

SHORT COMMUNICATION

THE KARYOTYPE OF *Oryzomys capito laticeps* (CRICETIDAE, RODENTIA) FROM CENTRAL BRAZIL

Marta Svartman and Eunice Judith Cardoso de Almeida

ABSTRACT

Cytogenetical data, including G-, C-, R-bands and NORs of *Oryzomys capito laticeps* (2n=54; FN=62) captured in Central Brazil are presented. The karyotype described in this paper is compared with those of other *O. capito* specimens.

INTRODUCTION

Two karyotypical forms of *Oryzomys capito* have been described in the literature: one with 2n=54 and FN=62, in animals from the states of Amazonas and Pará (Leitão and Barros, 1977; Barros, 1978), from the Suriname (Baker *et al.*, 1983; Koop *et al.*, 1984) and from Venezuela (Perez-Zapata *et al.*, 1986); a second form with 2n=52 and FN=62 was described in specimens from the states of Pernambuco (Maia, 1990), Paraíba (Zanchin, 1988) and from Peru (Gardner and Patton, 1976).

The karyotypes with 2n=52 and 2n=54 are very similar and, based on the chromosomal number and morphology, Maia (1990) suggested that they represent a single karyotypical entity and that one Robertsonian event was responsible for their difference. Nevertheless, data on the banding patterns of the complement with 2n=54,

that would allow the degree of similarity of both karyotypes, as well as the chromosomal mechanisms involved in their discrepancy, to be checked has not been available.

In this work we describe the cytogenetical data of *O. capito laticeps* with $2n=54$, $FN=62$ from Central Brazil. Our results include G-, C- and R-banding, as well as NORs distribution analysis. We compare the banded karyotype of our animals with the ones previously described.

MATERIAL AND METHODS

Two male *O. capito laticeps*, captured in the Reserva Biológica de Águas Emendadas ($15^{\circ}33'S$; $47^{\circ}35'W$) and Reserva Ecológica do IBGE ($15^{\circ}56'S$; $47^{\circ}53'W$), Federal District, state of Goiás, Central Brazil, were analyzed cytogenetically. The specimens were identified by Dr. Philip Hershkovitz (Field Museum of Natural History, Chicago) and by the group of Prof. Jader Marinho Filho (Universidade de Brasília). The skins and skulls were deposited in these two institutions.

Cell cultures obtained from tail biopsy were used for chromosomal preparations (Almeida and Yonenaga-Yassuda, 1985). G-, C- and R-bandings were performed according to Seabright (1971), Sumner (1972) and Dutrillaux *et al.* (1976), respectively. NORs were demonstrated following the method of Howell and Black (1980).

RESULTS

Both animals studied displayed a karyotype with $2n=54$ and $FN=62$, composed of: 21 acrocentric autosomal pairs, 5 biarmed autosomal pairs, a large acrocentric X and a medium acrocentric Y (Figure 1).

G-banding patterns (Figure 2) allowed the identification of almost all chromosomal pairs, including the sexual one. The X chromosome had four conspicuous bands in the long arm and the Y appeared uniformly stained.

Pericentromeric heterochromatin was revealed by C-banding in all autosomes and in the X chromosome, which also had two interstitial blocks in its long arm. The long arm of the Y chromosome, except for the proximal region, was strongly stained (Figure 3).

The R-banding pattern (Figure 4), presented here for the first time for this species, permitted the recognition of all the autosomes and of the sexual pair. The Y chromosome is totally late replicating.

The NORs, analyzed in 76 cells of both specimens, always occurred in the short arms of acrocentric autosomes. The minimum number of chromosomes per cell, bearing NORs, was five, the maximum, ten and the modal number of NORs was eight (Table I, Figure 5).

