

Redescription of the type specimens of *Georthocladius* (*Georthocladius*) *collarti* (Goet., 1941) and *Parachaetocladius scaturiginis* (Goet., 1940) n. comb. with keys to the European species [Diptera, Chironomidae]

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The known European species belonging to the genera *Georthocladius* Strenzke, 1941, and *Parachaetocladius* Wülker, 1959, are reviewed with taxonomic notes on: *Georthocladius collarti* (Goetghebuer, 1941) and *Parachaetocladius scaturiginis* (Goetghebuer, 1940) n. comb. The type specimens of these two species are redescribed and a key to European species of both genera is provided.

Redescription du matériel-type de *Georthocladius* (*Georthocladius*) *collarti* (Goet., 1941) et *Parachaetocladius scaturiginis* (Goet., 1940) n. comb. avec clés de détermination pour les espèces connues d'Europe [Diptera, Chironomidae]

Mots clés : Diptera, Chironomidae, genres *Georthocladius* et *Parachaetocladius*, *G. collarti* (Goet., 1941), *P. scaturiginis* (Goet., 1940) n. comb., clés de détermination, Europe.

Une révision des espèces européennes appartenant aux genres *Georthocladius* Strenzke, 1941 et *Parachaetocladius* Wülker, 1959 est proposée. Elle est accompagnée de notes taxonomiques sur *Georthocladius collarti* (Goetghebuer, 1941) et *Parachaetocladius scaturiginis* (Goetghebuer, 1940) n. comb. Une redescription du matériel-type de ces deux espèces et une clé de détermination des espèces européennes sont présentées.

1. Introduction

Recent publications on the genera *Georthocladius* Strenzke, 1941, and *Parachaetocladius* Wülker, 1959 including the first author (NAMAYANDEH et al. 2020, MOUBAYED-BREIL 2020), prompted the investigation of two Goetghebuer species: *Orthocladius* (*Chaetocladius*) *collarti*, 1941 and *Orthocladius scaturiginis*, 1940, the former a nomen dubium in *Chaetocladius*, the

latter a nomen dubium in Orthocladiinae in ASHE & O'CONNOR (2012). The type specimens were borrowed from the Royal Belgian Institute of Natural Sciences (RBINS). Both species have been assigned to the nominal subgenus of the genus *Georthocladius* by MAGOGA et al. (2017). However, the detailed examination of the holotype of *Orthocladius scaturiginis* shows it to be a *Parachaetocladius*. The type specimens are here redescribed in detail and assigned to their respective genera. This has facilitated the compilation of a key to the male adults of the two genera. Morphological terminology and measurements for the imagines follow those of SÆTHER (1980) and LANGTON & PINDER (2007); seta types in NAMAYANDEH et al. (2020).

2. Redescriptions

Georthocladius collarti (Goetghebuer, 1941)

Material examined

The studied material consists of male adult type specimens: *Orthocladius* (*Chaetocladius*) *collarti* (Goetghebuer, 1941), the lectotype and paralectotype, mounted on 2 slides.

- **Slide 1:** *Orthocladius collarti* n. sp., labelled as: Coll. et dét. M. Goetghebuer (only the left side of the hypopygium is mounted). *Georthocladius collarti* (Goetghebuer, 1941) comb. nov. Lectotype (B. Rossaro). *Orthocladius collarti*. n. comb. (M. Goetghebuer, dét. Type-locality: Hockai Hautes Fagnes -Belgium¹-, swampy habitat, 21 IV.1939. RBINS 18.073).

- **Slide 2:** *Orthocladius collarti*, male adult. Dr. M. Goetghebuer dét. Labelled: *Georthocladius* (*Georthocladius*) *collarti* (Goetghebuer, 1941). Paralectotype (B. Rossaro); hypopygium missing. Same date and locality as on slide 1. RBINS, I.G. 12.190; Coll. M. Goetghebuer.

Diagnosis

Median tubercle of vertex absent; tentorium kidney-shaped; palpomere 3 with 6 sensilla clavata and a single pointed sensilla coeloconica located distally; clypeus broadly rectangular; antenna 850 µm long, last flagellomere linearly elongate, weakly clubbed distally and bearing 5-6 curved stout sensilla chaetica located on pre-apical part. Lobes of anteprepronotum slightly gaping; acrostichals 13 in 1-2 rows, located close to anteprepronotum; humeral pit absent; scutellum with 11 setae; anal lobe of wing not undulated; sensilla chaetica present on tarsomeres of at least hind leg. Tergite IX semi-circular. Anal point subtriangular with rounded apex, with about 35 setae. Gonocoxite well-sclerotized at base and distally, apical inner margin with a small tubercle; virga hook-like, branched apically on 1 side, fused to base of gonocoxite; inferior volsella rectangular bearing long and short setae on both dorsal and ventral side; gonostylus slender in its proximal half, massive and widely expanded distally, dorsally with 3 longer setae; megaseta well-developed, located pre-apically on ventral side.

