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Revision of *Marenzelleria* Mesnil, 1896 (Spionidae, Polychaeta)

A. V. Sikorski & A. Bick

SARSIA

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Marenzelleria is revised on the basis of material from the Arctic, North America, Europe and the Far East. Types of all species included in the genus are examined. Five species are registered. *Marenzelleria neglecta* sp. nov. is described from the coastal waters of the southern Baltic. Two species, *M. arctia* and *M. wireni*, occur in the Arctic, whereas *M. viridis* and *Marenzelleria* sp. A are found in coastal waters of the Atlantic. *Marenzelleria neglecta* occurs both in arctic and boreal estuaries. Complete description of *Marenzelleria* sp. A must await additional material. A generic diagnosis and a key to the species are given.

A. V. Sikorski, Zoological Museum, Moscow University, Bolshaya Nikitskaya 6, 103009 Moscow, Russia.
E-mail: andrey_sikorski@mail.ru; andrey.sikorski@akvaplan.niva.no
A. Bick, Universität Rostock, FB Biologie, Allgemeine und Spezielle Zoologie, Universitätsplatz 5, D-18051 Rostock, Germany.
E-mail: andreas.bick@biologie.uni-rostock.de

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INTRODUCTION

The classification within the genus *Marenzelleria* presents many difficulties as there are only a few external characters suitable for classification. In general, three to four extremely variable numerical characters are used and these overlap in different species, thus making correct identification nearly impossible. However, the invasive nature of some members of the genus has made it increasingly important to identify the different species of this group, particularly in environmental assessment studies. Seven valid species names actually belonging to the genus are known (see "Historical review"). The names are often used incorrectly (see the lists of synonyms below). Many papers have been published over the past two decades on the genus *Marenzelleria* [Leling 1986; Bick & Zettler 1997; Sikorski & Buzhinskaya 1998; see list in Zettler (1997) for more], particularly in Europe. This interest arises mainly from the detailed investigations of problems stemming from the invasion of North American *Marenzelleria* spp. into the North Sea and Baltic Sea in the late 1970s and early 1980s. The introduced species have become an important faunistic element. Therefore, most studies have concentrated on their distribution in the North Sea and Baltic Sea, as well as on the Atlantic coast of North America. *Marenzelleria* has also been recorded after introduction by man, from the San Joaquin Delta, California, the Pacific coast of North America (identified as *M. viridis* by Cohen & Carlton 1995). The need to identify *Marenzelleria* correctly has prompted a revision of the genus based on a morphological examination of all *Marenzelleria* types and material available to us. The investigation presented here attempts to resolve the taxonomic problems as far as practicable, to provide clear descriptions of all species to facilitate future investigations and to clarify the area of distribution of these species.

MATERIAL AND METHODS

All available European and North American material of *Marenzelleria* has been examined, consisting of, in total, 180 samples and ~3000 specimens from the following sources: Zoological Museum, Rostock University, Germany (ZSRO): 22 samples, 402 specimens; Zoological Museum, Moscow State University, Russia (ZMUM): 90 samples, ~1430 specimens; Zoological Institute, Russian Academy of Sciences, St. Petersburg, Russia (ZISP): 48 samples, ~880 specimens; National Museum of Natural History, Washington DC, USA (USNM): three samples, 100+ specimens; Swedish Museum of Natural History, Stockholm, Sweden (SMNH): three samples, 12 specimens; Zoological Museum of the Hamburg University, Germany (ZMH): five samples, 15 specimens; Peabody Museum, Yale University, New Haven, Connecticut, USA (PYM): five samples, 33 specimens; Zoological Museum,

