Annls Limnol. 35 (3) 1999 : 185-191

Cladotanytarsus bukavus (Lehmann, 1979) comb. n. and *C. congolensis* (Lehmann, 1979) comb. n. from Central Africa (Diptera: Chironomidae)

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Keywords : *Cladotanytarsus*, Afrotropical, new combinations, morphology, taxonomy.

Tanytarsus bukavus Lehmann, 1979 and *Tanytarsus congolensis* Lehmann, 1979 are transferred to the genus *Cladotanytarsus* Kieffer. Adult males as well as pupae of both species are redescribed and the female of *T. bukavus* is described as new to science. An emended diagnosis to include the presence or absence of pedes spurii B for *Cladotanytarsus* pupae is given.

Cladotanytarsus bukavus (Lehmann, 1979) comb. n. and _C. congolensis_ (Lehmann, 1979) n. comb. d'Afrique centrale (Diptera : Chironomidae)

Mots-clés : *Cladotanytarsus,* région afrotropicale, nouvelle combinaison, morphologie, taxonomie.

Tanytarsus bukavus Lehmann, 1979 et *Tanytarsus congolensis* Lehmann, 1979 sont transférés dans le genre *Cladotanytarsus* Kieffer. Les imagos mâles et les nymphes des deux espèces sont redécrites et la femelle de *T. bukavus* est décrite comme nouvelle pour la science. Une diagnose modifiée qui inclue la présence ou l'absence de pedes spurii B chez la nymphe de *Cladotanytarsus* est donnée.

1. Introduction

The genus *Cladotanytarsus* Kieffer, 1921 has a worldwide distribution (Cranston et al. 1989). Based on adult and pupal morphology, it is probably closest related to *Tanytarsus* v. d. Wulp, 1874 (Sæther 1977). Adult males can be recognized on the following combination of characters: eye with no dorsomedian elongation; gonostylus short; digitus long, projecting past median margin of superior volsella, anal point rather broad, usually with spines between well developed crests and branched lamellae of median volsella. *Cladotanytarsus* apears to have a fairly large species diversity in the Afrotropical region. Freeman & Cranston (1980) list six species in the Catalogue of Afrotropical Diptera, and Lehmann (1979, 1981) added two species from Zaire (now the Democratic Republic of Congo). After including *Cladotanytarsus bukavus* (Lehmann, 1979) comb. n. and *C. congolensis* (Lehmann, 1979) comb. n., a total of ten *Cladotanytarsus* species are known from the Afrotropical region.

Lehmann (1979) recognized the diagnostic characters for *Cladotanytarsus* males, but placed the two species in *Tanytarsus* based on the pupal morphology, especially the shape of the thoracic horn. He also discussed the possibility of erecting a new genus for the two

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species, but rejected the idea on the basis that larvae were not known. A close examination of the type material and a comparison with the most recent diagnoses of *Cladotanytarsus* and *Tanytarsus* (Pinder & Reiss 1986, Bilyj & Davies 1989, Cranston et al. 1989), revealed that both species clearly belong to the genus *Cladotanytarsus*.

2. Material, methods and morphology

Morphological nomenclature follows Sæther (1980) with the additions given by Ekrem (1999). All measurements are when possible given as ranges. The type material of the redescribed species is deposited at the Zoologische Staatssammlung München, Munich, Germany.

3. *Cladotanytarsus bukavus* (Lehmann, 1979) comb. n.

Tanytarsus bukavus Lehmann 1979 (Figs.224-231)

Type material :

Holotype 1 ♂ Zaire : Kivu-Gebiet, Kalengo, emergence-trap, 29. IX. 1972, leg. J. Lehmann ; paratype 1 ♂ and 1 pupal exuviae as holotype but collected 27. IX.1972 ; 1 ♀ & 1 pupal exuviae as holotype ; 6 ♂♂ as holotype, but collected «Late April».1972, 18.IX.-6.XII.1972 ; 8 ♀♀ as holotype, but collected 16.IX.-8.XII.1972 ; 9 pupae as holotype, but collected 12.IX.-06.XII.1972.

Diagnosis :

C. bukavus is separable from other *Cladotanytarsus* species by the following combination of characters on the male imago. AR larger than 0.39. Wing : Cu with less than 4 and PCu with less than 9 setae. Hypopygium : Relatively broad anal point with a large group of spines between well developed anal crests ; superior volsella elliptic with dorsolateral microtrichiae, digitus long, somewhat caudally curved, extending well beyond median margin of superior volsella. Pupa : Well developed thoracic horn, bent 90°, bearing numerous chaetae smaller than 10 µm ; 3 precorneals, 1 conspicuously longer than the other two ; pedes spurii B present on segment II ; U-shaped spine patch on tergite II, oval spine patches on tergite III-V, shagreen on sternite I, II, III, VII ; well developed anal fringe with long filamentous setae.