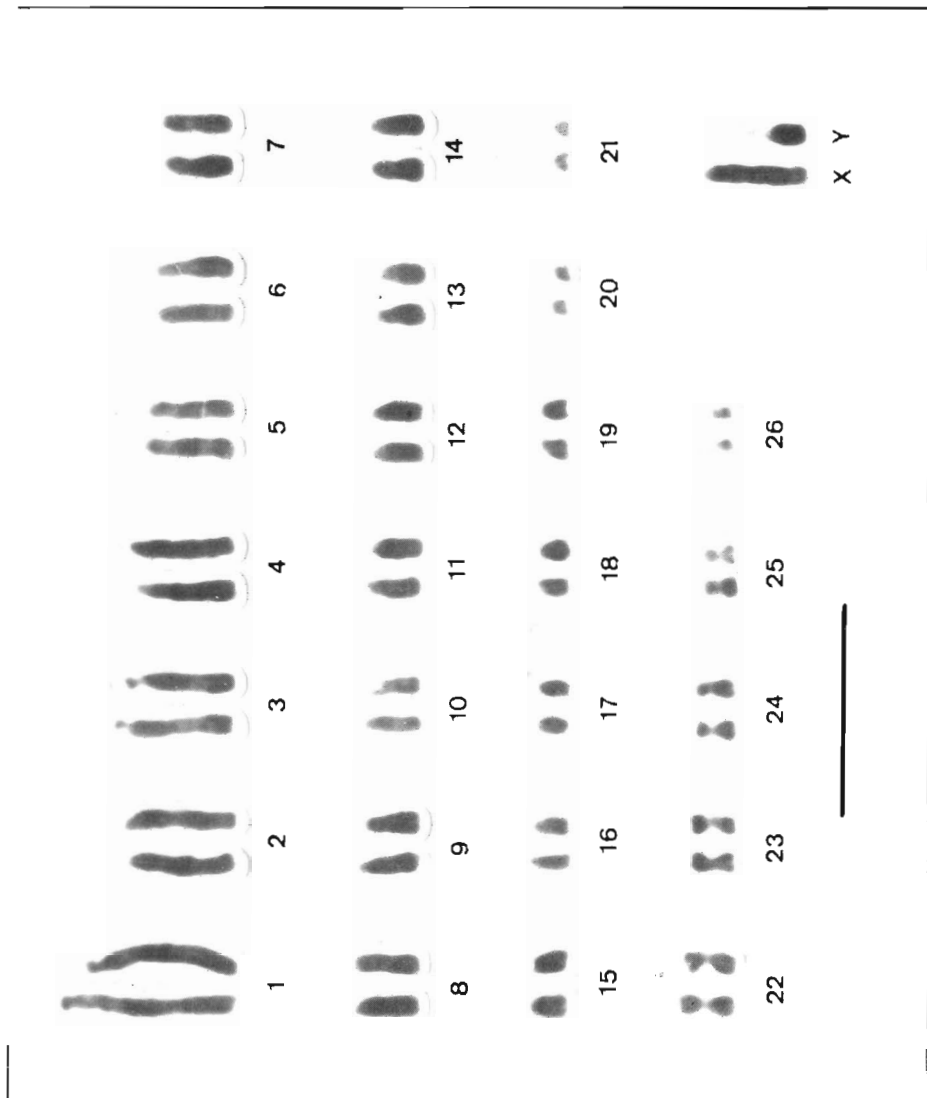


Figure 1 - Karyotype of a male *Oryzomys capito laticeps* ($2n=54$; FN=62). The bar indicates 10 μ m.

