

***Corynoneura tyrrhena* sp. n., a crenophilous species occurring in high mountain streams of Corsica [Diptera, Chironomidae, Orthocladiinae]**

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Keywords: *Corynoneura tyrrhena* sp. n., Diptera Chironomidae, Tyrrhenian insular element, mountain springs and streams, conservation.

The male adult and the pupal exuviae of *Corynoneura tyrrhena* sp. n. are described based on associated material of male adults, male pharate adults and pupal exuviae collected in pristine mountain springs and streams (altitude 1700-1350 m) delimited by the Restonica and Asco upper basin in Corsica. The new species is distinguished from other known Palaearctic *Corynoneura* species on the basis of the following characters: in the male adult (antenna 8-segmented; third segment of maxillary palp spherical; sternapodeme inverted U-shaped; phallapodeme scalpel-like with median projection and caudally attached on lateral sternapodeme; tergite IX bilobed; inner margin of gonocoxite distinctly truncate, superior volsella bearing a characteristic semi-circular notch, inferior volsella smooth; gonostylus long, gradually narrowed, bent and curved inwards, megaseta long and slender); in the pupal exuviae (L-setae on abdominal segments bristle-like; posterior transverse rows of spines present on: tergites II-VIII, sternites IV-VIII; rows of hooks present on: tergites II-VI, sternites IV-VII; anal lobe diamond-like, anterior side longer, fringe restricted to the posterior part). Worldwide there are currently about 97 valid species of *Corynoneura* including the present description. Consequently there are now about 45 known *Corynoneura* species from the Palaearctic Region, of which 12 from continental France and 8 from Corsica. On the basis of the shape pattern of the phallapodeme, the male adult of the new described species should temporarily belong to the *celeripes* subgroup. Geographical distribution of *Corynoneura tyrrhena* sp. n. is currently known from the upper basin of the Restonica and Asco Rivers in Corsica. This species is considered as a true Tyrrhenian faunal element, which evolved locally perhaps during the Palaeocene (Montian) or the late Miocene. Taxonomic remarks, discussion and comments on the ecology and geographical distribution of the new species are provided.

***Corynoneura tyrrhena* sp. n., une espèce crénophile connue des ruisseaux de haute montagne de Corse [Diptera, Chironomidae, Orthocladiinae]**

Mots-Clés: *Corynoneura tyrrhena* sp. n., Diptera Chironomidae, élément tyrrhénien insulaire, sources et ruisseaux de montagne, conservation.

L'adulte mâle et l'exuvie nymphale de *Corynoneura tyrrhena* sp. n. sont décrits à partir d'un matériel composé d'adultes mâles, de pharates et d'exuvies nymphales collectés dans des habitats lotiques (altitude 1350-1700 m) délimités par les bassins supérieurs de la Restonica et de l'Asco en Corse. La nouvelle espèce se distingue des autres *Corynoneura* connues de la région paléarctique par les caractères morphologiques suivants: adulte mâle (antenne avec 8 segments; troisième segment du palpe maxillaire sphérique; sternapodème en forme d'U inversé; phallapodème en forme de scalpel, muni d'une protubérance médiane et attaché caudalement au sternapodème latéral; tergite IX bilobé; gonocoxite distinctement tronqué, volsella supérieure munie d'une encoche semi-circulaire caractéristique, volsella inférieure simplifiée; gonostylus progressivement effilé et courbé, mégasoie longue et effilée); exuvie nymphale (soies latérales présentes

sur les segments abdominaux I-VIII ; rangées postéro-transversales d'épines présentes sur: les tergites II-VIII, sternites IV-VIII; rangées de crochets présentes sur les: tergites II-VI, sternites IV-VII; lobe anal en forme de losange, côté antérieur plus long, frange anale présente uniquement sur la partie postérieure). La présente description porte le nombre total d'espèces mondialement connues appartenant au genre *Corynoneura* à environ 97 dont 45 de la région paléarctique, 12 de France continentale et 8 de Corse. En nous basant sur la forme du phallapodème, l'adulte mâle de la nouvelle espèce appartient provisoirement au sous-groupe *celeripes*. *Corynoneura tyrrhena* sp. n. est actuellement connue des bassins supérieurs de la Restonica et de l'Asco. Il s'agit d'un élément tyrrhénien qui a probablement évolué localement au cours du paléocène ou du miocène supérieur. Un commentaire et des discussions sur la position systématique, l'écologie et la distribution géographique de la nouvelle espèce sont fournis.

