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KARYOTYPE AND NUCLEOLUS ORGANIZER REGIONS OF *Pyrrhulina* cf. *australis* (PISCES, CHARACIFORMES, LEBIASINIDAE)

Claudio Oliveira[1], Artur A. Andreata[2], Lurdes F. Almeida Toledo[2] and Silvio A. Toledo Filho[2]

ABSTRACT

The mitotic chromosomes and nucleolus organizer regions (NORs) of the Upper Paraná Basin fish *Pyrrhulina* cf. *australis* were studied. The karyotype (2n = 40; 6st + 34a) is characterized by the presence of four chromosome pairs with NORs, one of them with NORs in both terminal regions. Comparison of this karyotype with those of other Characiformes, revealed a strong similarity to the family Erythrinidae.

INTRODUCTION

The order Characiformes comprises a large group of freshwater fishes with about 1,150 species in Mexico and Central and South America; the family Lebiasinidae contains about 50 South American species, divided into two subfamilies: the Lebiasininae and the Pyrrhulininae (Nelson, 1984). Most of the species of Lebiasinidae live in the Amazonian region; one, *Pyrrhulina* cf. *australis*, occurs in the upper basin of the Paraná river, state of São Paulo (Britski, 1972).

For several families of Characiformes a reasonable quantity of cytogenetical data is available, but for the family Lebisinidae, only haploid numbers have been

[1] Departamento de Morfologia, Instituto de Biociências, Universidade Estadual Paulista "Julio de Mesquita Filho", Campus de Botucatu, 18610 Botucatu, SP, Brasil. Send correspondence to C.O.

[2] Departamento de Biologia, Instituto de Biociências-USP, Caixa Postal 11.461, 05499 São Paulo, SP, Brasil.

described (Oliveira *et al.*, 1988a). The objective of the present paper is to describe the karyotype of *P.* cf. *australis* (Lebiasinidae, Pyrrhulininae) obtained by standard cytogenetic analysis, as well as, the localization of the nucleolus organizer regions and to compare the results with information available concerning other Characiformes families.

MATERIAL AND METHODS

Six specimens (four females and two males) of *P.* cf. *australis* from the Móia stream, Penápolis, state of São Paulo, Brazil were analyzed. Specimens were identified and deposited in the "Museu de Zoologia" of the "Universidade de São Paulo", São Paulo, Brazil. Chromosome spreads were made as described by Oliveira *et al.* (1988b) and silver staining of nucleolus organizer regions (NORs) according to the technique of Howell and Black (1980).

RESULTS

P. cf. *australis* has 2n = 40 chromosomes, with 6 subtelocentrics and 34 acrocentrics (Figure 1). No chromosome differences between sexes were found. The NORs are present in four acrocentric pairs: two pairs have NORs in the terminal region of the short arms, one pair has two NORs (one in the short arm and the other in the long arm) in the terminal region, and one pair has an interstitial NOR (Figure 2).

DISCUSSION

The present study shows that *P.* cf. *australis* has 2n = 40 chromosomes, six of them subtelocentric and 34 acrocentric (Figure 1a). The diploid number found for *P.* cf. *australis* falls within the range of haploid chromosome numbers known for the Lebiasinidae (n = 11 to n = 23, see review in Oliveira *et al.*, 1988a). Until now, nothing has been reported concerning the karyotypic constitution of these fishes.

Among the Characiformes the modal chromosome number is 2n = 54, and several groups may be characterized on the basis of chromosomal number. One of these groups, which comprises the Erythrinidae and the Lebiasinidae, is characterized by chromosome numbers below 2n = 54 (Oliveira *et al.*, 1988a). The family Erythrinidae has been extensively studied by Bertollo *et al.* (1986), with diploid numbers ranging from 2n = 39/40 to 2n = 50, and several populations of *Hoplias malabaricus* with 2n = 40 metacentric and submetacentric chromosomes.

