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A description of *Cernosvitoviella tridentina,* a new species of Enchytraeidae (Oligochaeta) from the Italian Alps.

E. Dumnicka

Institute of Nature Conservation, Polish Academy of Sciences, al. Mickiewicza 33, 31-120 Krakow, Poland. E-mail : dumnicka@iop.krakow.pl

A new species of Enchytraeidae, *Cernosvitoviella tridentina* sp.n., is described from alpine streams (Stelvio National Park, Trentino). C. *tridentina* sp.n. belongs to a group of species with spermathecae confined to the V segment; it particularly resembles *Cernosvitoviella carpatica* (Cernosvitov), *C. minor* Dozsa-Farkas and C. *celere* Nurminen, but differs from these species by some important anatomical features: the presence of small seminal vesicles, longer ectal ducts of the spermathecae and (from two first species) by deep incision of the posterior margin of the brain.

Keywords : Oligochaeta, Enchytraeidae, new species, alpine streams.

Introduction

The studies on enchytraeids fauna of Italy have a history of one hundred years (Cognetti 1901, 1903, Dequal 1914, Issel 1905, Sciacchitano 1932, Nielsen and Christensen 1961, 1963, Nurminen 1977, Rota 1994, 1995). However, these works concerned almost exclusively soil inhabitants. Enchytraeids from freshwater environment, especially from running waters, were rarely studied (Kasprzak 1976, Dumnicka & Boggero in press), though they are common and sometimes abundant in Alpine streams (Malard et al. 2001, Maiolini & Lencioni 2001). During the realization of the HIGHEST program (Health and Integrity of Glacial Headwater EcoSystems in Trentino), a detailed ecological study of alpine headwater streams, benthic macroinvertebrate samples were collected in glacial and non-glacial streams between 1985 and 2600 m a.s.l., within the two river catchments : Noce Bianco (NB) and Careser (CR), situated in Stelvio National Park, Trentino. A new species of *Cernosvitoviella* N. & C. 1959 was found and is described in this paper.

Description of the species

Holotype: whole mounted specimen in Canada balsam. Kept in the collection of Institute of Nature Conservation, Polish Academy of Sciences, Krakow, Poland

Type locality: stream Careser (site CR4 Q4), Trentino, Italy, 46° 25'N, 10°43' E, 1985 m a.s.l., collected 14 June 2001, leg. Lencioni V. & Maiolini B.

Paratypes: two whole mounted specimens from the tape locality are kept in the collection of Institute of Nature Conservation.

Three whole mounted specimens from stream Noce Bianco (NB2bis Q5), collected 30 July 2001, leg. Lencioni V. & Maiolini B., are kept in the HIGHEST collection in the Natural Science Museum of Trento (Italy).

Other materials studied: stream Noce Bianco: 2bis Q1 and Q4 30 July 2001, NB3bis Q3 31 July 2001, NB4 ramo3 04 Sept. 2001, NB4 Q1 31 July 2001, stream Careser: 1bis Q2, 02 Aug. 2001.

Within each sampling reach, 5 replicate (Q1 - Q5)

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kick samples of zoobenthos were collected using a standard pond net (mesh size of 250 µm, mouth of 30 x 30 cm), disturbing the substrate for 1 minute within an area of 0.1 m^2. Samples were washed through a 250 µm mesh funnel to remove excess water and then preserved in 75% ethanol. Detailed information concerning studied stations and streams were published by Lencioni & Maiolini (2002).

Etymology: the species was named after the Latin name of the geographical area.

Small species - length of preserved specimens 2 - 3.5 mm. Number of segments: 24 - 31 (segments were counted on 6 individuals only, because in the majority of specimens the caudal part was missing). Setae 32 - 48 µm long in anterior segments, a little shorter posteriorly, sigmoid, sharply pointed, nodulus situated at about 1/3 from the distal end of seta. Setal formula as follows (5),6,7,8(9)-5,6 : (5),6,7,8-5,6, sometimes bundles of 4 setae were observed in the caudal part of the body. Setae absent in segment XII. Small cutaneous glands present on prostomium, peristomium and on clitellar segments of mature worms.