Description

MALE IMAGO (n = 8-10)

Total length 1.80-2.38, 2.03 mm. Wing length 1.2-1.3, 1.2 mm. Total length / wing length 1.4-2.0, 1.7.

Colouration. Head pale yellowish with blackish brown eyes, antenna pale brown ; thorax, legs and abdomen all pale yellowish ; wing without pigmented cells.

Head. (Fig. 1D). AR 0.36-0.50, 0.42. Thirteen flagellomeres, ultimate flagellomere 184-213, 205 µm long. Longest antennal seta 355-426, 375 µm long. Temporal bristles 7-10 ; 2-3 inner verticals, 2-3 outer verticals, 3-4 post orbitals. Clypeus 58-81, 67 µm long with 9-13, 12 setae. Tentorium 74-103, 86 µm long, 16-26, 20 µm wide at sieve plate. Stipes 107-129, 122 µm long. Width of cibarial pump about 45 µm. Lengths of palp segments (in µm) : 26-32, 29 ; 23-29, 28 ; 71-84, 80 ; 90-103, 96 ; 145-165, 153.

Thorax. Dorsocentrals 5-8, acrostichals 9-11, prealars 1. Scutellum with two closely set median setae. Haltere with 4-5 small setae.

Wing. (Lehmann 1979, Fig. 227). VR 1.29-1.43, 1.36. Brachiolum with 1 seta, Sc bare, R with 12-17, 14 ; R1 with 13-16, 14 ; R_{4+5} with 20-31, 24 ; M bare, M_{1+2} with 28-36, 32 ; M_{3+4} with 16-22, 20 ; Cu with 0-3, 1 ; Cu_1 with 12-15, 14 ; PCu with 4-8, 5 and An with 15-19, 17 setae. Cells : m bare, r_{4+5} with 66-140, 96 ; m_{1+2} with 93-137, 106 including setae on false vein, m_{3+4} with 28-48, 35 ; cu and an combined with 16-32, 23 setae.

Legs. Spur of fore tibia 26-36 µm long. Spurs of middle tibia 32-36 µm long including 10-16 µm long comb and 19-25 µm long including 10-13 µm long comb ; of hind tibia 32-39 µm long including 13-16 µm long comb and 19-36 µm long including 10-16 µm long comb. Lengths (in µm) and proportions of legs :

	fe	ti	ta_1	ta_2	ta_3	ta_4	ta_5
p_1	465-523, 481	226-255, 243	669-701, 689	313-349, 333	55-281, 267	194-220, 205	87-100, 94
p_2	478-510, 487	378-413, 398	229-262, 241	103-116, 110	74-81, 78	45-61, 49	36-52, 41
p_3	478-504, 489	462-533, 501	317-362, 340	184-210, 197	178-194, 185	100-113, 105	58-64, 60

	LR	BV	SV	BR
p_1	2.70-3.10, 2.84	1.47-1.69, 1.57	0.99-1.09, 1.05	2.6-3.2, 2.8
p_2	0.55-0.64, 0.60	3.90-4.13, 4.04	3.48-3.99, 3.71	2.8-4.2, 3.6
p_3	0.64-0.72, 0.67	2.38-2.55, 2.45	2.77-3.07, 2.92	2.7-4.7, 4.0