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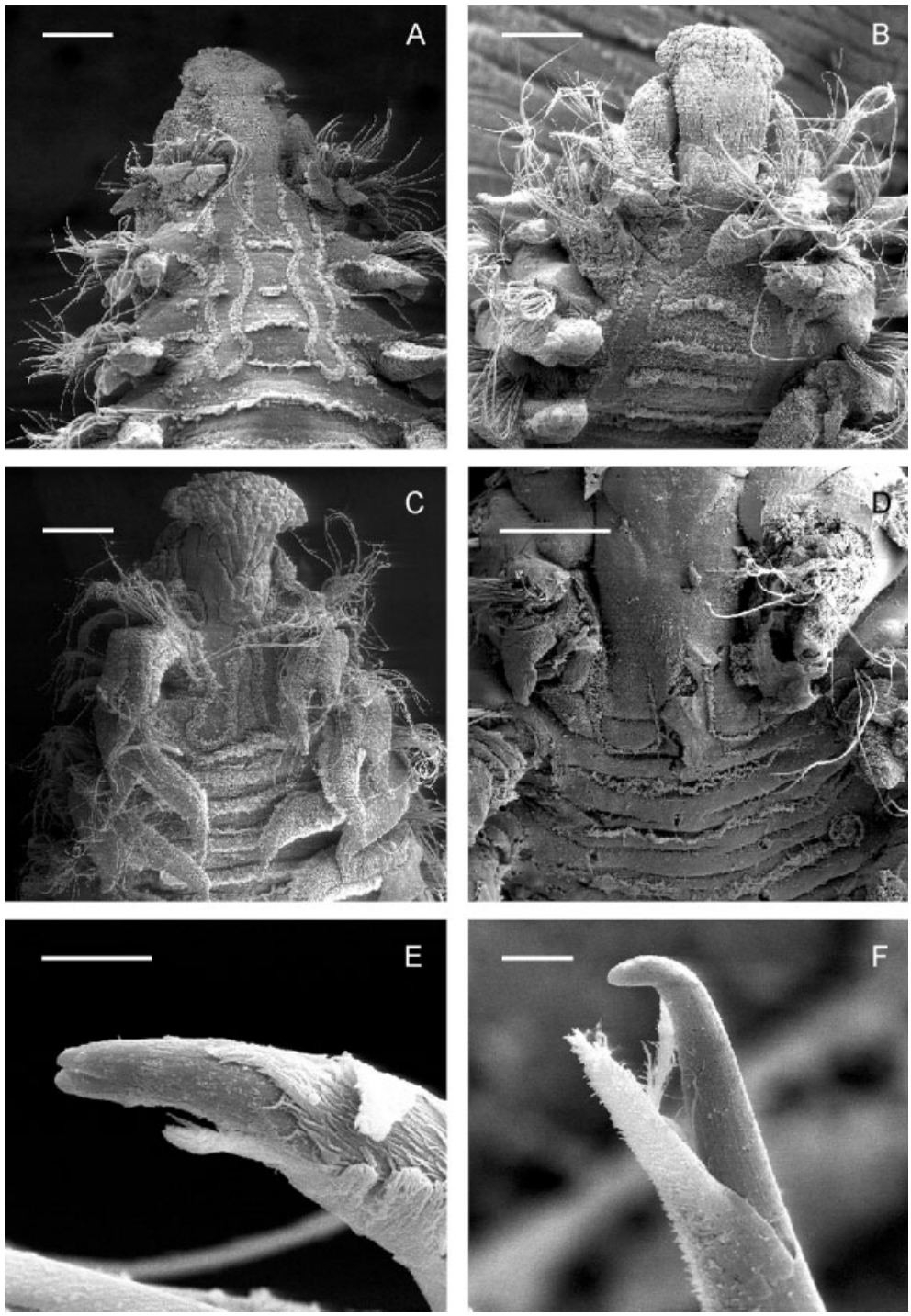

Fig. 2. Scanning electron micrographs. A. *Marenzelleria wireni*, nuchal organs. B. *Marenzelleria neglecta*, nuchal organs. C. *Marenzelleria viridis*, nuchal organs. D. *Marenzelleria arctia*, nuchal organs. E. *Marenzelleria wireni*, tip of hook. F. *Marenzelleria arctia* tip of posterior notopodial hook. Material: A, E – White Sea, "Prof. Zenkevich", Stn 113/2; B – ZSRO P-893; C – ZSRO P-33; D, F – ZSRO P-892. Scales (mm): A–D = 0.2; E, F = 0.005.

becoming completely fused to branchiae. Notopodial post-setal lamellae becoming elongated oval to broadly rounded posteriorly (Fig. 4D–E) and acutely triangular in far posterior setigers. Neuropodial lamellae with elongated tip on first 10 setigers; rounded to quadrangular on middle setigers, often with a slightly elongated tip ventrally; acutely triangular and similar in shape to notopodial lamellae in posterior part of body.

Neuropodial hooded hooks start between setigers 16 and 51, on setigers 16–18 in juveniles after settlement ($\leq$0.4 mm wide), two to 10 per fascicle (two to three per fascicle in specimens $\leq$0.4 mm wide). Notopodial hooded hooks start between setiger 16 (juveniles) and setiger 69, two to eight per fascicle. Hooks bidentate as a rule, with only one apical tooth above main tooth (Fig. 4F); occasionally with second apical tooth; apical teeth sometimes reduced. Ventral inferior tuft of neuropodium bearing sabre setae from setiger 4, occasionally from setiger 2 or 3, two to six setae per fascicle anteriorly, decreasing in number to two to three and looking stouter from setigers 13 to 56 (setae identical on all setigers in smallest specimens). Pygidium of smallest specimens with three pairs of anal cirri, ventral pair shortest; adults with up to five or six pairs, sometimes dichotomously branched, hence may thus be odd numbered.

Gametes present from setigers 32 to 40.

Type locality

USA, Massachusetts, off Martha's Vineyard, Naushon Island.

