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Studies of southern African sandflies (Diptera: Psychodidae: Phlebotominae): the subgenus Sintonius of Sergentomyia with description of a new subgenus

by

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Accepted: 2 February 1979

ABSTRACT

All but one of the species formerly assigned to the subgenus Sintonius in southern Africa, are assigned to a new subgenus Capensomyia. Three new species, namely, Sergentomyia drakensbergi, S. kalaharica and S. xena, are described. All known southern African species are redescribed. A key to all southern African species is given.

1 INTRODUCTION

First proposed by Nitzuleu in 1931 as a subgenus of the genus Phlebotomus, Sintonius has since been recognized as such, or placed within the genus Sergentomyia. The latter arrangement is considered best. As originally defined, and revised in subsequent major revisions (Kieck & Lewis, 1946/51; Theodor, 1944/58; Povolny, 1961; and Lewis, 1971), Sintonius as a subgenus contains species having the following characteristics:

a) Clusters of raised sete insertion scars on the posterior mid-dorsal region of the tergites (the remainder being recumbent), especially on tergites II and III, notably in males.

b) Females having segmented spermathecae (fig. 1b); males having parameres hooked terminally, a short cone-shaped aedeagus, as well as an enlarged sixth abdominal tergite, style with 4 spines. 2 terminal and 2 subterminal (fig. 1d).

c) Buccal armature and pigmented plate well developed; pharynx narrowed apically and underdeveloped in both sexes (figs. 6a and 6b).

2 DESCRIPTION OF TAXA

Of the species known from southern Africa, and formerly assigned to Sintonius, only one in fact complies fully with the above definition. The remaining southern African species appear to constitute a group with important and consistent differences from Sintonius, and I therefore establish a new subgenus of the genus Sergentomyia to accommodate this assemblage of species.

Characters used in keys and descriptions follow as closely as possible those of Abonnenc (1972). Taxonomic aspects follow those of Theodor (1938).

2.1 Capensomyia subgen. nov.

Type species: Sergentomyia drakensbergi spec. nov.

Definition: Spermathecae are convoluted (fig. 1a); apically with a crown-shaped arrangement of ductules, a narrow collar surrounding this arrangement. Male terminalia: style with 4 elongate spathulate tipped spines, 2 terminal and 2 subterminal; the pre-apical setae long but fine. Paramere recurved apically giving a hooked
appearance, armed along its dorsal and lateral surfaces with a number of fairly stout elongate setae plus a number of shorter finer setae. Aedeagus an elongated cone-shaped, the ventral surface of the apical quartet curved upwards forming a sharply rounded translucent extremity. Sixth abdominal tergite same size as the fifth. Female pharyngeal armature is well developed, broad, being 3—5 times its anterior width, coarsely developed. Buccal armature of females well developed; in males to a marked lesser degree. Females all have erect setae insertion scars on the mid-posterior to lateral margins of the abdominal tergites, if not on all segments always on tergites V and VI. Males are rarely provided with erect setae insertion scars as above, never on tergite VI, but if they are present they occur on tergites II and III.

Discussion: The spermathecae present the most important criteria in separating Sintonius from Capensomyia, the former segmented and narrow, the latter convoluted, twice as broad and longer than those of Sintonius. In the male terminalia the only essential difference between the two subgenera is the shape of the aedeagus, that in Sintonius being short, and narrowed uniformly toward the tip, which is more or less pointed, whilst that of Capensomyia being an elongated cone-shaped with the ventral surface of the apical quartet upcurved forming a sharply rounded translucent extremity. In Capensomyia the pharyngeal armature is well-developed, compared with only lightly so in Sintonius, and never narrowed posteriorly to its anterior width as is the case in Sintonius.

The subgenus Sintonius has only one known representative in southern Africa, that being Sergentomyia (Sintonius) millent (Sinton 1933). One other species, not mentioned before, Sergentomyia transvaalensis (Sinton 1933), is incorrectly assigned to the subgenus Sintonius and will be discussed in a forthcoming paper in preparation.

The erect setae insertion scars on the posterior mid to lateral dorsal surface of the abdominal tergites, thought at the time to be important criterion in separating Sintonius from other subgenera of the Philebotominae, is in fact a character of minor taxonomic use. Many species of Sergentomyia sens. strict., the subgenus Rondanomyia and species incertae sedis, have these insertion scars.

Capensomyia may be divided into two easily differentiated species groups. In the caffarica species group, comprising species occurring in the east of the southern African sub-continent, the pharynges of the females are 4—6 times as broad posteriorly as anteriorly, elaborately and ornately armed. In the rubens species group, comprising species occurring in the west of the southern African sub-continent, the pharynges of the females are 2—3 times as wide posteriorly as anteriorly, and coarsely armed with large scale-like denticles with serrated posterior margins. Males of both species groups are inseparable except on locality (i.e. east or west of southern African sub-continent).

Explanation of terms used in text and key: The only term which may not be familiar to readers is the ratio c/b. This refers to the ascioids and as explained in Abonnenc (1972 p. 72 and fig 3E), is the ratio of the distance from the anterior edge of the ascus to the longest ascus to the posterior end of its antennal segment (c), to the length of the longest ascus in the segment (b).

2.2 The caffarica species-group

Sergentomyia (Capensomyia) caffarica (De Meillon & Lavoirier, 1944) figs. 1, 10.

Philebotomus caffarica De Meillon & Lavoirier, 1944; Kirk & Lewis 1946; Zielke, 1971.

Philebotomus (Sintonius) caffarica, Kirk & Lewis, 1951; De Meillon, 1955.

Philebotomus (Prophelebotomus) caffarica, Abonnenc, 1967.

Philebotomus (Sergentomyia) caffarica, Abonnenc, 1972.

