The *Eurycope producta* Sars, 1868 Species Complex (Isopoda, Munnopsidae) at the Transition of the Northern North Atlantic and the Nordic Seas—Including Descriptions of Six New Species and a Key †

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Abstract: *Eurycope producta* Sars, 1868 is a highly abundant and widely distributed munnopsid species complex within Icelandic waters. The complex differs from all other *Eurycope* Sars, 1864 species by having a broad and long rostrum with serrated margins, which is subequal in length and width to article 1 of antenna I. Previous molecular evidence to disentangle the *E. producta* species complex forms the base for the herein-presented taxonomic description of six new species belonging to the genus *Eurycope*. Additionally, descriptions of specimens of *E. producta* s.s. and *E. dahli* Svavarsson, 1987, which were included in the analyses, are presented herein for morphological comparison with the new species. The studied species can be divided in two subgroups: (1) *E. producta* s.s., *E. dahli*, *E. mishkai* sp. nov., and *E. nikitai* sp. nov. and (2) *E. gordeyi* sp. nov., *E. emmae* sp. nov., *E. jakobi* sp. nov., and *E. mathiasi* sp. nov. Additionally, a key to the eight studied species of the complex is presented.

Keywords: Asellota; Eurycopinae; morphology; taxonomy; new taxa; deep sea; benthos; Icelandic fauna; Greenland–Scotland Ridge; IceAGE project

1. Introduction

Asellote isopods are considered to be the most numerous crustacean taxon present within deep-sea macrobenthic samples [1–5]. The family Munnopsidae Lilljeborg, 1864 [6] is a major component of deep-sea communities, being one of the most abundant and diverse isopod families encountered within samples [2,7–10]. The family currently contains 43 genera and more than 320 described species [11]. The subfamily Eurycopinae Hansen, 1916 [12] is the most diverse taxon within munnopsid isopods, currently containing seven genera (*Eurycope* Sars, 1864 [13]; *Disconectes* Wilson and Hessler, 1981 [14]; *Belonectes* Wilson and Hessler, 1981 [14]; *Tytthocope* Wilson and Hessler, 1981 [14]; *Baeonectes* Wilson, 1982 [15]; *Dubinectes* Malyutina; and Brandt, 2006 [16] and *Pirinectes* Malyutina and Brix, 2020 [17]). Relationships within this subfamily still remain unresolved, especially within the most numerous and complex genus *Eurycope*. Thus, Wilson [18,19] indicated a few species complexes without giving them taxonomic status: the *E. complanata* Bonnier, 1896 [20]; the *E. inermis* Hansen, 1916 [12] (the group C); and the *E. longiflagrata* Wilson, 1983 [18] complexes. Svavarsson [21] noted that *E. dahli* Svavarsson, 1987 [21] is similar to *E. producta* Sars, 1868 [22] and that these species may form “a cluster of related species” together with *E. gaussi* Wolff, 1956 [23] from the Indian sector of the Southern Ocean and the two northwest Pacific species *E. linearis* Birstein, 1963 [24] and *E. spinifrons* Gurjanova, 1933 [25].
Eurycope producta sensu stricto was revealed later to be highly abundant and widely distributed within Icelandic waters [26,27] and was presumed to be a species complex [27,28]. Figure 1 shows the thus far known distribution of the unresolved E. producta complex specimens within Icelandic Waters based on data of the BIOICE project (Benthic Invertebrates of Icelandic Waters) [27] and the IceAGE project (Icelandic Marine Animals: Genetics and Ecology [28].

Figure 1. Sampling locations of the E. producta complex. Black dots indicate E. producta complex sampling locations during the IceAGE1 and IceAGE2 cruises used in the current study; grey dots indicate E. producta complex sampling locations during the BIOICE project. Note: Due to the formalin fixation of BIOICE samples, no genetic data are available. The figure was reprinted and adapted from [28] by permission from Springer Nature, Marine Biodiversity (2018).

Environmental conditions around Iceland are shaped by the Greenland–Scotland Ridge (GSR), extending across the North Atlantic in an east–west direction. This submarine ridge system, with a mean depth of 500 m, separates the deep-sea basins of the North Atlantic from deep-sea basins of the Nordic Seas (Greenland, Iceland, and Norwegian Seas) and the Arctic Mediterranean. Water exchanges of cold and dense water masses occur at depth through channels in the Faroe Bank Channel (840 m), Denmark Strait (620 m) and across the Iceland–Faroe Ridge (480 m) [29]. Major temperature differences of near-bottom water masses could be observed within the area, ranging from −1 to up to 12–14 °C [30]. Thus, this highly variable environment, with such a unique mixture of abiotic factors, is predestined to be studied regarding species’ distributional patterns and limits.

Examination and close investigation with a focus on species complexes within this area become highly interesting, since one would expect that species occupy smaller ecological niches than species complexes. For instance, the documented bathymetric depth range of the E. producta complex was, prior to Schnurr et al. [28], 103–2029 m depth.

Schnurr et al. [28] examined specimens of E. producta within Icelandic waters (see Figure 1 and Table 1 for sampling locations). The authors included not only specimens of the E. producta complex, but also some specimens of E. dahli, a species closely related to E. producta. Schnurr et al. [28] showed that the species clades were geographically and bathymetrically much more restricted than previously assumed. Further, Schnurr et al. [28] revealed that the observed molecular species clades (Figure 2) coincide with morphological findings. The mainly molecular-based study identified eight potential species clades
(including an *E. producta* sensu stricto clade and an *E. dahli* clade). Specimens from all clades, including six potentially new species clades, were available for a thorough morphological investigation of this species complex, whereas only a short summary of morphological characters was presented in Schnurr et al. [28]. The current study is a follow-up of this project and aims to elucidate the species clades further by providing illustrations and thorough morphological species descriptions of: *Eurycope producta* sensu stricto, *E. dahli*, *E. mishkai* sp. nov., *E. nikitai* sp. nov., *E. gordeyi* sp. nov., *E. emmae* sp. nov., *E. jakobi* sp. nov., and *E. mathiasi* sp. nov. along with a key to the species of the complex.

**Figure 2.** Consensus Bayesian tree for *E. producta* of the concatenated four gene loci dataset (16S, COI, 18S, and H3) of Schnurr et al. [28]. The branch lengths are proportional to the number of substitutions per site considering the models of nucleotide substitution estimated by MrAIC for the respective loci or partition. Posterior probabilities (>0.9) from Bayesian analyses and bootstrap percentages (>70) from maximum likelihood trees are indicated at the nodes. The names of the species are indicated next to the respective clade: *E. producta* sensu stricto, *E. dahli*, *E. mishkai* sp. nov., *E. nikitai* sp. nov., *E. gordeyi* sp. nov., *E. emmae* sp. nov., *E. jakobi* sp. nov., and *E. mathiasi* sp. nov. The figure was reprinted and adapted from [28] by permission from Springer Nature, Marine Biodiversity (2018).
Table 1. Voucher specimen information with reference to voucher name; clade names of Schnurr et al. [28]; species names; type status (H, holotype; P, paratype; d, dissected), sex (F, female; M, male; J, juvenile), German Centre for Marine Biodiversity Research numbers (DZMB HH), Zoological Museum of Hamburg collection numbers (ZMH K), cruise name (Ice1, IceAGE1 cruise; Ice2, IceAGE2 cruise), station number, sampling coordinates, sampling depth, and GenBank Accession numbers of COI, 16S, 18S, and H3. The table was reprinted and adapted from [28] by permission from Springer Nature, Marine Biodiversity (2018).

| Voucher Name | Species Clade | Species Name | Type | Sex | DZMB-HH No. | ZMH K-No. | Cruise | Station No. | Coordinates | GenBank Accession No. |
|--------------|---------------|--------------|------|-----|-------------|-----------|--------|-------------|--------------|----------------------|
| IMunp149     | Ep_1          | E. producta  | F    |     | 34,260      | 45,586    | Ice1   | #1010       | 020°23.71'W/ 62°33.10'N | MH056295 MH056370 MH056550 |
| IMunp173     | Ep_1          | E. producta  | M    |     | 34,284      | 45,587    | Ice1   | #1119       | 026°14.50'W/ 67°12.81'N | MH056294 MH056373 |
| IEury28      | Ep_1          | E. producta  | F    |     | 19,981      | 45,588    | Ice1   | #1132       | 026°45.28'W/ 67°38.48'N | MH056301 MH056364 |
| IMunp177     | Ep_1          | E. producta  | F    |     | 34,288      | 45,589    | Ice1   | #1136       | 026°45.99'W/ 67°38.15'N | MH056302 MH056366 |
| IMunp179     | Ep_1          | E. producta  | M    |     | 34,290      | 45,590    | Ice1   | #1136       | 026°45.99'W/ 67°38.15'N | MH056304 MH056363 |
| IMunp181     | Ep_1          | E. producta  | F    |     | 34,292      | 45,591    | Ice1   | #1136       | 026°45.99'W/ 67°38.15'N | MH056305 MH056365 |
| IMunp175     | Ep_1          | E. producta  | M    |     | 34,286      | 45,592    | Ice1   | #1136       | 026°45.99'W/ 67°38.15'N | MH056303 |
| IMunp176     | Ep_1          | E. producta  | F    |     | 34,287      | 45,593    | Ice1   | #1136       | 026°45.99'W/ 67°38.15'N | MH056306 |
| IMunp163     | Ep_1          | E. producta  | F    |     | 34,274      | 45,594    | Ice1   | #1212       | 012°52.48'W/ 66°32.63'N | MH056297 MH056374 MH056551 |
| IMunp164     | Ep_1          | E. producta  | F    |     | 34,275      | 45,595    | Ice1   | #1212       | 012°52.48'W/ 66°32.63'N | MH056298 MH056367 MH056552 |
| IMunp206     | Ep_1          | E. producta  | M    |     | 59,245      | 45,596    | Ice1   | #1212       | 012°52.48'W/ 66°32.63'N | MH056300 MH056376 MH056553 |
| IMunp160     | Ep_1          | E. producta  | F    |     | 34,271      | 45,597    | Ice1   | #1212       | 012°52.48'W/ 66°32.63'N | MH056296 MH056369 |
| IMunp204     | Ep_1          | E. producta  | F    |     | 59,244      | 45,582    | Ice1   | #1212       | 012°52.48'W/ 66°32.63'N | MH056299 MH056375 |
| IA2Munp18    | Ep_1          | E. producta  | F    |     | 34,323      | 45,583    | Ice2   | #880_2      | 008°09.42'W/ 63°23.36'N | MH056291 MH056372 |
| IA2Munp61    | Ep_1          | E. producta  | F    |     | 34,367      | 45,584    | Ice2   | #880_2      | 008°09.42'W/ 63°23.36'N | MH056292 MH056371 |
| IA2Munp62    | Ep_1          | E. producta  | M    |     | 34,368      | 45,585    | Ice2   | #880_2      | 008°09.42'W/ 63°23.36'N | MH056293 MH056368 |
### Table 1. Cont.

