CYTOGENETIC INVESTIGATION OF THE SAMBAR DEER, *CERVUS UNICOLOR EQUINUS*

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Introduction

In our literature search on the deer chromosomes, we noticed that the diploid number (2n) of the Sambar deer from the Philippines, *Cervus unicolor*, was reported to be 64 and 65 in the male and female deer respectively (Hsu and Benirschke, 1973). On the other hand, the chromosome make-up of the Malaysian Sambar deer, *Cervus unicolor equinus,* has not yet been investigated. There is the danger of extinction facing this ruminant species and the incongruity of chromosome constitutions between male and female Sambar deer (Hsu and Benirschke, 1973). We decided to investigate the diploid number and the general morphology of both male and female Malaysian Sambar deer chromosomes especially since it is not known at present whether the Malaysian and the Philippines deer species are one and the same.

Materials and Methods

Blood samples were collected from three adult male and three adult female *Cervus unicolor equinus* kept in captivity at the Melaka Zoo, located 140 km south of the university. The method of culturing, terminating and harvesting lymphocytes were adapted with some modifications, from that described previously (Rosnina, 1994) for conventional analysis. The concentration of colcemid was increased (0.1 mg/ml) the duration of hypotonic treatment was extended from 12 minutes to 15 minutes and and slides were dried using a hair dryer. Slides were stained with 10% Giemsa for four minutes and then, washed under running water. Each slide was examined under a phase-contrast light microscope and photographs of good chromosome spreads were taken using black and white Technical Pan films. Karyotypes were made from developed black and white prints of chromosome spreads.

Results and Discussion

Combined scores of chromosome spreads from three cultures of each sex were tabulated. Approximately, 87.7% and 86.9% of cultured cells from the male and female deer respectively exhibited 62 chromosomes. Cells with 55, 57, 59 and 61 chromosomes noted in cultures of both sexes were probably *in vitro* artefacts due to loss of chromosomes during preparation. The fundamental number, NF, is 70. The chromosomes may be grouped into two distinct series based on the centromeric position. Both male and female Sambar deer displayed 4 pairs of biarmed chromosomes and 27 pairs of uniarmed chromosomes. The biarmed elements consisted of 2 pairs of submetacentrics and 2 pairs of metacentrics. The X-chromosomes were the largest pair among the acrocentrics while the Y-chromosomes was the smallest of the acrocentrics in the metaphase spreads from cultures of male Sambars. The karyotype of *Cervus unicolor equinus* described here differs from that of the Philippines species in several aspects. Earlier studies on the diploid number of the Philippine species were reported to carry a diploid number of 64 and 65 chromosomes (Hsu and Benirschke, 1973). On the other hand, our study clearly shows that the total chromosome number of both male and female Sambars is 62. In the course of our chromosome analyses, we have not encountered cell populations exhibiting more than 62 chromosomes. However, there have been reports on organisms with difference in diploid number between sexes. In one report (Ohno et al. 1965), there was a disparity in chromosome number between sexes among lower organisms and in some rodents such as the Creeping vole, *Microtus oregoni,* in which a loss of a gonosome occurs during gametogenesis. However, the loss of a chromosome in this case, occurs in the male. Thus, it is unlikely that the female Sambar will have an extra chromosome relative to the male as reported by Hsu and Benirschke (1973). According to these investigators, the difference in chromosome number between the sexes is due to a Robertsonian translocation between the two acrocentrics of the female deer, which underwent a centric fusion to form a submetacentric in the male. However, in their report, they failed to indicate the number of cells examined from skin biopsies, to justify their statement.

Conclusions

Based on our cytogenetic investigation, the diploid number of *Cervus unicolor equinus* is 62 for both sexes. It is possible that the previous report was based on a small number of cells and therefore subject to erroneous interpretation of a chromosomal polymorphism in the population. However, a detailed karyotype analysis using banding techniques on the species from the Philippines and from Malaysia will be necessary to establish if they represent chromosomal polymorphism followed by geographic isolation.

References

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