1. Introduction

According to data on the taxonomy and geographical distribution of the genus *Corynoneura* Winnertz, 1846 (WINNERTZ 1846, EDWARDS 1924, BRUNDIN 1949, SCHLEE 1968a, 1968b, SASA 1979, TUISKUNEN 1983, COFFMAN et al. 1986, HIRVENOJA & HIRVENOJA 1988, CRANSTON et al. 1989, LANGTON 1991, SÆTHER & KRISTOFFERSEN 1996, HAZRA et al. 2003, MAKARCHENKO & MAKARCHENKO 2006, 2010, FU et al. 2009, WIEDENBRUG & TRIVINHO-STRIXINO 2011, ASHE & O'CONNOR 2012, FU & SÆTHER 2012, KRASHENINNIKOV 2012, WIEDENBRUG et al. 2012, SÆTHER & SPIES 2013, FANG et al. 2014) there are currently about 96 valid species reported from all zoogeographical Regions including the Nearctic Region (19), the Neotropical Region (25), the Oriental Region (16), the Afrotropical Region (4) and the Australasian Region (5). The description here of *Corynoneura tyrrhena* sp. n. increases the total number of worldwide *Corynoneura* species to about 97. Consequently there are actually 45 species known from the Palaearctic Region, of which 12 are now reported from continental France and 8 from Corsica.

Main morphological characters of the adult males of *Corynoneura* species include:

- the shape of antennal apex (rounded or pointed) and hind tibial apex;
- the shape and position of both superior and inferior volsella;
- the shape of phallapodeme and its position relation with lateral sternapodeme;
- the shape pattern of gonostylus.

The new described species is distinguished from other known *Corynoneura* species on the basis of the following characters:

- in the male adult (antenna 8-segmented, antennal apex notched; third segment of palp spherical; sternapodeme inverted U-shaped; phallapodeme scalpel-like with median projection and caudally attached on lateral sternapodeme; tergite IX bilobed; inner margin of gonocoxite distinctly truncate, superior volsella bearing a characteristic semi-circular notch, inferior volsella smooth; gonostylus long, gradually narrowed, bent and curved inwards, megaseta long and slender);

- in the pupal exuviae (L-notched apically and setae on abdominal segments bristle-like; posterior transverse rows of spines present on: tergites II-VIII, sternites IV-VIII; rows of hooks present on: tergites II-VI, sternites IV-VII; anal lobe diamond-like, anterior side longer, fringe restricted to the posterior part).

The genus *Corynoneura* includes both rheophilic and semi-lentic species mainly occurring in streams and rivers. Habitats, including the type locality, where material was collected consist of submerged stony and gravely substrata in shady pristine stretches with cold mountain helocrenes and streams (altitude 1700-1350 m) delimited by the upper basin of the Restonica and Asco Rivers in Corsica.

In this paper, a description of the male adult and pupal exuviae of *Corynoneura tyrrhena* sp. n., is given based on associated material of male adults, pharates and pupal exuviae. Terminology, nomenclature and measurements follow those of SÆTHER (1980) for the imagines and pupal exuviae. Measurements and ratios of hind tibia follow SCHLEE (1968), as figured in FANG et al. (2014, Fig. 1A). Taxonomic remarks, discussion and comments on the ecology and geographical distribution of the new species are provided.

2. Diagnostic characters

Corynoneura tyrrhena sp. n. can be separated from all the European species on the basis of the following diagnostic characters.

Male adult. Hairs present on proximal half part on inner eye margin. Antenna 8-segmented, last flagellomere notched and slightly clubbed distally, longer than the 3 preceding segments. Palpomere 2 square-like, 3 globe-shaped, last segment bearing one single apical seta. Inner margin of tentorium swollen medially, anterior margin of the cibarial pump weakly concave. Hind tibia expanded, bearing a distinct S-shaped and relatively long apical seta. Phallapodeme scalpel-like with medial projection and attached caudally for joint on sternapodeme. Sternapodeme inverted U-shaped with oral projection, transverse sternapodeme relatively wide. Gonocoxite markedly truncate; superior volsella with smoothly dented edge, bearing a characteristic semi-circular notch; inferior volsella smooth. Gonostylus long, distinctly curved and gradually narrowed, megaseta long and slender.