| Voucher Name | Species Name | Type | Sex | DZMB-HH No. | ZMH K-No. | Cruise | Station No. | Coordinates | Depth [m] | GenBank Accession No. |
|--------------|--------------|------|-----|-------------|-----------|--------|-------------|-------------|----------|-----------------------|
| IMunp98      | Ep_2         | E. dahli | F   | 20,626      | 45,599    | Ice1   | #1155       | 009°55.02' W/69°06.66' N | 2204     | MH056589             |
| IMunp99      | Ep_2         | E. dahli | F   | 20,627      | 45,600    | Ice1   | #1155       | 009°55.02' W/69°06.66' N | 2204     | MH056590             |
| IEury61      | Ep_2         | E. dahli | M   | 20,591      | 45,601    | Ice1   | #1159       | 009°55.02' W/69°06.66' N | 2203     | MH056588             |
| IMunp113     | Ep_2         | E. dahli | F   | 20,641      | 45,602    | Ice1   | #1159       | 009°55.02' W/69°06.66' N | 2203     | MH056592             |
| IEury62      | Ep_2         | E. dahli | F   | 20,592      | 45,603    | Ice1   | #1159       | 009°55.02' W/69°06.66' N | 2203     | MH056568             |
| IMunp110     | Ep_2         | E. dahli | M   | 20,638      | 45,604    | Ice1   | #1159       | 009°55.02' W/69°06.66' N | 2203     | MH056591             |
| IMunp116     | Ep_2         | E. dahli | F   | 20,644      | 45,605    | Ice1   | #1159       | 009°55.02' W/69°06.66' N | 2203     | MH056595             |
| IMunp117     | Ep_2         | E. dahli | F   | 20,645      | 45,606    | Ice1   | #1159       | 009°55.02' W/69°06.66' N | 2203     | MH056596             |
| IEury68      | Ep_2         | E. dahli | J   | 20,598      | 45,607    | Ice1   | #1159       | 009°55.02' W/69°06.66' N | 2203     | MH056588             |
| IEury55      | Ep_2         | E. dahli | F   | 20,585      | 45,608    | Ice1   | #1159       | 009°55.02' W/69°06.66' N | 2203     | MH056307             |
| IEury56      | Ep_2         | E. dahli | d M  | 20,586      | 45,609    | Ice1   | #1159       | 009°55.02' W/69°06.66' N | 2203     | MH056308             |
| IEury64      | Ep_2         | E. dahli | M   | 20,594      | 45,610    | Ice1   | #1159       | 009°55.02' W/69°06.66' N | 2203     | MH056319             |
| IEury57      | Ep_2         | E. dahli | F   | 20,587      | 45,611    | Ice1   | #1159       | 009°55.02' W/69°06.66' N | 2203     | MH056312             |
| IEury58      | Ep_2         | E. dahli | F   | 20,588      | 45,612    | Ice1   | #1159       | 009°55.02' W/69°06.66' N | 2203     | MH056309             |
| IEury66      | Ep_2         | E. dahli | F   | 20,596      | 45,613    | Ice1   | #1159       | 009°55.02' W/69°06.66' N | 2203     | MH056318             |
| IEury59      | Ep_2         | E. dahli | F   | 20,589      | 45,614    | Ice1   | #1159       | 009°55.02' W/69°06.66' N | 2203     | MH056583             |
| IEury60      | Ep_2         | E. dahli | M   | 20,590      | 45,615    | Ice1   | #1159       | 009°55.02' W/69°06.66' N | 2203     | MH056584             |
| IEury65      | Ep_2         | E. dahli | M   | 20,595      | 45,616    | Ice1   | #1159       | 009°55.02' W/69°06.66' N | 2203     | MH056587             |
| IMunp114     | Ep_2         | E. dahli | F   | 20,642      | 45,617    | Ice1   | #1159       | 009°55.02' W/69°06.66' N | 2203     | MH056593             |
| IMunp115     | Ep_2         | E. dahli | F   | 20,643      | 45,618    | Ice1   | #1159       | 009°55.02' W/69°06.66' N | 2203     | MH056594             |
Table 1. Cont.

| Voucher Name | Species Name | Species Clade | Type | Sex | DZMB-HH No. | ZMH K-No. | Cruise | Station No. | Coordinates | Depth [m] | GenBank Accession No. |
|--------------|--------------|---------------|------|-----|-------------|-----------|--------|-------------|-------------|----------|-----------------------|
| IEury63      | E. dahli     | Ep_2          | F    |     | 20,593      | 45,619    | Icel   | #1159       | 009°55.02' W/69°06.66' N | 2203     | MH056396             |
| IMunp156     | E. dahli     | Ep_2          | F    |     | 34,267      | 45,620    | Icel   | #1168       | 007°00.08' W/67°36.38' N | 2373     | MH056316 MH056391    |
| IMunp157     | E. dahli     | Ep_2          | M    |     | 34,268      | 45,598    | Icel   | #1168       | 007°00.09' W/67°36.38' N | 2373     | MH056323 MH056390    |
| IMunp120     | E. mishkai sp. nov. | Ep_3       | P,M |     | 20,648      | 45,622    | Icel   | #1148       | 023°41.76' W/67°50.79' N | 1249     | MH056638 MH056324 MH056360 MH056554 |
| IMunp122     | E. mishkai sp. nov. | Ep_3       | P   | F   | 20,650      | 45,623    | Icel   | #1148       | 023°41.76' W/67°50.79' N | 1249     | MH056639 MH056326 MH056359 MH056555 |
| IMunp128     | E. mishkai sp. nov. | Ep_3       | H   | M   | 20,656      | 45,621    | Icel   | #1148       | 023°41.76' W/67°50.79' N | 1249     | MH056640 MH056327 MH056358 MH056556 |
| IMunp208     | E. mishkai sp. nov. | Ep_3       | P,M |     | 59,247      | 45,624    | Icel   | #1148       | 023°41.76' W/67°50.79' N | 1249     | MH056641 MH056329 MH056361 MH056558 |
| IMunp207     | E. mishkai sp. nov. | Ep_3       | P   | F   | 59,246      | 45,625    | Icel   | #1148       | 023°41.76' W/67°50.79' N | 1249     | MH056328 MH056362 MH056557 |
| IMunp127     | E. mishkai sp. nov. | Ep_3       | P   | F   | 20,655      | 45,626    | Icel   | #1148       | 023°41.76' W/67°50.79' N | 1249     | MH056325 MH056357 |
| IMunp146     | E. nikitai sp. nov. | Ep_4       | P   | F   | 34,257      | 45,629    | Icel   | #963        | 021°28.06' W/60°02.73' N | 2749     | MH056643 MH056336 MH056563 |
| IMunp142     | E. nikitai sp. nov. | Ep_4       | P,M |     | 34,253      | 45,630    | Icel   | #963        | 021°28.06' W/60°02.73' N | 2749     | MH056634 MH056419 MH056560 |
| IMunp143     | E. nikitai sp. nov. | Ep_4       | P   | F   | 34,254      | 45,631    | Icel   | #963        | 021°28.06' W/60°02.73' N | 2749     | MH056635 MH056420 MH056561 |
| IMunp144     | E. nikitai sp. nov. | Ep_4       | P   | F   | 34,255      | 45,632    | Icel   | #963        | 021°28.06' W/60°02.73' N | 2749     | MH056637 MH056521 MH05662 |
| IMunp147     | E. nikitai sp. nov. | Ep_4       | P   | M   | 34,258      | 45,633    | Icel   | #963        | 021°28.06' W/60°02.73' N | 2749     | MH056639 MH056421 |
| IMunp141     | E. nikitai sp. nov. | Ep_4       | P   | F   | 34,252      | 45,634    | Icel   | #963        | 021°28.06' W/60°02.73' N | 2749     | MH056520 |
| IMunp166     | E. nikitai sp. nov. | Ep_4       | P   | F   | 34,277      | 45,635    | Icel   | #967        | 021°28.54' W/60°02.77' N | 2750     | MH056644 MH056340 MH056422 |
| IMunp148     | E. nikitai sp. nov. | Ep_4       | H   | M   | 34,259      | 45,627    | Icel   | #979        | 018°08.24' W/60°21.48' N | 2568     | MH056338 |
| IEury17      | E. nikitai sp. nov. | Ep_4       | P   |     | 19,968      | 45,628    | Icel   | #983        | 018°08.14' W/60°21.44' N | 2568     | MH056642 MH056333 MH056559 |
Table 1. Cont.

