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THE GEOGRAPHICAL DISTRIBUTION OF ANOPHELES SPECIES AND VECTORS OF MALARIA IN IRAQ,

by

Arab Bakir Al-Tikrity
Entomology Section,
Endemic Diseases Institute, Baghdad.

Introduction

Iraq covers a territory of about 442,000 square kilometres. It is bordered at the East by Iran (Persia), by Kuwait and Saudi Arabia at the South, by Jordan and Syria at the West and by Turkey at the North. In the northern and eastern portions are high mountains, in the center and south parts is a large plain of land and in the west of the country a large area of desert.

This paper is an attempt to set forth our present knowledge of the anopheline mosquitoes of Iraq and the vectors of malaria, partly from the literature but mostly from the personal observations of the writer. It deals with their known and unknown geographical distribution. The writer's own studies have been confined mainly to the three regions of Iraq and he has had the opportunity to collect material of every species and even discover new ones. Until recently only little was reported on the extent of anopheline mosquitoes in Iraq. Since the change of the Endemic Diseases Institute Director in 1962, every opportunity has been taken to increase our knowledge of the three regions of Iraq and the species of anopheles. The first entomological survey was carried out by the writer in 1954, in the northern region. The second and third investigations were carried out in 1955 and 1959 in the same area.

During the period Sept. 1955 to Sept. 1958, a general survey was made of the central and southern regions of Iraq. Many specimens were collected of different kinds of mosquitoes present in these areas. Many trips were made to the different parts of Iraq between the period of 1961—1963, collecting several species of anopheles. The results of all investigations are gathered in this paper.

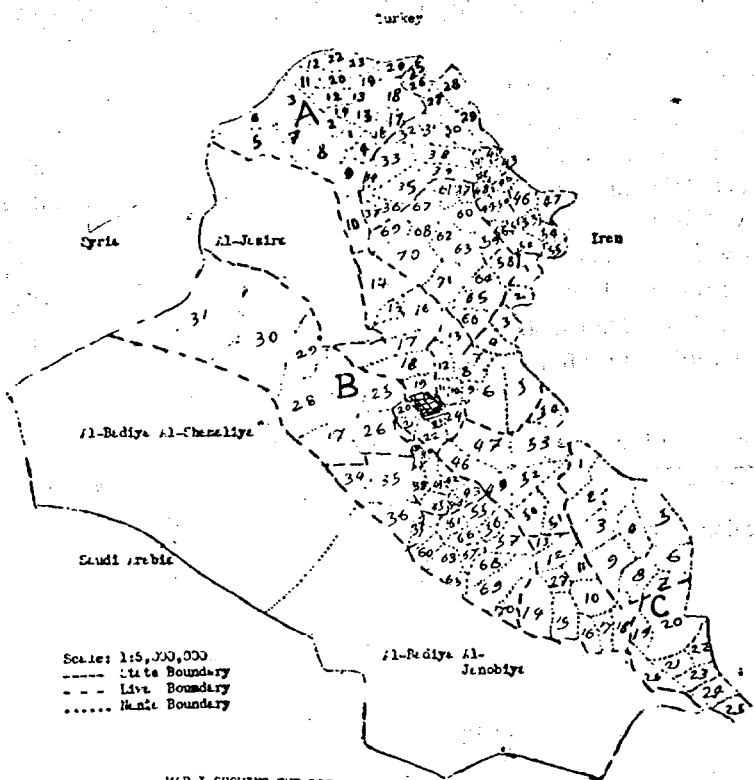
There are more than fifteen species of anopheles in Iraq. The vector species responsible for the malaria transmission are :

1. *A. superpictus* in the foot-hill escarpment and plateau.
2. *A. sacharovi* in the foot-hill and escarpment region.
3. *A. maculipennis* in the Turkish and Persian plateau.

These three species are vectors of malaria in the four northern liwas and in four of the central liwas (Ramadi, Baghdad, Diwala and Kut).

4. *A. stephensi* in the alluvial plain region in the central and southern areas.

5. *A. fluviatilis*. This species is a very important vector of malaria in Iran and may be a vector in Iraq, because it is found in many malarious areas as Karbala, Diala, Diwania, Kut and Kirkuk liwas, in foot-hill and plain areas.



Scale: 1:5,000,000
 - - - - - Liwa Boundary
 - - - - - Liwa Boundary
 Liwa Boundary

MAP I SHOWING THE DISTRIBUTION OF ANOPHELES IN THE 14 LIWAS OF IRAQ

- | | | |
|--|--|--|
| <p>A- Northern Region</p> <ul style="list-style-type: none"> 1-Kirkuk 2-Mosul 3-Frbil 4-Sul-Iraqiya | <p>B- Central Region</p> <ul style="list-style-type: none"> 5-Baghdad 6-Ram di 7-Diyala 8-Karbala 9-Hilla 10-Kut 11-Diwaniya | <p>C- Southern Region</p> <ul style="list-style-type: none"> 12-Basra 13-Masiriya 14-Amara |
|--|--|--|

A. maculipennis Meigen

Meigen (1818 Syst. Besch. 1 : 18

Edwards (1932) Gen. Insect. 194 : 39

basilei Falleroni (1932) "Zooprofilassi, etc."

typicus Hachett and Missiroli (1935) Riv. di malarial. 14 : 53.

