

Genetic discrimination of two *Capoeta* species in north-eastern Anatolia, using mitochondrial 16S rRNA gene

(Osteichthyes: Cyprinidae)

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Abstract. The genetic discrimination of two species of the genus *Capoeta*, *C. tinca* (Heckel, 1843) and *C. banarescui* Turan et al., 2006, which is represented by many endemic species in Anatolian Turkey, has been investigated by analysing the partial 16S ribosomal DNA gene (525 bp). A total of 85 fish was sampled from two localities in the Marmara basin and 5 localities in the Black Sea basin. The amount of 16S rDNA sequence divergence separating these two taxa (mean 1.19%) is within the range observed for 16S rDNA variation between other species of freshwater fishes. The derived haplotypes (h: 28) were strictly local and were not shared between species or populations within species. Three types of phylogenetic tree (Bayesian, MP and ML) clearly showed *C. banarescui* and *C. tinca* as distinct species separated with significant bootstrap values (BI:94, MP:88, ML:81), confirming previous conclusions based on morphometric and meristic characters. Furthermore, four novel SNPs were identified, allowing discrimination between two species. AMOVA tests revealed that populations of *Capoeta* in Northeastern Anatolia can be divided into two main groups: Coruh River group, including SVS, TRT and ISP populations, and Yesilirmak-Harsit group, consisting of ALC and HRS populations. These results indicate the effectiveness of mitochondrial 16S rDNA gene sequences for both species identification and the phylogenetic analysis of *Capoeta* species.

Key words. *Capoeta*, mtDNA, genetic identification, 16S rRNA.

Introduction

The members of the genus *Capoeta* (Valenciennes in Cuvier & Valenciennes, 1842) belonging to the family Cyprinidae are distributed widely in freshwater sources, such as lakes and fast flowing streams (GELDIAY & BALIK 1996) in a wide geographic area, including Anatolia (Turkey) (BANARESCU 1991). *Capoeta tinca* (Heckel, 1843) with two pairs of barbels has been considered as a single species with a broad geographic distribution covering some large rivers in the western, central and northern Anatolia (KURU 1975, BALIK 1979, ERK'AKAN 1981). BANARESCU & HERZIG-STRASCHIL (1999) reported that the distribution of this species encompasses most rivers in Anatolia and western Transcaucasia; yet populations show considerable morphological differences. TURAN et al. (2006) compared different populations referred to *C. tinca*, and described the Coruh population as a new species under the name *Capoeta banarescui* Turan et al., 2006, based on morphometric and meristic characters.

In the last decade, molecular approaches have helped to support taxonomic conclusions in fishes based on morphological traits (ORTI & MEYER 1997). The mitochondrial 16S rRNA gene sequence was used as an effective genetic marker for the discrimination and genetic identification of fish species (BROWN 1985, KOCHZIUS et al. 2003, SANTOS et al. 2003) and