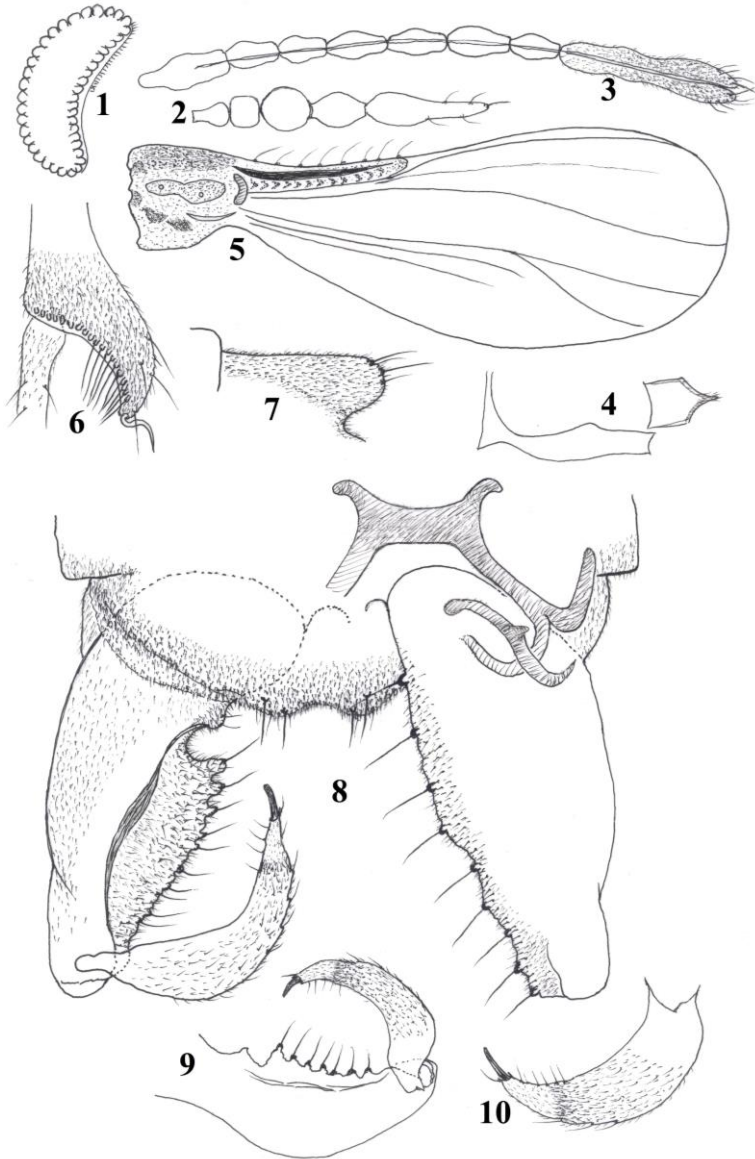
Pupal exuviae. Colouration brown except for the abdominal segments I-VIII, which are dark brown. Frontal apotome smooth. Cephalothorax distinctly wrinkled; median anteprenotals long; pearl rows on antennal sheath nearly indistinct, composed of 5-6 rows. All L-setae on abdominal segment I-VIII bristle-like, taeniae are restricted to anal lobe. Posterior transverse rows of spines present on: tergites II-VIII, sternites IV-VIII; rows of hooks present on: tergites II-VI, sternites IV-VII. Anal lobe diamond-like, anterior side longer than posterior side, fringe restricted to the posterior part.

3. *Corynoneura tyrrhena* sp. n.

Studied material

Holotype, CORSICA: upper basin of the Restonica River, Central Corsica, zone 4 in MOUBAYED-BREIL & ASHE (2012), Cavacciole tributary, lotic and lentic habitats at the outflow of Lakes Mielu and Capitellu (altitude 1700-1350 m), 1 male adult, leg. J. Moubayed-Breil, 23.IX.2014.

Paratypes (all leg. J. M-B). 2 male adults (each, mounted on 1 slide), 2 male adults (preserved in 70% alcohol), 2 pharate male adults and 2 male exuviae, upstream area of the Restonica River, lotic and lentic habitats at the Bergeries de Grotelle, altitude 1600-1350 m, 23.IX.2014. 1 male and 1 female pupal exuviae, upper basin of the Asco River and Tassinette stream, altitude 1700-1450 m, 05.VI.2015.



Figures 1-10. Male imago of *Corynoneura tyrrena* sp. n.: Hairs on inner margin of eyes (1); palp (2); antenna (3); tentorium and cibarial pump (4); wing (5); hind tibial apex (6); tergite IX in lateral view (7); hypopygium, dorsal (left) and ventral (right) (8); gonocoxite in lateral view (9); left gonostylus in dorsal view (10).