This species was found in the escarpment region, north and north east of Iraq, at more than 3000 feet high. It is a vector of malaria in this area. The adults were found resting indoors in human dwellings and animal shelters both during the day and during the night. It was present in watered areas with high rainfall and low summer temperature. It breeds in swampy places where irrigation water was allowed to run to waste, in rice fields, stagnant water and in small streams with vegetation, in the shade or under direct sunlight. Map II shows the distribution of this species in the country. It was recorded in the following nahias :

<u>Region</u>	<u>Liwa</u>	<u>Nahia</u>	<u>Ref. Nr. in the Map</u>		
A. Northern					
Region	Mosul	Slivani	11		
		Nahla	18		
		Sersank	19		
		Doski	20		
		Sindi	21		
		Gulli	22		
		Barwaribala	23		
		Narwarikan	24		
		Arbil		Barzan	25
				Zibar & Mirgasoor	26 & 27
Baradost	28				
Balak	29				
		Rawandooz	30		

<u>Region</u>	<u>Liwa</u>	<u>Nahia</u>	<u>Ref. Nr. in the Map</u>
	Sulaimaniya	Sangasar	40
		Raniya	41
		Mirza Rostam	42
		Qalaa Diza	43
		Mawat	45
		Sewail	46
		Penjwin	47
		Barzinja	53
		Khormal & Shahrazoor	54
		Halabcha	55

B. Central

Region	Diala	Maidan	1
		Koratoo	2
		Khanaquin	3

C. Southern

Region	Basrah	Shatt Al Arab	22
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A. apoci Marsh

Marsh (1933) slylops 2:193

It was known to exist in the foot-hill areas. It was recorded from the east and west of the country. It was collected from saline breeding places, which were exposed to direct sunlight. Map II shows the distribution of this species in Iraq. It was found in the following nahias :

<u>Region</u>	<u>Liwa</u>	<u>Nahia</u>	<u>Ref. Nr. in the Map</u>
A. Northern			
Region	Kirkuk	Daquk	71
B. Central			
Region	Baghdad	Tikrit	15
	Diala	Khanaqin	3
	Ramadi	Hit	28

A. hyrcanus Palls

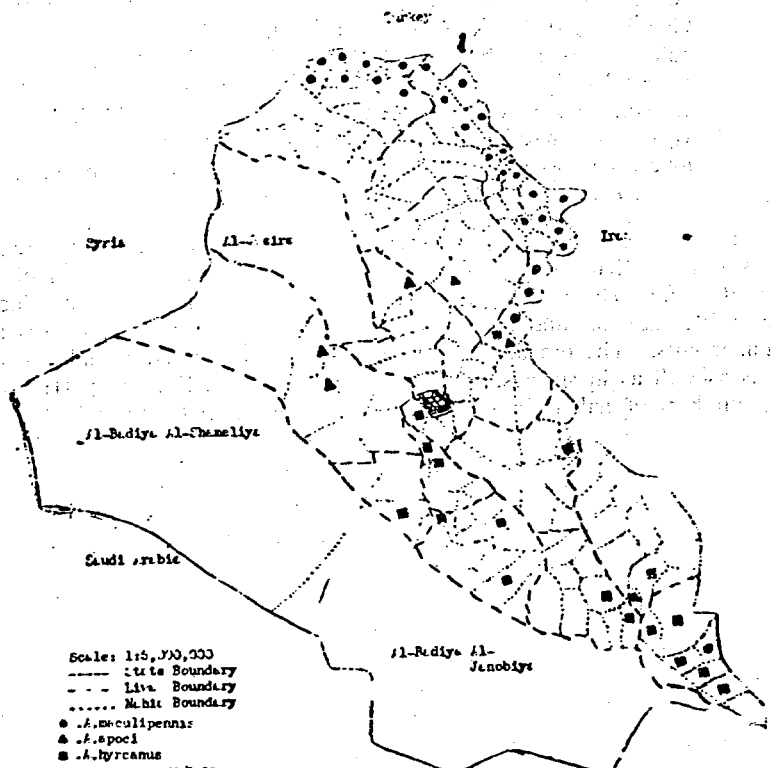
Palls (1771) Reise Russ. Reichs. 1 : 475 (Culex)

Edwards (1932) Gen. insect. 194 : 41

sinensis Wiedemann (1828) Aussereurop. Zweifl. 1 : 547.

