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Lerheimia, a new genus of Orthocladiinae from Africa

(Diptera, Chironomidae)

By **Trond Andersen** and **Ole A. Sæther**

Andersen, T. & O. A. Sæther (1993): *Lerheimia*, a new genus of Orthocladiinae from Africa (Diptera, Chironomidae). - Spixiana **16/2**: 105-112.

The genus *Lerheimia* is erected for three new species from Tanzania, and *Smittia wulfi* Freeman, 1956, from Zaire. The genus is easily separable from other orthoclads by having bare, protruding eyes; strongly produced costal extension; strongly downcurved anal vein; bare squama; reduced palps; 2 weak median acrostichals; reduced sternapodeme and small triangular anal point. The male imago of *L. scopulata*, spec. nov., *L. villangulata*, spec. nov., *L. aviculata*, spec. nov., and *L. wulfi* (Freeman), comb. nov. are described. The genus appears to belong in the *Parakiefferiella* group of genera, but shows some similarities also with *Pseudosmittia* Goetghebuer.

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Introduction

During an expedition by the Museum of Zoology, University of Bergen, to locations in the evergreen forests in the West Usambara mountains, NE Tanzania in the autumn of 1990, several interesting new genera and species of chironomids were collected together with a few genera new to the African continent (Andersen & Sæther in press a, in press b, Sæther & Andersen in press a, in press b, Sæther & Wang 1992). The field work, which included an extensive use of Malaise traps and sweep net, was mainly executed in the Mazumbai Forest Reserve in the eastern part of the West Usambara Mts. In addition, samples obtained from the same area by a Malaise trap operated in spring 1991 were added to the material. A thorough description of the vegetation in the Usambara Mts is given by Iversen (1991). Our Malaise trap localities along the Kaputu Stream near Mazumbai is described in Andersen & Johanson (in press).

Three new species, although differing significantly in the hypopygia, appeared to belong in the same genus based on other features. One of us (O. A. S.) presently is revising the genus *Pseudosmittia* Goetghebuer together with L. C. Ferrington jr., Lawrence, Kansas. The species *Pseudosmittia wulfi* (Freeman) originally described in *Smittia* Holmgren showed to be congeneric with the three species.

The expedition to Tanzania as well as the institutes involvement in other African projects would not have been possible without the support, advise and encouragement of Magne Lerheim, formerly director general of the University of Bergen, head of the Norwegian Agency for International Development (NORAD) in Tanzania from 1981 to 1984 and presently special adviser to the University director general, University of Bergen. We take the pleasure of naming the new genus after him.

Methods and terminology

The material examined were mounted on slides following the procedure of Sæther (1969). The general terminology follows Sæther (1980). The measurements are given as ranges followed by a mean when four or more measurements are made, followed by the number measured (n) in parentheses.

The types of *L. scopulata*, spec. nov., *L. villangulata*, spec. nov. and *L. aviculata*, spec. nov. are in the Museum of Zoology, University of Bergen, Norway (ZMBN).

Lerheimia, gen. nov.

Type species: *Lerheimia scopulata*, spec. nov. by present designation. Other included species: *Lerheimia aviculata*, spec. nov., *L. villangulata*, spec. nov., *L. wulfi* (Freeman, 1956: 354).

Diagnostic characters. - The strongly extended costa combined with a downcurved anal vein and protruding eyes are unique among chironomids. Other very characteristic features include the short antennal ratios with sensilla chaetica on flagellomere 3 and 13 only, but very long; the short palpal segments; reduced median lobes of antepronotum; 2 median acrostichals, reduced sternapodemes and anal point short, hairy, and triangular and placed high on tergite IX.

Etymology. - Named in honor of Magne Lerheim, former director general of the University of Bergen, see introduction.

Description

Small species with wing length of about 0.8-1.3 mm.

Eyes bare, strongly protruding, without dorsomedial elongation. Temporal setae consisting of weak inner verticals and occasionally 1-2 weak to strong outer vertical or postorbital. Tentorium and stipes normal. Palp 5-segmented, segments reduced. Third palpal segment with few long lanceolate sensilla clavata. Antennae of male with 12-13 flagellomeres, basal flagellomere long, antennal ratio lower than 0.65, antennal grove starting on flagellomere 3, flagellomeres 2 and 13 with very long sensilla chaetica, apex without straight apical setae.