Distribution (Fig. 3B)

Atlantic species; along the North American coast from Nova Scotia to Cape Henlopen, Scotland, North Sea. Estuaries, eulittoral.

Biology and ecology

Eulittoral; on sandy bottoms; brackish waters, salinity usually >16‰; spawning observed in the Dollard-Ems estuary, the Netherlands, from March to May (Bochert 1997).

Remarks

Marenzelleria viridis is particularly difficult to distinguish from *M. neglecta* sp. nov. Both species may occur sym- and parapatrically (for example in the Elbe estuary, North Sea; Bastrop & al. 1999). The characters most useful for identification of *M. viridis* in this case are: NO to the middle of setiger 2 (does not cross the mid-segmental ciliary band on setiger 2), Br on about one half of the total number of setigers (significantly fewer in *M. neglecta*), Br–VHH and Br–DHH (Table 1). Not all specimens under 1.0 mm wide could be reliably identified. The following characteristics can be used in the identification of small specimens: all examined smaller specimens of *M. neglecta* with nuchal organs not crossing mid-segmental transdorsal ciliary band on setiger 2 had Br–VHH $\leq$2 and Br–DHH ≤ -1 (all specimens of *M. viridis* >0.4 mm wide with Br–VHH of larger values and most of them with larger values of Br–DHH); specimens of *M. viridis* hardly ever possess more than one apical tooth on their hooks. *Marenzelleria viridis* differs from *M. arctia* in having a greater number of setigers and a longer, more slender body. It differs from *M. arctia* also by larger values of VHH, DHH, Br, Br–VHH and Br–DHH (Table 1). *Marenzelleria viridis* differs from *M. wireni* in having nuchal organs not crossing the mid-segmental ciliary band on setiger 2, Br on about one half of the total number of setigers in specimens >0.8 mm wide (instead of more than two thirds of the total number of setigers in *M. wireni*), and a greater number of setigers. Specimens <0.8 mm wide differ from *M. wireni* in having clearly bilobed prostomia.

All examined type specimens of *Sc. viridis*, *Sc. tenuis* and *M. jonesi* belong to the same species. The syntypes of *Sc. viridis* and *Sc. tenuis* were rediscovered in 1986. Thus, this is the first re-examination of the types since Verrill's (1873) original description. *Scolecolepis viridis* and *Sc. tenuis* were described in the same paper. We use the epithet "*viridis*" to name this species for two reasons: (1) Maciolek (1984) treated *Sc. tenuis* as the junior synonym of *M. viridis*; (2) syntypes of *Sc. viridis* are in much better condition than syntypes of *Sc. tenuis*. We regard it as necessary to designate a lectotype for this species to stabilize its taxonomic status.

Marenzelleria neglecta sp. nov.
Figs 2B, 3C, 5A–I, 6

Marenzelleria viridis – Maciolek 1984:51–55, fig. 2 (partim); Bick & Burckhardt 1989:239–241, fig. 1, plates VII–VIII; Sikorski & Buzhinskaya 1998:1118–1119, fig. 4.
Marenzelleria cf. *viridis* – Bick & Zettler 1997: 141–142, figs 3–4.
Marenzelleria type II – Bastrop & al. 1995, 1997, 1998; Röhner & al. 1996a, b: genetic analysis.

Material examined

Nineteen samples, 128 specimens.

HOLOTYPE: Europe, Baltic Sea – Darss-Zingst-Boddenchain, 54°25′N 12°40′E, 0.2–0.8 m, 4–6‰, November 2000 (ZMH P-24386).

PARATYPES: Europe, Baltic Sea – Darss-Zingst-Boddenchain, 54°25′N 12°40′E, 0.2–0.8 m, 4–6‰, November 2000 (ZMH P-24387, four specimens; ZSRO P-983, two specimens; ZSRO P-984, three specimens); 54°25′N 12°40′E, 0.2–0.8 m, 4–6‰, May–September 1995 (ZSRO P-38, 14 specimens; ZSRO P-39, 22 specimens; ZMUM Pl-2235, seven specimens). – R/V *Lev Titov*, Stn 55, 59°53′N 28°16′E, 21 m, silty sand, 20 July 1996 (ZISP 1/49123, one specimen); Stn 56, 59°50′N 28°11′E, 20 m, sand and clay, 20 July 1996 (ZISP 2/49124, one specimen); Stn 25, 59°51′N 28°40′E, 21 m, silty sand, 20 July 1996 (ZISP 3/49125, 1); Stn 18H, 54°41.3′N 19°52′E, 18 m, fine sand, 7.1‰, 4 August 1990 (ZISP no no., 10 specimens; ZMUM Pl-2236, 10 specimens). Europe, North Sea – Lower Elbe River, Mühlenberger Loch, 1.8 m, fine sand, 0.7‰, 15 October 1996 (ZSRO P-37, seven specimens). USA, Atlantic coast – North Carolina, Currituck Sound, eulittoral, 4‰, June 1995 (ZSRO P-44, three specimens); Georgia, Ogeechee River, eulittoral, low tide, 1–2‰, June 1995 (ZSRO P-41, three specimens).

