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MOSQUITO SPECIES FOUND IN ISRAEL DURING A SURVEY 1955-58

J. Margalit and A. S. Tahori

Dept. of Parasitology, The Hebrew University, Jerusalem and

Israel Institute for Biological Research,

University of Tel-Aviv Medical School. Ness-Ziona

Introduction

During an extensive survey of Culicidae in Israel in the years 1955-58 (Margalit & Tahori 1970), in addition to the two most common Culex species C. pipiens molestus Forskal and C. univittatus Theobald several less common species of Culicinae and also some Anophelinae were collected. Since some of these mosquitoes are now practically extinct in Israel with others having lost their former importance, it was deemed of interest to record their finding. In this survey emphasis was placed on Culicinae and data on Anophelinae are re- latively meagre.

Material and Methods

Only adult mosquitoes were collected. They were usually caught by hand aspirator in human dwellings or air raid shelters. At Hulata, Zikhron Ya'aquov railway station and Hadera they were collected by means of grass sweeps. They were identified under light carbon dioxide anesthesia according to the key of O. Theodor (unpublished, Hebrew University, Jerusalem). Collecting sites are enumerated elsewhere (Margalit & Tahori 1970 pagel46).

Results

The following mosquito species were found. Data for their world wide distribution are taken from Stone et al. (1959).

Culex Linnaeus

Subgenus: Culex Linnaeus

Culex antennatus (Becker)

This mosquito was found only at Hulata: 2 ♂ + ♀ VII/56; 2 ♀VII/56; 4 ♀ VII/56; ♀ IX/56; ♀ XII/56; 4 ♀ VI/57: 28 ♂♀ IX/57: 1 6 ♂♀ X/57: 2 ♂+♀ XI/57. Its world wide distribution is: Egypt, Ethiopian region south to Angola, Botsuana. In Israel it is limited to the Hula area. It prefers to breed in

swamps (Hopkins 1936). This species is an important vector of West Nile virus in Egypt (Taylor et al. 1959).

Culex laticinctus Edwards

This mosquito was collected in Jerusalem 2 ♀ VI/56; at Bahan 5 ♂ + 6 ♀ VI/56; o VII/56; ♂ + ♀ VIII/56; 3 ♀ VII/58; ♂ + ♀ VIII/58; at Elon ♀ VII/56; at Zefat 8 ♂ ♀ VI/56; ♂ VII/56 and at En HaMifraz ♀ II/56.

It's world wide distribution is: The Mediterranean region, Arabian Peninsula, Somaliland, Ethiopia, Sudan and Canary Islands. In Israel it is found practically everywhere. Frequently it breeds together with Culiseta longiareolata (Macquart) (Buxton 1924). This species breeds mainly in artificial pools (Kirkpatrick 1925), but was also found in natural pools.

Culex mimeticus Noe

This species was collected at Elon 2 ♂ + 5 ♀ VIII/56: at Dalia in the Menashe Hills 4 ♂ + 6 ♀ XI/58.

It's world wide distribution is the Southern Palearctic Region and Oriental Region. This mosquito prefers to breed in springs. With the elimination of open springs or at least ther treatment with antimalarial insecticides, this mosquito has become rare in Israel.

Culex pipiens molestus Forskal

This species was very commonly found during the survey and is the most prevalent mosquito in Israel. Data on its population dynamics in various regions of Israel are reported elsewhere (Margalit & Tahori 1970). It's world wide distribution is the Holoarctic Region, Eastern and Southern Africa, Southern South America and Australia. It is more evident in the warmer portions of these regions. It is a vector of Sindbis virus (Taylor et al. 1955) and of West Nile virus (Tahori et al. 1955).

Culex theileri Theobald

This mosquito was found at Yir'on (Upper Galilee) 6 ♀ VI/56; at Zikhron Ya'aqov 6 ♂ + 3 ♀ VI/56; Hadera 3 ♂ V/56; En Shemer ♀ V/56; 2 ♀ IV/58; Ramla ♂ V/56; Ayanot VI/57; Ashqelon 60 ♂ + 64 ♀ V/56; 3 ♂ + 4 VI/56; 3 ♂ VI/57; ♀ III/58; ♀ IV/58; Hulata 3 ♀ VI/56; Shaar HaGolan ♀ IV/55; 5 ♀ XI/55; 3 ♂ + 2 ♀ V/56; ♀ VII/58; Kfar Ruppin ♀ III/56; 2 ♂ + 3 ♀ V/56; 3 ♂ + 2 ♀ VI/56; ♀ VII/56; 2 ♂ + 4 ♀ X/56; 2 ♀ IV/58; En Gedi (Dead Sea Valley) 4 ♂ 16 ♀ V/58.

