

Article

Heleniella crenophila and *H. helenae* spp. n., two new species occurring in France (Diptera, Chironomidae)

Joel Moubayed

Freshwater & Marine Biology, 10 rue des Fenouils, 34070 Montpellier, France; chirojmb@free.fr

Reçu le 16 mai 2026 - Accepté le 22 juin 2026 - Publié le 27 juillet 2026

ABSTRACT

Heleniella crenophila sp. n. and *H. helenae* sp. n. are described and diagnosed based on material collected in two high mountainous sites: the first one in the maritime Alps (spring of Fontanalba, SE-France, alt. 1700-1500 m), the second in eastern Pyrenees (glacial upper stream of the River Têt, Massif of Carlit, S-France, alt. 2300-2100 m). *H. crenophila* sp. n. is described as male adult and pupal exuviae, *H. helenae* sp. n. is described only as male adult. *H. crenophila* sp. n. keys near *H. ornatcollis* (Edwards, 1929) and *H. assiana* Moubayed, 2026, while *H. helenae* sp. n. resembles to *H. gaultieri* Moubayed, 2018. Main distinguishing characters found in the male adult are: distribution pattern and number of setae on postnotum, unusual shape of virga, sternapodeme, phallapodeme, anal point, inferior volsella and gonostylus. The pupal exuviae of *H. crenophila* sp. n. is briefly described and illustrated on the basis of the chaetotaxy and distribution pattern of armament on sternites I-III. To date, the two discovered species increase the total number of known *Heleniella* species to six from France, with *H. dorieri* Serra-Tosio, 1966, *H. gaultieri*, *H. ornatcollis* and *H. serratosioi* Ringe, 1976. Taxonomic notes and comments on the ecology and geographical distribution of the two new species are given.

Keywords: taxonomy, new species, Maritime Alps, Eastern Pyrenees, conservation

Heleniella crenophila et *H. helenae* spp. n., deux nouvelles espèces présentes en France (Diptera, Chironomidae)

RÉSUMÉ

Heleniella crenophila sp. n. et *H. helenae* sp. n. sont décrites et diagnostiquées à partir d'un matériel collecté dans deux sites de haute montagne : la première dans les Alpes-Maritimes (source de Fontanalba SE-France, alt. 1 700-1 500 m), la seconde dans les Pyrénées-Orientales (cours supérieur glaciaire de la rivière Têt, Massif du Carlit, S-France, alt. 2 300-2 100 m). *H. crenophila* sp. n. est décrite à l'état d'adulte et d'exuvie nymphale, *H. helenae* sp. n. seulement à l'état d'adulte. *H. crenophila* sp. n. est proche d'*H. ornatcollis* (Edwards, 1929) et d'*H. assiana* Moubayed, 2026, alors qu'*H. helenae* sp. n. ressemble à *H. gaultieri* Moubayed, 2018. Les principaux caractères distinctifs de l'adulte mâle sont : distribution et nombre de soies sur le postnotum, forme inhabituelle de la virga, du sternapodème, du phallapodème, de la pointe anale et du gonostyle. L'exuvie nymphale d'*H. crenophila* sp. n. est brièvement décrite et illustrée à partir de la chaetotaxie et de la distribution de l'ornementation sur les sternites I-III. Ces nouvelles descriptions portent à six le nombre d'espèces du genre *Heleniella* en France, avec *H. dorieri* Serra-Tosio, 1966, *H.*

gaultieri, *H. ornatcollis* et *H. serratosioi* Ringe, 1976. Des données taxonomiques et des commentaires sur l'écologie et la distribution géographique des deux nouvelles espèces sont fournis.

Mots-clés : taxonomie, nouvelle espèce, Alpes maritimes, Pyrénées orientales, conservation

1. Introduction

Based on data provided on the taxonomy, geographical distribution and ecology of the genus *Heleniella* Gowin, 1943 (ALBU 1966, 1972, BRUNDIN 1956, SERRA-TOSIO 1967, REISS 1968, RINGE 1976, CRANSTON et al. 1989, SERRA-TOSIO & LAVILLE 1991, ANDERSEN & WANG 1997, LANGTON & PINDER 2007, ASHE & O'CONNOR 2012, SÆTHER & SPIES 2013, MOUBAYED-BREIL & ASHE 2016, MOUBAYED-BREIL & LODS-CROZET 2016, MOUBAYED-BREIL & GAULTIER 2018, MOUBAYED-BREIL 2020), currently there are six reported *Heleniella* species from Europe: *H. extrema* Abu, 1972; *H. dorieri* Serra-Tosio, 1966; *H. gaultieri* Moubayed-Breil, 2018; *H. helvetica* Moubayed & Lods-Crozet, 2016; *H. ornatcollis* (Edwards, 1929); *H. serratosioi* Ringe, 1976). Until then the genus is represented in France by four species: *H. dorieri*, *H. gaultieri*, *H. ornatcollis* and *H. serratosioi*.

On the basis of some morphological common characters found in the male adult, *H. ornatcollis* represents the nearest related species to *H. crenophila* sp. n. while *H. helenae* sp. n. resembles to *H. gaultieri*. In this paper, the male adult of the two new species is diagnosed and described while only the pupal exuviae of *H. crenophila* sp. n. is figured and illustrated based on male pharate adult.

2. Material and methods

The studied material was collected using some standard methods: sweep net for adults; Surber net for larvae and pupae and Brundin drift nets for drifted pupae and pupal exuviae (Pe) floating on the surface of the water. *H. crenophila* sp. n. was collected as male pharate adult and Pe in the spring of Fontanalba (SE-France, alt. 1700-1500 m). Male adult of *H. helenae* sp. n. was captured in the upper glacial basin of the River Têt

running along the Massif of Carlit (Eastern Pyrenees, alt. 2300-2100 m). Preserved male adult in 80% ethanol, was cleared of musculature in 90% lactic acid (head, thorax, abdomen and anal segment) for about 60 to 80 minutes; this can be left overnight at room temperature without any detrimental damage. When clearing was complete the type-material was mounted in polyvinyl lactophenol. Before the final slide mountings, the hypopygium including the tergite IX and the anal point were viewed ventrally and laterally to examine and draw all the necessary details of the species. Additional information is provided in MOUBAYED et al. (2024) and MOUBAYED (2026). Morphological terminology and measurements follow those of SÆTHER (1980) and LANGTON & PINDER (2007) for the adult and LANGTON (1991) for the pupal exuviae.

3. Descriptions

Heleniella crenophila sp. n.

urn:lsid:zoobank.org:act:331EDF61-94DE-41AB-8932-546DF2D80D15

Material examined

Holotype. France. One male pharate adult; valley of Fontanalba, Tende city (06163), karstic spring of Fontanalba (7.490 °E, 44.094 °N); alt. 1700-1500 m; calcareous water, conductivity and temperature of water: 400 µS/cm, 12 °C; 27.VI.2016.

