*Kafkas Univ Vet Fak Derg*
*15 (3): 407-409, 2009*

**RESEARCH ARTICLE**

# Karyotype of *Pseudorasbora parva* (Temminck and Schlegel 1846) (Pisces, Cyprinidae) in Kızılırmak River, Turkey

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**Makale Kodu (Article Code): 2009/013-A**

## Summary

Karyotype of *Pseudorasbora parva* in the Kızılırmak River, Turkey, was investigated by kidney tissue. Diploid chromosome number was 2n=50. The karyotype consisted of 7 pairs of metacentric, 10 pairs of submetacentric and 8 pairs of subtelocentric chromosomes, and the fundamental number (NF) was 100. No heteromorphic sex chromosomes were found.

**Keywords:** *Pseudorasbora parva, Chromosome, Karyotype, Turkey*

# Kızılırmak'taki (Türkiye) *Pseudorasbora parva* (Temminck and Schlegel 1846) (Pisces, Cyprinidae)'nın Karyotipi

## Özet

Kızılırmak'tan yakalanan *Pseudorasbora parva*'nın böbrek dokusundan karyotipi araştırıldı. Diploid kromozom sayısı 2n=50 bulundu. Karyotip, 7 çift metasentrik, 10 çift submetasentrik ve 8 çift subtelosentrik kromozomdan meydana gelmişti. Kol sayısı (NF) 100 idi. Eşey kromozomu farklılaşması gözlenmedi.

**Anahtar sözcükler:** *Pseudorasbora parva, Kromozom, Karyotip, Türkiye*

## INTRODUCTION

Cyprinidae family is the fish group with the richest number of species in Turkey, as well as the world. Cyprinidae are represented by 33 genera and 116 species [1]. The number of newly discovered species is increasing rapidly in Turkey. Stone moroco *Pseudorasbora parva* (Temminck and Schlegel 1846), whose original homeland was Far East, has invaded many places on the earth [2]. *P. parva* feeding on small fish and other vertebrates was previously reported in Europe and Far East [3-6]. *P. parva* was introduced accidentally into much European drainage, including the Thrace region of Turkey. This species has been hitherto registered in the southern Anatolia by Wildekamp et al.[4], in the Thrace region by Erk'akan [5], in the Antalya basin by Küçük [7], in Karacaören Dam Lake I by Becer and İkiz [8], in Topçam Dam Lake by Şaşı and Balık [9], and in Gelingüllü Dam Lake by Ekmekçi and Kırankaya [10]. Our knowledge about the distribution of this late translocated exotic species in the rivers and lakes of our country is scarce.

The number of studies in our country was limited, as fish chromosomes are small and numerous and standard chromosome techniques do not apply to fish. Nevertheless, new researchers recently took interest in the field and started to contribute to fish cytogenetic [11-19]. Cytogenetic studies were conducted on *P. parva* by several researchers. Some differences, though not many, have been seen between the results of previous studies and those of the present study [20-23]. Therefore, it is deemed more appropriate to publish this study as a new karyotype. The present study is intended to determine the karyotype of this species, which was lately translocated to Turkey, and to compare it with previously studied karyotypes to establish similarities and differences thereof.

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## MATERIAL and METHODS

Four specimens of *Pseudorasbora parva* were collected from Kızılırmak River, Kırşehir, Turkey, (38° 57' N, 34° 12' E), 2006. The fish were transported live to the laboratory, and kept in well aerated aquaria until analysis. Chromosomes were prepared directly from the head kidney according to the method of Collares-Pereira [24]. At least 10 metaphases were counted and karyotyped per specimen. Chromosomes were classified using the nomenclatures proposed by Levan [25]. A total of 24 metaphase plates were examined. Specimens analyzed are deposited as vouchers in the Cytogenetics Laboratory of Department of Biology, Faculty of Science and Arts, University of Ahi Evran, 40200, Kirsehir, Turkey, M. Gaffaroglu (M.G. 33).

## RESULT

Diploid chromosome number of all specimens of examined *Pseudorasbora parva* was 2n=50 *(Fig 1)*. The karyotype consisted of 7 pairs of metacentric, 10 pairs of submetacentric and 8 pairs of subtelocentric chromosomes; hence, fundamental arm number (FN) was 100 *(Fig 2)*. No heteromorphic sex chromosomes were detected.