Antepronotum with median lobes reduced and separated, with 1 lateral setae. Dorsocentrals few, acrostichals 2 in median less sclerotized field, prealars few, supraalars absent. Scutellum with few setae.

Wing with very fine punctation of microtrichia, anal lobe absent or reduced. Costa strongly extended; R_{2+3} running in the middle between R_1 and R_{4+5}, ending close to R_{4+5}; R_{4+5} ending above to well proximal of end of M_{3+4}; Cu_1 curved to sinuate; FCu far distal to RM; postcubitus extending beyond FCu; anal vein extending to FCu, then sharply downcurved at apex. Brachiolum with 1 setae, other veins bare. Squama bare. Sensilla campaniformia about 8 on base of brachiolum, 3 below seta, and about 8 at apex of brachiolum; 1 at base of subcosta; 1 on FR and 1 at base of R_1.

Tibial spurs of front, middle and hind leg normal. Pseudospurs and sensilla chaetica absent, at least in *L. wulfi*. Pulvilli small or absent.

Tergites with very few setae in anterior and posterior transverse rows.

Tergite IX of male with short, triangular anal point placed high on tergite, with setae and microtrichia; laterosternite IX with few setae. Sternapodeme occasionally absent, when present oral projection absent or weak and lateral sternapodeme far lateral; coxosternapodeme indistinct or absent; phallapodeme normal. Virga apparently consisting of single spine with sclerotized base and sometimes margins of penis cavity. Gonocoxite with well developed highly variable inferior volsella. Gonostylus with dense brush of setae or several long scattered setae on inner margin; megasetae well developed.

Female, pupa and larva unknown.

Systematics

The new genus shows a number of features not common among orthoclads. Protruding eyes are found in *Nanocladius* Kieffer, *Lopescladius* Oliveira, and to some extent in *Gymnidocladius* Sublette & Wirth. An equally long extension of costa is found only in *Compterosmittia* Sæther, *Stilocladius* Rossaro, some *Smittia* Holmgren, and *Rheosmittia* Brundin, while nearly equally long extension is present in *Tavastia* Tuiskunen, some *Thienemannia* Kieffer and *Krenosmittia* Thienemann & Krüger. Reduced palp

with 5 segments otherwise is found in *Acricotopus* Kieffer, *Lapposmittia* Thienemann, *Corynoneura* Winnertz and some *Abiskomyia* Edwards and *Chasmatonotus* Loew. Two median acrostichals are found in *Synorthocladius* Thienemann, *Heterotanytarsus* Spärck, *Nanocladius* Kieffer, *Mesocricotopus* Brundin, *Vivacricotopus* Schnell & Sæther, *Unniella* Sæther, *Stilocladius* Rossaro, *Diplosmittia* Sæther, and most *Pseudosmittia* Goetghebuer. An anal point originating in the middle of tergite IX, not at posterior margin is found in *Paralimnophyes* Brundin, *Boreosmittia* Tuiskunen, *Lindebergia* Tuiskunen, and in those *Pseudosmittia* which have an anal point. The absence of setae on the squama and the curved to sinuate Cu_1 exclude some of the above mentioned genera as possible relatives. The most likely position of *Lerheimia* is in the *Parakiefferiella* group of genera. However, the immatures are needed for a more precise evaluation.

Key to the male imagines of genus *Lerheimia*, gen. nov.

