Short Communication

Intra-individual numerical chromosomal polymorphism in Trichomycterus davisi (Siluriformes, Trichomycteridae) from the Iguaçu River basin in Brazil

Luciana Andreia Borin and Isabel Cristina Martins-Santos

Abstract

Cytogenetic analysis of Trichomycterus davisi, collected from the Iguaçu River basin, has shown a diploid number of 2n = 54 chromosomes. However, we observed intra-individual numerical polymorphism in a T. davisi specimen. There were three cell populations with diploid number 2n = 54 (40M + 12SM + 2ST), 2n = 55 (40M + 12SM + 2ST + 1M) and 2n = 56 (40M + 12SM + 2ST + 2A) chromosomes. This variation was attributed to a probable post-zygotic non-disjunction of a metacentric chromosome of small/middle size, followed by centric fission, which originated in this individual.

INTRODUCTION

The best known example of polymorphism in fish involving chromosomal rearrangement occurs among certain genera of the Salmonidae family. Both inter- and intra-individual chromosomal polymorphisms seem to be more extensive in rainbow trout than in other fish species (Thorgaard, 1976; Hartley and Horne, 1982). Intra-individual chromosomal variation in fish has been little studied. Most research concerning this type of variation refers to size and number differences in nucleolus organizer regions (Almeida-Toledo and Foresti, 1985) or to the presence of supernumerary chromosomes (Fenocchio and Bertollo, 1990). We examined a mosaic individual of Trichomycterus davisi with three cell populations. This polymorphism was attributed to post-zygotic non-disjunction followed by centric fission.

MATERIAL AND METHODS

Cytogenetic analyses of 50 individuals (20 males and 30 females) of the species Trichomycterus davisi were performed. Among specimens collected in Três Barras do Parana, PR, Brazil (Iguaçu River basin) one had intra-individual polymorphism and was be analyzed in the present study. Mitotic chromosomes were obtained according to the air-drying technique described by Bertollo et al. (1978). Chromosomes were classified according to Levan et al. (1964).

RESULTS AND DISCUSSION

Previous karyotypic analyses of T. davisi indicated a diploid number of 2n = 54 chromosomes and a karyotypic formula of 40M, 12SM and 2ST (Borin and Martins-Santos, 1999). However, one specimen had three populations of different cells. Analysis of 42 metaphases showed three cytotypes consisting of 18 cells with normal karyotype (2n = 54, 40M + 12SM + 2ST; Figure 1a), two with 55 chromosomes (40M + 12SM + 2ST + 1M; Figure 1b), due to the presence of one medium-sized metacentric chromosome, and 19 cells with 56 chromosomes (40M + 12SM + 2ST + 2A; Figure 1c), due to the presence of two acrocentric chromosomes. Furthermore, cells with 53 chromosomes were detected (Figure 2), although absent chromosome could not to determined. Cell populations with 55 chromosomes may have originated due to a post-zygotic non-disjunction of a medium-sized metacentric chromosome and 2n = 56 chromosome cells by chromosome fission in the first divisions after non-disjunction. The latter event would originate cells with two acrocentric chromosomes. A similar mosaic in an individual of Trichomycterus sp. (equal T. paolence), collected from Quinta brook (Itatinga, SP) was registered by Torres et al. (1995). Four different cytotypes were observed in this specimen: 2n = 54 (normal karyotype), 2n = 55 (2n = 54, +1 submetacentric), 2n = 55 (2n = 54, +1 small metacentric) and 2n = 56 (2n = 54, +2 chromosomes, a submetacentric and a small metacentric). According to these authors, such results suggest and even characterize this specimen as a carrier of an aneuploidy due to post-zygotic non-disjunction events, that probably occurred during the first blastomere divisions. Arratia and Veloso (1980) also detected a variation of chromosome numbers in T. areolatus and T. laucaensis.
Figure 1a, b, c - Karyotype of *Trichomycterus davisi* with 2n = 54, 55 and 56, respectively.
Numerical polymorphism in *T. davisi*

Benjamin Wosiacki, M.Sc., of the Federal University of Paraná for making the species identification.

**RESUMO**

Análise citogenética de *T. davisi*, coletada na bacia do rio Iguaçu, demonstrou um número diplóide de 2n = 54 cromossomos. Contudo, um indivíduo desta espécie apresentou polimorfismo intra-individual numérico. Análise mitótica mostrou três populações de células com número diplóide de 2n = 54 (40M + 12SM + 2ST), 2n = 55 (40M + 12SM + 2SM + 1M) e 2n = 56 (40M + 12SM + 2SM + 2A) cromossomos. Esta variação foi atribuída a uma provável não disjunção pós-zigótica de um cromossomo metacêntrico de tamanho médio/pequeno, seguido de fissão cêntrica, originando um indivíduo mosaico.

**REFERENCES**


(Received December 9, 1999)