This species was reported in large numbers from the marshy areas of south Iraq. It was widely distributed along Shatt-Al-Arab, Tigris and Euphrates up to near Baghdad. It was reported from the central and southern regions. It breeds in large numbers among reeds in stagnant water and in small number in irrigation channels where no reeds were growing. Map II shows the distribution of this species in the country. It was found in the following nahias :

Region	Liwa	Nahia	Ref. Nr. in the Map
B. Central Region	Diala Baghdad	Khanaquin	3
		Mahmudia	22
	Hilla	Iskandaria	33
		Saddat Al Hindia	40
	Karbala	Najaf	36
		Kut	53
	Diwaniya	Ghammas	63
		Al-Shanafia	65
		Samawa	69
	C. Southern Region	Amara	Qumait
Misan (Qalat Sukar)			7
Majar Kabir			8
Majar Saghir			9
Nasiriya		Al Busalah	10
		Chebaiesh	18
Basrah		Al Madaina	19
		Al Sweib	20
		Al Hartha	21
		Shatt Al Arab	22
	Abul Khasib	23	
	Siba	24	



MAP II SHOWING THE DISTRIBUTION OF MACULIPENNIS, A. APOCLI AND A. LYCRAMUS IN IRAQ

A- Northern Region

- 1-Kirkuk
- 2-Mosul
- 3-Erbil
- 4-Sulaimaniya

B- Central Region

- 5-Baghdad
- 6-Ramadi
- 7-Diyala
- 8-Tarbala
- 9-Hilla
- 10-Kut
- 11-Divanlya

C- Southern Region

- 12-Basra
- 13-Masiriya
- 14-Amara



<u>Region</u>	<u>Liwa</u>	<u>Nahia</u>	<u>Ref. Nr. in the Map</u>
A. Northern Region	Sulaimaniya	Sangasar	40
		Raniya	41
		Mirza Rostum	42
		Qaladiza	43
		Bingerd	44
		Mawat	45
		Sewail	46
		Benjwein	47
		Razzian	49
		Surdash	48
		Sarchinar	50
		Tanjero	51
		Wermawa	52
		Berzanja	53
		Khurmal & Sharhrazor	54
		Halabcha	55
Qaradagh	56		
Kirkuk		Aghjalar	57
		Sangaw	59
		Pibaz	58
		Chamchamal	60
		Shwan	61
		Qarahassan	62
		Qadirkaram	63
		Kifri & Sargala	64 & 65
		Qaratappa	66
		Altonkupri	67
		Kirkuk	68
		Hawija	69
		Tuzkhurmato	70
		Daquk	71
		Kufri & Sargalla	64 & 65
Qaratappa	66		
Altonkubri	67		
Kirkuk	68		
Hawija	69		
Tuzkhermatoo	70		
Daquk	71		

<u>Region</u>	<u>Liwa</u>	<u>Nahia</u>	<u>Ref. Nr. in the Map</u>
B. Central Region	Diala	Maidan	1
		Korattoo	2
		Khanaquin	3
		Saadia	4
		Mandili & Qazania	5
		Baladroos	6
		Magdadia	7
		Abu Saida	8
		Kanan	9
		Baquba	10
		Khalis	12
		Mansooria	13
		Baghdad	Beji
	Tikrit		15
	Samarra		16
	Balad		17
	Tarmiya Baghdad		19
	Romadi	Garma	25
		Falluja	26
Ramadi		27	
Hit		28	
Kut	Haditha	29	
	Ana	30	
	Al Qaim	31	
	Kut	49	
	Badra	53	
	Zarbatia	54	
	C. Southern Region	Amara	1
Basrah		22	
		Shekh Saad	
		Shatt Al Arab	



A. superpictus Grassi (1898)

Grassi (1898) Att R. Acad. Lincei (5), 8 : 560

palestinensis Theobald (1903) Mon. Cul. 3 : 71*nursei* Theobald (1907) Mon. Cul. 4 : 66*cardamitisi* Newstead and Carter (1910) Ann. Trp. Med. 4*vassilievi* Portschinsky (1911) Trudy Bur. Ent. 5 : 58*macedoniensis* Cot and Hovasse (1917) Bull. Soc. Path. exot.

10 : 891

This species is the main vector of malaria in the northern region (Mosul, Erbil, Kirkuk and Sulaimaniyá liwas) and in some liwas of the central region (Diala, Baghdad, Ramadi an dKut). It was found during the spring, summer and autumn in human dwellings, animal shelters and summer huts. The breeding places were common in riverain and irrigated areas as well as in springs, pools, streams and rice fields. Map III shows the numbers of nahias in which *A. superpictus* were found.

<u>Region</u>	<u>Liwa</u>	<u>Nahia</u>	<u>Ref. Nr. in the Map</u>
A. Northern			
Region	Mosul		
		Ba'asheeka	1
		Tel Kaif	2
		Zimmar	3
		Al Hamdaniya	4
		Sinjar	5
		Al Shimal	6
		Tel Afar	7
		Hemaidat	8
		Qaiyara	9
		Al Sharkat	10
		Slivani	11
		Sumail	12
		Muzoori	13
		Al Kosh	14
		Shekhan	15
		Ashaeir Al Saba	16
		Al Sorchia	17
		Sersang	18
		Nahla	19
		Sindi	20
		Doski	21
		Gulli	22
		Barwaribala	23
		Narwarikan	24
	Erbil		
		Barzan	25
		Zibar & Mirgasoor	26 & 27
		Baradost	28
		Balak	29
		Rawandooz	30
		Deira Harir & Koshawa	31
		Salah Al Din	32
		Ankawa & Kochtappa	33 & 35
		Al Gweir	34
		Kandinawa	36
		Makhmoor	37
		Kwaisanjak	38
		Taq Taq	39

