

Karyotype of the Cyprinid Fish *Alburnoides bipunctatus* (Cyprinidae) from the Tigris River

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Chromosome numbers and karyotypes of Cyprinid fish *Alburnoides bipunctatus* (Bloch, 1782) from the River Tigris were determined by the chromosome preparation technique from uncultured kidney cells. The diploid chromosome number $2n=50$, was composed of 8 pairs of metacentric, 11 pairs of submetacentric and 6 pairs of subtelo-acrocentric chromosomes (NF=88). Sex chromosomes were not determined in the this species. The results were briefly discussed with other, previously conducted studies.

Key words: *Alburnoides bipunctatus*, chromosome, karyology, Tigris River.

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Alburnoides bipunctatus (Bloch 1782) is distributed in Europe and Asia in the basins of the Biscay Bay, the North, Baltic, Black, Caspian and Aral Seas, in Vardar and Struma Rivers of the Aegean basin, in the Tigris-Euphrates river system, and in some other localities in Iran (BOGUTSKAYA 1997). In Turkey, the species is distributed in Coruh, Kizilirmak, Sakarya and Meles and Gumuldur (PELEGRIN 1928; KOSSWIG & BATTALGIL 1942; BERG 1949; BALIK 1979; ERKAKAN & KURU 1982). It has also been reported from the Tigris and Euphrates drainages (KURU 1979; BOZKURT 1994; ERDEMLİ & KALKAN 1996). Two subspecies are known from Turkey (KURU 1979) and five from Europe (LADIGES & VOGT 1979). However, their validity is quite uncertain (BOGUTSKAYA 1997).

Little is known of the chromosomes of *Alburnoides bipunctatus*. RÁB und COLLARES-PEREIRA (1995) reviewed all of the available karyological data for *Alburnoides bipunctatus* given by SOFRADZIJA *et al.* (1979) and RÁB (1981). As far as the present authors know, this species in Turkish freshwaters has not been karyotyped yet.

The aim of the present study was to report the chromosome numbers and karyotype of *Alburnoides bipunctatus* samples from the Tigris River (Turkey) and to compare data obtained with those given for other European populations.

Material and Methods

Five males and seven females of *Alburnoides bipunctatus* were captured by using an electroshock apparatus in the Tigris River (37° 55' N, 40° 12' E). The fish were transported alive to the laboratory and kept in a well aerated aquarium at 20-25° C before analysis.

The mitotic chromosome preparations were obtained from kidney cell suspensions by the air-dried technique of COLLARES-PEREIRA (1992). Two days before the investigations, the fish were injected with a 0.4% CoCl₂ solution (0.2ml/100g body weight). Afterwards, fish were injected intraperitoneally with a 0.1% colchicine solution (1ml/100g body weight) and killed after 2 hours. The techniques for preparations of cell suspensions, hypotonic treatment and fixation of the cells have been described previously (COLLARES-PEREIRA 1992; ERGENE & CAVAS 2002). Preparations were stained with % 0.5 Giemsa. The best 4-8 metaphase figures of each specimen were karyotyped following the method by LEVAN *et al.* (1964).

Results and Discussion

The number of specimens, the number of analyzed karyotypes and the chromosome number distribution of each sex are presented in Table 1. It is clear that the diploid chromosome number of *Al-*

Table 1

Number of specimens, karyotypes analysed and chromosome number distribution in *Alburnoides bipunctatus* from the Tigris River (Turkey)

Sexes	Specimens	Karyotypes	Chromosome number distribution						Total cell
			≤47	48	49	50	51	52≥	
Male	5	20	–	1	3	59	1	–	64
Female	7	32	1	1	5	64	2	–	73

burnoides bipunctatus was $2n=50$ (Fig. 1A), comprising 8 metacentric, 11 submetacentric and 6 subtelo-acrocentric chromosome pairs (Fig. 1B).

The first pairs of metacentric, submetacentric and subtelo-acrocentric chromosomes were the biggest in size when compared with other chromosomes in each group. The number of chromosome arms was determined as $NF=88$ for both sexes. No differences between sexes in chromosome number were noticed. Also, sex chromosomes could not be determined.