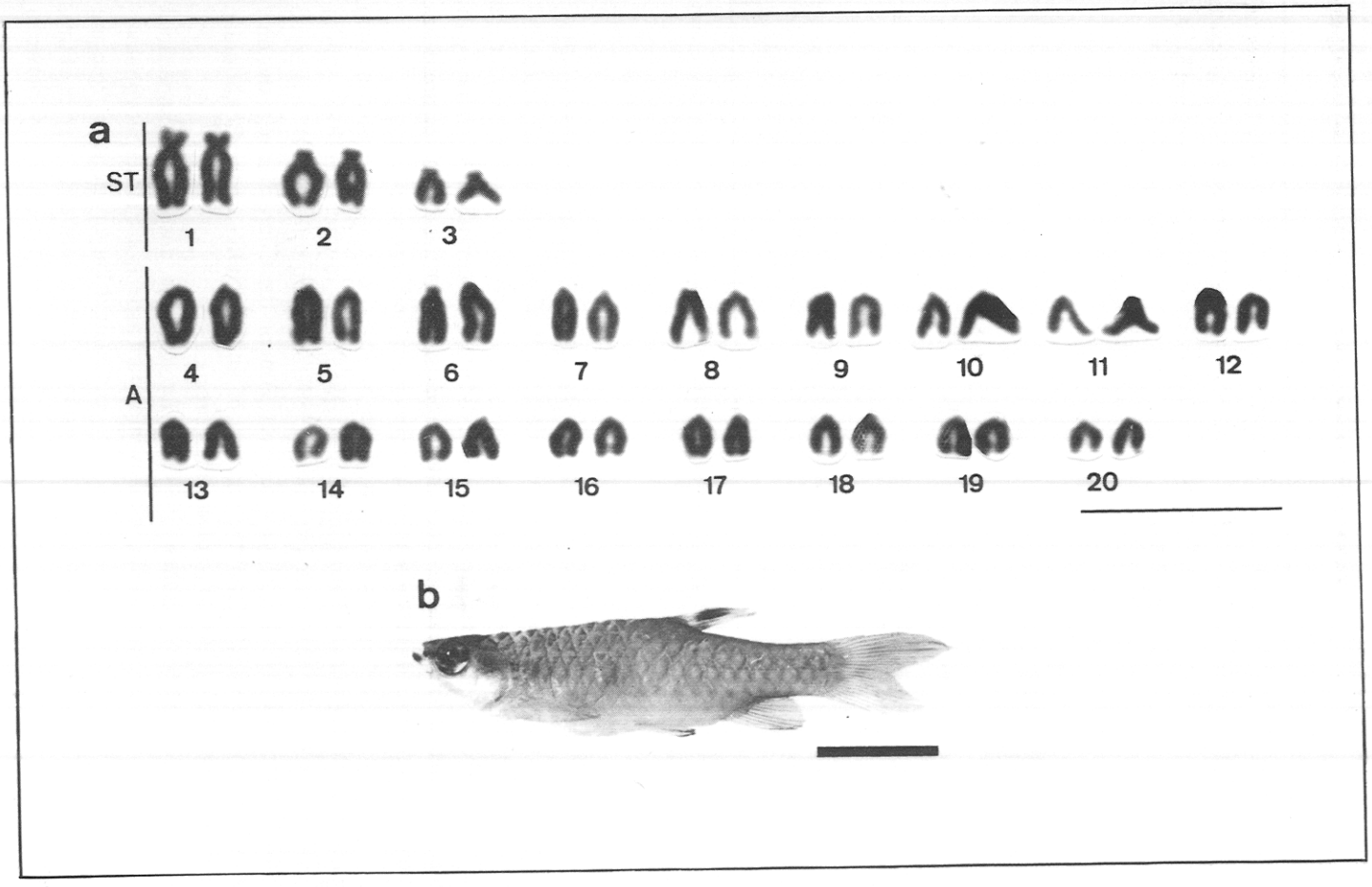

Figure 1 - Karyotype (a) and a specimen of *Pyrrhulina* cf. *australis* (b). Thin bar = 10 μm and thick bar = 1 cm.