1. Gonostylus with scattered, long setae on inner margin; inferior volsella reticulate, resembling a small bird in shape; wing with indication of anal lobe; R_{4+5} ending above M_{3+4}; Cu_1 sinuate ..... *L. aviculata*, spec. nov.
– Gonostylus with dense brush of setae; inferior volsella single or with setal brush on accessory lobe; wing cuneiform; R_{4+5} ends slightly to well proximal of M_{3+4}; Cu_1 curved, but not sinuate ..... 2.
2. Gonostylus with basal brush of dense setae separated from an apical brush; accessory lobe of inferior volsella with brush of setae; AR 0.25 ..... *L. wulfi* (Freeman), comb. nov.
– Gonostylus with single group of setae; inferior volsella single; AR 0.30 or 0.65 ..... 3.
3. Gonostylus large, triangular with outer heel; AR about 0.65; R_{4+5} ends slightly proximal of end of M_{3+4}. ..... *L. villangulata*, spec. nov.
– Gonostylus normal; AR about 0.3; R_{4+5} ends above the middle between R_1 and M_{3+4}. ..... *L. scopulata*, spec. nov.

Lerheimia scopulata, spec. nov.

Figs 1a-c, 2a, 3a

Type locality: TANZANIA, Tanga region, West Usambara Mts, Mazumbai.

Type material: Holotype ♂, TANZANIA, Tanga region, West Usambara Mts, Mazumbai, Kaputu Stream, Malaise trap loc. 10, 1420 m a.s.l., XII.1990, ZMB's Tanzania Expedition (ZMBN No. 152). - Paratypes: 1♂ as holotype; 2♂♂ as holotype except loc. 7, 1535 m a.s.l., 4-13.XII.1990, and 1-8.VII.1991.

Diagnostic characters - (see key).

Etymology - From the Latin *scopula*, small broom, and the suffix *-atus* meaning provided with, referring to the dense brush of setae on the gonostylus.

Description

Male imago (n = 3-4, except when otherwise stated) - Total length 1.11-1.46, 1.25 mm. Wing length 0.84-0.96 mm. Total length / wing length 1.34-1.52. Wing length / length of profemur 2.87-3.23. Coloration brown with conspicuously pale shoulders.

Head (Fig. 1a). Antenna with 12 or 13 segments. AR 0.29-0.33. Ultimate flagellomere 99-122 µm long. Temporal setae consisting of 3-4, 4 inner verticals and 0-1, 0 outer vertical. Clypeus with 2-4 setae. Tentorium 90-91 µm (2) long, narrow, nearly parallel-sided, 11 µm (2) wide. Stipes 50-53 µm (2) long, 18 µm (1) wide. Palp segments lengths in µm: 11-16, 13; 16-23, 20; 23-28, 25; 24-27, 26; 30-41. Third palpal segment with 1-2 lanceolate 16 µm (2) long sensillum clavatum (Fig. 1b).

Thorax (Fig. 1c). Antepronotum with 1 lateral seta. Dorsocentrals 4-7, 5; prealars 3-4, 3. Scutellum with 2 setae.

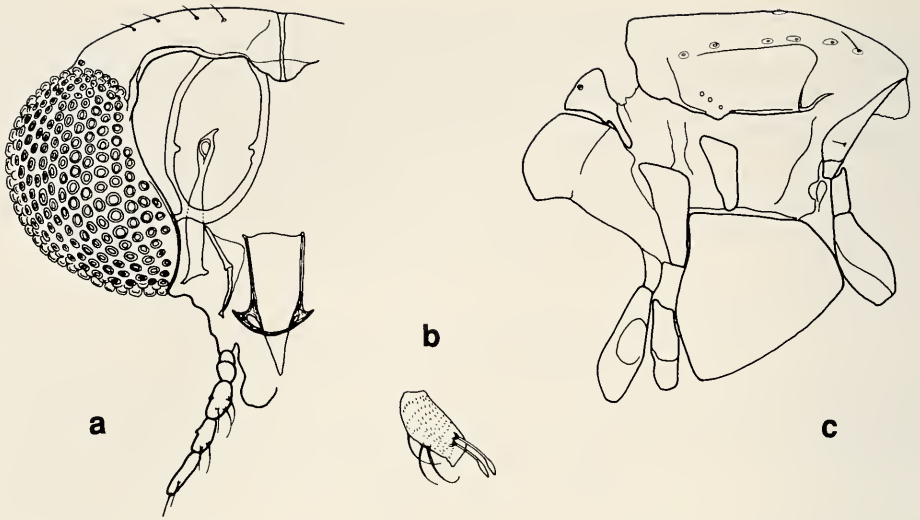

Fig. 1. *Lerheimia scopulata*, gen. nov., spec. nov., ♂. a. Head. b. Third palpal segment. c. Thorax.