Figures 1-10. Imago mâle de *Corynoneura tyrrena* sp. n.: pubescence de la membrane interne des yeux (1); palpe (2); antenne (3); tentorium et pompe cibariale (4); aile (5); extrémité apicale du tibia postérieur (6); tergite IX en vue latérale (7); hypopyge, vues dorsale (à gauche) et ventrale (à droite) (8); gonocoxite en vue latérale (9); gonostyle gauche en vue dorsale (10).

Holotype (male adult and its pupal exuviae, mounted on one slide) is deposited in the collections of the Zoologische Staatssammlung (ZSM), Munich, Germany. Paratypes are deposited in the author's collection.

Type material was preserved in 70% alcohol, and later mounted in polyvinyl lactophenol mountant. For each adult, the head, thorax and abdomen were cleared in 90% lactic acid before mounting on slides.

Etymology: the species name '*tyrrhena*' refers to the Tyrrhenian Province, which includes Corsica, Sardinia, Sicily, Elbo and the Tyrrhenian area of continental France, Italy and Spain.

Description

Male imago

(n = 3, 2 male adults and 1 paratype adult; Figs 1-10)

Small sized species. Total length 1.85-1.90 mm. Wing length 0.67-0.70 mm. General colouration contrasting brownish to dark brown especially in the thorax and abdomen. Head dark brown. Antennal and wing sheath brownish; antenna yellow brown except for the half distal part of last flagellomere which is dark brown (Fig. 2). Palpomere yellowish. Thorax dark brown with blackish scutum, scutellum, preepisternum, postnotum. Wing with yellowish veins and membrane, Clavus brown dark to blackish, brachiolum brown dark with blackish areas anteriorly and posteriorly. Legs yellow brownish, third and fourth tarsomeres of all legs darker. Tergites I-IV brownish, VI-VIII dark brown. Anal segment brown.

Head. Eyes bare; hairs present on proximal half part on inner eye margin (Fig. 1). Temporals absent. Clypeus with 10-11 setae in 3 rows. Palp (Fig. 2) 5-segmented, segment 2 square-like, 3 globular, 5 clubbed proximally and narrowed distally, bearing 1 apical seta; length (μm) of segments: 12, 9, 18, 21, 43. Antenna (Fig. 3) 385-390 μm long, 8-segmented, antennal groove reaching segment 1; segment 1 long, segments 2-7 nearly subequal (33-39 μm long); ultimate flagellomere 120-125 μm long, longer than the 3 preceding segments, distal part club-shaped and distinctly notched, covered with blackish macrotrichia, apical club about 1/3 the length of last flagellomere. AR 0.47. Tentorium and cibarial pump as in Fig. 4, tentorium swollen medially, anterior margin of cibarial pump slightly concave.

Thorax. Anteprenotum with 5 setae, 2 placed near the median area and 3 laterally; dorsocentrals with 5 uniserial setae. Scutellum with 4 uniserial setae. Wing (Fig 5). Width/wing length 0.46. Brachiolum with 2 setae, costa with 7-8 setae, clavus as in figure 5.

Legs. Length (μm) of spurs on: fore tibia 25, mid tibia 15, hind tibia 22. Width (μm) at apex of: for tibia 14, mid tibia 18, hind tibia 41. Apex of hind tibia (Fig. 6) well expanded, bearing one seta markedly S-shaped. Tarsomere 4 (ta_4) of PI, PII and PIII bi-lobed apically. Length (μm) and proportions of legs:

	fe	ti	ta ₁	ta ₂	ta ₃	ta ₄	ta ₅	LR	BV	SV	BR
PI	235	266	150	76	50	24	31	0.56	4.60	3.34	2.30
PII	306	269	171	67	35	20	29	0.64	4.94	3.36	3.34
PIII	260	282	142	80	32	20	29	0.50	4.25	3.82	2.50

“ LR = Length of tarsomere ta_1 divided by length of tibia (ti); BV = Combined length of femur (fe), tibia and ta_1 divided by combined length of tarsomeres ta_2 - ta_5 ; SV = Ratio of femur plus tibia to tarsomere ta_1 ; BR = Ratio of longest seta of ta_1 divided by minimum width of ta_1 , measured one third from apex.”

