What is *Homochaeta naidina* Bretscher, 1896 (Annelida, Oligochaeta, Naididae)?

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ABSTRACT
Homochaeta naidina Bretscher, 1896 has never been redescribed. No type material exists while all subsequent material, when available, proved to be misidentified. The original description may be based on different immature Naididae and Tubificidae (probably *Uncinais uncinata* (Ørsted, 1842) and *Bothrioneurum vejdovskyanum* Štolc, 1886). We think that *H. naidina*, although formally a valid species, may not exist in the nature. The remaining members of the nominal genus *Homochaeta* Bretscher, 1896, based on the type species *H. naidina* are either synonyms of a tubificid, *Aulodrilus limnobius* Bretscher, 1899 (*Paranais multispinus* Michaelsen, 1914; *P. setosa* Moszyński, 1933; *P. tenuis* Černosvitov, 1938), or actual naidids known on immature specimens only (*P. lacteus* Černosvitov, 1938; *H. africana* Grimm, 1985; *H. proboscidea* Grimm, 1985; *Homochaeta* sp. recorded by Falls 1974). The true generic position of the latter ones remain uncertain until they have been thoroughly redescribed. The genus *Homochaeta* and, particularly, the species *H. naidina* should not be included in the routine identification keys of Oligochaeta.

KEY WORDS
Annelida,
Oligochaeta,
Naididae,
Homochaeta,
misidentification,
synonyms.

RÉSUMÉ
Qu'est-ce que Homochaeta naidina *Bretscher, 1896 (Annelida, Oligochaeta, Naididae) ?*
Homochaeta naidina Bretscher, 1896 n'a jamais été redécrit. Le matériel type n'existe pas et tout le matériel subséquent se trouve être mal identifié quand il est disponible. La description originale peut être basée sur différents Naididae et Tubificidae immatures (probablement *Uncinais uncinata* (Ørsted, 1842) et *Bothrioneurum vejdovskyanum* Štolc, 1886). Nous pensons que *H. naidina*, bien qu'étant une espèce formellement valide, n'existe pas dans la nature. Les membres restants du genre nominal *Homochaeta* Bretscher, 1896, basé sur l'espèce type *H. naidina*, sont soit synonymes du Tubificidae *Aulodrilus limnobius* Bretscher, 1899 (*Paranais multispinus* Michaelsen, 1914 ; *P. setosa* Moszyński, 1933 ; *P. tenuis* Černosvitov, 1938), ou des Naididae seulement connus par des spécimens immatures (*P. lacteus* Černosvitov, 1938 ; *H. africana* Grimm, 1985 ; *H. proboscidea* Grimm, 1985 ; *Homochaeta* sp. de Falls 1974). La véritable position générique de ces derniers reste incertaine tant qu'ils n'ont pas été redécrits complètement. Le genre *Homochaeta* et en particulier l'espèce ne devraient pas être inclus dans les clés d'identification des Oligochaeta.

MOTS CLÉS
Annelida,
Oligochaeta,
Naididae,
Homochaeta,
erreur d'identification,
synonymes.

INTRODUCTION

Homochaeta naidina Bretscher, 1896 has been a member of species lists for many European fresh water bodies throughout the 20th century as a bare name. Nobody has ever redescribed or depicted it. The original description, copied and inserted in various guide-books, is ambiguous, enabling inclusion within this taxon of different small oligochaetes with bifid chaetae beginning in II, but without hair chaetae. This name can be misused for indistinct juvenile naidids and maybe even for tubificids. We therefore decided to try and revise *H. naidina* as well as the genus *Homochaeta* Bretscher, 1896, of which it is the type species.

HISTORY OF THE PROBLEM

Homochaeta naidina was described as the single representative of a new genus, *Homochaeta*, by Bretscher (1896). The generic diagnosis was rather scanty (translated from German): "All chaetae with two prongs, dorsally beginning already from II, by 3-6, ventrally by 3-5". The description of the species was the following:
"No proboscis; prostomium sharpened, about three times longer than a chaetal segment. Eyes either present or lacking. Head pore seems to be present. Chaetae as above; cephalization expressed as the dorsal chaetae in II-V are slimmer than the rest, and by 5-6; beginning from VI, they are similar to the ventral ones, 3-5 per bundle. The former ones reveal a median nodulus, while the upper tooth is longer than the lower; the nodulus lying at the distal third in the other chaetae.
The anteriormost chaetae lie very close to mouth opening, that is why the first segment seems to be very short.
Anterior end impregnated with yellowish brown pigment (the pharyngeal region) and bears, like the posterior end, long sensory hairs; single hairs occur also on the rest of body. Twenty segments, at a length of 8 mm; a budding zone present.
A loop [of blood vessel] going from the ventral vessel to intestine in every segment; in the anteriormost five of them the connection between the dorsal and ventral vessel seems to be dispersed into a network of capillaries.