This species is known only from the Holotype female which is in a poor state of preservation. The Enderlein has been lost by a previous worker. All notations below in parentheses are after De Meillon & Lavoirier, 1944. The male is unknown.

FIGURE 1: Figs. a), b). Spermatheca, (scale line 0.05 mm) a. Capensomyia subgen. nov. b. Sintonius.

Figs. c) - d). Male terminalia (scale line 0.1 mm) e. Capensomyia subgen. nov. d. Sintonius.
FEMALE: (figs. 1a, 1b) Length (excluding head) 1.95 mm. Wing length 2.51 mm; breadth 0.67 mm. Antennal segment 3 is 0.26 mm; ascoic length 0.065 mm, being 0.25 length of segment; c:b ratio 1.15. Antennal segment 4 is missing. Ascoic formula 2 / 3 / 2 - IV. Labrum 0.30 mm, segment 3 being (0.26) its length. Palpal formula 1, 2, 3, 4, 5.

Cibarium armed with an even row of 40 subequal pointed denticles anterior to these a row of fine punctiform dots. Pigment plate very dense, obscuring teeth. Pharynx armed with large curved denticles along its lateral margins; posteriorly armed with a row of large curved teeth, apex anterior to these very heavily striated with many ridges, and posterior to this row numerous elongate setae. Spermathecae (lateral transversely, not distinctly segmented).

Erect setae insertion scars on abdominal tergites II – VI respectively 4:1:4:7:15.

Material examined: September, Transkei, Bizana (30°50'S; 29°55'E) (February 1944) (SAIMR).

Discussion: Pharyngeal armature very like that of Sergentomyia drakensbergi spec. nov. but cibarial armature and ascoic formula will separate these two species. This species is only known from the type material.

Sergentomyia (Capenomyia) capensis (De Meillon, 1955) figs. 1, 5, 6.

Phlebotomus (Sinomitus) capensis De Meillon, 1955.


MALE: Unknown.

FEMALE: (figs. 1a, 2a, 2b) Length (excluding head) 1.79 – 2.03 mm. Wing length 1.87 – 1.94 mm; breadth 0.43 – 0.47 mm. Antennal segment 3 is 0.14 – 0.16 mm, being 0.24 – 0.26 length of segments 4 plus 5: ascoic length 0.026 – 0.028 mm, being 0.18 length of segment; c:b ratio 1.5 – 2.0. Antennal segment 4 is 0.09 – 0.10 mm, ascoic length 0.029 mm, being 0.31 length of segment; c:b ratio 2.07. Ascoic formula 2/3/1 – XV. Labrum 0.16 – 0.19 mm, segment 3 being 0.85 – 0.90 its length. Palpal formula 1, 2, 3, 4, 5. Mean ratio of segments 10:24:33:37:58.

Cibarium armed with a concave row of 7 – 9 irregularly placed large pointed denticles. No pigment plate or anterior row of spines. Pharynx ornate and armed (except in posterior) with one row of large curved teeth followed by two rows of large rounded teeth each with an elongate stout seta, the remaining area with large irregular shaped denticles bearing elongate setae. Spermatheca convoluted.


Type material: Holotype ♂ and 8 ♀ Paratype specimens, South Africa, Cape Province, Cape Peninsula, Hout Bay, Skoonkentop (34°3' S, 18°25'E) and 1 Paratype ♂, Cape Peninsula, Little Lions Head (33°55'S, 18°30'E).

Material examined: 1 Paratype ♂ (P1/34, 1963, 21.1.51; P1/54, 3959, 18.2.51; P1/34, 3952, 28.1.51) Data as for Holotype. (SAIMR Johannesburg).

Discussion: This species and Sergentomyia kaesel-barthi Abonnenc have been confused on previous occasions, but although cibarial armature is relatively weak in both species, pharyngeal armature, ascoic formula and distribution should separate the two species. This species is known only from the type material.

Sergentomyia (Capentomyia) drakensbergi spec. nov. figs. 1a, 1b, 3a, 4b.

MALE: (figs. 1a, 3a, 3b) Length (excluding head) 1.40 – 1.64 mm. Wing length 1.56 – 1.72 mm; breadth 0.34 – 0.38 mm. Antennal segment 3 is 0.13 – 0.15 mm, being 0.75 – 0.85 length of segments 4 plus 5; no ascoic present. Antennal segment 4 is 0.085 – 0.095 mm, longest ascoic 0.02 – 0.028 mm, being 0.23 – 0.29 length of segment; c:b ratio 2.1 – 2.7. Ascoic formula 2/IV – XV. Labrum 0.16 – 0.18 mm, segment 3 being 0.82 – 0.86 its length. Palpal formula 1, 2, 3, 4, 5. Mean ratio of segments 10:19:29:36:73.

Cibarium with 9 – 10 large elongate pointed denticles. Pigment plate small and lightly pigmented. Pharynx armed with a single row of large elongate and curved denticles, and posterior to these numerous irregular block-like denticles each with a very long pointed tooth.

Spermatheca convoluted 0.04 – 0.05 mm in length.

Erect setae insertion scars on abdominal tergites II – VI respectively 0:0 – 1:2 – 4:2 – 5:4 – 6.

MALE: (figs. 1c, 3c, 4b) Length (excluding head and terminalia) 1.17 – 1.64 mm. Wing length 1.56 – 1.72 mm; breadth 0.34 – 0.38 mm. Antennal segment 3 is 0.13 – 0.15 mm, being 0.7 – 0.8 length of segments 4 plus 5; no ascoic present. Antennal segment 4 is 0.090 – 0.095 mm, longest ascoic 0.022 – 0.024 mm, being 0.23 – 0.25 length of segments; c:b ratio 2.25 – 2.73. Ascoic formula 1/IV – XV. Labrum 0.14 – 0.16 mm, segment 3 being 0.9 – 1.10 its length. Palpal formula 1, 2, 3, 4, 5. Mean ratio of segments 10:18:25:34:68.