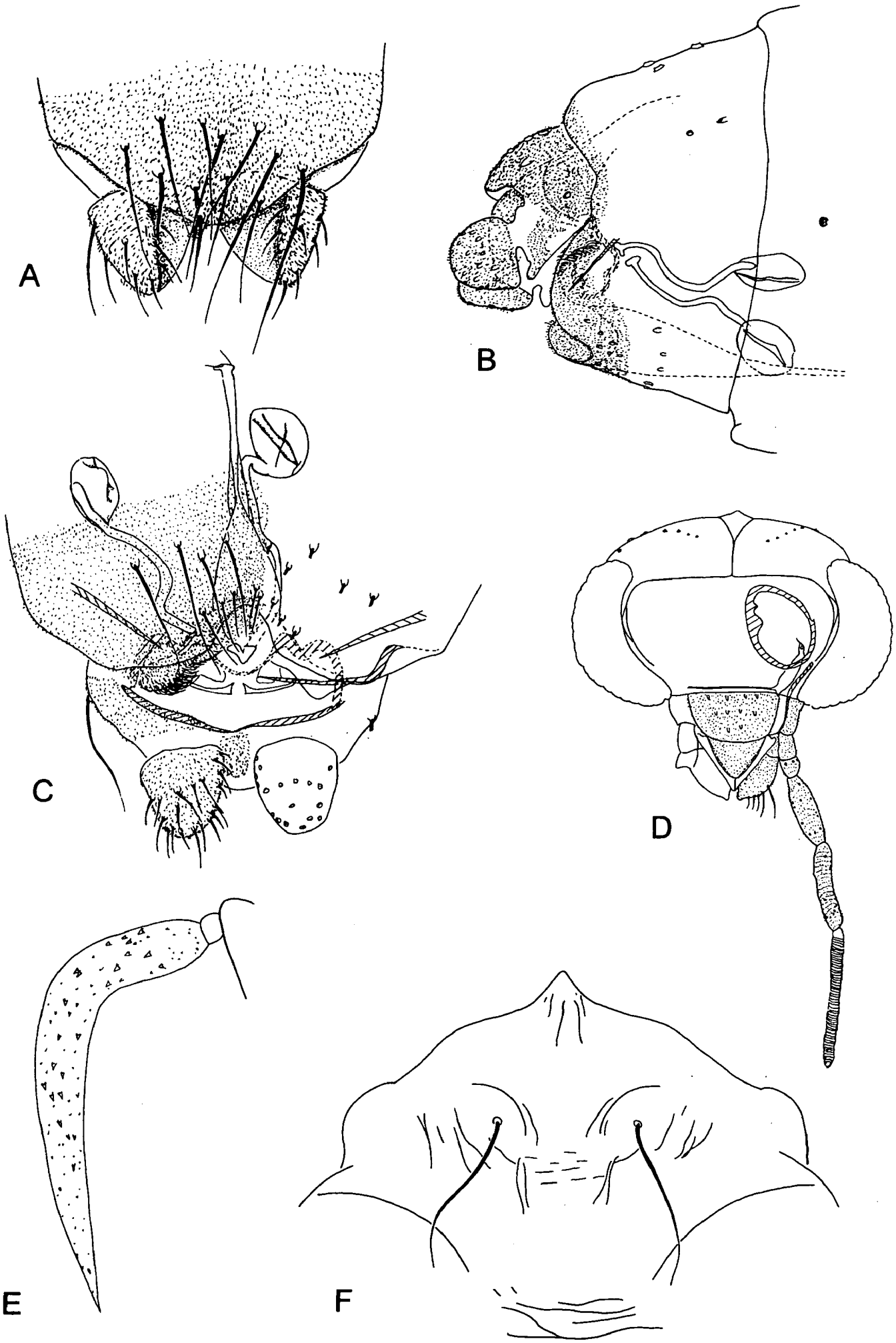

Fig. 1. *Cladotanytarsus bukavus* (Lehmann) comb. n. A, female genitalia dorsal view ; B, female genitalia lateral view ; C, female genitalia ventral view ; D, male head ; E, pupal thoracic horn ; F, pupal frontal apotome.

Fig. 1. *Cladotanytarsus bukavus* (Lehmann) n. comb. A, genitalia femelle, vue dorsale : B, genitalia femelle, vue latérale ; C, genitalia femelle, vue ventrale ; D, tête mâle ; E, corne thoracique de la nymphe ; F, apotome frontal de la nymphe.

Hypopygium (Lehmann 1979, Fig. 224). Tergite IX 76-86, 81 µm long with 6-15, 10 median and 6-10, 8 apical setae. Anal point 21-29 µm long, 10-12 µm wide at base, about 4 µm wide at apex, with 8-25 spines between well developed anal crests. Anal tergite bands short, not reaching median margin. Transverse sternapodeme 55-80, 68 µm long, phallapodeme 78-98, 85 µm long. Gonocoxite 82-103, 90 µm long, gonostylus 49-62, 56 mm long. Superior volsella oval with lateral field of microtrichiae, 6 small setae dorsally and 2 venteromedian setae on small tubercles. Digitus long, slightly caudally curved, extending well beyond median margin of superior volsella. Median volsella (Lehmann 1979, Fig. 226) 58-64, 61 µm long including 23-35, 31 µm long branched lamellae. Inferior volsella 41-51, 47 µm long, medially curved, with about 7 strong apical setae. HR 1.43-1.83, 1.61.