A distinct dilatation of intestine (a glandular diverticulum) in VIII.
Brain narrow, with a deep posterior, and a slight anterior incision.
Collection locality: [the River] Limmat, on aquatic plants near the outflow from Zürichsee [Lake Zurich], a few individuals".
K. Bretscher himself found this species also from three Swiss lakes: Zürichsee (Bretscher 1900), Ägerisee (Bretscher 1903) and Vierwaldstättersee (Bretscher 1905). No illustration of *H. naidina* has been published; nor is any type material designated or preserved. However, the original description is reproduced in all subsequent guide-books on the family Naididae Vejdovský, 1884. More recently, this species has been treated mostly as *Paranais naidina* until Sperber (1948) restored the genus *Homochaeta*. It is remarkable that *H. naidina* was never observed by the two most outstanding experts in the Naididae, Piguet (1906) and Sperber (1948).
Homochaeta naidina (or *Paranais naidina*) has been recorded from many Holarctic waterbodies: in Norway (Bremnes & Sloreid 1994), Finland (Hirvenoja 2000), England (Friend 1912; Percival & Whitehead 1930; Learner 1979), Ireland (Murphy & Carter 1984), Italy (Stammer 1932; Gallico 1934; Nocentini 1979; Ceretti & Nocentini 1996), Germany (Hrabě 1960; Grimm 1979; Frenzel 1983 after unpublished data by R. Muckle), Poland (Moszyński 1925; Seligo 1931; Szarski 1947; Moszyński & Moszyńska 1957; Dratnal *et al.* 1979), Lithuania (Šivickis 1934; Grigjalis 1961, 1986), Czech Republic (Wolf 1928; Schenková & Komárek 1999), Austria (Pointner 1913; Schiemer 1979), Slovenia (Kerovec & Mršić 1981), Croatia (Kerovec 1980, 1981a, b), Serbia (Paunovic *et al.* 2003), Romania (Bušnicè *et al.* 1961; Motaş *et al*. 1962; Brezeanu & Prunescu-Arion 1962; Prunesku-Arion & Elian 1962; Popesku & Botja 1962; Prunescu-Arion & Elian 1966; Popescu-Marinescu *et al.* 1966; Enăceanu & Brezeanu 1970; Marcoci & Botea 1970), Moldova (Čokyrlan 1970), Bulgaria (Caspers 1951; Uzunov 1977, 1980, 1983; Islam *et al.* 1986; Janeva 1987; Uzunov & Kapustina 1993; Uzunov *et al.* 2001), Armenia (Bening & Popova 1947), Georgia (Pataridze 1957), Ukraine (Grimajlovs'ka-Morozova 1929; Berestov 1941; Lubjanov 1956, 1958; Jarošenko 1957; Polišćuk 1974), Russia (Svetlov 1925; Gerd 1946; Žadin 1948; Ioffe 1948, 1954; Ekaterininskaja 1960, 1962; Sokolova 1963; Čekanovskaja 1965; Mihajlov 1970; Popčenko 1971, 1978, 1988; Mirošničenko 1972; Slepuhina 1977; Ekaterininskaya 1980; Vinberg 1980; Lazareva *et al.* 1983; Šubina 1986; Mikhailov 1980), including Siberia and Far East (Michaelsen 1929; Urban 1949; Veršinin 1962; Leščinskaja 1962; Zaloznyj 1972, 1973, 1984), Lake Peipsi-Pskov on the border of Estonia and Russia (Mihajlov 1970; Mikhailov 1980; referred to also by Timm 1970), Turkey (Balık *et al.* 2004) and Israel (Pascar-Gluzman & Dimentman 1984).
The record from the Elbe River in Germany, provided by the second author (Grimm 1979), was not verified in his later, unpublished investigations, which is most probably due to the misinterpretation discussed in the present paper.
Kondô (1936) recorded *Paranais naidina* (Bretscher, 1896) from Japan, but once more without any additional description. *Osaka shimasakii* Kondô, 1936 and *Paranais heteroseta* Kondô, 1936, described in the same paper and suggested as the possible synonyms of *H. naidina* by Sperber (1948) and Brinkhurst & Jamieson (1971), may belong rather to Enchytraeidae Vejdovský, 1879 and Tubificidae Eisen, 1879, respectively. *H. naidina* has not been recorded from the New World.
H. naidina was also mentioned in several reports at the VIII (Bilbao, 2000; see Arslan 2000; Schenková *et al.* 2000) and IX (Wageningen, 2003; see Yıldız *et al.* 2003) International Symposia on Aquatic Oligochaeta. Unfortunately, nobody has ever redescribed it. The only small addition was provided by Popčenko (1988: 137) who wrote that 6-10 mm long, juvenile individuals were found in northern Russia in summer, and 4-8 mm long mature ones were recorded in autumn. Almost no relevant material on *H. naidina* is available for a possible reexamination.

