Int.J.Curr.Microbiol.App.Sci (2016) *5*(9): 667-674

International Journal of Current Microbiology and Applied Sciences
ISSN: 2319-7706 **Volume 5 Number 9 (2016) pp. 667-674**
Journal homepage: http://www.ijcmas.com

Original Research Article http://dx.doi.org/10.20546/ijcmas.2016.509.077

Morphological Descriptive Study of Phlebotominae Species (Diptera: Psychodidae) in Eastern Al-Hamza District / Al-Diwaniya City

Hadi M. Hamza Al-Mayali* and Mahammad K. Kamil Al-Hassani

Al-Qadisiya University/College of Education/ Department of Biology, Iraq

**Corresponding author*

Keywords
Phlebotominae Species, Sand flies Psychodidae, Sergentomiya.

Article Info
Accepted:
25 August 2016
Available Online:
10 September 2016

A B S T R A C T

3100 insect were collected of Phlebotominae (Sand flies) from different areas of study and were distributed among 1409 females and 1718 males. During the field study, three different species of sand fly two belonging to the Phlebotomus genus (*P. papatasi* and *P. sergenti*) and one species of the Sergentomiya genus is *S. sintoni*, it was noted that more species prevalent is *P. papatasi* at rate (53.4%), followed by *S. sentoni* (28%) and *P. sergenti* (18.6%), respectively. There are very important differences between species superficial reliable classification, especially females was also observed.

Introduction

The sand flies Phlebotominae of vector to leishmaniosis, and nearly 700 species known to it, but there are a small number of species are carriers of the disease, especially of animal origin, as found 20 species of the Phlebotomus genus exist in the ancient world and 24 species of the Lutzomyia genus exist in the modern world known to be proved and probable carriers of the disease (Sacks *et al*., 2008).

Sand fly Insect belong to the Psychodidae, which includes several hundred species and dubbed as "Skeet" being the ringing does not occur in flight sometimes called bed flies (Moth fly) because the body and wings covered with thick hair, and in Iraq; locally called as "Alharms" (Jargeis and Amin, 1987). Sand fly had been small-sized length of between (3-5) mm and a body covered with thick hair and yellowish brown color, hiding during the day away from light in dark caves and burrows of animals in the stables, while females of this insect active at night where attacking humans and animals to absorption larger amount of blood, As for males, they feed on the nectar of flowers (Al-Baroni, 1985).

It depends classified of Sandflies in the period between 1786 to 1925 on the exterior in terms of the number and spread of the capillaries ongenitalia and the size, color, and the spread of hair and scales on the

body, wing venation, length of antenna part, measure the head and abdomen in females (Perfiliew, 1968). A description of each of the buccal cavity, pharynx, cibarial teeth and spermatheca all adopted that comes taxonomic of the insect. Sand fly had over large semi-oval eyes and long tentacles covered with tiny hairs as well as possessing long legs, short parts of cebariumand a body covered with dense hairs (Emami and Yazdi, 2008). The current study was aimed at determining the species of Phlebotominae insect in all study areas being is home to the leishmaniosis, according to previous studies.

Materials and Methods

Sand flies insects were collected from different areas of eastern Al-Hamza district (30 km south of Al-Diwaniya city, 210 km south of Baghdad capital/ Iraq) for the period from 1/8/2015 until 6/1/2016, and followed it with the following steps:

Collection: to collect Phlebotominae insects from study areas followed by several methods adopted every one of them for a specific purpose depending on the nature of the site want to collect samples of it are as follows:

Stiky papers

Direct collected: Aspiratory method (Quate, 1964).

Loading: Insects preserved were collected by previous methods in small cap container on ethanol (70%) with the addition of a few drops of pure glycerol to avoid dehydration forms of alcohol, and be saved samples for a short period to prevent any damage to their parts or decomposition. Insect samples are temporarily loaded on a glass slide for the purpose of diagnosis and then washed with distilled water to put it in ethyl alcohol (70%) for a period of one hour to dehydration and then transported to place on a glass slide and be sure of the order of its parts and furnished well to allow watching taxonomic qualities and stabling by using installation material (DPX), cover slide is placed diagonally in order to avoid air bubbles and leaves form a period of time to dry and form information recorded on the slide then be ready for examination (Muhannaand Hassan, 2003).