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A. fluvatilis James

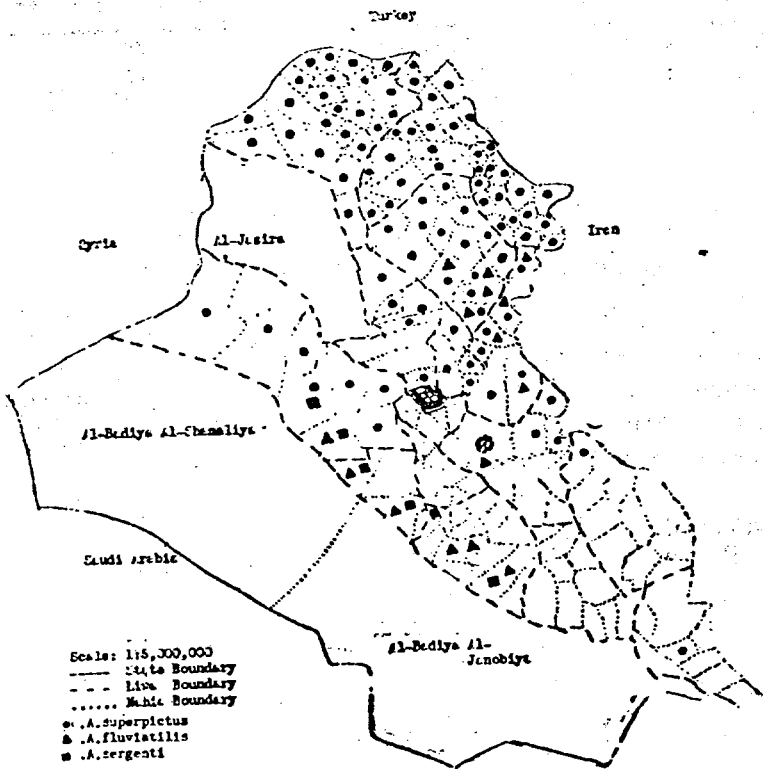
James (1902) Sc. Mem. Govt. India, 2 : 31

listoni, Liston (nec. Giles) (1901) Ind. M. Gaz. 36 : 361

arabica Christophers and Chand (1915) Ind. J. Med. Res. 3 : 189

This species was found in different parts of Iraq (north and central regions), where it is suspected to cause malaria transmission. A small number was found indoors, but large numbers were found in the natural holes and caves. Their breeding places were found in streams, springs and pools with fresh, saline and chlorinated water. Map III shows the distribution of this species in the country. The species was recorded from the following nahias :

<u>Region</u>	<u>Liwa</u>	<u>Nahia</u>	<u>Ref. Nr. in the Map</u>
A. Northern			
Region	Kirkuk	Kifri & Sargalaa	64 & 65
		Qaratappa	66
		Daquk	71
B. Central			
Region	Diala	Maidan	1
		Koratoo	2
		Khanaquin	3
		Mandili	5
	Ramadi	Ramadi	27
	Karbala	Ain Al Tamor	34
		Najaf	36



MAP III SHOWING THE DISTRIBUTION OF *A. SUPERPICTUS*, *A. FLUVIALIS*, AND *A. SERGENTI*.

A- Northern Region

- 1-Kirikuk
- 2-Mosul
- 3-Erbil
- 4-Sulaimaniya

B- Central Region

- 5-Baghdad
- 6-Ramadi
- 7-Diyala
- 8-Karbala
- 9-Hilla
- 10-Kut
- 11-Diwaniya

C- Southern Region

- 12-Basra
- 13-Masiriya
- 14-Amara



Region	Liwa	Nahia	Ref. Nr. in the Map
B. Central Region	Kut Diwaniya	Al Naamaniya	48
		Faisaliya	60
		Ghammas	63
		Hamza	67
		Samawa	69

A. sergenti Theobald
Theobald 1907) Mon. Cul. 4 : 68

This species was found for the first time by the writer in the west of Iraq. Its breeding places mostly were saline desert springs with chlorinated water and small streams. It was never found in adult stages in-or out-doors in Iraq. Map III shows the distribution of this species in Iraq. It was found in the following nahias :

C-Central Region	Ramadi	Ramadi Hit	27 28
	Karbala	Ain Al Tamor	34
		Najaf	36
	Diwaniya	Faisaliya	60
		Samawa	69

A. stephensi Liston
Liston (1901) Indian M. Gaz. 36 : 441
metaboles Theobald (1901)
intermedia Rothwell (1907)

This species is widespread in the southern and central regions of Iraq. It is present in ten liwas or more. It is the main vector of malaria transmission in these parts and is usually found in human dwellings and animal shelters during both day and night-time. It breeds in different kinds of water such as small streams, springs, pools and in the irrigation system in gardens, with or without vegetation, shadad or under direct sunlight. Map IV shows the distributions of this species in Iraq. It was found in the following nahias :

