

Barbus ida, a new barbel species from the Southern Marmara Sea basin (Teleostei: Cyprinidae)

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Barbus ida, a new species, is described from the streams Gönen and Biga, in western Anatolia. It is distinguished from other *Barbus* species in the adjacent basins by a less thickened last unbranched dorsal-fin ray, serrated along the proximal half of its posterior margin; larger irregular black blotches on the back and the flanks, and small black spots on the head, extending downwards to the cheeks; 56–61 total lateral line scales, 11–13 scale rows between dorsal-fin origin and lateral line and 7–8 scale rows between anal-fin origin and lateral line. *Barbus ida* also differs from its most closely related species, *B. niluferensis*, by 8 nucleotide substitution sites in the mtDNA cytochrome oxidase I barcode region.

Introduction

A total of 11 species of the cyprinid genus *Barbus* have been reported from Turkish inland waters (Güçlü et al., 2020). Eight of which have been reported from Western Anatolia and the Thrace region, including: *B. anatolicus* Turan, Kaya, Geiger & Freyhof 2018 from Yeşilirmak and Kızılırmak rivers, *B. cyclolepis* Heckel, 1837 from Ergene River and Istranca stream, *B. escherichii* Steindachner, 1897 from Sakarya River, *B. niluferensis* Turan, Kottelat & Ekmekci, 2009 from Susurluk River, *B. oligolepis* Battalgil, 1941 from the streams and rivers in Biga Peninsula, *B. xanthos* Güçlü, Kalaycı, Küçük & Turan, 2020 and *B. pergamonensis* Kara-

man, 1971 from the streams and rivers in the Aegean Sea basin, and *B. tauricus* Kessler, 1877 from small streams in southeastern and western Black Sea (Kottelat & Freyhof, 2007; Geiger et al., 2014; Turan et al., 2018; Levin et al., 2019; Güçlü et al., 2020).

Geiger et al. (2014) recorded *Barbus* (as *Barbus* sp.) from Gönen Stream. Later on, we examined additional specimens of *Barbus* sp. from both Gönen and Biga streams and compared these with the morphologically similar (and putatively genetically similar) species, *B. niluferensis*, and also species in adjacent basin. Based on morphological and genetic characters, we consider the specimens of

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Literature cited

- Geiger, M. F., F. Herder, M. T. Monaghan, V. Almada, R. Barbieri, M. Bariche, P. Berrebi, J. Bohlen, M. Casal-Lopez, G. B. Delmastro, G. P. Denys, A. Dettai, I. Doadrio, E. Kalogianni, H. Karst, M. Kottelat, M. Kovacic, M. Laporte, M. Lorenzoni, Z. Marcic, M. Ozulug, A. Perdices, S. Perea, H. Persat, S. Porcelotti, C. Puzzi, J. Robalo, R. Sanda, M. Schneider, V. Slechtova, M. Stoumboudi, S. Walter & J. Freyhof. 2014. Spatial heterogeneity in the Mediterranean biodiversity hotspot affects barcoding accuracy of its freshwater fishes. *Molecular Ecology Resources*, 14: 1210–1221.
- Güçlü, S. S., G. Kalaycı, F. Küçük & D. Turan. 2020. *Barbus xanthos*, a new barbel from the south-eastern Aegean basin (Teleostei: Cyprinidae). *Journal of Fish Biology*, 96: 1309–1319.
- Hall, T. A. 1999. BioEdit: a user-friendly biological sequence alignment editor and analysis program for Windows 95/98/NT. *Nucleic Acids Symposium Series*, 41: 95–98.
- Hammer, O., Harper, D. A. T., & Ryan, P. D. 2001. PAST: Paleontological statistics software package for education and data analysis. *Palaeontologia Electronica*, 4: 1–9.
- Kimura, M. 1980. A simple method for estimating evolutionary rates of base substitutions through comparative studies of nucleotide sequences. *Journal of Molecular Evolution*, 16: 111–120.
- Kottelat, M. & J. Freyhof. 2007. Handbook of European freshwater fishes. Kottelat, Cornol and Freyhof, Berlin, xiv + 646 pp.
- Kumar, S., G. Stecher, M. Li, C. Kinyaz & K. Tamura. 2018. MEGA X: Molecular evolutionary genetics analysis across computing platforms. *Molecular Biology and Evolution*, 35: 1547–1549.
- Levin, B. A., A. A. Gandlin, E. S. Simonov, M. A. Levina, A. E. Barmintseva, B. Japoshvili, N. S. Mugue, L. Mumladze, N. J. Mustafayev, A. N. Pashkov, H. R. Roubenyan, M. I. Shapovalov & I. Doadrio. 2019. Phylogeny, phylogeography and hybridization of Caucasian barbels of the genus *Barbus* (Actinopterygii, Cyprinidae). *Molecular Phylogenetics and Evolution*, 135: 31–44.
- Posada, D. 2008. jModelTest: phylogenetic model averaging. *Molecular Biology Evolution*, 25: 1253–1256.
- Thompson, J. D., D. G. Higgins & T. J. Gibson. 1994. CLUSTAL W: improving the sensitivity of progressive multiple sequence alignment through sequence weighting, position-specific gap penalties and weight matrix choice. *Nucleic Acids Research*, 22: 4673–4680.
- Turan, D., M. Kottelat & G. Ekmekci. 2009. *Barbus niluferensis*, a new species of barbel (Teleostei: Cyprinidae) from Nilufer River, Turkey, with re-description of *B. oligolepis*. *Zootaxa*, 1981: 15–28.
- Turan, D., C. Kaya, M. F. Geiger & J. Freyhof. 2018. *Barbus anatolicus*, a new barbel from the Kızılırmak and Yeşilirmak River drainages in northern Anatolia (Teleostei: Cyprinidae). *Zootaxa*, 4461: 539–557.
- Ward, R. D., T. S. Zemlak, B. H. Innes, P. R. Last & P. D. N. Hebert. 2005. DNA barcoding Australia's fish species. *Philosophical Transactions of the Royal Society of London. Series B, Biological Sciences*, 360: 1847–1857.
- Zhang, J., P. Kapli, P. Pavlidis & A. Stamatakis. 2013. A general species delimitation method with applications to phylogenetic placements. *Bioinformatics*, 29: 2869–2876.

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