New Record of *Sergentomyia mervynae* Pringle (1953) from Pakistan (Diptera, Psychodidae, Phlebotominae)

Juma-Khan Kakarsulemankhel
Sandflies-Leishmaniasis and Mosquitoes Laboratory/Zoology, University of Balochistan, Quetta, Pakistan

**Abstract:** During entomological surveys conducted by the author in the whole of Balochistan Province *Sergentomyia (Sergentomyia) mervynae*, Pringle, 1953 was collected (N=19) from four localities. These localities appear to be the new record of this species in the literature to-date. This is to the author's knowledge the first record of this species from Pakistan. Taxonomic characters not described by earlier workers are described and illustrated. Results are compared with the data available in the existing literature. Differential diagnosis of this species is also given.

**Key words:** Sandfly, *Sergentomyia mervynae*, taxonomic characters

**INTRODUCTION**

*Sergentomyia mervynae* was first reported from Karbala City, Iraq by Pringle (1953). Two ♀ and one ♂ were taken in Karbala city in October 1950. Pringle (1953) while describing female specimens did not supply morphometric measurements of cibarium and pharynx and figures of mouthparts, antennal segments, palps and wings. Similarly, morphometric measurements of cibarium and pharynx and illustrations of antennal segments, wings, palps, exoite, surstyle, genital filament and pump of ♂ fly were also not supplied. Lewis (1967) while discussing sandflies of Pakistan did not record this species. In view of the insufficient description by Pringle (1953) and Artemiev (1978), this species is redescribed.

**MATERIALS AND METHODS**

During 1996-2001, a taxonomic study of the species of sandflies prevalent in Balochistan province was conducted by the present author and 2013 sandflies comprising genera *Phlebotomus*, *Sergentomyia* and *Grassonomyia* were collected (Kakarsulemankhel, 2001). Flies were collected, processed, preserved, dissected and mounted according to the conventional methods especially those adopted by Johnson et al. (1963), Lewis (1973), Killieq-Kendrick (1983), Lawyer et al. (1991) and Killieq-Kendrick et al. (1994). For species identification, keys furnished by Pringle (1953) and Artemiev (1978) were consulted. All the diagrams were drawn with the help of camera lucida and are to the given scales. Measurements are in millimeter unless otherwise indicated.

*Sergentomyia (Sergentomyia) mervynae* Pringle (1953) (Fig. 1 and 2 and Table 1)

**Female:** (2 specimens measured). (Fig. 1) Wing (Fig. 1A) 1.20-1.30 mm long, 0.264-0.28 mm broad, α=0.12-0.15 mm long, β=0.20-0.26 mm long, δ=0.24-0.28 mm long, γ=0.04-0.05 mm, alar index=0.576-0.6, Proboscis 0.164-0.18 mm long. Palps (Fig. 1B) total length 0.45-0.5 mm, palp ratio 1.2-1.4:3:4:8:4:8:07, palp ratio 1.2-3-4.5. A3 (Fig. 1C) 0.09-0.10 mm long, 0.555-0.562x length of proboscis, 0.818-0.877x length of A4+5, 0.818-0.909 x length of labrum, ascoid on A3 0.02 mm long and situated at 0.56 of A3, 1 papilla situated at 0.84 of A3. A4 (Fig. 1D, lower) 0.052-0.054 mm long, ascoid on A4 0.2 mm long and was 0.37-0.384 of the length of segment, ascoid situated at 0.38 of A4, 1 papilla situated at 0.74 of A4. A5 (Fig. 1D, upper) 0.058-0.06 mm long, ascoid on A4 0.02 mm long and was 0.33-0.34 of the length of the segment, ascoid was at 0.344 of A5. Ascoid formula 2/3-15. Papilla formual1 5/1-3, mostly tip of the papilla reaches up to the tip of the ascoid, papilla on A3 and A4 are at one side. Labrum (Fig. 1E) 0.11 mm long, with 4 short and thin apical sensilla, sensilla depth 0.024 mm, hypopharynx (Fig. 1F) with smooth teeth, apex 0.004 mm broad and a dental depth of 0.024 mm, mandible (Fig. 1G) broad (0.008 mm), sharp re-curved teeth, 5 teeth per 0.004 mm, a dental depth of 0.052 mm. Cibarium (Fig. 1H) 0.04 mm broad, with about 16 rather indistinct teeth obscured by a large darkly pigmented patch and has a markedly tapering extension which is produced forwards in the form of a long anterior process. The posterior margin of pigmented area appear like a curve with convexity posteriorly. Central teeth are shorter than the lateral teeth, chitinous arch absent. Pharynx (Fig. 1I) 0.14-0.15 mm long and 2.41-2.58 times of the posterior width, pharynx hind with 3.62 times fore width, armature 0.026 mm height and was 0.173-0.185 of the length of pharynx. The anterior edge of pharyngeal teeth forms an almost convex line. The antero-central and lateral armature
Table 1. Comparative taxonomic characters (in mm) of *Sergentomyia mervynae* Pringle (1953)

