

# New Record of *Sergentomyia fallax* Parrot, 1921 (Diptera, Psychodidae, Phlebotominae) From Pakistan

JUMA-KHAN KAKARSULEMANKHEL

Sandflies, Leishmaniasis and Mosquitoes Laboratory, Department of Zoology, University of Balochistan, Quetta- Pakistan  
Correspondence: Fax. No. ++92-81-9211277; E-mail: [jumakhankakar@yahoo.co.uk](mailto:jumakhankakar@yahoo.co.uk)

## ABSTRACT

During entomological survey conducted by the present author in the whole of Balochistan during 1996-2001, *Sergentomyia* (*Sergentomyia*) *fallax* Parrot (1921a) was collected (n= 80) from 12 localities. These localities appear to be the new records of this species in the literature to date. This is, to the author's knowledge, the first record of *Sergentomyia fallax* from Pakistan. Taxonomic characters of Pakistani specimens are described, measured, and illustrated. The results are compared with the data available in the existing literature.

**Key Words:** *Sergentomyia fallax*; Taxonomic characters

## INTRODUCTION

Parrot (1921a) described *Phlebotomus minutus* var. *fallax* and later elevated it to specific rank because the external male genitalia were relatively narrow as compared with the *Ph. minutus* and because of the alleged absence of accessory seta on the style (Parrot, 1921b). Nitzulescu (1931) rightly pointed out that the accessory seta was present but was very short and thin. After examining a co-type and material from Tunis it was concluded that there were not sufficient grounds for giving its specific rank and reinstated it as a variety. However, *Sergentomyia fallax* has been divided into three sub species: *S. fallax cypriotica* Theodor, *S. fallax afghanica* Artemiev, and *S. fallax fallax* (Parrot), principally based on absolute size. However, Lewis (1974) distinguished between ♀ of *S. fallax cypriotica* and *S. fallax fallax* on the size of the third antennal segment, 0.07-0.10 mm and 0.12-0.15 mm respectively. Lane (1986) pointed out that males of these species could not be reliably separated.

*Sergentomyia fallax* is being reported first time from Pakistan. In view of the insufficient description of Parrot and Nitzulescu (*loc. cit.*), this species is re-described in detail and its taxonomic characters are illustrated.

## MATERIALS AND METHODS

During entomological survey conducted by the present author in the whole of Balochistan Province in 1996-2001, 2013 sandflies were collected comprising of the genera *Phlebotomus*, *Sergentomyia* and *Grassomyia* (Kakarsulemankhel, 2001). Flies were collected, processed, preserved, dissected and mounted according to conventional methods especially those followed by Johnson *et al.* (1963), Lewis (1973), Killick-Kendrick (1983), Lawyer *et al.* (1991) and Killick-Kendrick *et al.* (1994).

Standard keys furnished by Lewis (1967, 1978, 1982) and Artemiev (1978) were followed for identification of sandfly species. All the diagrams were drawn with a camera lucida and are to the given scale and the measurements are in millimeter.

Specimens are housed in the Author's Sandflies collections, Department of Zoology, University of Balochistan, Quetta.

## RESULTS

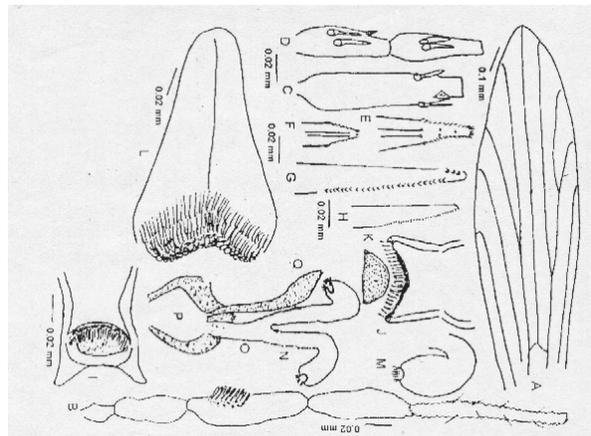
***Sergentomyia* (*Sergentomyia*) *fallax* Parrot (1921a)**