| Voucher Name | Species Clade | Species Name | Type | Sex | DZMB-HH No. | ZMH K-No. | Cruise | Station No. | Coordinates | GenBank Accession No. |
|--------------|---------------|--------------|------|-----|-------------|----------|--------|-------------|-------------|----------------------|
| IA2Munp21    | Ep_5          | E. gordeyi sp. nov. | P    | M   | 34,326      | 45,645   | Ice2   | #868,3      | 00° 15.51' E / 62° 09.14' N | 587 MH056645 MH056348 MH056408 MH056564 |
| IA2Munp22    | Ep_5          | E. gordeyi sp. nov. | P, d | M   | 34,327      | 45,646   | Ice2   | #868,3      | 00° 15.51' E / 62° 09.14' N | 587 MH056349 MH056406 |
| IA2Munp23    | Ep_5          | E. gordeyi sp. nov. | P    | F   | 34,328      | 45,647   | Ice2   | #868,3      | 00° 15.51' E / 62° 09.14' N | 587 MH056646 |
| IA2Munp27    | Ep_5          | E. gordeyi sp. nov. | P    | M   | 34,332      | 45,648   | Ice2   | #869,3      | 00° 01.21' E / 62° 16.20' N | 846 MH056647 MH056351 MH056407 MH056565 |
| IA2Munp32    | Ep_5          | E. gordeyi sp. nov. | P    | F   | 34,337      | 45,649   | Ice2   | #870,4      | 00° 06.10' W / 62° 19.73' N | 1058 MH056350 |
| IA2Munp48    | Ep_5          | E. gordeyi sp. nov. | P    | F   | 34,353      | 45,650   | Ice2   | #878,1      | 01° 13.77' W / 61° 53.79' N | 781 MH056648 MH056352 MH056411 MH056566 |
| IA2Munp49    | Ep_5          | E. gordeyi sp. nov. | P    | F   | 34,354      | 45,651   | Ice2   | #878,1      | 01° 13.77' W / 61° 53.79' N | 781 MH056354 MH056567 |
| IA2Munp57    | Ep_5          | E. gordeyi sp. nov. | H    | M   | 34,363      | 45,656   | Ice2   | #879,5      | 00° 34.32' W / 63° 06.10' N | 511 MH056355 MH056410 MH056568 |
| IA2Munp54    | Ep_5          | E. gordeyi sp. nov. | P    | F   | 34,360      | 45,657   | Ice2   | #879,5      | 00° 34.32' W / 63° 06.10' N | 511 MH056356 MH056413 |
| IA2Munp58    | Ep_5          | E. gordeyi sp. nov. | P    | F   | 34,364      | 45,658   | Ice2   | #879,5      | 00° 34.32' W / 63° 06.10' N | 511 MH056355 MH056414 |
| IA2Munp55    | Ep_5          | E. gordeyi sp. nov. | P    | F   | 34,361      | 45,659   | Ice2   | #879,5      | 00° 34.32' W / 63° 06.10' N | 511 MH056649 MH056403 |
| IA2Munp50    | Ep_5          | E. gordeyi sp. nov. | P    | F   | 34,356      | 45,640   | Ice2   | #879,5      | 00° 34.32' W / 63° 06.10' N | 511 MH056412 |
| IA2Munp86    | Ep_5          | E. gordeyi sp. nov. | P    | F   | 34,392      | 45,641   | Ice2   | #882,5      | 01° 58.20' W / 63° 25.04' N | 441 MH056651 MH056405 |
| IA2Munp90    | Ep_5          | E. gordeyi sp. nov. | P    | F   | 34,396      | 45,642   | Ice2   | #882,5      | 01° 58.20' W / 63° 25.04' N | 441 MH056652 MH056404 |
| IA2Munp83    | Ep_5          | E. gordeyi sp. nov. | P    | F   | 34,389      | 45,643   | Ice2   | #882,5      | 01° 58.20' W / 63° 25.04' N | 441 MH056650 |
| IA2Munp81    | Ep_5          | E. gordeyi sp. nov. | P    | F   | 34,387      | 45,644   | Ice2   | #882,5      | 01° 58.20' W / 63° 25.04' N | 441 MH056409 MH056569 |
| IMunp174     | Ep_6          | E. emmae sp. nov. | H, d | M   | 34,285      | 45,652   | Ice1   | #1136       | 02° 45.99' W / 67° 38.15' N | 316 MH056343 MH056148 MH056572 |
| IMunp165     | Ep_6          | E. emmae sp. nov. | P    | F   | 34,276      | 45,653   | Ice1   | #1212       | 01° 52.48' W / 66° 32.63' N | 317 MH056342 MH056415 MH05671 |
| IA2Munp63    | Ep_6          | E. emmae sp. nov. | P, d | M   | 34,369      | 45,654   | Ice2   | #880,2      | 00° 09.42' W / 63° 23.36' N | 686 MH056341 MH056416 |
| IA2Munp84    | Ep_6          | E. emmae sp. nov. | P    | F   | 34,390      | 45,655   | Ice2   | #882,5      | 01° 58.20' W / 63° 25.04' N | 441 MH056344 MH056417 MH056570 |
Table 1. Cont.

| Voucher Name | Species Clade | Species Name | Type | Sex | DZMB-HH No. | ZMH K-No. | Cruise | Station No. | Coordinates | Depth [m] | GenBank Accession No. |
|--------------|---------------|--------------|------|-----|-------------|-----------|--------|-------------|-------------|----------|----------------------|
| IMunp151     | Ep_7          | E. jakobi sp. nov. | P    | F   | 34,262      | 45,659    | Ice1   | #1010       | 020°23.71' W / 62°33.10' N | 1385     | MH056347 MH056399 MH056573 |
| IEury39      | Ep_7          | E. jakobi sp. nov. | H, d | M   | 20,030      | 45,656    | Ice1   | #1069       | 028°05.70' W / 62°59.33' N | 1588     | MH056345 MH056400  |
| IEury41      | Ep_7          | E. jakobi sp. nov. | P    | F   | 20,032      | 45,657    | Ice1   | #1069       | 028°05.70' W / 62°59.33' N | 1588     | MH056346 MH056401  |
| IEury38      | Ep_7          | E. jakobi sp. nov. | P, d | F   | 20,025      | 45,658    | Ice1   | #1069       | 028°05.70' W / 62°59.33' N | 1588     | MH056402  |
| IMunp172     | Ep_8          | E. mathiasi sp. nov. | H    | F   | 34,283      | 45,660    | Ice1   | #1043       | 025°57.66' W / 63°55.46' N | 214      | MH056330 MH056526  |
| IEury46      | Ep_8          | E. mathiasi sp. nov. | P    | F   | 20,574      | 45,661    | Ice1   | #1043       | 025°57.66' W / 63°55.46' N | 214      | MH056653 MH056522  |
| IMunp93      | Ep_8          | E. mathiasi sp. nov. | P, d | F   | 20,621      | 45,662    | Ice1   | #1086       | 026°23.05' W / 63°42.53' N | 698      | MH056654 MH056532 MH056574 |
| IMunp96      | Ep_8          | E. mathiasi sp. nov. | P    | F   | 20,624      | 45,663    | Ice1   | #1086       | 026°23.05' W / 63°42.53' N | 698      | MH056656 MH056531 MH056524 MH056575 |
| IMunp95      | Ep_8          | E. mathiasi sp. nov. | P    | F   | 20,623      | 45,664    | Ice1   | #1086       | 026°23.05' W / 63°42.53' N | 698      | MH056655 MH056525  |
2. Materials and Methods

All 83 *E. producta* complex specimens of the current study were sampled during the IceAGE1 and IceAGE2 (Icelandic marine Animals: Genetics and Ecology) expeditions in 2011 and 2013 onboard the RVs Meteor and Poseidon, respectively, using three different types of epibenthic sleds [31–33]. Cooling and fixation in 96% nondenatured ethanol of bulk samples was immediately conducted on deck. Cooled subsamples were already sorted on board and also fixed in 96% nondenatured ethanol. Samples were handled according to Riehl, et al. [34] and kept cool throughout the whole sorting process. A semi-destructive approach of dissection for tissue digestion and DNA amplification was executed, considering that specimens will be needed for further taxonomic investigation. Thus, only one to three posterior pereopods (depending on the size of the individual) were dissected.

The molecular methods applied in order to obtain sequences for 18S, 16S, COI, and H3 gene fragments and the methods used for the conducted analyses were described in detail in Schnurr et al. [28] and are thus not repeated herein. *Eurycope complanata* was chosen as an outgroup for the tree. All sequences can be retrieved from GenBank (see Table 1 for accession numbers). We only present the tree of the concatenated analyses. Further details and a thorough discussion on tree topologies and species delimitation results can be retrieved from Schnurr et al. [28].

Morphological analyses of the specimens were conducted with a Leica M125 binocular microscope and a Leica DM2500 compound microscope, both equipped with a *camera lucida*. The pencil drawings were inked by hand and finalized using Adobe Photoshop 7. The drawings were created following the guidelines of Hessler [35] and Wilson [36] and the terminology of eurycopid structures follows Wilson and Hessler [37] and Wilson [38]. Measurement of the total body length was conducted medially from the anterior edge of the cephalon to the posterior tip of the pleotelson. Body segment length was measured medially from the anterior margin to the posterior margin. If the body was voluminous and the pleotelson was tucked up, its length was measured in the lateral view.

All specimens were deposited in the collections of the Zoological Museum of Hamburg (see Table 1 for accession numbers).

3. Results

3.1. Taxonomy

Asellota Latreille, 1802 [39]
Superfamily Janiroidea G.O. Sars, 1897 [40]
Family Munnopsidae Lilljeborg, 1864 [6]
Subfamily Eurycopinae Hansen, 1916 [12]
Genus *Eurycope* G.O. Sars, 1864 [13]
Type species: *Eurycope cornuta* G.O. Sars, 1864 [13]

*Eurycope producta* G.O. Sars, 1868 [22] species complex

**Diagnosis:** Body ovoid; rostrum subequal in width and length to article 1 of antenna I, concave medially. Pereonites 1–4 subequal in medial length, longer than cephalon behind antennae I. Pereonite 7 longer than previous ones (medially), pereonites 5 and 6 subequal in length. Pleotelson about 0.3 times body length. Antenna I article 2 not longer than distomedial lobe of article 1; article 3 not shorter than article 2. Maxilliped palp subequal to basis in width; basis lateral projection near palp insertion acute, subequal in length to article 1. Epipod subequal to basis in length; tip narrow; lateral margin projected midlength. Pereopods V–VII dactylus length subequal to propodus width. Male pleopod I distolateral lobes weak, not longer than distomedial lobes. Male pleopod II distomedial margin with weak notch for exopod emerging. Uropod protopod and rami subequal in length; exopod about half of endopod width.
**Description of characters common for all species of the complex:** Body about twice as long as wide. Cephalon behind antennulae shorter than pereonite 1. Rostrum width about one third of cephalon width. Anterolateral margin of pereonites acute; coxae of pereopods I–IV visible in dorsal view, subequal in length and in shape, with acute anterior lobe and rounded posterior lobe. Pleotelson broader than long, about 0.3 times body length.

Antenna II squama of article 3 half as long as article 4.

Mandibular molar process distally truncate, denticulate; palp stout, subequal to mandibular body in length; article 3 slightly broader than article 2, twisted; distal seta longest.

