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CHROMOSOMES OF *XIPHIDIOPSIS STRAMINULA* (WALKER) (ORTHOPTERA, TETTIGONIIDAE, MECONEMATINAE)

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ABSTRACT

A study of chromosomes in the females of *Xiphidiopsis straminula* has been carried-out. The diploid number is 34 with two outstandingly large metacentric sex-chromosomes. Discussion has been made on the probable mode of origin of such matacentric sex-chromosomes.

INTRODUCTION

Cytological studies on the Indian Tettigoniidae are far less satisfactory as compared to those carried out on the family Acrididae. Earlier Asana *et al.* (1938), Makino (1956) and recently Dave (1965), Chatterjee and Manna (1971) have provided some information on this group. This investigation, therefore, was undertaken to obtain information on the nature of mitotic chromosomesl. Tettigoniids, in general, have a higher diploid number 2n♂ 20-35 (White, 1973) and a well established XO ; XX sex-determining mechanism with a few exceptions. Occurrence of large metacentric X in tettigoniids is, however, not a rare phenomenon. This is a first report dealing with the chromosomes of a tettigoniid belonging to the subfamily Meconematinae.

MATERIAL AND METHODS

Only female specimens were available which were collected from Calcutta, and injected with 0.1 cc of 0.1% Colchicine and sacrifised after three hours. Midgut tissues were dissected out and treated with 0.9% sodium citrate solution for 30-35 minutes, then fixed 1 : 3 aceto-methanol with three changes. The material was squashed, air-dried and stained with Giemsa and mounted in D. P. X. The measurements and classification of the Karyotype are after Levan *et al.* (1964).

OBSERVATION

Diploid chromosome number in the female was observed to be 34 which included two large metacentric (M) X-Chromosomes (Plate III a & b). The autosomes were grouped into two categories ; submetacentric (sm) and telocentrics (t). The morphometric measurements revealed that the X-chromosomes were the longest of the complement and nearly twice the length of the longest autosome. The 2nd pair of autosome was sub-metacentric. The rest were telocentrics. The details of relative percentage lengths (L^R) of each chromosome and centromeric indices (I^C) of 2nd autosomal pair and the sex-chromosome are given in the table. The idiogram is shown in figure 1.

DISCUSSION

In Tettigoniids, unlike Acridids, the X-chromosome is frequently found in both the forms i.e. acro and metacentrics. The evo-

Measurements of a chromosome complement of *Xiphidiopsis straminula*.

Chromosome number	1	2	3	4	5	6	7	8	9
L^R	126.20	110.60	72.60	56.30	50.90	47.80	41.80	39.99	32.60
I^C	—	34.57	—	—	—	—	—	—	—

Chromosome number	10	11	12	13	14	15	16	X
L^R	32.60	30.973	29.82	28.16	23.09	21.41	21.41	222.10
I^C	—	—	—	—	—	—	—	49.53

