

# Mosquitoes of the Oases of the Libyan Desert of Egypt

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In all Surveys of the Mosquitoes of Egypt, the Mosquitoes of the Oases play a distinguished part not equalled by those of any other part of the Country, with the exception perhaps of Sinai. The peculiar characters of the oases regarding their isolation, climatic conditions, type of soil, etc., are reflected upon the flora and fauna of the oases and certainly upon mosquitoes.

The present study reviews what is known about the Mosquitoes of the Oases of the Libyan Desert (Siwa, Bahria, Kharga and Dakhla), and includes material obtained at the Insect Control Section, Ministry of Health, during malaria-control projects in the years 1950-1955.

## **A n o p h e l i n i**

### **Anopheles (Anopheles) algeriensis** Theobald.

This is mostly a Mediterranean species occurring in countries in Europe and in the Middle East.

In his extensive Survey of the Mosquitoes of Egypt, Kirkpatrick (1925) did not find this species but suspected its occurrence in Sinai. Saleem (1933) reported a single female, but no larvae, in a big collection of mosquitoes from Sitra near Siwa Oasis. Our investigations at Siwa have revealed that this species is widely distributed in most of the villages of the Oasis and that it forms about 0.02% of the total anopheline larvae collected in the year 1951.

*A. algeriensis* breeds mostly in seepage water and in drains, and less frequently in irrigation channels, surface water and wells. Seasonal prevalence of larvae is from February to May.

Although 483 larvae of *A. algeriensis* were collected during 1951, yet not a single adult of this species was found among over 34,000 anopheline mosquitoes. In 1952, only two females were found in a similar collection caught from houses, sheds and other familiar resting places. It is assumed that the

adults of this species are wild and seldom enter houses.

It is obvious that *A. algeriensis* in Siwa has no part in transmitting malaria.

Hitherto this species has not been reported, apart from Siwa, from any other region including Sinai.

### **Anopheles (Myzomyia) pharoensis** Theobald.

In the Delta and Nile Valley, this species is widely distributed and most abundant of all anopheline mosquitoes. In Dakhla Oasis, it was recorded by Storey (1918), and in Kharga by Kirkpatrick (1925). Barber and Rice (1937) recorded this species in Siwa Oasis where they found one adult mosquito among a batch of 117. Subsequent surveys of the oasis failed to find it again except for a single 4th. stage larva collected in 1949 from a remote place in South Siwa. *A. pharoensis* was also found to occur in Bahria Oasis.

This species breeds in all collections of water with some vegetation and especially in rice-fields. Its seasonal prevalence coincides with rice cultivation, i.e. from July to October. In Dakhla Oasis, adult catches of *pharoensis* comprise 10.2% of all adult anophelines caught during 1952 from houses and sheds, while larval collections amount to over 50% of the anopheline larvae.

Although Barber and Rice (1937) consider that *A. pharoensis* is an efficient carrier of malaria and has a decided affinity for human hosts, other workers, e.g. Hackett (in Boyd's Malariology, 1949) considers it an ineffective carrier and least domestic of all palaeartic vectors. This latter statement was found to be the case in Dakhla where this species was found, during the day, resting on rice plants.

Precipitin tests of stomach blood showed that of 156 specimens, 155 taken from sheds were positive for blood of ox and only one from a house positive for human blood.

In Egypt, *A. pharoensis* has been found infected in nature during an exceptionally malarious season, the sporozoite index being 1.4% (Madar, 1936), 0.33% (Barber and Rice, 1937). Number of mosquitoes dissected was 138 and 1573, respectively.

### **Anopheles (Myzomyia) superpictus** Grassi.

This species is rare in Egypt. It occurs in Sinai (Kirkpatrick, 1925) but not in the Delta or the Nile Valley. Salem (1933) reported a few adults from Siwa. Examination of many thousands of larvae and adults collected over three years at the laboratories of the Insect Control Section have failed to detect this species in Siwa. Some worn-out adults, however, were collected in May 1950 and being suspected for *A. superpictus*,

they were sent to London School of Tropical Medicine for identification. Major H.S. L e e s o n named them *A. multicolor*, but admitted the probable confusion with *A. superpictus*.

It is interesting also to note that neither K i r k p a t r i c k nor S a l e m were able to distinguish these two species in the larval stage.

### **Anopheles (Myzomyia) sergenti** Theobald.

This is a desert species occurring in Fayoum, Sinai and all the Oases, but scarcely found in the Delta or Nile Valley. S t o r e y (1918) recorded *A. sergenti* from Siwa under the name *A. palestiniensis*. K i r k p a t r i c k (1925) found it in Kharga Oasis and suspected its presence in the other Oases. Subsequently its existence in Siwa, Bahria, Dakhla and Kharga was established and it is known that it is the predominant anopheline species there. In Dakhla it comprises 60.6% of all anopheline catches of the year 1952. Its seasonal prevalence is during autumn and early winter.

