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CYTOGENETIC OBSERVATIONS ON SPECIES *C*, *MERUS* AND *MELAS* OF THE *ANOPHELES GAMBIAE* COMPLEX * (1)

par

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In previous papers (1, 2) the possibility has been shown of differentiating species A and B of the *A. gambiae* complex by the morphology of the salivary gland X chromosome. These investigations have been recently extended to species C and to the salt-water species *melas* and *merus*.

Cytogenetic observations were carried out on the following strains : *A. melas* from Harbel, Liberia ; *A. merus* from the Pangani river estuary, Tanzania ; species C from the Lundi river valley and from Chiredzi (Rhodesia). The F_1 hybrids from the following crosses were also examined : C × A, C × B, *merus* × A, *merus* × B, *melas* × A, *melas* × B and *melas* × C. This material was kindly supplied by Dr. G. DAVIDSON of the Ross Institute, London. The strains of *A. melas* and *A. merus* are old colonies maintained in the Ross Institute while species C has been recently sent from Southern Rhodesia to London by Mr C. A. GREEN.

The salivary gland chromosomal complement of species C, *melas* and *merus* was found very similar to that described for species A and B. The salivary gland chromosomes appeared generally synaptic or in intimate pairing in the hybrids. Asynaptic chromosomal segments, with banding-patterns that did not closely correspond, were more frequently observed in the hybrids between fresh-water and salt-water species. Each species was found to be characterized by typical changes in band sequences due to paracentric inversions.

Species C.

The study of the salivary gland chromosomes of species C gave clear evidence, as expected, of the very close affinity between this species and species A and B. The examination of the C × A and C × B hybrids showed the remarkably close correspondence of the autosomal pattern. Evident chromosomal changes, resulting in peculiar aberrations in the hybrids, were only observed in the long arm of the X chromosome.

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(1) Communication présentée au Congrès de Téhéran (7-15 septembre 1968), section B. 2.1.
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The free end of the X chromosome in species C looks very similar to that of species B. However the correspondence was limited to zones 1 and 5 of the map for species B, while the central zones showed evident rearrangements. The comparison of the maps and the pairing figure observed in the C × B hybrids would suggest that at least three inversions have been involved in these changes of the chromosomal pattern.

The differences between the X chromosomes of species C and A seem to be less complex, involving essentially one simple inversion extending from section 1B to 4B of the map for species A. An inversion loop has been actually observed in the X chromosome of the A × C hybrids.

Anopheles merus.

This species was found to be closely related, on a cytogenetic ground, to species A. The X chromosomes of *merus* and of species A have an almost identical banding pattern except for the basal part of the arm.

The study of the autosomal complement in the *merus* × A hybrids showed constant aberrations in chromosomes 2L and 2R. The 2L aberration appeared as an asynaptic area extending from 22C to 20D of the map for species B. The 2R aberration appeared as a complex pairing figure involving zones 9, 8, 11, 12, 13 and 14 of the map for species B. These zones were found completely rearranged through at least two inversions.

Anopheles melas.

This species was found related to species C by the morphology of the X chromosome. The close correspondence of the pattern of the X chromosome was confirmed through the examination of the *melas* × C hybrids.

The autosomal complement of the hybrids between *melas* and the fresh-water species were mainly characterized by two simple inversion loops, one including zones 11-16 of chromosome 2R and the other zones 32-34 of chromosome 3R. The inversion loop on chromosome 2R sometimes included more complex pairing figures, depending on the arrangement of the inversions 2RB, 2RC and 2RD in the fresh-water species.

Areas of asynapsis were also observed particularly in the basal part of the chromosomal arms and appeared to be related to slight but definite changes in the banding pattern.

DISCUSSION

The results show that each of the five species of the *gambiae* complex can be identified through the observation of typical band sequences in the salivary gland chromosomes. The identification of the three fresh-water species is based on the different morphology of the X chromosome. *A. merus* can be separated by the peculiar band sequence on chromosome 2R and *A. melas* by the inverted arrangements on chromosome 2R and 3R.

Both *merus* and *melas* showed chromosome 2R rearranged with respect to the fresh-water *gambiae*. However these rearrangements were clearly different and due to different inversions. Furthermore the two salt-water species were shown to be most closely related to different fresh-water species : *A. melas* to species C and *A. merus* to species A.

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