

(Diptera: Psychodidae)

(2)

(1)

(1)

(1)

(2)

2006/01/19

2006/07/03

988

13

2004

(- - - -)

*S. dentata**Sergentomyia*

(%2)

988/20

P. papatasi (49.8%) :*Phlebotomus*

988/968

P. simici *P. jacusieli* (0.7%) *P. neglectus* (0.6%) *P. tobbi* (10.8%) *syriacus* (35.5%*P. jacusieli* *P. simici*

. (0.5%)

:

The sand flies (Diptera: Psychodidae) in Tartous governorate Syrian Arab Republic

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ABSTRACT

The governorate of Tartous, which lies on the east Mediterranean coast in the west of Syria, is considered an important endemic area for human cutaneous leishmaniasis (HCL). Between June and October 2004, 988 sand flies were collected, from 13 villages distributed in five principle areas of the governorate, by using sticky paper (SP) and CDC traps.

The 20/988 sand flies caught, belonged to the genus *Sergentomyia*, whereas 968/988 sand flies were *Phlebotomus* species. The *Sergentomyia* caught were *S. dentata* (2%). The identified *Phlebotomus* were *P. papatasi* (49.8%), *P. syriacus* (35.5%), *P. tobbi* (10.8%), *P. neglectus* (0.6%), *P. jacusieli* (0.7%), and *P. simici* (0.5%). The later two species are recorded for the first time in Tartous governorate.

Key words: Leishmaniasis, Sand flies, CDC traps, Sticky paper (sp), Tartous governorate .

Leishmania -
 (visceral cutaneous) leishmaniasis
 Phlebotominae -
 .Arthropoda Diptera
 (1)
L. tropica
 (Anthroponotic cutaneous leishmaniasis ACL)
 ()
 (2) *P. sergenti*
L. major
 (Zoonotic cutaneous leishmaniasis ZCL)
Psammomys obesus
L. infantum (3-2) *P. papatasi*
Ph. tobbi
 .(5-4) 1998 1990
 1951-4045 -5221 -3621
 . 2005-2004-2003-2002
) (

- °35.57 " : -1
"N °35.33 - °34.51" "E°36.21
(60) (90) ()
:

28 25 20 10
/ 1100 850

13 : -2
(1) 1095
) 2004 (29
×21) ()
) ()
()

(1)

-2002

()

2005

	Σ	**				**	*	()		
		2005	2004	2003	2002					
299	49	4	9	27	9		485	350		
	174	11	57	76	30		3207	375		
	52	6	14	20	12		1845	450		
	24	6	8	9	1		911	50		
444	58	6	13	9	30		3432	50		
	174	19	47	75	33		285	50		
	123	13	23	46	41		2432	250		
	32	6	10	9	7		3845	285		
	57	7	16	19	15		1111	300		
149	13	31	22	83		2556	400			
50	4	16	22	8		1332	350			
153	98	12	23	47	16		961	300		
	55	0	22	19	14		842	350		

** - 2004

*

: - 3

(SP)

20

.(%75)

CDC

10

8 4

(%10) KOH

()

Chloral Gum

(9-8-7-6)

2004

Phlebotomus 988/968 988350 *P. Syriacus* (35.4%) 492 *P. papatasi* (49.8%) }:7 *P. jacusieli* (0.7%) 6 *P. neglectus* (0.6%) 107 *P. tobbi* (10.8%)*Sergentomyia* 988/20 {5 *P. simici* (0.5%)
(%2) *S. dentata**P. syriacus**P. syriacus**P. papatasi**P. syriacus* *P. tobbi**P. tobbi* *P. papatasi**P. papatasi**P. tobbi*

(988/370)

(988/618)

. (2) 1.6:1

()

(2)

2004 (♂ ذكر و ♀ أنثى).

