

## SHORT COMMUNICATIONS

### SUPERNUMERARY CHROMOSOMES IN THE MARSUPIAL

#### *SCHOINOBATES VOLANS* (KERR)\*

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The presence of special chromosomes which are additional to, and different from, the normal chromosomes, has been reported in many organisms, particularly in plants (Muntzing 1958). These are variously described as *B* chromosomes, supernumerary chromosomes, or accessory chromosomes. This communication describes the demonstration of these chromosomes in the greater glider, *Schoinobates volans* (Kerr). We believe this to be the first report of supernumerary chromosomes in a mammal.

Mr. R. Smith, Department of Zoology, Australian National University, made available to us five females and two males which had been collected from an area near Bondo, 23 miles east of Tumut in the Southern Tablelands of New South Wales. With one exception attempts to culture the leucocytes failed and cytological studies were carried out on the bone marrow divisions, using the technique of Ford and Hamerton (1956). Colchicine (1 ml, 0.02% solution) was injected 1 hr before the animals were killed. Testicular material was also examined.

Four different chromosome numbers were found in the five females examined,  $2n = 24, 26, 27$  (twice), and 28; one male had  $2n = 25$ , the other  $2n = 26$  (see Plate 1, Figs. 1*a* and 2*a*). All females had 22 large chromosomes and the males 21 large chromosomes. The additional chromosomes were very small and uniform in size. Some 20 cells from each individual were counted, and the chromosome numbers were constant from cell to cell. Further, where two or more different tissues, e.g. bone marrow, peripheral lymphocytes, and testes, were examined from the one animal the results were always the same.

The male contains one unpaired chromosome among the large chromosomes and this is present twice in the female (Plate 1, Figs. 1*b* and 2*b*). Since marsupials have either an  $XX/XY$  or  $XX/XY_1Y_2$  sex-chromosome system (Sharman 1961) a distinction has to be made between these in this species. An  $XX/XY_1Y_2$  sex-chromosome system would require the presence in the male of a relatively large, probably acrocentric,  $Y_2$  element absent in the female. Such a chromosome has not been seen. It is assumed that one of the small chromosomes in the male is a  $Y$ -chromosome and that the sex-chromosome system is of the  $XX/XY$  type. In spermatogonial mitoses, one of the small chromosomes does appear to be larger than the rest (Plate 1, Fig. 3).

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Agar (1923) reported that the chromosome number of *Petauroides volans* (syn. *Schoinobates volans*) was "almost certainly twenty two, the male being  $20 + XY$ ". While this count was made before improved techniques enabled good preparations, it is clear that no small supernumerary chromosomes of the sort reported here were observed; had they been present, they would most likely have been seen. It is not clear where the material examined by Agar was obtained. The species occurs close to Melbourne and there is a possibility that he obtained his specimens in that locality. A study of the chromosomes of animals from this area would be of interest.

The range in the number of the small chromosomes (from 2 to 6) and the absence of any gross morphological features or sex determination associated with this range suggest that they are closely analogous to the supernumerary chromosomes found in plants. The population from Bondo has a high frequency of these supernumerary chromosomes—indeed, unusually high when compared to the situation in plants. The significance of such a high frequency cannot be indicated at present. Studies of the meiotic divisions in the male to detect possible aberrant segregations of supernumerary chromosomes have not been possible because the critical divisions have been poorly represented in the material available. There are no genetic data about the inheritance of these chromosomes.

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### EXPLANATION OF PLATE 1

All magnifications  $\times 1430$

- Fig. 1a.—Somatic division from the bone marrow of a male with 21 large and four small chromosomes.
- Fig. 1b.—Cut-out of Figure 1a showing probable pairing. The unpaired large metacentric is thought to be the X-chromosome; the group of four small chromosomes is thought to include three supernumeraries and a Y-chromosome.
- Fig. 2a.—Somatic division from the bone marrow of a female with 22 large chromosomes and five supernumeraries.
- Fig. 2b.—Cut-out of Figure 2a showing probable pairing and sex chromosomes.
- Fig. 3.—Spermatogonial mitosis from the same individual as in Figure 1 and showing three supernumeraries and the chromosome which is presumed to be the Y (indicated by arrow).

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