Cibarium armed with 2 rows of spiked denticles, irregular in size and length. Pigment plate large but indistinct. Pharynx armed with numerous irregular-
shaped large denticles each bearing many short spiculate spines.

Style 0.08 – 0.09 mm in length bearing 4 large spatulate tipped spines, 2 terminal and 2 sub-terminal. Cervix .16 – .18 mm. Paramere 0.14 – 0.13 mm long hooked terminally with 2 – 3 long stout setae and a number of finer ones. Aedeagus 0.08 – 0.12 mm in length, cone-shaped and rounded terminally. Genital pump 0.10 – 0.12 mm long, filaments 2.5 – 3.6 its length.

No erect sete insertion scars on abdominal tergites II – VI.

Material: Holotype ♀ (No. T1-1), 3 Paratypes ♀♂ (No. T1-2, 3, 4) and 7 Paratypes ♀♂ (No. T1-21, 3, 5, 7, 9, 31, 3), South Africa, N.E. Transvaal, Malta Forest, Selati River source (24°10'S; 30°10'E). Lesaba district ex Proca danae capensis (Pallas) rock holes in forested cliffs. (I. H. Davison, 13.1.77). (All material in SAIRM except 1 ♀ (No. T29) and 1 ♀ (No. T1-2) Paratype in BMNH).

Discussion: Pharyngeal armature of this species closely resembles Sergentomyia caffrarica De Meillon & Lencioni, but may be separated from this species on cibarial armature and aecid formula. It may be separated from Sergentomyia haeselbarthii Abonnenc which has the same aecid formula, on pharyngeal and cibarial armature.

Sergentomyia (Capensomyia) haeselbarthii (Abonnenc, 1967) figs. 1, 3, 7, 9, 10
Pithebacter (Prophilebacter) haeselbarthii Abonnenc, 1967
Pithebacter (Sergentomyia) haeselbarthii Abonnenc, 1972
Sergentomyia (Simionius) brioni Lewis, 1967

FEMALE: (figs. 1a, 2a, 2d) Length (excluding head) 1.92 – 2.12 mm. Wing length 1.79 – 2.12 mm; breadth 0.42 – 0.59 mm. Antennal segment 3 is 0.17 – 0.20 mm being .83 – .97 length of segments 4 plus 5; no aecid present. Antennal segment 4 is 0.69 – 0.11 mm, longest aecid 0.04 – 0.05 mm, being .4 length of segment; c/b ratio 1.25 – 1.4. Aecid formula 2/IV – XV. Labrum 0.18 – 0.24 mm. segment 3 being .75 – .95 its length. Pulpal formula 1,2,3,4,5. Mean ratio of segments 10:23:32:36:70.

Cibarium equipped with a row of punctiform denticles. Pigment plate absent. Pharynx (anterior-posterior) with 1 row of large curved short spines, 1 row of block-like denticles each with 3 – 6 short stout spiculate denticles, and numerous irregular block-shaped denticles armed with a few elongate scilate setae.

Sperrnathacea convoluted 0.04 – 0.05 mm in length. Erect sete insertion scars on abdominal tergites II – VI respectively 3 – 14:2 – 14.6 – 19.9 – 15.8 – 20.

MALE: (figs. 1c, 2a, 4b) Length (excluding head and terminalia) 1.32 – 1.80 mm. Wing length 1.56 – 1.88 mm; breadth 0.31 – 0.36 mm. Antennal segment 3 is 0.19 – 0.22 mm, being 3 – 9 length of segments 4 plus 5; no aecid present. Antennal segment 4 is 0.11 – 0.13 mm, longest aecid 0.03 – 0.045 mm, being .25 – .35 length of segment; c/b ratio 2.0 – 2.5. Aecid formula 1/IV – XV. Labrum 0.15 – 0.18 mm, segment 3 being 1.1 – 1.4 its length. Pulpal formula 1,2,3,4,5 or 1,2,4,3,5. Mean ratio of segments 10:19:29:28:57.

Cibarium: armature with a very convex anterior edge, provided with numerous scattered punctiform denticles. No pigment plate present. Pharynx armed with scattered ridges of spiculate setae.

Style 0.11 – 0.13 mm in length provided with 4 spines, 2 terminal and 2 sub-terminal. Cervix 0.26 – 0.28 mm. Paramere 0.18 – 0.22 mm in length, hooked apically with about 12 elongate stout setae along its upper surface. Aedeagus an elongate cone-shape with a rounded tip, 0.10 – 0.16 mm in length. Genital pump 0.16 – 0.18 mm long, filaments 3.4 – 5.4 its length.

FIGURE 2: Figs a, b. Sergentomyia capensis. ♀, a. pharynx & cibarium.
Figs. c, d. Sergentomyia haeselbarthii. c, ♀ pharynx & d, ♀ cibarium. e, ♀ male cibarium.
Fig. f. Sergentomyia caffrarica. ♀ cibarium. (Scale line 0.05 mm).
Material examined: Holotype ♀ (P1/59, SAIRM, originally labelled as Phelobatomus capensis de Meillon, see Abonnenc, 1967), South Africa, Cathedral Park (28°57' S; 29°12' E) (B. R. Steenkamp, 7.600 feet, March 1959); Para-type ♀ (P1/59, SAIRM), data as per Holotype: 1 ♀ (Paratype, Sergentomyia brantii Lewis), South Africa, Natal, Impelweni Valley (B. R. Steenkamp, 54.12' S, 24.11.62); 7 ♀, South Africa, Natal, Hills (29°55' S; 30°15' E) (L. G. Mason, May 1970); 4 ♀, South Africa, Natal, Giant's Castle Game Reserve (29°12' S; 29°30' E) (B. R. Steenkamp, 14.548, 8.60 feet); 4 ♀, South Africa, Natal, Zinkwazi, Dzezana Forest Nature Reserve, Eshowe (29°52' S; 31°30' E) (B. R. Steenkamp, 6.12.77, alt. 500 m ex bark of tree).

