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A CONTRIBUTION TO PRESENT KNOWLEDGE OF MYZOMYIA  
IN SOUTHERN MOROCCO

by

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The distribution of the eight species of anophelines so far known in Morocco formed the subject of a study by Gaud, Fauré & Maurice (1950) in which these authors state that Anopheles sergenti represents more than 50% of the total anophelism in the region stretching from the Atlantic Ocean to the Algerian Sahara, south of the Haut-Atlas mountains. Figure 2 in the paper mentioned illustrates this.

It was therefore with some surprise that, on examining the material collected during entomological surveys made in the same region, I noted the presence of a species previously unknown in the country, namely A. d'thali Patton; it was even sometimes the predominant species.

Table 1 lists the specimens I was able to collect in Southern Morocco of the four Myzomyia species (d'thali, sergenti, hispaniola, multicolor) and of A. labranchiae; the dates of collection and the localities in which the specimens were found are also given in the same table.

These collections were made during entomological explorations carried out when I was acting as WHO entomological consultant in Morocco, and I should like to thank WHO for giving me this opportunity and also the Government of Morocco which provided practical assistance.

The material studied represents only a part of that collected, but the data are of some interest, at least in view of the remarkable abundance (about 50% of the catches) of a species never previously reported as present in the country.

A. d'thali is fairly widespread: up to the present it has been found in Somalia, Ethiopia, Sudan, Egypt, Israel, Arabia, India (Evans, 1938; Botha de Meillon, 1947). Specimens have also been collected in the Tunisian and Algerian Sahara (Senevet & Andarelli, 1956; Senevet, 1958). One of the localities in these

last-named areas is Beni-Abbès, 300 km from Erfoud and 350 km, as the crow flies, from Tagounit (see Table 1 and Fig. 1).

Patton (1905), Kirkpatrick (1925), Lega et al. (1937), Brambilla (1941), Melville et al. (1945) - all cited by De Meillon (1947) - suspected, on the basis of epidemiological conclusions, that this species was a malaria vector. No dissection of the salivary glands of this species has as yet been made and the question as to whether it can act as a vector remains open.

The adult specimens studied were captured almost entirely inside houses. The most common type of building in Southern Morocco is the "Ksar" (plural "Ksur"), a kind of mediaeval castle made of dried mud with a palm wood framework, in which the whole village population lives. Inside the ksar, which can only be entered through the door or doors made in the surrounding walls, the separate family dwellings are arranged one beside the other in a disorderly and picturesque manner. The village is traversed by lanes which are often covered, forming tunnels. As a rule each home consists of rooms on the ground floor which are used as storehouses or quarters for the animals, and a kitchen and bedrooms on the first floor. These rooms on the first floor are ventilated and lit by means of a large hole in the roof, whereas the ground floor rooms are dark and relatively damp. In the centre of the building there is usually a kind of farmyard in which animals and poultry are kept; some of the ground floor rooms may communicate with this yard.

The mosquitos were generally caught by means of a suction tube. In addition, pyrethrum spraying was carried out where this technique could be applied. The work of collection was made difficult by the complicated topography and darkness of the rooms and by difficulty of access to the villages. This partly explains the small number of mosquitos caught as compared with the larvae (see Table 1). It was noted that the mosquitos took refuge mainly in the darkest rooms: they were never caught in the upper rooms which are better lit and ventilated. On the other hand, they were captured in the morning or afternoon on the ground floor even when there were no animals present and sometimes being caught even on the stairs leading to the first floor.

The larvae were found in breeding places along the river beds in small pools of water often not directly connected with the stream, with little or no macroscopic vegetation and sometimes very shallow; the larval density in them can be very high.

The surrounding terrain usually shows clear traces of chlorides, large quantities of which appear to be dissolved in the water.