Brain about 1.5 times longer than wide, deeply incised posteriorly. Lateral edges slightly concave or straight (Fig. 1A). Two pairs of pharyngeal glands present in IV - V: primary glands small, usually united dorsally, connection sometimes very narrow; second pair of secondary glands stout, almost spherical (Fig. 2). Chloragogen cells from segment VI. Coelomocytes present in a small number, oval and spherical, transparent, without granulation, or with granules clustered along coelomocyte walls (Fig. 1B). Unpaired nephridia observed at VI/VII and VII/VIII. Anteseptal part small, consisting of the funnel only, postseptal part elongated. Dorsal vessel begins in the XIII segment.

Clitellum situated on 1/2XI - XII, sometimes on 1/2XI - 1/2XIII, clitellar gland cells irregularly arranged, inconspicuous. Seminal vesicles small, confined to XI. Sperm funnels barrel-shaped (Fig. 1C), ratio length : width about 1-1.5; collar distinct, slightly narrower than the funnel. Vas deferens irregularly coiled, long - at least five times longer than sperm funnel, ended with a small enlargement formed by thickened walls. The ectal opening of this structure (penial bulbus) surrounded by densely distributed glands (Fig. 1D, E). Spermathecae confined to V (Fig. 2). Ampulla small, spherical (Fig. 1F), sometimes its shape is slightly irregular (Fig.1G) - most probably due to the

