A NOTE ON THE CHROMOSOMES OF *ACRYDIUM JAPONICUM* (ORTHOPTERA)\(^1\)

A. B. MISRA

The Benares Hindu University, India

(From the Zoological Institute, Hokkaido Imperial University, Japan)

Received January 28, 1937

The extensive studies of McCLUNG (1) and his students on the chromosomes of the Acrididae are well-known to cytologists. Their work brought out the important fact that "with a few exceptions, all susceptible of reasonable explanation, this great and well-defined group of insects shows a remarkable constancy in the number of chromosomes in the two sexes." Such findings stimulated an ever-widening field of enquiry and yielded fruitful results. ROBERTSON (2) found that the short-horned grasshoppers were divisible into two well-defined groups on the basis of their chromosome numbers: the family Tettigidae having 13 (♂) and 14 (♀), and the family Acrididae having 23 (♂) and 24 (♀). He also found that "within the cell, the varying degrees of relationship which we have been looking at from taxonomic point of view are again shown to a surprising extent by chromosomes." It is now admitted that chromosomes furnish a basis for variation, heredity and evolution. It is, therefore, necessary that the chromosomes of as many species as possible be studied so that a complete knowledge of all the Acrididae and, if possible, the Orthoptera be available to critical students for forging a scheme of the evolutionary gradient in these insects. For this reason, the chromosomes of *Acrydium japonicum* BOLIVAR

\(1\) Contribution No. 117 from the Zoological Institute, Faculty of Science, Hokkaido Imperial University, Sapporo.
were studied and the results are set forth below.

I am indebted to Prof. K. Oguma and Dr. S. Makino for helpful guidance during the course of this study, and for criticism of the results obtained from this work.

Observations

Spermatogonia: The chromosomes of the spermatogonial metaphase are all rod-shaped, straight or slightly curved (Figs. 1–2), arranged radially, and appear double owing to splitting. In well-preserved cells, the homologous mates can easily be made out. The diploid number is 13, that is, 6 pairs of autosomes plus an X-chromosome which is easily recognisable on account of its rough contour. The autosomes exhibit a great range of size among themselves, and the X-chromosome is of a medium size.

Primary spermatocytes: At the first maturation division there are found 7 chromosomes in the metaphase (Fig. 3). They are all rod tetrad in structure and no rings are found. The X-chromosome is usually eccentric in position. In division the autosome tetrads are all divided into two equal halves. All the tetrads, however, are not in the same stage of separation, some of them being more advanced than others. This is a characteristic of the species of Acrydium as indicated by Robertson (2). The X-chromosome goes undivided to one pole in this division in the usual manner (Fig. 4).

Secondary spermatocytes: As a result of the previous division, two kinds of secondary spermatocytes are produced. That is, one set of them has 7 chromosomes including the X-element, while the other set has only 6 chromosomes, without the counterpart of the X-chromosome (Figs. 5–6). The chromosomes of the secondary spermatocytes are all V-shaped, being composed of two rods superimposed one upon the other, and having their apices towards the centre of the spindle.

On comparing these facts observed in Acrydium japonicum with those recorded by Robertson in the case of A. granulatus, A. incurvatus, A. ornatus, A. obscurus, Paratettix sp. and Tettigidea parvipennis, may points of similarity suggest themselves to us.

Literature