Paratype (leg. J. Moubayed). One male adult, same locality and date as for holotype.

Holotype. Mounted on one slide with hypopygium and 2 Pe (1 male and 1 female); remaining parts are missing. Paratype mounted on one slide.

Holotype (GBIFCH01224299) and **paratype** (GBIFCH01224300) are deposited in the collections of the 'Naturéum, Muséum cantonal des

	fe	ti	ta ₁	ta ₂	ta ₃	ta ₄	ta ₅	LR
PI	550	510	260	140	100	110	110	0.51
PII	515	520	250	135	110	65	70	0.48
PIII	535	620	310	150	135	75	70	0.50

Table I. *Heleniella crenophila* sp. n., Leg ratio of the male adult ($n = 2$, holotype). "LR = Length of tarsomere ta_1 divided by length of tibia (ti)".

sciences naturelles, département de Zoologie, Palais de Rumine, Place de la Riponne 6, CH-1014 Lausanne, Suisse'.

Etymology: the name "*crenophila*" of the new species refers to the Fontanalba spring, which is located in the Maritime Alps, where the type-material was collected.

Diagnostic characters

H. ornatcollis represents the nearest *Heleniella* species to *H. crenophila* sp. n., which is easily separated from other related species by the following combination of pertinent characters found in the male adult: postnotum with 7 setae; anal tergite bands absent; virga narrowed bell-like shaped, composed of three not fused rods projecting downwards, one shorter placed medially and two much longer inserted laterally which are reaching tergite IX; phallapodeme linearly elongated and uniformly thick, aedeagal lobe short and lacking basal expansion; anal point well-developed, distinctly swollen medially and bearing about 8 dorsal setae, dorsal hump low; inferior volsella broadly rectangular with a characteristic undulation on proximal part, distal area with two specific and characteristic transverse rows of setae; gonostylus shaped as in *H. ornatcollis*, bearing a markedly low crista dorsalis.

Male imago

($n = 2$; Fig. 1A-H; Photo 1A-F)

Medium to big sized *Heleniella* species. Total length 2.75 mm. Wing length 1.55 mm. Colouration dark brown to brownish in general. Head, antenna, thorax and anal segment brown to dark brown; legs brownish; abdomen brown, anal segment brownish.

Head, thorax and legs are described from the paratype. Head. Eyes densely pubescent, inner eye margin bare; temporals consist of 12 setae including 9 inner and 3 outer verticals. Clypeus trapezoidal. Palp 5-segmented; sensilla clavata absent on palpomere 3. Antenna 13-segmented, 835 μm long; antennal groove clearly visible, beginning on segments 3 and reaching ultimate flagellomere; last flagellomere 285 μm long, well-clubbed apically, with sensilla chaetica apically; AR 0.52. Thorax. Anteprenotum bearing numerous setae (about 25), anteprenotal lobes in close contact, very thick; acrostichals densely covered with setae, about 25; scutellum with 6 setae; postnotum (Fig. 1A) with 7 setae (on each side) including 5 on anterior part and 2 in one row on lateral side. Wing. Brachiolium with one seta; squama bare. Legs. Tarsus ta_4 of PII shorter than ta_5 of PII; LR of PI 0.50. Length (μm) and proportions of prothoracic (PI), mesothoracic (PII) and metathoracic (PIII) legs as in Table I.

Abdomen (described from the holotype). Hypopygium in dorsal view (Fig. 1B, Photo 1); sternapodeme and coxapodeme visible in Photo 1. Tergite IX semicircular, posterior margin with one single row of short setae, in one row; anal tergite bands apparently absent. Laterosternite IX with 6 setae (3 on each side). Virga (Fig. 1C, Photo 1A) about 85 μm long, typical long narrowing bell-like shaped, consists of 3 separate rods projecting downwards, median one shorter, lateral rods much longer reaching posterior part of tergite IX. Phallapodeme (Fig. 1D) 55-60 μm long, uniformly elongate with concave median part, aedeagal lobe and basal expansion absent.