Wing (Fig. 2a). VR 1.44-1.5 1 . No anal lobe, wing cuneiform. Costal extension 101-123 µm long. R_{4+5} ends above middle of distance between end of Cu_1 and end of M_{3+4}; Cu_1 curved but not sinuate.

Legs. Spur of front tibia 21-23, 22 µm long; spurs of middle tibia both 11-18 µm; of hind tibia 26-34 µm and 11-15 µm. Width at apex of front tibia 16-19 µm; of middle tibia 19-21 µm; of hind tibia 23-26, 24 µm. Hind tibial comb of 9-11, 10 setae; 16-30 µm long. Small pulvilli apparently present. Lengths (in µm) and proportions of legs (n = 1-2 of tarsi and ratios):

	fe	ti	ta_1	ta_2	ta_3	ta_4	ta_5	LR	BV	SV	BR
p_1	284-297, 289	347-378, 359	180	104-113	76-77	43-45	33-36	0.51-052	3.02-3.20	3.53	2.7
p_2	359-423	369-457	142-146	71-76	57-61	33-38	24-28	0.38	4.21-4.40	5.10-5.13	3.0
p_3	326-342, 332	360-423, 384	156	85	85	38	33	0.41	3.55	4.52	3.3

Hypopygium (Fig. 3a). Anal point 13-23, 19 µm long with 6-8, 7 lateral setae; laterosternite IX with 1-2, 1 setae. Phallapodeme 53-73, 63 µm long. Transverse sternapodeme 50-53, 52 µm long. Virga 26-41, 35 µm long. Gonocoxite 114-124, 118 µm long, with large, single inferior volsella. Gonostylus 59-69, 61 µm long, with dense brush of equally long setae along inner margin; megaseta 8-13, 10 µm long. HR-1.73-2.07, 1.95, HV 1.85-2.43, 2.04.

Lerheimia villangulata, spec. nov.

Figs 2b, 3b

Type locality: TANZANIA, Tanga region, West Usambara Mts, Mazumbai.

Type material: Holotype ♂, TANZANIA, Tanga region, West Usambara Mts, Mazumbai, 1740 m a.s.l., 4.XI.1990, sweep net, ZMB's Tanzania Expedition (ZMBN No. 153).

Diagnostic characters - (see key).

Etymology - From the Latin *villus*, tuft of hair, and *angulatus*, with angle, referring to the hairy, triangular gonostylus.

Description

Male imago (n = 1) - Total length 1.72 mm. Wing length 1.19 mm. Total length / wing length 1.45. Wing length / length of profemur 3.06. Coloration brown with pale shoulders and parts of anepisternum. Abdomen brown with pale gonostylus.