NON-TYPE MATERIAL: Europe, Baltic Sea – Darss-Zingst-Boddenchain, 1 m, 25 March 2000 (ZSRO P-893, eight specimens). Canada – North West Territories, Tuktoyaktuk Harbor, 69°29′N 132°53′W, August 1982 (ZSRO P-894; formerly NMC-Acc. IZ 1984-031, 16 specimens). USA, Pacific coast – California, Sacramento, San Joaquin Delta, Grizzly Bay at Dolphin (SIO A660, 13 specimens; ZSRO P-896, two specimens).

Description

HOLOTYPE: Complete specimen, 1.5 mm wide, 75 mm long, 194 setigers; no eyes visible; nuchal organs extending to border of setigers 3 and 4. Neuropodial hooded hooks appear on setiger 47, notopodial hooded hooks start from setiger 56; number of branchiate setigers 53; pygidium with five pairs of anal cirri.

All material examined

Up to 2.0 mm wide, 115 mm long, with up to 250 setigers.

Prostomium bell-shaped, broadly rounded anteriorly, often incised medially. Two pairs of eyespots (pale in fixed specimens), usually arranged in line or trapeziformly with posterior pair closer together (Fig. 5A). Palps short, never extending posteriorly beyond setiger 10 in fixed specimens. Nuchal organs may reach to mid-segmental ciliary band of setiger 4 (Fig. 2B) or, exceptionally, to posterior border of setiger 4. Number of branchiae one to 69 pairs (depending on size; see Table 1): one pair of branchiae found in juvenile with 15 setigers, all specimens $\leq$0.5 mm wide have $\leq$21 pairs of branchiae. Branchiae disappear sometimes immediately, sometimes six to 10 segments after starting to decrease in length. Branchiae of setiger 1 rarely as high as notopodial post-setal lamellae, usually above lamellae by up to one third of their length. Tips of notopodial post-setal lamellae on two to nine anterior-most setigers not fused to branchiae. In most of these cases, upper tip of anterior notopodial lamellae pointed (Fig. 5C), but sometimes rounded; in latter case anterior notopodial post-setal lamellae completely fused to branchiae (specimens from Canadian Arctic). Notopodial post-setal lamellae decreasing in size, posteriorly becoming nearly triangular or oval (Fig. 5E). Neuropodial post-setal lamellae sometimes pointed anteriorly (Fig. 5C, D), becoming rounded and slightly asymmetrical at end of anterior third of body, rounded or nearly triangular posteriorly (Fig. 5E). Neuropodial hooded hooks from setigers 11 to 51, two to eight per fascicle in middle of posterior half of body (only two per fascicle in specimens $\leq$0.4 mm wide). Notopodial hooded hooks appear one to 17 segments after neuropodial hooks, i.e. from setigers 12–67, two to seven per fascicle in middle of posterior half of body. Hooded hooks bidentate (Fig. 5F), sometimes tridentate posteriorly (more usual in larger specimens), with two unpaired apical teeth in tandem above main fang (Fig. 5G–I). Ventral inferior tuft of neuropodium with sabre setae appearing from setigers 1 to 5, two to six per fascicle anteriorly, decreasing in number to two to three and becoming stouter from setigers 4 to 41. Pygidium of juveniles with four pairs of anal cirri; cirri of ventral pair shortest. Pygidium of adults with up to seven pairs of anal cirri.

Gametes present from setigers 39 to 43.

Specimens unpigmented, sometimes with small black dots on palps.

Type locality

Baltic Sea, Germany, Darss-Zingst-Boddenchain.

Etymology

The name "*neglecta*" means that the species has been misidentified and overlooked.