REVISION OF AVAILABLE MATERIAL

After a special call to all aquatic oligochaete researchers, the first author (T. Timm) succeeded in revising some specimens identified as *H. naidina* by different colleagues. Results follow.

Zoological Museum of the Amsterdam University: four vials (V.OL.190-193) contained a total of 19 small immature worms collected simultaneously with numerous *Paranais litoralis* (Müller, 1784) from the I Jsselmeer, The Netherlands (June-August 1937) and labelled as *Paranais naidina* by A. P. C. de Vos. They appeared to be small, immature tubificids: one with hair chaetae, the rest probably being *Limnodrilus hoffmeisteri* Claparède, 1862.

Zoological Museum of the Hamburg University: a whole mount from Germany, originally labelled as *Paranais naidina* actually contained *Slavina appendiculata* (Udekem, 1855).

Two whole mounts, tentatively identified as *Homochaeta naidina*, were donated to T. Timm by B. Sambugar (Museo Civico di Storia Naturale, Verona, Italy). These severely damaged specimens had been collected from a spring in Koppenwand, Bayerisches Nationalpark (southern Germany). They have uniform bifid crotchets with a longer upper tooth in all bundles; their number is 3-5 in the anterior dorsal bundles, and 2-5 caudad. In one individual, an indistinct vascular network can be traced in some foremost segments. These characters are too scanty to include the worms in any naidid or tubificid genus.

Seven small worms from the Porsuk River (Turkey) were tentatively presented as *Homochaeta naidina* by N. Arslan (Eskişehir University, Turkey) in her report (Arslan 2000) at the VIII International Symposium on Aquatic Oligochaeta in Bilbao, 2000. After reexamination, there were found three specimens of different Enchytraeidae, three juveniles of *Limnodrilus* sp., and one tiny specimen which may belong either to Naididae or Tubificidae. The latter has only bifid chaetae, with a longer upper tooth, in all bundles (Fig. 1A, B).

One specimen from the Turkish Lake District, identified as *Homochaeta naidina* by S. Yıldız (Ege University, Turkey), proved to be an immature tubificid, most probably *Limnodrilus hoffmeisteri* when reexamined by T. Timm.

J. Schenková (Masaryk University, Brno) presented *Homochaeta naidina* from the Czech Republik, in her report (Schenková *et al.* 2000) at the Bilbao Symposium, as well as in an earlier publication (Schenková & Komárek 1999). Later on, in a personal communication, she stated that the specimens actually belong to *Rhyacodrilus falciformis* Bretscher, 1901.

The same mistake, i.e. identification of *Rhyacodrilus falciformis* at first as *Homochaeta naidina*, was once made by T. Van Haaren (AquaSense, Amsterdam, The Netherlands, pers. comm.).

A whole mount with alleged *Homochaeta naidina* from Finland (see also Hirvenoja 2000), donated to T. Timm by M. Hirvenoja (University of Helsinki), displayed an immature *Stylodrilus heringianus* Claparède, 1862.

Thus, eight available collections contained mostly misidentified immature tubificids (particularly *Limnodrilus hoffmeisteri* and *Rhyacodrilus falciformis*) but also small obscure representatives of the other families. In two cases (with three specimens), the identification as *Homochaeta naidina* cannot be confirmed or denied due to the poor condition of the material. It seems that the unambitious name *Homochaeta naidina*, given in all identification keys, has become some sort of a dustbin for small, immature oligochaete specimens with trivial bifid chaetae in all segments beginning from II. This possibility has been eagerly used by limnologists who are interested in the distribution of their material among the "boxes" of identified taxa. Consequently, *Homochaeta naidina* (= *Paranais naidina*) can be regarded as a ghost name circulating from one hydrobiological paper to another.