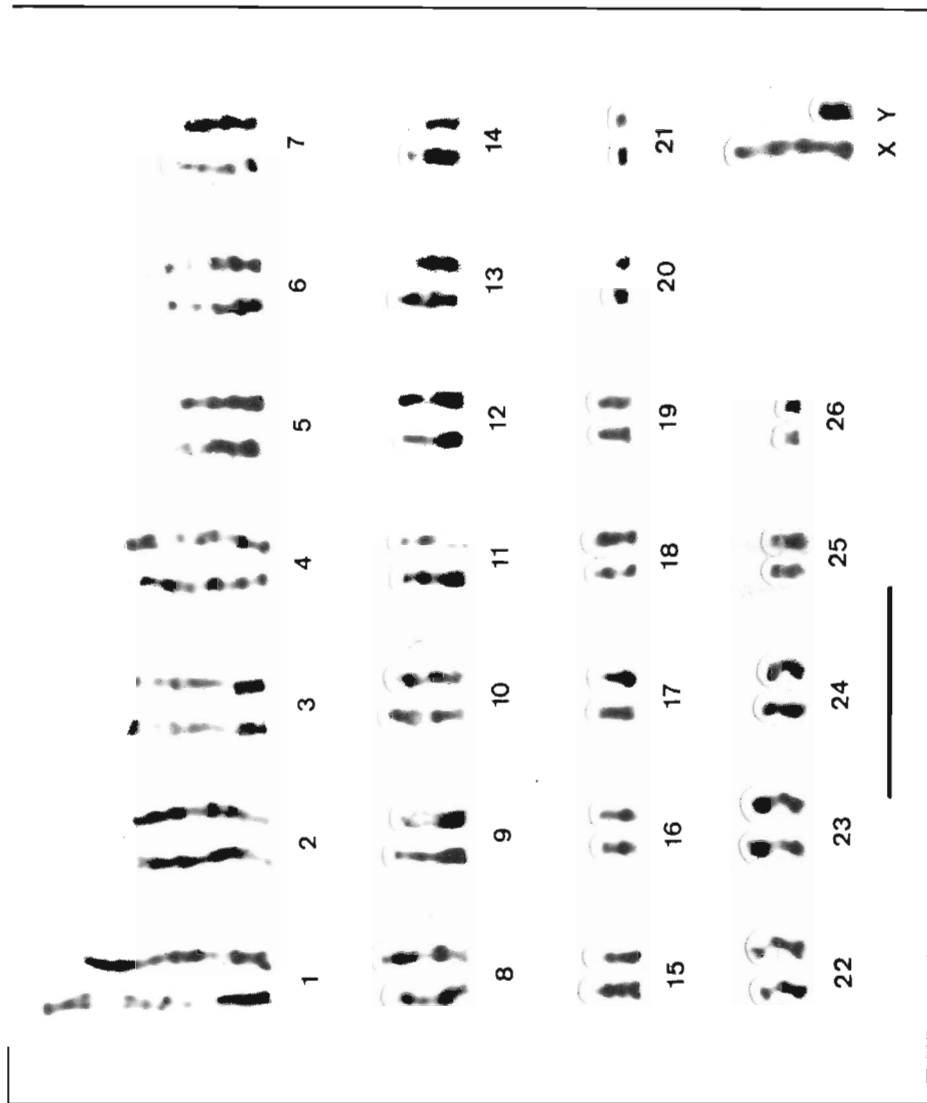


Figure 2 - G-banded karyotype of a male *Oryzomys capito laticeps* ($2n=54$; $FN=62$). The bar indicates 10 μm .

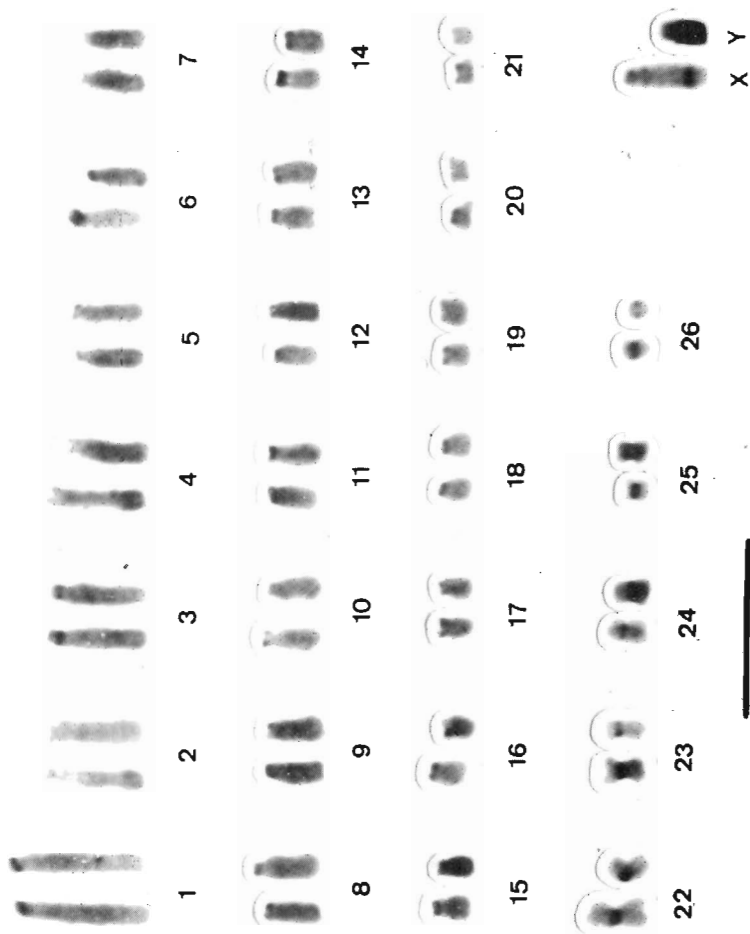


Figure 3 - C-banded karyotype of a male *Oryzomys capito laticeps* ($2n=54$; FN=62). The bar indicates 10 μm .