%	Σ	Taxonomy												
		♀		♂		♀		♂		♀		♂		Species
49.8	492	6	9	10	4	5	2	102	68	178	108	<i>P.papatasi</i>	<i>Phlebotomus</i>	<i>Phlebotomus</i>
0.7	7	-	-	-	-	-	-	2	1	2	2	<i>P.jacusieli</i>	<i>Para-phlebotomus</i>	
35.5	351	17	16	9	7	4	2	107	47	98	44	<i>P.syriacus</i>	<i>Larrousius</i>	
10.8	107	5	5	13	5	-	-	18	19	22	20	<i>P.tobbi</i>		
0.6	6	1	1	-	-	-	-	2	-	2	-	<i>P.neglectus</i>	<i>Adlerius</i>	
0.5	5	1	-	-	-	-	-	1	-	2	1	<i>P.simici</i>		
2.1	20	-	-	-	-	-	-	5	5	6	4	<i>S.dentata</i>	<i>Sergentomyia</i>	
%100	988	30	31	32	16	9	4	237	140	310	179			

(3)

(3)

30	17	55	28	40	<i>P.papatasi</i>	
-	-	-	-	3	<i>P.jacusieli</i>	
7	20	23	43	60	<i>P.syriacus</i>	
6	-	4	8	19	<i>P.tobbi</i>	
-	2	-	-	-	<i>P.neglectus</i>	
-	-	-	-	1	<i>P.simici</i>	
2	2	4	2	-	<i>S.dentata</i>	
21.4 -28.5C°	20.2 -30.3C°	22.2 -30C°	21.8 -30C°	19.3 - 27.9C°	Temperature	
66.5%	75.5%	69%	65%	66%	Relative Humidity	
60	35	50	71	70	<i>P.papatasi</i>	
-	-	4	-	-	<i>P.jacusieli</i>	
29	20	15	15	63	<i>P.syriacus</i>	
11	10	3	9	9	<i>P.tobbi</i>	
1	1	-	-	-	<i>P.neglectus</i>	
1	-	-	1	1	<i>P.smici</i>	
4	-	2	4	-	<i>S.dentata</i>	
22-29C°	20.5-29.5C°	22.5 -31C°	21 - 30 C°	20 - 28 C°	Temperature	
66%	76%	69%	67%	64.5%	Relative Humidity	
2	1	3	5	4	<i>P.papatasi</i>	
5	4	7	6	11	<i>P.syriacus</i>	
3	2	-	2	3	<i>P.tobbi</i>	
-	2	-	-	-	<i>P.neglectus</i>	
1	-	-	-	-	<i>P.simici</i>	
21.5- 29 C°	21 - 30 C°	22.5 - 30 C°	22 - 31 C°	°19 - 27C	Temperature	
66.5%	73.5%	67%	65%	62.2%	Relative Humidity	
1	2	-	4	-	<i>P.papatasi</i>	
1	-	2	-	3	<i>P.syriacus</i>	
20- 28 C°	20 - 29 C°	22 - 30 C°	21 - 31 C°	19 - 28C°	Temperature	
66.5%	71%	66%	64%	63.5	Relative Humidity	
2	2	2	5	3	<i>P.papatasi</i>	
3	5	-	4	4	<i>P.syriacus</i>	
4	4	2	2	6	<i>P.tobbi</i>	
21.5- 29C°	21 - 30 C°	22.5 - 31C°	22 - 31 C°	20 - 27C°	Temperature	
66.5%	69.5%	67.5%	64%	64%	Relative Humidity	

100	66	116	129	153		
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Sergentomyia (*S. dentata*)

Phlebotomus

P. jacusieli *P. simici* (- -)

(1) *P. neglectus*, *P. syriacus*, *P. tobbi*, *P. papatasi*,
Ismail & Pesson

.*P. major*, *S. dentata*, *P. papatasi*, *P. sergenti*, *P. tobbi*, :(10)

P. *P. major*

. *P. neglectus* *syriacus*

Sawalha (11) Killick-Kendrick

P. papatasi, *P. syriacus*, *P. tobbi*, *P. neglectus* (12)

P. syriacus

L. infantum *P. tobbi* *P. neglectus*

P. (5) (13) *L. donovani*

-15-14-1) *L. major* *papatasi*

.(17-16

-20-19-18-15-14) *L. tropica* *P. sergenti*

(22-21

L. tropica :

Douba

(24) nuwayri-Salti (23)