<u>Region</u>	<u>Liwa</u>	<u>Nahia</u>	<u>Ref. Nr. in the Map</u>
A. Northern Region	Sulaimaniya	Shahrazoor	54
B. Central Region	Diala	Khanaqin	3
		Saadia	4
		Mandeli & Qazannia	5
		Baladrooz	6
		Mogdadia	7
		Abu Saida	8
		Kanan	9
		Baquba	10
		Khalis	12
		Mansooria	13
	Baghdad	Beji	14
		Tikrit	15
		Samarra	16
		Balad	17
		Tarmiya	19
		Abu Grab	20
		Yussufia	21
		Mahmudia	22
		Dora	23
		Salman Pack	24
	Ramadi	Garma	25
		Falluja	26
		Ramadi	27
		Hit	28
		Haditha	29
	Hilla	Jurf Al Sakhar	32
		Iskandaria	33
		Jadwal Al Gharbi	38
		Abu Gharak	39
		Saddat Al Hindia	40
		Hilla	41
		Al Mahawiel	42
		Mathatia	43
		Kassim	44
		Kifl	45
	Karbela	Ain Al Tamor	34

<u>Region</u>	<u>Liwa</u>	<u>Nahia</u>	<u>Ref. Nr. in</u>
B. Central Region		Al Husseiniya	35
		Najaf	36
		Al Kufa	37
	Kut	Zubaidia	46
		Naamaniha	48
		Dugaila	52
		Badra	53
		Zorbatia	54
	Diwaniya	Deghara	55
		Afaq	56
		Al Bdair	57
		Abbassia	58
		Salahia	62
		Hire	59
		Faisaliya	60
		Qadissia	61
		Ghammas	63
		Saniyah	64
		Shafia	66
		Rumaitha	68
Al Khaddar	70		
Al Shanafia	65		
Hamza	67		
Samawa	69		
C. Southern Region	Amara	Shech Saad	1
		Ali Al Gharbi	2
		Qumait	3
		Amara	4
		Al Mubarrat	

<u>Region</u>	<u>Liwa</u>	<u>Nahia</u>	<u>Ref. Nr. in the Map</u>
		Al Bata	14
		Nassiriah	15
		Iakaika	16
		Garmat Beni Saad	17
		Chebaiesh	18
		Swaji Dachá	27
	Basrah	Al Mdaina	19
		Al Swaib	20
		Al Hartha	21
		Shatt Al Arab	22
		Abu Khasieb	23
		Siba	24
		Faw	25

A. claviger Meigen

Meigen (1804) Kass. 1: 4 (*Culex*)

Edwards (1932) Gen. Insect. 194: 38.

bifurcatus Meigen (1818) Syst. Besch. 1: 1.

villosus Robineau-Desvoidy (1827) Mem. soc. hist. Nat., Paris 3:411
petrahani del Vecchio (1939) Riv. Di parassit. 3: 29.

It was known from the escarpment and foothills areas in the valleys of north Iraq. This species was rarely found indoors (human dwellings or animal shelters) It is a wild species and a biter by day in the open. It breeds in cold water About 15C or less. It was found in slow running streams, pools, wells and in rice field canals. Map IV shows the distribution of this species in the northern region. It was found in the following nahias :

A. Northern

Region	Mosul		
		Al Hamdaniyah	4
		Qaiyara	9
		Al Sharkat	10
		Ashaeir Al Saba	16
		Al Sorchia	17
		Nahla	18
		Doski	20
		Gulli	22
		Barwaribala	23
		Narwarikan	24

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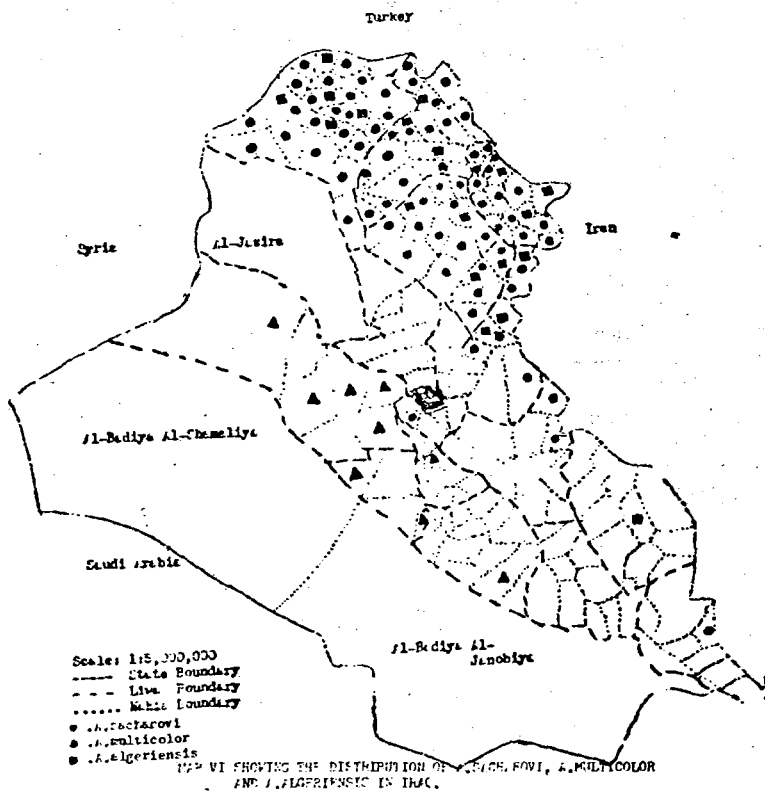
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<u>Region</u>	<u>Liwa</u>	<u>Nahia</u>	<u>Ref. Nr. in the Map</u>
A. Northern Erbil Region		Barzan	25
		Mirgasoor	27
		Balak	29
		Rawandooz	30
		Dira Harir & Koshawa	31
		Salah Al Dien	32
		Ain Kawa & Kochtaba	33 & 35
		Gweir	34
		Kandinawa	36
		Makhmor	37
Kwiasanjak	38		
Taq Taq	39		
Sulaimaniya		Sangasar	40
		Raniya	41
		Mirza Rostum	42
		Qaladiza	43
		Bingerd	44
		Mawat	45
		Sewail	46
		Banjwain	47
		Bazzian	49
		Surdash	48
		Sarchinar	50
		Tanjero	51
		Wermawa	52
		Khormal & Shahrzoor	54
		Halabcha	55
Qaradagh	56		
Kirkuk		Bipaz	58
		Chamchamal	60
		Shwan	61
		Hawieja	69
B. Central Region	Diala	Maidan	1
		Korattoo	2
		Khanaquin	3