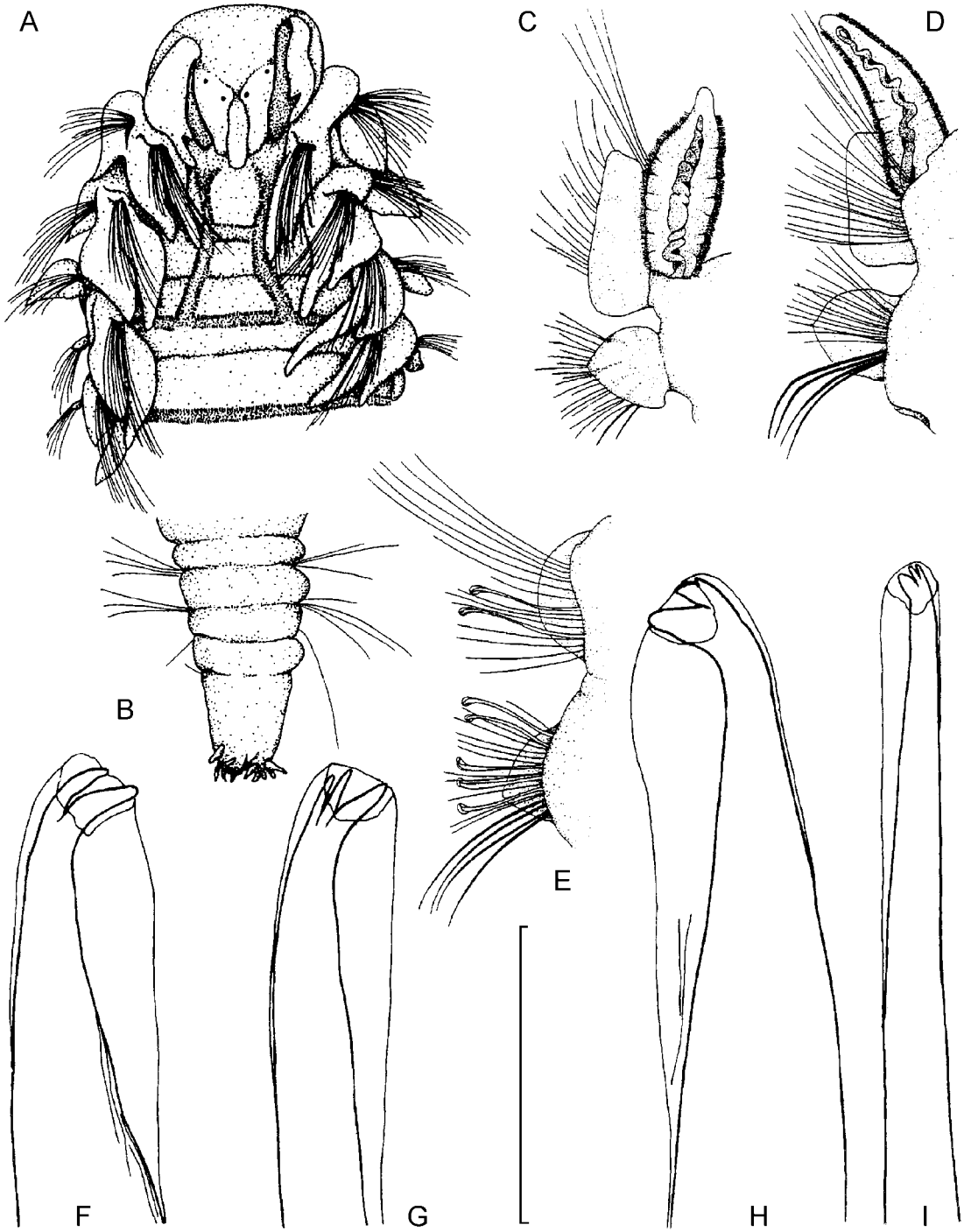

Fig. 5. *Marenzelleria neglecta* (Verrill, 1873). A. Anterior end, dorsal view. B. Pygidium, dorsal view. C. Left parapodium of setiger 3, posterior view. D. Right parapodium of setiger 45, anterior view. E. Right parapodium of setiger 70, anterior view. F. Neuropodial hook, setiger 86. G. Neuropodial hook, setiger 181. H. Neuropodial hook, setiger 147. I. Neuropodial hook, setiger 48. Material: A–E, G – Darss-Zingst-Boddenchain ZSRO P-38; F, H – Darss-Zingst-Boddenchain ZSRO P-893; I – Tuktoyaktuk Harbor ZSRO P-894. Scale (mm): A, B = 1.0; C–E = 0.8; F–I = 0.025.

Distribution (Fig. 3C)

From Durham, Fox Point (North Carolina) to Ogeechee River (Georgia) along the Atlantic coast of North America; Baltic Sea and North Sea (Elbe estuary); San Joaquin Delta, Grizzly Bay at Dolphin, California in the Pacific; Tuktoyaktuk Harbor in the Canadian Arctic.

Biology and ecology

On sandy and muddy bottoms, salinity usually 0.5–10‰ [see also Zettler (1997) for more details]; highly adapted to eutrophic conditions prevailing in brackish waters [see also Schiedek (1997) for more details]. Larvae were most abundant in plankton in the coastal waters of the Baltic Sea in September and October but occurred up to March [see also Bochert (1997) for more details]; larvae feed on phytoplankton <20 µm [see also Burckhardt & al. (1997) for more details].

Remarks

Marenzelleria neglecta can be identified by the combination of the following characters: the length of the nuchal organs (up to setiger 4) and the number of branchiate setigers in relation to the total number of setigers (about one quarter to one third). See "Remarks" for *M. viridis* and *M. arctia* and also Table 1 for more details.