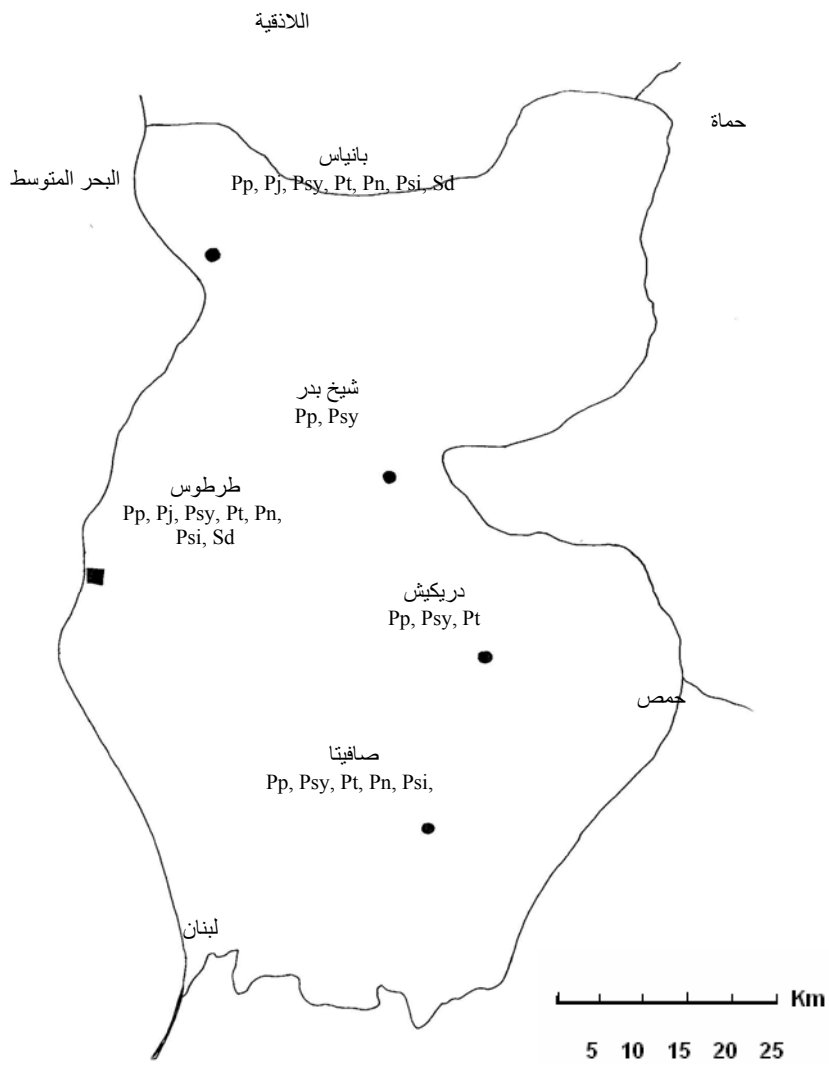
()

L. infantum *L. tropica*

()

L. tropica

P.papatasi



(1)

**Pp, *Phlebotomus papatasi*, Pj, *P. jacusieli*, Psy, *P. syriacus*, Pt, *P. tobbi*,
Pn, *P. neglectus*, Psi, *P. simici*, Sd, *Sergentomyia dentata***

.(27-26-25)

Misgevic & (11) Killick-Kendrick

(27) Yaman (25) Milutinovic
%70 28 22

°28

°19

%66

Phlebotomus

P. papatasi

450 50

)

(

.(28-10)

(50)

P. syriacus

450

.(31 -30 -29)

P. syriacus

P. neglectus

450 50

Larrousius

P. tobbi

400 200

150 50

(10-5-2)

.(32-29)

Adlerius

P. simici

)

400 - 350

.(50

Paraphlebotomus

P. jacusieli

)

.(50

350

*Sergentomyia**S. dentata*

.(28-10)