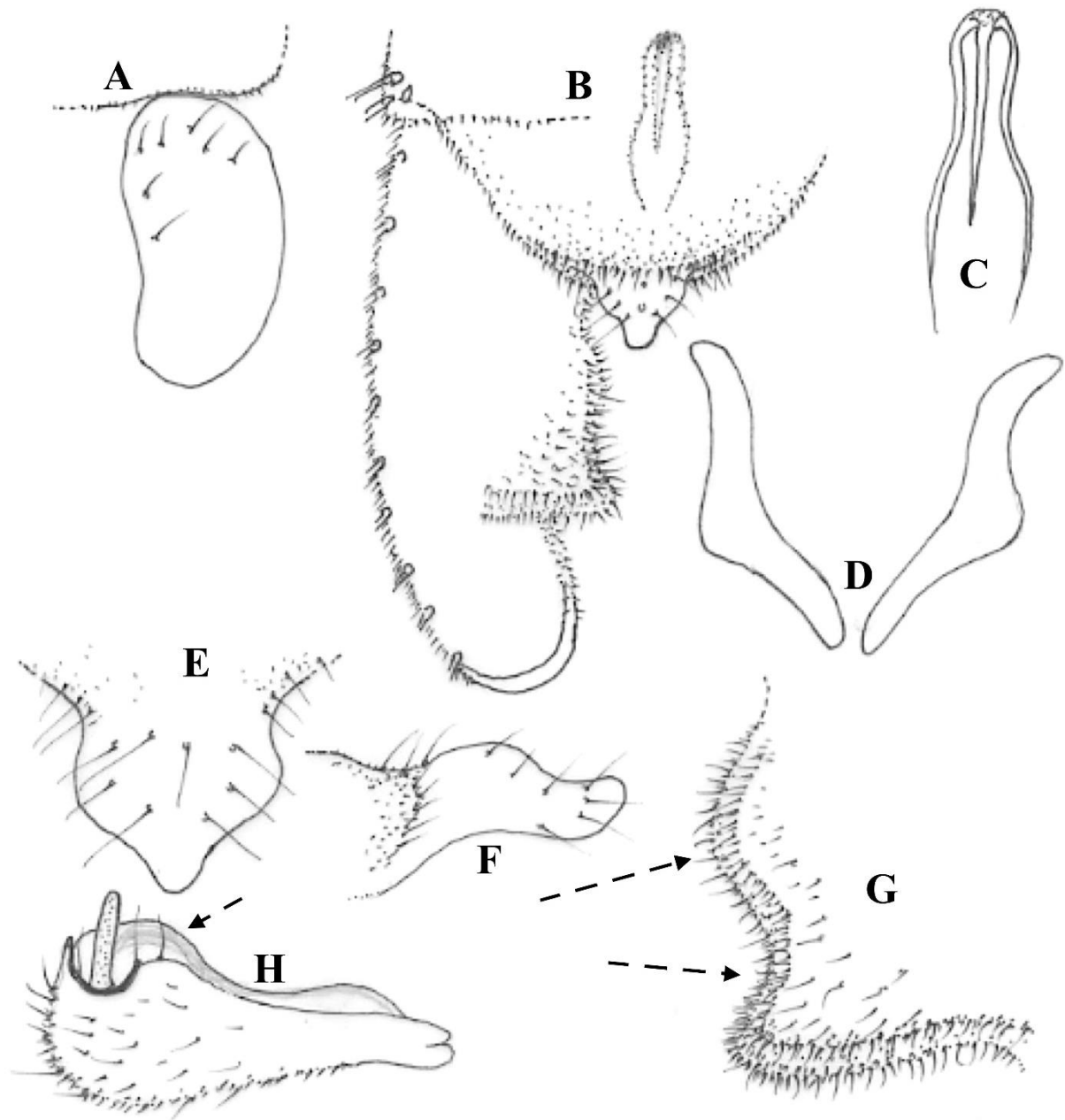
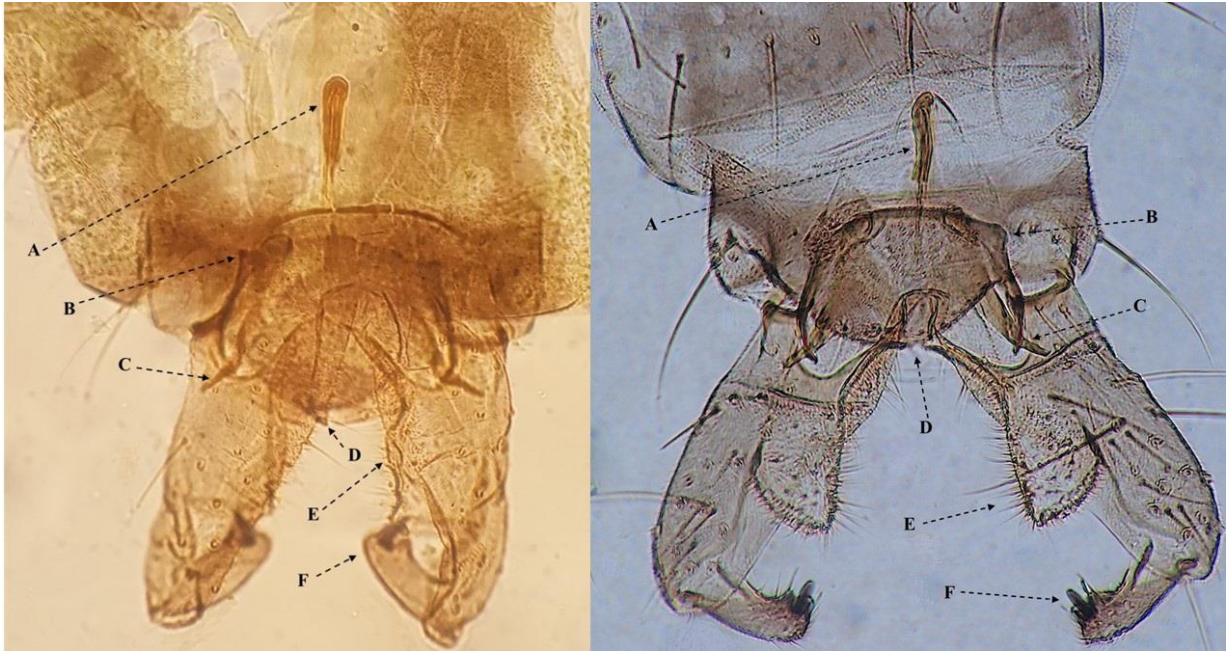


Figure 1. Male adult of *Heleniella crenophila* sp. n.: postnotum, (A); hypopygium in dorsal view (B); virga (C); phallapodeme, 2 aspects (D); anal point in dorsal (E) and lateral view (F); inferior volsella (G); gonostylus (H). Arrows indicate some distinctive characters.

Figure 1. Adulte mâle d'*Heleniella crenophila* sp. n. : postnotum (A) ; hypopyge, vue dorsale (B) ; virga (C) ; phallapodème, 2 aspects (D) ; pointe anale en vues dorsale (E) et latérale (F) ; volsella inférieure (G) ; gonostyle (H). Les flèches indiquent quelques caractères distinctifs.

Anal point (Figs 1B, E dorsal; 1F lateral) about 25 μm long, enlarged basally and swollen medially, distal part constricted ending with a specific distal drop-like apex, bearing about 8 dorsal setae.

Inferior volsella (Fig. 1G, Photo 1E) massive and broadly triangular with a distinct undulated inner margin, basal part swollen proximally, distal



Photos 1-2. Hypopygium in dorsal view of *Heleniella* spp. Photo 1 (left): *H. crenophila* sp. n.; photo 2 (right): *H. ornaticollis*, Ardennes, north-eastern France (photo G. Coppa).

Photos 1-2. Hypopyge en vue dorsale d'*Heleniella* spp. Photo 1 (gauche) : *H. crenophila* sp. n. ; photo 2 (droite) : *H. ornaticollis*, département des Ardennes, Nord-Est France (cliché G. Coppa).

