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New Records of *Sergentomyia (Parratomyia) grekovi* Khodukin (1929) from Balochistan and *Sergentomyia (Parratomyia) freetownensis* Sinton (1930) var. (*Diptera, Psychodidae*) from Pakistan

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Abstract: During entomological surveys conducted by the author in the whole of Balochistan province, a single female of *Sergentomyia (Parratomyia) grekovi* Khodukin (1929) was collected from Sibi on 25.3.2001 and *Sergentomyia (Parratomyia) freetownensis* Sinton (1930) var was collected (N=10) from five localities. These localities appear to be the new records of these species from Balochistan and Pakistan. Morphology of taxonomic characters not reported and measured previously, are also described in the present paper. Key for the identification of these Pakistani species is constructed. Comparative analysis of Balochistan specimen with the published data of this species from other territories is also given.

Key words: *Sergentomyia grekovi*, *sergentomyia freetownensis*, sandflies, taxonomic characters

INTRODUCTION

Sergentomyia grekovi was described by Khodukin^[1] from Tashkent. Thereafter, it was recorded by Mesghali^[2] from North Eastern Iran. A single male of this species was found by Theodor and Mesghali^[3] in Meshhad, Iran, but they gave no descriptive account of morphological characters. Perfiliev^[4] gave description and illustrations of buccal cavity, pharynx, spermatheca and male terminalia. Lewis^[5] described it from Gilgit, Pakistan (2 ♀ and one ♂) and sketched wing, cibarium, pharynx and spermatheca of ♀ and cibarium, pharynx and ♂ terminalia. Therefore, papillae, hypopharynx, mandible were neither figured nor measured. Palps, antennae, labrum and cibarium, pharynx, pharyngeal armature and spermatheca were also not figured and not measured respectively. Artemiev^[6,7] described it from Afghanistan but he did not reported details of characters like palp, A3, ascoid, papilla, hypopharynx, mandible, measurements of cibarium, pharynx, spermatheca and furca. Artemiev^[7] also did not furnish figures of palp, A3, ascoid, papilla, hypopharynx, mandible, genital atrium and furca of female of *S. grekovi*. *S. freetownensis*. Newstead^[8] collected interesting ♂ and ♀ sandflies from mid Luanga River, North East Rhodesia, (now Zimbabwe) in August, 1910. Newstead^[9] described it under the name *Phlebotomus minutus* var. *africanus* and separated it from *P. minutus*, Rondani on account of its dark colour and of certain differences in external morphology. Adler and Theodor^[10] observed ♀ *P. minutus* var. *africanus* with characteristic features of

Spermathecae, pharynx and buccal cavity that were strikingly and constantly different from the corresponding parts of *P. minutus* and concluded that it cannot be maintained as a variety and must be raised to the rank of a distinct species with the name *P. africanus*. Many varieties of this species have been created since 1926. Adler and Theodor^[11] described *P. africanus* from Palestine in which armature of buccal cavity consists of 40-50 teeth and without anterior point like punctiform denticles. Adler *et al.*^[12] described *P. africanus* from the Belgian Congo with no anterior small teeth in the buccal cavity. Sinton^[13] described a new species named *P. africanus* var. *magnus* (♀) from Transvaal, South Africa, which differs from the typical *africanus* of Palestine and India in its larger size, its broader and less lanceolate wings, the larger size of α and δ, buccal teeth about 40 in number, spermatheca is relatively longer and narrower being about 2, ¾ times as long as broad. Theodor^[14] stated that the form which occurs in the Sudan and Congo is typical and shows buccal armature (of about 30 to 33 in number) of the ♀ of this form with anterior punctiform teeth at the base of every second tooth, whereas buccal cavity of *P. africanus* var. *asiaticus* has 44-50 teeth and the row of small point like denticles absent. Kirk and Lewis^[15] pointed out that several species have been recorded as *P. africanus* in the past and many varieties had been created since 1926. Theodor^[16] placed *P. africanus* in the genus *Sergentomyia*. Kirk and Lewis^[17] suggested that *P. africanus* and its allies be regarded as *P. freetownensis* Sinton^[18] which was described from a