Taxonomy: Sand flies have been diagnosed by using taxonomic key to family of Diptera: Psychodidaein Iraq (Abul-Hab and Ahmed, 1984). The study included three different genera of sand fly are*P. papatasi*, *P. sergenti* and *S. sintoni*.

Results and Discussion

P. papatasi (Scopoli, 1780)

It is one of the common speciess spread and followed Phlebotomus genus; It comes primarily in this study byratio at 53.4% and is one of the species that prefer to be in the house and can be a president carrier of Leishmania in the study area.

Femalesadvantage (Fig. 1) that the buccal cavity “Cebarium” contains many cibarial teeth scattered vertically as well as on a number of lateral spicules. Pharynx resembles shaped flask and occupies the back of it broad support or structure consists of a sheet-like serrated cibarial teeth at the end of the regular excessively and average length of the labrum (0.3 - 0.4) mm, while the length of the wing of 0.2 mm. Females characterized by the presence of spermatheca which are a cylindrical shape consisting of (9-11) wide piece located in the vicinity of which grooved channel a little bit smaller.

In males (Fig. 2) cebarium and pharynx shall be similar to what exists in the females and Labrum ranging in length between the rate at (0.1 - 0.2) mm. The average length of the wing is 0.3 mm and the coxa is spire bit with length rate of 0.5 mm containing a set of thick capillaries with dark color and length between the range of (12-18) vertical piece located at the rear and is moving forward with the excessive presence a base near the front end carry about nine short bristles. Style with a length of 0.5 mm cylindrical rate holds five small thorns thick; three of which terminal (one of them small and two longer) and both other are semi-centrist located in almost the middle of style. Paramere have been trilobites, the ventral lobe is short and bent almost to the top with a tiny fork short on the top, while the dorsal surface the edge was curved and presence a scattered short bristles. The dorsal lobe's like a sickle shape or mold and be longer than the ventral lobe with dorsal curved direction it ventral surface has Includes a row of tiny capillaries. Middle surface is a digit form and slightly smaller than the ventral lobe and be straight or curved slightly higher as well as having a ventral surface of the number rear half of micro-capillaries. Aedeagus is a short about of 0.1 mm and the funnel-shaped curve. The length of lateral lobe is 0.4 mm and contains short terminal spicules.

P. sergenti (Parrat, 1917)

It is also of belonging to the Phlebotomus genus and is a small presence in the study area as the spread ratio at 18.6%, which came mostly, collected from inside the houses.

Females advantage (Fig. 3) that the cebarium contains a small number of abdominal cibarial teeth scattered and lateral spicules. Pharynx shaped it flask and armature is a rear quarter of the pharynx and consists of chitin it is large in size, elongated, softy, shapes are similar and tidy in the center and with the edge of dots from the back. Spermatheca had a short capsule consists of six pieces of which are overgrown terminal while the nearby from spermathecal duct is a small sized and planned usually.

Males (Figure 4) sometimes do not contain the cebarium with a cibarial teeth and lateral spicules. Pharynx like flask shaped and armature supported with chitin and formed a back third of pharynx which constitutes of parts resemble large scales had dotted and cibarial teeth front of them similar be separate and partially pixelated in casual line on the back. The length of coxa about 0.2 mm with elongated small head and slightly curved abdominally shows it a bundle of long capillaries up to 25 capillary and there is no casual line between the head and neck. The basal excess is shape elongated with a length of 0.05 mm. The style had been with length about 0.1 mm and less than of coxa length half and a much wide compared with coxa but had 4 spicules; two of which terminals are similar in length but are isolated from the others and features by thickness and almost curved. The other spiculeswere central; the one is tiny, short and straight while the other is terminal and thicker than the other. Ejaculatory duct had a length is 0.1 mm and the upper surface has an elliptical and curved with a presence of scattered capillary, the surface of the ventral side contains a six capillary. Aedeagus had been a funnel-shaped and top curved with length about 0.06 mm, while the length of lateral lobeis 0.2 mm.

S. sentoni (Pringle, 1953)

It is the one belonging to the Sergentomyia genus and comes in second place in prevalence of this study at a ratio of 28%, one of the species that tend to enter houses but often resides outside the houses, near of

animals' barns and wilderness areas.