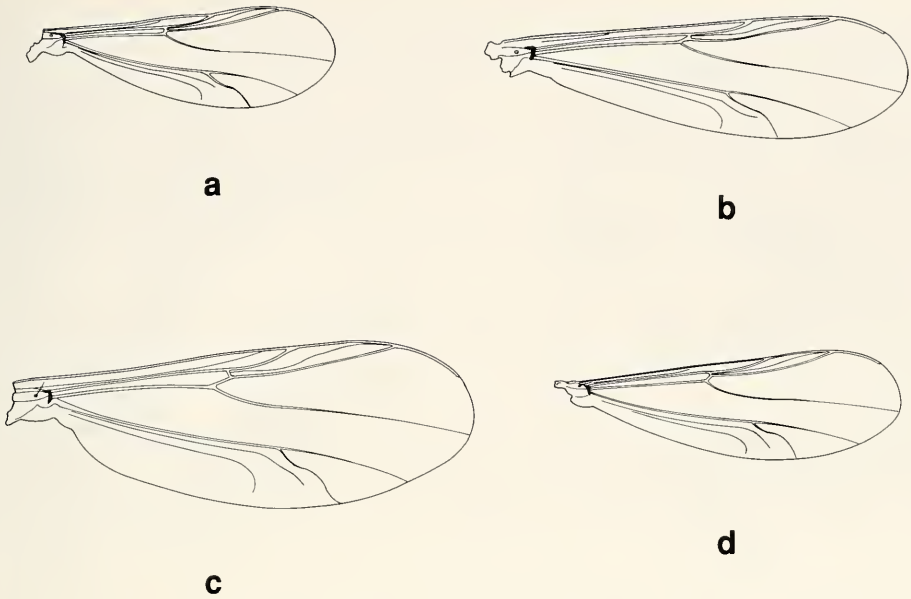

Fig. 2. Wings of *Lerheimia*, gen. nov., ♂. a. *L. scopulata*, spec. nov. b. *L. villangulata*, spec. nov. c. *L. aviculata*, spec. nov. d. *L. wulfi* (Freeman), comb. nov.

Head. AR 0.65. Ultimate flagellomere 283 µm long. Temporal setae consisting of 6 weak inner verticals and 2 stronger outer verticals. Clypeus with 4 setae. Tentorium 71 µm long, 15 µm wide. Stipes 53 µm long, 15 µm wide. Palp segments lengths in µm: 19, 23, 41, 41, 53. Third palpal segment apparently with 2 sensilla clavata.

Thorax. Antepronotum with 1 lateral seta. Dorsocentrals 6, prealars 2. Scutellum broken, apparently with 2 setae.

Wing (Fig. 2b). VR 1.43. No anal lobe. Costal extension 169 µm long. R_{4+5} ends slightly proximal to end of M_{3+4}; Cu_1 downcurved, but not sinuate.

Legs. Spur of front tibia 36 µm long; spurs of middle tibia 19 µm and 15 µm long; of hind tibia 30 µm and 19 µm. Width at apex of front tibia 23 µm; of middle tibia 24 µm; of hind tibia 32 µm. Hind tibial comb of 10 setae, 19-30 µm long.

Lengths (in µm) and proportions of legs:

	fe	ti	ta_1	ta_2	ta_3	ta_4	ta_5	LR	BV	SV	BR
p_1	387	496	255	170	132	57	33	0.51	2.90	3.46	2.6
p_2	454	548	232	118	95	52	33	0.42	4.14	4.33	3.3
p_3	444	539	250	132	132	52	33	0.46	3.53	3.92	3.0

Hypopygium (Fig. 3b). Anal point 11µm long with 8 lateral setae; laterosternite IX with 2 setae. Phallapodeme 56 µm long. Sternapodeme and coxosternapodeme apparently absent. Virga apparently about 26 µm long. Gonocoxite 128 µm long; inferior volsella simple. Gonostylus large, triangular, with outer heel and dense group of inner setae; megaseta 11 µm long. HR 1.89, HV 2.53.

Lerheimia aviculata, spec. nov.

Figs. 2c, 3c

Type locality: TANZANIA, Tanga region, West Usambara Mts, Mazumbai.

Type material: Holotype ♂, TANZANIA, Tanga region, West Usambara Mts, Mazumbai, Kaputu Stream, Malaise trap loc. 7, 1535 m a.s.l., 1-8.VII.1991, ZMB's Tanzania Expedition (ZMBN No. 154).