single ♀ specimen collected by Sir Rickard Christophers at Sierra Leone in September, 1928. They observed that *P. freetownensis* was found identical in description and figures with the form described by Sinton^[13] as *P. africanus* var. *magnus*. They also concluded that in case of the other varieties of *P. africanus* if any, these should be regarded as varieties of *P. freetownensis* Sinton. Theodor^[19] placed *P. africanus* in genus *Sergentomyia*. Lewis^[5] while describing phlebotomine sandflies from Pakistan pointed out that the specimens presented to the British Museum (Natural History) by Sinton came from West Pakistan and he, Sinton, differentiated *S. africanus asiatica* from African form (now known as *S. africanus magna*) by the absence in *asiatica* of punctiform cibarial denticles and the presence of more (40-50) horizontal teeth and few long pharyngeal teeth at the posterior narrow part of the pharynx of the ♀. He too, did not furnish measurements neither illustration of diagnostic characters of *S. africanus asiatica* from Pakistan. Lewis^[20] while treating the Pakistani form as a form of *S. africanus magna*, reported the cibarium of ♀ with 45-50 teeth in a concave row, pigment patch concave posteriorly and pharynx with long teeth and oblong sprematheca but he did not supply measurements of wing, palp, antennae, cibarium, pigment patch, pharynx, ♂ terminalia and ♀ genitalia nor he furnished drawings of these taxonomic characters. However, *P. africana* was reported by Rab *et al.*^[21] from Uthal area of Balochistan and *P. africana asiatica* (Theodor) (originally from Sindh as reported in Sinton's notes) was re-mentioned by Lewis^[5]. These authors did not furnish morphology, measurements and figures of the taxonomic characters of this species.

To fill these gap of knowledge, an extensive taxonomic study of the species of sandflies was carried out by the present author in the whole of the Balochistan Province during 1996-2001 and 2013 sandflies comprising of the genera *Phlebotomus*, *Sergentomyia* and *Grassomyia* were collected^[22]. In view of insufficient descriptions of Adler and Theodor, Artemiev, Khodukin, Kirk and Lewis, Lewis, Mesghali, Newstead, Perfiliev, Rab *et al.*, Sinton, Theodor, Theodor and Mesghali (*loc.cit.*), *S. grekovi* and *S. freetownensis* are redescribed here in detail. Taxonomic characters not measured and figured by earlier workers are measured and illustrated in the present paper.

MATERIALS AND METHODS

For collection, processing, preservation, dissection, mounting of the specimens and observation of external and anatomic parts of the sandflies, the conventional techniques especially those used by Johnson *et al.*^[23], Killick-Kendrick^[24], Killick Kendrick *et al.*^[25], Lawyer

et al.^[26] and Lewis^[27] were followed. For the species identification of sandflies, keys furnished by Artemiev^[7], Kirk and Lewis^[28], Lewis^[5,20], Perfiliev^[4], Sinton^[18,13] were consulted. Measurements are in millimeter (mm). All the diagrams were drawn with the camera lucida and are to the given scales. Specimens are housed in the Author's collection of sandflies, Department of Zoology, University of Balochistan, Quetta.

RESULTS

Sergentomyia (Parrotomyia) grekovi Khodukin^[1] (Text-Fig. 1 and Table 1)

Phlebotomus grekovi Khodukin^[1], Medskaya mysl. Tashk., Suppl:101, *Sergentomyia (Parrotomyia) grekovi* Khodukin, Theodor^[19], Die Fliegenden Palaearktischen Region, 9C:44, Lewis^[5], Brit. Mus. Nat. Hist. (Ent.), 19:32, Perfiliev^[4]:319, Artemiev^[6] Medskaya Parazit, 45: 425, Lewis^[20], Bull. Brit. Mus. Nat. Hist. (Ent.), 37: 262; Artemiev^[7]: 27.