Discussion: Pharyngeal armature of this species and Sergentomyia capensis de Meillon are similar in some respects. However, differences in cibarial armature, ascod formula and ascod lengths are characteristic.

Sergentomyia (Capensorina) meerseri (de Meillon & Hardy, 1953) (figs. 1, 3, 14-16, 18)

Phelobatomus (Stinotus) meerseri de Meillon & Hardy 1953; de Meillon, 1955.

Phelobatomus (Propheleobatomus) meerseri, Abonnenc, 1967.


Phelobatomus (Sergentomyia) meerseri, Abonnenc, 1972.

FEMALE: (figs. 1a, 3d, 3c) Length (excluding head) 1.56 - 2.03 mm. Wing length 1.56 - 1.98 mm; breadth 0.45 - 0.60 mm. Antennal segment 3 is 0.13 - 0.20 mm, being 39 - 93 length of segments 4 plus 5; longest ascod 0.022 - 0.030 mm, being 14 - 20 length of segment; c/r ratio 1.6 - 3.2. Antennal segment 4 is 0.075 - 0.11 mm. Longest ascod 0.025 - 0.031 mm, being 27 - 38 length of segments; c/r ratio 1.9 - 2.6. Ascod formula 2/13 - XV. Labrum 0.16 - 0.21 mm. Segment 3 being 0.02 - 0.03, 1.05 length. Palpal formula 12-3-4-5. Mean ratio of segments 3:10:21:28:36:72. Cibarium armed with 15 - 18 sub-equal pointed denticles on a flat plane. Pigment plate triangular, lightly pigmented, Pharynx armed anteriorly to posteriorly with 1 row of large central curved denticles and 2 rows of large rounded denticles each equipped with a long spine; remaining posterior region armed with block-shaped denticles with fine setae. Spermathecae convoluted, 0.60 - 0.50 mm in length. No erect setae insertion scars on abdominal tergites II - VI.

MALE: (figs. 1c, 3, 4b) Length (excluding head and terminalia) 1.17 - 1.56 mm. Wing length 1.48 - 1.96 mm; breadth 0.32 - 0.48 mm. Antennal segment 3 is 0.15 - 0.20 mm, being 85 - 1.16 length of segments 4 plus 5; longest ascod 0.012 - 0.024 mm, being 0.08 - 1 length of segment; c/r ratio 2.54 - 3.83. Antennal segment 4 is 0.08 - 0.12 mm, longest ascod 0.019 - 0.028 mm, being 0.19 - 0.26 length of segment; c/r ratio 2.78 - 3.69. Ascod formula 1/13 - XV. Labrum 0.14 - 0.18 mm, segment 3 being 85 - 1.16, 6.7 length. Palpal formula 1:2:3:4:5. Mean ratio of segments 10:20:29:38:69. Cibarium armed with 12 - 14 very small pointed denticles. Pigment plate an indistinct blob shape. Pharynx anteriorly armed with large spike-like teeth, posteriorly lined with many fine setae.

Style 0.08 - 0.09 mm in length provided with 4 spines, 2 terminal and 2 sub-terminal. Cowrie, 19 - 20 mm. Paramere 0.16 - 0.17 mm in length hooked apically and provided with about 6 stout clavate setae and a few shorter ones along its upper surface. Aedeagus a short cone-shaped rounded apically. Genital pump 0.14 - 0.16 mm long. Filaments 2.7 - 3.0 mm length.

Discussion: Pharyngeal armature may initially confuse this species with Sergentomyia capensis de Meillon, but cibarial armature will separate the two species.

2.3 The namibensis species group

Sergentomyia (Capensorina) namibensis (de Meillon & Hardy, 1953) (fics. 1, 3, 17-20)

Phelobatomus (Stinotus) namibensis de Meillon & Hardy, 1953.


Phelobatomus (Propheleobatomus) namibensis, Abonnenc, 1967.

Phelobatomus (Sergentomyia) namibensis, Abonnenc, 1972.
FEMALE: (figs. 1a, 4a, 4c) Length (excluding head) 1.61 - 2.03 mm. Wing length 1.61 - 2.19 mm; breadth 0.35 - 0.62 mm. Antennal segment 3 is 0.14 - 0.19 mm being .84 - 1.07 length of segments 4 plus 5; longest ascid 0.025 - 0.032 mm, being .14 - .19 length of segment; c/b ratio 1.4 - 2.1. Antennal segment 4 is 0.085 - 0.10; longest ascid 0.029 - 0.037 mm being .32 - .41 length of segment; c/b ratio 1.45 - 2.10. Ascid formula 2/III - XV. Labrum 0.16 - 0.19 mm, segment 3 being .85 - 1.15 its length. Pulpal formula 1.2,3.4,5 or 1.2,(3.4),5. Mean ratio of segments 10:19:32:63:71.

Cibarium with 12 - 18 short pointed denticles plus an anterior row of stout punctiform denticles. Pigment plate large, lightly to heavily pigmented. Pharynx armed with many individual elongate spines

Spermatheca with many convolutions 0.04 - 0.045 mm in length.

Erect setae insertion scars on abdominal tergite II - VI respectively 5 - 24; 5 - 27; 6 - 20; 9 - 24.

MALE: (figs. 1c, 4b, 4d) Length (excluding head and terminalia) 1.32 - 1.96 mm. Wing length 1.56 - 1.88 mm; breadth 0.37 - 0.47 mm. Antennal segment 3 is 0.16 - 0.22 mm being .85 - 1.15 length of segments 4 plus 5; longest ascid 0.019 - 0.022 mm, being .09 - .13 length of segment; c/b ratio 1.89 - 2.87. Antennal segment 4 is 0.09 - 0.11 mm; longest ascid 0.02 - 0.027 mm being .22 - .28 length of segment; c/b ratio 2.15 - 2.9. Ascid formula I/III - XV. Labrum 0.15 - 0.18 mm, being 1.05 - 1.28 its length. Pulpal formula 1.2,3.4,5 or 1.2,(3.4),5. Mean ratio of segments 10:19:32:63:71.