Male adult

(n = 1, lectotype; Figs 1A-M)

Orthocladius (*Chaetocladius*) *collarti* Goetghebuer, 1941

¹ Editor's note.

Total length 3.35 mm. Wing length 1.75 mm, TL/WL = 1.92. General colouration contrasting brown to blackish. Head dark brown; antennae pale brown; thorax contrasting brown to blackish, mesonotal stripes blackish; wing pale; legs brown to dark brown; abdomen brownish, anal segment contrasting pale brown to dark brown.

Head. Eyes bare between ommatidia, hairs absent on inner lateral margin; outer posterior margin with a few short setae; temporals 8 including 5 inner (uniserial) and 2-3 outer verticals, postorbitals absent; vertex (Fig. 1A) narrow triangular, coronals 4, median tubercle absent; tentorium (Fig. 1B) 135 μ m long, 35 μ m maximum width, kidney-shaped; cibarial pump racket-shaped; palp, first and second segments fused, segments 3 and 4 slightly subequal, segment 5 missing; length (μ m) of palpomeres: 47, 83, 123, 122; palpomere 3 (Fig. 1C) with 6 sensilla clavata (4 dorsal, 2 ventral) and 1 needle-like sensilla coeloconica; clypeus (Fig. 1D) 110 μ m long, 80 μ m width, vertically rectangular, with 10 setae in 2 rows. Antenna as in Magoga et al. (2017, Fig. 2), 850 μ m long; last flagellomere 460 μ m long, linearly elongate, weakly clubbed distally and bearing 5-6 curved sensilla chaetica; antennal groove reaching segment 3. Thorax. Lobes of antepnotum (Fig. 1E), widely gaping and slightly thinner at apex, lateral antepnotals 7; acrostichals present, 13 setae (25-30 μ m long), located a short distance from the antepnotum; dorsocentrals 13-14 in 1-2 rows; prealars 4-5 in 1 row; humeral pit absent; preepisternum bare; scutellum (Fig. 1G) with 11 setae in 2 rows. Wing. Brachiolum with 1 seta; membrane densely covered with macrotrichia visible at 400X; number of setae on veins: R, 8-9; R₁, 5; remaining veins bare; squamal area not undulated, squama with 21-22 setae in 2 rows. Legs. Tarsomeres of fore and mid leg missing. Sensilla chaetica present on tarsomeres: ta₁-ta₄ of PIII. Length (μ m) of tibial spurs of: PII, 55 and 60; PIII, 70 and 55. Length (μ m) of femora and tibiae of prothoracic (PI), mesothoracic (PII) and metathoracic (PIII) legs and tarsomeres of metathoracic leg as in following table:

	fe	ti	ta ₁	ta ₂	ta ₃	ta ₄	ta ₅	LR	BV	SV	BR
PI	815	855	-	-	-	-	-	-	-	-	-
PII	710	755	-	-	-	-	-	-	-	-	-
PIII	750	890	450	260	205	95	85	0.51	3.24	3.65	2.00

Hypopygium as in MAGOGA et al. (2017, Fig. 1) and Figs 1H-M; dorsal and ventral view as in Figs 1-I (1I, dorsal and 1J, ventral with tergite IX and anal point omitted). Tergite IX broadly semi-circular posteriorly. Anal point (Fig. 1H) 100 μ m long, 90 μ m maximum width at base, broadly triangular with rounded apex, bearing about 35 stout setae 30 μ m long. Latero-sternite IX with 8 setae inserted laterally (4 on each side). Sternapodeme and phallapodeme as in Fig. 1J, transverse sternapodeme weakly projecting oral at each end; coxapodeme thicker at base; phallapodeme much wider in its distal half. Virga (Figs 1I, K) well-sclerotized and fused to base of gonocoxite, hook-like and distinctly branched apically on one side. Gonocoxite (Fig 1I) 270 μ m long, 145 μ m maximum width; dorsal margin slightly-sclerotized and nearly hyaline, ventral margin well-sclerotized at base and apical part (Fig. 1I); inferior volsella (Fig. 1I) rectangular with long and short setae on both dorsal and ventral side. Gonostylus as in Figs 1L-M (1L, dorsal; 1M, ventral) 140 μ m long, 65 μ m maximum width, slender in its proximal half, massive and widely expanded distally, dorsal and ventral sides with 3-4 long setae; crista dorsalis absent; megaseta well-developed, clearly visible when the gonostylus is viewed ventrally. HR = 2.14; HV = 2.39.