Female: 1 specimen was examined (Fig. 1). Wings were missing. Palp (Fig. A), 0.53 mm long, palpal formula 1, 2, 4, 3, 5. P3 has about 30-40 Newstead's sensillae at basal third of segment 3. Head 0.36 mm long, 0.336 mm broad, eye 0.16 mm long, and 0.104 mm broad, and distance between eyes 0.112 mm. A3 (Fig. 1B) 0.13 mm long, ascoid very long (0.04 mm), position of ascoid=0.66, position of papilla=0.787. A3 is 0.36x length of head, 0.70x length of labrum, 0.189x combined length of A4+5. AIV (Fig. 1C, lower) 0.072 mm long, ascoid length=0.044, position of ascoid=0.4, position of papilla 0.73, ascoid 4/A4=0.555-0.611. AV (Fig. 1C, upper) 0.072 mm long, ascoid length 0.04, position of ascoid=0.39. Ascoid 5/A5=0.611. Antennal segments III and IV have a single prominent papilla. On both it was situated at the mid length of the ascoid. The positions of the papillae on segments are: AIII, 0.78, AIV, 0.73. The positions of the ascoids on segments were: AIII, 0.66, AIV, 0.4, AV, 0.39. AIII was smaller than A4+5 (0.88). There are two ascoids on AIII to XV. Labrum (Fig. 1D) 0.185 mm long, 4-5 small, narrow, compact apical sensillae, sensillae depth 0.032 mm. Hypopharynx (Fig. 1E) 0.014 mm broad, a dental depth of 0.028 mm. Mandible (Fig. 1F) narrow, 8 teeth per 0.008 mm, a dental depth 0.048 mm. Cibarium (Fig. 1G) 0.046 mm broad, about 11 long parallel teeth (each tooth about 0.008 mm long) on an almost straight row, a few punctiform denticles at the base of teeth, a dark triangular pigmented area (0.04 mm long and 0.02 mm broad) on the background of the teeth with an irregular forward broad extension and an irregular basal part, chitinous arch well developed at sides and postero-lateral edges of cibarium

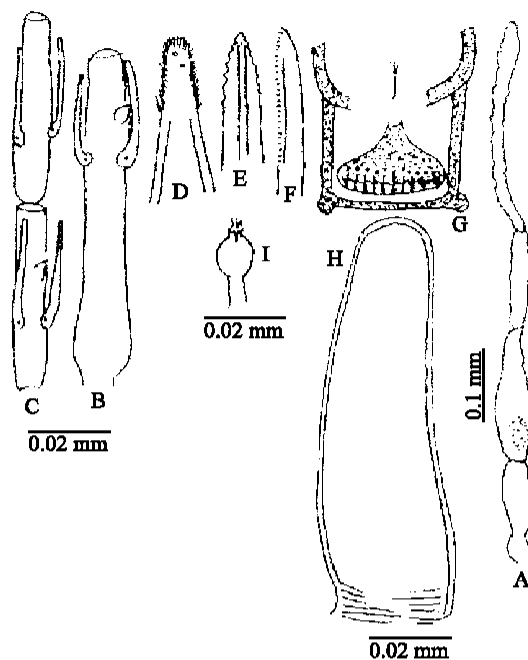


Fig. 1: Camera Lucida drawings of ♀ *Sergentomyia grekovi* collected from Balochistan (Pakistan) showing: palp (A), third (B), fourth (C, lower) and fifth (C, upper) antennal segments, labrum (D), hypopharynx (E), mandible (F), cibarium (G), pharynx (H), spermatheca (I)

knob like. Pharynx (Fig. 1H) 0.16 mm long, not dilated posteriorly, length 3.3 times greatest breadth is about 1.5 times the narrowest anterior portion. Armature 0.016 mm long, in the form of weak, short, transverse lines at the base of pharynx, armature is 0.1x length of pharynx. Spermatheca (Fig. 1I) small, almost oval 0.008 mm long and 0.006 mm broad, furca, 0.056 mm long.

♂: Not came in the collection of present survey.

Distribution: Balochistan. Present survey, New Record. Sibi, a single ♀ was collected by the author on 25. iii. 2001 using sticky traps from the campus of the Government Degree College. This locality is an important focus of cutaneous leishmaniasis. Northern areas of Pakistan: Gilgit^[5]. Afghanistan^[6,7]. Central Asia^[1,4]. Iran Sabzevar in N.E Iran^[2], Meshhad (a single ♂)^[3].