Cibarium with 8 - 12 short pointed denticles and an anterior row of spicate denticles. Pigment plate large but lightly pigmented. Pharynx armed with numerous irregularly shaped denticles with numerous spines.

Style 0.10 - 0.14 mm in length equipped with 4 spatulate tipped spines, 2 terminal and 2 sub-terminal. Coxite 0.24 - 0.29 mm. Paramere 0.16 - 0.23 mm in length, hooked terminally with a number of elongate setiferous setae along its upper surface. Aedeagus 0.12 - 0.14 mm in length, cone-shaped with a rounded tip. Genital pump 0.12 - 0.16 mm long, its filaments 3.25 - 4.10 its length.

Erect setae insertion scars on abdominal tergite II - VI respectively 0 - 2.0 - 2.0 - 6.

Material examined: Holotype ♂ and Paratype ♀. South West Africa, Olijnberge (22°20'S; 16°10'E), Karabib district (23.5.30); 3 ♀♂ and 7 ♂♂; locality as per Holotype; 10 ♀♂ and 7 ♂♂, Kaokland, 3rd Heerawar crossing (18°16'S; 15°14'E), near Oosjo (C. H. Davidson, 17.4.77); 1 ♀, Kaokland, 60 miles W. Ohopoha; 5 ♀♂, South West Africa, farm ‘Sandmodder’ (26°33'S; 18°55'E), Karasburg mountains (J. Ledger, 10.4.73); 1 ♀, South West Africa, farm "Waldsee" (27°S; 17°18'E), Bethanie district (L. H. Davidson, 26.3.76). Type material SAIMR.

Discussion: Collected in the Kaokland from the ground burrows of Xerus praecepis (Thomas), the Kaokland Ground Squirrel, and in the South from rock holes and at light in predomionantly rocky or montane type habitat. Pharyngeal armature of this species, Sergentomyia kalaharica spec. nov. and Sergentomyia xera spec. nov. are more or less identical. The cibarial teeth of this species are shorter, more compact and placed on a flatter plane than the latter two species. There is an overlap in measurements between Sergentomyia kalaharica spec. nov. but cibarial armature and typical habitat separate these two species.

Sergentomyia (Cepenomyia) kalaharica spec. nov. figs. 1a, 1c, 4a, 4b, 5a, 5b

FEMALE: (figs. 1a, 4a, 5c) Length (excluding head) 1.48 - 1.72 mm. Wing length 1.48 - 1.72 mm; breadth 0.34 - 0.41 mm. Antennal segment 3 0.12 - 0.15 mm, being .85 - .90 length of segments 4 plus 5; longest ascid 0.025 - 0.035 mm, being .19 - .21 length of segment; c/b ratio 1.5 - 1.9.
Antennal segment 4 is 0.065 - 0.080 mm, longest ascoid 0.027 - 0.035 mm being .40 - .45 length of segment; c/b ratio 1.4 - 1.7. Ascoid formula 2/III - XV. Labrum 0.15 - 0.18 mm, segment 3 being .75 - .90 its length. Palpal formula 1.2,3,4,5 or 1.2,3,4,5,6 or 1.3,4,5. Mean ratio of segments: 10:16:29:28:57.

Cibarium with 7 - 11 large elongate pointed denticles plus an anterior row of punctiform denticles. Pigment plate dark, bean seed-shaped, obscuring 4 - 5 denticles. Pharynx armed with large irregular-shaped denticles bearing spicules and short spine-like sciae. Spermathecae with numerous convolutions 0.04 - 0.05 mm long, the spermathecal ducts concentrically striated.

Erect sciae insertion scars on abdominal tergites II - VI respectively 5 - 9,3 - 5,6 - 8,6 - 12,7 - 13.

MALE: (figs. 1c, 4b, 5b) Length (excluding head and terminalia) 1.09 - 1.34 mm. Wing length 1.40 - 1.56 mm; breadth 0.28 - 0.35 mm. Antennal segment 3 is 0.15 - 0.18 mm, being .85 - .93 length of segments 4 plus 5; longest ascoid 0.016 - 0.028 mm, being .10 - .16 length of segment; c/b ratio 1.9 - 2.6. Ascoid segment 4 is 0.085 - 0.099 mm longest ascoid 0.023 - 0.029 mm being .27 - .31 length of segment; c/b ratio 2.1 - 2.4. Ascoid formula 1/III - XV. Labrum 0.13 - 0.16 mm, segment 3 being 1.0 - 1.2 its length. Palpal formula 1.2,3,4,5 or 1.2,3,4,5,6 or 1.2,4,4,3,5. Mean ratio of segments: 10:18:29:28:65.

Cibarium armed with 6 - 9 large irregularly shaped denticles, apically bearing numerous spicules, plus an anterior row of punctiform denticles. Pigment plate not apparent. Pharynx armed with large irregularly shaped denticles bearing numerous spicules.

Style 0.09 - 0.12 mm long equipped with 4 spathulate tipped spines, 2 terminal and 2 sub-terminal. Coxite 0.2 - 0.22 mm. Paramere 0.16 - 0.19 mm long, hooked terminally and equipped with a number of very long stout setae along its length. Aedeagus an elongated cone with a rounded tip, 0.10 - 0.13 mm long. Genital pump 0.14 - 0.16 mm long, its filaments 3.1 - 4.5 its length.