FEMALE IMAGO (n = 8-10)

Total length 1.48-1.62, 1.53 mm. Wing length 1.13-1.21, 1.17 mm. Total length/ wing length 1.26-1.34, 1.30.

Colouration. As male.

Head. AR 0.56-0.70, 0.61. Pedicel 39-48 µm long. Lengths of flagellomeres (in µm) : 58-71, 67 ; 39-45, 42 ; 45-55, 47 and 94-107, 98. Longest antennal seta 149-171, 164 µm long. Distance between eyes 161-197, 183 µm. Temporal bristles 7-9 ; 3 inner verticals, 1-3 outer verticals, 3 post orbitals. Clypeus 48-68, 57 µm long with 11-13 setae. Tentorium 81-103, 90 µm long, 10-16, 12 µm wide at sieve plate. Stipes 87-94, 91 µm long. Width of cibarial pump 45-52 µm. Lengths of palp segments (in µm) : 26-29, 26 ; 26-29, 27 ; 74-81, 76 ; 87-97, 92 ; 142-161, 152.

Thorax. Dorsocentrals 5-7, acrostichals 10-12, prealars 1. Scutellum with two closely set median setae. Halteres with 4-5 small setae.

Wing. VR 1.30-1.40, 1.36. Brachiolum with 1 seta, Sc bare, R with 13-21, 16 ; R_1 with 12-15, 13 ; R_{4+5} with 24-47, 36 ; M bare, M_{1+2} with 31-48, 35 ; M_{3+4} with 23-30, 25 ; Cu with 6-15, 12 ; Cu1 with 14-17, 15 ; PCu with 26-36, 32 and An with 17-23, 20 setae. Cells : m and r_{4+5} combined with 70-117, 103 ; m_{1+2} with about 150 including setae on false vein, m_{3+4} with 51-70, 60 ; cu and an combined with about 75-100 setae.

Legs. Spur of fore tibia 23-29 µm long. Spurs of middle tibia 29-36 µm long including 10-16 µm long comb and 19-26 µm long including 10-13 µm long comb ; of hind tibia 29-36 µm long including 13-16 µm long comb and 19-32 µm long including 10-13 µm long comb. Lengths (in µm) and proportions of legs :

	fe	ti	ta_1	ta_2	ta_3	ta_4	ta_5
p_1	423-520, 451	236-262, 246	598-701, 663	287-349, 320	245-274, 261	178-236, 206	84-90, 86
p_2	436-475, 455	359-417, 392	213-248, 228	97-107, 103	71-81, 75	42-55, 46	36-39, 38
p_3	410-478, 453	468-520, 493	294-333, 314	171-207, 182	161-171, 169	68-103, 92	52-61, 56

	LR	BV	SV	BR
p_1	2.66-2.92, 2.77	1.53-1.59, 1.56	1.00-1.10, 1.04	2.4-4.2, 3.2
p_2	0.55-0.60, 0.58	3.98-4.22, 4.09	3.63-3.94, 3.71	2.7-4.2, 3.3
p_3	0.60-0.68, 0.63	2.21-2.77, 2.53	2.83-3.15, 3.00	2.8-4.3, 3.4

Genitalia (Fig. 1A-C). Tergite IX semicircular with about 12 setae on posterior part, sternite VIII with about 17 setae, forms a comparatively small floor below posterior part of vagina. Gonocoxapodeme VIII straight. Gonapophysis VIII simple with relatively long medially directed microtrichiae. Gonocoxite IX with 1 seta. Notum extending anteriorly far beyond seminal capsules. Seminal capsules 32- 39, 36 µm long with lateral neck, spermathecal ducts curved slightly medially at 1/2 length in uncleared specimens. Postgenital plate oval. Cerci small, 36-45, 41 µm long, with about 20 setae.

PUPA (n = 10)

Total length of abdomen 1.7-1.9, 1.8 mm. Pupal exuvia without pigmentation.

Cephalothorax. Frontal setae 113-161, 138 µm long sitting on broad, low cephalic tubercles (Fig. 1F). Thoracic horn (Fig. 1E) 229-307, 280 µm long, 29-36, 33 µm wide, with 8-10 µm long chaetae, conspicuously bent 90° at about 1/4-1/3 of total length. Precorneals 3 : 2 shorter 32-94, 67 µm long, 1 longer 139-187, 170 µm long ; Antepronotals 2 : 1 median 94-142, 118 µm long, 1 lateral 66-103, 80 µm long ; dorsocentrals 4, arranged in two pairs each with one weak 26-64, 42 µm long and one strong 42-74, 55 µm long seta.