Hypopygium in dorsal and ventral view (Fig. 8). Tergite IX large at base, slightly narrowed posteriorly, posterior margin distinctly bilobed, 56 μm wide at posterior edge; anal point absent, lateral view of tergite IX as in figure 7, each lobe bearing 4 setae (2 stout and long setae + 2 bristle-like setae). Laterosternite IX bare. Sternapodeme orally projecting, inverted U-shaped; transverse apodeme 15 μm long, 9 μm wide; lateral coxapodeme 28 μm long, coxapodeme 20 μm long, nearly straight; phallapodeme scalpel-like, with medial projection for joint with sternapodeme placed caudally. Gonocoxite 65 μm long, maximum width about 33 μm ; distinctly truncate and strongly dented as it is figured in dorsal and lateral views (Figs 8-9); superior volsella bearing a characteristic semi-circular notch; inferior volsella small and weakly swollen; ventral margin nearly straight, wider at base and bearing 9 stout setae. Gonostylus (Figs 8-10) 36 μm long, gradually narrowed, bent and curved inwards; distal 1/3 part covered with finest setae and macrotrichia; megaseta 7 μm long, slender and slightly bent.

Male pupal exuviae

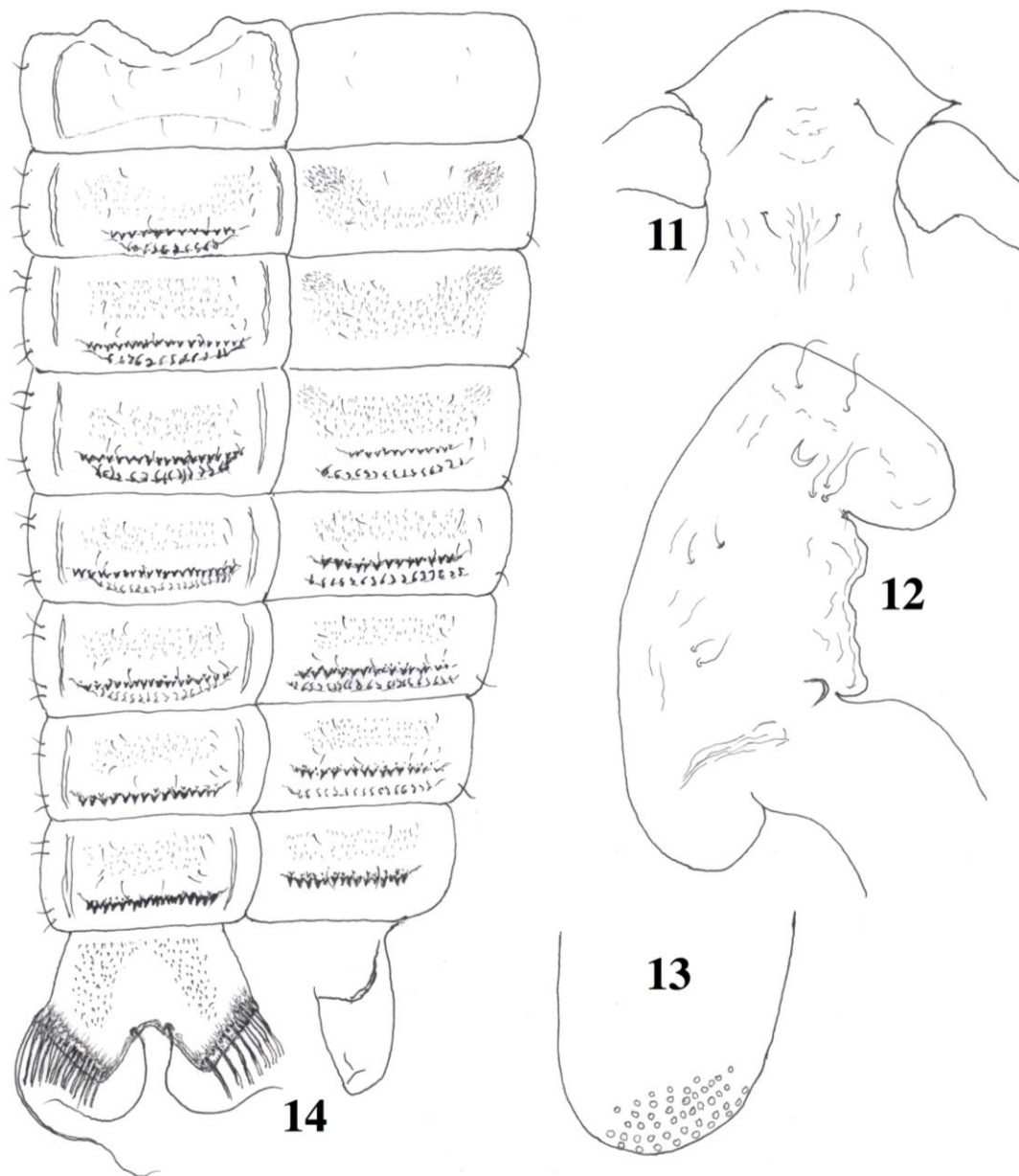
(n = 3, including 1 male pharate; figures 11-19)

General colouration brown to dark brown. Frontal apotome nearly smooth, cephalothorax distinctly wrinkled. Abdomen brown to dark brown, area delimited by the lateral muscle marks of segments I-VIII markedly dark brown. Total length 1.90-2.0 mm.