The diploid number of *Alburnoides bipunctatus* was $2N=50$, the number most frequently found in other Cyprinid species (COLLARES-PEREIRA 1989). According to RÁB and COLLARES-PEREIRA (1995), *Alburnoides* belongs to Leuciscine cyp-

rinids karyologically, characterized by $2n=50$ and a karyotype morphology consisting of 6-8 pairs of metacentric, 12-14 pairs of submetacentric and 2-4 pairs of subtelocentric/acrocentric chromosomes. The chromosome numbers and karyotypes of *Alburnoides bipunctatus* in the Tigris River are very similar to other European populations, although some small differences are apparent, due to the difficulty of recognition of the centrometric position of small chromosomes. RÁB (1981) reported that the chromosome number of *Alburnoides bipunctatus* from Rokytna and Poprad Rivers was $2n=50$, and 8 pairs of these chromosomes were metacentric, 12 pairs submetacentric and 4 pairs of subtelo morphology. In addition, the arm number was $NF=96$ in the same study. The mitotic chromosome numbers and metacentric chromosome num-

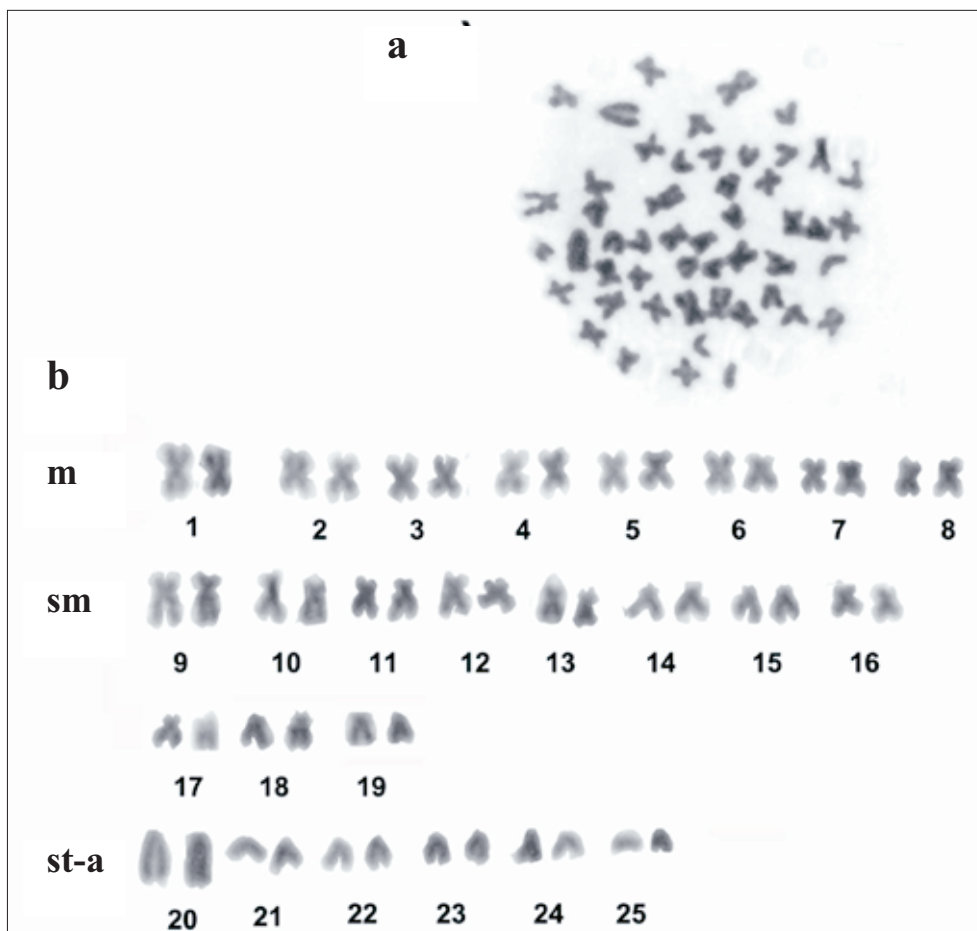


Fig. 1. Giemsa-stained metaphase plate (a) and karyotype (b) of *Alburnoides bipunctatus* from the Tigris River (Turkey).

bers of *Alburnoides bipunctatus* from Rokytna and Poprad Rivers were the same as in this study. However, higher submetacentric chromosome numbers were observed by RÁB (1981). Furthermore, acrocentric chromosomes were not determined by RÁB (1981). SOFRADZIJA *et al.* (1979) suggested that the diploid number for *Alburnoides bipunctatus* from Vrbanje River was 50 and the karyotype consisted of 19 meta-submetacentric and 6 subtelo-acrocentric chromosome pairs. When the present results are compared with the above mentioned karyological data, it is apparent that the number of subtelo-acrocentric chromosomes and NF number are the same. However, metacentric and submetacentric chromosomes are not comparable due to the given total number of metacentric and submetacentric chromosomes (SOFRADZIJA *et al.* 1979).

More detailed karyotype research is required on other populations of *Alburnoides bipunctatus* to determine their intraspecific variation and role in evolution.

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