It's world wide distribution is in the southern and eastern Ethiopian Region, southern Palaearctic and northern Oriental Regions. It is quite common in Israel. At Ashqeulon it was the most prevalent mosquito species during May 1956 (Margalit & Tahori 1970). It breeds mainly in pools, dipping tanks and stagnant or slowly flowing streams (Bedfird 1928).

Culex tritaeniorhynchus Gyles

This species was collected at Zikhron Ya'aqov 2 ♀ V/58; at Hulata ♀ IX/56; 45 ♂ ♀ VIII/57; 59 ♂ ♀ IX/57;2 ♂ + 2 ♀ X/57; at Kefar Ruppin 2 ♀ IX/56; ♀ X/56; ♀ X/57; ♀ IV/58; and at En Gedi 2 ♀ X/58.

The world wide distribution of this species is: India, Ceylon, Maldive Islands, Malagasy, Mozambique, Zanzibar, Kenya, Nigeria, Dahomey, Togo, Gold Coast, Zambia, Egypt, Arabian Peninsula, Syria, Lebanon, Turkey, Iraq, Iran, Trans-Kaukasia, Turkmen SSR. In Asia it is an important vector of encephalitic diseases (Buescher et al. 1959) and in Africa of Sindbis virus (Taylor et al. 1955). In Israel it is common along the Jordan Rift Valley, it may, however also be collected in the Akko area and Nahal Soreq near the coast (Margalit unpublished). It is mainly a summer mosquito.

Culex univittatus Theobald

Like C. p. molestus this species was also quite commonly found during this survey, especially in the warmer regions during late summer and autumn. Data on its population dynamics in Israel are reported elsewhere (Margalit & Tahori 1970). It's world wide distribution is the Ethipean Region, Mediterranean Region, Iran, Pakistan, India, Turkmen SSR. It is a vector of Sindbis virus (Taylor et al. 1955) and West Nile virus (Taylor et al. 1956, Klingberg et at. 1959).

Subenus: Neoculex Dyar

Culex hortensis Ficalbi

This species was collected at Yiron2♀ IV/58, at Zefat (Galil) 2 ♀ VII/56; at Zikhron Ya'akov ♀ I/57; En Shemer ♀ IV/58, Hulata 2 ♂ + 4 ♀ VI/56; 1 ♂ + 3 ♀ XI/56; Tabcha 2 ♀ I/57; ♂ + ♀ XII/56; Shaar HaGolan 2 ♀ II/55; Aqua Bella (Judaean Hills) 6 ♂ ♀ III/55.

The world wide distribution of this species is: Mediterranean Region, Central Europe, Southwestern U.S.S.R. up till Tadzhik S.S.R., Iran, Canary Islands. Like C. mimeticus this species also prefers to breed in springs. It was once widely distributed in Israel (Buxton 1924) with the elimination of open springs or their treatment with antimalarial pesticides, it has recently become rare in Israel.

Genus Aedes Meigen

Subgenus Ochlerotatus Lynch Arribalzaga

Aedes caspius (Pallas)

This species was collected at Zikhron Ya'akov 5 ♀ VI/55; 12 ♀ VII/55; 5 ♂ + 8 ♀ X/55; 30 ♀ I/56; ♀ IV/56; ♂ + 2 ♀ V/56; ♀ VI/56; 7 ♀ VII/56; ♂ + 2 ♀ VIII/58; ♂ + ♀ XII/56; 4 ♂ + 2 ♀ VI/57; 3 ♂ + 2 ♀ VII/57; ♀ V/58; 2 ♀ VI/58; at Hadera ♂ + ♀ I/56; ♂ + 16 ♀ VII/56; at Pardess Hanna 4 ♂ X/57; at En Shemer ♀ VIII/56; at Ramla ♂ VI/55 and ♂ IX/55. At Ashqelon 2 ♀ VI/57; Sha'ar Ha'Golan ♀ V/56; ♀ X/56; x VIII/56 at Kefar Ruppin ♀ V/56; ♂ + ♀ VI56; 2 ♀ VIII/56; ♀ X/56; ♀ XII/56; ♂ VI/57; ♀ VII/57; ♀ VIII/58; 2 ♀ X/57; ♀ XI/57; ♀ IV/58; En Gedi 14 ♀ IV/58; 4 ♂ + 3 ♀ VII/58; 4 ♀ X/58; Hulata 2 ♀ VII/58; ♀ IX/56; o X/57.