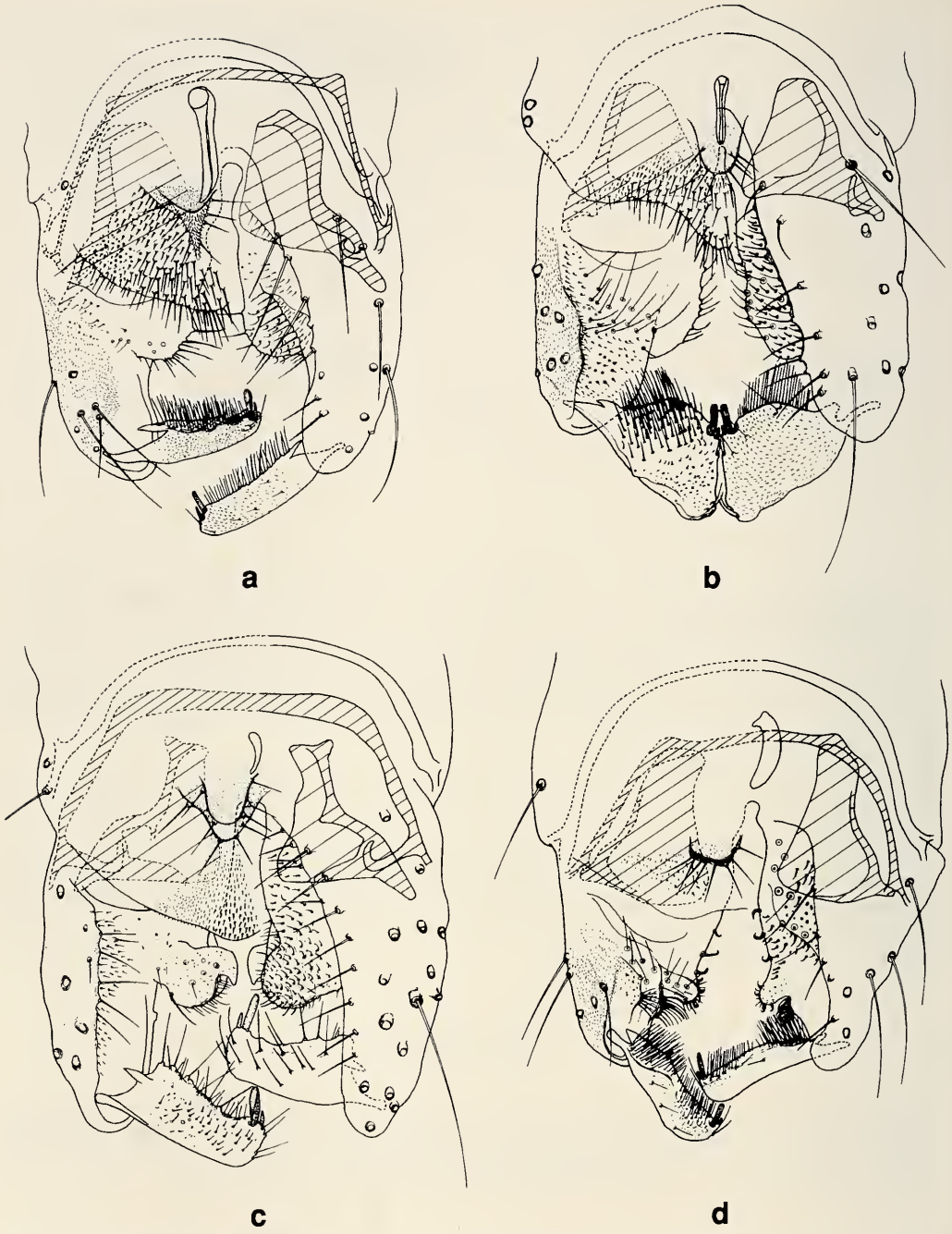

Fig. 3. Hypopygium of *Lerheimia*, gen. nov., ♂. a. *L. scopulata*, spec. nov. b. *L. villangulata*, spec. nov. c. *L. aviculata*, spec. nov. d. *L. wulfi* (Freeman), comb. nov.

Diagnostic characters - (see key).

Etymology - From the Latin *avicula*, small bird, and the suffix *-atus* meaning provided with, referring to the structure of the inferior volsella.

Description

Male imago (n = 1) - Total length 2.03 mm. Wing length 1.30 mm. Total length / wing length 1.57. Wing length / length of profemur 3.06. Coloration brown with pale shoulders and scutellum, abdomen with tergites pale in anterior 1/3.

Head. AR 0.40. Ultimate flagellomere 198 µm long. Temporal setae consisting of 8 weak inner verticals and 1 weak outer vertical. Clypeus with 6 setae. Tentorium 91 µm long, 14 µm wide. Stipes 59 µm long, reduced. Palp segments lengths in µm: 16, 22, 27, 32, 46. Third palpal segment with 3 lanceolate sensilla clavata.