Female, pupa and larva: unknown.

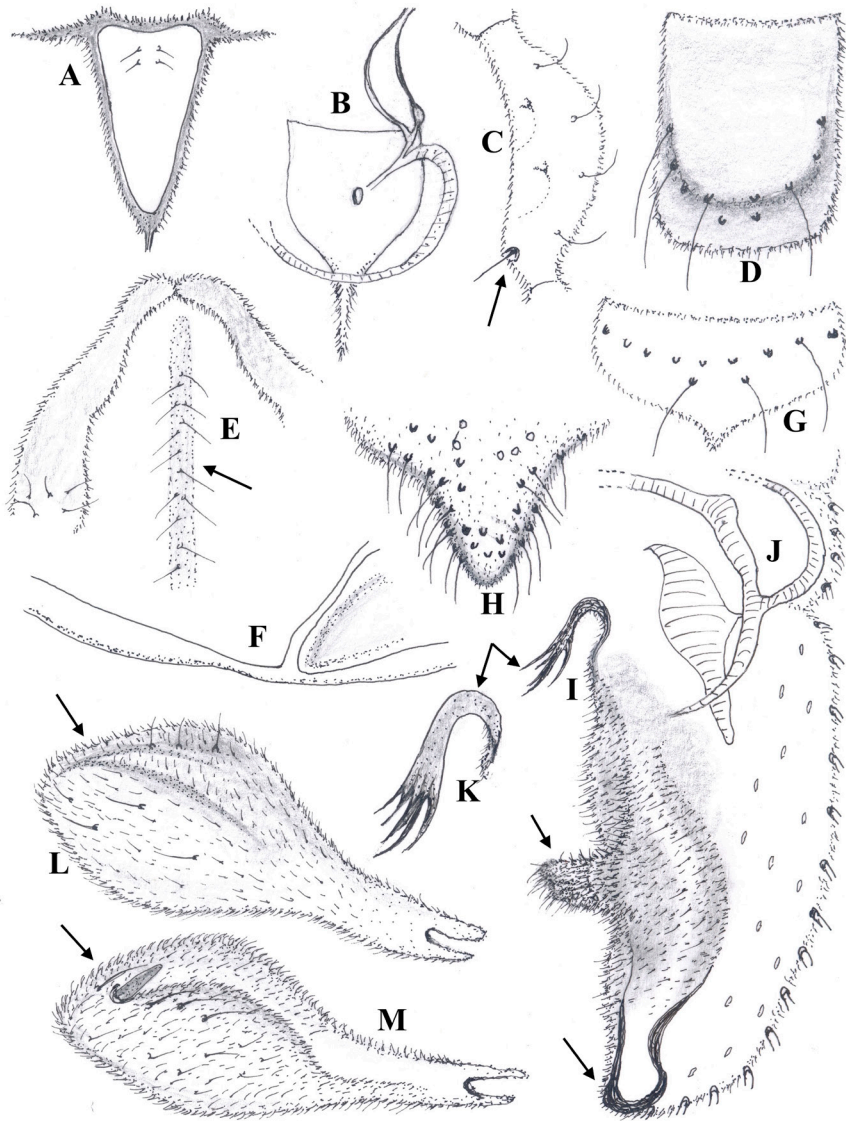


Figure 1. Male adult of *Georthocladius collarti*. Vertex with coronal setae (A); tentorium, cibarial pump and stipes (B); palpomere 3 with details of sensilla coeloconica (C); clypeus (D); lobes of antepnotum with acrostichals (E); humeral area (F); scutellum (G); anal point, dorsal (H); hypopygium, dorsal with junction base of gonocoxite (I); apodemes (J); virga (K); gonostylus, dorsal (L); gonostylus, ventral (M). The arrows indicate some distinguishing characters.

Figure 1. Adulte mâle de *Georthocladius collarti*. Vertex et soies coronales (A) ; tentorium, pompe cibariale et stipes (B) ; palpomère 3 et détails de la sensilla coeloconica (C) ; clypéus (D) ; lobes de l'antepnotum et soies acrosticales (E) ; aire humérale (F) ; scutellum (G) ; pointe anale, vue dorsale (H) ; hypopyge en vue dorsale et jonction basale du gonocoxite (I) ; apodèmes (J) ; virga (K) ; gonostyle, vue dorsale (L) ; gonostyle, vue ventrale (M). Les flèches indiquent quelques caractères discriminants.