Frontal apotome (Fig. 11) with rounded anterior margin, frontal setae 25 μm long, relatively short. Cephalothorax (Fig. 12). Thorax. Median anteprenotal subequal, 61-63 μm long, lateral anteprenotals absent; precorneal setae 49-51, 37 and 38 μm long. Dorsocentrals, all bristle-like. Length (μm) of dorsocentrals: Dc₁ 17, Dc₂ 25, Dc₃ 17, Dc₄ 32; distance (μm) between Dc₁ to Dc₂ 25, Dc₂ to Dc₃ 48, Dc₃ to Dc₄ 12. Metanotals absent. Pearl rows on wing sheath (Fig. 13) composed of dense characteristic 5 to 6 rows nearly indistinct.

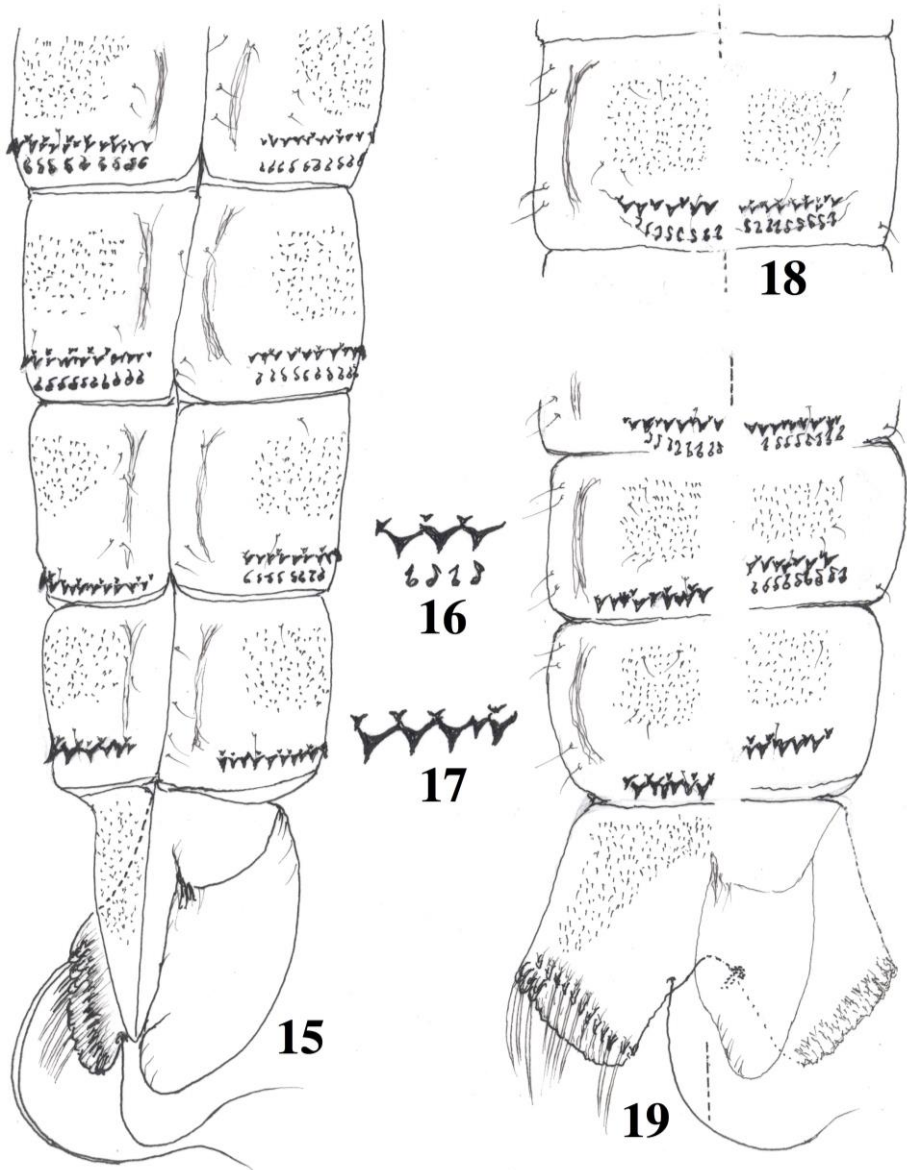
Abdomen (tergites and sternites) and anal segment (Figs 14-19), lateral view of segments V-IX and details of armament as in Figs 15-17. Armament and distribution pattern of shagreen, patches of spinules, hooks and points, chaetotaxy and lateral setation of abdominal segments as illustrated in Figs 14-19 (tergites and sternites). Tergite I bare. Posterior transverse rows of spines present on: tergites II-VIII, sternites IV-VIII; rows of hooks present on conjunctives of: tergites II-VI, sternites IV-VII; tergite II armed with one row of spines and hooks occupying about 1/2 of segment width, row of hooks weak on II (7-9) becoming gradually more extensive (12-21) on tergites III-VII; row of hooks on sternites IV-VII nearly similar (15-22). Anteromedian patches of shagreen and small points present on both tergites and sternites II-VIII and tergite IX. Sternites II-IV armed antero-laterally with colourless patch of spinules, which is gradually decreasing from II to IV. Pedes spurii B absent. Apophyses absent. Lateral muscle marks well represented on tergites I-VIII. Anal segment diamond-shaped, maximum width 210 μm , minimum width 180 μm ; anterior side (90 μm long) longer than posterior side (70 μm long); fringe composed of 12-14 taeniate setae; median setae bristle-like and relatively long (155-160 μm). Genital sac 120-125 μm long, rounded apically, overreaching apical margin of anal lobe by 7-10 μm . Anal macrosetae 215-225 μm long; taeniae 240-260 μm long.