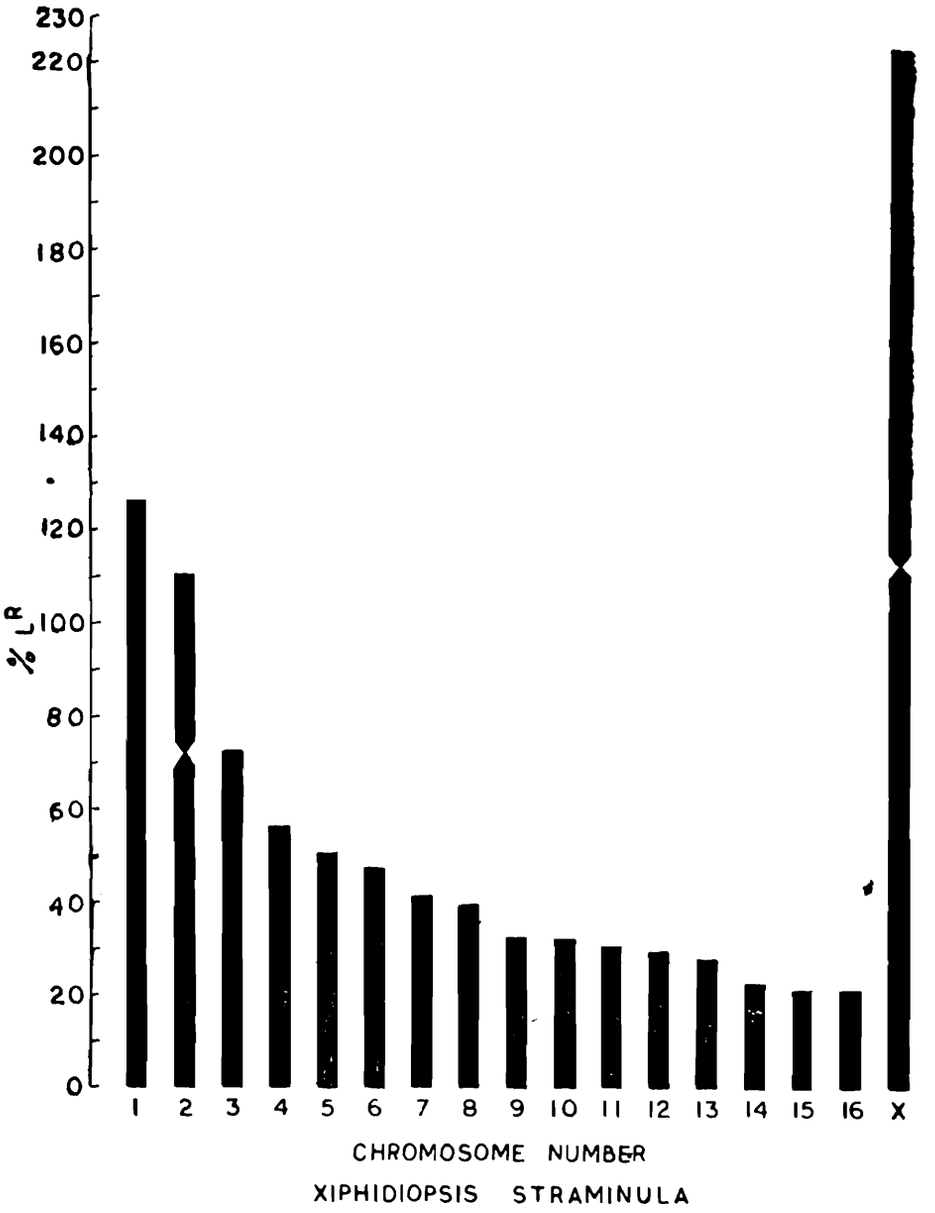

Fig. 1. Idiogram showing relative length and centromeric indices of *Xiphidiopsis straminula*.

lution of metacentric X-chromosome is of considerable importance. In Tettigoniids the sex-chromosome has an independent evolution. The X/A ratio suggests that there is no transfer of material from autosomes to X-chromosome (White, 1941). Further, in the longhorned grasshoppers the X is positively heteropycnotic in all the dividing stages. Since it is totally heterochromatic throughout its length, if any addition of euchromatic material had taken place in course of evolution there would have certainly been a differential staining behaviour in some part of the X, but there is no such evidence. Presumably internal mechanism in the X-itself causes a change in centromeric position through pericentic inversion. The 2nd autosomal pair in our species which is submetacentric is believed to be due to fusion of two acrocentric autosomes. All the smaller chromosomes are acrocentrics.

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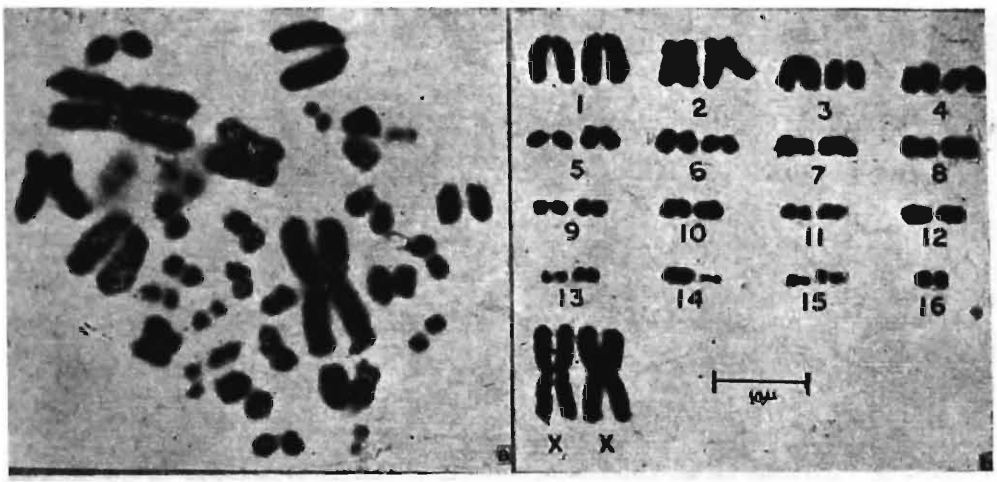

a *b*

a. Somatic metaphase of *Xiphidiopsis straminula* showing two large metacentric X-chromosomes ;

b. Karyotype of the same.