*P. papatasi**P. tobbi* / *P. syriacus* /

REFERENCES

- 1- World Health Organization, WHO. (1990). Control of the leishmaniasis. Report of WHO expert committee. Technical report series 793.
- 2- Rioux, J. A., Dereure, T., Khiami A., Pratlong, F., Siradar, K., and Lambert, M. (1990). Écoépidémiologie de leishmanioses en Syrie. 1- infestation de *Psammomys obesus cretzenschmar* (Rodentia – Gerbillidae) par *Leishmania major*. Yakimoff et Schokhor (Kinetoplastidae – Trypanosomatidae). Ann. Parasitol. Hum. Comp. 65 (5): 203-7
- 3- Desjeux, P. (1991). Information sur l'épidémiologie des leishmanioses et la lutte contre ces maladies par pays ou territoires. WHO/Leish/91/: 30.
- 4- Dereure, J., Roux, J. A., Khiami, A., Pratlong, F., Perieres, J. and Martini, A. (1991). Écoépidémiologie des leishmanioses en Syrie. 2- Presence chez le chien de *Leishmania infantum* Nicolle et *Leishmania tropica* (Wright) (Kinetoplastidae: Trypanosomatidae). Ann. Parasitol. Hum. Comp. 66:252 - 255
- 5- Rioux, J. A., Leger, N., Haddad, N., Gramiccia, M., Jalouk, L., Dereure, T., Khiami, A., and Desjeux, P. (1998). Infestation naturelle de *Phlebotomus tobbi* (Diptera - Psychodidae) par *Leishmania donovani* .s. st. (Kinetoplastidae – Trypanosomatidae) en Syrie. Parassitol. 40: 148.
- 6- Artemiev, M. M. (1980). A revision of sand flies of the subgenus *Adlerius* (Diptera, Phlebotominae, *Phlebotomus*). Zoologicheskii Zhurnal. 59: 1177-1192.
- 7- Lewis, D.J. (1982). A taxonomic review of the genus *Phlebotomus* (Diptera: Psychodidae). Bull. of the British Museum (Natural History), Entomol. Series 45: 121-209.
- 8- Killick-Kendrick, R., Tang, Y., Killick-kendrick, M., Sang, D. K., Sirdar, M. K., Ke L., Ashford, R. W., Schorscher, J. and Johnson, R . H. (1991). The identification of female sand flies of the subgenus *Larrousius* by the morphology of the spermathecal ducts. Parassitol. 33 (Suppl.1): 335-347.
- 9- Haddad, N. (1998). les phlébotomes du liban. Inrentaire et corollaire éco-épidémiologique. These d'universite, Reims, n° 208-220 P.
- 10- Ismail M.T., and Pesson, B. (1992). Contribution à l'étude des *Phlebotomes* de Syrie. Bull. Soc. Path. Ex. 85: 317-321.
- 11- Killick-Kendrick, R. (1999). The biology and control of *Phlebotomine* sand flies. Clin. Dermatol. 17: 279-289.
- 12- Sawalha, S. S., Shtayeh, M. S., Khanfar, H. M., Warburg, A. and Abdeen, Z. A. (2003). *Phlebotomine* sand flies (Diptera: Psychodidae) of the Palestinian West Bank: potential vectors of leishmaniasis. J. Med. Entomol. 40: 321-328.