Sergentomyia (Parrotomyia) freetownensis Sinton^[18] var. (Text-Figs. 2. and Table 2)

Phlebotomus minutus var. *africanus*, Newstead^[9], Bull. Ent. Res., 3: 363,^[10] Bull. Ent. Res., 16: 401,^[11] Ann. Trop. Med. Parasit., 21: 63, *P. africanus*^[12], Rev. Zool. Bot. Afr., 18: 72 (♂ ♀) *P. freetownensis*. Sinton^[18], Indian J. Med. Res., 18: 171-193.

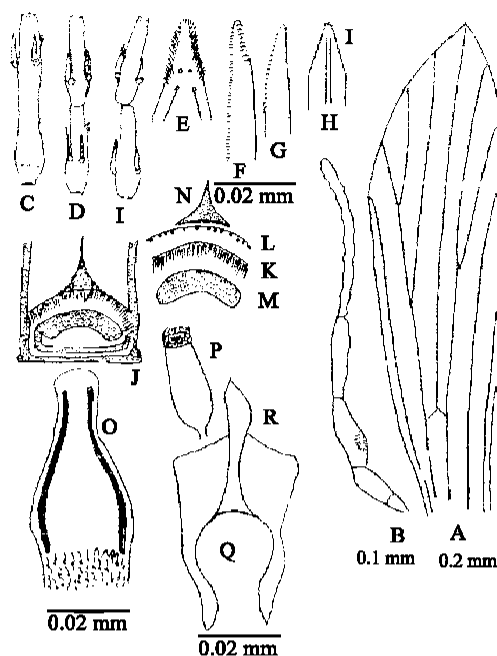


Fig. 2: Camera Lucida drawings of ♀ *Sergentomyia freetownensis* Sinton var. collected from Balochistan (Pakistan) showing: wing (A), palps (B), the third (C), the fourth (D, lower), and fifth (D, upper) antennal segments, unequal sized ascoids on antennal terminal segments (D 1), labrum (E), maxilla (F), mandible (G), hypopharynx (H), apical and lateral smooth margin of hypopharynx (I), cibarium (J), cibarial teeth (K), anterior denticles (L), pigment patch (M), a triangular anterior extension of pigment patch (N), pharynx (O), spermatheca (P), genital atrium (Q), genital furca (R)

Female: 98 specimens were examined (Fig. 2). Wing (Fig. 2A), much more pointed and relatively narrow, 1.36 (1.32-1.40) mm long, 0.329 (0.304-0.344) mm broad, $\alpha=0.17$ (0.144-0.20) mm, $\beta=0.27$ (0.224-0.32) mm, $\delta=0.07$ (0.064-0.08) mm, in 2 specimens from Bela, δ was measured to be zero, $\gamma=0.224$ (0.20-0.24) mm, $\pi=0.12$ (0.08-0.16) mm, alar index=0.629 (0.625-0.642). Palps (Fig. 2B) 0.48-0.50 mm long, palpal ratio 1:2.42:3.62:4.12:7.31 and formula 1,2,3,4,5, or 1,2,3-4,5, Newstead's sensillae are situated at the basal third of segment 3 and are about 20-30 in number. A3 (Fig. 2C) 0.106 (0.11-0.12) mm long, 0.785x length of labrum 0.841x length of A4+5, 0.077x length of wing, ascoid on A3=0.022 (0.020-0.024) mm long, ascoid 3/A3=0.207. A4 (Fig. 2D, lower) 0.063 (0.062-0.065) mm long, ascoid on A4=0.022 (0.020-0.024) mm long, ascoid 4/A4=0.349. A5 (Fig. 2D, upper) 0.065 (0.062-0.067) mm long, ascoid on

Table 1: Comparison of taxonomic characters of *Sergentomyia grekovi* Khodukin (1929)