POSSIBLE SOURCES OF CONFUSION WITH THE ORIGINAL DESCRIPTION

What kind of material could Bretscher (1896) have had when describing *Homochaeta naidina*? A possible solution is that there were posterior zooids of *Uncinais uncinata* (Ørsted, 1842) with

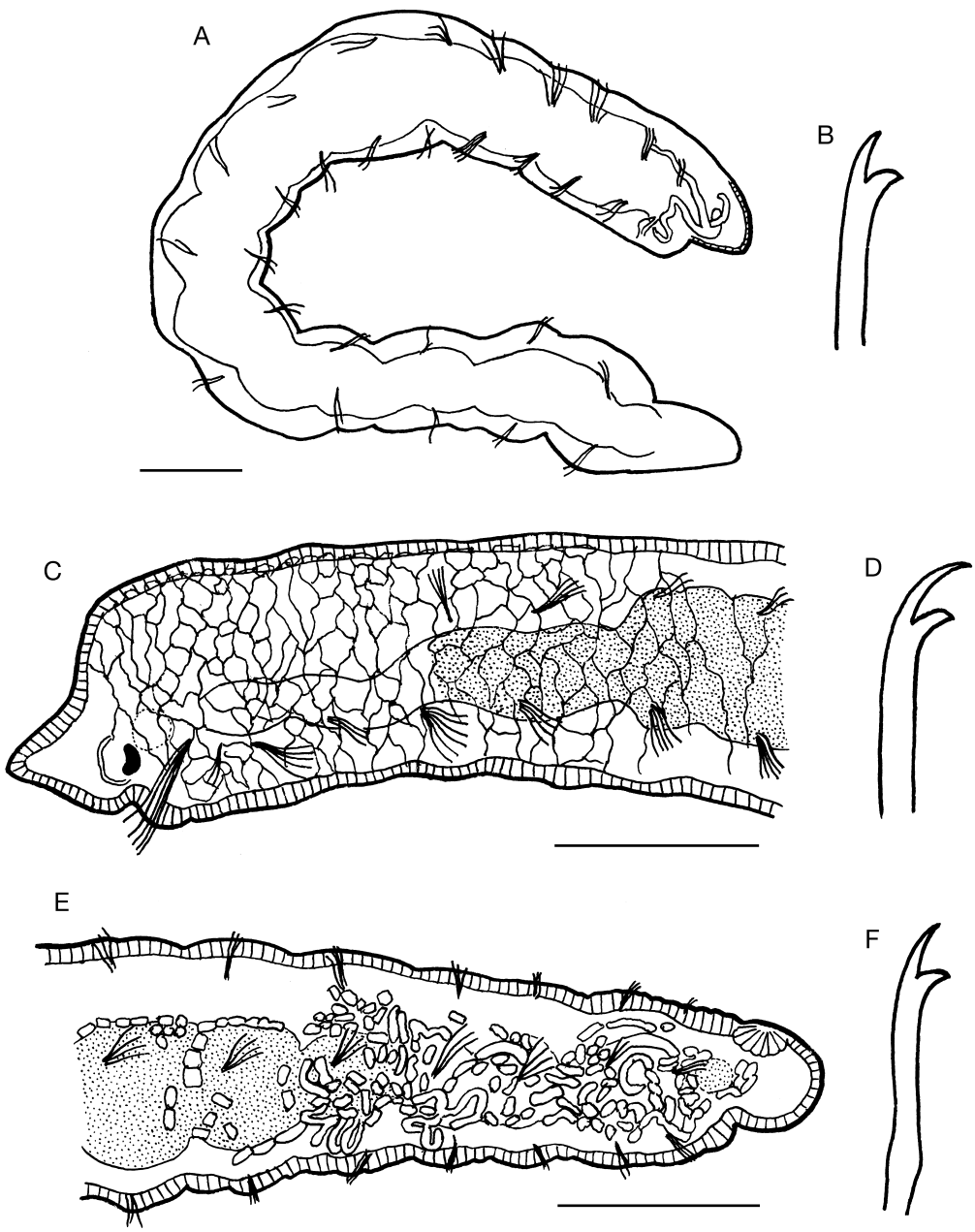

FIG. 1. — Possible candidates for misidentification as *Homochaeta naidina* Bretscher, 1896; **A**, **B**, a juvenile, probably tubificid oligochaete which has been tentatively identified as *Homochaeta naidina*, River Porsuk, Turkey, collection N. Arslan; **A**, general view; **B**, anterior chaeta; **C**, **D**, *Uncinais uncinata* (Ørsted, 1842), with well expressed blood capillaries, Lake Peta, Estonia, collection T. Timm; **C**, forebody; **D**, anterior chaeta; **E**, **F**, *Bothrioneurum vejdovskyanum* Štolc, 1886, with well expressed blood capillaries, and with prostomial sensory pit, pond of Schaapsloopven, The Netherlands, collection T. Timm; **E**, forebody; **F**, anterior chaeta. Scale bars: A, C, E, 0.2 mm.