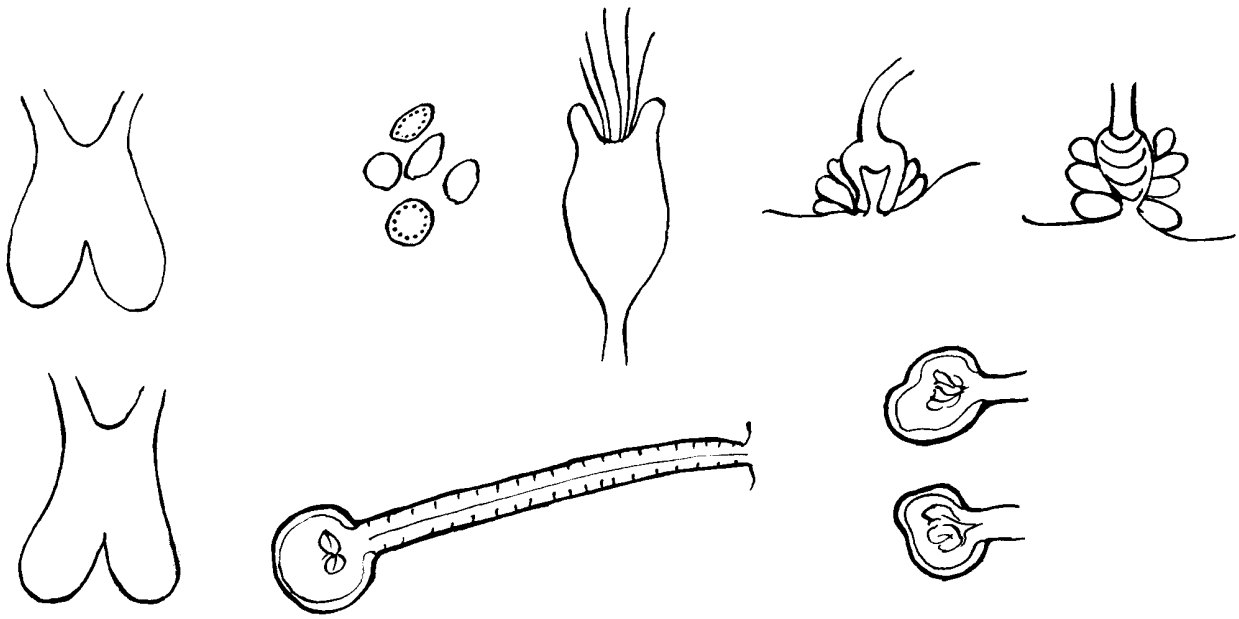

Fig. 1. *Cernosvitoviella tridentina* sp.n. A - brain, B - coelomocytes with and without granulation, C - sperm funnel, D, E - glands situated around «penial bulb» formed by thickened walls of vas deferens: D - cross section, E - from lateral side, F - spermatheca, G - variations of ampullan shape (probably caused by fixation or drying out of specimens)

preservation. Ectal duct long, 4 - 5 times longer than ampulla, having the same width along all length, devoid of glands at the ectal orifice. The total length of each spermatheca slightly smaller than the diameter of the worm (Fig. 2). One or two mature eggs present at a time.

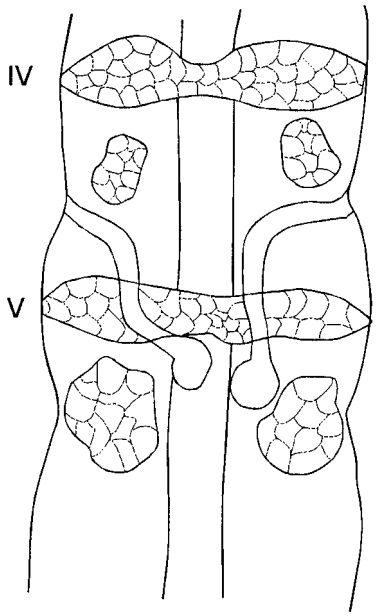

Fig. 2. Localization of pharyngeal glands and spermathecae (schematized).

Discussion

Up to now, more than 20 species have been described as belonging to the genus *Cernosvitoviella* N. & C. 1959. Among them only 3 species: *C. minor* Dózsa-Farkas, *C. celere* Nurminen and *C. carpatica* (Černosvitov), are similar to *Cernosvitoviella tridentina* sp.n. (Table 1). They were described based on preserved (*C. carpathica*) or living material (*C. minor*). In the case of *C. celere* the author did not specify which kind of material was elaborated. The preservation of the material could influence significantly the dimensions of the studied structures, but their shapes do not change considerably. Dózsa-Farkas (1990) describing *C. minor* and Rota & Healy (1999) completing this description had access to both live and preserved specimens, but in both papers only differences in dimensions were noted. Therefore I think that the comparison of diagnostic features of live and preserved specimens should be made. The above mentioned species differ by some important anatomical features. *C. carpatica* could be distinguished from all other species from this genus by having three pairs of pharyngeal glands. Spermathecae of all the above mentioned species are confined to segment V; their ampullae are small and spherical (onion - shaped in *C. celere*) and the ectal ducts are longer than the ampullae (Fig. 3). The length of ducts varies depending on the species - the shortest ones were recorded in *C. carpatica* - less than two times longer than ampullae (Fig. 3A) (Černosvitov

Table 1. Comparison of anatomical structures of some *Cernosvitoviella* species.

Species	Size (mm)	No of segments	Pharyng. glands	Coelomo-cytes	Seminal vesicle	Sperm funnel	Ratio duct:funnel	Spermatheca	
								shape of ampulla	ratio ectal duct:ampulla
C. tridentina sp.n.	2-3.5	24-31	2+2	oval and spherical	present, small	barrel-shaped	5 - 6	spherical	4 - 5
C. carpatica (Černosvitov)	3-4	25-28	3+3	oval	absent	cylindrical	3 – 3.5	spherical	2 – 3 (a) ~4 (b)
C. minor Dózsa – Farkas	2-3.5	18-24	2+2	oval and spindle-shaped	absent	pear-shaped	2.5-3 (3) ~ 5 (4)	spherical	2.5-3 (c) 1.5-3 (d)
C. celere Nurminen	2 - 3	23-26	2+2	spindle-shaped	absent	bottle-shaped	?	onion-shaped	~3