A- Northern Region

- 1- Kirkuk
- 2- Mosul
- 3- Erbil
- 4- Sulaimaniya

B- Central Region

- 5- Baghdad
- 6- Ramadi
- 7- Diyalah
- 8- Karbala
- 9- Hillah
- 10- Kut
- 11- Diwaniya

C- Southern Region

- 12- Basra
- 13- Nassiriya
- 14- Amara

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A. d'ihali Patton

Patton (1905) J. Bombay Nat. Hist. Soc. 16 : 627

rhodesiensis Theobald (1901) Mon. Cul. 1 : 184 (Part)

This species is very rare in Iraq. It was reported from around the Shatt Al Arab in the south and also in the central and northern parts of the country. The adults were found indoors during warm weather. It breeds in running streams, pools and ditches. *A. d'ihali* larvae were always associated with those of *A. superpictus*, *A. stephensi* and *A. pulcherrimus*. Map IV shows the distribution of this species in Iraq. It was found in the following nahias:

<u>Region</u>	<u>Liwa</u>	<u>Nahia</u>	<u>Ref. Nr. in the Map</u>
A. Northern			
Region	Kirkuk	Kifri	64
B. Central			
Region	Diala	Maidan	1
		Korato	2
		Khanaquin	3
		Saadia	4
		Mandili	5
C. Southern			
Region	Basra	Al Sweib	20
		Al Hartha	21
		Shatt Al Arab	21
		Abu Al Khasib	23

A. pulcherrimus Theobald

Theobald (1902) Proc. Roy. Soc. 69 : 369

This species is abundant all over the country. It was found in the alluvial plains of the central and southern areas and in the escarpment and foothills, of the northern areas. The adults were found in large numbers in the human dwellings and animal shelters during the spring, summer and autumn. It breeds in slow running streams, pools, rice fields, ditches, marshes and all kinds of water, with or without vegetation. Map V shows the distribution of this species in Iraq. It was found in about 150 of 166 nahias of Iraq.

A. martari Senevet and Prunelle

Senevet and Prunelle (1927), Arch. Inst. Pasteur d' Algerie, 5:529

Very few numbers of this species were found in the far north and north east of Iraq. It was never found indoors, human dwellings or animal shelters, because it is a wild species. It breeds in cold and clean water of the mountain streams. Map V shows its distribution in Iraq. It was recorded in the following nahias :

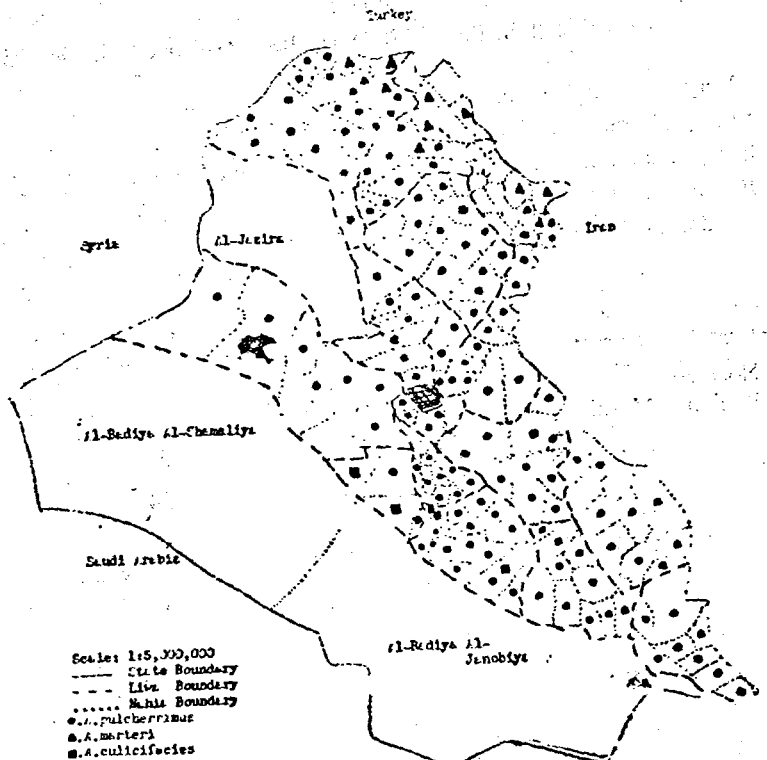
<u>Region</u>	<u>Liwa</u>	<u>Nahia</u>	<u>Ref. Nr. in the Map</u>
A. Northern Region	Mosul	Nahla	18
		Barwaribala	23
		Narwarikan	24
	Erbil	Zibar & Mirgasoor	26 & 27
		Balak	29
		Rawandooz	30
		Dira Harier & Koshawa	31
	Sulaimaniya	Sewail	46
		Penjiwien	47
		Khormal & Shahrazoor	54