an under-developed anterior end, where the lack of dorsal chaetae in II-V had not yet become apparent. A similar error was made later by Ditlevsen (1936) when describing the hind zooids of *V. comata* (Vejdovský, 1884), with dorsal bundles beginning already from II, and devoid of eyes, as a new species *Vejdovskyella faeroensis*. The occasional presence of eyes in *H. naidina* can be connected with the inclusion of some more developed zooids. The shape and number of chaetae per bundle, as well as the network of the transversal vessels in the anterior segments, are similar in *U. uncinata* and *H. naidina* (Fig. 1C, D). However, this version would not explain the prolonged prostomium equipped with a head pore(?) claimed to exist in *H. naidina*.

The last problem can be solved if we hypothesize that Bretscher (1896) has actually observed a short specimen of the architomic tubificid *Bothrioneurum vejdovskyanum* Štolc, 1886. The regenerating thinner and lighter anterior end with smaller chaetae can be easily confused with the cephalized anterior portion of a naidid. The genus-specific sensory pit on the prostomium of *B. vejdovskyanum* can be confused with a head pore. The shape of the chaetae (longer upper tooth in the anteriormost bundles only) fits well, too. The number of chaetae present in *B. vejdovskyanum* is less than described for *H. naidina* (only three or four instead of five or six, on the anterior end, and two instead of three to five, in the posterior segments). A parietal network of blood vessels in *B. vejdovskyanum*, giving the animal an orange colour, is in good accordance with the description of *H. naidina* (Fig. 1E, F). The presence of coelomocytes in *B. vejdovskyanum* (not characteristic of the typical tubificids), although not mentioned by Bretscher, may seem naidid-like. The lost type series of *H. naidina* may consist of representatives of both *U. uncinata* with the eyes and the budding zone, more numerous chaetae, ability to swim, and *B. vejdovskyanum* with a prolonged prostomium, a "head pore" instead of the eyes, and with dorsal bundles beginning in II. The description of *H. naidina* by Bretscher (1896) seems to combine the characters of these two species.

Is it possible that Bretscher (1896) did not recognize the cosmopolitan tubificid *Bothrioneurum vejdovskyanum* described by Štolc (1886) in Bohemia (now Czech Republic) already 10 years earlier? This seems possible, and even likely. Štolc described mature individuals, including their penial chaetae, and the strange ectal spermatophores. These details were inserted into all guidebooks, and used for identification of this allegedly rare species. Immature individuals remained without any attention. Nobody was aware of asexual reproduction in any tubificids before Hrabě (1934) described it in *B. vejdovskyanum*. As fragmentation is accelerated at higher temperatures, short individuals with one or both ends regenerating, can be abundant in the summer months. Such individuals may have been confused with naidids and identified as *H. naidina* by K. Bretscher.

We propose to treat *Homochaeta naidina* as a name without any material cover, until somebody redescribes it from adequate fresh material, including mature specimens, and designates a neotype. It should not be used in routine identification keys. This would avoid further misuse of the name *H. naidina* for obscure small oligochaetes, devoid of hair chaetae, by less experienced researchers.

STATUS OF THE OTHER SPECIES OF THE GENUS *HOMOCHAETA*

Five or six additional, poorly known species have been ascribed to this genus. First of all, there is *Paranais setosa* Moszyński, 1933, transferred later to *Homochaeta* by Sperber (1948). This species was originally described from Poland, on the basis of mature individuals, as displaying a typical naidine position of reproductive system, with male pores in VI. Its chaetal apparatus, with numerous chaetae and the shorter upper tooth, is remarkably similar to that of the tubificid *Aulodrilus limnobius* Bretscher, 1899. The latter reproduces mostly in an asexual way, maturing only seldom, while the reproductive system is then shifted forward in comparison with most