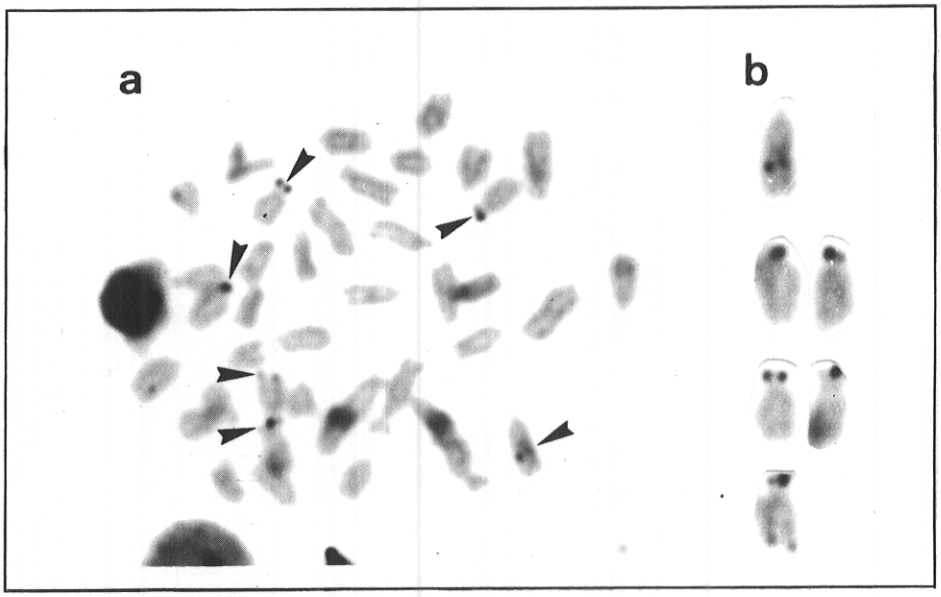

Figure 2 - Ag-stained somatic metaphase; the arrows indicate the silver-stained chromosomes (a) and specify pairs with NORs (b).

The low diploid number of *P.* cf. *australis* is similar to that of the Erythrinidae. However a comparison of the cytogenetic data for *P.* cf. *australis* with those for the Erythrinidae shows that, despite their similarity in chromosome number, they have a different chromosome structure: the species of Erythrinidae with 2n = 40 have only biarmed chromosomes (metacentrics and submetacentrics) and *P.* cf. *australis* has almost only uniarmed chromosomes (subtelocentrics and acrocentrics).

The number and localization of the NORs is very characteristic in some groups of fishes (Almeida-Toledo and Foresti, 1985). *P.* cf. *australis* has NORs similar to those of the Erythrinidae (Bertollo, 1988), with multiple NORs and some chromosomes with NORs in both telomeres. Among the Characiformes, the only groups characterized thus far by the presence of multiple NORs are the Erythrinidae and the Characidae (Almeida-Toledo and Foresti, 1985).

According to Weitzman (1964), the Lebiasinidae, despite their superficial resemblance to the Erythrinidae, in many important aspects are closer morphologically to the Characinae. The absence of more detailed karyotypic data from the Characinae prevents a comparison of this group with *P.* cf. *australis*. In spite of this, our results show that there is a considerable karyotypic similarity between

Lebiasinidae and Erythrinidae. More detailed chromosomal data from other species of Characinae and Lebiasinidae will be necessary in order to understand the real significance of these similarities.

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RESUMO

Foram estudados os cromossomos mitóticos e as regiões organizadoras de nucléolo (RONs) de *Pyrrhulina* cf. *australis*, uma espécie encontrada na bacia superior do rio Paraná. O cariótipo (2n = 40; 6st + 34a) é caracterizado pela presença de quatro pares cromossômicos com RONs, um deles em ambas as regiões terminais. A comparação deste cariótipo com os demais descritos para outros Characiformes mostrou uma grande similaridade com os da família Erythrinidae.

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