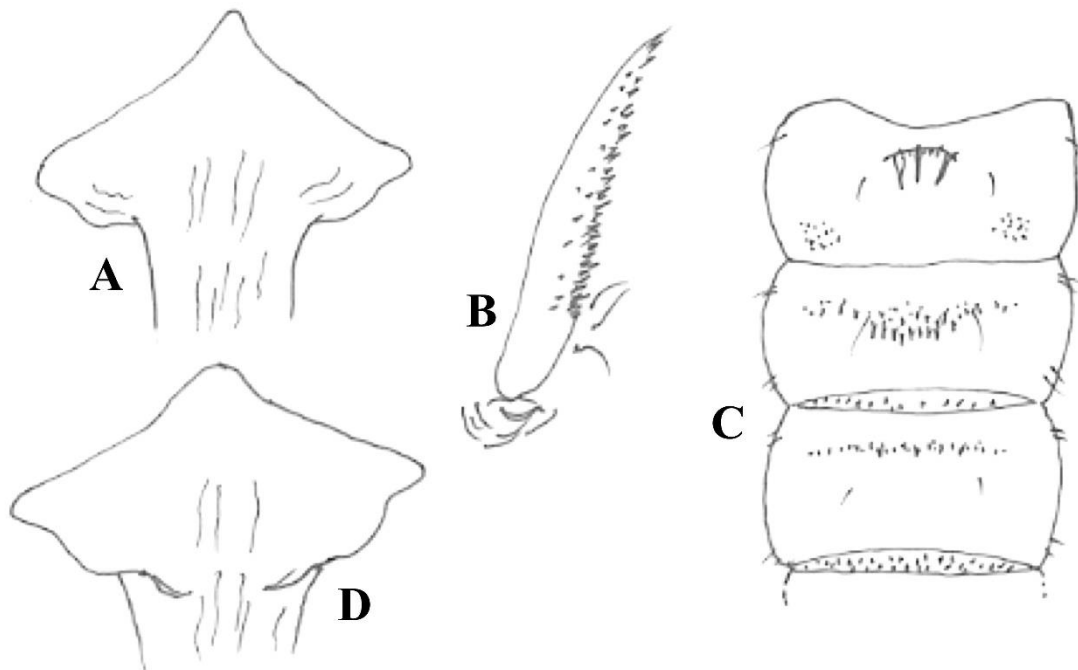


Figure 2. Pupal exuviae of *Heleniella* spp. *H. crenophila* sp. n.: frontal apotome (A); thoracic horn and precorneal setae (B); armament and chaetotaxy of sternites I-III (C). *H. ornaticollis* : frontal apotome (D).

Figure 2. Exuvie nymphale d'*Heleniella* spp. *H. crenophila* sp. n. : apotome frontal (A) ; corne thoracique et soies précornéales (B) ; ornementation et chaetotaxie des sternites I-III (C). *H. ornaticollis* : apotome frontal (D).

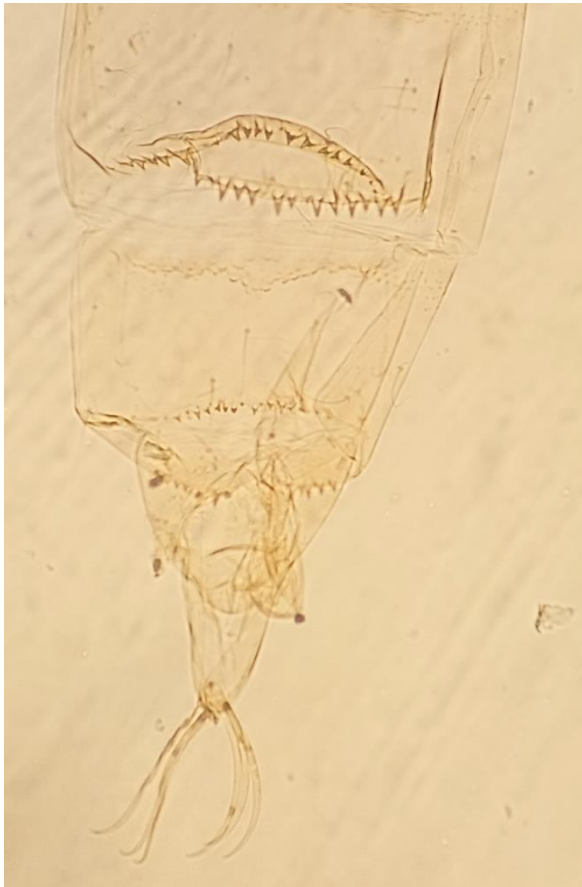


Photo 3. *H. crenophila* sp. n.: last segments of male pupal exuviae.

Photo 3. *H. crenophila* sp. n. : derniers segments de l'exuvie nymphale mâle.

part with a specific transverse row of setae, apex broadly triangular. Gonocoxite about 155 μm long, inner margin swollen basally, apical part truncate with a sclerotized lobe-like inner expansion. Gonostylus (Fig. 1H, Photo 1) about 65 μm long (*ornaticollis*-type as in Photo 2), anterior and posterior margin bearing several stout setae; crista dorsalis large lobe-like, present distally behind the megaseta; megaseta well developed, inserted apically. HR (GC/GS), 2.38; HV (TL/GS.10), 4.2.

Pupal exuviae

(n = 2, Fig. 2A-C; Photo 3, last segments)

Medium sized species, total length 2. 70 mm. Colouration pale in general. Cephalothorax without granulation; antennal sheath, thoracic

horn and wing sheath pale to yellowish. Thoracic horn (Fig. 2B) 225 μm long, uniformly narrowing distally and toothed on both sides; precorneals 85-90, nearly sub-equal; Tergites I-II bares; fields and rows of shagreen present on tergites II-IX absent on sternites. Distribution pattern of armament and chaetotaxy on sternites I-III including that of conjunctives II/III and III/IV as shown in Fig. 2C. Anteromedian area of sternite I with a characteristic patch of 3 long spines; anterolateral area of sternites one bearing a semi-circular field of points; anteromedian area of sternites II with a semi-circular patches of medium to big sized spines as illustrated in details in Fig. 2B; anteromedian patch of long spines absent on sternite III. Armament of conjunctives II/III, III/IV (Fig. 2C) consists of points giving the appearance of irregular triangular granules, which are markedly not interrupted medially. Posterior transverse row of patch present on tergites III-IX and sternites V-IX, is present on tergites II-IX and sternites III-IX in *ornaticollis* and *serratosioi*. Armament and chaetotaxy of last segments as illustrated in Photo 3.

Larva: unknown.

Heleniella helenae sp. n.

urn:lsid:zoobank.org:act:994F96D8-8323-4880-B033-23388EA60621

Material examined

Holotype. France. One male adult, upper glacial stream of the River Têt, Massif of Carlit, Eastern Pyrenees, Angoustrine-Villeneuve-des-Escaldes city (66005), along "Rec de la Grava" (1.958 °E, 42.599 °N); alt. 2300-2100 m; siliceous water, conductivity 40-50 $\mu\text{S}/\text{cm}$; temperature 6-10 °C; 05.VI.2000.

Paratype (leg. J. Moubayed). One male adult, same locality and date as for holotype.

Holotype (mounted on 2 slides). Only slide 1 with head, thorax and abdomen including the hypopygium is well preserved; slide 2 with remaining parts is missing. Slide 1 deposited in the col-

	fe	ti	ta ₁	ta ₂	ta ₃	ta ₄	ta ₅	LR
PI	550	510	260	140	100	110	110	0.51
PII	515	520	250	135	110	65	70	0.48
PIII	535	620	310	150	135	75	70	0.50

Table II. *Heleniella helenae* sp. n., Leg ratio of the male adult ($n = 1$, holotype). “LR = Length of tarsomere ta_1 divided by length of tibia (ti)”.

lections of the ‘Naturéum, Muséum cantonal des sciences naturelles, département de Zoologie, Palais de Rumine, Place de la Riponne 6, CH-1014 Lausanne, Suisse’ (GBIFCH01224301).

