Wakahama, K.[1], O. Kitagawa and O. Yamaguchi[2]. 1. Shimane University, Matsue, Japan; 2. Tokyo Metropolitan University, Japan. Evolutionary and genetical studies of the D. nasuta subgroup. I. Chromosomal polymorphism found in the natural populations of D. albomicans.

Drosophila albomicans is one of very polymorphic species chromosomally. From the analyses of the salivary gland chromosomes of this species in two strains of the Okinawan Islands and eighteen strains in Formosa, we have found 4 heterozygotic inversions in the X chromosome, 3 in chromosome 2R, 11 in chromosome 2L and 2 in chromosome 3. Among them, an inversion named 2L A is the most common in all but two strains.

In the previous note (DIS 44), we reported on the karyotype variations found in this species. Generally, the karyotype of this species consists of 1V (chromosome 2), 2 Rods (the sex chromosome and chromosome 3 which are seen in V shape chromosome as a result of fusion of both chromosomes) and one short rod (chromosome 4 which is made from dot plus heterochromatin). However, some individuals showed 1V+3 Rods+1 short rod configuration in their larval ganglion cells. Added to these larval ganglion cells, six arm cells were seen in the salivary gland chromosomes of some individuals. And also there were two cases in the six arm cells. In one case, the basal region of the X was inverted to make one short arm. In the other case, double length chromosome (3) was divided into two chromosomes as a result of the inversion that occurred in the middle portion. In the first case, the X chromosome changes to a J type from its original Rod type and in the second case, chromosome 3 alters to V type from its original long Rod shape.

Fig. 1

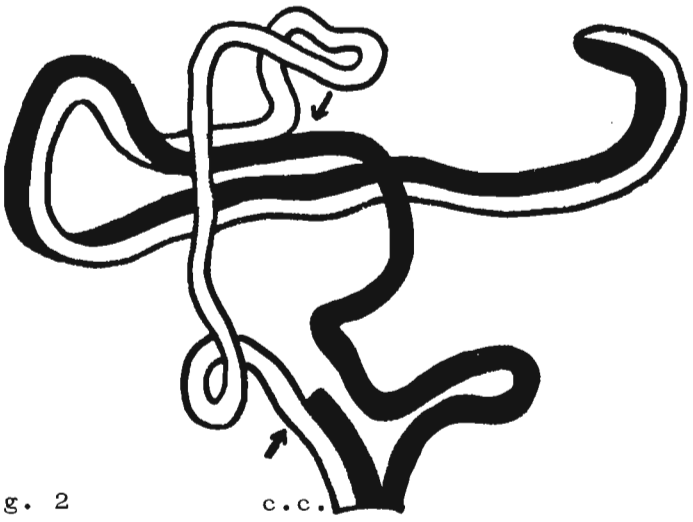

Fig. 2

Further, an individual which proves the above mentioned phenomena was found in the salivary chromosomes of the Okinawan strain (Fig. 1). As seen in Figures 1 and 2, one chromatid of the X chromosome was cut near the chromocenter. And disjoined chromatid was attached to the opposite side of chromocenter and at the median region, it was paired again with the unmutated chromatid of this chromosome. If an individual has this altered chromatid homogeneously, and the X or the third chromosomes will be divided into two chromosomes, this individual will have 1V+3Rods+1 short rod karyotype. And it seems very significant to study the evolutionary process of this species and this subgroup.