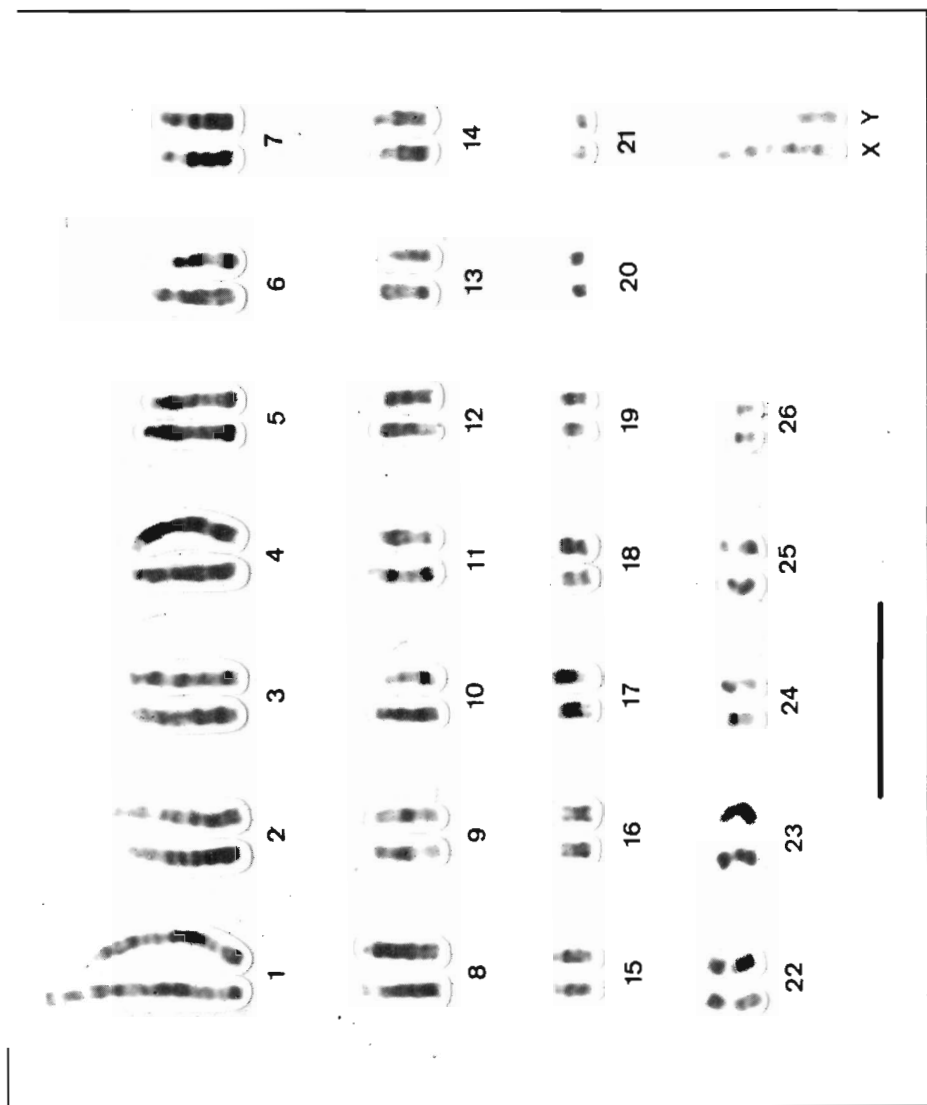


Figure 4 - R-banded karyotype of a male *Oryzomys capito laticeps* ($2n=54$; FN=62). The bar indicates 10 μm .