The paratype is deposited in the collection of the author.

Etymology: the name “*helenae*” of the new species in honour of my beloved wife Marie-Hélène, who keeps taking care of the family.

Diagnostic characters

H. helenae sp. n. is closely related to *H. gaultieri* and *H. helvetica*, in particular to *H. gaultieri* which appears to be considered as a sister species of *H. helenae* sp. n. However, the new species is easily separated on the basis of the following pertinent combination of characters: distribution pattern and number of setae on postnotum; anal tergite bands interrupted medially, ds tapering towards median part of tergite IX; virga composed of five not fused long rods reaching tergite IX; transverse sternapodeme bearing a lobe-like lateral projection; phallapodeme long and finely elongated, thin, ending with a wide crotchet-like basally; anal point (Fig. 3E-F) well developed, cylindrical, long and parallel-sided; inferior volsella (Fig. 3G, Photo 4F) broadly enlarged from its base to median part, abruptly tapering distally with a typical triangular apex; gonostylus (Fig. 3H, Photo 4G) is slender and specifically truncate posteriorly, antero-posterior area densely covered with orally directed fine setae.

Male imago

($n = 2$; Fig. 3A-G; Photo 4A-F)

Small sized *Heleniella* species. Total length 1.85 mm. Wing length 1.75 mm. General colouration brownish to dark brown. Head, antenna,

thorax and anal segment brown to dark brown; legs brownish; abdomen brown, anal segment dark brown. Head, thorax and legs are described from the paratype.

Head. Eyes densely pubescent, inner eye margin bare; temporals consist of 26 setae including 23 inner and 3 outer verticals. Clypeus trapezoidal. Palp 5-segmented; sensilla clavata absent on distal part of palpomere 3. Antenna 13-segmented, about 750 μm long; antennal groove clearly visible, beginning on segments 3 and reaching ultimate flagellomere; last flagellomere 265 μm long, moderately clubbed apically, with sensilla chaetica apically; AR 0.55. Thorax. All thoracic setae are decumbent except for the dorcentrals; acrostichals absent; lobes of anteprenotum gaping, anteprenotum with 28-30 setae; scutellum densely covered with setae (up to 35 in 3-4 rows); postnotum (Fig. 1A) with 11 setae (on each side), anterior area with 7 setae in 2 rows, inner lateral setae are vertically inserted. Wing 1750 μm long, maximum width about 300 μm ; brachiolum with one seta; squama bare. Legs. In general the length of tarsomeres is shorter than in *H. gaultieri*. Tarsomeres ta_4 and ta_5 of PI are equal in size (100 μm); tarsomeres ta_4 of PII is slightly shorter than ta_5 . Length (in μm) and proportions of prothoracic (PI), mesothoracic (PII) and metathoracic (PIII) legs as in Table II.

Abdomen (described from the holotype). Hypopygium in dorsal view (Fig. 1B, Photo 4). Tergite IX semicircular; anal tergite bands interrupted medially, progressively narrowing distally; posterior margin with about 26 setae in one row. Laterosternite IX with 6 setae (3 on each side). Virga (Fig. 3C, Photo 4A) 230 μm long, consists of 5 separate long rods reaching tergite

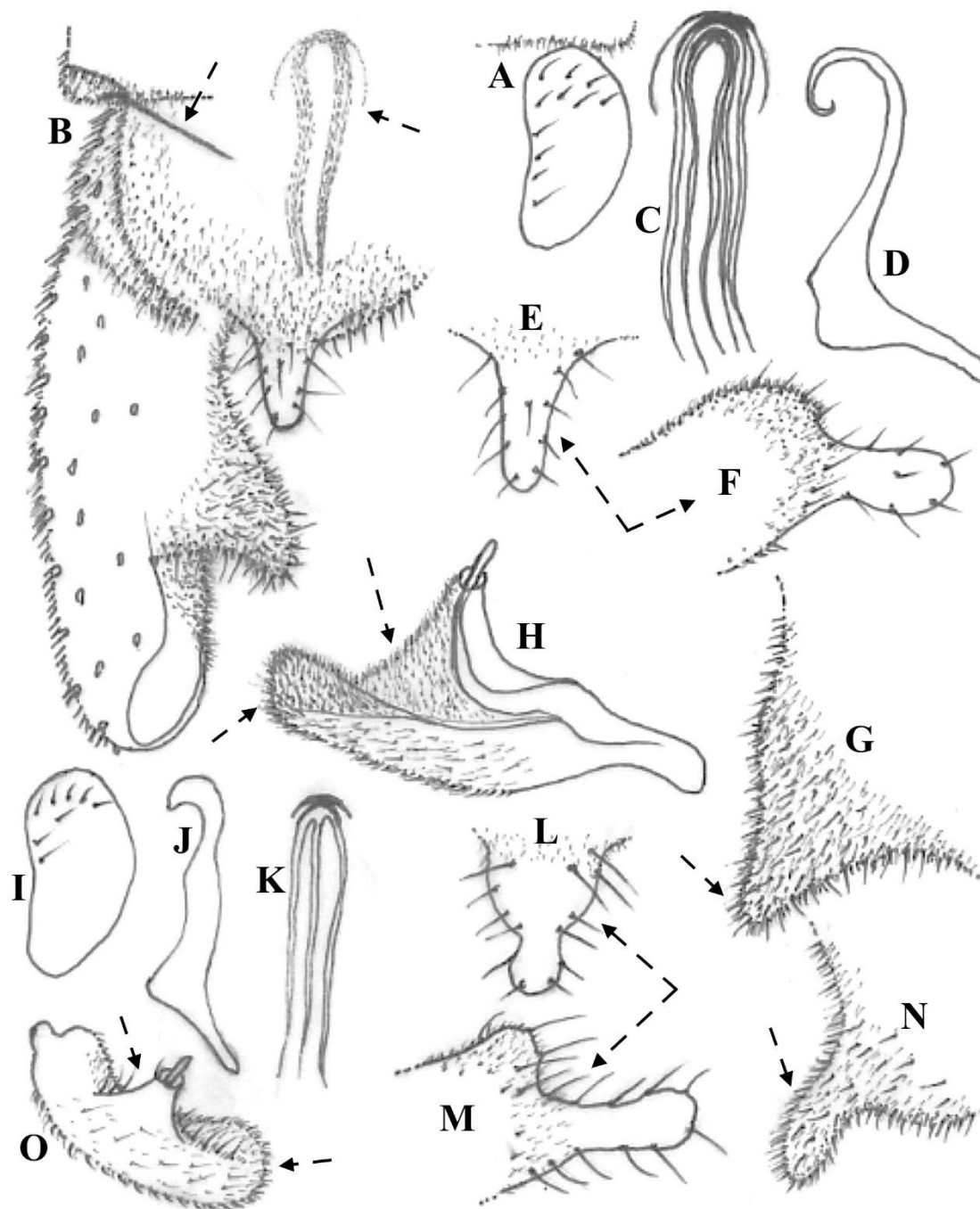


Figure 3. Male adult of *Heleniella* spp. *H. helenae* sp. n.: postnotum (A); hypopygium in dorsal view (B); virga (C); phallapodeme (D); anal point in dorsal (E) and lateral view (F); inferior volsella (G); gonostylus (H). *H. gaultieri*: postnotum (I); phallapodeme (J); virga (K); anal point, dorsal (L) and lateral (M); inferior volsella (N); gonostylus (O). Arrows indicate some distinctive characters.

