps to other areas within the Great Lakes basin. Since tubenose gobies lay eggs on vegetation, it is important to remove plants from boats and trailers after use in infested waters to prevent further spread.

Status: The tubenose goby is believed to be established in the St. Clair River, and in Lake St. Clair, Michigan. However, the presence of this species in these locations is believed to be rare and it appears that its spread is progressing slowly. While the establishment of

round goby has spread to parts of all of the Great Lakes within 8 years of its introduction to the region, tubenose goby populations have remained localized and small, spreading no farther (in considerable numbers) than the Detroit River and Western Lake Erie.

Current Regulations: It is illegal to transport tubenose gobies out of Lake Erie (Ohio Department of Natural Resources), and their live possession is illegal in Ontario. Many regulations and recommendations for the management and control of the tubenose overlap with the related – and far more abundant – round goby.

Distribution Maps: Geographic information on the location of aquatic invasive species sightings in the United States is made available through the U.S. Geological Survey, Nonindigenous Aquatic Species (NAS) program (<http://nas.er.usgs.gov>). The NAS distribution maps for the tubenose goby can be found at: <http://nas2.er.usgs.gov/viewer/omap.aspx?SpeciesID=714>.

Significant Contributions Provided by:

U.S. Geological Survey, Nonindigenous Aquatic Species Program. 2009. <http://nas.er.usgs.gov>.

Studies, Assessments and Management Plans

Expansion of tubenose gobies *Proterorhinus semilunaris* into western Lake Erie and potential effects on native species (2011)

Kocovsky, P.M., J.A. Tallman, D.J. Jude, D.M. Murphy, J.E. Brown, and C.A. Stepien.

<http://www.springerlink.com/content/x176m2v802g24881/fulltext.pdf>

This study reports on the range expansion of tubenose gobies into new habitats in western Lake Erie. The authors discuss the genetic origins of the fish, the potential for future range expansion, mechanisms for expansion, and possible effects on native species.

Round and Tubenose Goby Parasites (2009)

University of Toledo

<http://www.utoledo.edu/as/lec/goby/Parasites.html>

This study analyzed the parasites of two exotic Eurasian gobies established in the Great Lakes since 1990: the round goby, *Apollonia melanostoma* and the tubenose goby, *Proterorhinus semilunaris*.

Metazoan Parasites of Introduced Round and Tubenose Gobies in the Great Lakes: Support for the “Enemy Release Hypothesis” (2008)

Y. Kvach and C. A. Stepien

<http://www.bioone.org/doi/abs/10.3394/0380-1330%282008%2934%5B23%3AMPDIRA%5D2.0.CO%3B2?journalCode=jglr> (Abstract)

This study shows support for the “Enemy Release Hypothesis,” or the idea that newly established non-native species may be free of their native parasites, increasing the chance of population success. Authors compared the parasite load of invasive gobies in the Great Lakes with those in their native Eurasian habitats.

Tubenose Goby Phylogeny (2007)

University of Toledo

<http://www.utoledo.edu/as/lec/goby/TubePhy.html>

This study conducted an analysis of mitochondrial and nuclear DNA sequences and morphological characters from exotic Great Lakes as well as introduced and native Eurasian population sites of *Proterorhinus marmoratus* (Pallas). This broad scale study was the first comprehensive examination of the species’ characters across its range.

Mitochondrial DNA analysis of round goby (*Neogobius melanostomus*) and tubenose goby (*Proterorhinus marmoratus*) in the Great Lakes basin (1995)

Dougherty, John D., William S. Moore, and Jeffrey L. Ram

<http://article.pubs.nrc-cnrc.gc.ca/RPAS/rpv?hm=Hlnit&afpf=f95-211.pdf&journal=cjfas&volume=53>

Authors of this study used the mitochondrial cytochrome *b* gene to examine several aspects of the invading goby population, including genetic diversity, the existence of source populations in the Black Sea, and phylogenetic relationships within the *Gobiidae* family.

U.S. and Canadian Federal Resources

Tubenose Goby (*Proterorhinus marmoratus*)

National Sea Grant Network & Geographic Education Alliances

<http://www.iisqcp.org/EXOTICSP/tubenosegoby.htm>

Tubenose Goby Fact Sheet

U.S. Geological Survey-Nonindigenous Aquatic Species

<http://nas.er.usgs.gov/queries/FactSheet.asp?speciesID=714>

Tubenose Goby

U.S. Army Corps of Engineers

http://www.glmris.anl.gov/documents/docs/ans/Proterorhinus_semilunaris.pdf

State and Provincial Resources

Tubenose Goby Distribution Map

Michigan Department of Natural Resources

http://www.dnr.state.mi.us/spatialdatalibrary/pdf_maps/fish_atlas/maps/promar.pdf

Tubenose Goby "Leaps" to Duluth/Superior

Minnesota Sea Grant

http://www.seagrants.umn.edu/newsletter/2002/03/tubenose_goby_leaps_to_duluthsuperior.html

Tubenose Goby (*Proterorhinus marmoratus*)

Illinois-Indiana Sea Grant

<http://www.iisgcp.org/exoticsp/tubenosegoby.htm>

Tubenose Goby

Ohio Department of Natural Resources

<http://www.dnr.state.oh.us/Default.aspx?tabid=22722>

Tubenose Goby (*Proterorhinus marmoratus*)

University of Wisconsin Sea Grant Institute

<http://seagrants.wisc.edu/Home/Topics/InvasiveSpecies/Details.aspx?PostID=654>