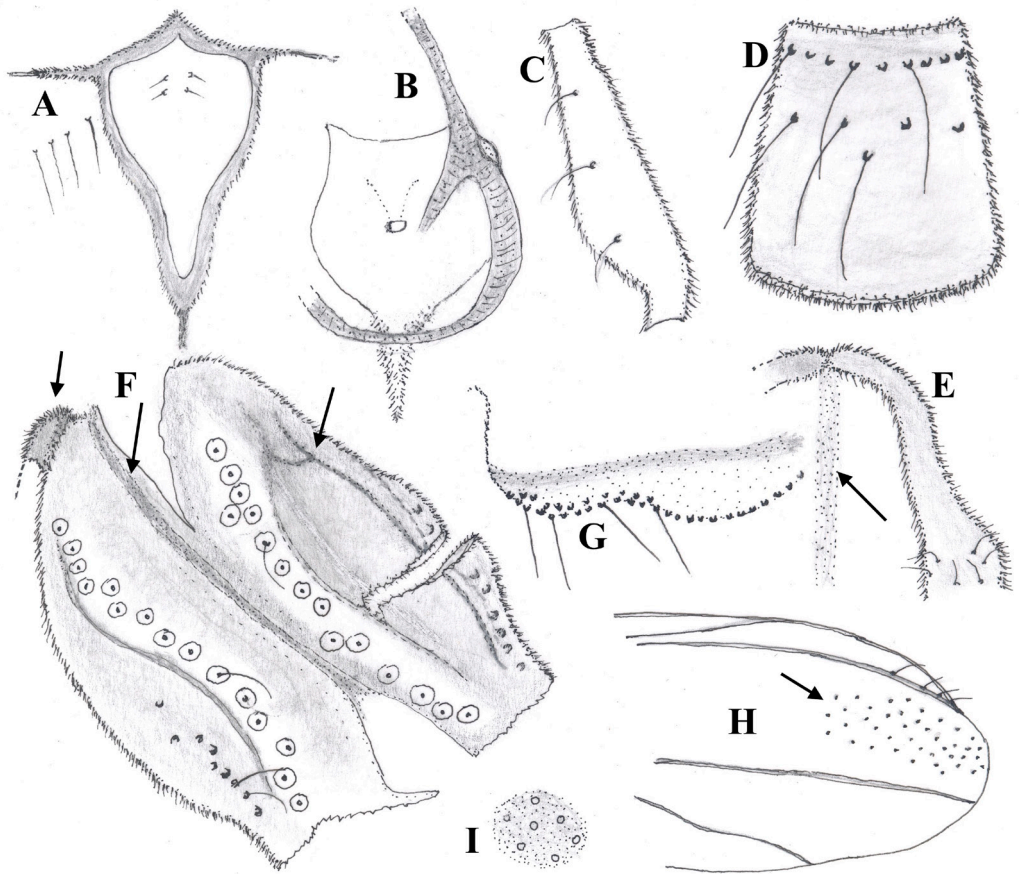


Figure 2. Male adult of *Parachaetocladius scaturiginis*. Vertex with coronal setae (A); tentorium, cibarial pump and stipes (B); palpomere 3 (C); clypeus (D); left lobe of antepronotum (E); scutum of thorax in dorsal view with left lobe of antepronotum (broken), dorsocentrals and prealars (F); squamal area of wing (G); distal part of wing with macrotrichia (H); detail of macrotrichia on wing drawn at 400X magnification (I). The arrows indicate some distinguishing characters.

Figure 2. Adulte mâle de *Parachaetocladius scaturiginis*. Vertex et soies coronales (A) ; tentorium, pompe cibariale et stipes (B) ; palpomère 3 (C) ; clypéus (D) ; lobe gauche de l'antepronotum (E) ; scutum du thorax en vue dorsale et lobe gauche de l'antepronotum (cassé), soies dorsocentrales et préalaires (F) ; aire squamale de l'aile (G) ; partie distale de l'aile avec des macrotriches (H) ; détails des macrotriches alaires tracées au grossissement 400X (I). Les flèches indiquent quelques caractères discriminants.

Parachaetocladius scaturiginis (Goetghebuer, 1940) n. comb.

Material examined

The studied material consists of male adult type specimens: *Georthocladius* (*Georthocladius*) *scaturiginis* (Goetghebuer, 1940), the lectotype and paralectotype, mounted on two slides; *Orthocladius scaturiginis* Goetghebuer, 1940, the holotype, mounted on one slide.

Holotype. *Orthocladius scaturiginis* Goetghebuer, 1940; one male adult, was stored in isin-glass, currently mounted on one slide and labelled by MAGOGA et al. (2017) as: *Georthocladius scaturiginis* (Goetghebuer, 1940, new comb.); type-locality: around Abisko area in Swedish Lapland, Thienemann, 1939; RBINS, 18.073. Coll. M. Goetghebuer.