♀ Taxonomic characters	Balochistan (Present study)	Northern Pakistan (Gilgit) (Lewis, 1967:32)	Central Asia (Perfiliev (1968 : 320)
Palpal formula	1, 2, 4, 3, 5	1,2, 3, 4, 5.	1,2, 3-4, 5.
A3 length	0.128 mm long	0.20-0.22 mm	0.20-0.23 mm long
A3/4	A3 < A4	A3 < A4	A3 < A4+5 About 1/3 the
A3/labrum	+5 0.70	+51.2 times	length of segment
Labrum length	0.185 mm long	0.17-0.18 mm long	-
Asoid 4/A4	0.55-0.61	0.3	-
Cibarium	0.046 mm broad, about 11 long, parallel pointed teeth (each tooth about 0.008 mm long), on an almost straight row, a few punctiform denticles at the base of teeth, a large triangular pigmented area on the background of teeth, a short conical anterior process	18 – 24 parallel pointed teeth on an arc which is slightly concave posteriorly, a few punctiform teeth on each side, chitinous arch well developed at sides, postero lateral of cibarium knob like, pigment patch with an irregularly forward extension	20, 30, 35 large arrowlike teeth on a line slightly convex anteriorly. The second row consists of minute denticles appearing as dots at the base of lateral teeth. Pigmented area dark, large, triangular with square anterior process
Spermatheca	Almost oval	Nearly spherical	More or less oval form

A5=0.023 (0.02-0.024) mm long, ascoid 5/A5=0.365. Antennal segments III and IV have a single prominent papilla (Fig. 2C-2D). On A3 and A4 it is usually anterior to the tip of the ascoid. The positions of the ascoids on the segments are: AIII, 0.716, AIV, 0.322 and AV, 0.312. There are 2 ascoids on segments III to XV. Ascoids on each segment specially the terminal ones are unequal in size (Fig. 2D1). Labrum (Fig. 2E) 0.135 (0.13-0.14) mm long, 0.028 mm broad, 0.099x length of wing, with 3-4 small narrow, apical sensilla and about 14 adorals small, sensillae depth 0.036 mm. Maxilla (Fig. 2F) with 9 lateral and 35 ventral teeth and a dental depth of 0.07 mm. Mandible (Fig. 2G) narrow, 0.011 mm broad, small uniform teeth, 7 re-curved teeth per 0.008 mm. Hypopharynx (Fig. 2H) apical and lateral margins of hypopharynx are weakly undulating or smooth. Cibarium (Fig. 2J) 0.059 (0.058-0.060) mm broad, comb like cibarial armature consisting of 60-70 parallel, straight teeth, the extreme lateral ones slightly bigger (0.007 mm long) than the median ones (0.006 mm long) standing on an arc concave posteriorly (Fig. 2K). Besides this, a row of pointed anterior denticles is present, each of these being situated at the base of every 3rd or 4th tooth (Fig. 2L). Pigment patch large (Fig. 2M), dark, brown in the form of a crescent strongly curved, 0.046 mm long, 0.014 mm broad and prolonged anteriorly by a yellowish triangular extension (Fig. 2N), pigmented area, not occupying the whole width of cibarium, pigmented plate with thickened lateral arms appear almost rounded ends and posterior margin is concave. Very often pigment patch obscuring the cibarial teeth, chitinous arch ill developed at center, but lateral flanges heavily dark brown pigmented as dark as pigmented plate. Pharynx (Fig. 2O) flask shaped, slightly widened in its posterior half and narrowing again posteriorly, pharynx 0.12-0.13 mm long, 0.024 mm fore width, 0.05 mm hind width, 0.04 mm basal width, height of armature 0.022 (0.02-0.024) mm, 0.166-0.184x length of pharynx. The anterior edge of armature formed an almost

straight line. Armature composed of 5-6 rows of backwardly directed short points in its posterior part. Most of the armature confined to the basal part of the pharynx. The length of the pharynx is about 2.4-2.6 times its greatest breadth and pharynx is 2.08 times as wide posteriorly as anteriorly. Spermatheca (Fig. 2P) elongated oval capsule, 0.022 mm long, 0.009 mm broad with apical head of capsule 0.005 mm long, 0.004 mm broad, spermatheca open into a narrow duct which open jointly into genital atrium (Fig. 2Q) which is 0.04-0.048 mm broad, genital furca (Fig. 2R) 0.068-0.84 mm long.