Figure 3. Adulte mâle d'*Heleniella* spp. *H. helenae* sp. n. : postnotum (A) ; hypopyge en vue dorsale (B) ; virga (C) ; phallapodème (D) ; pointe anale en vues dorsale (E) et latérale (F) ; volselle inférieure (G) ; gonostyle (H). *H. gaultieri*: postnotum (I); phallapodème (J); virga (K); pointe anale, en vues dorsale (L) et latérale (M); volselle inférieure (N); gonostyle (O). Les flèches indiquent quelques caractères distinctifs.

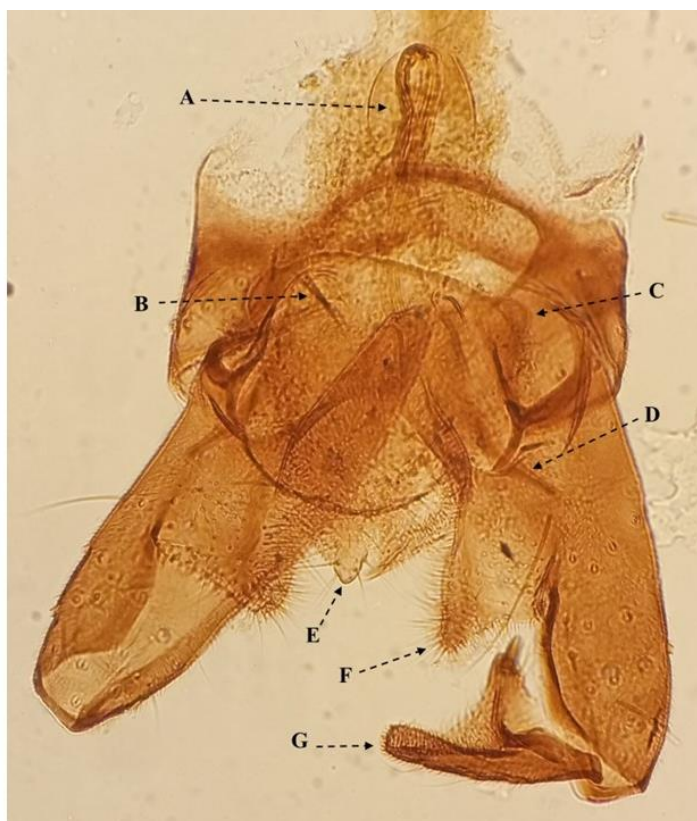


Photo 4. Male adult of *H. helenae* sp. n.: hypopygium of the holotype in dorsal view. A, virga; B, anal tergite band; C, lateral projection of sternapodeme; D, phallapodeme; E, anal point; F, inferior volsella; G, gonostylus.

Photo 4. Mâle adulte d'*H. helenae* sp. n. : hypopyge de l'holotype en vue dorsale. A, virga ; B, bande tergale anale ; C, corne latérale du sternapodeme ; D, phallapodème ; E, pointe anale ; F, volselle inférieure ; G, gonostyle.

IX, basal part typically semicircular. Phallapodeme and sternapodeme as in Photo 4; transverse sternapodeme with a specific rounded lateral projection (Photo 4C); phallapodeme (Fig. 3D, Photo 4B) with a large crotchet-like basal part, aedeagal lobe and basal expansion absent. Anal point (Fig. 3EF, Photo 4E) 65 μm long, about 3 μm maximum width, parallel sided to cylindrical, bearing 11-12 dorsal setae, dorsal hump low well visible in lateral view as in figure 3F. Gonocoxite (Fig. 3B) about 365 μm long, rounded apically. Inferior volsella (Fig. 3G) about 110 μm long, 80 μm wide medially, sub-triangular apically, densely covered with short setae. Gonostylus (Fig. 3H) 175 μm long, 3 μm maximum width distally, slender, posterior margin distinctly truncate, distal part of anterior area densely covered with orally directed fine setae;

crista dorsalis absent; megaseta is retractable and orally projecting, inserted medially on a broadly triangular prominence. HR (GC/GS), 2.09; HV (TL/GS.10), 1.1.

Larva: unknown.

4. Remarks and differential diagnosis

Pertinent distinctive morphological characters found in the male adult and pupal exuviae of *H. crenophila* sp. n., as well in the male adult of *H. helenae* sp. n. are highlighted in the following taxonomic discussion.

***Heleniella crenophila* sp. n.**

Male adult

H. ornatcollis represents the nearest species to *H. crenophila* sp. n. Atypical pertinent characters found in the male adult are clearly highlighted in Fig. 1 and Photos 1-2.

- Postnotum (Fig. 1A) with 7 setae placed in a specific distribution pattern, is differently figured in *H. ornatcollis* (MOUBAYED 2026, Fig. 1E);

- Virga (Fig 1B-C, Photo 1A) is not reaching (ending before) posterior margin of tergite IX, consisting of 3 narrowing rods, while is composed of one single thick linear rod in *H. ornatcollis* as illustrated in MOUBAYED (2026, Fig. 1F) and Photo 2;

- Sternapodeme with transverse part bearing a triangular lateral horn-like projection as in Photo 1B;

- Phallapodeme (Fig. 1D; Photo 1C) linearly thick without basal crotchet-like, is bearing a distinct crotchet-like on basal part in *H. ornatcollis* (MOUBAYED 2026, Fig. 1G);

- Anal point (Fig. 1B, E-F; Photo 1D) present, markedly swollen medially, is cup-like shaped in *H. ornatcollis* as figured in BRUNDIN (1956, Fig. 107);

- Inferior volsella (Fig. 1BG; Photo 1E) broadly triangular, proximal margin markedly swollen, distal area with a typical transverse row of distinctive setae; is lacking a transverse row of setae on posterior part, differently shaped in *H. ornatcollis* as illustrated by BRUNDIN (1956, Fig. 107) and LANGTON & PINDER (2007, Fig. 161A) and Photo 2;

- Gonostylus (Fig. 1H, Photo 1F) is similarly shaped as in *H. assiana* (MOUBAYED 2026, Fig. 1F) and *H. ornatcollis* (Photo 2) with a distinct posterior crista dorsalis, is otherwise shaped in BRUNDIN (1956, Fig. 107), LANGTON & PINDER (2007, Fig. 161A) and Photo 2.