Thorax. Antepronotum with 1 lateral seta. Dorsocentrals 8, prealars 3. Scutellum with 4 setae.

Wing (Fig. 2c). VR 1.39. Anal lobe weak. Costal extension 206 µm long. R_{4+5} ends above end of M_{3+4}; Cu_1 sinuate.

Legs. Spur of front tibia 32 µm long; spurs of middle tibia broken and 21 µm; of hind tibia 41 µm and 21 µm. Width at apex of front tibia 23 µm; of middle tibia 25 µm; of hind tibia 33 µm. Hind tibial comb of 10 setae, 18-34 µm long. Lengths in µm of front to hind femur as: 423, 504, 486; of tibia as: 531, 558, 536; all tarsi lost.

Hypopygium (Fig. 3c). Anal point 16 µm long with 8 lateral setae; laterosternite IX with 2 setae. Phallapodeme 82 µm long. Transverse sternapodeme 57 µm long. Virga apparently about 14 µm long. Gonocoxite 139 µm long; inferior volsella characteristic bird-like, with polygonal reticulation. Gonostylus abruptly widened at base, wider near base than at apex, with long scattered setae along inner margin, with apical point; megaseta 14 µm long. HR 2.26, HV 3.28.

Lerheimia wulfi (Freeman), comb. nov.

Figs 2d, 3d

Smittia wulfi Freeman, 1956: 354 (description of male).

Pseudosmittia wulfi (Freeman) Freeman & Cranston 1980: 186 (generic placement).

Type material examined: Holotype ♂, ZAIRE (as Belgian Congo), Lulemba, Envir. Mission Rugasi, 1933, de Wulf, (in Musée Royal de l'Afrique Centrale, Tervuren, Belgium).

Diagnostic characters - (see key).

Description

Male imago (n = 1) - Total length 1.34 mm. Wing length 0.95 mm. Total length / wing length 1.41. Wing length / length of profemur 3.42. Coloration brown with yellow shoulders and yellowish legs.

Head. AR 0.25. Ultimate flagellomere 96 µm long. Temporal setae consisting of 5 weak inner verticals and 1 weak postorbital. Clypeus with 5 setae. Tentorium 82 µm long, 11 µm wide. Stipes 55 µm long, 16 µm wide. Palp segments lengths in µm: 9, 21, 27, 25, 34. Third palpal segment with 2 lanceolate sensilla clavata.

Thorax. Antepronotum with 1 lateral seta. Dorsocentrals 7, prealars 3. Scutellum with 4 setae.

Wing (Fig. 2d). VR 1.39. Anal lobe absent, wing cuneiform. Costal extension 153 µm long. R_{4+5} ends slightly proximal of end of M_{3+4}; Cu_1 strongly downcurved; postcubitus slightly downcurved; An strongly downcurved.

Legs. Spur of front tibia 26 µm long; spurs of middle tibia 23 µm and 14 µm; hind tibia lost. Width at apex of first tibia 18 µm; of middle tibia 21 µm. Pulvilli apparently absent. Hind femur 360 µm long. Lengths and proportions of front and middle legs in µm as:

	fe	ti	ta_1	ta_2	ta_3	ta_4	ta_5	LR	BV	SV	BR
p_1	279	396	194	126	95	45	32	0.49	2.92	3.49	3.1
p_2	392	441	153	77	63	36	32	0.35	4.76	5.44	2.4

Hypopygium (Fig. 3d). Anal point 14 µm long with about 8 setae; laterosternite IX with 2 setae. Phallapodeme 63 µm long. Transverse sternapodeme 48 µm long; lateral sternapodeme and coxosternapodeme not observed. Virga apparently about 25 µm long. Gonocoxite 135 µm long; inferior volsella with brush of setae on apical accessory lobe. Gonostylus 56 µm long, with dense basal brush of setae and less dense apical brush; megaseta 11 µm long. HR 2.41, HV 2.39.

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