*A. sergenti* breeds in the weedy edges of slowly running water arising from permanent wells and springs. It is also found in rice-field channels, seepage and rarely in weels. *A. sergenti* has been incriminated as a malaria vector in Egypt (F a r i d , 1940), the sporozoite index being 2.7 (220 mosquitoes examined). The species is fairly domestic and it is considered the main malaria vector in all oases. When this species was eradicated from Dakhla and Kharga Oases during 1948-1949, malaria dropped in Dakhla from 13% (1946) to 02.% (1948) (S h a w a r b i , in the press).

### **Anopoheles (Myzomyia) multicolor** Cambouliu.

This species occurs in the Delta and Nile Valley but it is not as abundant as *A. pharoensis*. It is very common in all the oases and was reported by all workers who surveyed any of these oases for mosquitoes.

*A. multicolor* breeds chiefly in seepage water with fairly liberal amount of salt. K i r k p a t r i c k mentions that the seasonal prevalence of this species is from July to November, but our repeated findings, however, over more than 3 years and in different localities indicate that it is a spring species common in March and April. This might be attributed, however, to the drying of most of *A. multicolor* breeding places in the oases from May onward.

The role played by *A. multicolor* in malaria transmitting is still doubtful. S t o r e y (1918) and K i r k p a t r i c k (1925) believed it to be the malaria carrier of Egypt. B a r b e r and R i c e (1937) succeeded in infecting it in the laboratory with *Plasmodium falciparum*, but they did not find it (neither did we in Dakhla) infected in nature.

**Culicini****Uranotaenia unguiculata** Edwards.

Occurs in Siwa, but never abundant. Larvae are found in August and September and disappear in January and February. Adults do not enter houses. It breeds in pools with vegetation, occasionally in wells. Kirkpatrick (1925) recorded it from Kharga in October. We did not find it in Kharga, nor in Dakhla, and it is reported here for the first time from Siwa.

**Theobaldia longiareolata** Macquart.

Recorded from Kharga and Bahria (Kirkpatrick, 1925), Siwa and Dakhla (Saleem, 1933). More frequently met with than the previous species. Its seasonal prevalence is from November to April and it is rare in summer. Adults are found occasionally in houses, but never known to bite. In the oases, it breeds in seepage and surface water and frequently in unused wells.

**Theobaldia annulata** Schrank.

This is the first record of this species from Egypt. Few larvae were collected from seepage water near Siwa town during January 1955, together with larvae of *Aedes caspius* and *Theobaldia longiareolata*.

**Aedes caspius** Pallas.

Abundant in all oases throughout the year but especially during autumn and winter. It is at its minimum in summer (June to September). It breeds in seepage and surface water, and sometimes in rice fields. It enters houses occasionally but frequently met with in large numbers, outdoors at day time where it bites severely.

**Aedes detritus** Haliday.

Kirkpatrick obtained a single larva of this species, which was successfully bred, at Siwa Oasis. Our investigations there revealed its presence in moderate numbers from February to May, and in lesser numbers in November to January. In summer (June-September), larvae are not found at all. This confirms Kirkpatrick's suggestion that this species breeds in fairly cool weather. *A. detritus* is a salt water breeder. Most of the larvae obtained in one year (378) were from seepage water with a high supply of salt and a few from drains. Females enter houses and like *A. caspius*, it is often found outdoors where it bites by day.

*A. detritus* is not recorded from Dakhla and Kharga, but found in Bahria.

**Culex pusillus** Macquart.

The distribution of this species is the same as that of *A. detritus*, i.e. occurring in Siwa and Bahria, but not in Dakhla or Kharga. This too, is a salt water breeder occurring mostly in seepage water and drains. In Siwa, it is also found in wells and channels (Siwa's wells contain a considerable amount of salts). The species is abundant all over the year, except in winter (December-March).

**Culex deserticola** Kirkpatrick.

This species was first described by Kirkpatrick (1925) from specimens found at the Eastern desert. Subsequently, Salem (1933) found it in Siwa breeding in a salt pool. Our investigations revealed its presence in all the oases, though never abundant. It is not found in houses and not known to bite man.

**Culex theileri** Theobald.

This species is very common and abundant in the oases (except Siwa), while very scarce in the Nile Valley. It breeds in rice fields, pools and drains with abundant vegetation. In Bahria it is most abundant in July and August. It is met with indoors and is known to bite.

**Culex pipiens** L.

This species, which is the most abundant mosquito in the Nile Valley, is only scarce in the oases, and it seems that it is replaced there by *Culex theileri*. Few specimens of it are found nearly all over the year in the four oases. It breeds in almost all sorts of fresh water breeding places including pools, wells, containers, etc. This species is the proved carrier of *Wuchereria bancrofti* (Khalil, Hala wani and Hilmy, 1932) in the Nile Valley. Its role in the oases has not been investigated owing to its scarcity.

**Culex univittatus** Theobald.

Recorded by Kirkpatrick from Kharga and Bahria, and by Salem from Dakhla. The present survey confirmed both authors, and revealed its absence from Siwa Oasis. It breeds in pools, wells, drains and rice fields. It is known to enter houses and bite during the evening. This species is also common in the Nile Valley.

**Culex tritaeniorhynchus** Giles.

This species was recorded from Kharga and Dakhla by Kirkpatrick and Salem, respectively. It also exists in Bahria where it was found in abundance, especially during August and September. Its main breeding places are rice fields and their drains. No adults were found inside houses.

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