

SHORT COMMUNICATION:

Cytogenetic analysis of the Pampas Deer, *Ozotoceros bezoarticus* (Mammalia, Cervidae)

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ABSTRACT

The chromosome constitution of five males and three females of the Pampas deer (*Ozotoceros bezoarticus*) coming mainly from the region of Corumbá-MS, was studied. The diploid number of the species was reconfirmed as 68 chromosomes with Fundamental Number (FN) = 74. The X chromosome was the largest and the Y the smallest in the genome. Constitutive heterochromatin demonstrated by C banding was present in the centromeric region of all chromosomes, except in pair number two, which had none, and in chromosome X which had a stained region in the telomere on the long arm. Chromosomes pairs 3 and 4 bore Ag-NORs. The banding patterns differed from those of previous reports for this species. This may be due to subspecific differences.

INTRODUCTION

The Pampas deer (*Ozotoceros bezoarticus*) is a South American deer threatened with extinction (Bernardes *et al.*, 1990), Appendix no. I of the CITES (Convention of International trade in Endangered species of wild Flora and Fauna). It is found in open grassland and savannah areas (Ribeiro, 1919) and is divided into three subspecies according to Cabrera (1960): *O.b. bezoarticus* is found in central and eastern Brazil, between the southern edge of the Amazon basin and the Mato Grosso plateau as far east as the São Francisco river basin, and to the south as far as Rio Grande do Sul and Uruguay; *O.b. celler* is found in the pampas region of Argentina and *O.b. leucogaster* is

found in western Brazil and in southern Mato Grosso state, in the extreme southeast of Bolivia, in Paraguay and in northern Argentina, as far as the Chaco Santiaguense and the northern provinces of Santa Fé and Corrientes. According to Redford (1987), this species is the least known within the six deer genera found in South America.

The species karyotype was first reported by Neitzel (1979) as $2n=68$ and $FN=74$. Neitzel (1987) showed a C-banded metaphase with a large quantity of heterochromatin in the X chromosomes. Spotorno *et al.* (1987) found the same in a female from Uruguay and also found an absence of heterochromatin in the smallest metacentric chromosome. Only the telomere of the largest acrocentric chromosome had NOR-bands (Spotorno *et al.*, 1987).

This study was carried out to confirm these data with the analysis of a larger number of animals from different locations.

MATERIAL AND METHODS

Five males and three females, of *O. bezoarticus*, were used in this study (Figure 1). Seven were captured in the wild, by the technique described by Duarte (1992), in the district of Corumbá, MS, Brazil. The other animal was from the Sorocaba Zoo (Sorocaba City, SP, Brazil), of unknown origin.



Figure 1 - The male Pampas deer (*Ozotoceros bezoarticus*).

Lymphocytes were cultured according to Moorhead *et al.* (1960) and the Sumner (1972) and Howell and Black (1980) techniques were used for C and NOR-banding patterns, respectively. All the techniques were slightly modified.

Chromosomic biometry was used to obtain the Arm Ratio (AR) and subsequent chromosome classification, according to Guerra (1986).

RESULTS

All the animals had a diploid number of 68 chromosomes, with two metacentric autosomes (AR = 1.20 and 1.49), the remaining being acrocentric chromosomes (FN = 74). The X chromosome was the largest of the karyotype and metacentric (AR = 1.19) while the Y was the smallest and also metacentric (AR = 1.16) (Figure 2). With C banding, the majority of the