All valid names listed in "Historical review" do not concern this taxon, as it is absent in the type materials. Therefore, a new name, "*neglecta*", is designated for the taxon.

Marenzelleria neglecta sp. nov. was found in coastal waters of lower salinity on both sides of the Atlantic Ocean, with one exception: Bastrop & al. (1998) found *Marenzelleria* type II (= *M. neglecta*) at Tuktoyaktuk Harbor (Canadian Arctic). All 16 examined specimens from this station were <0.9 mm wide and incomplete, which means that important diagnostic characters to

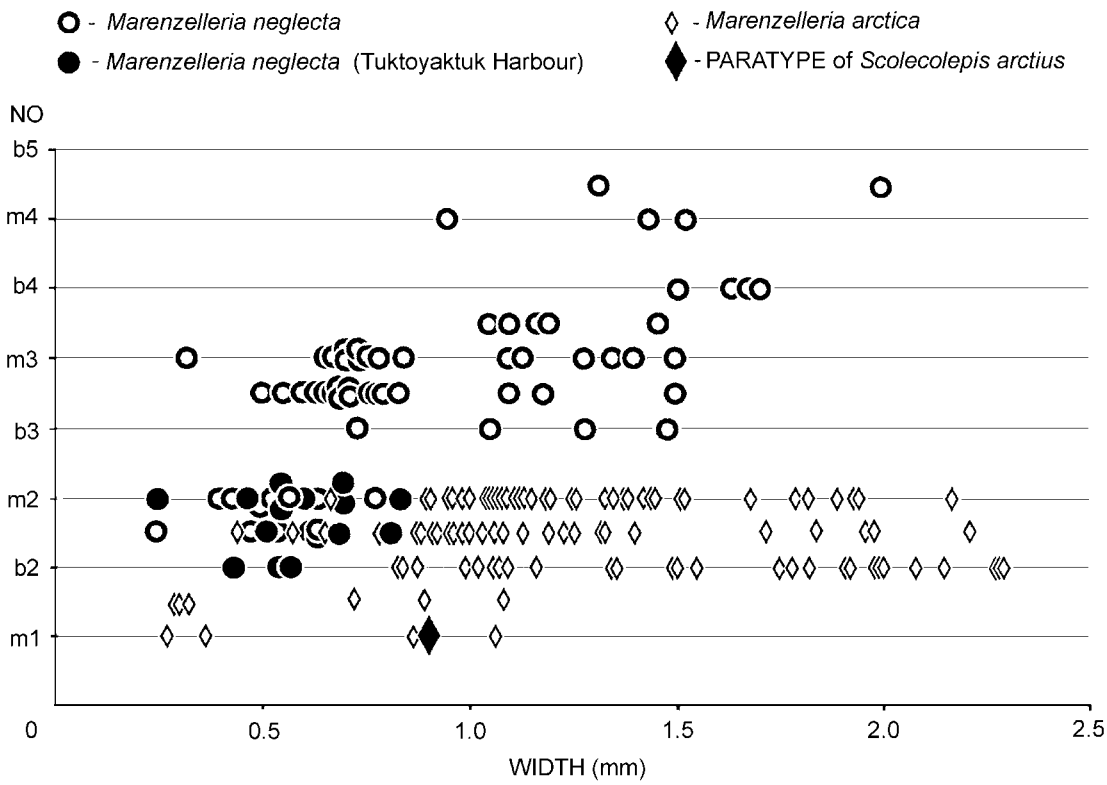

Fig. 6. Relationship between size of worm (width, mm) and length of nuchal organs (NO) in *Marenzelleria neglecta* and *M. arctia*, with special signatures for paratype of *Scolecolepides arctius* and for specimens of *M. neglecta* from Tuktoyaktuk Harbor, Canadian Arctic (m1: middle of setiger 1; b2: beginning of setiger 2; m2: middle of setiger 2, etc.).

differentiate these specimens from *M. arctia* could not be determined. However, the nuchal organs were longer than in *M. arctia* in case of comparable size (Fig. 6). We could not obtain further arctic material for genetic analysis.

Material from California was in agreement with the diagnosis of *M. neglecta*, but all specimens investigated were small; therefore some doubts about their identity remain.

Marenzelleria arctia (Chamberlin, 1920)
Figs 2D, F, 3D, 6, 7A–I

Scolecolepides arctius Chamberlin, 1920:17–18: plates III (5–7), IV (1).
Laonice annenkovae Zachs, 1925:3.
Nerine vulgaris – Wirén 1883:408 (partim).
Microspio wireni – Söderström 1920:249–250 (partim).
Laonice annenkovae – Uschakov 1939:82; 1950:200; 1955:265.
Marenzelleria wireni – Annenkova 1932:176; Vinogradov 1947:131–132; Maciolek 1984:49–51, fig. 1A–G (?partim); Sikorski & al. 1988 (partim):835–837, fig. 4a–k; ?Holmquist 1967:298–313.
Marenzelleria arctia – Stoljarov 1994:67; Burkovsky & al. 1995:69; Burkovsky & Stoljarov 1995:36; Sikorski & Buzhinskaya 1998 (partim):1115–1118.