(a) after Nielsen & Christensen (1959), (b) after Kasprzak (1979), (c) after Dózsa-Farkas (1990), (d) after Rota & Healy (1999)

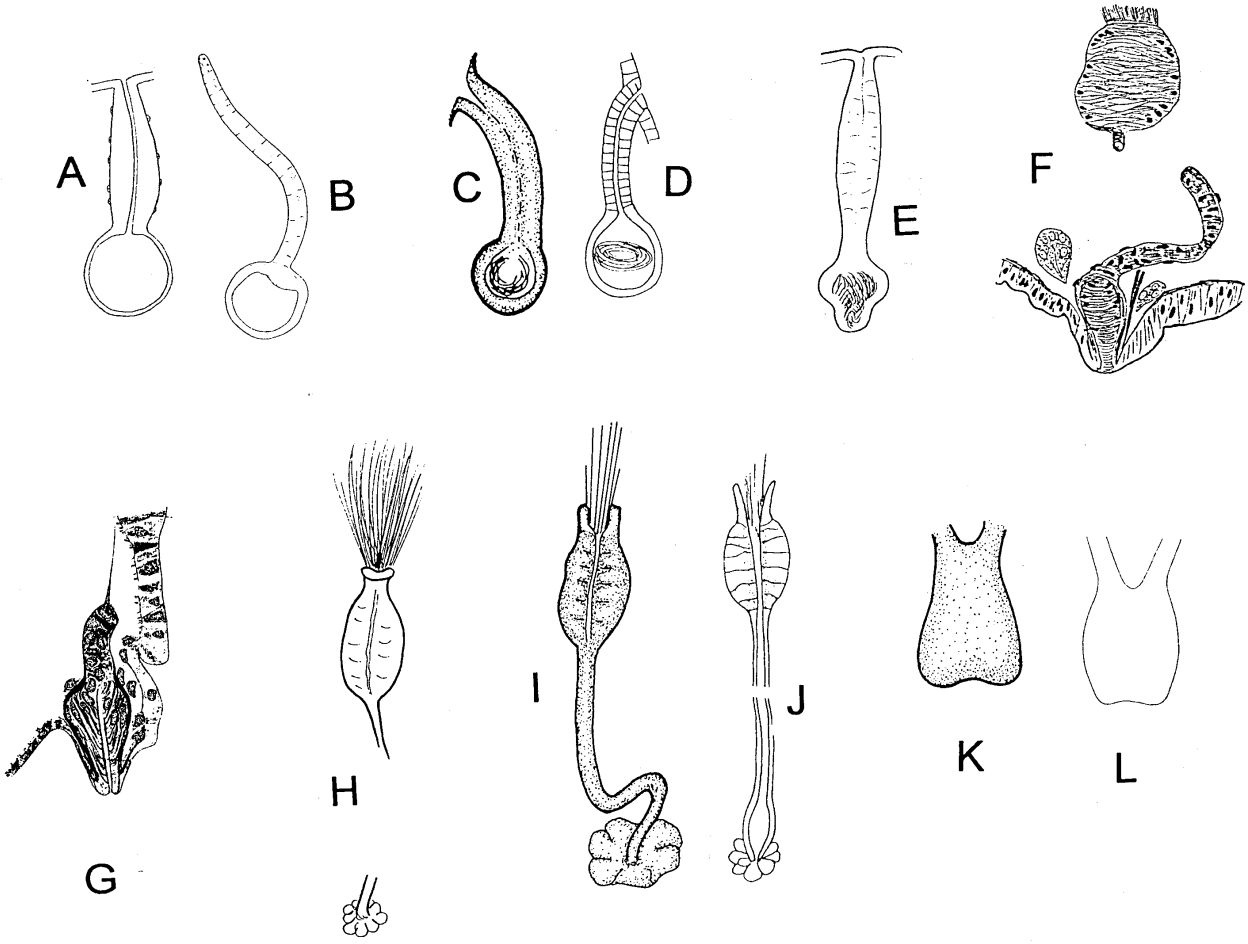

Fig. 3. Comparative features of the main anatomical characteristics of three *Cernosvitoviella* species closest to *C. tridentina* sp.n.

