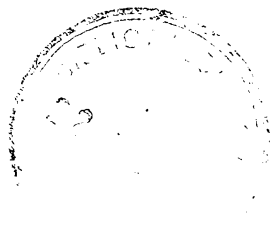


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A NOTE ON THE IDENTIFICATION OF ADULT WILD-CAUGHT FEMALES OF
A. DEMEILLONI AND THE A. FUNESTUS GROUP IN SOUTHERN RHODESIA

by

R. C. Muirhead-Thomson, D.Sc.
WHO Regional Entomology Adviser in Malaria Eradication
for the South-East Asia Region, New Delhi, India

A great deal is known about the distribution of the various members of the A. funestus group and of A. demeilloni throughout Southern Rhodesia due to the combined records of Leeson (1931), Meeser (unpublished) and the present staff of the Malaria and Bilharziasis Research Laboratory, Salisbury. Perhaps the most accurate records are those based on larval collections carried out by government health inspectors since 1954 in connexion with malaria control schemes, and subsequent identification by the entomological staff of the research laboratory. All available information has recently been summarized by Reid and Woods (1957).

The larval characters of this group have been fully described by de Meillon (1947), and these characters are sufficiently diagnostic to enable larvae of the different members to be differentiated without too much difficulty (a simplified local key, based on de Meillon's monograph, has been produced by the above research laboratory in Salisbury and has proved extremely useful).

The characters of the adults however are much less clearly defined and diagnostic features are subject to considerable variation and overlap. Experience with A. demeilloni in Southern Rhodesia soon revealed that variations also occur within this species with regard to size and wing pattern which make it difficult to tell in individual cases whether the specimen is really A. demeilloni or one of the A. funestus group. These extremes of variation were also encountered among adults which had been bred out in the laboratory from eggs laid by a single female.

This uncertainty about adult characters is particularly unfortunate in an entomological assessment of malaria control or eradication projects where it is important to define any changes in the composition of the group, or any changes

44996

in behaviour with regard to feeding and resting outdoors or indoors, changes which may have been brought about, for example, by the extensive house treatment with BHC in Southern Rhodesia over a number of years. The problem is not exclusive to that part of Africa, but is also encountered in such places as Swaziland and the Taveta-Pare area of Tanganyika where the A. funestus group as a whole has not been eliminated by intensive house treatment with insecticides.

It is possible that further taxonomic studies may reveal more stable adult characters, but it was felt that at the present state of knowledge, advantage should be taken of the fact that the larval characters of the different members are fairly clearly defined and that in addition some members of the group can be separated from others by egg characters.

The identity of samples of wild-caught 'funestus-demeilloni' group has therefore been confirmed as frequently as possible by inducing females to oviposit in the laboratory, examining the character of the eggs, and subsequently rearing out larvae to confirm the identity of the eggs if necessary. As this was only one of many parallel lines of investigation in this assessment, it was only possible to devote a limited amount of time to this special problem. The methods used, however, have proved sufficiently productive as to suggest a basis for more detailed studies of this group in the future.

With practice, eggs of demeilloni could be distinguished readily from those of the funestus group, the identity being doubly confirmed in the initial stages by rearing out larvae and examining the fourth stage characters.

In the funestus group itself the eggs of leesoni are very distinctive and confirmation of identity by larval examination is not necessary. In the areas studied in the north-eastern region only two other members of the group - confusus and funestus funestus - have so far been identified as adults in this assessment, but Reid and Woods' records show that fuscivenosus and rivulorum are liable to occur. Differences between the eggs of funestus funestus and confusus are described by de Meillon, and with experience it is possible that these two forms could be differentiated with confidence on this character alone. In this present study, however, separation of these two forms has been based on larval characters, which will also reveal the presence of rivulorum.

The method used for rearing out larvae from eggs, and which has proved very satisfactory for all anophelines tested in this region, is as follows. Shallow white enamelled breeding dishes (photographic developing dishes are useful) are lined with mud which is then baked dry in the sun. When required the dishes are filled with distilled water and kept out of direct sunlight in the laboratory. Young recently hatched larvae from the egg batches are transferred to these dishes, and left undisturbed for two or three days. After that time they are provided with food in the form of powdered brewers yeast (unfortified) which is ground, sieved through bolting silk, and then sprinkled lightly on the surface of the water. The water in the dishes is topped up from time to time with distilled water, but otherwise left unchanged. When all full grown larvae have eventually been removed from the dish, the water is run off, and the mud dried hard in the sun before the dish is used again. In this way, the same breeding dish can be used over and over again.

The identity of 74 wild-caught females of the A. 'demeilloni-funestus' group based on egg characters, on larval characters, or on both is shown in Table 1. All these adult females were taken in outdoor resting places in four different experimental areas in the Mazoe valley region. Throughout this whole area it is extremely difficult to find adults of this group indoors, even in houses which have never been treated. Although the sample is small owing to the reluctance of many females to oviposit,¹ it does reveal that A. funestus funestus is still present in three of the four experimental areas, two of these areas being native reserves which are regularly treated with BHC. The limited figures suggest that leesoni and confusus are the dominant members of the funestus group in this north-eastern region. One of the wild-caught leesoni identified in this way was found to have a sporozoite infection in its salivary glands, the first record of a natural infection in this species.

¹ This might be a serious obstacle and much attention will have to be given to the technical side of the problem to enable the greatest possible number of captured female Anopheles to oviposit in individual vials. (Editor's remark)

TABLE 1. IDENTIFICATION OF A. 'FUNESTUS' GROUP ADULT WILD-CAUGHT FEMALES BASED ON EGG CHARACTERS AND ON CHARACTERS OF LARVAE REARED FROM THESE EGGS

	Bushu	Shamva	Madziwa	Uzumba	Total
<u>Anopheles demeilloni</u>	35	3	3	1	42
<u>Anopheles confusus</u>	9	1	1	0	11
<u>Anopheles lesoni</u>	3	2	3	10	18
<u>Anopheles funestus</u> <u>funestus</u>	1	1	1	0	3
Total	48	7	8	11	74

SUMMARY

The identification of individual wild-caught females of A. demeilloni and the A. funestus group in Southern Rhodesia is sometimes rendered extremely difficult on adult characters alone. The identity of such females however can in many cases be determined accurately by inducing them to oviposit in the laboratory and using the more clearly defined diagnostic features of the eggs and of the fourth stage larvae reared from these egg batches in the laboratory. The limited figures so far available indicate among other things that A. funestus funestus is still present in villages regularly treated with BHC for several years. From adult samples from such villages it appears that A. demeilloni, A. lesoni and A. confusus are the dominant members of this combined group.

A simple technique is described for rearing out larvae and adults from egg batches of this group in the laboratory. There may be advantages in applying this technique on a wider scale wherever there is a possibility that the behaviour and composition of this group has been affected by large scale application with residual insecticides.

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