Diagnosis

Head. Median tubercle of vertex triangular and projecting; temporals 20-21 including 17-18 inner and 3-4 outer verticals; tentorium linear, parallel-sided and elongate; palpomere 3 with 3 sensilla clavata, lacking sensilla coeloconica; clypeus vertically sub-rectangular to tongue-like, with 13 setae in 3 rows. Thorax. Lobes of antepnotum not gaping; lateral antepnotals 5-6, acrostichals absent, dorsocentrals 15 in 1-2 rows, prealars 9; humeral pit indistinct. Wing. Anal lobe undulated, distal area of membrane (cell R₅) covered with macrotrichia (about 37) visible at 100X magnification, dense punctuation visible at 200X magnification, squama with 35-37 stout, needle-like setae. Tergite IX broadly sub-rectangular, dorsal setae absent; anal point triangularly elongate, bearing about 18 setae located along the lateral inner margins (9 on each side), apical area without setae. Gonocoxite well-sclerotized on ventral side, apical inner sclerotization with a small inner tubercle, superior volsella present, a low rounded lobe; inferior volsella broadly semi-circular, bearing short needle-like setae both dorsally and ventrally. Gonostylus *Orthocladius*-type, anterior dorsal margin concave, anterior surface with 3 long orally directed setae, posterior angle hyaline and bare; crista dorsalis present, a tooth-like projection located pre-apically; megaseta well-developed, located apically.

Male adult

(n = 1, holotype; Figs 2A-I, 3 A-D)

- *Orthocladius scaturiginis* Goetghebuer, 1940

- *Georthocladius (Georthocladius) scaturiginis* (Goetghebuer, 1940) [MAGOGA et al. 2017].

General colouration brown to dark brown with contrasting dark brown to brownish head, mesonotal stripes, legs and anal segment. Head and antennae dark brown to brownish; thorax contrasting brown to dark brown, humeral pit pale brown; wing pale to light brown; legs dark brown; abdomen brownish, gonocoxite and gonostylus contrasting pale brown to dark brown.

Head. Eyes bare between ommatidia, hairs absent on inner lateral margin; vertex (Fig. 2A) broad sub-rectangular in its proximal half, broader distally; coronals 4, median tubercle triangular and projecting; tentorium (Fig. 2B) linearly elongate from base to apex; temporals consist of 20-21 setae including 17-18 inner and 3 outer verticals, postorbitals absent; palp 5-segmented, palpomere 3 longer than 4, length (µm) of palpomeres: 55, 70, 165, 115, 185; palpomere 3 (Fig. 2C) with 3 sensilla clavata, sensilla coeloconica absent; clypeus (Fig. 2D) about 200 µm long, 150 µm wide at base and 190 at apex, broadly rectangular, bearing 14 setae in 3 rows; antenna (right, missing; left, half preserved), antennal groove beginning on segment 2. Thorax. Antepnotum (Fig. 2E) well-developed, lobes not gaping and thinner at apex; lateral antepnotals 5-6; acrostichals absent, dorsocentrals 15 in 1-2 rows; prealars 9 in one sinuous row; preepisternum bare; humeral pit indistinct; scutellum missing. Wing (Figs 2G-I). Brachiolum with 1 seta; anal lobe (Fig. 2G) distinctly undulated; distal area of cell R₅ (Figs 2H-I) covered with macrotrichia (about 37) visible at 100X magnification, punctuation of membrane visible at 200X magnification; costa and vein R₄₊₅ ending with a characteristic notch; number of setae on veins: R, 9-10; R₁, 14-15; R₄₊₅, 4-5; remaining veins bare; squama with 35-37 stout needle-like setae located in 2 rows in proximal half and in 1 row distally. Legs. Sensilla chaetica present on tarso-

meres: ta₁-ta₄ of PI; ta₁-ta₅ of PII-PIII. Length (µm) of tibial spurs of: PI, 65; PII, 45; PIII, 80. Length (µm) and proportions of prothoracic (PI), mesothoracic (PII) and metathoracic (PIII) legs as in following table:

	fe	ti	ta ₁	ta ₂	ta ₃	ta ₄	ta ₅	LR	BR
PI	1090	1070	865	455	390	225	150	0.81	1.60
PII	1110	1040	530	305	240	160	160	0.51	1.35
PIII	1195	1230	735	425	350	215	180	0.60	1.10