<table>
<thead>
<tr>
<th></th>
<th>Balochistan (SW Pakistan) (present study)</th>
<th>Iraq (Pringle 1953: 716)</th>
<th>Afghanistan (Artemiev 1978: 26)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wing</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>length</td>
<td>1.20-1.30</td>
<td>1.47-1.57</td>
<td>-</td>
</tr>
<tr>
<td>length / breadth</td>
<td>4.54-4.642</td>
<td>4.4</td>
<td>-</td>
</tr>
<tr>
<td>A3 / 3</td>
<td>0.57-0.6</td>
<td>0.47</td>
<td>-</td>
</tr>
<tr>
<td>A3 / labrum</td>
<td>0.09-0.10</td>
<td>0.098-0.114</td>
<td>-</td>
</tr>
<tr>
<td>A3 / labrum</td>
<td>0.818-0.909</td>
<td>0.64-0.66</td>
<td>-</td>
</tr>
<tr>
<td>Ascoel 4 / A4</td>
<td>0.37-0.384</td>
<td>About one quarter the length segment.</td>
<td>-</td>
</tr>
<tr>
<td>Labrum</td>
<td>length</td>
<td>0.11</td>
<td>0.153-0.166</td>
</tr>
<tr>
<td>Palps</td>
<td>formula</td>
<td>1.23-4.5</td>
<td>1.23-4.5</td>
</tr>
<tr>
<td></td>
<td>ratio</td>
<td>1.23-4.5</td>
<td>1.23-4.5</td>
</tr>
<tr>
<td>Cibarium</td>
<td>With 16 rather indistinct teeth</td>
<td>With 16 long teeth, indistinct and somewhat obscured by a large pigmented area which has a clearly marked tapering extension which is produced forwards in the mid line.</td>
<td>With 16-22 teeth in concave row, central teeth are shorter than the lateral ones, pigmentation patch with long anterior process.</td>
</tr>
<tr>
<td></td>
<td>obscured by a darkly pigmented patch with a long anterior process.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pharynx</td>
<td>About 2.5 times as long as broad</td>
<td>About 3 times as long as broad, the armature consists of a group of long, brown spines bunched centrally so that their posterior margin presents a strong curve with the convexity posteriorly, the remainder of the pharynx posterior to these spines is scarcely armed.</td>
<td>Pharynx rather broad with lateral constriction, membranous base and connecticd with the pharyngeal armature.</td>
</tr>
<tr>
<td></td>
<td>pharynx with posterior membranous part</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>with lateral constriction</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spermatheca</td>
<td>Simple, tubular with less wide duct</td>
<td>The terminal umbilication is almost absent and the duct is narrower than in the other species examined.</td>
<td>-</td>
</tr>
</tbody>
</table>

Table 1 (continued)

