

## Expansion of *Proterorhinus marmoratus* in the Morava River basin (Czech Republic, Danube R. watershed)

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**Abstract.** A rapid expansion of tubenose goby (*Proterorhinus marmoratus*) in a system of lowland reservoirs and adjacent rivers in the south-east of the Czech Republic (Danube basin) is reported. Spontaneous expansion of distributional range resulted in this species becoming a dominant fish in littoral zones with up to 100% relative abundance of the reservoirs and rivers.

**Key words:** tubenose goby, new distribution, Gobiidae, Morava and Dyje Rivers

### Introduction

Tubenose goby, *Proterorhinus marmoratus* (Pallas, 1814), is a small benthic fish (max. 10 cm long) occupying both the lotic and lentic waters. They have been found on places with dense aquatic vegetation, gravel-sand beaches and stony riprap (L e l e k 1987, B a r u š & O l i v a 1995).

Originally tubenose goby occupied basins of the Black, Caspian and Azov Seas inhabiting salt and brakish water. They also permanently live in freshwater in the rivers Danube, Bug, Dnieper, Don, Donets and Kuban. In the Danube, tubenose goby was, for a long time, registered as far west as Neusiedler Lake in Austria and also in tributaries from Slovakia to the Danube (Váh, Nitra, Morava Rivers) (L e l e k 1987). Recently it was registered in all Austrian (A h n e l t 1988) up to Bavarian stretch of Danube (R e i n a r t z & H i l b r i c h 2000). In 1997 the tubenose goby was registered in River Main near Eltmann town, where it entered through Rhine-Main-Danube canal (R e i n a r t z & H i l b r i c h 2000). The description of an early expansion of the tubenose goby in the south-east of the Czech Republic was the main goal of this work. Both area of the lower Morava and Dyje Rivers and part of the Slovakian stretch of the Morava River were regularly checked.

In the Morava River, tubenose goby was registered the first time by K o e l b e l (1874), near mouth into the Danube. This locality was for a long time the only one in the Morava River. In 1991, tubenose goby was registered in confluence of the Malina stream (left tributary of the Morava River, 10.5 r. km) (S p i n d l e r et al. 1992).

### Methods

Monitoring was provided by electrofishing using electroshocker Lena (f. Bednář Czech Republic – output voltage 225/300 V, max output current 6A and pulse frequency 50–95 Hz)

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and by dipnetting along shorelines of the lower Dyje and Morava Rivers and the Nové Mlýny Water Reservoirs (NMWRs) – three artificial reservoirs on the Dyje River. A round dipnet with mesh size 1 mm and 30 cm diameter was used.

For the quantitative estimation 100 points in 350m length stretches of the rivers were sampled.

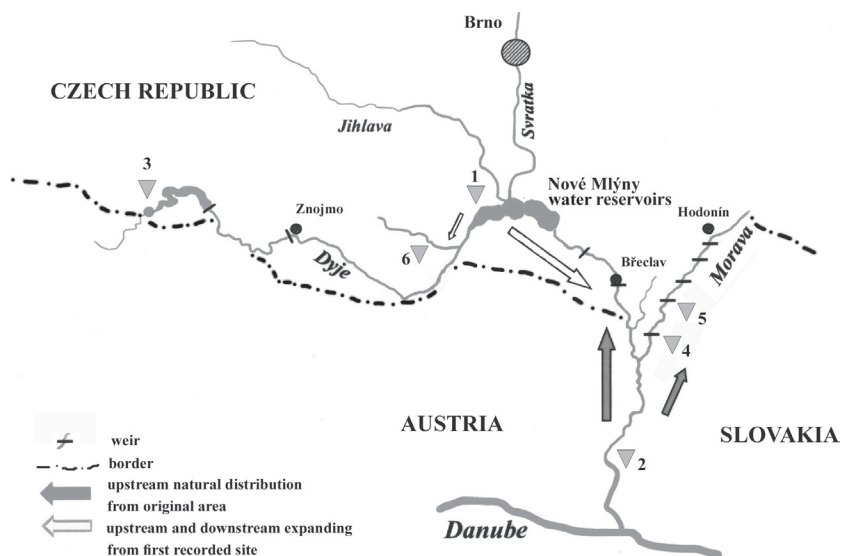
## Results and Discussion

In 1996, 8 specimens of the tubenose goby was registered up to 41<sup>st</sup>. r.km of the Morava River near the village Gajary (Slovakia).