Maxilla I mesial endite width about 0.7 times lateral endite width, with several small fan setae and numerous fine small setae. Basis acute lateral projection near palp insertion subequal in length to lateral projection of article 1. Palp article 2 longest, equal in width to basis. Article 3 almost as wide as article 2; medial margin subequal in length to article 2, rounded. Article 4 equal to article 3 in lateral length; medial lobe subequal to article 5. Epipod length about twice width, 0.9 times basis length, width 1.3 times basis width tip narrow rounded, lateral margin projected midlength.

Bases of pereopods I–IV subequal in length, basis V shortest among all bases. Pereopod I broadest on basis–merus, dactylus < 0.3 times propodus length. Pereopods V–VII dactyli elongate, slightly bent, subequal in length to propodi; two setae proximal to claws, dorsal claw twice broader and longer than ventral one, two setae between claws. Pereopods V–VII carpi semirounded; propodi drop-like, broadened distally, about half as broad as carpi; dorsal margin serrated.

Male pleopod I and female pleopod II longer than branchial cavity of pleotelson, overlapping anterior part of anal. Male pleopod II protopod distolateral margin with several plumose setae; endopod and exopod inserted in middle of medial side, Pleopod III endopod with three or more plumose distal setae exopod with one distal seta. Pleopods V embraced laterally pleopods IV and III.

Uropod protopod cylindrical.

**Remarks:** The complex differs from all *Eurycope* species by having a broad and long rostrum, which is subequal in length and width to article 1 of antenna I. The combination of the other characters mentioned in the diagnosis distinguishes the species complex as well. The broad and long—almost rectangular—rostrum with lateral keels of the *E. producta* complex is similar to that of the genus *Disconectes*. Some species of *Disconectes* also have the pronounced distomedial lobes of male pleopod I. However, *Disconectes* differ in having the pereonites 5 and 6 dorsally fused, which are free in *Eurycope*.

As already noted by Svavarsson [21], *E. gaussi* from the Indian sector of the Southern Ocean and the two northwest Pacific species *E. linearis* and *E. spinifrons* are closely related species to the *E. producta* complex. We may also include to the similar and related species *E. septentrionalis* Malyutina and Kussakin, 1996 [41] from the Canadian Basin of the North Polar Ocean as well as *E. andreyi* Malyutina and Golovan, 2022 [42]. All these mentioned species have a large rostrum, though not as notable as in the studied North Atlantic ones. All of them also possess similar morphological features to the male pleopods I and the maxillipeds. The North Pacific species differ from the studied species of the complex by a reduced distomedial lobe of antenna I article 1, which is shorter than article 2, in contrast to the long lobe of the species of the *E. producta* complex.

3.2. *Eurycope producta* G.O. Sars 1868

Material examined:
Male (ZMH K-45596), 3.25 mm length; male (ZMH K-45592), 3.15 mm length, used for dissection; female (ZMH K-45583), 2.7 mm length; female (ZMH K-45584); and 12 further specimens (see Table 1 for specimen information).

**Diagnosis:** Cephalon rostrum tapering distally, length 0.8 times basal width, basal width subequal to antenna I basal width. Maxilliped endite with three coupling hooks. Basis lateral projection near palp insertion length 1.2 times article 1 lateral length. Palp article 4 distomedial lobe length 0.75 times article 5 length. Epipod length 2.0 times width, 0.9 times basis length, width 1.3 times basis width. Male pleopod I length 2.3 times width, distal width 0.6 times basal width; distal margin rounded, lobes not separated. Male pleopod II protopod distomedial notch length 0.4 times medial margin length. Endopod of pleopod III with six plumose distal setae. Uropod protopod length 1.0 times width, endopod length 1.25 times protopod length, width 0.5 times protopod width; exopod length 0.95 times endopod length.

**Description of male** (ZMH K-45596, Figure 3): Body length 1.95 times pereonite 5 width. Cephalon behind antennulae about half as long as pereonite 1; interantennular distance equal to antenna I basal width, 0.3 times cephalon width. Rostrum basal width subequal to length and antenna I basal width, reaching beyond tip of article 1 of antenna I, tapering distally; distal width 0.55 times basal width; middle groove deep. Pereonite 5 width 1.5 times pereonite 1 width; pereonite 7 posterior width 1.15 times pereonite 1 width. Natasome length 1.4 times anterior body part length. Pereonite 7 medial length 0.7 times pereonites 5 and 6’s combined medial length. Pleotelson length 0.8 times width, 0.3 times body length.

Antenna I (male, ZMH K-45592, Figure 4A) broken off; article 1 length 1.25 times width, with five broom dorsal setae, one small UB seta laterally, and two UB setae distomedially. Article 2 length 1.3 times width, 0.4 times article 1 length, 0.85 times length of article 1 distomedial lobe, with three UB distal setae; articles 3 broken off.

Antenna II (male, ZMH K-45596, Figure 3B) broken off after article 4; articles 1–4 subequal in length; squama on article 3 reaching midlength of article 4.

Mandible (male, ZMH K-45592, Figure 4B,C) incisors of both mandibles with four cusps; *lacinia mobilis* of left mandible almost as long as incisor, with seven small distal teeth; spine row with eight and nine spines on left and right mandibles, respectively; molar process distally with six small setae on base of denticles. Palp length 1.1 times mandible body length; article 2 with row of small simple lateral setae and two stout setulated distal setae; articles 2 and 3 length 2.15 and 1.05 times article 1 length, respectively. Article 3 distal seta length 2.1 times other marginal setae length and 0.55 times article 3 length.

Maxilla I (male, ZMH K-45592, Figure 5A) mesial endite width 0.75 times lateral endite width; lateral endite with five robust distolateral setae smooth other setae differently serrated. Maxilla II (male, ZMH K-45592, Figure 5B) middle endite shortest, lateral endite longest; mesial endite with tuft of distal setae, distomedial setulated setae longest, middle and lateral endites with two long and two shorter comb-like distal setae.

Maxilliped (male, ZMH K-45592, Figure 5C) basis length 2.95 times width, lateral margin setulated; endite width 0.55 times basis width, with three coupling hooks; distal margin with five narrow fan setae. Basis acute lateral projection near palp insertion length 1.2 times article 1 lateral length. Palp length 2.25 times width, 0.75 times basis length. Article 2 length 0.8 times width, as wide as basis, lateral length 1.2 times medial length, each distal angle with small seta; article 3 almost as wide as article 2, medial length equal to article 2 medial length, lateral length 0.4 times article 2 lateral length, medial margin rounded, denticulate, few small setae distally; article 4 equal to article 3 in lateral length, medial lobe slightly shorter than article 5, with three long distal setae, article 5 with four long, distal setae. Epipod length 2.0 times width, 0.9 times basis length, width 1.3 times basis width; tip narrow, with three setae.
Pereopod I (male, ZMH K-45592, Figure 6C) as long as body, length ratios of ischium–dactylus to basis: 0.4, 0.3, 0.8, 0.65, 0.15. Basis length 7.1 times width, dorsal margin with nine small simple setae and one broom proximal seta, ventral margin with five small simple setae and three longer simple distoventral setae. Ischium length 4.0 times width, with three small simple distal setae. Merus with three simple distal setae. Carpus 0.6 times basis width, length 9.65 times width; with three dorsal and seven ventral simple setae. Propodus with six ventral simple setae and six distal simple setae; dactylus almost straight, claw length 0.4 times dactylus length.

Pereopod II (male, ZMH K-45592, Figure 6D) length 1.9 times pereopod I length. Length ratios of ischium–dactylus to basis: 0.45, 0.4, 1.4, 1.7, 0.5. Basis stout, length 7.7 times width, with scattered small setae along basis, one broom dorsal seta and few distal setae. Ischium with two strong and five small simple ventral setae. Merus with five dorsal and five ventral simple setae. Carpus with 12 simple dorsal setae, seven small simple
and 17 UB ventral setae; distal margin with one broom, one long and six small UB setae. Propodus with 17 simple dorsal setae, one broom seta, and one small UB seta distodorsally and 25 UB ventral setae. Dactylar claw length 0.25 times dactylus length.

Figure 4. Eurycope producta GO Sars, 1868. Male (ZMH K-45592): (A) articles 1, 2 of antenna I; (B) left mandible ventral and medial view; (C) incisor of right mandible.
Figure 5. *Eurycope producta* GO Sars, 1868. Male (ZMH K-45592): (A) maxilla I; (B) maxilla II; (C) maxilliped.

Pereopod V (male, ZMH K-45592, Figure 7A) propodus and dactylus broken off, length ratios of ischium–carpus to basis: 1.4, 0.6, 2.0. Basis length 1.8 times width, with one long whip and five broom dorsal setae and four small simple ventral setae. Ischium and merus visibly narrower than basis; ischium with eight plumose dorsal setae and three simple ventral setae. Carpus length 1.6 times width, with 24 dorsal and 18 ventral plumose setae, one broom, one UB, and three simple setae distally.
Figure 6. *Eurycope producta* GO Sars, 1868. Male (ZMH K-45592): (A) lateral view; (B) pleotelson, ventral view; (C) pereopod I (dactylus enlarged); (D) pereopod II (dactylus enlarged).
Figure 7. *Eurycope producta* GO Sars, 1868. Male (ZMH K-45592): (A) pereopod V; (B) pereopod VI; (C) pereopod VII; (D) uropod.

Pereopod VI (male, ZMH K-45592, Figure 7B) propodus and dactylus broken off, length ratios of ischium–carpus to basis: 0.4, 0.5, 1.4. Basis length 2.7 times width, with three long distal setae. Ischium as wide as basis, with nine plumose dorsal setae and 14 simple ventral setae. Merus with one plumose dorsal seta and five simple ventral setae. Carpus length 1.5 times width, with 22 dorsal and 15 ventral plumose setae, one broom and three simple setae distoventrally.
Pereopod VII (male, ZMH K-45592, Figure 7C) length ratios of ischium–dactylus to basis: 0.75, 0.45, 1.4, 1.3, 0.5. Basis length 2.5 times width, with one long proximodorsal seta and one distoventral simple seta. Ischium as wide as basis with six plumose dorsal setae and one distoventral broom seta. Merus with one plumose dorsal seta and five simple ventral setae. Carpus length 1.3 times width, with 20 dorsal and 14 ventral plumose setae. Propodus length 2.6 times width, with 15 dorsal and 14 ventral plumose setae, one small simple seta distoventrally, one broom seta and one stout long UB seta distodorsally; dactylus slender, spine-like al long as propodus width.