**Female:** 15 specimens were examined (Fig. 1). Head 0.264-0.28 long, 0.248-0.256 broad. Length / breadth=1.06-1.09 and length of head is 0.206-0.215 of length of the wing. Eyes 0.096--0.104 long, 0.072-0.08 broad, distance between eyes 0.12-0.144. Wing 1.28-1.3 long, 0.30-0.32 broad,  $\alpha$ =0.144-0.224 long,  $\beta$ =0.24-0.25 long,  $\delta$ =0.04-0.08 long,  $\Upsilon$ =0.24-0.26,  $\pi$ =0.04-0.064 long. Alar index=0.6-0.896. Palps 0.44-0.48 long, palpal ratio 1:2.5:3.5:3.75:8.08, palpal formula 1, 2, 3, 4, 5. Newstead's sensillae were situated on the basal third of segment 3 and number about 20-30. Proboscis 0.15-0.16 long. Antennal segment 3: 0.08-0.094 long, 0.06-0.072x length of wing, 0.53-0.58 x length of proboscis, 0.78-0.8x length of labrum, 0.75-0.81x combined length of A4+5, ascoid on A3=0.022 long, ascoid 3/A3=0.234-0.275. A4 (Fig. 1D, lower) 0.05-0.056 long, ascoid on A4= 0.02 long, 0.357- 0.4x length of segment. A5 (Fig. 1D, upper) 0.056-0.06 long, ascoid on A5=0.02 long, 0.333-0.357x length of segment. Antennal segment III and IV have a single prominent papilla. On both, it was usually by the side of ascoid, but on A3 it was up to the tip of the ascoid whereas on A4 it was above the tip of the ascoid. A3 was shorter than A4+A5 (about x 0.69-0.81). The positions of the papilla on the segments were: on A3 0.67, A4 0.34, A5 0.33. There were two ascoids on antennal

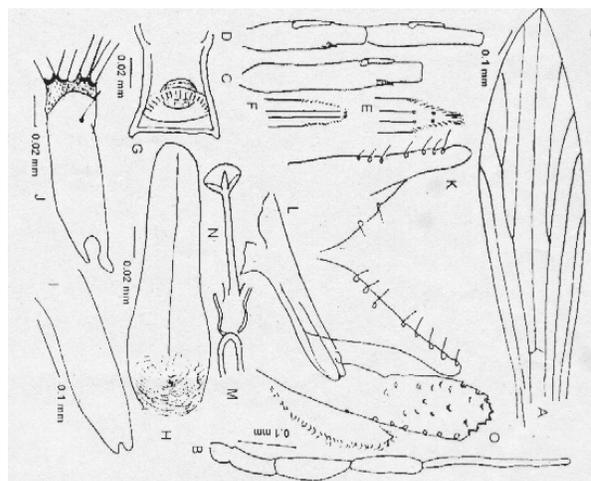
segment III to XV. Labrum 0.10-0.12 long, 0.02 broad with two relatively long and stouter apical sensilla, lateral sensilla fine and sensilla depth of 0.024, labrum was 0.378-0.428x length of head, 0.078-0.092x length of wing. Hypopharynx 0.01 broad, apex pointed, 0.003 broad, lateral margins sharply undulating, a dental depth of 0.028. Maxilla 0.009 broad, 4 teeth per 0.008, a dental depth of 0.066. Mandible narrow, 0.006 broad, apex more pointed, fine and re-curved teeth: 5 teeth per 0.004, a dental depth of 0.044. Cibarium 0.04-0.044 broad, 20-22 teeth almost uniform, arranged on a slightly curved arc, teeth were 0.004 long, on the back ground of teeth there was a dark slightly oval pigment patch 0.024 long and 0.013-0.016 broad, without anterior process, chitinous arch invisible. Pharynx 0.12 long, much dilated posteriorly, length of pharynx about 1.625-1.875 times of the greatest breadth which was about 2.1 times the width of narrow anterior portion of pharynx, armature yellow pigmented and occupies the posterior 0.25-0.30 of the pharynx, anterior edge forms a sharply curved line, anterior armature was in the form of long horizontal straight lines about 0.018-0.020 long whereas posterior part of armature was in the form of a patch of about 0.016 broad and was composed of numerous small punctiform denticles and base of pharynx with a deep median notch. Spermatheca tubular, capsule relatively smaller, 0.026-0.028 long, anteriorly 0.018-0.022 broad, at middle 0.022-0.025 broad and posteriorly 0.017-0.020 broad, individual duct about 0.018 broad and open into a common duct which open into a genital atrium which was 0.024 broad and furca 0.07 long.