Pupal exuviae

- Anteromedian patch of spines on sternite I (Fig. 2C), is absent in *H. ornatcollis* and *H. serratosioi* as reported by RINGE (1976) and LANGTON (1991);

- Apical transverse row of patches typically present on tergites III-IX and sternites V-IX, is present on tergites II-IX and sternites III-IX in *H. ornatcollis*;

- Distribution pattern of armament on last segments (Photo 3) is differently represented in *H. ornatcollis* and *H. serratosioi* as illustrated in RINGE (1976) and LANGTON (1991).

***Heleniella helenae* sp. n.**

Male adult

H. gaultieri and *H. helvetica* appear to be the nearest *Heleniella* species to *H. helenae* sp. n. In particular, *H. gaultieri* resembles much more to *H. helenae* sp. n. and therefore it can be considered as a sister species of the new species.

- Postnotum (Fig. 3A) with 11 setae placed in a specific distribution pattern, is bearing 8 setae in *H. gaultieri* (Fig. 3I);

- Anal tergite bands interrupted medially, progressively narrowing distally (Fig. 3B, Photo 4B); differently figured in *H. gaultieri* (Fig. 22 in MOUBAYED-BREIL & GAULTIER 2018);

- Transverse sternapodeme with a specific lobe-like lateral projection (Photo 4C), is otherwise shaped in *H. gaultieri* (Fig. 23 in MOUBAYED-BREIL & GAULTIER 2018);

- Phallapodeme (Fig. 3D, Photo 4D) linearly thin, basal expansion long crotchet-like shaped, is much thicker with a shorter basal crotchet in *H. gaultieri* (Fig. 3J);

- Anal point (Fig. 3BEF; Photo 4E) unusually cylindrical to tube shaped, parallel-sided medially and distally (Fig. 3BE), dorsal hump low (clearly visible in lateral view, Fig. 3F); otherwise shaped in *H. gaultieri* which is bearing a well developed dorsal hump (Fig. 3LM) giving appearance of a drop-like apex as in MOUBAYED-BREIL & GAULTIER (2018, Figs 18, 22);

- Inferior volsella (Fig. 3B, G; Photo 4F) broadly triangular, with a typical tapering apex, is differently shaped in *H. gaultieri* (Fig. 3N), bearing a much longer finger-like apical part as in MOUBAYED-BREIL & GAULTIER (2018, Fig. 22);

- Gonostylus (Fig. 3H, Photo 4G) slender with a typical truncate posterior margin, antero-posterior area densely covered with fine orally directed setae (Fig. 3H), megaseta well projecting orally; is distinctly massive, lacking orally directed setae on antero-posterior part (Fig. 3O), with rounded posterior margin, megaseta less projecting as illustrated in MOUBAYED-BREIL & GAULTIER (2018, Figs 25-27).

5. Ecology and geographical distribution

H. crenophila sp. n. is a strictly stenothermic and crenophilous species collected as pharate and Pe in a calcareous cold spring. Enriched shaded lotic habitats with abundant aquatic and subaquatic plants represent the favourable microhabitats for larval populations. Emergence period: early to late spring.

Occurrence of *H. crenophila* sp. n. in the Maritime Alps indicates that it is more widespread in other similar zones of streams and rivers located in south-eastern France.

Male adults of *H. helenae* sp. n. were collected in the upper glacial stream of the River Têt (E-Pyrenees, Massif of Carlit, alt. 2300-2100 m). Its discovery in such preserved lotic habitats reinforces the importance of pristine headwaters and cold enclaves in the preservation and persistence of autochthonous glacial relic species. The new species is typically rheophilic and representative of glacial cold stenothermic streams. Emergence period: late spring.

Geographical distribution of *H. helenae* sp. n. is apparently restricted to the upper rhithral sections of the River Têt and therefore can be expected to occur in other similar areas all around the Pyrenees. This indicates and reinforces the importance of pristine headwaters and cold enclaves in the preservation and persistence of autochthonous glacial relic species.

The two described new species are very rare in France. Therefore, they can be considered as biological indicators of the global warming and

climate change in this local biogeographical region. They both belong to the crenobiontic and crenophilous community of species as documented by LINDEGAARD (1995).

To date, four *Heleniella* species were hitherto known from France: *H. dorieri*, *H. gaultieri*, *H. ornaticollis* and *H. serratosioi*. Consequently, the descriptions of *H. crenophila* sp. n. and *H. helenae* sp. n. increase the total number to six from this country. Currently, the genus is represented by three species in the French Alps (*dorieri*, *ornaticollis*, *serratosioi*) and by only two species in Eastern Pyrenees (*ornaticollis* and *H. serratosioi*). Consequently, the presence of *H. crenophila* sp. n. and *H. helenae* sp. n. increases the total number in the genus to four and to three valid species from these two regions.

Associated species encountered in the same locality as *H. crenophila* sp. n. include:

Boreoheptagyia legeri (Goetghebuer, 1933); *Diamesa bertrami* Edwards, 1935; *D. cinerella* Meigen, 1835; *D. hamaticornis* Kieffer, 1924; *D. insignipes* Kieffer, 1908; *D. latitarsis* (Goetghebuer, 1921); *D. modesta* Serra-Tosio, 1968; *D. zernyi* Edwards, 1933; *Pseudodiamesa branickii* (Nowicki, 1873); *Bryophaenocladus subvernalis* (Edwards, 1929); *Chaetocladius dentiforceps* (Edwards, 1929); *C. laminatus* Brundin, 1947; *C. melaleucus* (Meigen, 1818); *C. perennis* (Meigen, 1830); *C. suecicus* (Kieffer, 1916); *Eukiefferiella brehmi* Gowin, 1943; *E. brevicar* (Kieffer, 1911); *E. coerulescens* (Kieffer, 1926); *E. fittkaui* Lehmann, 1972; *E. minor* (Edwards, 1929); *Krenosmittia camptophleps* (Edwards, 1929); *Metriocnemus atriclava* Kieffer, 1921; *M. eurynotus* (Holmgren, 1883); *M. fuscipes* (Meigen, 1818); *M. hirticollis* (Staeger, 1839); *Parametriocnemus stylatus* (Sparck, 1923); *Rheocricotopus effusus* (Walker, 1856); *Thienemannia gracilis* Kieffer, 1909; *Thienemanniella acuticornis* (Kieffer, 1912); *T. obscura* Brundin, 1947; *Tvetenia bavarica* (Goetghebuer, 1934); *Rheotanytarsus curtistylus* (Goetghebuer, 1921); *R. distinctissimus* (Brundin, 1947).