A. culicifacies Giles

Giles (1901) Entom. Monthly Mag., Ser. 2, 12:197

In Dec. of 1956 and Sept. of 1957, the winter found this species for

the first time in a few breeding places in west Iraq (Karbala and Diwaniya liwas of the central region). It was never found in adult stages in Iraq, but only in the third stage of larvae. It breeds in streams, springs and pools, with or without vegetation in the breeding places. The water contained a varying proportion of dissolved H₂S. Map V shows the distribution of this species in Iraq. It was present in the following nahias :



MAP V SHOWING THE DISTRIBUTION OF PULCHERRIMUS, A. NIGER AND A. CULICIFACIES IN IRAQ.

A- Northern Region

- 1-Kirkuk
- 2-Mosul
- 3-Erbil
- 4-Sulaymaniya

B- Central Region

- 5-Baghdad
- 6-Ramadi
- 7-Diyala
- 8-Karbala
- 9-Hilla
- 10-Kut
- 11-Diyala

C- Southern Region

- 12-Basra
- 13-Mosuliyah
- 14-Amara

<u>Region</u>	<u>Liwa</u>	<u>Nahia</u>	<u>Ref. Nr. in the Map</u>
B. Central Region	Karbala	Ain Al Tamor	34
		Najaf	36
	Diwaniya	Ghamas	63
		Samawa	69

A. multicolor Cambouliu

Cambouliu (1902) Compt. rend. d.Sc. 135 : 704

impuctus Donitz (1902) Ztschr. Hyg. 41 : 67

chaudoyei Theobald (1903) Mon. Cul. 3 : 68

nigrifasciatus Theobald (1907) Mon. Cul. 4 : 65

This species was found for the first time by the writer in the wes of Iraq. The adults were caught in small numbers indoors (living rooms and stables). It breeds in high saline water such as streams, pools, desert springs and the edges of the saline lakes. Map VI hews the distribution of this species in west Iraq. It was recorded in the following nahias :

B. Central Region	Ramadi	Garma	25
		Falluja	26
		Ramadi	27
		Hit	28
		Ana	30
	Hilla	Saddat Al Hindiya	40
	Karbala	Ain Al Tamor	34
		Najaf	36
	Diwaniya	Ghamas	63
		Samawa	69

A. sacharovi Favre

Favre (1903) Malaria in Russia, p. 189

Edwards (1932) Gen. insect. 194 : 38

maculipennis var Christophers and Shortt (1921) Ind. J. Med.
Res. 8 : 519

elutus Edwards (1921) Bul. ent. Res. 12 : 273

martinus Shingarev (1926) Russian J. Trop. Med. 6 : 47

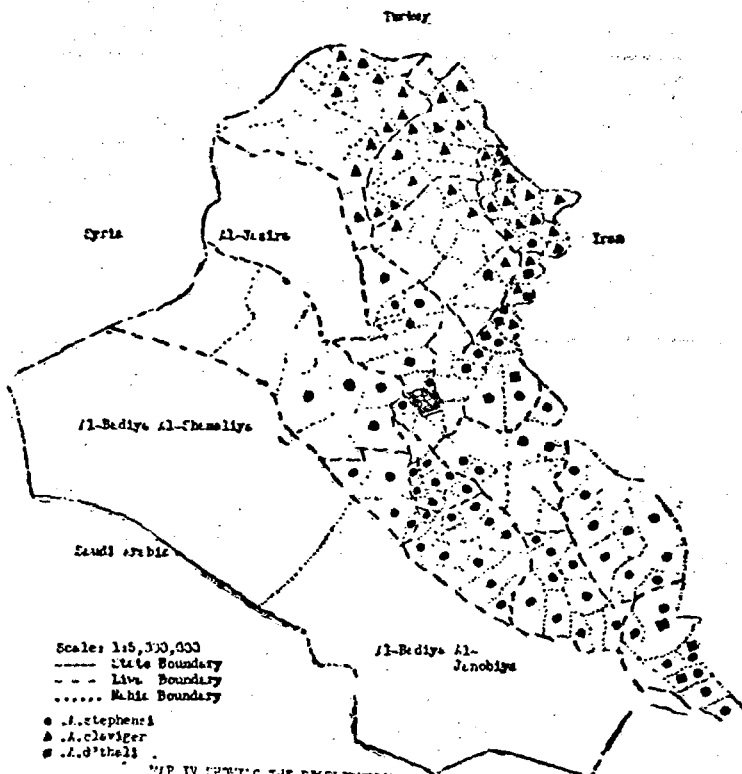
relictus Shingarev (1926) Russian J. Trop. Med. 6:47
 elutior Martini (1930) Flig. Pal. reg. Culicidae, P. 135