Hypopygium as in Figs 3A-B (3A, dorsal; 3B, ventral). Tergite IX broadly sub-rectangular with straight lateral margins, dorsal setae absent. Anal point about 150 µm long, 120 µm maximum width, cylindrical to triangularly elongate, narrowing distally to a rounded apex, bearing about 18 setae located along the lateral inner margins (9 on each side), apical area without setae. Latero-sternite IX with about 14 setae (7 on each side). Sternapodeme and phallapodeme (Fig. 3B), transverse sternapodeme nearly straight; lateral sternapodeme pointed at base; coxapodeme linearly thin; phallapodeme sickle-shaped, pointed basally and apically. Virga absent. Gonocoxite (Figs 3A-B) 310 µm long, 110 µm maximum width, ventral side well-sclerotized, apical inner sclerotization ending with a small inner tubercle; superior volsella distinct, a wide low rounded lobe; ventral inner margin with 12 stout setae. Inferior volsella 75 µm long, 35 µm maximum width, broadly semi-circular, covered with short setae (15-25 µm long) both dorsally and ventrally. Gonostylus (Figs 3C-D) 180 µm long, 40-45 µm maximum width, *Orthocladius*-type, anterior dorsal margin concave, anterior surface with 3 long orally directed setae, posterior margin slightly swollen medially, posterior angle hyaline and bare; crista dorsalis present pre-apically, a tooth-like projection; megaseta well-developed, located apically. HR = 1.72; HV = 2.56.

Female, pupa and larva: unknown.

3. Remarks

3.1. Genus *Georthocladius* Strenzke, 1941

Currently, six *Georthocladius* species are recorded from Europe: *G. collarti*, *G. luteicornis* (Goetghebuer, 1941); *G. meluensis* Moubayed-Breil, 2020; *G. retezati* (Albu, 1972); *G. scaturiginis* and *G. techensis* Moubayed-Breil, 2020. *G. scaturiginis* is here transferred to *Parachaetocladius*, leaving five recorded European species. The hypopygium of *G. collarti* and *G. luteicornis* are similarly illustrated in GOETGHEBUER (1941) and LANGTON & PINDER (2007). Therefore, *G. collarti* is considered here as a senior synonym of *G. luteicornis*. However, the examined hypopygium of *G. collarti* shows a distinct well-sclerotized virga consisting of an inversed curved hook, which is fused to the junction base of the gonocoxite. *G. retezati* is distinct by virtue of the following characters as illustrated in ALBU (1972): inferior volsella digitiform; gonostylus with a typical posterior expansion, crista dorsalis well-developed on distal half.

3.2. Genus *Parachaetocladius* Wülker, 1959

According to data provided in the literature (ASHE & O'CONNOR 2012, MAGOGA et al. 2017, NAMAYANDEH et al. 2020), the genus *Parachaetocladius* is represented in Europe by 3 species: *P. abnobaeus* (Wülker, 1959), *P. pyrenaeus* Moubayed, 2020 and *P. scaturiginis* (Goetghebuer, 1941) n. comb. This last species, first described as *Orthocladius scaturiginis* (in GOETGHEBUER,

1940) and then transferred by MAGOGA et al. (2017) to *Georthocladus* (*Georthocladus*), is reassigned here to the genus *Parachaetocladus*.

4. Differential diagnosis - Discussions

Based on some features found in the male adults of *G. collarti* and *P. scaturiginis*, these two species can be separated from their congeners by a combination of characters.

4.1. *G. collarti* (senior synonym of *G. luteicornis*)

- Median tubercle of vertex absent (Fig. 1A); present in both *G. meluensis* and *G. techensis* (in MOUBAYED-BREIL 2020, Figs 1A, 2A);
- Palpomere 3 with only 1 thin and pointed sensilla coeloconica (Fig. 1C); 3-4 thicker with rounded apex in both *G. meluensis* and *G. techensis* (in MOUBAYED-BREIL 2020, Figs 1C, 2C);
- Anal point (Fig. 1H) subtriangular with about 35 setae; triangular and bearing up to 40 setae in *G. retezati* (ALBU 1972, Fig. 3); decumbent setae present in *G. techensis* (in MOUBAYED-BREIL 2020, Figs 2H, K), absent in both *G. collarti* and *G. retezati*;
- Virga hook-shaped and fused to the base of gonocoxite (Figs 1I, K); differently figured in both *G. meluensis* (Figs 1I-J) and *G. techensis* (Figs 2I);
- Inferior volsella rectangular (Fig. 1I); digitiform in *G. retezati* (ALBU 1972, Fig. 3), a broad lobe with stout, decumbent distal setae in *G. meluensis* (Figs 1I, L) and triangular with pointed apex in *G. techensis* (in MOUBAYED-BREIL 2020, Fig. 2H);
- Gonostylus widely expanded distally (Figs 1L-M); slender and linearly elongate in *G. meluensis* (Figs 1M-N) and capital L-shaped with characteristic pointed teeth apically in *G. techensis* (in MOUBAYED-BREIL 2020, Figs 2L-M);
- Posterior expansion absent on gonostylus; distinctly present in *G. retezati* (in ALBU 1972, Fig. 3).
- Crista dorsalis absent; present in *G. retezati*;
- Megaseta inserted pre-apically on ventral side (Fig. 1M); located apically in *G. retezati* (in ALBU 1972, Fig. 3; TATOLE 1999, Fig. 1B), *G. meluensis* (in MOUBAYED-BREIL 2020, Figs 1M-N) and *G. techensis* (in MOUBAYED-BREIL 2020, Figs 2L-M).