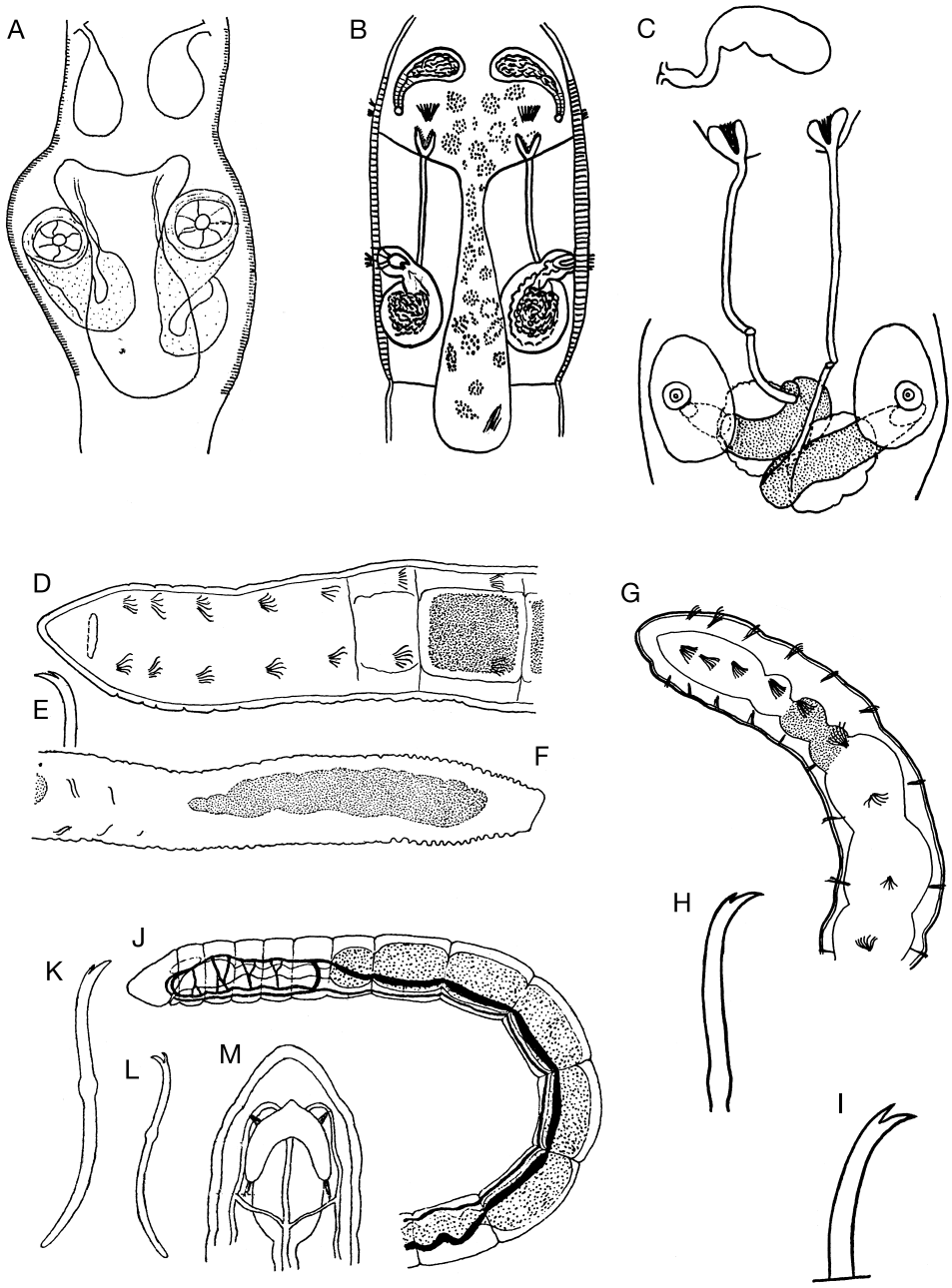

FIG. 2. — Possible candidates for misidentification as *Homochaeta setosa* (Moszyński, 1933); **A**, scheme of the genital organs of *Paranais setosa* in ventral view, from Moszyński (1933); **B**, the same organs of *Aulodrilus limnobius* Bretscher, 1899, redrawn after Marcus (1944); **C**, the same organs of *Aulodrilus limnobius*, redrawn after Kowalewski (1915); **D**-**F**, *Homochaeta setosa* from Hrabě (1973); **D**, forebody; **E**, chaeta; **F**, tubular tail portion; **G**, **H**, *Aulodrilus limnobius* from Lake Peipsi, Estonia, collection T. Timm; **G**, forebody; **H**, chaeta; **I**, *Paranais multisetosus* (= *multispinus* Michaelsen, 1914), chaeta, redrawn after Michaelsen (1914); **J**-**M**, *Paranais tenuis* Černosvitov, 1938, from Černosvitov (1938); **J**, forebody; **K**, chaeta from IV; **L**, chaeta from VIII; **M**, anterior end in dorsal view.