Sixth abdominal tergite darker than remaining tergites, pitted with many circular indentations with very few recumbent setae insertion scars. No erect setae insertion scars on abdominal tergites II - VI.

Material examined: Holotype ♂ (No. KN10-82), South Africa, Northern Cape Province, Kalahari Gemsbok National Park, Nossob Camp (25°15'S; 15°30'E) (L.H. Davidson, 25.2.77); 2 Paratypes ♀ (No. KT7-83/4), South Africa, Northern Cape Province, Kalahari Gemsbok National Park, 5 miles N. Rooiputs (20°10'S; 20°30'E) (H. Davidson, 24.2.77); 1 Paratype ♂ (No. 81), South Africa, Northern Cape Province, Kalahari Gemsbok National Park; 1 Paratype ♀ (No. NDP52A-94) and 2 Paratypes ♂ (No. NDP52A-161, 165), South West Africa, Namib Desert Park, Zebra Pan (23°26'S; 18°45'E) (H. Davidson, 29.4.77); 3 Paratypes ♀ (No. SL22-173/4/5), South West Africa, farm 'MacKenzie' (23°26'S; 18°45'E), Leonardville (H. Davidson, 1.3.77); All material in SAIMR except 1 Paratype ♂ (No. SL22-173) and 1 Paratype ♀ (No. KT7-84) in BMNH.

Discussion: This species and Sergentomyia xera spec. nov. would appear to be very closely associated with Xerus inarius (Zimmermann), the Cape Ground Squirrel. In one locality, the Namib Desert Park, both species were collected from the same burrows indicating that these two species are sympatric, at least over some of their range. Cibarial and pharyngeal armature of both species is very similar, the shapes of the pigment plates being different. Antennal segments 3 and 4 and their ascoids differ markedly in their lengths.

Sergentomyia (Cepenomyia) xera spec. nov. Figs. 1a, 1e, 4a, 4b, 5c, 5d.

FEMALE: (figs. 1a, 4a, 5c) Length (excluding head) 1.56 - 2.03 mm. Wing length 1.79 - 2.19 mm; breadth 0.45 - 0.57 mm. Antennal segment 3 is 0.21 - 0.26 mm being 1.0 - 1.1 length of segments 4 plus.
5; longest asccid 0.045 – 0.055 mm being .18 -.28 length of segment; c/b ratio 1.2 – 1.45. Antennal segment 4 is 0.10 – 0.125 mm; longest asccid 0.030 – 0.060 mm being .40 -.57 length of segment; c/b ratio 1.3 – 1.55. Asccid formula 2/III – XV. Labrum 0.17 – 0.21 mm, segment 3 being 1.1 – 1.35 its length. Palpal formula 1,2,3,4,5 or 1,2,3(4),5 or 1,2,4,3,5. Mean ratio of segments 10:18:32:33:77.

Cibarium equipped with 6 – 11 large elongate pointed denticles plus an anterior row of a few punctiform denticles. Pigment plate triangular in shape, lightly pigmented. Pharynx armed with many spiculate denticles.

Spermathecae with many convolutions 0.05 – 0.06 mm in length.


MALE: (figs. 1c, 4b, 5d) Length (excluding head and terminalia) 1.25 – 1.72 mm. Wing length 1.56 – 1.88 mm; breadth 0.28 – 0.35 mm. Antennal segment 3 is 0.23 – 0.29 mm being .9 – 1.1 length of segments 4 plus 5; longest asccid 0.04 – 0.055 mm, being .18 – .19 length of segments; c/b ratio 1.5 – 2.0. Antennal segment 4 is 0.11 – 0.15 mm; longest asccid 0.045 – 0.055 mm, being .32 – .40 length of segment; c/b ratio 1.7 – 1.95. Asccid formula 1/III – XV. Labrum 1.4 – 1.6 mm, segment 3 being 1.6 – 2.0 its length. Palpal formula 1,2,3,4,5 or 1,2,3(4),5 or 1,2,3,4,3,5. Mean ratio of segments 10:18:32:33:76.

Cibarium armed with 7 – 8 teeth, most with several points, and an anterior row of punctiform denticles. Pigment plate indiscernible or not apparent. Pharynx armed with irregular-shaped denticles bearing numerous spicules.

Style 0.11 – 0.13 mm in length is equipped with 4 spatulate tipped spines and 2 terminal and 2 sub-terminal; Conix 0.25 – 0.28 mm; Paramere is 0.22 – 0.26 mm in length with a hooked tip and a number of elongate strong setae arising along its ventral surface; Aedeagus 0.12 – 0.13 mm long is an elongated cone-shape with a rounded tip; Genital pump 0.15 – 0.18 mm long, filaments 2.9 – 3.5 its length.

Erect setae insertion scars on abdominal tergites II – VI respectively 4 – 8:2 – 5:0 – 4:0 – 2:0.

Material examined: Holotype ♀ (No. NDPS2A–90), South West Africa, Namib Desert Park, Zebra Pan (23°15’S; 15°30’E) (I. H. Davidson, 29.4.77); 6 ♀ ♀ Paratype (No. NDPS2A–92/3, 95–98) and 9 Paratype ♂ (No. NDPS2A–162–168, 170/2); data as per Holotype; 1 Paratype ♂ (No. 91) and 1 Paratype ♂ (No. 171), South West Africa, Cobabas (22°25’S; 18°55’E) (13 and 22.3.71). 43 ♀ ♀ specimens not designated, locality as per Holotype. All ex Xeros inaurus (Zimmermann) ground burrows. All in SAIMR except 1 ♂ Paratype

(Figures 5: a), b). Sergentomyia kalahariae spec. nov. a. ♀ cibarium. b. male cibarium.
Figs. c), d). Sergentomyia sera spec. nov. a. ♀ cibarium. d. male cibarium. (scale line 0.05 mm)

(No. NDPS2A–162) and 1 ♀ Paratype (No. NDPS2A–92) in BMNH.