Females advantage (Fig. 5) that the cebariumcavity consists in the row concave from chitin teeth in the back, which is about numbering 15 tooth equal in size and consist of two groups of scatteredsmall teeth in front of front tooth side with a splash of dark color tend to brown. Pharynx is being funnel-shaped and the front line where the base is curved and the front sideincluding the number of granular teeth shape but the rearside consists of a number of dotted teeth shape. Spermatheca had tubular shape, smooth and is divided into pieces with a width of about 0.02 mm and integrated with the top surface.

In male shall be cebarium which is similar to the present in females but it consists of (8-12) small-size tooth with bulleted format and a few small teeth located behind the lateral tooth extended and stain color brown is a light form (Fig. 6). Pharynx armature was a small shaped, trigonal and consists of a number of front shape cibarial teeth. Style length is 0.09 mm with 4spicules which were two terminals and other quasi-terminal, and internal peripherals; one is larger than the other and longer than the style, while The other spicules equal the length style approx. Male genitalia consists of two parts, including exterior represents a ejaculatory pump but interior represents a ejaculatory duct with a length of 0.2 mm and a dotted-like shape of the hand, while aedages shall be dark and curved downward.

Sand fly is the carrier of the parasite as host disease transmitted to humans and other mammals by the bite of the insect container on promastigote of parasite while taking a blood meal from the host through the skin (Davies *et al*., 2004). Which cause infection and the appearance of clinical signs of the disease after the passage of ten days to about a year(Benjamin *et al*., 1994).

The phenotypic description to*P.papatasi* was identical to describe of Abul-Hab and Ahmed (1984) and completely mentioned in the taxonomic key to Diptera: Psychodidae family in Iraq as forward described taxonomically both males and females, and refers that this species of pervasive in Iraq, which prefer to enter the house and it has the ability to transfer a number of diseases such as leishmaniosis because of the abundance and the widening spread.

Fig.1 Cebarium composition and spermatheca in sand flies female (P. papatasi)

Cebarium (100X) | Pharynx (100X) | Spermatheca (400X) | Spermatheca magnify (400X)

Fig.2 Morphological and composition of male genitalia in sand flies male (P. papatasi)

Male morphology
(100X)

Cebarium
(100X)

Pharynx and teeth
(400X)

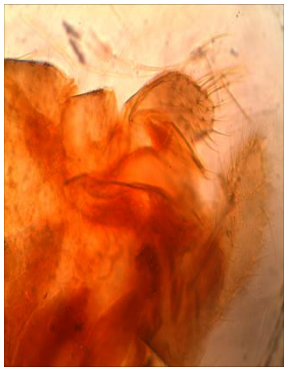
Male ending
(400X)

Ejaculatory pump and paramere (400X)

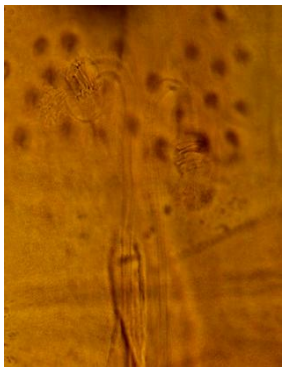
Ejaculatory pump magnify
(400X)

Fig.3 Cebarium composition and spermatheca in sand flies female (P. sergenti)

Pharynx
(400X)



Female ending
(400X)



Spermatheca
(400X)

Spermatheca magnify
(400X)

Fig.4 Morphological and internal composition of male genitalia in sand flies male (P. sergenti)


Male morphology(100X)


Cebarium
(100X)


Male ending
(100X)


Style, coxa and paramere
(400X)


Aedeagus
(400X)


Ejaculatory pump
(400X)

Fig.5 Cebarium composition and spermatheca in sand flies female (S. sintoni)


Female morphology
(100X)


Pharynx and teeth
(400X)


Pharynx and teeth
(400X)


Spermatheca
(400X)

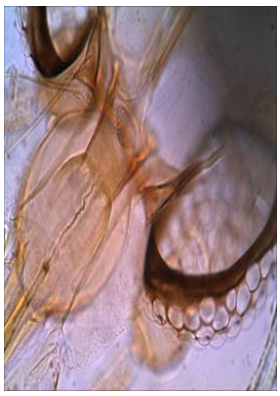

Spermatheca (400X)

Fig.6 Morphological and internal composition of male genitalia in sand flies male (S. sintoni)