For the abovementioned morphological differences, the author has treated the present flies as a *S. freetownensis* Sinton^[18] var.

Male: Not known from Balochistan during the present study.

Distribution: Balochistan. New Record Present survey: Bela, Khuzdar, Sibi, Uthal, Vinder. These localities are important foci of cutaneous leishmaniasis. Sandflies were collected from indoors and outdoors using mouth aspirators.

Key for the identification of Pakistanese *S. grekovi* and *S. freetownensis*: Cibarium with 1 or more rows of teeth, pigment patch usually present, hind ends of abdominal tergites 2-6 usually with all or most hairs recumbent, most sockets much smaller than on 1, style of ? with four major spines and an accessory seta..... Genus *Sergentomyia*
 A comb like cibarial armature, lamp-glass-shaped pharynx, and elliptical capsular spermatheca subgenus *Parratomyia*
 Cibarium with 11 long parallel teeth on an almost straight row, a few punctiform denticles at the base of these teeth, A3=0.13 mm long, spermatheca small, almost oval in

Table 2: Comparison of taxonomic characters of *Sergentomyia* (*Parrotomyia*) *freetownensis* Sinton (1930) var. from Balochistan and the published data of sub species of africana group from other territories

♀ Taxonomic characters	Balochistan (Present study)	<i>P. freetownensis</i> from Sierra Leone (Sinton, 1930 : 188)	<i>P. africanus</i> var. <i>magnus</i> from Letsitelle, Tanzeen, Transvall, S. Africa (Sinton, 1932 : 571)	<i>Phlebotomus</i> (<i>Sergentomyia</i>) <i>freetownensis</i> var. <i>magnus</i> Sinton. (Kirk and Lewis, 1951 :472)	<i>P. (Sergentomyia) freetownensis</i> var. <i>eremitis</i> Parrot and deJoliniere (Kirk and Lewis, 1951 : 474)
Wing Length	1.36	1.857	1.77	1.4-1.77	1.65-1.79
Breadth	0.329	0.50	0.485	0.36-0.485	0.31-0.41
α	0.17	0.357	0.27	-	-
β	0.27	0.334	0.343	-	-
γ	0.24	0.285	0.243	-	-
δ	0.07	0.193	0.114	+0.04 to 0.14	0.017 to +0.051
π	0.12	0.157	-	-	-
Alar index	0.629	1.06	0.79	0.52-0.89	0.470-0.65
Palp segment 1		0.106			
2	0.258	0.036	0.040	-	-
3	0.386	0.10	0.080	-	-
4	0.440	0.16	0.140	-	-
5	0.780	0.177	0.160	-	-
Total Length	0.48-0.50 mm	0.360	0.318	-	-
Formula	1,2,3,4,5, or 1,2,3-4,5	0.838	0.738	-	-
Palpal ratio	1:2.42:3.62:4.12:7.31	1,2,3,4,5	1,2,3,4,5	1,2,3,4,5	1,2,3-4,5
A3 Length	0.106, AIII < A4 + 5	0.192	-	0.135-0.171, A3<A4+5	0.114-0.147, A3<A4+5
A4	0.063	0.093	-	-	-
A5	0.065	0.096	-	-	-
A3/labrum	0.785	1.163	-	0.8-1.0	0.79-0.96
Ascoide 4 / A4	0.349, ascoids on the terminal segments are unequal in size	-	-	0.25	0.3, ascoids on each segments Specially the terminal ones are unequal in size
Labrum length	0.135	0.165	-	0.15-0.17	0.13-0.156
Cibarium	Pigment patch large in the form of a crescent strongly curved and prolonged anteriorly by a yellowish triangular extension, pigmented area not occupying the whole width of cibarium, pigmented patch with thickened lateral arms with rounded ends.	Cibarium has a triradiate pigmented area with thickened lateral arms which show rounded ends. The amature consists of a line of narrow, parallel about 60 in number arranged in a curved line concavity posteriorly	40 buccal teeth	Pigment plate sausage shaped, concave posteriorly and with a pale triangular pointed forward extension. 40-50 straight parallel teeth arranged on an arc concave posteriorly, there may be some very small punctiform denticles at the bases of teeth	Pigmented plate dark down no occupying the whole width of buccal cavity, in the form of a crescent slightly concave posteriorly, with irregular posterior margin and a paler anterior triangular prolongation. 60-65 teeth parallel, straight and long, the extreme lateral ones slightly bigger than the median ones, arranged on an arc slightly concave posteriorly, at the bases of these teeth is a row of about a dozen punctiform denticles
Pharynx	Pharynx flask shaped, length about 2.4 – 2.6 times its breadth, the posterior breadth 2.08 times than the anterior breadth, most of the sharply pointed teeth confined to the basal part of the pharynx	Pharynx is flask-shaped the widest posterior portion being about 2. ½ times as broad as the narrower anterior part, the length is nearly 3 times the greater breadth. The amature consist of rows of very numerous fine teeth the bases of which are distinctly separated from each other, at the widest part there are about 20 spines in a transverse row	-	About twice as wide posteriorly as anteriorly armed with short backward directed spines in its posterior part	Posterior width slightly less than twice anterior width, armed in posterior part with about 40 well developed pointed spines
Spermatheca	0.022 mm long, 2.44xbreadth 0.009 mm broad, Spermatheca is an elongated oval capsule and open into a narrow duct which open jointly into genital atrium. The inner margin of furca are thickened.	0.075 mm long, 2.0 x breadth. 0.037 mm broad, Spermatheca is an elongated oval capsule. It ends in a narrow duct, the inner margin of furca are thickened	2 ¾ times as long as broad	An elongated oval capsule, opening into a relatively narrow duct	Spermatheca as in <i>P. freetownensis</i> .