It's world wide distribution is the Palaearctic Region, but only in the Coastal and inland saline areas. Barraud (1921) states that it is very abundant in Egypt but not so common in Palestine. Since then Buxton (1924) found it to be very common in Israel throughout the coastal zone. We found it also to be very abundant in the coasta area, Jordan Rift Valley and Dead Sea Area, but not in the higher parts of the country, since it prefers brackish water.

Aedes detritus (Haliday)

The species was found at En HaMifraz 2 ♀ II/57; ♂ IV/58; at Zikhron Ya'akov 5 ♀ I/56; ♀ IV/56; ♂ VI/56; 2 ♂ VII/56; o III/58; at Hadera ♂ + ♀ I/56 at Pardess Hanna 2 ♂ + 5 ♀ X/57.

It's world wide distribution is the Palaearctic Region, coastal and inland saline areas. In Israel it is a common species in spring (Buxton 1924). The larvae are found chiefly in brackish water near the coast (Barraud 1921).

Aedes mariae (Sergent and Sergent)

This species was found at Atlith VII/56 30 ♂ ♀ . It's world wide distribution is in the coastal parts of the Mediterranean Region. In Israel it is found only along the coast line in rocky salt pools.

Subgenus Finlaya Theobald

Aedes geniculatus (Olivier)

On 23.IV.54 2 ♀ of Ae. geniculatus or possibly Ae. echinus unfortunately in bad condition (identification by O. Theodor, Hebrew University, Jerusalem) were found at Aqua Bella in the Judean Hills. This is the only record of any of these species from Israel. The world wide distribution of Ae. geniculatus is the Palaearctic Region, and of Ae. echinus (Edwards) Greece, Turkey, Algeria, Morocco, Portugal, Spain and France. A. geniculatus breeds in tree holes (Marshall 1938).

Genus Culiseta Felt

Subgenus Culiseta Felt

Culiseta annulata (Schrank)

This species was collected at Kefar Ruppin ♂ III/56; ♀ V/56; at Hulat ♀ VI/56; ♀ VII/56: at En HaMifraz ♀ X/56; at Zikhron Ya'aqov ♂ IV/58; ♀ V/58; at Hadera ♀ II/56; ♂ III/56; ♂ + 2 ♀ IV/56; En Shemer ♂ + ♀ V/56; ♀ III/58; ♀ III/58; at Ayanot ♂ V/56; ♀ VI/56; Ashqelon 2 ♂ VI/57; 2 ♀ III/58; 12 ♀ + 6♂ IV/58; at Sha'ar HaGolan 3 ♀ V/56.

The world wide distribution of this species is the Western Palaearctic Region. It is usually found only in swamps and in the spring months (Buxton 1924). Since the drying of the swamps it has been collected in Israel only sporadically.

Subgenus Allotheobaldia Brolemann

Culiseta longlareolata (Macquart)

This species was collected at Elon 3 ♀ VII/56; at Yir'on ♂ + ♀ VII/56; at Zefat ♀ VI/56; at Kadoori ♂ + ♀ IX/58; at En HaMifraz ♂ + ♀ VI/56; ♂ + 2 ♀ VII/56; ♀ I/57; 2 ♂ + 2 ♀ VI/57; 2 ♀ VII/57; ♂ IV/58; at Pardess Hanna ♀ VIII/58; En Shemer 2 ♀ IV/56; ♀ V/56; ♂ V/58; at Bahan 3 ♂ + ♀ V/56; 3 ♂ + 5 ♀ VI/56; 2 ♀ III/58; 7 ♂ + 4 ♀ IV/58; 7 ♂ + 6 ♀ V/58; 6 ♂ + 3 ♀ VI/58; 3 ♂ + 2 ♀ VII/58; ♀ VIII/58; Eyal ♀ VI/56; Ramla ♂ VI/56; Ayanot ♂ VI/55; ♂ III/56; 2 ♂ + 5♀V/56; at Ashqelon 2 ♂ IV/58; at Tabcha 3 ♂ + ♀ XII/56; at Sha'ar HaGolan ♂ + i II/55; I/56; ♂ + ♀ II/56; ♂ V/56; ♀ VI/56; ♀ IX/57; at Kfar Ruppin ♀ III/56; ♂ V/56;; ♂ VI/56; at Jerusalem 14 ♀ VII/56; at Pardess Hanna 4 ♂ X/57; at En Shemer ♀ VIII/56; at Ramla ♂ VI/55; ♂ IX/55.

