

MORPHOLOGICAL OBSERVATIONS ON THE *ANOPHELES GAMBIAE* COMPLEX *

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Research on morphological differences between the members of the *A. gambiae* complex has a special importance in malariology. It is evident in fact that the practical value of data acquired on a genetic base is seriously limited by the non availability of diagnostic criteria at normal taxonomic level.

Observations were made first on colonies identified by behaviour in crosses, then on fixed material from various sources (see COLUZZI WHO/Mal, 456, 1964). About 350 characters, mainly quantitative, were studied in at least one population for each form, as well as in 31 samples derived from colonies and 38 collected in the field for a total of over 3.500 specimens.

The resulting morphologic picture is mostly characterized by adaptative polymorphisms and clinal differences in substantially similar phenotypes.

Significant morphologic differences were observed or confirmed among all members of the complex and in almost all stages. Finally, differences of definite taxonomic value were detected only between the two salt water species and between the latter and the fresh water species. Even based on the basis of morphological criteria only, we can, however assume that *A. melas*, *A. merus* and *A. gambiae* s. l. are to be handled like independent entities.

The more reliable diagnostic characters seem to be the number of the coeloconic sensilla, the value of the palpal ratio and the shape of the eggs. The average number of the coeloconic sensilla of the antennal flagellum is about 23-25 in many populations of *A. gambiae* s.l., over 25 in *A. melas* and over 32 in *A. merus*. The ratio between the total length of the fourth and fifth palpal segment and the length of the third has an average value of 0.70-0.80 in *A. gambiae* s.l.; 0.83-0.90 in *A. melas* and *A. merus*. The shape of the eggs, though extremely variable proves to be diagnostic between *A. melas* and the sympatric fresh water populations and the character works also, though less efficiently, in the case of *A. merus*. These characters which presumably have adaptive value, show similar divergences in both the two salt water species.

The highest diversity between *A. melas* and *A. merus* is observed in the ornamentation of the legs, which is richer in white scales in the eastern variant, and in the larval chaetotaxy. The larval chaetotaxy also indicates a greater affinity of *A. melas* with *A. gambiae* A and *A. gambiae* C as well as of *A. merus* with *A. gambiae* B.

The identification of the three fresh water species appears much more difficult mainly because of the existence of wide intraspecific gradients which conceals the interspecific differences and limits the taxonomic reliability of all or almost all the characters studied. It must be

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stressed, however, that the study of the complex over the whole Ethiopian region is somewhat unrealistic. It is in fact possible that in geographically limited comparisons, among mendelian populations, morphological characters may be usefully employed, including even those based on adaptive polymorphisms. One of the most promising characters in this sense is given by the branches of protothoracic seta n° 1 of the larva which, at least in some West Africa areas, clearly shows less branches in *A. gambiae* A populations than in *A. gambiae* B. The number of coeloconic sensilla might prove useful for the separation of *A. gambiae* A and *A. gambiae* B in East Africa. The morphological studies also give evidence of the existence of intraspecific differences which reach the conventional subspecific level. Among them the most important seems to concern the population of *A. gambiae* B from Aden whose wing ornamentation is richer in white scales and is quite different from all other forms of the complex.

On the other hand, various degrees of gonic incompatibility have been observed, that could be the result of different degrees of isolation between the numerous populations of each form.