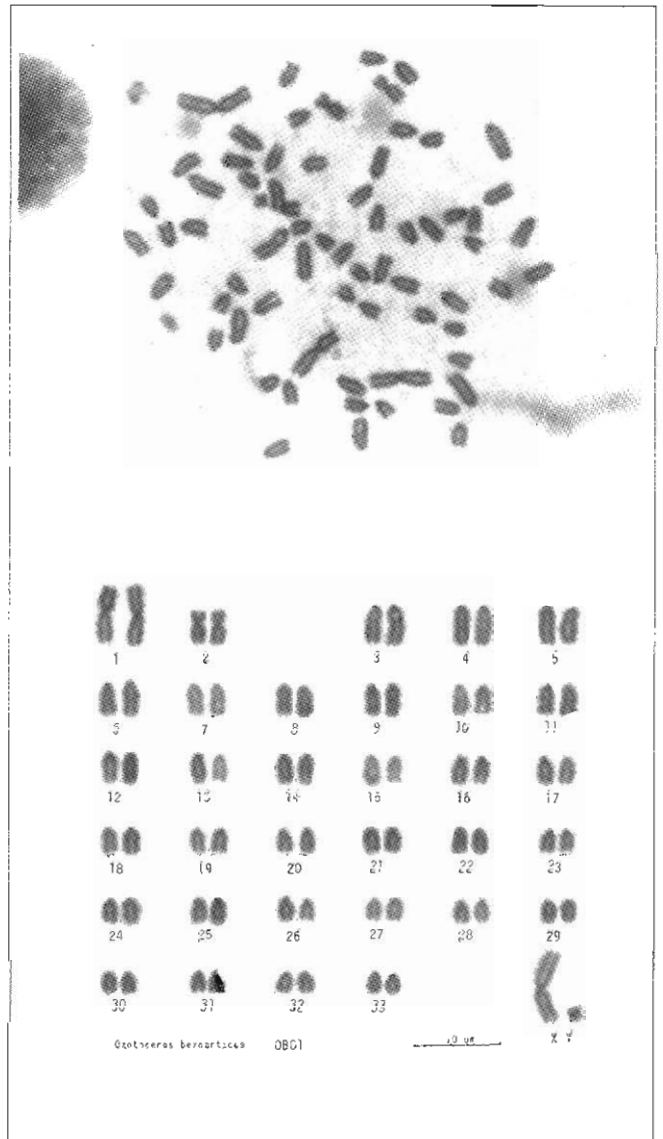


Figure 2 - Karyotype of a male Pampas deer (*Ozotoceros bezoarticus*) with conventional Giemsa staining.

chromosomes had strong staining in the centromeric region. Chromosome pair number 2, which showed very weak bands and the X chromosome, with two thirds of the terminal part of the long arm stained were exceptions (Figure 3). Chromosomes 3 and 4 had NOR banding in the telomeric region (Figure 4).

DISCUSSION

Within this population there was chromosome stability, without polymorphisms. Some differences, were observed in comparison with the animal analysed by Spotorno *et al.* (1987) (*O. b. celler*). The most evident difference was in the number of pairs of Ag-NOR bearing chromosomes. In our animals two chromosome

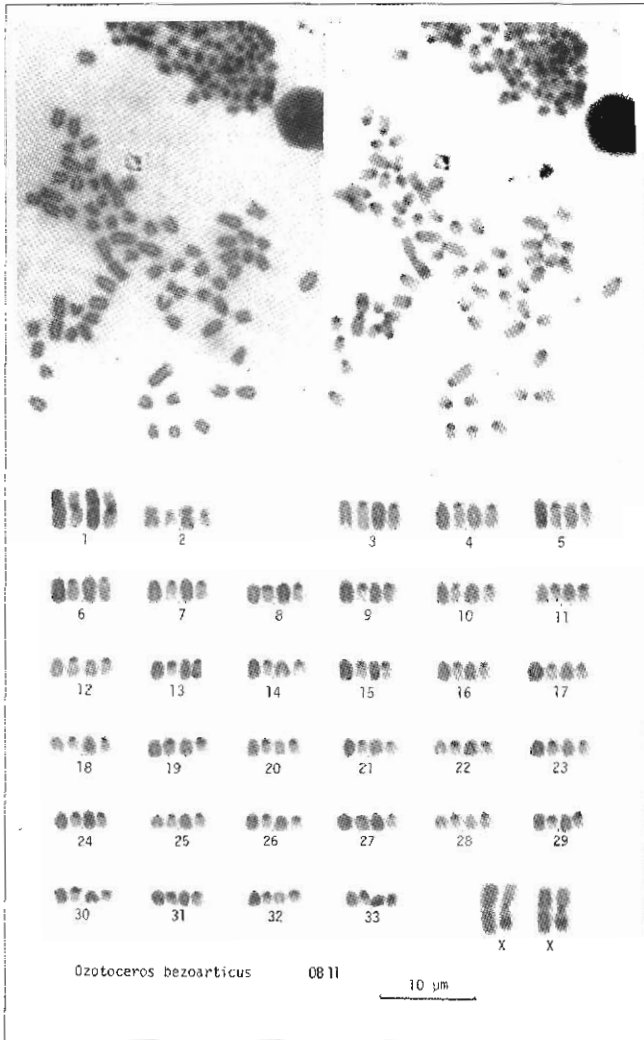


Figure 3 - Sequential Giemsa-stained and C-banding karyotype of a female Pampas deer (*Ozotoceros bezoarticus*).