shape..... ♀ *S. grekovi*
Cibarium with comb like cibarial teeth (parallel and straight) arranged on a concave row, pigment patch large, dark brown, very often pigment patch obscuring cibarial teeth, A3=0.11- 0.12 mm long, spermatheca elongated oval capsule..... ♀ *S. fretownensis*

DISCUSSION

The measurements of various taxonomic characters of *S. grekovi* show considerable morphological differences when compared with the published data of this species from other territories (Table 1). Balochistan forms are found to differ in characters like shorter A3, A3/ labrum and fewer cibarial teeth from the form of north Pakistan^[5] and Central Asia^[4]. However, it is closely resembling in characters viz., A3<A4+5, labrum and morphology of nearly spherical spermatheca. Lewis^[20] pointed out that Artemiev^[6] noted much variation in number of cibarial teeth and possibly indicating more than one form in Afghanistan. However, more specimens are needed for study.

S. grekovi is a Central Asiatic species and is very uncommon in Pakistan. Its present record from Balochistan suggests its western limit of distribution starting from north east of Iran as its eastern border, and extending to north to Central Asia through northern Pakistan. There are no published reports incriminating *S. grekovi*, which is thought to be non-thermophilic and vector of reptilian leishmaniasis^[7] and presumably plays no part in transmitting *Leishmania* to man.

The morphology and measurements of various taxonomic characters of *S. fretownensis* Sinton^[18] var. show considerable differences when compared with the published data of this species and its related sub-species from other territories (Table 2). Pakistani form is found slightly differing in characters like shorter wing, A3, labrum, A3/labrum with *P. fretownensis* Sinton^[18] (from Sierra Leone), *P. africanus* var. *magnus* Sinton^[13] (from South Africa), *P. fretownensis* var. *magnus* Sinton (from Congo, Transvaal, South Africa)^[28], *P. fretownensis* var. *eremitis* Parrot and de Jolaniere (from Al-Ahaggar and Tamanvasset-Algeria)^[28]. However, Pakistani form is observed more closely resembling with the description given by Parrot and de Jolaniere^[30] for specimens from Algeria and Sudan. Further, Pakistani form is found corresponding well in taxonomic characters like palpal formula (1,2,3,4, 5), A3<A4+5, ascoids on terminal segments are of unequal size, ascoid formula (2/ III-XV), 60-65 parallel, straight, long, cibarial teeth, (lateral ones are slightly larger than the central ones) arranged on an arc slightly concave posteriorly, at the base of teeth, there are