Pleopod I (male, ZMH K-45592, Figure 8A) length 2.3 times basal width, distal width 0.6 times basal width. Distal margin slightly rounded; medial and lateral lobes not separated; distolateral angles with small setulae; seven longer ventral setae posteriorly distolaterally lobes, distomedial rounded lobes with small setulae.

Pleopod II (male, ZMH K-45592, Figure 8B,C) protopod length 1.65 times width, 0.9 times pleopod I length; distal margin with five simple setae, distomedial notch weak, length 0.4 times medial margin length. Stylet length 0.8 times protopod length, tip reaching behind pleopod I tip; sperm duct opening at 0.3 times length from proximal margin. Exopod distal article half as wide and 0.8 times as long as basal article.

Pleopod III (male, ZMH K-45592, Figure 8D) protopod length 0.6 times width; endopod length 1.3 times width; three distal plumose setae length 0.4 times pleopod III length; exopod length 1.2 times protopod and endopod’s combined length, width 0.4 times width of endopod, with row of fine simple lateral setae; plumose distal seta subequal in length to endopod distal setae.

Pleopod IV (male, ZMH K-45592, Figure 8E) endopod length 1.4 times width; exopod 0.85 times endopod length and 0.4 times endopod width; stout plumose distal seta as long as pleopod III distal setae.

Pleopod V (male, ZMH K-45592, Figure 8F) length 1.45 times width, 1.2 times pleopod IV length.

Uropod (male, ZMH K-45592, Figure 7D) length 0.3 times pleotelson length; protopod length 1.0 times width, with one UB distolateral seta and one broom seta and six UB distomedial setae. Endopod length 1.25 times protopod length, width 0.5 times protopod width, with four broom and seven UB distal setae and three simple medial setae. Exopod length 0.95 times endopod length, width 0.5 times endopod width, with seven UB and two broom distal setae.

Female (ZMH K-45583 and ZMH K-45584, Figure 9A,B) habitus similar to that of male.

Pleopod II (female, ZMH K-45583, Figure 9C) length 0.8 times width, proximolateral margin with one simple seta; distomedial margin rounded, pronounced, overlapping anterior part of anal operculum; distolateral margin with row of simple setae. Ventral keel length 0.7 times pleopod II length with strong UB seta posteriorly.

Remarks: Our specimens were identified as E. producta G.O. Sars, 1868 sensu stricto as they fit the original descriptions and illustrations in G.O. Sars [43], though the male pleopod I in Sars’s Pl. 65 has more pronounced distomedial lobes than our specimens.

Distribution: Eurycope producta occurs according to G.O. Sars [43] along the Norwegian coast from Christiania Fjord (Oslo), Skagerrak in the South to Vadso in the North at a depth range of 60–400 fathoms (109.7–731.5 m). The species was recorded in many further publications west of Ireland, off the Faroe Islands, south of Iceland, near eastern, southern and southwestern Greenland, and in the southern part of the Davis Strait, featuring a depth range of 72–2087 m [44] (pp. 56–59). The herein-studied specimens of E. producta sensu stricto were sampled in the Denmark Strait, the Norwegian Sea, the Iceland–Faroe Ridge, and the Iceland Basin, featuring a depth range of 316–1385 m.
Figure 8. *Eurycope producta* GO Sars, 1868. Male (ZMH K-45592): (A) pleopod I (distal margin enlarged); (B) left pleopod II, ventral view; (C) right pleopod II, dorsal view; (D) pleopod III; (E) pleopod IV; (F) pleopod V.
3.3. *Eurycope dahli* Svavarsson, 1987

Material examined:

Male (ZMH K-45598), 5.7 mm length; male (ZMH K-45609), used for dissection; female (ZMH K-45612), 4.6 mm length; juvenile (ZMH K-45606); and 19 further specimens (see Table 1 for specimen information).

**Diagnosis:** Cephalon rostrum not tapering distally length 1.0 times basal width, 0.8 times antenna I article I length, basal width 0.75 times antenna I width. Maxilliped endite with four coupling hooks. Basis lateral projection near palp insertion length 1.2 times article 1 lateral length. Palp article 2 length 1.05 times width, width 0.85 times basis width. Article 4 distomedial lobe length 0.8 times article 5 length. Epipod length 2.2 times width, 0.85 times basis length, width 1.2 times basis width. Male pleopod I length 2.7 times basal width, width 0.5 times basal width, distal margin straight, lobes not separated. Male
pleopod II protopod distomedial notch length 0.3 times medial margin length. Endopod of pleopod III with six plumose distal setae. Uropod protopod length 1.0 times width; endopod length 1.35 times protopod length, width 0.35 times protopod width; exopod length 0.95 times endopod length.

**Description of male** (ZMH K-45598, Figure 10A–C): Body length 2.1 times pereonite 5 width. Cephalon behind antennulae slightly shorter than pereonite 1; interantennular distance 0.65 times antenna I basal width, 0.25 times cephalon width. Rostrum length 1.0 times basal width, 0.8 times antenna I article I length, not reaching tip of article 1 of antenna I, longitudinal groove deep. Pereonites 1–4 subequal in medial length. Pereonite 5 width 1.75 times pereonite 1 width; pereonite 7 posterior width 1.3 times pereonite 1 width. Natasome length 2.0 times anterior body part length. Pereonites 5 and 6 of same length; pereonite 7 longest; medial length 0.8 times pereonites 5 and 6’s combined medial length. Ventral projection of pereonites 6–7 0.35 times body length. Pleotelson length 0.9 times width, 0.35 times body length.

![Figure 10](image-url)  
*Figure 10. Eurycope dahli* Svavarsson, 1987. Male (ZMH K-45598): (A) dorsal view; (B) lateral view; (C) pleotelson, ventral view. Female (ZMH K-45612): (D) dorsal view; (E) pleotelson, ventral view; juvenile (ZMH-K 45606): (F) dorsal view.
Antenna I (male, ZMH K-45609, Figure 11A) broken off on article 3; article 1 length 1.15 times width with two distal and two dorsal broom setae; article 2 length 0.35 times article 1 length, not reaching tip of distomedial lobe of article 1, with one distal broom seta; article 3 broken, width 0.4 times article 2 width.

Figure 11. *Eurycope dahli* Svavarsson, 1987. Male (ZMH K-45609): (A) antenna I, articles 1 and 2; (B) maxilla I (distal parts enlarged); (C) maxilla II (distal parts enlarged); (D) maxilliped (distal parts of endite enlarged).
Antenna II (male, ZMH K-45598, Figure 12A) broken off after article 4; articles 1–4 subequal in length; squama on article 3 reaching midlength of article 4.

Figure 12. *Eurycope dahli* Svavarsson, 1987. Male (ZMH K-45598): (A) cephalon with rostrum antennae I and antenna II; male (ZMH K-45609): (B) left mandible (incisor and molar process enlarged); (C) uropod.

Mandible (male, ZMH K-45609, Figure 12B) incisors of left mandible with six cusps, lacinia mobilis almost as long as incisor, with seven distal teeth; spine row with 11 spines; molar process distodorsally acute, with 11 small setae on base of denticles; condyle length 0.15 times mandibular body length. Palp length 1.05 times mandibular body length; article 2 with nine thin medial setae and one long distal seta; articles 2 and 3's lengths 2.1 times and 0.85 times article 1 length, respectively. Article 3 distal seta length 3.5 times other marginal setae length and as long as article 3.

Maxilla I (male, ZMH K-45609, Figure 11B) mesial endite width 0.7 times lateral endite width, with fine distal setae, and one stout long distomedial seta; lateral endite with 12 robust setae, four distolateral setae smooth—other setae differently serrated.

Maxilla II (male, ZMH K-45609, Figure 11C) mesial and lateral endites subequal in length, middle endite shortest; mesial endite with tuft of distal setae, one long setulated seta distomedially, middle and lateral endites with two long and two shorter comb-like distal setae.

Maxilliped (male, ZMH K-45609, Figure 11D) basis length 2.85 times width; endite width 0.55 times basis width, with four coupling hooks, distal margin slightly concave, with six small fan setae. Basis acute lateral projection near palp insertion length 1.2 times
article 1 lateral length. Palp length 2.6 times width, 0.75 times basis length. Article 2 length 1.05 times width, width 0.85 times basis width, lateral length 1.4 times medial length. Article 3 almost equal to article 2 in width and medial length, lateral length 0.3 times article 2 lateral length; medial margin rounded, denticulate, with small setae. Article 4 lateral length 1.45 times article 3 lateral length, medial lobe slightly shorter that article 5, with six long distal setae. Article 5 as long as article 4 laterally, with seven long distal setae. Epipod length 2.2 times width, 0.85 times basis length, width 1.2 times basis width.

Pereopods broken off.

Pleopod I (male, ZMH K-45609, Figure 13A) length 2.7 times basal width, distal width 0.5 times basal width, distal margin straight, medial and lateral lobes not separated, distolateral and distomedial angles with small setulae, each lobe with seven small ventral setae subdistally.

Pleopod II (male, ZMH K-45609, Figure 13B) protopod length 1.6 times width, 0.9 times pleopod I length; distal margin with eight simple setae, distomedial notch well defined, length 0.3 times medial margin length. Stylopect length 0.7 times protopod length, tip reaching slightly behind pleopod II tip; sperm duct opening at 0.4 times length from proximal margin. Exopod distal article half as wide and almost as long as basal article.

Pleopod III (male, ZMH K-45609, Figure 13C) protopod length 0.45 times width, endopod length 1.3 times width; six plumose setae distally, length 0.35 times pleopod III length; exopod subequal in length to protopod and endopod together, width 0.3 times endopod width, with row of fine simple marginal setae, plumose seta distally, length slightly longer than endopod distal setae length.

Pleopod IV (male, ZMH K-45609, Figure 13D) endopod length 1.4 times width; exopod 0.9 times endopod length and 0.6 times endopod width. Stout plumose distal seta length 1.2 times distal seta of pleopod III exopod length.

Pleopod V (male, ZMH K-45609, Figure 13E) length 1.2 times width.