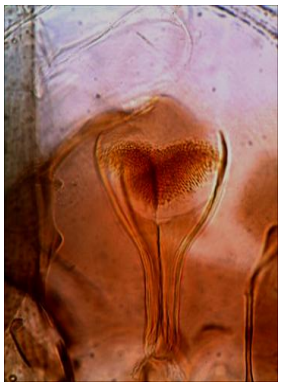
Male morphology (100X)

Male ending (Style) (100X)

Cebarium (100X)



buccal cavity and teeth(400X)



Cebarium (400X)

Ejaculatory duct (400X)

Ejaculatory pump and aedeagus (400X)

While the *P. sergenti* also showed a match with the species described by Abul-Hab and Ahmed (1984) in terms of phenotypic description and internal composition of both males and females, and pointed out that this species was spread in central and southern region, rare in number, spreading limited and does not have a big role in transfer "East Blister" disease in Iraq, which is the opposite of what emphasized by the likes of the first researchers (Pringle, 1957; Sukker, 1974) this species of relationship with the disease in Iraq. The conclusions also came to a matching those researchers having been to isolate the gene for this parasite from this species of insect.

The description species *S. sintoni* of the phenotypic identical to description of Abul-Hab and Ahmed (1984) for both males and females as forward and very detailed description of the compostion and anatomy of this species froms and flies and refed to one of the common two species of Sergentomyia genus (*S. dentata* and *S. sentoni*), They stated that were last species are common in Iraq's plains and plateaus but does not exist in the northern region and resides usually outside the role and enter often, this also corresponds with the results of the current study, which showed that most of the samples were collected from outside homes and places of animals, agricultural areas for breeding. In the end, the previous studies on the molecular classification of the insect is very rare for a reason due to the dependence usually (previous studies) to phenotypic classification only.

References

Abul–Hab, J. and Ahmed, S. 1984. Revision of the family Phlebotomidae (Diptera) in Iraq. *J. Biol. Sci. Res.,* 7: 1-64.

Al-Baroni, M.A. 1985. Disease-carrying insects.National Council for Culture, Arts and Letters, Kuwait.

Benjamin, C. and German, G. 1994. Students study Guide of Microbiology. Concepts and Application, McGraw Hill, London.

Davies, C.R., Reithinger, R., Campbell-Lendrum, D., Feliciangeli, D., Borges, R. and Rodriguez, N. 2004. The epidemiology and control of leishmaniasis in Andean Countries. *Cad. Saude. Publica*, 16: 925–950.

Emami, M.M. and Yazdi, M. 2008. Entomological survey of Phlebotominae sand flies (Diptera: Psychodidae) in a focus of visceral leishmaniosis in central Iran. *J. Vect. Bor. Dis.,* 45: 38-43.

Jargeis, S.J. and Amin, A.H. 1987. Medical and Veterinary Insects and Arachnids. Dar Alketab for Printing and Publishing, Mosul University, Iraq, pp: 287.

Muhanna, F.L. and Hassan, A.N. 2003. Malaria Vectors: Discoveries and Control Guide. TheControl Center of Communicable Diseases, Elite Office for Printing, Iraq, pp: 151.

Perfiliew, P.P. 1968. Phlebotominae (Sandflies) Faun of the U.S.S.R., *Diptera,* 3(2): 363-370.

Pringle, G. 1957. Oriental sore in Iraq.Historical and Epidemiological problem. *Bull. End. Dis.,* 2: 41-79.

Quate, L.W. 1964. Phlebotomus sand flies of the paloioh area in the Sudan. *J. Med. Ento.,* 1: 213-268.

Sacks, S., Lawyer, P. and Kamhawi S. 2008. The Biology of Leishmania-Sand Fly Interactions. Leishmania after the Genome. Peter J. Myler and Nicolas Fasel (Eds), Caister Academic Press.

Sukker, F. 1983. Study on sandflies as vectors of Kala-azar in Iraq. *Bull. End. Dis.,* 15: 85-104.

How to cite this article:

Hadi M. Hamza Al-Mayali and Mahammad K. Kamil Al-Hassani. 2016. Morphological Descriptive Study of Phlebotominae Species (Diptera: Psychodidae) in Eastern Al-Hamza District / Al-Diwaniya City. *Int.J.Curr.Microbiol.App.Sci.* 5(9): 667-674.
doi: http://dx.doi.org/10.20546/ijcmas.2016.509.077