Larva: unknown.



Figures 11-14. Male pupal exuviae of *Corynoneura tyrrhena* sp. n.: frontal apotome (11); cephalothorax (12); distribution pattern of pearl rows on wing sheath (13); armament pattern and chaetotaxy of abdominal segments, tergites and sternites I-VIII including anal segment (14).

Figures 11-14. Exuvie nymphale mâle de *Corynoneura tyrrhena* sp. n.: apotome frontale (11); céphalothorax (12); mode de distribution des rangées de perles sur le fourreau alaire (13); ornementation et chaetotaxie des segments abdominaux, tergites et sternites I-VIII, y compris le segment (14).



Figures 15-19. Male pupal exuviae of *Corynoneura tyrrhena* sp. n.: Armament of abdominal segments V-IX in lateral view (15); details of rows of spines and hooks on sternites VII-VIII (16-17); abdominal segment IV, tergite and sternite (18); abdominal segments VI-VIII and anal segment, tergites and sternites (19).

Figures 15-19. Exuvie nymphale mâle de *Corynoneura tyrrhena* sp. n.: ornementation des segments abdominaux V-IX en vue latérale (15); détails des rangées d'épines et de crochets sur les sternites VII-VIII (16-17); segment abdominal IV, tergite et sternite (18); segments abdominaux VI-IX, tergites et sternites (19).

4. Taxonomic position

The male adult and pupal exuviae of *Corynoneura tyrrhena* sp. n. are characterized by some unusual specific features that could easily separate it from other European *Corynoneura* species:

- in the male adult (antenna 8-segmented, antennal apex notched, last flagellomere is longer than the 3 preceding segments; shape pattern of calvus; sternapodeme inverted U-shaped; phallapodeme scalpel-like with median projection and caudally attached to lateral sternapodeme; superior volsella truncate and bearing a characteristic semi-circular notch; gonostylus long, bent and gradually narrowed with distal 1/3 part covered with fine setae and macrotrichia;

- in the pupal exuviae (frontal setae relatively short and bristle-like; shape pattern of pearl rows on wing sheath; L-setae are all bristle-like; rows of spines and hooks present on tergites and sternites; anal lobe diamond-like, fringe restricted to the posterior part.

Useful worldwide revision, diagnoses characters, taxonomic notes, key and phylogenetic parsimony analysis for identification of known male imagines of the genus *Corynoneura* are provided by HIRVENOJA & HIRVENOJA (1988), MAKARCHENKO & MAKARCHENKO (2006), FU et al. (2009), WIEDENBRUG & TRIVINHO-STRIXINO (2011), FU & SÆTHER (2012), WIEDENBRUG et al. (2012), FANG et al. (2014). According to all the cited works above, the male adult of *C. tyrrhena* sp. n. can be placed, based on some differentiating morphological characters (antenna, wing, sternapodeme, phallapodeme, gonocoxite, gonostylus) near the following species: *C. celeripes* Winnertz, 1852; *C. brundini* Hirvenoja & Hirvenoja, 1988; *C. carriana* Edwards, 1924; *C. celtica* Edwards, 1924; *C. edwardsi* Brundin, 1949; *C. isigaheius* Sasa & Suzuki, 2000; *C. latusatra* Fu, Sæther & Wang, 2009; *C. porrecta* Fu & Sæther, 2012; *C. macdonaldi* Fu, Sæther & Wang, 2009; *C. ephora* Fang, Wang & Fu, 2014. Nevertheless, three subgroups are actually separated in the male adult, based on the shape pattern of phallapodeme (FU et al. 2009):

