

## SHORT COMMUNICATION

### KARYOTYPIC CHARACTERIZATION AND NUCLEOLUS ORGANIZER REGIONS IN THREE SPECIES OF DORADIDAE (PISCES, SILURIFORMES)

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#### ABSTRACT

*Pseudodoras niger*, *Rhynodoras d'orbignyi* and *Trachydoras paraguayensis* (Doradidae, Pisces, Siluriformes) were studied cytogenetically. The chromosome preparations were obtained directly from the renal tissues and analyzed by conventional staining and differentiation techniques. In *P. niger* and *R. d'orbignyi* (2n=58), NORs (nucleolus organizer regions) were detected in a terminal position on the short arm of only one pair of chromosomes. However, in *T. paraguayensis* (2n=56), NORs were located in an interstitial position, also on a single pair of chromosomes.

#### INTRODUCTION

The Doradidae, widely distributed throughout different neotropical hydrographic basins, are Siluriformes with a series of bony plates along the flanks. The plates cover the lateral line totally or partially, and each one has a spine oriented

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posteriorly. The first ray of the dorsal and pectoral fins is very hard and has serrated edges. These fish are popularly known as "bacu", "cuiu-cuiu", "armado", "abotoado", etc. Gosline (1975), while analyzing the palatine-maxilar system found relationships between the Ariidae and Pimelodidae of the basal group of the Siluroidei, with the Doradidae.

Cytogenetic studies for this group are scarce. There are only three species whose diploid chromosome number is known: *Opsodoras humeralis* (Della Rosa *et al.*, 1980). *Pterodoras granulosus* and *Trachydoras paraguayensis* (Julio Jr. *et al.*, 1988). We compared the karyotypes of *Pseudodoras niger*, *Rhynodoras d'orbignyi* and *T. paraguayensis*.

## MATERIAL AND METHODS

Nine *P. niger* specimens (7 ♀ and 2 ♂) from the river Tocantins (Pará, Brazil), five *R. d'orbignyi* specimens (4 ♀ and 1 ♂) from the river Mogi-Guaçu (São Paulo, Brazil), and five *T. paraguayensis* specimens (3 ♀ and 2 ♂) from the river Paraná (Posadas, Argentina) were analyzed.

The chromosome preparations were obtained directly from the renal tissues, following the method of Bertollo *et al.* (1978), with small modifications, and also using a short term culture medium (Fenocchio *et al.*, 1991). The NORs were stained by the Howell and Black method (1980).

## RESULTS AND DISCUSSION

A modal diploid number of 58 chromosomes and a fundamental number (FN) of 102 were found for *P. niger* and *R. d'orbignyi*. The karyotype of the first species showed 10 pairs of metacentric (M), eight pairs of submetacentric (SM), four pairs of subtelocentric (ST) and seven pairs of acrocentric (A) chromosomes. *R. d'orbignyi* presented small differences, with the following chromosome order: 10 pairs of M, 10 pairs of SM, two pairs of ST and seven pairs of A. In both species the NORs were detected on the short arms of a single pair of SM chromosomes in a terminal position, which seemed to correspond with the secondary constrictions of the 15th and 16th pairs of the respective karyotypes (Figure 1a and 1b).

The karyotype of *T. paraguayensis* was distinct from that of the other two species with  $2n=56$  chromosomes and  $FN=112$ , composed of 16 pairs of M chromosomes, 10 pairs of SM, two pairs of ST and no A chromosomes. An NOR was found in only one pair of SM chromosomes, but it was located in an interstitial position on the long arm (Figure 1c).

No karyotypic differences were found between the males and females in the three species studied.