4.2. *P. scaturiginis* (n. comb.)

Some morphological affinities between *P. scaturiginis* and other related species are highlighted in the following discussion. Beside the 2 known congeners from Europe (*P. abno-baeus* and *P. pyrenaicus*), two Nearctic species (*P. broankerothurrie* Namayandeh & Beresford, 2020, *P. imberbus* Sæther & Sublette, 1983) are also taken in consideration, due to a close resemblance in the shape of the gonostylus;

- Anterior margin of vertex with a median triangular tubercle (Fig. 2A); differently figured in *P. pyrenaicus* (NAMAYANDEH et al. 2020, Fig. 6A);
- Tentorium linear and elongate (Fig. 2B); distinctly swollen distally in *P. imberbus* (in SÆTHER & SUBLETTE 1983, Fig. 25A) and *P. pyrenaicus* (in NAMAYANDEH et al. 2020, Fig. 6B);

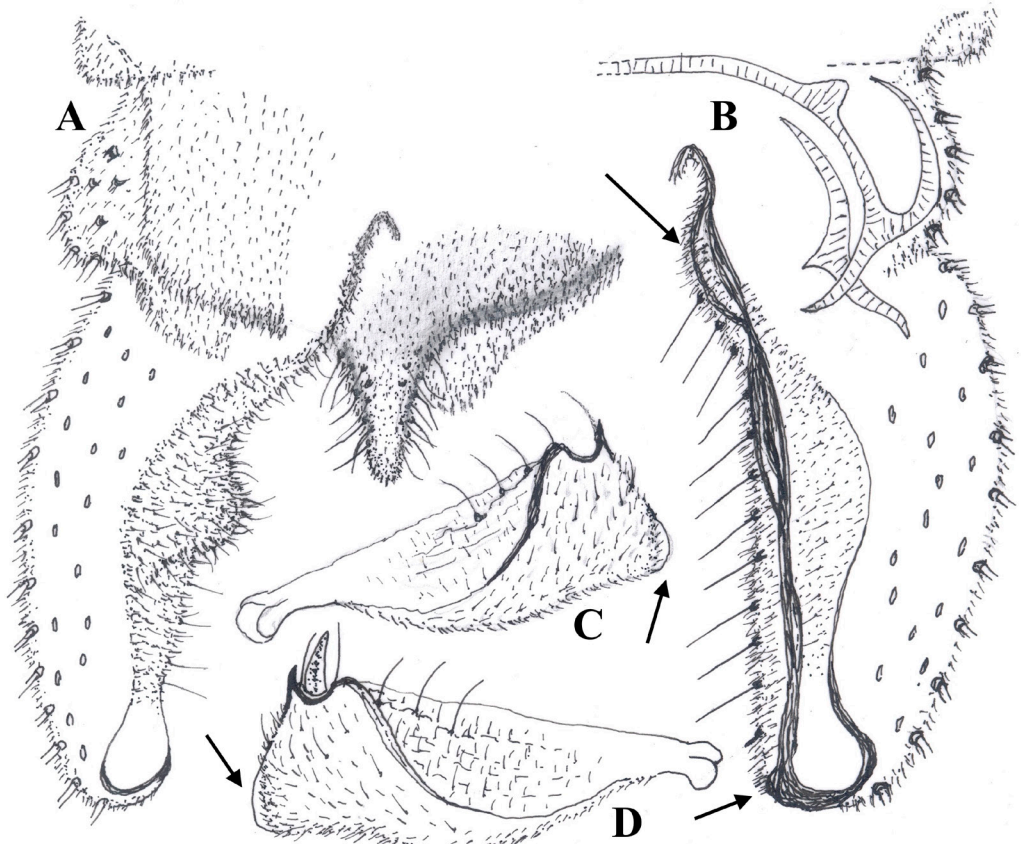


Figure 3. Male adult of *Parachaetocladius scaturiginis*. Hypopygium, dorsal with tergite IX, anal point and left gonocoxite (A); apodemes and right gonocoxite, ventral (B); left gonostylus, dorsal (C); right gonostylus, dorsal (D). The arrows indicate some distinguishing characters.

Figure 3. Adulte mâle de *Parachaetocladius scaturiginis*. Hypopyge en vue dorsale avec tergite IX, pointe anale et gonocoxite gauche (A) ; apodèmes et gonocoxite droit en vue ventrale (B) ; gonostyle gauche, vue dorsale (C) ; gonostyle gauche, vue dorsale (D). Les flèches indiquent quelques caractères discriminants.