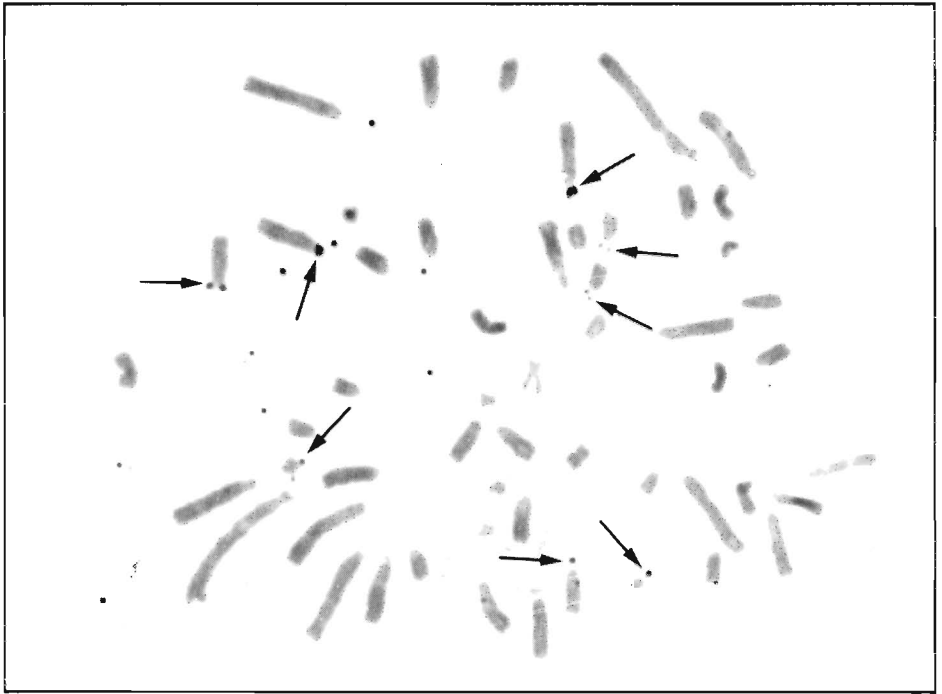


Figure 5 - NORs in a metaphase of a male *Oryzomys capito laticeps* ($2n=54$; FN=62). The arrows indicate eight NORs.

Table I - Nucleolus Organizer Regions (NORs) in *Oryzomys capito laticeps* ($2n=54$; FN=62).

Specimen	Sex	Number of NORs per cell						Number of cells
		5	6	7	8	9	10	
Bio 409	M	-	1	14	24	2	-	41
Bio 531	M	1	6	5	17	5	1	35

DISCUSSION

The karyotype of the animals identified as *O. capito laticeps*, with $2n=54$ and FN=62, was identical to the one described in specimens of *O. capito* from the states of Amazonas and Pará (Barros, 1978) and differs from the complement with $2n=52$, FN=62,

found in *O. capito* trapped in the States of Paraíba (Zanchin, 1988) and *O. capito oniscus* from Pernambuco (Maia, 1990), by the presence of two extra pairs of acrocentrics and the absence of one metacentric pair.

A comparison of the G-banded karyotype of *O. capito laticeps* and *O. capito oniscus* (Maia, 1990) showed homologies between the fourteen largest autosomal pairs of both complements, as well as between their X chromosomes. The smallest autosomes could not be compared due to their small size and the Y because it was not described in *O. capito oniscus*. A Robertsonian rearrangement, involving the smallest acrocentric pairs of *O. capito laticeps* (pairs 20 and 21) and a small metacentric pair (pair 23 or 24) of *O. capito oniscus* was responsible for the difference in the diploid numbers.

The autosomal and Y chromosomes C-banding patterns were identical in the specimens of *O. capito* from Central Brazil and from Pernambuco (Maia, 1990), while the X chromosome, which showed only pericentromeric heterochromatin in the animals studied by Maia (1990), had two additional interstitial heterochromatic blocks in our sample. Heterochromatic interstitial blocks have also been described in the Xs of *Sigmodon ochrognatus* (Elder and Lee, 1985), *Nectomys squamipes* (Yonenaga-Yassuda *et al.*, 1988) and *Oryzomys subflavus* (Almeida and Yonenaga-Yassuda, 1985).

The number and location of NORs were variable among the samples of *O. capito*: in the animals from Pernambuco (Maia, 1990) NORs occurred in the telomeres of the short arms of small acrocentrics and banded chromosomes and varied in number from four to six; in the specimen from Paraíba (Zanchin, 1988), six to nine autosomes per cell showed NORs; and in our sample, five to ten NORs were observed, always in the short arms of acrocentrics. These data show that at least ten chromosomes are involved with nucleolus formation in this species.

Although Maia (1990) considered that the *O. capito* with $2n=54$ and $2n=52$ represent a single karyotypic entity, we are tempted to assume that they may pertain to different subspecies, as Dr. Hershkovitz identified the animals from central Brazil as *O. capito laticeps*, while the specimens with $2n=52$ studied by Maia (1990) were classified as *O. capito oniscus*. The two karyotypical forms of *O. capito*, have not been observed in the same geographical area, which could mean that they do not occur in sympatry.