**Male:** 4 specimens were examined (Fig. 2). Wing short and narrow, 0.096-1.28 long, 0.19- 0.27 broad,  $\alpha=0.08-0.112$ ,  $\beta=0.16-0.20$ ,  $\delta=$  zero-0.032,  $\Upsilon= 0.2-0.024$  long,  $\pi=$  zero to +0.04 long, alar index=0.5-0.56. Palp 0.5 long, with a palp ratio 1,3,5,5,5,10.5, palpal formula 1,2,4,3,5. Antenna 3: 0.104-0.116 long, ascoid on A3=0.014-0.016 long, position of ascoid on A3=0.597, ascoid 3/A3=0.134-0.137, position of a single papilla on A3= 0.79, A3/labrum=1.04-1.05, A3/A4+5=0.72-0.8. A4 (Fig. 2D. lower) 0.06-0.08 long, ascoid on A4=0.016-0.018 long, position of ascoid on A4=0.22-0.26, position of a single papilla on A4=0.7. A5 (Fig. 2D. upper) 0.07-0.08 long, ascoid on A5=0.018-0.02 long, position of ascoid on A5=0.243, ascoid 5/A5=0.25. There was a single ascoid on antennal segments III to XV. Labrum 0.10-0.11 long, 0.014 broad and a sensilla depth=0.028. Hypopharynx apex pointed, 0.012 broad, and a dental depth of 0.024. Cibarium 0.44-0.46 broad with about 20 uniform small teeth arranged on a concave row and on the back ground of teeth there was an almost rounded pigment patch, chitinous arch and anterior process both invisible. Pharynx 0.10-0.12 long and was about 2.853.12 times as long as broad and its widest posterior portion was 1.23-1.40 times as wide as the narrowest anterior part. There was no marked posterior dilation of pharynx. Male terminalia: Coxite 0.18-0.23 long, 0.064-0.074 broad. Style 0.07-0.09 long, 0.024 broad and a ventral seta at 0.88. Coxite length / breadth= 2.81-3.1, style length/ breadth=

**Fig. 1. Camera lucida drawings of ♀ *Sergentomyia fallax*** showing: wing (A), palps (B), the third (C), fourth (D, lower), and fifth (D, upper), labrum (E), hypopharynx (F), maxilla (G), mandible (H), cibarium (I), cibarial teeth (J), slightly oval pigment patch (K), pharynx (L), spermatheca (M), individual duct (N), common duct (O), genital atrium (P), furca (Q)



**Fig. 2. Camera lucida drawings of ♂ *Sergentomyia fallax*** showing: wing (A), palp (B), the third (C), fourth (D, lower), and fifth (D, upper), labrum (E), hypopharynx (F), cibarium (G), pharynx (H), coxite (I), style (J), paramere (K), aedeagus (L), genital filament (M), pump (N), surstyle (O)



2.91-3.75, coxite/style= 2.55- 2.57, coxite/ A3=1.73-1.98, coxite/ labrum=1.8-2.09. Paramere 0.12-0.13 long, 0.59-0.61% of the length of the body of paramere was 0.03-0.04 mm broad whereas the neck portion (0.38-0.41% of the length of paramere) was about 0.012 broad, apex of armature rounded or blunt. Aedeagus 0.08-0.09 long and 0.012-0.014 broad. Genital filament smooth, 0.25-0.32 long, pump 0.07-0.09 long and filament to pump ratio= 3.55-3.57. Surstyle 0.16- 0.17 long, 0.73-0.88x length of coxite.

**Distribution:** Balochistan: Present survey, new record: Bela, Chaman, Dashte Kuddan, Duki, Kahan, Khuzdar, Kohlu, Mewand, Nanasaheb ziarat, Sibi, Tump, Turbat.

## DISCUSSION

Results of the present study are compared with the published data of this species from other territories (Table I, II). The ♀ *S. fallax* from Pakistan slightly differs from the from the published data of this species from Saudi Arabia (Lewis & Buttiker, 1980) in shorter head, its length/ width ratio, a shorter labrum, length of labrum/head, labrum/ wing and head length/ wing length ratio. Pakistani specimens also differs with the published data of specimens from Sinai-Egypt and Yemen (Lane, 1986) in shorter A3 [0.085 (0.08-0.094 mm)] but are observed closer to ♀ of *S. fallax cypriotica* (A3= 0.07-0.10 long). Pakistani form of ♀ of *S. fallax* have a greater number of cibarial teeth (20-22) than the Afghanistan form of ♀ of *S. fallax afghanica* (17-22 cibarial teeth) (Artemiev, 1974, 1978) and also have a greater ratio of pharynx length/ breadth (2.1) whereas *afghanica* has a shorter ratio of 1.7-1.8. Similarly, Pakistani form differs with Afghanistan form of ♂ of *S. fallax afghanica* in other taxonomic characters viz., labrum (0.10-0.11 mm long, *afghanica*=116-136 µm long), A3 (0.104-0.116 mm long, *afghanica*=100-122 µm long), A3/ labrum (1.04-1.05, *afghanica*=0.89-1.05 µm), cibarial teeth (20 uniform small teeth, *afghanica*=15-22 teeth), coxite (0.18 mm long, *afghanica* =236-276 µm long), coxite/ style (2.55-2.57, *afghanica*=2.0-2.5), coxite/ labrum (1.8-2.09, *afghanica*=2.34-2.7). However, Pakistani specimens of *S. fallax* were found to be similar with Afghanistan specimens of *S. fallax afghanica* in diagnostic characters like: in ♀ : pharynx very broad, base of pharynx with a deep notch, pharyngeal armature consists of rather long teeth distally and very numerous small teeth at the base of the pharynx,