Abdomen (Lehmann 1979, Fig. 230). Pedes spurii B well developed on segment II, weaker on segment III. Tergite I bare. Spinule patch on tergite II somewhat M-shaped with stronger anterior spinules, 4 µm long. Spine patches on tergites III-V oval with posteriomedially

directed spines, 5-8 µm long. Tergites VI-VIII bare, posterior hook row 74-110, 94 µm wide. Shagreen present as anterior patches on sternite I and VIII, as a continuos field on sternite II and III. Segment II with 3, 32-48, 39 µm long L-setae, segment III with 3, 36-48, 43 µm long L-setae, segment IV with 1, 32-45, 40 µm long L-seta and 2, 39-107, 74 µm long LS-setae, segment V with 3, 64-103, 80 µm long LS-setae, segment VI with 3, 71-129, 97 µm long LS-setae, segment VII with 4, 97-139, 120 µm long LS-setae and segment VIII with 5, 129-216, 170 µm long LS-setae. Posterolateral comb (Lehmann 1979, Fig. 231) on segment VIII present, 16-32, 27 µm wide with longest spine 13-19 µm long. Anal lobe with two pairs of dorsal filamentous setae, 129-233, 154 µm long. Well developed anal fringe with 26-29 ; 388-501, 154 µm long filamentous setae.

4. *Cladotanytarsus congolensis* (Lehmann, 1979) comb. n.

Tanytarsus congolensis Lehmann, 1979 (Fig.232-237)

Type material :

Holotype 1 imago ♂ & 1 exuviae, Zaire : Kivu-Gebiet, Kalengo, emergence trap, 15.IX.1972, leg. J. Lehmann. Paratype as holotype but collected 5.X.1972. Additional material examined : 1 imago ♂ & 1 exuviae as holotype, but collected 04.X.1972, 1 imago ♂and 2 exuviae as holotype but collected 04.IX.1972.

Diagnosis :

C. congolensis is separable from other *Cladotanytarsus* species by the following combination of characters : AR less than 0.34. Wing : Cu with more than 10 and PCu with more than 35 setae. Hypopygium : Anal point relatively broad with a large group of spines between well developed crests ; superior volsella elliptic without dorsolateral microtrichiae ; digitus long, slightly curved medially, extending well beyond posteromedian margin of superior volsella. Pupa : Thoracic horn well developed, bent 90°, bearing numerous small chaetae longer than 17 µm ; 3 precorneals of equal length ; pedes spurii B present on segment II ; one pair of triangular spine patches on tergite II ; distinct, round spine patches on tergite III-V ; shagreen on sternite I, II, III, VIII ; well developed anal fringe with long filamentous setae.

Description

MALE IMAGO (n = 3-4)

Total length 1.94-2.06 mm. Wing length 1.17 mm. Total length / wing length 1.33-1.65.

Colouration. Head pale yellowish with blackish brown eyes, antennae pale brown ; thorax, legs and abdomen all pale yellowish ; wings without pigmented cells.

Head. AR 0.32-0.38. Thirteen flagellomeres, last flagellomere 152-165 µm long. Longest antennal seta 323-388 µm long. Distance between eyes about 333 µm. Temporal bristles 7-10 ; 3 inner verticals, 1-3 outer verticals, 3-4 post orbitals. Clypeus 42-55 µm long with 10-13 setae. Tentorium 87-100 µm long, 19-23 µm wide at sieve plate. Stipes 74-113 µm long. Width of cibarial pump 42 µm. Lengths of palp segments (in µm) : 23-26, 23-26, 74-94, 97-107, 165-178.

Thorax. Dorsocentrals 6-7, acrosticals 12-14, prealars 1. Scutellum with 6-7 setae. Halteres with 4-5 small setae.

Wing. (Lehmann 1979, Fig. 235). VR 1.32-1.33. Brachiolum with 1 seta, Sc bare, R with 19-20, R_1 with 14-17, R_{4+5} with 25-32, M bare, M_{1+2} with 41-42, M_{3+4} with 22-25, Cu with 11-18, Cu_1 with 15-18, PCu 36-41 and An with 24-28 setae. Cells : m bare, r_{4+5} with 120-190 setae, m_{1+2} with about 200 including on false vein, m_{3+4} with 60-90, cu and an combined with 103-137 setae.