The world wide distribution of this species is the Southern Palaearctic Region from the Azores to Central Asia, Ethiopian Region, India and Pakistan. This species was described as being mainly urban (Buxton 1924), but it is now very widespread and found practically everywhere in Israel.

Genus Uranotaenia Lynch Arribalzaga

Uranotaenia ungulculata Edwards

This species was found at En HaMifraz ♂ + ♀ V/56; Zikhron Ya'aqov ♀ III/56; Hadera 5 ♀ VI/55; ♂ IV/56; 2 ♀ VII/57; Pardess Hanna 3 ♀ VII/55; 10 ♂ + 16 ♀ IX/57; 2 ♂ X/57; Bahan ♀ VIII/58; Ayanot 2 ♀ V/56; Ashqelon 4 ♀ 3 ♀ VII/56; 4 ♀ X/56; 14 ♀ VI/57; 8 ♂ ♀ VII/57; 7 ♂ ♀ IX/57; Tabcha ♂ V/58; ♂ V/58; Sha'ar HaGolan ♀ X/55; Kefar Ruppin ♀ VIII/56; Hulata 7 ♀ VII/56; 2 ♀ XII/56; 2 o IX/57.

Its world wide distribution is the Mediterranean Region, Iraq, Rumania, Hungary, USSR, Kazakhstan USSR, Pakistan. In Israel it is a fairly common species, but mainly from the end of August to the winter (Buxton 1924).

Genus Mansonia Blanchard

Sibgenus Coquillettidia Dyar

Mansonia buxton (Edwards)

This was found only at Hulata. About 20 ♂♀ V/56, and another 20 ♂♀ VIII/56. Its world wide distribution is Syria, Sardinia, Corsica. In Israel we found it in the Hula Area, and with the drying of the Hula Lake, it has become extinct.

Mansonia richiardii (Ficalbi)

This species was collected at Hulata VII/56; and about 30 ♂♀ VI/56. Its world wide distribution is Europe, East to Western Siberia, Syria. In Israel it has been recorded only from the Hula Lake area, and it can still be found in the Hula Nature Reserve.

Genus Anopheles Meigen

Subgenus Anopheles Meigen

Anopheles algeriensis Theobald

In this survey this species was collected only at Zikhron Ya'aqov ♀ VI/55; and 6♀ IV/55. Its world wide distribution is the Mediterranean Region, England, Germany, Middle East to Kasakhstan SSR. In Israel it is found only breeding in swamps (Barraud 1921), however it has also been found in the Hula area and in the Akko Bay. (J. Margalit unpublished).

Anopheles claviger (Meigen)

This species was collected at Elon, Upper Galilee 3 ♀ VIII/56; 8 ♀ VII/56; at Pardes Hanna ♀ VIII/53; Dan 2 ♀ V/56; Tabcha 2 ♀ XII/56. Its world wide distribution is Germany, Denmark, Great Britain, Corsica, Sardinia, Spain, Morocco, Algeria, Iraq. Iran as far as Kazakhstan SSR, Afghanistan.

In Israel species breeds mainly in wells, and is still found in Arab villages where wells form the main water supply. It was an important malaria vector in Israel, but its importance as a vector is now negligible (Saliternik 1958).

Anopheles coustani Laveran

This species was found at Zikhron Ya'akov ♀ IV/55 and ♀ X/55. Its world wide distribution is the Ethiopean Region, Morocco, Egypt, Israel. It was formerly found only rarely in Israel (Saliternik 1933), but it seems to have taken

the place formerly occupied by A. hyrcanus and is now the most prevalent anopheline mosquito in the Hula Nature Reserve.

Anopheles hyrcanus (Pallas)

This species was found at Hulata 5 ♀ V/56, 3 ♀ VI/56, 2 ♀ VII/56. Its world wide distribution is Central and Southern Asia, northern Mediterranean, Libya, Japan. In Israel it was breeding together with A. algeriensis very commonly in swamps (Buxton 1924). With the drainage of the swamps and other ecological changes it seems to have disappeared from the country.