HOLOTYPE of *Sc. arctius* Chamberlin, 1920 (not examined, unavailable for study due to postal restrictions): NMCIC (National Museum of Canada, Invertebrate Collection) 1900-8368 (two slides containing a series of parapodia). Label: Canadian Arctic Expedition station 27o, lagoon at Collinson Point, Alaska, USA. Pelagic under 5 inches (13 cm) of ice over 1 foot (0.3 m) of water.

Material examined

One hundred and one samples, about 2300 specimens from MCZ, ZISP, ZMUM and ZSRO. Two PARATYPES of *Sc. arctius*: Beaufort Sea, "Alaska: Collinson Point, Stn 27: under 5 inches of ice over 4 feet of water, coll. F. Johansen, 18 September 1913, Canadian Arctic Expedition" (MCZ no. 2194 and 2195).

LECTOTYPE and PARALECTOTYPES of *L. annenkovae*, designated by Sikorski & Buzhinskaya (1998): Barents Sea – "Murman, Kola Bay, mouth of Tuloma River, 2 June 1923" (ZISP 1/2210, 1; ZISP 2/2211, 13). "Teriberka River, 13 May 1925" (ZISP 3/13765, 10).

NON-TYPE MATERIAL: Barents Sea – Kola Bay, Mouth of Tuloma River, low-tide mark, silty sand, 17 July 1999 (ZSRO P-892, 170). White Sea – Kandalaksha Bay, estuary of Chornaya River, summer 1991 (ZMUM Pl-838, 3); summer 1997 (ZMUM Pl-2240, 7); summer 1998 (ZSRO P-895, 31). Kara Sea – Dikson Bay, "*Vega*" Expedition, Stn 19, 73°09.9′N 80°20′E, fine, very soft light brown clay, 4–5 fm, 9 August 1878 (SMNH 2041, 4) = SYNTYPES of *M. wireni*. – Mouth of Yenisey, eastern coast, 72°43′N, 300 m off shore, 31 August 1927 (ZISP 1/25658, 1). – 73°09.9′N 80°20′E, Sever Bay, Stn 7, 10 m, 1 October 1930 (ZISP 8/25665, 1). – R/V *Sibiryakov*, Stn 5, 72°24.5′N 80°51.5′E, brown ooze, pieces of algae, 7 August 1933 (ZISP 16/8664, 1). – R/V *Dm. Mendeleev*, Stn 4416, Mouth of Ob, 71°45′N 73°03.5′E, clayey silt, 18 m, 26 September 1993 (ZMUM Pl-289, 154). – R/V *Polarstern*, Stn 13, 73°35′N 80°06′E, 20 m, clay, 31.59‰, –0.49°C, August 1993 (ZISP 9/49456 and 10/49457, 2; ZMUM Pl-2238 and Pl-2239, ∼80; ZSRO P-327, 20). – Mouth of Yenisey, August 1993, coll. Komendantov (ZISP 11/49458-20/49467, 576). East Siberian Sea – Chaun Bay, Mouth of Chaun River, 2–3 km off shore, silt, 4.1 m, 14 August 1967 (ZISP 4/16576, 26); Mouth of Palyavoom River, sand, 0.67 m, 21 August 1967 (ZISP 5/16577, 8). – Russian Polar Expedition, Stn 77, south of Kotelniy Island, silty sand, gravel, 3–4.5 m, 17 September 1903 (ZISP 5/25662, 1). Bering Sea – Mouth of Anadyr River, silt, 3.7–4.47 m, 11.6°C, 1 August 1970 (ZISP 6/39681, 11); Stn 103, silt, 4.47 m, 11.6°C, 1 September 1970 (ZISP 7/40436, 15). – Avachinskaya Inlet, estuaries of Avacha and Paratunka Rivers, Stn 552, 554, sandy silt, detritus, 0.5–1 m, 1932–1935 (ZISP 10/25667, 9). – Mouth of Kamchatka River, Nerpichye Lake, 5–20‰, 1961 (ZISP 20/11664, ∼70). – Avachinskaya Inlet, 1988 (ZMUM 65 samples without no., ∼1000).

Description

PARATYPES: MCZ no. 2194 contains one anterior fragment (Fig. 7A, E), 0.9 mm wide, neuropodial hooded hooks from setiger 20, three per neuropodium; notopodial hooded hooks from setiger 25, two per notopodium; 22 pairs of branchiae; nuchal organs reaching middle of setiger 1, ventral inferior tuft of neuropodium bearing sabre setae from setiger 5; MCZ no. 2195 contains middle fragment only.