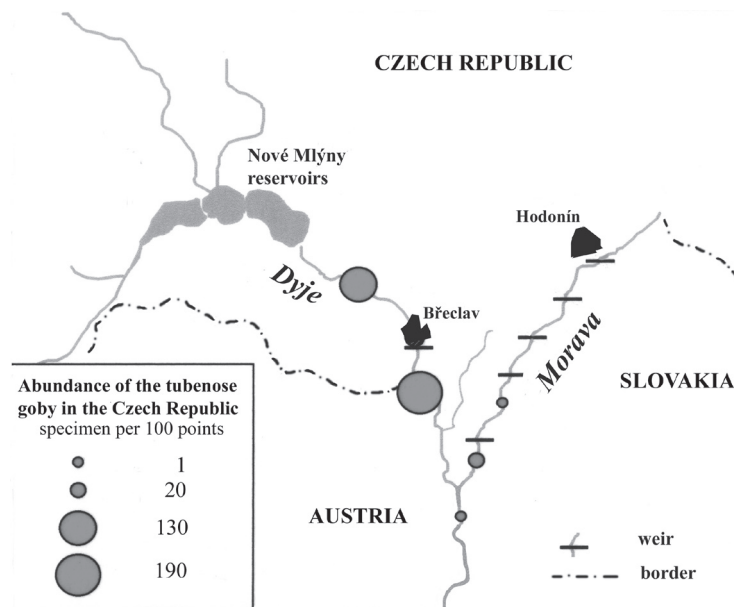
Occurrence of tubenose goby in the Czech Republic (11 specimens) was for the first time recorded in the Czech Republic in spring 1994 in the upper reservoir (528 ha) of the system of Nové Mlýny Water Reservoirs (NMWRs), in the stony bank near the village of Pasohlávky, far away from its original distribution area (Fig. 1). The distribution was limited to the about 500 m long shoreline in this reservoir (L u s k & H a l a č k a 1995). The most probable origin of these gobies seems to be a release of this fish as a baitfish by foreign anglers on Danube countries. In 1996 tubenose goby was registered by L u s k et al. (2000) in the Dyje River upstream NMWRs, at 81.6<sup>th</sup> r. km. The further expansion in the littoral of NMWRs was monitored. Already three years after the first record in July 1997, we registered tubenose goby all around the upper reservoir of NMWRs. Tubenose goby formed 2.5 % of the littoral fish community relative abundance. In the middle reservoir (1031 ha), we found only one specimen in its upper part.

One year later (in 1998), tubenose goby was a dominant (up to 100% relative abundance) species of the littoral fish community in the upper reservoir, which was a centre of its further expansion into adjacent waterbodies. Higher intensity of expansion was downstream to the middle reservoir. Finally, in the lower reservoir (1668 ha), this species was registered in 1998.

Already in 1998, tubenose goby was registered from the confluence of the Jevišovka Stream



**Fig. 1.** The map of present occurrence of *Proterorhinus marmoratus* in the Czech Republic (1 – first recording site in the Czech Republic in 1994; 2 – Gajary (Slovakia), the Morava River, 41 r. km., 1996, 3 – Podhradí nad Dyjí, the Dyje River, 207 r. km., 1998, 4 – Lanžhot, the Morava River, 73 r. km, 1998, 5 – Lanžhot, the Morava River, 79 r. km, 2000, 6 – Jevišovka, the Dyje River, 84 r. km, 1999).



**Fig. 2.** Actual abundance of the tubenose goby in waters of the Czech Republic (the lower Dyje and Morava Rivers), illustrated by number of individuals caught per 100 points.

to the Dyje River on 84<sup>th</sup> r. km (upstream the upper reservoir) through the lower reservoir and further in the Dyje River downstream to the confluence with the Morava River. In the same year tubenose goby was registered by L u s k et al. (2000) in the lower Jevišovka Stream. During 5 years of research, tubenose goby occupied 84 km of the Dyje River and became the dominant species in the shoreline assemblage. The fast expansion downstream the reservoirs to the river was supported by drift of juvenile stages through power plant in the lowest dam (K r u ž í k o v á et al. 2003) and probably also by the flood discharge in late summer 1997.

Second exceptional occurrence of small satellite population was registered in 1998 on the Dyje River near the town of Podhradí n. Dyjí, 207 r. km (Š v á t o r a et al. 2000) and probably also originated from a released baitfish (Fig. 1). Similar occurrence of tubenose goby in an isolated gravel pit was also registered in south Austria in 1998, but it was probably an accidental stocking brought together with a sport fish from Hungary (F r i e d e l & S a m p l 2000).

In 1998, tubenose goby appeared also in Morava River upstream the Dyje confluence on 74<sup>th</sup> r. km (L u s k et al. 2000). We registered two specimens on 73<sup>rd</sup> r. km bellow the first lowermost weir near the town of Lanžhot in early 1999. In December 2000 one adult specimen was registered already on 79<sup>th</sup> r. km in a section above second weir (Fig. 1). The further expansion upstream was getting slower and the distribution had stabilised by summer 2003.

Quantitative fluctuations in number of the individuals per 100 points in the lower Morava and Dyje Rivers are shown in Fig. 2. There is much stronger population in the lower Dyje River, where the upstream expanding population is added with downstream migrating fishes from the Nové Mlýny Water Reservoirs, unlike at the lower Morava River. On the other hand, no similar situation occurred under the confluence of the Dyje and Morava Rivers.