Legs. Spur of fore tibia 19-26 µm long. Spurs of middle tibia 29-32 µm long including 13-16 µm long comb and 23-26 µm long including 13-16 µm long comb ; of hind tibia 32-36 µm long including 13-16 µm long comb and 26-36 µm long including 13-16 µm long comb. Lengths (in µm) and proportions of legs :

	fe	ti	ta_1	ta_2	ta_3	ta_4	ta_5
p_1	462-481	223-242	675-682	329-333	255-265	197-249	87-97
p_2	491-501	375-407	236-258	113-120	77-87	48-55	36-42
p_3	481-488	497-523	336-339	210	184-191	116-123	61

	LR	BV	SV	BR
p_1	2.81-3.03	1.49-1.57	1.03-1.06	3.2
p_2	0.63-0.66	3.86-3.90	3.49-3.57	4.4
p_3	0.68	2.32	2.90	3.1

Hypopygium (Lehmann 1979, Fig. 232-234) (n = 4). Tergite IX 68-82, 77 µm long with 9-14, 12 median and 10-12 apical setae. Anal point 21-27, 23 µm long, 12-14 µm wide at base, about 4 µm wide at apex, with 22-35, 26 spines between well developed crests. Anal tergite bands short, not reaching median margin. Transverse sternapodeme 51-68, 58 µm long, phallapodeme 78-92, 85 µm long. Gonocoxite 82-94, 85 µm long, gonostylus 55-57, 56 mm long. Superior volsella oval with 7 small setae on dorsal side and 3 ventero-median setae on small tubercles. Digitus long, slightly curved medially, extending well beyond posteriomedian margin of superior volsella. Median volsella 54-58, 56 µm long including 25-29, 27 µm long branched lamellae. Inferior volsella 43-56, 47 µm long, curved medially, with about 6 strong apical setae. HR 1.43-1.70, 1.52.

PUPA (n = 5)

Total length of abdomen 1.72-1.94, 1.84 mm. Pupal exuvia without pigmentation.

Cephalothorax (Fig. 2A). Frontal setae 71-81, 79 µm long sitting on broad, low cephalic tubercles. Thoracic horn 323-346, 336 µm long, 23-39, 35 µm wide, conspicuously bent 90° at about 1/4-1/3 of the total length ; with 18 µm long chaetae present on median 1/3. Precorneals 3, of about equal length, 74-110, 95 µm long ; antepronotals 2 : 1 median 64-107, 87 µm long, 1 lateral 58-71, 64 µm long ; dorsocentrals 4, in two pairs, each pair with one weak 16-32, 26 µm long and one strong 22-42, 31 µm long seta.

Abdomen (Lehmann, Fig. 237). Well developed pedes spurii B on segment II. Tergite I bare. Spinule patches on tergite II triangular with 3 µm long spinules. Spine patches on tergite III-V circular with 10-16 µm long, posteriomedially directed spines. Tergites VI-VIII bare. Hook row on tergite II, 87-103 (n=2) µm wide. Shagreen present as 1 anterior patch on sternite I, 2 anterior patches on sternite VIII, as a continuous field on sternite II and III. Segment II with 3, 29-45, 36 µm long L- setae, segment III with 3, 36-48, 41 µm long L- setae, segment IV with 1, about 45 µm long L- setae and 2, 90-123, 107 µm long LS- setae, segment V with 3, 97-113, 108 µm long LS- setae, segment VI with 3, 81-107, 95 µm long LS- setae, segment VII with 4, 97-145, 111 µm long and segment VIII with 5, 129-171, 152 µm long LS- setae. Lateral combs on segment VIII 26-32, 28 µm wide with longest spine 16-19 µm long. Two pair of dorsal filamentous setae 123-145, 165 µm long present on anal lobe. Well developed anal fringe with 27-29 ; 355-452, 414 µm long filamentous setae.

5. Discussion

The stream Kalengo (type locality) originates in montane springs at about 1800 m.a.s.l., and drains into Lake Kivu on the Rwandan border at 1460 m.a.s.l.