<table>
<thead>
<tr>
<th></th>
<th><em>S. mervynae</em> (in micron)</th>
<th>Balochistan (SW Pakistan) (present study)</th>
<th>Iraq (Pringle 1953: 716)</th>
<th>Afghanistan (Artemiev 1978: 26)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wing</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>length</td>
<td>1.04-1.12</td>
<td>1.46-0.27</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>length / breadth</td>
<td>3.86-93</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A3 / 3</td>
<td>0.517-0.521</td>
<td>0.142</td>
<td>0.74-0.91</td>
<td></td>
</tr>
<tr>
<td>A3 / labrum</td>
<td>0.04-0.10</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ascoel 4 / A4</td>
<td>0.33-0.35</td>
<td>1.96</td>
<td>0.29-0.36</td>
<td></td>
</tr>
<tr>
<td>Palps</td>
<td>formula</td>
<td>1.23-4.5</td>
<td>1.23-4.5</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>ratio</td>
<td>1.23-4.5</td>
<td>1.23-4.5</td>
<td>-</td>
</tr>
<tr>
<td>Cibarium</td>
<td>With 15-18 weak blunt teeth</td>
<td>With about 20 weakly chitinnised blunt teeth, there is an irregular shaped, greyish, brown, pigmented area in the center of the armature.</td>
<td>With concave row of 15-22 teeth, the central teeth shorter than the lateral ones.</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>arranged on a concave, central teeth</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>smaller than the laterals, pigmenat patch present in the center of cibarial teeth</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pharynx</td>
<td>Length is 2.5-2.7 times as long as broad.</td>
<td>Length just over three times the maximum breadth.</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Coxitae</td>
<td>length</td>
<td>0.2-0.21</td>
<td>0.26</td>
<td>236-284</td>
</tr>
<tr>
<td></td>
<td>breadth</td>
<td>0.08 bread</td>
<td>0.095</td>
<td></td>
</tr>
<tr>
<td>Coxitae / style</td>
<td>2.83-2.76</td>
<td>2.28</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coxitae / A3</td>
<td>2.1-2.22</td>
<td>2.11-2.79</td>
<td></td>
<td>-</td>
</tr>
<tr>
<td>Coxitae / labrum</td>
<td>1.90-2.0</td>
<td>1.88-2.1</td>
<td></td>
<td>-</td>
</tr>
<tr>
<td>Style</td>
<td>length</td>
<td>0.076</td>
<td>0.114</td>
<td>-</td>
</tr>
<tr>
<td>Seta</td>
<td>0.03 mm long, at 0.86 of the style.</td>
<td>0.02 mm long, at 1/3 of the style.</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Paramere</td>
<td>length</td>
<td>0.076-0.09, paramere with rounded ends</td>
<td>0.035</td>
<td>Paramere with rounded ends</td>
</tr>
<tr>
<td>Aedeagus</td>
<td>length</td>
<td>0.076-0.09, aedeagus straight</td>
<td>0.093</td>
<td>Aedeagus straight.</td>
</tr>
</tbody>
</table>

was composed of group of long spines pointing towards center, the posterior margin appears like a curve with convexity posteriorly. The remainder of the pharynx posterior to the armature consists of membranous part which is 0.02 mm broad and scarcely armed, the lateral posterior margins of pharynx with a lateral constriction, base of the pharynx without a median notch. Spermatheca (Fig. 1J), simple, tubular 0.024 mm long, 0.016 mm broad, with less wide duct, furca (Fig. 1K) 0.072 mm long, genital atrium (Fig. 1L) 0.04 mm broad.

Male: (6 specimens examined) (Fig. 2A) l.04-1.12 mm long, 0.264-0.288 mm broad, α=0.096-0.12 mm long, β=0.184-0.232 mm long, δ=0.2-0.232 mm long, π=0.04 mm long, alar index=0.517-0.521. Palp (Fig. 2B) 0.42-0.46 mm long, palpal ratio 1, 2.66, 4.66, 4.5, 9.0 and palp formula 1, 2, 4, 3, 5, but also 1, 2, 3, 4, 5 A3 (Fig. 2C) 0.09-0.10 mm long, ascoid 0.018 mm long, position of ascoid=0.655, ascoid 3A3=0.2, position of a papilla on A3=0.827, A3/labrum= 0.9-0.91, A3/A4+5= 0.77-0.83. A4 (Fig. 2D, lower) 0.056-0.6 mm, ascoid 0.02 mm long,
position of ascoid = 0.386, ascoid 4/A4 = 0.33-0.35, position of single papilla on A4 = 0.78. A5 (Fig. 2D, upper) 0.06 mm long, ascoid on A5 = 0.018 mm long, ascoid 5/A5 = 0.3 position of ascoid on A5 = 0.376. Labrum (Fig. 2E) 0.10-0.11 mm long and a sensilla depth 0.036 mm. Hypopharynx (Fig. 2F) 0.016 mm broad with pointed apex and a dorsal depth of 0.028 mm. Cibarium (Fig. 2G) 0.044-0.05 mm broad, with 15-18 weakly chitinised but blunt teeth arranged on a concave line, central teeth appear relatively shorter than the laterals and there is an oval shaped, grayish brown pigmented area (0.012 mm long, and 0.009 mm broad) in the center of cibarial teeth. Pharynx (Fig. 2H) 0.11-0.12 mm long and is about 2.5-2.7 times as long as broad and its widest posterior portion was not quite twice as wide as the narrowest anterior part. There is no marked posterior dilation of pharynx. Anterior edge of armature forms an almost convex line. Armature is in the form of short serrated transverse ridges. Armature occupies 0.254-0.3 of the length of the pharynx. Coxite (Fig. 2I) 0.2-0.21 mm long, 0.08 mm broad, coxite/A3 = 2.1-2.22, coxite/labrum = 1.90-2.0, coxite/style = 2.63-2.76. Style (Fig. 2J) 0.076 mm long, 0.03 mm broad, with 4 terminal spine 0.1-0.11 mm long, usually spatulate, a ventral seta 0.03 mm long at 0.86 of the style. Paramere (Fig. 2K) 0.11-0.12 mm long (longer part is 0.07-0.08 mm long and 0.02-0.03 mm broad whereas 0.04 mm longer neck is about 0.01-0.012 mm broad) and a ventral tubercle with 4-5 short hairs. Aedeagus (Fig. 2L) 0.076-0.09 mm, each halves individually 0.01-0.012 mm broad, with pointed sub apical tubercle at 0.88 of the aedeagus. Genital filament (Fig. 2M) 0.25-0.3 mm long, smooth and pump (Fig. 2N) 0.07-0.08 mm long, with filament to pump ratio of 3.71-3.75. Surstyle (Fig. 2O) 0.17-0.18 mm long, 0.8-0.85x length of coxite.