Discussion: See under Sergentomyia kalahariae spec. nov.

This species name is taken from the generic name of its host species (Xeros inaurus) which is derived from the Greek word Xeros meaning dry or arid;

2.4 Key to species

FEMALES:

1. Pharynx 3 – 5 times as broad posteriorly as anteriorly, very elaborately and ornately armed; Eastern species of Southern African sub-continent (cafferica species group) ...
   - Pharynx as above; Western species of Southern African sub-continent (namibensis species group) ...

2. Asccid formula 2/IV – XV ...
   - Asccid formula 2/III – XV ...

3. Ascacid IV = 0.04 – 0.05 mm; c/b IV = 1.25 – 1.4 ....... haseelharthi (Abonnenc, 1967)
   - Ascacid IV = 0.02 – 0.028 mm; c/b IV = 2.1 – 2.7 ....... drakensbergi spec. nov.
4. AlI = 0.26 mm; Ascoid III = 0.065 mm; cibarium with 40 sub-equal teeth. 
   *cafraria* (De Meillon & Lavoipierre), 1944
   
   - Not as above ........................................ 5

5. Cibarium with 15 – 19 sub-equal pointed denticles on a flat plane; AlIV = 0.075 – 0.11 mm; 
   AlII/AlIV + V = .79 – .93. 
   *meeseri* (De Meillon & Hardy), 1953
   
   - Cibarium with 7 – 9 irregularly placed large pointed denticles on a convex arch; AlIV = 0.090 – 0.10 mm; 
     AlII/AlIV + V = .74 – .8. *capensis* (De Meillon), 1955

6. AlI = 0.21 – 0.26 mm; Ascoid III = 0.045 – 0.055 mm; Ascoid IV = 0.05 – 0.06 mm ............ xera spec. nov.
   - Not as above ........................................ 7

7. Cibarium with 12 – 18 short pointed denticles; AlIV = 0.08 – 0.10 mm; Asc IV/AlIV = 32 – 41 mm 
   *nambensis* (De Meillon & Hardy), 1953
   
   - Cibarium with 7 – 11 large elongate pointed denticles; AlIV = 0.065 – 0.08 mm; Asc IV/AlIV = 0.4 – 0.45 
     *kalakarla* spec. nov.

**MALES:**

1. Ascoid formula 1/IV – XV .............................. 2
   
   - Ascoid formula 1/III – XV ............................ 3

2. AlI = 0.19 – 0.22 mm; AlIV = 0.11 – 0.13 mm 
   *kaeselbarti* (Abonnece), 1967
   
   - AlI = 0.13 – 0.15 mm; AlIV = 0.09 – 0.095 mm .............. drakensbergi spec. nov.

3. AlI = 0.23 – 0.29 mm; Asc III = 0.04 – 0.055 mm; AlII/E = 1.6 – 2.0 mm ............ xera spec. nov.
   - Measurements less than above .......................... 4

4. AlII/E = .85 – 1.16; c/b IV = 2.78 – 3.69; 
   AlII/AlIV + V = .77 – .87; c/b III = 2.54 – 3.83 
   *meeseri* (De Meillon & Hardy), 1953
   
   - AlII/E = 1.0 – 1.3; c/b IV = 2.1 – 2.9; AlII/ 
     AlIV + V = .85 – 1.15 mm; c/b III = 1.89 – 2.67. 
     *nambensis* (De Meillon & Hardy), 1953

5. AlIV = 0.09 – 0.11 mm; Cibarium with 8 – 12 short pointed denticles 
   *nambensis* (De Meillon & Hardy), 1953
   
   - AlIV = 0.085 – 0.095 mm; Cibarium with 6 – 9 
     irregular-shaped denticles apically bearing numerous 
     spicules. *kalakarla* spec. nov.

**FEMALE:** (figs. 1b, 6a, 6b) Length (excluding head) 1.87 – 2.19 mm. Wing length 1.97 – 2.55 mm; 
breast 0.54 – 0.68 mm. Antennal segment 3 is 
0.28 – 0.35 mm, being 1.01 – 1.16 length of segments 4 plus 5; ascoid length 0.03 – 0.045 mm, being 
0.10 – 0.15 length of segment; c/b ratio 1.7 – 2.5. Antennal segment 4 is 0.13 – 0.16 mm; ascoid length 
0.035 – 0.043 mm, being 0.2 – 0.3 length of segment; 
C/b ratio 2.56 – 3.4. Ascoid formula 2/III – XV. 
Labium 0.23 – 0.28 mm, segment 3 being 1.15 – 1.35 its length. Palpal formula 1,2,3,4,5. Mean ratio 

Cibarium armed with a row of 13 – 17 elongate pointed denticles placed on a slightly convex plane, plus an 
 anterior row of peniform denticles. Pigment plate large, mushroom-shaped, heavily pigmented. Pharynx 
narrowed anteriorly to its anterior wth and armed lightly with ridges of spinulate denticles.

Spermatheca with 9 – 14 segmentationes 0.04 – 0.045 mm long.

Erect setae insertion scars on abdominal tergites II – VI respectively 12 – 29/8 – 28; 9 – 25.6 – 18; 2 – 8.

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*Phlebotomus (Sintonius) meylloni* Sinton, 1932; *Phlebotomus (Prosphlebotomus) meylloni* Abonnece, 1967.

*Phlebotomus (Sergentomyia) meylloni* Abonnece, 1972.