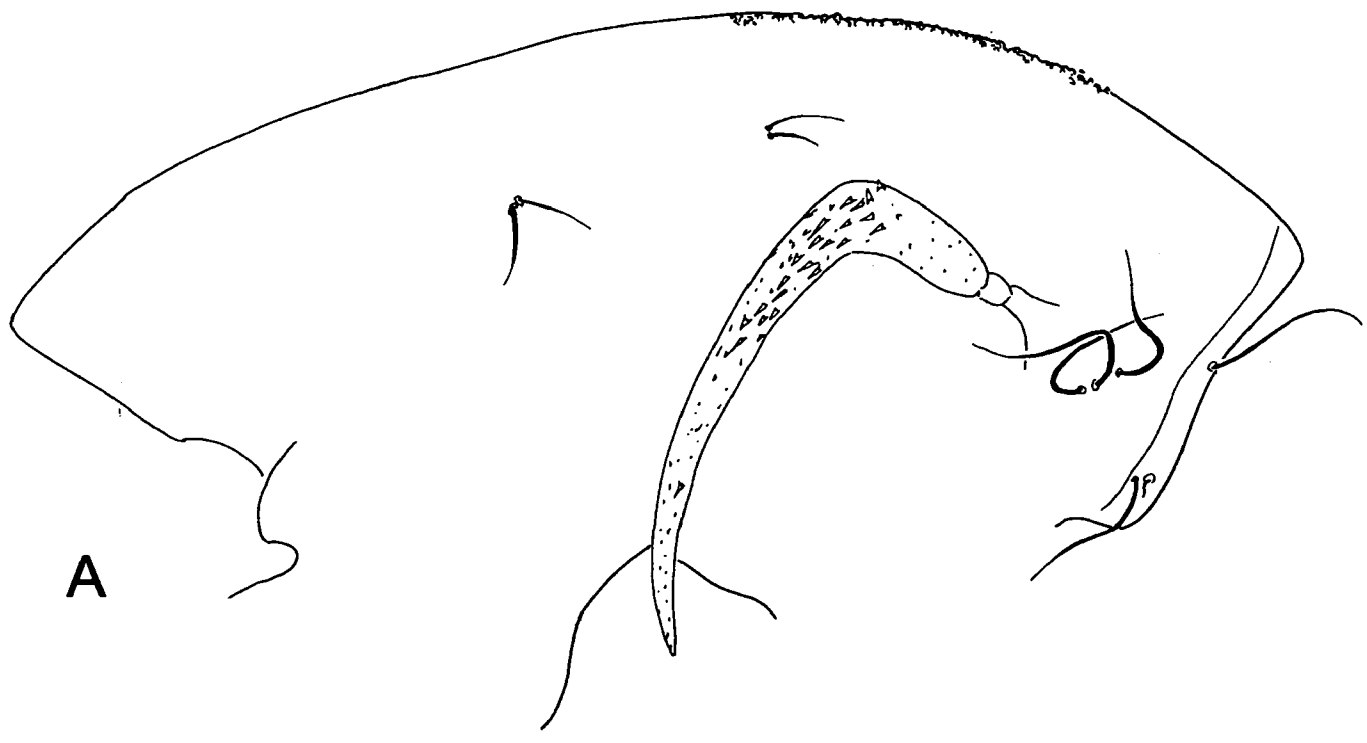

Fig. 2. *Cladotanytarsus congolensis* (Lehmann) comb. n. A, pupal cephalothorax.
Fig. 2. *Cladotanytarsus congolensis* (Lehmann) n. comb. A, cephalo-thorax de la nymphe.

(Lehmann 1979). The groundwater fed springs keep the water level of Kalengo fairly constant, thus the regular dry- and wet seasons do not have much influence on the aquatic environment in Kalengo. At the site where Lehmann (1979) constructed his emergence house, the stream is about 2 m wide, and 7-10 cm deep. The stream itself did not contain submerged aquatic plants, but the streambanks were densely vegetated with bushes and trees, mainly *Pennisetum purpureum* and *Eucalyptus*- species. Larvae of *C. bukavus* and *C. congolensis* are benthic in lotic waters. According to Lehmann (1979), *C. bukavus* larvae prefer a substratum of fine gravel and sand, while *C. congolensis* larvae are mainly found on muddy substratum.