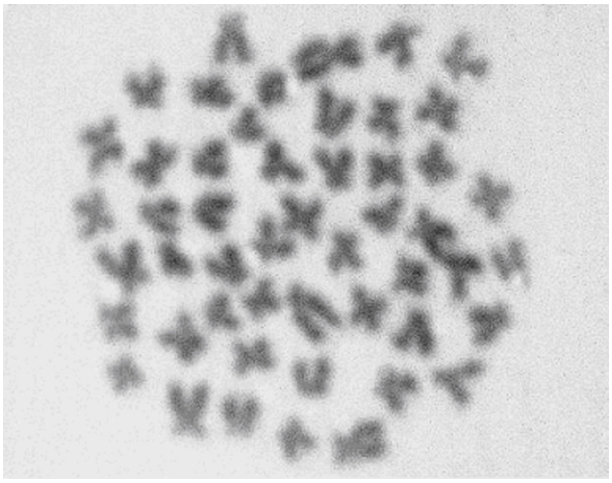

**Fig 1.** Metaphase of *Pseudorasbora parva*

**Şekil 1.** *Pseudorasbora parva*'nın metafazı

## DISCUSSION

Most authors consider subtelocentric chromosomes biarmed and some authors regard them monoarmed [25,26]. In the present study, subtelocentric chromosomes were accepted as biarmed when calculating FN. Meta-

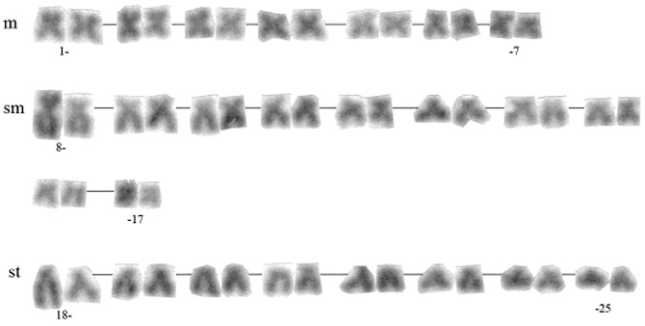


**Fig 2.** Karyotype of *Pseudorasbora parva*

**Şekil 2.** *Pseudorasbora parva*'nın karyotipi

centric chromosomes were generally of medium size. The largest and the tiniest chromosomes were submetacentric chromosomes. No acrocentric chromosomes were observed. When considered with regard to karyotype, chromosomes were seen to shrink gradually. Like in *Pseudorasbora parva*, chromosome number in *Alburnoides bipunctatus* [15], *Chalcalburnus mossulensis* [17], *Acanthobrama marmid* [18,19], *Cyprinion macrostomus* [19], *Pseudaspius leptocephalus* [27] is 2n=50. Ojima et al.[20] examined the karyotype of *P. parva* together with some other fish species of Far Eastern origin. Although most of the Cyprinidae have 2n=50 (48-52) chromosomes [12,14,15,17-19,26], there are also species with 2n=100 (98-102) chromosomes like *Cyprinus* [26] and those with 2n=150 chromosomes like *Barbus* and *Capoeta* [13,26]. Eurasian leuciscine cyprinids of many genera such as *Alburnus, Alburnoides, Abramis, Aspius, Blicca, Leucaspius, Leuciscus, Phoxinus, Rutilus, Scardinus, Vimba,* etc., are characterized by both 2n=50 and very similar karyotypes comprising 6-8 pairs of metacentric, 12-16 pairs of submetacentric, and 3-5 pairs of subtelo-acrocentric elements with the largest pair characteristically included in the lattermost category. It is well known that karyotypes of cyprinids are characterized by the presence of small elements with their centromere position ranging gradually from median nearly terminal [26,27]. The *P. parva* we studied exhibits the characteristics of the typical European leuciscine cyprinid in terms of chromosome number and morphology.

The karyotype of *P. parva* has been described by several authors from Japan, who found 2n=50 [21-23,28] (18 metacentric, 22 submetacentric, 10 subtelocentric, FN 90) [20]. Although number of chromosomes in this study was found the same with that found in previous studies, there are differences in chromosome morphology and FN. Some researchers noted that

they did not observe any subtelocentric chromosomes, whereas Kim [23] reported seeing 10 subtelocentric chromosomes. The results obtained in our study are most similar to those of Kim [23]. In their study, Ojima et al.[20] recorded the chromosome number of *P. parva* as 2n=50 and FN as 100, and found that 7 pairs of these chromosomes were metacentric and 18 pairs were submetacentric.

In conclusion, some karyotypes of *P. parva* which was previously karyotyped in the Far East are consistent, while others are different. However, the samples of this species caught in our country should be subjected to further and more detailed banding studies.

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