Uropod (male, ZMH K-45609, Figure 12C) length 0.25 times pleotelson length; protopod cylindrical, length 1.0 times width, with four UB and three simple distal setae. Endopod length 1.35 times protopod length, width 0.4 times protopod width, with four broom and six UB distal setae. Exopod length 0.95 times endopod length, width 0.5 times endopod width, with one broom and three UB distal setae.

**Female** (ZMH K-45612, Figure 10D) habitus is similar to male.

Antenna I (female, ZMH K-45612, Figure 10D) article 1 length 1.1 times width, distomedial lobe reaching beyond tip of article 2. Article 2 length 0.45 times article 1 length, 0.8 times distomedial lobe of article 1 length. Articles 3 length 1.4 times article 2 length; articles 3–5 width 0.75 times article 2 width; articles 4 and 5 subequal in width. Tip of flagellum broken off.

Pleopod II (female, ZMH K-45612, Figure 10E) length 1.2 times width; distomedial margin overlapping anterior part of anal operculum; ventral keel length 0.7 times pleopod II length.

**Remarks:** The species differs from other species of the complex by its rostrum, which is shorter (0.8 times) than antenna I article I (in all other species the rostrum is equal in length or longer than antenna I article I) and narrower (0.75 times) than antenna I article I. It is the only species of the complex which has six distal plumose setae on the endopod of pleopod III (all others have only three setae).

**Distribution:** The Greenland Sea (2470–3709 m), the Norwegian Sea (2085–3672 m), and the North Polar Basin (81°40'N 2°60'2'E 2400–2500 m). The studied specimens of *E. dahli* were sampled in the Norwegian Sea, featuring a depth range of 2203–2373 m depth.
Figure 13. *Eurycope dahli* Svavarsson, 1987. Male (ZMH K-45609): (A) pleopod I (distal margin enlarged); (B) pleopod II; (C) pleopod III; (D) pleopod IV; (E) pleopod V.

3.4. *Eurycope mishkai* Malyutina & Schnurr sp. nov. 
http://zoobank.org/4EBD065A-900B-4F8B-99C1-F957C591FFB2 (accessed on 3 June 2022)

Material examined:
Holotype: male (ZMH K-45621), 3.1 mm length.
Paratypes: female (ZMH K-45626), 3.1 mm length; female (ZMH K-45625), used for dissection; male (ZMH K-45624), used for dissection; and 2 further specimens (see Table 1 for specimen information).

**Diagnosis:** Cephalon rostrum tapering distally, length 1.0 times basal width basal width subequal to antenna I basal width, longitudinal groove deep. Maxilliped endite with three coupling hooks. Basis lateral projection near palp insertion as long as article 1. Article 4 distomedial lobe length 1.25 times article 5 length. Epipod length 2.35 times width, 0.95 times basis length, width 1.2 times basis width. Epipod length 2.1 times width, 0.9 times basis length, width 1.35 times basis width. Pleopod I length 4.0 times basal width; distal margin straight, its width 0.5 times basal width; medial and lateral lobes not separated. Male pleopod II protopod distomedial notch length 0.4 times median marginal length. Uropod protopod length 1.0 times width; endopod length 1.25 times protopod length, width 0.5 times protopod width; exopod length 0.95 times endopod length.

**Description of male** (holotype, ZMH K-45621, Figure 14A–D): Body length 2.2 times pereonite 5 width. Cephalon interantennular distance subequal to antenna I basal width, 0.3 times cephalon width. Rostrum length 1.0 times basal width, slightly reaching behind tip of article 1 of antenna I; longitudinal groove deep. Pereonite 5 width 1.5 times pereonite 1 width; pereonite 7 posterior width 1.2 times pereonite 1 width. Natasome length 2.3 times anterior body part length. Pereonites 5–7 subequal in lateral length; medially, pereonites 5 shortest; pereonite 6 slightly longer; pereonite 7 longest. Pereonite 7 medial length 0.6 times pereonites 5 and 6's combined medial length. Pleotelson length 0.65 times width, 0.25 times body length.

Antenna I (male paratype, ZMH K-45624, Figure 15A) article 1 length 1.3 times width, with one small UB distomedial seta. Article 2 length 0.3 times article 1 length, 0.7 times distomedial lobe of article 1 length, with two distal broom setae. Articles 3 and 4 lengths 1.0 times and 0.2 times article 2 length, respectively; article 3 width 0.75 times article 2 width. Flagellum broken off.

Antenna II (male holotype, ZMH K-45621, Figure 14A,C) broken off after article 4; articles 1–4 subequal in length; squama on article 3 reaching midlength of article 4.

Mandible (male paratype, ZMH K-45624, Figure 15B) incisors of left mandible with four cusps; lacinia mobilis almost as long as incisor, with four distal teeth; spine row with eight spines; molar process distodorsal margin acute, with four small setae on base of denticles; condyle length 0.15 times mandibular body length. Palp length 0.85 times mandibular body length; article 2 with two long distal setae; articles 2 and 3 lengths 1.95 times and 0.95 times article 1 length, respectively. Article 3 distal seta length 1.65 times other marginal setae and 0.85 times article 3 length.

Maxilla I (male paratype, ZMH K-45624, Figure 15C) mesial endite width 0.7 times lateral endite width, with fine distal setae and one stout long distomedial seta; lateral endite with 12 robust setae, four distolateral setae smooth other setae differently serrated.

Maxilla II (male paratype, ZMH K-45624, Figure 15D) mesial and lateral endites subequal in length, middle endite shortest; mesial endite with tuft of distal setae, one long setulated seta distomedially, middle and lateral endites with two long and two shorter comb-like distal setae.

Maxilliped (male paratype, ZMH K-45624, Figure 15E) basis length 2.9 times width; endite width 0.5 times basis width, with three coupling hooks; distal margin slightly concave, with five small fan setae and numerous fine small setae. Basis acute lateral projection near palp insertion as long as article 1. Palp length 2.0 times width, 0.7 times basis length. Article 2 length 0.85 times width, as wide as basis; lateral length 1.05 times medial length. Article 3 almost equal to article 2 in width; median length 0.7 times medial length of article 2; median margin rounded, denticulate, with small setae; lateral length 0.3 times article 2 lateral length. Article 4 lateral length equal to article 3 lateral length; medial lobe length 1.1 times article 5 length, with three long distal setae; article 5 with three long distal setae. Epipod length 2.35 times width, 0.95 times basis length, width 1.2 times basis width.
Figure 14. *Eurycope mishkai* sp. nov. Male holotype (ZMH K-45621): (A) lateral view; (B) dorsal view; (C) cephalon with rostrum, antenna I and antenna II; (D) pleotelson, ventral view. Female paratype (ZMH K-45626): (E) dorsal view. Female paratype (ZMH K-45625): (F) uropod.

Pereopods broken off.

Pleopod I (male paratype, ZMH K-45624, Figure 16A) length 2.5 times basal width, distal width 0.5 times basal width; distal margin truncated; medial and lateral lobes not separated. Distolateral and distomedial angles with small setulae.

Pleopod II (male paratype, ZMH K-45624, Figure 16B) Protopod length 1.5 times width, 0.75 times pleopod I length, distomedial weak notch 0.4 times protopod length, distal margin with few simple setae. Stylet length 0.85 times protopod length, tip reaching behind protopod tip; sperm duct opening at 0.35 times length from proximal margin. Exopod distal article half as wide and almost as long as basal article; small setae on outer angle of hook.
Figure 15. *Eurycope mishkai* sp. nov. Male paratype (ZMH K-45624): (A) antenna I; (B) left mandible (incisor and molar process enlarged); (C) maxilla I (distal parts enlarged); (D) maxilla II (distal parts enlarged); (E) maxilliped (distal parts of endite enlarged).

Pleopod III (male paratype, ZMH K-45624, Figure 16C) protopod length 0.65 times width; endopod length 1.3 times width, distal margin truncated, width 1.2 times proximal width, with three distal plumose setae, setae length 0.3 times pleopod III length. Exopod subequal in length to protopod and endopod together, width 0.3 times endopod width, with row of fine simple lateral setae; length of thin simple distal seta subequal to endopod distal setae length.
Figure 16. *Eurycope mishkai* sp. nov. Male paratype (ZMH K-45624): (A) pleopod I; (B) pleopod II; (C) pleopod III; (D) pleopod IV; (E) pleopod V.
Pleopod IV (male paratype, ZMH K-45624, Figure 16D) endopod length 2.1 times width; exopod length 0.9 times endopod length and 0.8 times endopod width. Stout plumose distal seta length 0.6 times exopod length and 1.7 times pleopod III distal setae length.

Pleopod V (male paratype, ZMH K-45624, Figure 16E) length 1.7 times width.

**Female** (female paratype, ZMH K-45626, Figure 14E) habitus similar to male, length 2.0 times width; natasome broader than in male. Cephalon interantennular distance 0.9 times antenna I basal width, 0.25 times cephalon width. Rostrum length 1.15 times basal width.

Uropod (female paratype, ZMH K-45625, Figure 14F) length 0.15 times pleotelson length; protopod cylindrical, length 1.0 times width, with one lateral and five UB distal setae. Endopod length 1.25 times protopod length, width 0.5 times protopod width, with one simple and six UB distal setae; exopod length 0.95 times endopod length, width 0.5 times endopod width, with three UB distal setae.

**Etymology:** The name honors Marina Malyutina’s son, Mikhail Malyutin (Mishka is a child nickname).

**Distribution:** Known only in the type locality in the Denmark Strait at a depth of 1249 m.

3.5. *Eurycope nikitai* Malyutina & Schnurr sp. nov.

http://zoobank.org/AD5AFECD-0F9A-4F6C-9378-EBCFC254C0B6 (accessed on 3 June 2022)

Material examined:
Holotype: male (ZMH K-45627), 3.2 mm length.

Paratypes: female (ZMH K-45629), 3.8 mm length; male (ZMH K-45633); male (ZMH K-45630), used for dissection; and five further specimens (see Table 1 for specimen information).