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*Sergentomyia (Sintonius) meylloni* (Sinton, 1932) figs. 2, 4, 25–27

MALE: (figs. 1d, 6c) Length (excluding head and terminalia) 1.48 — 2.19 mm. Wing length 2.03 — 2.44 mm; breadth 0.54 — 0.58 mm. Antennal segment 3 is 0.33 — 0.42 mm, being 0.61 — 0.63 length of segments 4 plus 5; ascoid length 0.02 — 0.035 mm, being 0.3 — 0.36 length of segment; c/o ratio 2.6 — 6.3. Antennal segment 4 is 0.16 — 0.21 mm, ascoid length 0.023 — 0.035 mm, being 0.14 — 0.20 length of segment; c/o ratio 4.0 — 7.4. Ascoid formula 1/III — XV. Labrum 0.2 — 0.26 mm, segment 3 being 1.45 — 1.69 its length. Palpal formula 1.23.4.5. Mean ratio 10:30:46:38:103.

Clypeus armed with 8 — 14 square denticles each provided with a number of spicules posteriorly. An anterior row of punctiform denticles is present. Pigment plate small but dense. Pharynx narrowed posteriorly to its anterior width and armed very lightly with ridges of spinulose denticles.

Style 0.11 — 0.14 mm in length provided with 4 spines, 2 terminal and 2 sub-terminal; Coxite 0.24 — 0.28 mm; Paramere 0.18 — 0.22 mm in length, hooked terminally, its dorsal surface bearing many short setae; Ascagus 0.06 — 0.08 mm long, a very short pointed cone-shape; Genital pump 0.11 — 0.16 mm long, filaments 3.6 — 5.2 its length.

Erect setae insertion scars on abdominal tergites II — VI respectively 4 — 11;3 — 9;0 — 5.0 — 4.0.

Type designation: Sitton (1932) designated from 4 ♀ ♂ and 7 ♀ ♂ from the same locality 1 type ♂ and 3 Paratype ♀ ♂ as well as 1 type ♂ and 3 Paratype ♂ ♂ specimens. The Paratype preparations are however labelled as co-types. The material is distributed as follows: BMNH, 1 ♂ type, 1 ♂ co-type, + 2 ♂ ♂ not designated; SAMR, 1 ♂ co-type and 1 ♂ not designated. The remainder of the designated material is assumed to be lost. As first reviser it is my prerogative to designate the type ♂ (BMNH) as Holotype and the 2 remaining co-type ♂ ♂ as Paratypes.

Material examined: (Measurements taken from 10 of each sex). 1 ♂ (co-type), South Africa, North Eastern Transvaal, Lettisiele, Tzaneen (De Meillon, 1.3.32); 1 ♂, data as per co-type; 5 ♀ ♂ and 44 ♂ ♂; South Africa, North Eastern Transvaal, farm "Jaffray", 6 miles Tzaneen (H. Davidson, 18 — 21.11.77); 12 ♀ ♂ and 10 ♀ ♂; South Africa, North Eastern Transvaal, farm "Hope", Padabaowra (B. McIntosh, January 1977, 23/6.2.77); 1 ♂ and 1 ♀ ♂; South Africa, Lebowa, Rooipoort (24°11'S, 30°E) (H. Davidson, 19.11.77); 2 ♀ ♂ and 19 ♂ ♂; South Africa, N. Transvaal, Leuwvlei (22°48'S, 20°53'E) (D. L. Theron, 22.4.76); 1 ♂ and 4 ♀ ♂; South Africa, Transvaal, farm "Kraalplaat", Ongeboorpoort (B. McIntosh, January 1977, 9.12.75); 2 ♀ ♂; South Africa, N. Transvaal, farm "Cleavesley", Elim Hospital (E. Navill, 14.2.72); 1 ♂; South Africa, E. Transvaal, farm "Ludwicks Lust", Heilbron; 4 ♀ ♂ and 10 ♂ ♂; South Africa, N. Transvaal, Letaba, Mamitwana (D. L. Theron, 28.2.75); 1 ♂ and 5 ♀ ♂; South Africa, E. Transvaal, Modjadji, Madumeleane (D. L. Theron, 26.11.74); 1 ♂, South Africa, N. Transvaal, Sibuya Area, Matangari (B. De Meillon, 23.10.74); 1 ♂, South Africa, Letaba District, Manyonza; 1 ♂, South Africa, Hlabeni, Modjadji (D. L. Theron, 27.11.74); 1 ♂ and 4 ♀ ♂; Swaziland, Craydon (9.3.49); Swaziland, Mbabane (Mausibum); 1 ♀; Mozambique, Quelimane, Agua Quentes (3.6.40); 1 ♂ and 1 ♀; Rhodesia, Salisbury, Cranleigh Park (28.1.46); 1 ♂ and 6 ♂ ♂; Rhodesia, Salisbury, Cranleigh Park and Umfil, farm "Raheen" (1946 — 1949); 5 ♀ ♂ and 6 ♀ ♂; Rhodesia, "Raheen", Umfil; 1 ♂; South West Africa, Windhoek (P. Ziebe, 6.3.70).

Discussion: The only species of true Sittonius known in southern Africa. Habitat preference is rather difficult to analyse in view of the fact that a large number of the specimens have been caught at light. Some specimens collected by myself have been from rock holes in otherwise flat sandy grassed areas to Afromontane mountains areas surrounded by high cliffs.

3 ACKNOWLEDGEMENTS

Thanks are due to the following persons for providing material and assistance in various ways making possible this publication: Dr. B. McIntosh, Arboirus Research Institute; Dr. C. F. Hanford and R. Melawinsh, Siegfried Amecke Institute, Tzaneen; Deryck Day, the Director of the National Parks Board, Pretoria, for issuing of permits to collect in some of their parks; the Director of the South West Africa Administration, Nature Conservation Division, Windhoek and the following persons in his employ, J. Leesing, R. de Bruijn, D. Clarke, F. Burger and J. Dixon; E. Vilbert and L. van der Merwe, Public Health Department, Ovamboland and Kaokoland respectively.

I also thank Dr. David Lewis and John Ladger for their assistance and constructive criticism of this paper. This work was supported in part by a grant from the South African Medical Research Council.

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