Anopheles sacharovi Favre

This species was found at Tabcha 2 ♀ XII/56 and ♀ 22 I/57. Its world wide distribution is USSR, Italy, Sardinia, Corsica, Greece, Syria, Israel, Iraq, Iran, Austria, Cyprus, Kasakhstan SSR, Turkey, Lebanon and Jordan. This mosquito was once very important in Israel as a vector of malaria, but is now practically extinct (Saliternik 1958).

Anopheles superpictus Grassi

In our survey this species was found at Tabcha 2 ♀ XII/56; at Sha'ar HaGolan 2 ♀ II/56; ♀ X/55; ♀ IX/56. Its world wide distribution is the Mediterranean Region, the Middle East, USSR (Transcaucasia and Middle Asia) Afganistan and Pakistan. It is a potential vector of malaria in Israel (Saliternik 1966) but less prevalent than A. sergentii.

Theodor 1952 mentions also: A. marteri, pharaonis, multicolor, hispaniola, turkhudi, athali, rupicolus, ? pulcherrimus.
Theodor's material was collected before 1951, perhaps these species became meanwhile extinct ? Most of the species he states as very common to common; according to Margalith's catches they are all rare !

References

Barraud, P.S., 1921. Mosquitoes collected in Palestine and adjacent territories. Bull. entomol. Res. II : 387 - 95.

Bedford, G.A.H., 1928. "South African Mosquitoes". 13th and 14 Reports Director of Vet. Educ. and Res Union of South Africa. pp 883 - 990.

Buescher, E.L., Scherer, W.F., Rosenberg, M.Z., Gresser, I., Hardy, J.L. and Bullock, H.R., 1959. Ecologic studies of Japanese encephalitis virus in Japan. Am. J. Trop. Med. & Hyg. 8: 651 - 664.

Buxton, P.A., 1924. Applied entomology of Palestine. Bull. entomol. Res. 14: 289 - 340.

Hopkins, G.H.E., 1936. Mosquitoes of the Ethiopian Region. I. Larval bionomics of mosquitoes and taxonomy of culicine larvae. 250 pp. London

Kirkpatrick, T.W., 1925. The mosquitoes of Egypt. Egyptian Govt. Anti-Malaria Commission, 224 pp. Cairo.

Klingberg, M.A., Jasinska-Klingberg, W. and Goldblum, N. 1959. Certain aspects of the epidemiology and distribution of immunity of West Nile virus in Israel. Proc. 6th Int. Cong. Trop. Med. & Malar. 5 : 132 - 140.

Marshall, J.F. 1938. The British mosquitoes. Brit. Mus. Pub. 341 pp.

Margalit, J. and Tahori, A.S., 1970. Population dynamics of Culex pipiens molestus Forskal and of Culex univittatus Theobald in Israel. Israel J. Entomol. 5 : 141-150.

Saliternik, Z., 1933. The breeding of A. maurittanus in Palestine. Bull. Ent. Res. 24 : 343.

Saliternik, Z. 1958. The problems of mosquitoes in Israel and their control. Proc. 45th Ann. Meeting N.J. Mosquito Exterm. Ass 70 - 79.

Saliternik, Z. 1966. Methods of malaria eradication under the conditions peculiar to Israel. Israel J. Med. Sci. 2 : 232 - 238.

Stone, A., Knight, K.L., and Starcke, H. 1959. A synoptic catalog of the mosquitoes of the world. The Thomas Say Foundation. Vol. VI. 358 pp.

Tahori, A.S., Sterk, V.V., and Goldblum, N., 1955. Studies on the dynamics of experimental transmission of West Nile virus by Culex molestus Am. J. Trop. Med. & Hyg. 4 : 1015 - 1027.

Taylor, R.M., Hurlbut, H.S., Work, T.H., Kinston, J.R. and Frothingham, T.E. 1955. Am. J. Trop. Med. & Hyg. 4 : 844 - 862.

Taylor, R. M., Work, T.H., Hurlbut, H.S , and Rizk, F., 1956. A study of the ecology of West Nile virus in Egypt. Am. J. Trop. Med. & Hyg. 5: 579 - 620.

Theodor, O. 1925. Observations on Palestinian Anopheles. Bull entomol. Res. 15 : 377 - 382.

Theodor, O. 1952: On the Zoogeography of some groups of Diptera in the Middle East. Rev. Fac. Scient. Univ. Istambul. Ser. B. Scient. Natur. 17: 107 - 119.