**Diagnosis:** Pereonites 5–7 equal in medial length. Cephalon rostrum length 1.0 times basal width, subequal to antenna I basal width. Maxilliped endite with two coupling hooks. Basis lateral projection near palp insertion as long as article 1. Article 4 medial lobe length 0.6 times article 5 length. Epipod length 2.1 times width, 0.9 times basis length, width 1.35 times basis width. Pleopod I length 2.8 times basal width; distal margin with light rounded notch between distomedial and distolateral lobes. Male pleopod II protopod distomedial notch length 0.25 times medial margin length. Uropod protopod length 0.95 times width; endopod length 1.3 times protopod length, width 0.75 times protopod width; exopod as long as endopod.

**Description of male** (holotype, ZMH K-45627, Figure 17A–C): Body length 2.0 times pereonite 5 width. Cephalon behind antennulae slightly shorter than pereonite 1; interantennular distance 1.35 times antenna I basal width, 0.45 times cephalon width. Rostrum length 0.75 times basal width, reaching tip of article 1 of antenna I; interdistal width 0.35 times basal width; medial groove small. Ambulomere: pereonites 2 longest, pereonites 1, 3 and 4 subequal in medial length. Natasome length 1.8 times anterior body part length. Pereonite 5 width 1.4 times pereonite 1 width; pereonite 7 posterior width 1.2 times pereonite 1 width. Pereonites 5–7 subequal in medial length, pereonite 7 shortest laterally. Pleotelson length 0.8 times width, 0.35 times body length.

Antenna I (male paratype, ZMH K-45633, Figure 18A) article 1 length 1.0 times width, with one broom dorsal seta, one UB seta and one simple seta distomedially. Article 2 length 0.45 times article 1 length, reaching tip of distomedial lobe of article, with two broom and two simple distal setae. Article 3 and flagellum broken off.

Antenna II (male holotype, ZMH K-45627, Figure 17A,B) broken off after article 4; articles 1–4 subequal in length; squama on article 3 reaching midlength of article 4.

Antenna II (male paratype, ZMH K-45633, Figure 17E) twice longer than BL; article 5 length 0.5 times total body length, article 6 1.2 times article 5 length and slightly narrower than article 5; flagellum length 0.7 times peduncle length.
Figure 17. *Eurycope nikitai* sp. nov. Male holotype (ZMH K-45627): (A) dorsal view; (B) lateral view; (C) pleotelson, ventral view. Male paratype (ZMH K-45633): (A) dorsal view; (B) lateral view; (C) pleotelson, ventral view; (D) ventral view; (E) dorsal view.
Figure 18. *Eurycope nikitai* sp. nov. Male paratype (ZMH K-45633): (A) antenna I, articles 1 and 2; (B) right mandible (incisor process enlarged); (C) maxilla I; (D) maxilla II; (E) maxilliped.

Mandible (male paratype, ZMH K-45633, Figure 18B) incisors of right mandible with four cusps, spine row with eight spines, molar process with two small distal setae on base
of denticles; condyle length 0.15 times mandibular body length. Palp length 1.05 times mandible body length; article 2 with two distal setae; articles 2 and 3 lengths 1.85 times and 0.95 times article 1 length, respectively. Article 3 distal seta length 1.65 times other marginal setae and 0.5 times article 3 length.

Maxilla I (male paratype, ZMH K-45633, Figure 18C) mesial endite width 0.65 times lateral endite width, with fine distal setae and one stout long distomedial seta; lateral endite with 12 robust distolateral setae differently serrated.

Maxilla II (male paratype, ZMH K-45633, Figure 18D) middle endite visibly shorter than mesial and lateral endites which subequal in length; mesial endite with row of distal setae, middle and lateral endites with two long and two shorter distal setae.

Maxilliped (male paratype, ZMH K-45633, Figure 18E) basis length 3.1 times width; endite width 0.5 times basis width, with two coupling hooks, distal margin narrow, straight, with one small fan seta. Basis acute lateral projection near palp insertion as long as article 1 laterally. Palp length 2.25 times width, 0.7 times basis length. Article 2 length 0.9 times width, as wide as basis; lateral length 1.15 times medial length; one long distomedial seta. Article 3 almost equal to article 2 in width; medial length 0.9 times article 2 medial length, lateral length 0.35 times article 2 lateral length; medial margin rounded, denticulate, with small setae. Articles 4 and 5 lateral lengths 1.2 times and 1.4 times article 3 lateral length, respectively, medial lobe slightly shorter than article 5, with three simple distal setae; article 5 with three simple distal setae. Epipod length 2.1 times width, 0.9 times basis length, width 1.35 times basis width.

Pereopod I (male paratype, ZMH K-45633, Figure 19A) length 0.75 times body length, length ratios of ischium–dactylus to basis: 0.3, 0.25, 0.9, 0.75, 0.25. Carpus 0.6 times width of basis, length 10.2 times width; nine UB setae ventrally. Propodus with three ventral simple setae and four simple distal setae. Dactylus almost straight, claw length 0.4 times dactylus length.

Pereopod II (male paratype, ZMH K-45633, Figure 19B) broken off after carpus. Basis–carpus length 0.75 times body length, length ratios of ischium–carpus to basis: 0.45, 0.3, and 1.3. Basis stout, length 5.2 times width with five small dorsal and two distal setae. Carpus length 10.7 times width with 14 ventral and three distal UB setae.

Pereopod V (male paratype, ZMH K-45633, Figure 19C) length ratios of ischium–dactylus to basis: 1.75, 0.75, 2.35, 2.2, 1.1. Basis length 1.3 times width, with one long plumose and two small simple dorsal setae. Ischium slightly narrower than basis, with three dorsal plumose setae. Merus with one dorsal and one ventral long simple setae. Carpus length 1.4 times width, with 12 dorsal and 10 ventral plumose setae, one stout UB seta and two long simple setae. Ischium slightly narrower than basis, with four dorsal plumose setae; merus with one plumose dorsal seta. Carpus length 1.35 times width, with 10 dorsal and eight ventral plumose setae. Propodus length 2.1 times width, dorsal margin serrated with nine plumose setae ventral margin with 10 plumose setae, one stout UB seta and one broom seta distodorsally. Dactylar dorsal claw three times longer than slim ventral claw.

Pereopod VII (male paratype, ZMH K-45633, Figure 19D) length 0.7 times pereopod V length, length ratios of ischium–dactylus to basis: 0.9, 0.5, 1.6, 1.4, 0.7. Basis length 2.1 times width; ischium as broad as basis, with four dorsal plumose setae; merus with one plumose dorsal seta. Carpus length 1.35 times width, with 10 dorsal and eight ventral plumose setae. Propodus length 2.35 times width, dorsal margin serrated with six plumose setae; ventral margin with eight plumose setae and one stout UB seta, one broom seta distodorsally. Dactylar dorsal claw three times longer than tiny ventral claw.

Pleopod I (male paratype, ZMH K-45633, Figure 20A) length 2.7 times basal width, distal width 0.7 times basal width; distal margin almost straight; lateral lobes slightly longer than medial; distomedial lobes with four small setulae each.

Pleopod II (male paratype, ZMH K-45633, Figure 20B) protopod length 1.5 times width, subequal to pleopod I length; distal margin with few simple setae; distomedial notch length 0.25 times medial margin length. Stylet length 0.45 times protopod length, tip not reaching pleopod I tip. Exopod distal article half as wide and almost as long as basal article.
Figure 19. *Eurycope nikitai* sp. nov. Male paratype (ZMH K-45633): (A) pereopod I; (B) pereopod II; (C) pereopod V; (D) pereopod VII; (E) uropod.

Pleopod III (male paratype, ZMH K-45633, Figure 20C) protopod length 0.65 times width; endopod length 1.4 times width; three distal plumose setae length 0.7 times pleopod III length; exopod subequal in length to protopod and endopod together and 0.3 times width of endopod, with row of fine simple lateral setae; distal seta simple, thin, its length 0.3 times endopod distal setae length.
Figure 20. *Eurycope nikitai* sp. nov. Male paratype (ZMH K-45633): (A) pleopod I; (B) pleopod II; (C) pleopod III; (D) pleopod IV; (E) pleopod V.

Pleopod IV (male paratype, ZMH K-45633, Figure 20D) endopod length 1.2 times width, exopod 0.8 times endopod length and 0.5 times endopod width. Stout plumose distal seta as long as exopod.

Pleopod V (male paratype, ZMH K-45633, Figure 20E) length 1.2 times width, 1.15 times pleopod IV length.

Uropod (male paratype, ZMH K-45633, Figure 19E) length 0.3 times pleotelson length; protopod broadening distally, length 0.95 times width, with two simple and six UB distal
setae. Endopod length 1.3 times protopod length, width 0.5 times protopod width, with one simple, one broom, and four UB distal setae; exopod as long as endopod, width 0.5 times endopod width, with one broom and two UB distal setae.

**Female** (paratype, ZMH K-45629, Figure 21) habitus is similar to male, length 1.9 times width. Cephalon behind antennulae half as long as pereonite 1; interantennular distance 1.5 of antenna I basal width, 0.4 times cephalon width. Rostrum length 0.8 times basal width, apical width 0.4 times basal width, with small medial groove. In ambulomere pereonites 2–4 subequal in medial length. Pereonite 5 width 1.7 times pereonite 1 width; pereonite 7 posterior width 1.4 times pereonite 1 width.

Antenna I (female paratype, ZMH K-45629, Figure 21A,B) article 1 length 1.1 times width; distomedial lobe reaching midlength of article 2 with small distal seta. Article 2 length 1.15 times width, with two broom long distal setae; articles 3–5 lengths 1.05, 0.2, and 0.55 times article 2 length, respectively; articles 3–5 widths 0.75 times article 2 width; articles 4 and 5 subequal in width, 0.5 times article 2 width. Flagellum broken off.

Pleopod II (female paratype, ZMH K-45629, Figure 21C,D) length 0.9 times width; margins with few small simple setae, distomedial margin rounded, pronounced, overlapping anterior part of anal operculum, with 12 small simple setae; ventral keel length 0.7 times pleopod II length, long UB seta on tip.

**Etymology:** The name honors Marina Malyutina’s eldest grandson, Nikita Malyutin.

**Distribution:** Known only from the Iceland Basin, featuring a depth range of 2568–2750 m.

3.6. *Eurycope gordeyi* Malyutina & Schnurr sp. nov.

http://zoobank.org/486D70A6-F43D-47CC-82F8-C623A774D875 (accessed on 3 June 2022)

Material examined:
Holotype: male (ZMH K-45636), 2.6 mm length.