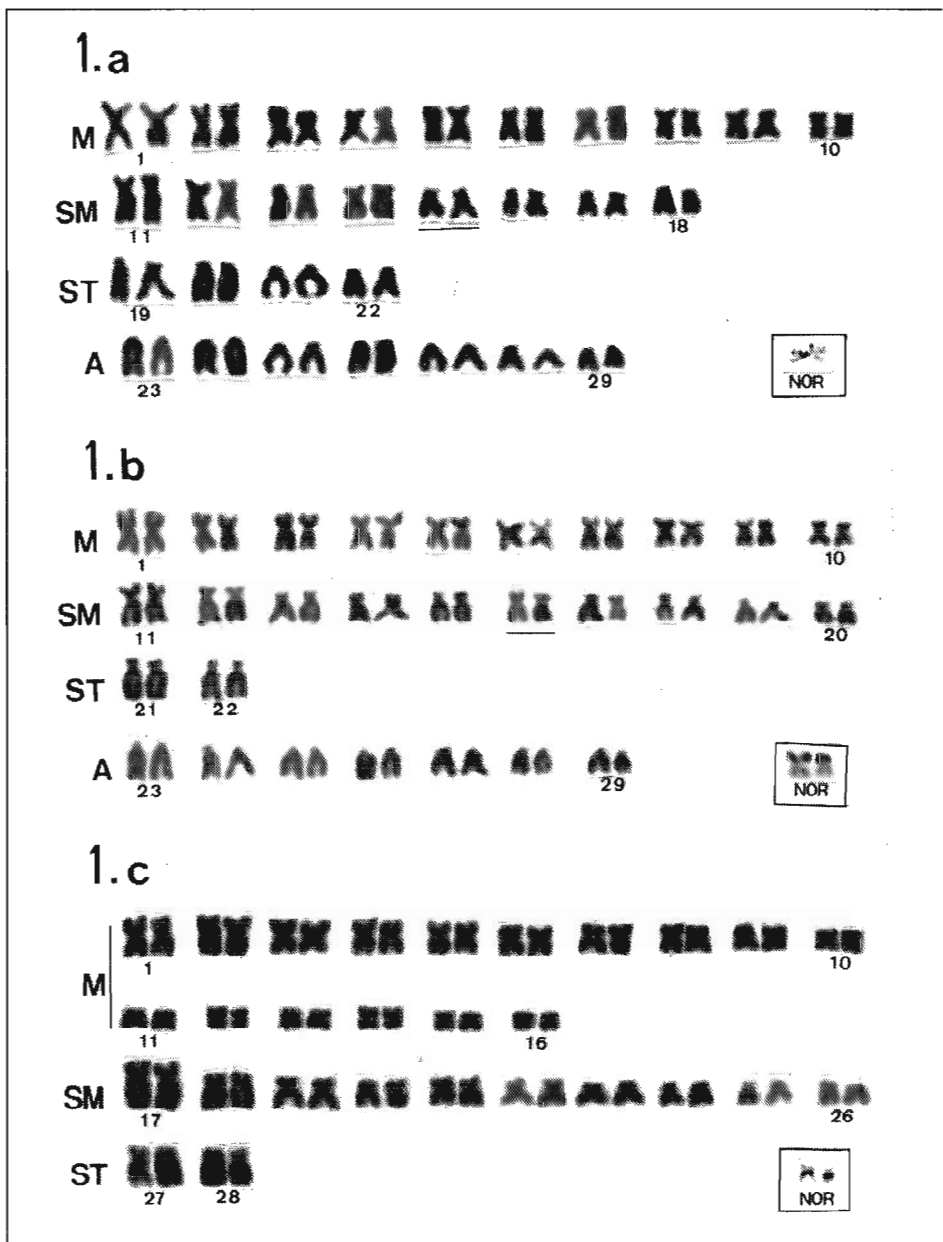


Figure 1 - Karyotypes of (a) *Pseudodoras niger* -  $2n=58$ , (b) *Rhynodoras d'orbignyi* -  $2n=58$ , (c) *Trachydoras paraguayensis* -  $2n=56$ . The underlined pairs in (a) and (b) correspond to the NOR carrying chromosomes. The NORs are indicated in the boxes, to the right of each karyotype, showing an association in (a).

Although each one of the three species can be characterized by its chromosomal complement, there is greater similarity between the karyotypes of *P. niger* and *R. d'orbignyi*, not only with respect to the general karyotypic structure but also to the NOR-bearing chromosome. This chromosome pair is comparable in both karyotypes, with a terminal NOR on the short arm, suggesting homology between *P. niger* and *R. d'orbignyi*.

*T. paraguayensis* from the Posadas region (Argentina), like that of the Alto Paraná (Julio Jr. *et al.*, 1988), presents a fairly unique karyotype, made up of a large quantity of bibraquial chromosomes, resulting in a higher FN. The interstitial position of the NOR, found in this species, is a relatively rare characteristic in the Siluroidei, having been described only among some species of Callichthyidae (Oliveira, 1987), Pimelodidae (Fenocchio and Dias, 1990), Aspredinidae and Loricariidae (Fenocchio *et al.*, 1990) and Ageneiosidae (Fenocchio and Bertollo, 1992). On the other hand, this NOR location seems to be a common characteristic among the Hypoptopomatinae (Loricariidae) (Andreata, 1991).

Four of the five species of Doradidae already analyzed, *P. niger* and *R. d'orbignyi* (present paper), *Opsodoras humeralis* (Della Rosa *et al.*, 1980) and *Pterodoras granulosus* (Julio Jr. *et al.*, 1988), present  $2n=58$ , which is regarded as basic for the neotropical Siluroidei (Oliveira *et al.*, 1988).

According to some authors, the reduction or loss of boney structures in the Siluroidei, especially the aculei, generally characterizes the more derived species (Britski, Garavello and Shibata, personal communications). This seems to be the case with *T. paraguayensis* within the Doradidae. The karyotypic data obtained for this species also support this argument. Apparently this species has a derived karyotype in comparison with other species in this family.

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## RESUMO

Foram estudadas, citogeneticamente, as espécies *Pseudodoras niger*, *Rhynodoras d'orbignyi* e *Trachydoras paraguayensis* (Doradidae, Pisces, Siluriformes). As preparações cromossômicas foram obtidas diretamente a partir de tecidos renais e analisadas mediante técnicas de coloração convencional e diferencial (NOR). Para *P. niger* e *R. d'orbignyi* detectou-se a presença de  $2n=58$  cromossomos e NORs em posição

terminal, no braço curto de um só par de cromossomos. *T. paraguayensis* apresenta  $2n=56$  e NORs em posição intersticial, também em um só par de cromossomos.

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