**Differential diagnosis of *S. mervynae*:** The morphology of cibarium, pigment patch with anterior process and
morphology of pharynx with broad central and basal membranous part with no median deep noteh are useful
diagnostic characters in the identification of female of this
species.

**DISCUSSION**

Results of the present study are compared with the
published data of *S. mervynae* from Iraq (Pringle, 1953)
and Afghanistan (Artemiev, 1978) (Table 1). ♂ *S. mervynae* from Pakistan are found to have a slightly larger
wing length/breadth, α/β, ascoaid 4/4A and A3/labrum but
are observed having a slightly shorter wing length, A3,
ascoid on A4, labrum and pharynx length/breadth as
compared with the published data of this species from
Iraq.

However, ♂ *S. mervynae* of the present study are
observed to be in full accord with the Iraqi and
Afghanistan specimens in the diagnostic characters like
the morphology of cibarium, pharynx and spermathecae.

Similarly, Pakistani ♂ *S. mervynae* are observed to
have a relatively shorter wing, A3, ascoaid on A3 pharynx
length/breadth, Coxite, style and paramere as compared with
the Iraqi specimens. The illustrations of the
structures of cibarium, pharynx, style, paramere and
aedegus produced by Pringle (1953) are observed to be
in full accord with their counterparts in Pakistani
specimens. However, Pakistani specimens are found to
differ slightly in the shorter 3rd antennal segments and
coxite as those from southern Afghanistan (Artemiev,
1978). Indeed, Pakistani specimens are observed to agree
well with the type specimens from Iraq in palpal formula,
morphology of cibarium and pharynx. Similarly, they are
also found to agree with the Afghanisn specimens in
characters like A3/labrum, ascoaid 4/4A, coxite/A3, coxite/
labrum, shape of the cibarium and pharynx.

The present study revealed that *S. mervynae* is a very
rare species (19/2013=0.95%) and has a localized and
discontinuous distribution in Pakistan. There are no
published reports incriminating *S. mervynae*, which is
thought to be thermophilic and a possible vector of
reptilian leishmaniasis (Artemiev, 1978) and presumably
plays no part in transmitting *Leishmania* to man.

**REFERENCES**

Artemiev, M.M., 1978. Sandflies (Diptera, Psychodidae,
Phlebotominae) of Afghanistan, pp. 48-87.

infections of leptomand flagellates in Paramanian

sandflies (Diptera, Psychodidae) in Balochistan,
Pakistan and the disease cutaneous leishmaniasis.
Ph. D. Thesis. University of Balochistan, Quetta,
Pakistan; pp. 389.

sandflies-vectors of leishmaniasis. Proceedings of the
Indo-UK Workshop on Leishmaniasis, December
6-10, 1983, Indian Council of Medical Research, New
Delhi, pp. 72-83.

Killick-Kendrick, R., Y. Tang, M. Killick-Kendrick, R. N.
Johnson, P.M. Ngumbi, D.K. Sang and P.G. Lawyer,
1994. Phlebotomine sandflies of Kenya (Diptera,
Psychodidae), III. The identification and distribution

Lawyer, P.G., Y.B. Mebrahtu, P.M. Numbi, P.
Mwanyumba, J. Mbuya, G. Kibu, D. Kipkoech, J.
Guggisbergi* (Diptera, Psychodidae), a vector of
Hyg., 44: 290-298.

Lewis, D.J., 1967. The Phlebotomine of west Pakistan
(Ent.), 19: 1-57.

Insects and other arthropods of medical importance
(Smith, K.G.V. ed.), British Museum Natural History,


Pringle G., 1953. The Sandflies (Phlebotominae) of Iraq.

Theodor, O. and A. Mesghali, 1964. On the