- Palpomere 3 (Fig. 2C) with only 3 sensilla clavata; differently figured in *P. imberbus* (SÆTHER & SUBLETTE 1983, Fig. 25A) and *P. pyrenaicus* (in NAMAYANDEH et al. 2020, Fig. 6C);

- Clypeus rectangular (Fig. 2D); widely trapezoidal in *P. pyrenaicus* (in NAMAYANDEH et al. 2020, Fig. 6D);

- Acrostichals absent (Figs 2E-F);

- Lobes of antepnotum not gaping (Fig. 2E); distinctly separated in *P. pyrenaicus* (in NAMAYANDEH et al. 2020, Fig. 6E);

- Lobe of wing undulated (Fig. 2G) as in *P. pyrenaicus* (in NAMAYANDEH et al. 2020, Fig. 6G);
- Macrotrichiae present on distal area of cell r_5 (Fig. 2H-I); absent in both *P. imberbus* (in SÆTHER & SUBLETTE 1983, Fig. 25C) and *P. pyrenaicus*;
- Anal point (Fig. 3A) nearly cylindrical and narrowing distally; widely semi-circular in *P. abnobaeus* (in WÜLKER 1959, Fig. 2) and *P. pyrenaicus* (in NAMAYANDEH et al. 2020, Fig. 6H);
- Gonocoxite (Figs 3A-B) well-sclerotized on ventral side; not so in *P. abnobaeus* (in WÜLKER 1959, Fig. 2) and *P. pyrenaicus* (in NAMAYANDEH et al. 2020, Fig. 6I);
- Superior volsella present (Fig. 3B); absent in *P. abnobaeus*, *P. imberbus* and *P. pyrenaicus*;
- Inferior volsella broadly semi-circular; digitiform to rectangular in *P. abnobaeus*, *P. imberbus* and *P. pyrenaicus*;
- Gonostylus (Figs 3C-D) is *Orthocladius*-type, the anterior dorsal part with concave margin (Figs 3C-D) resembles that of *P. abnobaeus* (in WÜLKER 1959, Fig. 2; holotype), *P. broankerothurrie* (in NAMAYANDEH et al., 2020; Fig. 5B), *P. imberbus* (in SÆTHER & SUBLETTE, 1983; Fig. 25D) and *P. pyrenaicus* (in MOUBAYED, 2020, Figs 6J-K). Posterior apical expansion absent (Figs 3C-D); present in *P. abnobaeus* and *P. pyrenaicus*;
- Crista dorsalis tooth-like, located pre-apical to megaseta; absent in *P. abnobaeus*, *P. broankerothurrie*, *P. imberbus* and *P. pyrenaicus*.

Key to known male adult of *Georthocladius* and *Parachaetocladius* genera from Europe

Genus *Georthocladius*

1. Anal point concave apically, widely extended transversally, with decumbent ‘c-type’ setae (MOUBAYED-BREIL 2020, Figs. 2H, K); gonostylus capital L-shaped (MOUBAYED-BREIL 2020, Figs. 2L-M), with pre-apical spines ***G. techensis***
 - Anal point broadly triangular to sub-rectangular, without decumbent setae; gonostylus without pre-apical spines 2
2. Inferior volsella broad lobe-like, bearing stout curved ‘b-type’ setae (MOUBAYED-BREIL 2020, Figs 1I, L); gonostylus uniformly elongate, megaseta inserted apically (MOUBAYED-BREIL 2020, Figs 1M-N) ***G. meluensis***
 - Inferior volsella rectangular or digitiform, lacking ‘b-type’ setae; gonostylus globular distally, megaseta inserted pre-apically or apically 3
3. Gonostylus with a distinct posterior expansion; megaseta located dorsally ***G. retezati***
 - Gonostylus without posterior expansion megaseta located ventrally...***G. collarti*** (syn. *G. luteicornis*)

Genus *Parachaetocladius*

1. Anal point short and broadly semi-circular; inferior volsella digitiform or sub-rectangular; virga present; gonostylus not *Orthocladius*-type, posterior expansion present 2
 - Anal point long and cylindrical (Fig. 3A); virga absent; gonostylus *Orthocladius*-type (dorsal inner margin concave), posterior expansion absent..... ***P. scaturiginis***
2. Inferior volsella digitiform, distinctly bent downwards, located on proximal half of gonocoxite; crista dorsalis present (WÜLKER 1959, Fig. 2) ***P. abnobaeus***

- Inferior volsella sub-rectangular, projecting at a right angle, located on distal half of gonocoxite; crista dorsalis absent *P. pyrenaicus*

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