This species is the main vector of malaria transmission in the north and north east of Iraq. It is present in large numbers in the escarpment and foothill regions. The adults were found resting indoors in human dwellings and animal shelters both during the day and during the night. It breeds in small streams, pools, river beds and rice fields with or without vegetation. Map VI shows the distribution of this species in Iraq. It was recorded in the following nahias :

Region	Liwa	Nahia	Ref. Nr. in the Map
A. Northern			
Region	Mosul	Baasheeka	1
		Tel Kief	2
		Zommar	3
		Al Hamdaniyah	4
		Sinjar	5
		Al Shimal	6
		Tel Afar	7
		Hmaidat	8
		Qaiyara	9
		Al Sharkat	10
		Slivani	11
		Simail	12
		Mazoori	13
		Al Khosh	14
		Shekhan	15
		Ashair Al Saba	16
		Al Sorchia	17
		Nahla	18
		Sersank	19
		Doski	20
		Sindi	21
		Gulli	22
		Barwaribala	23
		Narwarikan	24

<u>Region</u>	<u>Liwa</u>	<u>Nahia</u>	<u>Ref. Nr. in the Map</u>
A. Northern Erbil Region		Barzan	25
		Zibar & Mirgasoor	26 & 27
		Baradost	28
		Balak	29
		Rawandooz	30
		Dira Harir & Koshawa	31
		Salah Al Din	32
		Ainkawa & Koshtappa	33 & 35
		Gwer	34
		Kandinawa	36
		Makhmoor	37
	Kwisanjak	38	
	Taq Taq	39	
Sulaimaniya		Sangasar	40
		Raniya	41
		Mirza Rostum	42
		Qaladiza	43
		Bingerd	44
		Mawat	45
		Sewail	46
		Banjwin	47
		Bazzian	49
		Surdash	48
		Sarchinar	50
		Tanjiro	51
		Wermawa	52
		Barzanja	53
		Khormal & Shahrazoor	54
	Halabcha	55	
	Qaradagh	56	
Kirkuk		Aghjalar	57
		Sangaw	59
		Pipaz	58
		Chamchamal	60
		Shwan	61
		Qarahassan	62
	Qadir-karam	63	





MAP IV SHOWING THE DISTRIBUTION OF 12 PROVINCES IN IRAQ, 1930.

A. Northern Region

- 1-Kirkuk
- 2-Mosul
- 3-Erbil
- 4-Sulaimaniya

B. Central Region

- 5-Baghdad
- 6-Ramadi
- 7-Diyala
- 8-Karbala
- 9-Hillah
- 10-Kut
- 11-Edessa

C. Southern Region

- 12-Basra
- 13-Kassriya
- 14-Amara

<u>Region</u>	<u>Liwa</u>	<u>Nahia</u>	<u>Ref. Nr. in the Map</u>
B. Central Region	Diala	Maidan	1
		Korattoo	2
		Khanaquin	3
		Saadia	4
		Baaquba	10
	Mandili	5	
	Baghdad	Yossufia	21
Kut	Badra	53	
	Zorbatia	54	
C. Southern Region	Basrah	Shatt Al Arab	22

A. algeriensis Theobald

Theobald (1903) Mon. Cul., 3: 21

Iukisi Christophers (1916) ind. J. med. Res., 4: 120

The distribution of this species is shown in map VI; it was known in the following nahias :

A.	Mosul	Tel Kief	2
		Simail	12
		Shekhan	15
		Sindi	21
		Barwaribala	23
		Erbil	Mirgasoor
Sulaimaniya	Mawat	Dira Harir & Koshawa	31
		Kwisanjak	38
		Banjwin	47
Kirkuk	Barzinja	Mawat	45
		Banjwin	47
		Barzinja	53
		Pipaz	58
Kirkuk	Pipaz	Chamchamal	60
		Kufri	67
		Altonkubri	64
		Altonkubri	64



<u>Region</u>	<u>Liwa</u>	<u>Nahia</u>	<u>Ref. Nr. in the Map</u>
B. Central Region	Diala	Midan Korattoo	1 2
C. Southern Region	Amara	Khanaquin Amara	3 4

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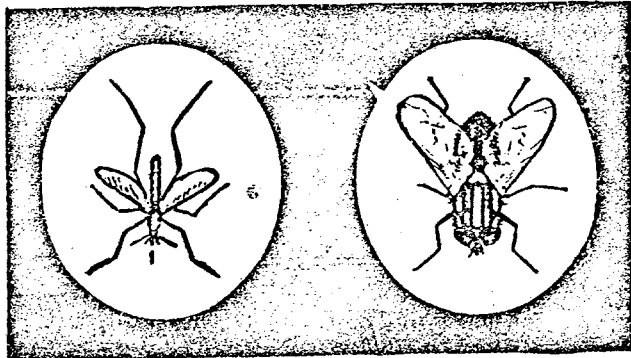
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