A. sergenti, which may be of some importance in the maintenance of malaria endemicity in Morocco, deserves some comment:

We caught this species in three localities only in Southern Morocco (Table 1 and Fig. 1). Collection operations in the Adgz area were to a large extent carried out under conditions of some interest since they lead to certain biological deductions - in particular concerning the feeding preferences of this species. The mosquitos were caught in the open towards sunset, by means of an entomological net near a larval breeding-place. The flight of the mosquitos began at 7.40 p.m. and ended at 7.55 p.m. The mosquitos were attracted to us and tried to bite us. Thirty-four mosquitos - all females - were caught and we identified 18 of them as A. sergenti. The proportion of this species among the adults was much larger than that encountered in the breeding-place, and probably gave a truer picture of its relative density (Table 2).

These data would seem to indicate, however, that A. sergenti is largely anthropophilic, as compared with A. hispaniola, whereas they do not enable us to draw any conclusions with regard to A. d'thali. This information is given here objectively; while we have no desire to over-estimate its importance, seeing that for the present it is all that is known about A. sergenti in Southern Morocco in this connexion, due account should be taken of it in later and more extensive research.

It would therefore seem that A. d'thali is the most abundant species in Southern Morocco and it is justifiable to suppose that in the past it may have been sometimes confused with A. sergenti. It may be that this latter, a predominantly autumnal species, subsequently becomes more numerous and thus appears in fairly large numbers even in localities where we did not find it. It is perhaps unnecessary to point out that A. sergenti is already known as a malaria vector in several other countries, whereas its role in this respect in Morocco has still to be studied. Moreover, we know nothing about A. d'thali in this connexion. It is therefore to be hoped that before long a careful entomological survey will elucidate

the problems of the geographical and seasonal distribution of these two interesting species in Southern Morocco, as well as their absolute and relative frequency, their biology and their role as vectors.

TABLE 1. COLLECTIONS OF D'THALI, SERGENTI, HISPANIOLA, MULTICOLOR AND LABRANCHIAE MADE IN SOUTHERN MOROCCO

Province	Locality and date	<u>d'thali</u>	<u>serg.</u>	<u>hisp.</u>	<u>mult.</u>	<u>lab.</u>
Agadir	Tamsrouth Sept. 1959	10 larvae 1 ♂ 3 ♀ ++	26 larvae 6 ♂ 43 ♀ ++	2 ♀ ++		8 larvae 4 ♀ ++
Ouarzazate	Near Tiseldei			64 larvae		
"	Near Ouarzazate			103 larvae 1 ♂ 20 ♀ ++		
"	Near Agdz (Drâa Valley)	1 larva 1 ♀ +	11 larvae 20 ♀ ++	259 larvae 2 ♂ 30 ♀ ++		
"	Near Zagcra (Drâa Valley)	226 larvae 21 ♀ ++		11 larvae 1 ♂ 3 ♀ ++		
"	Near Tagounite (Drâa Valley)	213 larvae 5 ♀ ++			11 larvae 1 ♀ +	
Ksar-es-Souk	Aoufouss (Ziz Valley)	42 larvae		11 larvae		
"	Meski (Ziz Valley)	1 ♂, 1 ♀ +	3 ♀ ++			
"	Erfoud (Ziz Valley)	23 larvae				
Total		515 larvae 2 ♂ 31 ♀ ++	37 larvae 6 ♂ 66 ♀ ++	448 larvae 4 ♀ 53 ♀ ++	11 larvae 1 ♀ +	8 larvae 4 ♀ ++

TABLE 2. COLLECTIONS OF MYZOMYIA IN THE NEIGHBOURHOOD OF  
ADGZ (DRÁA VALLEY)

Species	Relative larval density in the breeding-place	Relative density of females captured on human bait
<u>A. hispaniola</u>	259 (96%)	15 (44.1%)
<u>A. sergenti</u>	11 (3.6%)	18 (52.9%)
<u>A. d'thali</u>	1 (0.4%)	1 (3%)

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Fig. 1 Collections de *A. d'thali* et de *A. sergenti* dans le Sud marocain. (Provinces de Agadir, Ouarzazate, Ksar-es-Souk)  
 Places in South Morocco where *A. d'thali* and *A. sergenti* have been found. (Provinces of Agadir, Ouarzazate, and Ksar-es-Souk)