small dot like punctiform denticles, pigment plate in the form of a crescent with broad rounded ends not occupying the whole width of cibarium and finally, morphology of pharyngeal teeth. Pakistani form is observed, further, showing a slight difference with *P. fretownensis* var. *eremitis* Parrot and de Jolaniere in characters like : alar index (Pakistani form, 0.629, Algeria and Sudan form, 0.47-0.65)^[28] and ascoid 4/A4 (Pakistani form, 0.349, Algeria and Sudan form, 0.3)^[28]. On the evidence of the foregoing morphological details of the Pakistani specimens, the author has treated the present collection as *S. fretownensis* Sinton^[18] var. It is important to note that while discussing *S. africana* complex mainly from Africa, Lewis^[20], however, admitted that no certain specimens of the Pakistani form were available with him.

The results of present study show that *S. fretownensis* Sinton^[18] var. is not an uncommon species (110/2013, 5.5%) and has a localized distribution in Balochistan.

There are no published reports incriminating *S. fretownensis* Sinton^[18] var. which is thought to be zoophilic and presumably plays no part in transmitting *Leishmania* to man.

Differential diagnosis of *S. fretownensis* Sinton^[18] var.:

So far two species of *Africana* group i.e *Sergentomyia* (*Parrotomyia*) *africana magna* Sinton form *asiatica* Theodor, which has been reported and described by the absence of in *asiatica* from Sindh: punctiform cibarial teeth and presence of 45-50 teeth) by Lewis^[5]. *S. africana* has been reported by Rab *et al.*^[21] from Uthal. However, they both did not supply the details, measurements and figures details of the diagnostic characters of these species. The morphology of the diagnostic characters like cibarial and pharyngeal armature and other features easily differentiates *S. fretownensis* Sinton^[18] var. collected during the present study with other related sub-species and varieties as under.

***S. africana magna* (Sinton) form *asiatica*:** ♀ has 45-50 horizontal cibarial teeth in a concave row and no punctiform anterior denticles. There was no median notch in the ventral plate. The pharynx has few long teeth^[5, 20].

***S. fretownensis* (Sinton):** has a tri-radiate pigmented area with thickened lateral arms, which show rounded ends. The armature consists of a line of narrow parallel teeth about 60 in number arranged in a curved line with the concavity posteriorly. Pharynx was flask shaped, the widest posterior portion being about 2½ times as broad as the narrow anterior part, the length is nearly 3 times the

greater breadth. The armature consists of rows of very numerous fine teeth. The bases of which were distinctly separated from each other. The spermatheca was an elongated oval structure^[18].

***S. africana* var. *magna* (Sinton):** This species differs in several particulars from the descriptions of *P. africanus* from Palestine given by Adler and Theodor^[10,11] and by Sinton^[18] and more closely resemble that of given by Adler *et al.*^[12] for specimens from the Belgian Congo. This variety more closely resembles with *S. freetownensis* Sinton^[18], but the cibarial teeth were only 40 in number and with no punctiform denticles. This variety also differs from the *S. africanus asiaticus* of Palestine and India in its larger size, its broader and less lanceolate wings and with relatively longer and narrower spermathecae^[28].

***S. freetownensis* var. *eremitis*:** Parrot and de Jolaniere^[30]. It was described by Parrot and de Jolaniere^[29] using 10 ♀ and 24 ♀ captured from Amgel and Tamanrasset, Algeria. This variety corresponds well with the specimens collected from Pakistan during the present study. From the measurements and morphology it appears that this variety more closely resembles Pakistani form in A3, labrum, A3/labrum, ascoids 4/A4, ascoids of each segments shorter and stout but the terminal ones are of unequal in size, ascoid formula (2/3-15), cibarium with 60-65 teeth, the external lateral ones slightly bigger than the median ones, at the bases of these teeth is a row of about a dozen punctiform denticles, pigment patch not occupying the whole of the breadth of cibarium and pharynx with well developed spines pointing backward^[28].

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