- long and strongly curved (*scutellata* subgroup);
- intermediate (*fittkai* subgroup);
- scalpel-like (*celeripes* subgroup).

Consequently, on the basis of the previously emended three subgroups provided by FU et al. (2009), the male adult of the new described species should temporarily belong to the *celeripes* subgroup.

On the other hand, the pupal exuviae of *C. tyrrhena* sp. n. can be easily distinguished from other known *Corynoneura* species by the following unusual features: L-setae are all bristle-like; presence of rows of spines and hooks on tergites and sternites; anal lobe diamond-like; fringe restricted to the posterior part. However, *C. celtica* represents the only European known species which bears, except for the chaetotaxy and ornamentation of abdominal segments, a nearly similar anal lobe with fringe restricted to the posterior part.

5. Ecology and geographical distribution

Male adults and associated pharates and pupal exuviae belonging to *Corynoneura tyrrhena* sp. n. were collected in high mountain springs and streams located in central Corsica (altitude 1700-1350 m). Localities where material was collected consist of moderate to weakly shaded pristine stretches with cold mountain helocrenes and streams, including waterfalls, on rocky or

sandy to gravely substrata. Bryocolous, hygropetric and madicolous habitats probably represent the most common and favoured aquatic areas for larval populations.

Among the list of chironomid species and taxa reported by MOUBAYED-BREIL & ASHE (2012) from Corsica, the geographical distribution of some recently new described species seem to be restricted to the Tyrrhenian subregion, which includes both of the insular and continental provinces: *Limnophyes tyrrheneus* Moubayed-Breil, 2013; *Orthocladius* (*Euorthocladius*) *vicentei* Moubayed-Breil, 2013; *Thienemannia corsicana* Moubayed-Breil, 2013; *Trissocladius orsinii* Moubayed-Breil & Ashe, 2015; *Rheotanytarsus dactylophoreus* Moubayed-Breil, Langton & Ashe, 2012; *Paratanytarsus corsicanus* Moubayed-Breil, Ashe & Langton, 2012.

Corynoneura tyrrhena sp. n. is apparently a very rare species which is currently confined to streams located in the upper basin of the Restonica and Asco Rivers in Corsica, and therefore considered as a true Tyrrhenian faunal element, which evolved locally perhaps during the Palaeocene (Montian) or the late Miocene. Furthermore, despite extensive investigations during the last three decades in Corsica, only few male adults, pharates and pupal exuviae belonging to *C. tyrrhena* sp. n. have been obtained. Such lotic habitats, which are endangered by ecotourism and both natural and accidental flooding, deserve much greater consideration, protection and preservation.

The new species is typically rheophilic and representative of helocrenes and cold stenothermic streams. It belongs to the crenobiontic and crenophilous community of species as documented by Lindegaard (1995). Chironomid species encountered in the upper basin of the Restonica River, and listed by MOUBAYED-BREIL & ASHE (2012) for Corsica, include: *Boreoheptagyia cincitipes* (Edwards, 1928); *Diamesa latitarsis* (Goetghebuer, 1921); *D. insignipes* Kieffer 1908; *D. cinerella* Meigen, 1835; *D. macronyx* (Kieffer, 1918); *D. zernyi* Edwards, 1933; *Pseudodiamesa branickii* (Nowicki, 1873); *P. nivosa* (Goetghebuer, 1928); *Bryophaenocladius aestivus* (Brundin, 1947); *B. nidorum* (Edwards, 1929); *Chaetocladius suecicus* (Kieffer, 1916); *Eukiefferiella fittkaui* Lehmann, 1972; *E. minor* (Edwards, 1929); *Krenosmittia boreoalpina* (Goetghebuer, 1944); *Parametriocnemus boreoalpinus* Gowin & Thienemann, 1942; *Thienemannia corsicana* Moubayed-Breil, 2013; *T. gracilis* Kieffer, 1909; *Trissocladius orsinii*, *Rheotanytarsus dactylophoreus*.

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