This species fast expanded into the south-east region of the Czech Republic in lower parts of the Dyje and Morava Rivers despite its poor swimming ability and it is possible to expect its further expansion, through at a slower rate. Similarly in the USA (J u d e et al. 1992),

tubenose goby expanded far away from its first registration place.

At present, the importance of tubenose goby in the new area of its distribution is just speculative. It could be a prey for some predatory fish or it could predate on eggs and larvae of other fish (Jude et al. 1992). Neither of the parasitological problems are fully explained (Koubková & Baruš 2000).

Tubenose goby is not the only species from family Gobiidae enlarging its distribution area in the Danube River basin. There are some larger species of genus *Neogobius* (*N. kessleri*, *N. melanostomus*, *N. fluviatilis*, *N. gymnotrachelus*) which already expanded in the middle Danube and its tributaries (Simonović et al. 1998, Kautman 2000, Stráňai & Andreji 2004).

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#### LITERATURE

- AHNELT H. 1988: Zum Vorkommen der Marmorierten Grundel (*Proterorhinus marmoratus* (Pallas), Pisces: Gobiidae) in Österreich. *Ann. Naturhist. Mus. Wien* 90 B: 31–42 (in German).
- BARUŠ V. & OLIVA O. 1995: Fauna ČR a SR. Mihulovci a ryby (Fauna of the Czech and Slovak Republics, Vol. 28/1,2 Lampreys and Fishes). *Academia Praha*, 624 & 628 pp. (in Czech with English summary).
- FRIEDEL T. & SAMPL H. 2000: Erst Nachweis der Marmorierten Grundel in der Steiermark. *Österreichs Fischerei* 53: 189–191 (in German).
- JUDE D.J., REIDER R.H. & SMITH G.R. 1992: Establishment of Gobiidae in the Great Lakes basin. *Can. J. Fish Aquat. Sci.* 49 (2): 416–421.
- KAUTMAN J. 2000: Tri nové druhy rýb na Slovensku (Three new fish species of Slovakia). *Biodiverzita ichtyofauny ČR III., Brno: 29–36* (in Slovak with English summary).
- KOELBEL C. 1874: Über die Identität der *Gobius semilunaris* Heck. und *G. rubromaculatus* Kriesch mit *G. marmoratus* Pallas. *Verh. K.-k. zool.-bot. Ges. Wien*, 24 (2): 269–574 (in German).
- KOUBKOVÁ B. & BARUŠ V. 2000: The tubenose goby (*Proterorhinus marmoratus*: Perciformes) as paratenic host of the nematode *Anguillicola crassus* (Dracunculioidea). *Helminthologia* 37 (1): 43–45.
- KRUŽÍKOVÁ L., JURAJDA P. & PRÁŠEK V. 2003: Průchod 0+ juvenilních ryb turbínami MVE vodního díla Nové Mlýny [Passage of the 0+ juvenile fishes through small water plant of Nové Mlýny water reservoirs]. In: Bryja J. & Zukal J. (eds), *Zoologické dny Brno. Proc. of a Conference: 114–115* (in Czech).
- LELEK A. 1987: The freshwater fishes of Europe. Vol. 9: Threatened fishes of Europe. *Aula-Verlag GmbH Wiesbaden*, 343 pp.
- LUSK S. & HALAČKA K. 1995: The first finding of the Tubenose Goby, *Proterorhinus marmoratus*, in the Czech Republic. *Folia Zool.* 44:90–92.
- LUSK S., LUSKOVÁ V., HALAČKA K. & LOJKÁSEK B. 2000: Změny v druhové skladbě ichtyofauny na území České republiky po roce 1990 (Changes in the species composition of the ichthyofauna in the territory of the Czech Republic after 1990). *Biodiverzita ichtyofauny ČR III, Brno: 29–36* (in Czech with English summary).
- REINARTZ R. & HILBRICH T. 2000: Nachweis der Marmorierten Grundel im unterfränkischen Main bei Eltmann (Rheineinzugsgebiet). *Österreichs Fischerei* 53: 192–194 (in German).
- SIMONOVIĆ P., VALKOVIĆ B. & PAUNOVIĆ M. 1998: Round goby *Neogobius melanostomus*, a new Ponto-Caspian element for Yugoslavia. *Folia Zool.* 47: 305–312.
- SPINDLER T., HOLČÍK J. & HENSEL K. 1992: Die Fischfauna der österreichisch-tschechoslowakischen Grenzstrecke der March samt ihrem Einzugsgebiet. *Bericht 5/1992, Forschungsinstitut WWF Österreich*, 179 pp. (in German).
- STRÁŇAI I. & ANDREJI J. 2004: The first report of round goby, *Neogobius melanostomus* (Pisces, Gobiidae) in the waters of Slovakia. *Folia Zool.* 53: 335–338.
- ŠVÁTORA M., KRŽÍZEK J. & REITER A. 2000: Ichthyofauna horní Dyje – Bílý Kříž (Fish assemblage of the upper part of the River Dyje – Bílý Kříž). *Biodiverzita ichtyofauny ČR III., Brno: 161–164* (in Czech with English summary).