Associated species encountered in the same

locality as *H. helenae* sp. n. include:

Boreoheptagya legeri (Goetghebuer, 1933); *Diamesa aberrata* Lundbeck, 1898; *D. bertrami* Edwards, 1935; *D. bohemani* Goetghebuer, 1932; *D. cinerella* Meigen, 1835; *D. modesta* Serra-Tosio, 1968; *D. thomasi* Serra-Tosio, 1970; *D. veletensis* Serra-Tosio, 1971; *Pseudodiamesa branickii* (Nowicki, 1873); *P. nivosa* (Goetghebuer, 1928); *Pseudokiefferiella parva* (Edwards, 1932); *Syndiamesa edwardsi* Pagast, 1947; *S. hygropetrica* (Kieffer, 1909); *Bryophaenocladus subvernalis* (Edwards, 1929); *Chaetocladius guisseti* Moubayed, 2017; *C. laminatus* Brundin, 1947; *C. suecicus* (Kieffer, 1916); *Eukiefferiella fittkaui* Lehmann, 1972; *E. minor* (Edwards, 1929); *Krenosmittia boreoalpina* (Goetghebuer, 1944); *K. camptophleps* (Edwards, 1929); *Parametriocnemus boreoalpinus* Gowin & Thienemann, 1942; *Rheocricotopus effusus* (Walker, 1856); *Thienemannia gracilis* Kieffer, 1909; *T. valespira* Moubayed-Breil & Ashe, 2013; *Tvetenia bavarica* (Goetghebuer, 1934).

Acknowledgements

The author is indebted to G. Coppa for producing the photo 2 of *Heleniella ornatocollis*.

References

- ALBU, P. 1966. Chironomide din Carpatii Romanesti (I). *Studdi si Cercetari de Biologie, Série de Zoologie*. **18** (1): 193-205.
- ALBU, P. 1972. Doua specii de Chironomidae noi Pentru Stinta in Massivul Retezat. *Studdi si Cercetari de Biologie, Série de Zoologie*. **24** (1): 15-20.
- ANDERSEN, T. & X. WANG. 1997. Darkwinged *Heleniella* Gowin, 1943 from Thailand and China (Insecta, Diptera, Chironomidae, Orthoclaadiinae). *Spi-xiana*, **20** (2): 151-160.
- ASHE, P. & J.P. O'CONNOR. 2012. *A World Catalogue of Chironomidae (Diptera). Part 2. Orthoclaadiinae*. Irish Biogeographical Society & National Museum of Ireland, Dublin. 968 pp.
- BRUNDIN, L. 1956. Zur Systematic der Orthoclaadiinae (Diptera, Chironomidae). *Report of the Institute of Freshwater Research, Drottningholm*. **37**: 5-185.
- CRANSTON, P.S., D.R. OLIVER & O.A. SÆTHER. 1989. The adult males of Orthoclaadiinae (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*. *Entomologica Scandinavica. Supplement* **34**: 164-352.
- LANGTON, P.H. 1991. *A key to pupal exuviae of the West Palaearctic Chironomidae*. Privately published. Huntingdon, England, 386 pp.
- LANGTON, P.H. & L.C.V. PINDER. 2007. *Keys to the adult males of Chironomidae of Britain and Ireland*. Volume 1 (Pp 1-239) and volume 2 (Pp 1-68). Freshwater Biological Association, Scientific Publication, n° 64.
- LINDEGAARD, C. 1995. Chironomidae (Diptera) of European cold springs and factors influencing their distribution. *Journal of the Kansas Entomological Society, Supplement*. **68** (2): 108-131.
- MOUBAYED, J. 2026. Description of *Heleniella assiana* sp. n. from the upper basin of the river Assi in Lebanon (Diptera, Chironomidae). *Ephemera*, **27**: 81-88.
<https://doi.org/10.71868/a6ah-wk38>
- MOUBAYED, J., G. COPPA & P.H. LANGTON. 2024. Redescription of *Corynoneura magna* Brundin, 1949 from acidic springs and peat bogs in northeastern France (Diptera, Chironomidae, Orthoclaadiinae). *Ephemera*, **25**: 25-52.
<https://doi.org/10.71868/twg6-HV63>
- MOUBAYED-BREIL, J. 2020. Chironomidae de l'écosystème méditerranéen de France continentale sensu lato. Données faunistiques et biogéographiques sur les quatre dernières décennies (Diptera). *Ephemera*, **21** (1): 31-69.
- MOUBAYED-BREIL, J. & P. ASHE. 2016. New records and additions to the database on the geographical distribution of some threatened chironomid species from continental France (Diptera, Chironomidae). *Ephemera*, **16** (2): 121-136.
- MOUBAYED-BREIL, J. & P. GAULTIER. 2018. On the genus *Heleniella* Gowin, 1943 (extrema-gr.). I. *Heleniella gaultieri* sp. n., a crenophilous species confined to

- glacial streams in Eastern Pyrenees (Diptera, Chironomidae, Orthoclaadiinae). *Ephemera*, **19** (2): 71-81.
- MOUBAYED-BREIL, J. & B. LODS-CROZET. 2016. *Heleniella helvetica* sp. n., a cold stenothermic species inhabiting the upper Rhône catchment in central Switzerland (Diptera, Chironomidae, Orthoclaadiinae). *Journal of Entomological and Acarological Research*, **48** (6026): 339-344.
- REISS, F. 1968. Neue Chironomiden-Arten (Diptera) aus Nepal. *Khumbu Himal*, **3** (1): 55-73.
- RINGE, F. 1976. *Heleniella serratosioi* n. sp., eine neue Orthoclaadiine (Dipt., Chir.) aus der Emergenz von Rohrwiesenbach und Kalbach. *Archiv für Hydrobiologie*, **77** (2): 254-266.
- SÆTHER, O.A. 1980. Glossary of chironomid morphology terminology (Diptera, Chironomidae). *Entomologica Scandinavica, Supplement*. **14**: 1-51.
- SÆTHER, O.A. & M. SPIES. 2013. Fauna Europaea: Chironomidae. In P. Beuk & T. Pape (eds): *Fauna Europaea: Diptera Nematocera. Fauna Europaea version 2.6*. Internet data base at <http://www.faunaeur.org> [accessed February 2015].
- SERRA-TOSIO, B. 1967. Sur les Orthoclaadiinae du genre *Heleniella* Gowin (Diptera, Chironomidae). *Deutsche Entomologische Zeitschrift* (Neue Folge), **14** (1/2): 153-162.
- SERRA-TOSIO, B. & H. LAVILLE. 1991. Liste annotée des Diptères Chironomides de France continentale et de Corse. *Annales de Limnologie*, **27** (1) : 37-74.