As Lehmann (1979) realized, the adult males of both species fit the diagnosis of *Cladotanytarsus*, having eyes without dorsomedian elongation, a branched median volsella, very long digitus and comparatively short gonostyli. When using the key to Holarctic Chironominae (Cranston et al. 1989), the adult males do key out to *Cladotanytarsus*. The adult female of *C. bukavus* also keys out to *Cladotanytarsus* in the preliminary key to females of Tanytarsini (Sæther 1977). Using the key to the pupae of Chironominae of the Holarctic region (Pinder & Reiss 1986), gives the same result. On the other hand, the pupal skins of *C. bukavus* and *C. congolensis* do not fully match the diagnosis given by Pinder & Reiss (1986) in that they do not have well defined spine patches on tergite II and pedes spurii B are present. Lehmann's argument (1979) that the shape of the pupal thoracic horn prevents the placement of the new combinations in *Cladotanytarsus* is no longer valid. *C. bukavus* and *C. congolensis* fit well in the most recent pupal diagnosis for the genus (Bilyj & Davies 1989), but the diagnosis has to be emended to also include the presence of pedes spurii B on segment II. Within *Cladotanytarsus*, the species can be placed in the *C. vanderwulpi* species group based on the pupal characters (Pinder & Reiss 1986). The adults show similarities with *C. linearis* Freeman 1954, but differ in having longer digiti and larger, elliptical superior volsellae (compare Freeman 1958).

Prat (1985) discovered that intraspecific variation for male representatives of *Cladotanytarsus mancus* in Spain exceeds the interspecific variation between its close relatives. It can be expected that other *Cladotanytarsus* species show this type of variation as well, but I am confident that *C. bukavus* and *C. congolensis* are good species because as Bilyj & Davies (1989) mention, pupae often offer more stable diagnostic characters than male adults. The pupae of the two species are morphologically distinct, and according to Lehmann (1979), both species were collected at the same locality, emerging during the same period, thus, seasonal and spatial variations are excluded.

Acknowledgements

Thanks are due to Ole A. Sæther and Trond Andersen, Museum of Zoology, Bergen, for kindly reading through the final version of the manuscript. I would also like to thank Dr. Friedrich Reiss and Elisabeth Stur, both at the Zoologische Staatssammlung München (ZSM) for help with type material and good discussions, and Director Gerhard Haszprunar, ZSM, for giving me permission to work in the collection.

References

Bilyj B. & Davies I. J. 1989. — Descriptions and ecological notes on seven new species of *Cladotanytarsus* (Chironomidae : Diptera) collected from an experimentally acidified lake. *Can. J. Zool.*, 67 : 948-962.

Cranston P. S., Dillon M. E., Pinder L. C. V. & Reiss F. 1989. — The adult males of Chironominae (Diptera, Chironomidae) of the Holarctic region. Keys and diagnoses. In Wiederholm, T. (ed.) Chironomidae of the Holarctic region. Keys and diagnoses. Part 3. Adult males. *Ent. scand.* Suppl., 34 : 353-502.

Ekrem T. 1999. — Six new *Tanytarsus* species from Ghana, West Africa (Insecta, Diptera, Chironomidae). *Spixiana*, 22 (1) : 53-68.

Freeman P. 1958. — A study of the Chironomidae (Diptera) of Africa south of the Sahara. Part IV. *Bull. Brit. Mus. nat. Hist. Ent.*, 7 : 331-352.

Freeman P. & Cranston P. S. 1980. — II. Family Chironomidae. In Crosskey, R. W. (ed.) Catalogue of the Diptera of the Afrotropical Region. British Museum (Natural History), London, 175-202.

Lehmann J. 1979. — Chironomidae (Diptera) aus Fließgewässern Zentralafrikas (Systematik, Ökologie, Verbreitung und Produktionsbiologie), Teil I. Kivu-Gebiet, Ostzaire. *Spixiana* Suppl., 3 : 1-144.

Lehmann J. 1981. — Chironomidae (Diptera) aus Fließgewässern Zentralafrikas Teil II : Die Region um Kisangani, Zentralzaire. *Spixiana* Suppl., 5 1-85.

Pinder L. C. V. & Reiss F. 1986. — The pupae of Chironominae (Diptera : Chironomidae) of the Holarctic region - Keys and diagnoses. In Wiederholm, T. (ed.) Chironomidae of the Holarctic region. Keys and diagnoses. Part 2 - pupae. *Ent. scand.* Suppl., 28 : 299-456.

Prat N. 1985. — Variabilidad morfólogica de las poblaciones de *Cladotanytarsus mancus* (Walker, 1856) de los embalses Españoles (Diptera : Chironomidae). *Graellsia*, 41 : 65-88.

Sæther O. A. 1977. — Female genitalia in Chironomidae and other Nematocera : morphology, phylogenies, keys. *Bull. Fish. Res. Bd Can.*, 197 : 1-209.

Sæther O. A. 1980. — Glossary of chironomid morphology terminology (Diptera : Chironomidae). *Ent. scand.* Suppl., 14 : 1-51.