tubificids. Its male pores lie usually in VII (Hrabě 1981). When we compare the scheme of the reproductive organs of *P. setosa*, as drawn by Moszyński (1933), with those of *A. limnobius* as depicted by Marcus (1944: fig. 73) or Kowalewski (1915: fig. 2) (Fig. 2A, B, C respectively), they look similar, differing mostly in their position by one segment caudad, and presence of solid prostate glands in the figures by Marcus and Kowalewski. We cannot claim that Moszyński (1933) was wrong in his segment count, assuming that he was dealing with a naidid; yet this possibility cannot be excluded. The prostate glands can easily remain unnoticed in a whole mount. The remaining records of *H. setosa* are based on immature individuals only: from Poland (Kasprzak & Szczęsny 1976; Dobrowolski 1995), Romania (Enăceanu & Brezeanu 1970), France (Lafont & Juget 1976), Italy (Ravera 1956; Brinkhurst 1963), and Central Africa (Grimm 1974). The record from Slovenia (Hrabě 1973) is accompanied with a description and drawings (Fig. 2D-F) of immature worms belonging clearly to *A. limnobius*, especially considering the sand cases, mentioned already by Bretscher (1899) in his original description of this tubificid. Compare it also with *A. limnobius* from Estonia (Fig. 2G, H)! Bretscher (1899) also hesitated to ascribe *A. limnobius* (on the basis of immature individuals) either to naidids or tubificids. Thus, *Homochaeta setosa* seems to be a junior synonym of *Aulodrilus limnobius*.

Paranais multispinus Michaelsen, 1914 (error: *P. multisetosus* in his fig. 4) is known from Namibia on the basis of a single immature specimen (Fig. 2I). It can clearly be identical both with *P. setosus* (as its senior synonym) and *Aulodrilus limnobius*.

Paranais tenuis Černosvitov, 1938 was described from Argentina on the basis of numerous immature individuals (Fig. 2J-M). None of them revealed any sign of budding (Černosvitov 1938). This taxon was, even in the opinion of its author, similar to *P. multispinus* in many ways. It was regarded as a synonym of *Aulodrilus limnobius* by Marcus (1944).

P. lacteus Černosvitov, 1938, known on the basis of a single immature specimen, displayed abundant coelomocytes, chaetae with a slightly longer upper tooth, a trace of the budding zone at the posterior end of the body, and the ability to swim. It can be treated as a true naidid of unknown identity (Fig. 3A-D).

Homochaeta sp. from the USA (Falls 1974 – eyeless, swimming, budding, chaetae beginning from II, 2-3 per bundle, with a longer upper tooth) and Argentina (Gluzman de Pascar 1989, not described) are also American records of this genus.

Finally, two species were described, on the basis of immature specimens only, from Africa: *Homochaeta proboscidea* Grimm, 1985 from Sudan (Fig. 3E, F), and *Homochaeta africana* Grimm, 1985 from the Central African Republic, South African Republic and Ethiopia (Fig. 3G-I). They were discussed by their author (Grimm 1985). According to a recent, unpublished revision of the morphological characteristics by the second author, none of those "species" matches with features of any other naidid species known so far. *H. africana* can be most easily mixed up with some immature tubificids. The specimens are in a rather bad condition and immature, some lacking their posterior end. The main characteristic of *H. proboscidea*, the pronounced proboscis, is not known to occur in any other naidids which lack hair chaetae in the dorsal bundles.

Paranais lacteus, *Homochaeta africana*, *H. proboscidea*, and maybe also *Homochaeta* sp. by Falls (1974), if proved to be a coherent group of Naididae, may form their own genus, but only after further study including also the reproductive system.