- 13- Leger, N., Gramiccia, M., Gradoni, L., Madulo-Leblond, G., Pesson, B., Ferte, H., Boulanger, N., Killick-Kendrick, R., and Killick-Kendrick, M. (1988). Isolation and typing of *Leishmania infantum* from *Phlebotomus neglectus* on the Island of Corfou, Greece. *Trans. R. Soc. Trop. Med. Hyg.* 82: 419-420.
- 14- El-Sawaf, B. M., Shoukry, A., Elsaid, S., Lane, R.P., Kenawy, M. A., Beier, J.C., Abdelsattar, S. (1987). Sand fly species composition along an altitudinal transect in southern Sinai Egypt. *Ann. Parasitol. Hum. Comp.* 62 (5): 467-473.
- 15- Theodor, O. (1947). On some sand flies (*Phlebotomus*) of the *sergenti* group in Palestine. *Bull. Ent. Res.* 38: 91 - 98.
- 16- Ben-Ismaïl, R. Gramiccia, M., Gradoni, L., Helal, and Ben Rashid, M.S. (1987). Isolation of *Leishmania major* from *Phlebotomus papatasi* in Tunisia. *Trans. R. Soc. Trop. Med. Hyg.* 81: 749.
- 17- Ozbel, Y. Turgay, N., Ozensoy, S., Ozbilgin, A., Alkan, M. Z. and Ozel, M. A. (1995). Epidemiology diagnosis and control of leishmaniasis in the Mediterranean region. *Ann. Trop. Med. Parasitol.* 89: 89 - 93.
- 18- Papadopoulos, B. and Tselentis Y. (1998). Sand flies on the island of corfu, Greece. *Parasite* 4: 387-391.
- 19- Alptekin, D., Kasap, M., Luleyap, U., Kasap, H., Aksoy, S., and Wilson, M. L. (1999). Sand flies (Diptera: Psychodidae) associated with epidemic cutaneous leishmaniasis in Sanliurfa, Turkey. *J. Med. Entomol.* 36: 277 - 281.
- 20- Ok, U. Z., Balcioglu, I. C., Taylan Ozkan, A., Ozensoy, S., and Ozbel, Y. (2002). Leishmaniasis in Turkey. *Acta. Tropica* 84: 43-48.
- 21- Volf, P., Ozbel, Y., Akkafa, F., Svobodova, M., Votypka, J., and Chang, K. P. (2002). Cutaneous leishmaniasis in Sanliurfa, Turkey: *Phlebotomus sergenti* remains abundant with the decline of recent epidemic. *J. Med. Entomol.* 39: 12 - 15.
- 22- Jacobson, R. L., Eisenberger, C. L., Svobodova, M., Baneth, G., Sztern, J., Carvalho, J., Nasereddin, A., ElFari, M. Shalom, U., Volf P., Votypka, J., Dedet J., Pratlong F., Schnian G., Schnur L. F., Jaffe J. L., and Warburg A. (2003). Outbreak of cutaneous leishmaniasis in northern of Palestine. *J. Infect. Dis.* 188: 1065 - 1073.
- 23- Douba, M., Mowakeh, A., and Wail, A. (1997). Current status of cutaneous leishmaniasis in Aleppo, Syrian Arab Republic. *Bull. WHO* 75: 253 - 259.
- 24- Nuwayri-Salti, N., Salman, S., Shahin, N. M., and Malak, J. (1999) *Leishmania donovani* invasion of the blood in a child with dermal leishmaniasis. *Ann. Trop. Paediat.* 19: 61-64.
- 25- Misgevic, Z. and Milutinovic, M. (1986). Investigation of sand flies (Diptera: Phlebotomidae), in an endemic focus of visceral leishmaniasis in Yugoslavia. *Folia Parasitol.* 33: 77-86.

- 26- El Sayed, S. M., El Raaba, F. M., and El Nur, O. A. (1991). Daily and seasonal activities of some sand flies from Surrugia Village, Khartoum, Sudan. *Parassitol.* 33 (Suppl. 1): 205 – 215
- 27- Yaman, M. and Ozbel, Y. (2004). The sand flies (Diptera: Psychodidae) in the Turkey province of Hatay: some possible vectors of parasites causing human cutaneous leishmaniasis. *Ann. Trop. Med. Parasitol.* 98 (7): 741- 750.
- 28- Allahim, A. (2001). Environmental and taxonomical study of sand flies (Diptera: Psychodidae) in Aleppo- Syria. University These. Aleppo. 50 - 90.
- 29- Houin, R., Abonnence, E., and Deniau, M. (1971). *Phlébotomus* du sud de la Turquie. *Ann. Parasitol. Hum. Comp.* 46: 633 -652.
- 30- Kamhawi, S., Abdel-Hafez, S. K. and Molyneux, D. H. (1991). Urbanization – how does it affect the behavior of sand flies? *Parassitol.* 33 (Suppl.1): 299-306.
- 31- Daldal, N., Ozbel, Y., Babaoglu, A., Turgay, N., Alkan, M. Z. and Babalioglu, N. (1998). *Phlebotomus major syriacus*: a possible vector of visceral leishmaniasis in western Black Sea region of Turkey. *J. Egyptian Soc. Parasitol.* 28: 71-75.
- 32- Kamhawi, S. A., Abdel-Hafez, S. K. and Molyneux, D. H. (1995). A comparative account of species composition, distribution and ecology of *Phlebotomine* sand flies in Jordan. *Parasite* 2: 163 - 172.