CONCLUSIONS

1) Five species belonging to the genus were found: *M. wireni* Augener, 1913; *M. viridis* (Verrill, 1873); *M. arctia* (Chamberlin, 1920); *M. neglecta* Sikorski & Bick sp. nov.; *Marenzelleria* sp. A. *Laonice annenkovae* Zachs, 1925 is treated as a junior synonym of *M. arctia*. *Marenzelleria jonesi* Maciolek, 1984 and *Sc. tenuis* Verrill, 1873 are synonymized with *M. viridis*, and *Spio gorbunovi* Averintsev, 1990 with *M. wireni*. A lectotype for *M. viridis* is designated. We used the name *Marenzelleria* sp. A as we had only one incomplete specimen of this taxon.

2) Two species, *M. viridis* and *M. neglecta*, were found in the European Atlantic (they immigrated there from North America): both of them inhabit the North Sea, only *M. neglecta* – the Baltic Sea; three species are known from the Atlantic North American coast: *M. viridis*, *M. neglecta* and *Marenzelleria* sp. A; one is known from the Pacific North American coast: *M. neglecta*; and three in the Arctic: *M. wireni*, *M. arctia* and *M. neglecta*. The distribution of the latter species needs more careful investigation and its co-existence with *M. arctia* needs to be confirmed.

In the Far East, *M. arctia* and possibly *M. neglecta* occur.

There is a possibility that an undescribed species, having short nuchal organs and branchiae only in the anterior part of the body, is present in the Far East and possibly in the Arctic.

3) Four species are brackish water inhabitants. *Marenzelleria wireni* occurs in normal marine salinity, but may inhabit slightly brackish conditions. *Marenzelleria arctia* sometimes inhabits areas with extremely changeable salinity, from 0 to 30‰, but prefers to breed at 5–7‰. *Marenzelleria viridis* and *M. neglecta* often share habitats in the Atlantic but diverge in their salinity preferences: *M. viridis* does not occur in salinity lower then 16‰, but *M. neglecta* prefers 0.5–10‰.

4) No single morphological character allowed us to distinguish one species distinctly from another, as all characters overlap. A combination of characters must be used to diagnose any given species. Only large worms can be reliably identified. We cannot at this time recommend any method to identify small specimens (under 0.8–1.0 mm wide) – only genetic analysis and autecological investigations may provide solutions to this problem. Some problems with *M. arctia* and *M. neglecta* in the Arctic and Far East could not be solved using traditional morphological methods. Genetic methods may be quite helpful in this situation as an additional character to separate the species reliably. However, this would force us to modify the collecting process: before fixation the material would have to be divided to fix one part with formaldehyde for morphology and the other part with ethanol for genetic analysis.

We could not identify a single non-numerical morphological character capable of distinguishing species in the genus. The length of the first branchiae, the shape of post-setal lobes, the shape of the hooks, the shape of the pygidium are variable and may be useful only in certain cases. The shape of the hooks, usually so helpful in Spionidae, is nearly useless in *Marenzelleria* because of the wide variation of this character (Figs 1E–F, 2E–F, 5F–I, 7F–H) even in the same specimen and on the same parapodium. All numerical characters used are size dependent (Table 1, Fig. 6). The intervals of variation of all these characters overlap in all species (Table 1), mainly in small specimens. All the characters have low taxonomic value separately. The length of nuchal organs is a useful character in the genus. The nuchal organs do not cross the mid-dorsal ciliary band on setiger 2, which is a specific character that separates *M. viridis* and *M. arctia* from other members of the genus.

Size-dependent characters depend on width, length and number of setigers, but species that have their own pattern of growth and proportions may, with age, increase their width or length (number of setigers is also characteristic of length as usual). This may even happen with specimens of the same species living under different conditions. For example, it is quite noticeable in the case of *M. wireni* (see Remarks on *M. wireni*). Another example is the wide variation in Br in *M. viridis*.

5) We suggest the following species key for specimens >1.0 mm wide.

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1 DHH–VHH > 20 . . . . . ***Marenzelleria* sp. A**
– DHH–VHH ≤ 20 . . . . . **2**
2 Nuchal organs crossing the mid-segmental ciliary band on setiger 2 . . . . . **3**
– Nuchal organs not crossing the mid-segmental ciliary band on setiger 2 . . . . . **4**
3 Br–DHH ≥ 14 . . . . . ***Marenzelleria wireni***
– Br–DHH < 14 . . . . . ***Marenzelleria neglecta***
4 Br > 40 . . . . . ***Marenzelleria viridis***
– Br < 40 . . . . . ***Marenzelleria arctia***

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