In nitrogen mustard treated forms, this phenomenon was first seen 8 h after treatment; but large numbers of affected anaphases showing clear bivalent segregation were seen much later, and up to 5 days after injection. Sodium nucleate treated forms also exhibit the same phenomenon. 12 h after injection a few nuclei show bivalent segregation. The number increases gradually until, by about 30 h, a very large percentage exhibits this peculiarity.

It seems more probable that the chemicals affect the centromere rather than the spindle. This view obtains additional support from the fact that occasionally a few bivalents occur on the spindle in a disorientated manner. The conclusion seems irresistible that the chemical has inactivated the centromeres or in some way rendered them ineffectual so that the bivalents are carried passively to the poles or are left behind on the spindle. An upset in the nucleic acid charge in the chromosomes rendering the univalents unable to separate seems also possible.

B. R. SESHACHAR and P. K. NAMBIAR
Department of Zoology, University of Mysore, Central College, Bangalore (India), August 30, 1955.

Zusammenfassung

On the Multiple Sex Chromosome Mechanism in a Lygaeid, *Oxyearenus hyalinipennis* (Costa)

Multiple sex chromosome mechanisms have been described in numerous species of heteroptera belonging to at least ten different families of which the families Reduviidae and Nepidae have afforded maximum evidence. In the family Lygaeidae, only few examples of such a mechanism have been reported from the subfamilies Lygaeinae, and Rhyparochrominae, the

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1 C. Auerbach, Genetics 32, 3 (1947).
majority of lygaeids studied being found to possess a simple sex determining mechanism of the \( XX:XY \) type. The present report giving an account of meiosis in *Oxycarenus hyalinipennis* is the first recorded instance of a multiple sex chromosome mechanism for the subfamily Oxyacaraninae to which this species belongs.

In the first set of cells showing 17 chromosomes, diplotene and diakinesis stages show 10 elements, of which 7 are distinctly bivalents and 3 appear to be univalents and quite small in size (Fig. 3). The same condition is revealed in the side view of first division metaphase. At first division anaphase (Fig. 4) the 3 small univalent elements are found to be equational while the 7 bivalents reductional in division. The polar view of the second division metaphase shows 9 elements with the 3 univalent chromosomes arranged as a pseudotrivallent (Fig. 5) and in anaphase II the 2 sister cells are seen to possess 9 and 8 chromosomes respectively (Fig. 6).

In the second set containing 19 chromosomes, the diplotene and diakinesis stages are seen to be constituted of 11 elements (Fig. 7) and the first division metaphase also shows the same number (Fig. 8). At the first division anaphase (Fig. 9) the 2 cells show 11 chromosomes each, while the polar view of the second division metaphase shows 10 elements (Fig. 10). During the second division anaphase the 2 cells show 10 and 9 chromosomes respectively (Fig. 11).

The account of meiosis in *Oxycarenus* clearly indicates the existence of a multiple sex chromosome mechanism, showing the nature of the diploid complement to be composed of 14 autosomes and 3 sex chromosomes, i.e. \( X_1 X_2 Y \). In the observations made on the 19 chromosome cells the behaviour of the two \( m \)-chromosomes is interesting. It has been stated that with the exception of the tribe Lygaeini of the subfamily Lygaeinae, the rest of the lygaeids so far studied possess \( m \)-chromosomes, and therefore, *Oxycarenus* belonging to the subfamily Oxyacaraninae should be no exception to the rule. But during our observations, we have found that these \( m \)-chromosomes are found only in cells of some individuals but not in all, which is quite contrary to the usually stable type of \( m \)-chromosomes found in other heteropterans. Moreover, in all the cells at either diploic or diakinesis stages these \( m \)-chromosomes are found to be coupled to form a bivalent. Also recorded are a few first division anaphase stages showing 12 chromosomes in each of the sister cells which probably indicate a failure to pair on the part of these \( m \)-chromosomes. While maintaining the existence of \( m \)-chromosomes as a universal feature in the chromosomal constitution of most lygaeids, the coupling behaviour combined with the fact that these \( m \)-chromosomes have not become stabilized as members of the regular karyotype, point out a unique instance where the \( m \)-chromosomes may be supposed to behave like the supernumerary chromosomes observed in various other insect populations. In connection with the behaviour of \( m \)-chromosomes it is felt necessary to recall a particular instance in *Acanthocephala (= Metapodius) femoratus* reported by Wilson, where the single supernumerary chromosome observed is found to be structurally similar to the usual pair of \( m \)-chromosomes and that it couples with the 2 \( m \)-chromosomes forming a trivalent. It is hoped that a further study of the populations of the same insect collected from different territories might throw some light as to the role these extra bodies play in the population dynamics of the species in question.

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