CONCLUSION

The original description of *Homochaeta naidina* Bretscher, 1896 was based, in all probability, on a combination of different taxa (most probably, the naidid *Uncinais uncinata* and the tubificid *Bothrioneurum vejdovskyanum*). The ambiguity of the formal diagnosis has turned it into a "ghost taxon", never described again, and has led to

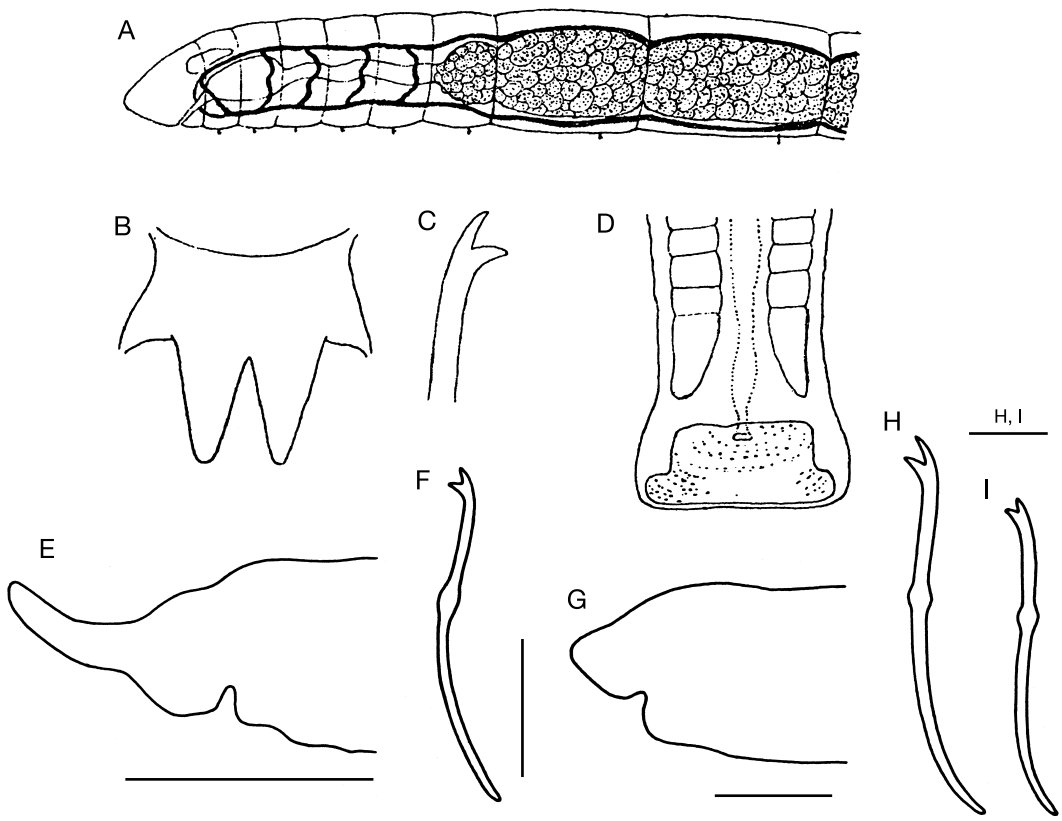

FIG. 3. — *Homochaeta* spp. of uncertain position; **A**-**D**, *Paranais lacteus* Černosvitov, 1938, from Černosvitov (1938); **A**, forebody; **B**, brain; **C**, chaeta; **D**, tail portion; **E**, **F**, *Homochaeta proboscidea* Grimm, 1985, from Grimm (1985); **E**, anterior end; **F**, ventral chaeta; **G**-**I**, *Homochaeta africana* Grimm, 1985, from Grimm (1985); **G**, anterior end; **H**, **I**, chaetae. Scale bars: E, G, 0.1 mm; F, H, I, 0.01 mm.

numerous misidentifications throughout the 20th century. This puts also the reality of the nominal genus *Homochaeta* Bretscher, 1896, based on the type species (by monotypy) *H. naidina*, under some doubt. Several of the other possible members of this genus, *Paranais multispinus* Michaelsen, 1914, *Paranais setosa* Moszyński, 1933, *Paranais tenuis* Černosvitov, 1938, are all most probably synonymous with the tubificid *Aulodrilus limnobius* Bretscher, 1899. The remaining three, *Paranais lacteus* Černosvitov, 1938, *Homochaeta africana* Grimm, 1985, *Homochaeta proboscidea* Grimm, 1985, as well as *Homochaeta* sp. recorded by Falls (1974) are evidently true naidids, but are known on the basis of scarce immature specimens only. Their actual generic position remains unclear. We suggest to exclude the genus *Homochaeta* and, particularly, the species *Homochaeta naidina* from the future identification keys, for avoiding any further misuse of these names.

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