ACKNOWLEDGMENTS

We are indebted to Dr. Philip Hershkovitz and to Marcelo Lima Reis, who provided us with the specimens studied; to Dr. Hsi Tien Chu, who performed the cell cultures, to Dr. Helena Luna Ferreira and Dr. Jader Marinho Filho, who gave us working possibilities in Brasília and to Miriam Romeo and Cristina M.L. Barnabé, for technical assistance.

This work was supported by Fundação de Amparo à Pesquisa do Estado de São Paulo (FAPESP), Programa Integrado de Genética (PIG) and Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq). Publication supported by FAPESP.

RESUMO

Foram estudados citogeneticamente espécimes de *Oryzomys capito laticeps* coletados no Distrito Federal, Brasil Central. Os animais apresentaram um cariótipo com $2n-54$ e NF-62, que se diferencia do descrito para *O. capito oniscus* ($2n-52$; NF-62) por um rearranjo Robertsoniano. Foram feitas comparações entre esses dois cariótipos com base nos padrões de bandeamento.

REFERENCES

- Almeida, E.J.C. and Yonenaga-Yassuda, Y. (1985). Robertsonian fusion, pericentric inversion and sex chromosome heteromorphisms in *Oryzomys subflavus* (Cricetidae, Rodentia). *Caryologia* 38: 129-137.
- Barros, R.M.S. (1978). Variabilidade cromossômica em *Proechimys* and *Oryzomys* (Rodentia) da Amazônia. PhD Thesis, Universidade de São Paulo, São Paulo.
- Baker, R.J., Koop, B.F. and Haiduk, M.W. (1983). Resolving systematic relationships with G-bands: a study of five genera of South American cricetine rodents. *Syst. Zool.* 32: 403-416.
- Dutrillaux, B., Couturier, J., Richer, C.L. and Viegas-Péquignot, E. (1976). Sequences of DNA replication in 277 R- and Q-bands of human chromosomes using a BrdU treatment. *Chromosome* 58: 51-61.
- Elder, F.F.B. and Lee, M.R. (1985). The chromosomes of *Sigmodon ochrognathus* and *S. fulviventer* suggest a realignment of *Sigmodon* species groups. *J. Mamm.* 66: 511-518.
- Gardner, A.L. and Patton, J.L. (1976). Karyotypic variation in Oryzomyine rodents (Cricetinae) with comments on chromosomal evolution in the Neotropical cricetine complex. *Occ. Papers of Mus. Zool.* 49: 1-48.
- Howell, W.M. and Black, D.A. (1980). Controlled silver-staining of nucleolus organizer regions with a protective colloidal developer: a 1-step method. *Experientia* 36: 1014-1015.
- Koop, B.F., Baker, R.J., Haiduk, M.W. and Engstrom, M.D. (1984). Cladistical analysis of primitive G-band sequences for the karyotype of the ancestor of the Cricetidae complex of rodents. *Genetica* 64: 199-208.
- Leitão, C. and Barros, R. (1977). Karyotypic studies of *Oryzomys* (Rodentia) from Amazon region. III *Congresso Latino Americano de Genética*, Uruguai: 242 (resumes).
- Maia, V. (1990). Karyotype of *Oryzomys capito oniscus* (Rodentia) from Northeastern Brazil. *Rev. Bras. Genet.* 13: 377-382.
- Perez-Zapata, A., Reig, O.A., Aguilera, M. and Ferrer, A. (1986). Cytogenetics and karyosystematics of South American oryzomyne rodents (Cricetidae: Sigmodontinae). I. A species of *Oryzomys* with low chromosome number from Northern Venezuela. *Z. Sauget.* 51: 368-378.
- Seabright, M. (1971). A rapid technique for human chromosomes. *Lancet* 2: 971-972.
- Sumner, A.T. (1972). A simple technique for demonstrating centromeric heterochromatin. *Exptl. Cell Res.* 75: 304-306.

- Yonenaga-Yassuda, Y., Maia, V. and L'Abbate, M. (1988). Two tandem fusions and supernumerary chromosomes in *Nectomys squamipes* (Cricetidae, Rodentia). *Rev. Bras. Genet. X*: 209-220.
- Zanchin, N.I.T. (1988). Estudos cromossômicos em orizomíinos e equimíideos da Mata Atlântica. Masters Thesis, Universidade Federal do Rio Grande do Sul, Porto Alegre.

(Received December 12, 1991)