C. carpatica : A, B - spermatheca, F - sperm funnel and «penial bulbus», G - cross section of «penial bulbus», L - brain. (A, F, G - after Černosvitov 1928, B, L - after Kasprzak 1979)

C. minor : C, D - spermatheca, I, J - sperm funnel and duct, K - brain. (C, I, K - after Dózsa-Farkas 1990, D, J - after Rota & Healy 1999).

C. celere : E - spermatheca, H - sperm funnel and ectal end of the sperm duct (after Nurminen 1973)

1928). Kasprzak (1979) found specimens belonging to this species with ectal ducts up to 4 times longer than ampullae (Fig. 3B) but these specimens had empty ampullae, which may indicate that they did not reach full maturity. The changes of ampullae shape and changes of the ratio between the length of ampullae to that of the ectal duct during maturation process can be observed in many *Cernosvitoviella* species, that is why only completely mature specimens should be taken for comparison. For *C. minor* (Fig. 3C & D) and *C. celere* (Fig. 3E) this ratio amounts to about 3, whereas in the newly described species it reaches up to 5. The remaining species with spermathecae confined to segment V or V and VI, have ampullae longer than their ectal ducts (*C. immota* (Knöllner 1935), *C. christenseni* Dash 1970, *C. tatrensis* (Kowalewski 1914), *C. pusilla* Nurminen 1973) or of the same length (*C. atrata* (Bretscher 1903), *C. crassoductus* Dózsa-Farkas 1990, *C. microtheca* Rota & Healy 1999), but the three last mentioned species have funnel - shaped sperm funnels. Another three species with spermathecae localized in V-VI (*C. aggtelekiensis* Dózsa-Farkas 1970, *C. parviseta* Gadzińska 1974 and *C. goodhui* Healy 1975) differ from *C. tridentina* sp.n. by having the widening of

the ectal part of the duct.

The shape of the sperm funnel and duct is also a feature permitting to distinguish the newly described species from *C. minor*, *C. celere* and *C. carpatica. C. tridentina* sp.n. (Fig. 1D, E) and *C. carpatica* (Fig. 3F, G) both have a muscular widening at the end of the duct called by Černosvitov (1928) «penial bulbus». It has narrow canal inside (Fig. 3G). *C. celere* (Fig. 3H) and *C. minor* (after original description) (Fig. 3I) have sperm duct of the same width to the end. Rota & Healy (1999) recorded the presence of distal swelling of the sperm duct in *C. minor* (Fig. 3J), but the structure of this swelling seems to have different character than that in *C. tridentina* sp.n. According to the figure published by Rota & Healy (1999) this widening is not muscular, but is formed by a widening of the inside canal. Moreover, brains of *C. minor* (Fig. 3K) and *C. carpatica* (Fig. 3L) are only slightly indented posteriorly, whereas in *C. tridentina* sp.n. the brain is deeply incised (as in the majority of *Cernosvitoviella* species). *C. celere* has spindle-shaped coelomocytes only, *C. minor* has spindle-shaped and oval ones, whereas *C. carpatica* and *C. tridentina* sp.n. have oval coelomocytes exclusively. The presence of seminal vesicles distinguishes *C. tridentina* from most of other species belonging to the *Cernosvitoviella* genus. Only *C. immota* has big seminal vesicles, reaching the VIII segment, while *C. bulboducta* Martinez-Ansemil & Collado 1996 has this feature poorly developed (or even absent).

Although the variability of morphological and anatomical features important for species determination is high among this genus, the whole combination of features must be taken into account for correct identification.

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