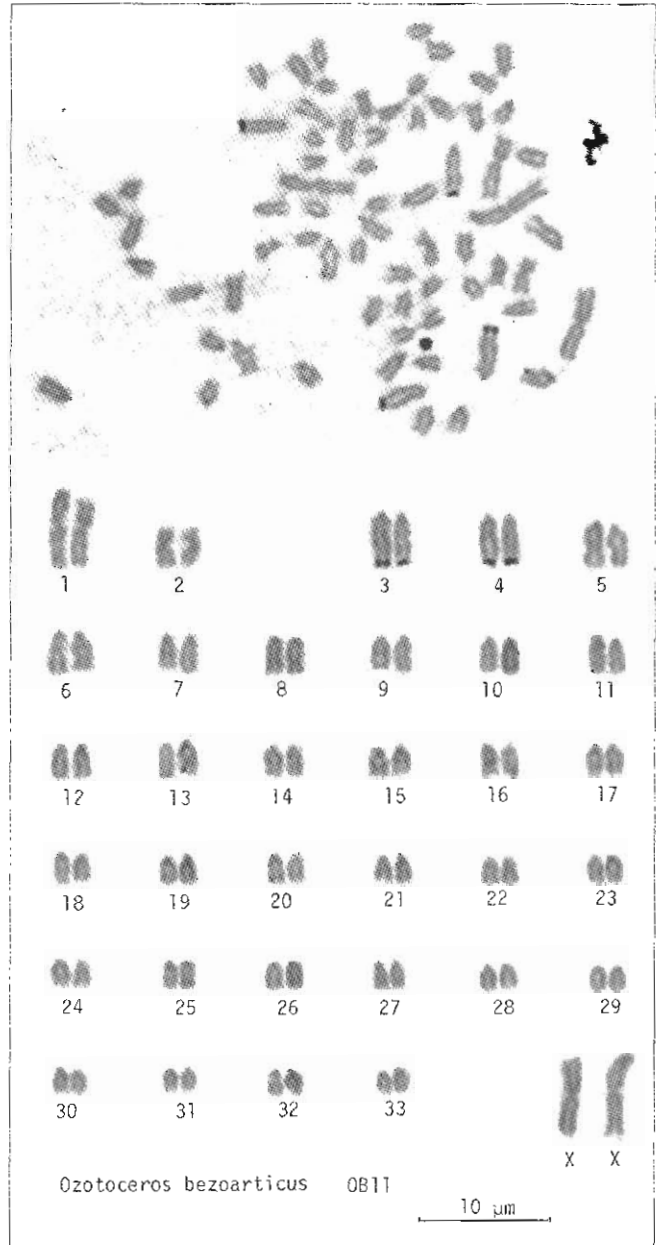


Figure 4 - Karyotype with Ag-NOR bands of a female Pampas deer (*Ozotoceros bezoarticus*).

pairs bore Ag-NORs whereas the Uruguayan animal had only one pair. Also, the large telomeric C-band on the X chromosome which we found in all the animals was not reported by other authors.

These differences suggest genetic variability among the populations, as indicated by the classification of Cabrera (1960).

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RESUMO

A constituição cromossômica do veado Campeiro (*Ozotoceros bezoarticus*) foi estudada em cinco machos e três fêmeas oriundas, em sua maioria, do município de Corumbá-MS. O número diplóide da espécie é de 68 cromossomos com $2n=74$. O cromossomo X é o maior lote e Y o menor. A heterocromatina constitutiva, marcada pela banda C, esteve presente em todos os cromossomos na região centromérica com exceção do par no. 2, que não marcou, e do cromossomo X o qual teve uma região marcada no telômero do braço longo. Os cromossomos 3 e 4 foram os portadores da região organizadora do nucléolo. Os resultados

apresentados diferem, nos padrões de bandeamento dos anteriormente publicados para a espécie, podendo estas diferenças estarem relacionadas às diferentes subespécies analisadas.

REFERENCES

- Bernardes, A.T., Machado, A.B.M. and Rylands, A.B.** (1990). *Fauna Brasileira Ameaçada de Extinção*. Fundação Biodiversitas, Belo Horizonte, pp. 62.
- Cabrera, A.** (1960). Catálogo de los mamíferos de America del Sur. *Rev. Museo Argent. Ciencias Nat. "Bernardino Rivadavia" 4*: 309-732.
- Duarte, J.M.B.** (1992). Aspectos taxonômicos e citogenéticos de algumas espécies de cervídeos brasileiros. Master's Thesis, Fac. Ciências Agrárias e Veterinárias, UNESP, Jaboticabal, SP.
- Guerra, M.S.** (1986). Reviewing the chromosome nomenclature of Levan *et al.* *Rev. Brasil. genet.* 9: 741-743.
- Howell, W.M. and Black, D.A.** (1980). Controlled silver-staining of nucleolous organizer regions with a protective colloidal developer: a 1. step method. *Experientia* 36: 1014-1015.
- Moorhead, R.S., Nowell, P.C., Melinan, W.J., Battips, D.M. and Hungerford, A.** (1960). Chromosome preparations of leucocytes culture from human peripheral blood. *Exp. Cell Res.* 20: 613.
- Neitzel, H.** (1979). Chromosomenevolution in der Familie der Hirsche (Cervidae). *Bongo* 3: 27-38.
- Neitzel, H.** (1987). Chromosome evolution of Cervidae: Karyotypic and molecular aspects. in: *Cytogenetic, Basic and Applied Aspects* (Obe, G. and Basler, A., eds.). Springer Verlag, Berlin, pp. 90-112.
- Redford, K.** (1987). The Pampas Deer (*Ozotoceros bezoarticus*) in Central Brazil. In: *Biology and Management of the Cervidae* (Wemmer, C.M., ed.). Smithsonian Institution Press, Washington, pp. 410-414.
- Ribeiro, A.M.** (1919). Veados do Brasil segundo as coleções Rondon e de vários museus nacionaes e estrangeiros. *Rev. Museu Paulista* 11: 213-308.
- Spotorno, A.E., Brum, N. and Tomaso, M.D.** (1987). Comparative cytogenetics of american deer. *Fieldiana* 39: 473-483.
- Sumner, A.T.** (1972). A simple technique of demonstrating centromeric heterochromatin. *Exp. Cell Res.* 75: 304-306.

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