**Table II. Comparative taxonomic characters of male *Sergentomyia fallax* Parrot**

♂ Taxonomic characters	Pakistan (Present study)	<i>S. fallax afghanica</i> (Afghanistan) (Artemiev, 1978) (in micron)
A3 Length	0.104-0.116	100-122
A3/Labrum	1.04-1.05	0.89-1.05
Labrum Length	0.10-0.11	116-136
Cibarium	With about 20 uniform small teeth arranged on a concave row	With a concave row of about 15-22 uniform teeth
Coxite Length	0.18-0.23	236-276
Coxite/Labrum	1.8-2.09	2.34
Coxite/Style	2.55-2.57	2.0-2.5
Style Length	0.07-0.09	Long with 4 spines terminal or 3 terminal and 1 sub-terminal
Paramere	With rounded or blunt ends	With rounded ends
Aedeagus	Straight	Straight

small cibarial teeth of uniform size arranged on a slightly concave arc, whereas in ♂ : uniform small cibarial teeth on a concave row, paramere rounded and aedeagus straight.

## CONCLUSION

The present study reveals that *S. fallax* is a rare species (3%, n= 2013) and has a nearly continuous distribution in hot and dry localities of Balochistan. Since, previously *S. fallax* has been reported from North Africa, Arabia, *S. fallax cypriotica* from Cyprus and *S. fallax afghanica* from eastern Afghanistan, its prevalence in Balochistan (adjacent to eastern Afghanistan) is supported by the fact that North African and Arabian elements might have extended into Balochistan and it may be its South

**Table I. Comparative taxonomic characters of female *Sergentomyia fallax* Parrot**

♀ Taxonomic characters	Pakistan (Present study)	Saudi Arabia (Lewis and Buttiker, 1980)	Sinai (Egypt) and Temen (Lane, 1986)	<i>S. fallax afghanica</i> (Artemiev, 1978)
Head Length	0.264-0.28, 1.06-109 times width	0.31, 1.0 times width	0.11 (0.09-0.12) (Sinai)	
A3 Length	0.2060-0.215xlength of wing	0.21 times length of wing	0.12-0.15 (Yemen)	
Labrum Length	0.085 (0.08-0.094)			
	0.10-0.12, 0.378-0.428 x length of wing	0.14, 0.45 x length of head,		
		0.1 x length of wing		
Pharynx	Much dilated posteriorly, length about 1.625-1.875 times greatest breadth which is about 2.1 times the width of narrow anterior portion, armature occupies the posterior 0.25-0.30 of the pharynx, anterior armature is in the form of long horizontal straight lines and posterior part of armature is composed of numerous small punctiform denticles, base of pharynx with a deep median notch.			Pharynx very broad, length/ breadth 1.7-1.8, armature consists of rather long teeth, base of pharynx with a deep median notch.
Cibarium	With about 20-22 teeth almost uniform, arranged on a slightly concave arc.			With a concave row of 17-22 teeth or uniform size.

Eastern range of distribution. According to Lane (1986) the validity of these three subspecies of *S. fallax* is doubtful, therefore, the present specimens from Pakistan are being designated as *S. fallax* until a comprehensive study of its geographical range is made, and till then, the validity of these three sub species must remain in doubt.

**Acknowledgements.** The author wishes to thank Professors/Drs. R. Killick-Kendrick; David, J. Bradley; R. W. Ashford; R.P. Lane and David Evans for their encouragement and valuable guidance on sandflies. My sincerest thanks are also due to respected Joanna Kapusta (BMNH), Linda Huddleston (BMNH), Dr. J.-P. Dedet (France), Dr. Farrokh Modabber (WHO) and Prof. Dr. V. N. Neronov (Russia) for providing the literature on sandflies.

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(Received 20 October 2003; Accepted 12 December 2003)