Paratypes: male (ZMH K-45646), 2.9 mm length, used for dissection; male (ZMH K-45645), used for dissection; female (ZMH K-45651), 2.55 mm length; female (ZMH K-45638); and 11 further specimens (see Table 1 for specimen information).

**Diagnosis:** Cephalon rostrum length 1.1 times basal width, 1.2 times article 1 of antenna I length; width 1.2 times antenna I basal width. Maxilliped endite with five coupling hooks. Basis lateral projection near palp insertion length 0.9 times article 1 lateral length. Palp article 2 length 1.2 times width, article 4 medial lobe as long as article 5. Epipod length 2.5 times width, 0.95 times basis length; width 1.2 times basis width. Pleopod I length 3.25 times basal width, distomedial lobe length 0.05 times pleopod I length, width 0.3 times pleopod I basal width; distolateral lobes tiny, acute, slightly projected. Male pleopod II protopod distomedial notch length 0.35 times medial margin length. Uropod protopod length 1.15 width; endopod length 0.9 times protopod length, width 0.75 times protopod width; exopod length 0.85 times endopod length.

**Description of male** (holotype, ZMH K-45636, Figure 22A–C): Body length 1.85 times pereonite 5 width. Cephalon behind antennulae slightly shorter than pereonite 1; rostrum width subequal to antenna I basal width, 0.3 times cephalon width. Rostrum length 1.25 times basal width, 1.2 times antenna I article I length; medial groove deep, margins with small simple setae distally. Pereonite 5 width 1.6 times pereonite 1 width; pereonite 7 posterior width 1.35 times pereonite 1 width. Natasome length 2.1 times anterior body part length. Pereonites 5–7 subequal in lateral length; medially, pereonites 5 and 6 subequal in length; pereonite 7 longest, 0.6 times pereonites 5 and 6’s combined medial length. Pleotelson length 0.7 times width, 0.3 times body length.

Antenna I (male paratype, ZMH K-45646, Figure 23A) article 1 length 1.0 times width, with three broom dorsal setae, distomedial lobe with two broom and two small UB setae. Article 2 length 1.05 times width, 0.85 times distomedial lobe of article 1 length, with three broom and three UB distal setae. Articles 3–5 subequal in width, 0.7 times article 2 width; lengths 0.9, 0.3, and 0.5 times article 2 length, respectively. Article 4 with one distal broom UB seta. Flagellum broken off after nine articles, last articles with eastetasc.
Figure 21. *Eurycope nikitai* sp. nov. Female paratype (ZMH K-45629): (A) dorsal view; (B) lateral view; (C) pleotelson, ventral view; (D) pleopod II.
Figure 22. *Eurycope gordeyi* sp. nov. Male holotype (ZMH K-45636): (A) dorsal view (rostrum and antennae I enlarged); (B) lateral view; (C) ventral view. Male paratype (ZMH K-45645): (D) uropod (distal parts enlarged).
Figure 23. *Eurycope gordeyi* sp. nov. Male paratype (ZMH K-45646): (A) antenna I; (B) left mandible
Male paratype (ZMH K-45645): (C) maxilla I; (D) maxilla II; (E) maxilliped.
Antenna II (male holotype, ZMH K-45636, Figure 22B) articles 1–6 length 0.75 times body length. Squama on article 3 reaching midlength of article 4. Article 6 1.1 times article 5 length and slightly narrower than article 5, flagellum broken off.

Left mandible (male paratype, ZMH K-45646, Figure 23B) incisor and lacinia mobilis with five cusps; spine row with nine spines; molar process distodorsally acute, with four thin setae on base of denticles. Condyle length 0.2 times mandibular body length. Palp length subequal to mandible body length; article 2 with three small simple lateral setae and three strong serrated distal setae; articles 2 and 3 lengths 2.2 times and 1.1 times article 1 length, respectively. Article 3 distal seta length 2.65 times other marginal setae length and 0.8 times article 3 length.

Maxilla I (male paratype, ZMH K-45645, Figure 23C) mesial endite width 0.6 times lateral endite width.

Maxilla II (male paratype, ZMH K-45645, Figure 23D) middle endite shortest, lateral endite slightly longer than mesial endite.

Maxilliped (male paratype, ZMH K-45645, Figure 23E) basis length 3.2 times width; endite width 0.5 times basis width, with five coupling hooks; distal margin with four fan setae. Basis acute lateral projection near palp insertion length 0.9 times article 1 lateral length. Palp length 2.2 times width, 0.7 times basis length. Article 2 length 1.2 times width, width 1.05 times basis width; lateral length 1.1 times medial length; two small setae distolaterally. Article 3 width 0.8 times article 2 width; medial length 0.8 times article 2 medial length; lateral length 0.35 times article 2 lateral length; medial margin denticulate, with seven small setae. Article 4 equal to article 3 in lateral length; medial lobe slightly shorter than article 5, with three distal setae. Article 5 with five long distal setae. Epipod length 2.5 times width, 0.95 times basis length; width 1.2 times basis width, tip narrow and rounded with one small simple seta.

Pereopods broken off after bases (male holotype, ZMH K-45636, Figure 22B,C); bases I–IV of same length—0.25 times body length.

Pleopod I (male paratype, ZMH K-45645, Figure 24A) length 2.3 times basal width; distal margin narrow, width 0.3 times basal width; medial lobes projected, rounded, length 0.05 times total pleopod length, with 12 small setae each; lateral lobes projected in small acute lateral angles, with small setae proximally.

Pleopod II (male paratype, ZMH K-45645, Figure 24B) protopod length 1.6 times width, 0.9 times pleopod I length; distal margin with five simple setae; distomedial notch length 0.35 times medial margin length. Stylet length 0.7 times protopod length, tip reaching protopod tip; sperm duct opening at 0.55 times length from proximal margin. Exopod distal article length 0.6 times basal article length, both articles subequal in length.

Pleopod III (male paratype, ZMH K-45646, Figure 24C) protopod length 0.65 times width; endopod length 1.25 times width; three distal plumose setae length 0.35 times pleopod III total length; exopod as long as protopod and endopod together, reaching endopod tip, width 0.3 times endopod width, with row of fine simple lateral setae; distal setae simple, thin, length 0.8 times endopod distal setae length.

Pleopod IV (male paratype, ZMH K-45646, Figure 24D) endopod length 1.35 times width, exopod as long as endopod, width 0.45 times endopod width. Stout plumose distal seta length 0.7 times exopod length.

Pleopod V (male paratype, ZMH K-45646, Figure 24E) length 1.2 times width.

Uropod (male paratype, ZMH K-45645, Figure 22D) protopod length 1.15 times width, with four UB, eight whip, and two simple distal setae. Endopod length 0.9 times protopod length, width 0.5 times protopod width, with one broom, one simple, and 14 UB distal setae; exopod length 0.85 times endopod length, width 0.5 times endopod width, with five UB distal setae.

Female (paratype, ZMH K-45651, Figure 25B–D) habitus length 1.75 times width. Cephalon behind antennulae length 0.3 times pereonite 1 length; interantennular distance 0.8 times antenna I basal width, 0.35 times cephalon width. Rostrum length 1.0 times basal width. Pereonite 5 width 1.6 times pereonite 1 width; pereonite 7 posterior width 1.3 times
pereonite 1 width. Natasome length 1.95 times anterior body part length. Pereonite 7 medial length 0.7 times pereonites 5 and 6's combined medial length. Pleotelson length 0.5 times width, 0.2 times body length.

Figure 24. *Eurycope gordeyi* sp. nov. Male paratype (ZMH K-45645): (A) pleopod I (distal margin enlarged); (B) pleopod II. Male paratype (ZMH K-45646): (C) pleopod III; (D) pleopod IV; (E) pleopod V.

Pleopod II (female paratype, ZMH K-45638, Figure 25E) length 0.65 times width; lateral margin with two small simple setae; distomedial margin rounded, pronounced, overlapping anterior part of anal operculum.

**Etymology:** The name honors Marina Malyutina's youngest grandson, Gordey Malyutin.

**Distribution:** Known only from the type locality in the Norwegian Channel and the Iceland–Faroe Ridge, featuring a depth range of 441–1058 m.
Figure 25. *Eurycope gordeyi* sp. nov. Male paratype (ZMH K-45646): (A) dorsal view; female paratype (ZMH K-45651): (B) dorsal view; (C) pleotelson lateral view; (D) pleotelson ventral view. Female paratype (ZMH K-45638): (E) pleopod II.
3.7. *Eurycope emmae* Schnurr & Malyutina sp. nov.
http://zoobank.org/9D1F19C9-78D0-4EA9-9ECF-8BFE9EBD3D40 (accessed on 3 June 2022)

Material examined:
Holotype: male (ZMH K-45652), 2.45 mm length, used for dissection.

Paratypes: female (ZMH K-45653), 2.6 mm length; female (ZMH K-45655), used for dissection; male (ZMH K-45654), used for dissection (see Table 1 for specimen information).

**Diagnosis:** Cephalon rostrum length 0.85 times basal width, 1.5 times antenna I article 1 length, 1.7 times antenna I article 1 width. Maxilliped endite with two coupling hooks. Basis lateral projection near palp insertion length 0.9 times article 1 lateral length. Palp article 4 medial lobe subequal in length to article 5. Epipod length 2.4 times width, 0.95 times basis length; width 1.2 times basis width. Male pleopod I length 2.4 times width; distomedial lobe length 0.05 times pleopod I length, width 0.25 times pleopod I width, distolateral lobes slightly projected. Male pleopod II protopod distomedial notch length 0.3 times medial margin length. Uropod protopod length 1.0 times width; endopod length 1.05 times protopod length, width 0.75 times protopod width; exopod length 1.0 times endopod length.

**Description of male** (holotype, ZMH K-45652, Figure 26A,B): Body length 1.7 times pereonite 5 width. Cephalon behind antennulae almost hidden under pereonite 1. Rostrum length 0.85 times basal width, 1.5 times antenna I article 1 length; width 0.3 times cephalon width, 1.7 times antenna I article 1 width; medial groove small. Pereonite 5 width 1.8 times pereonite 1 width; pereonite 7 posterior width 1.5 times pereonite 1 width. Natasome length 4.0 times anterior body part length; pereonite 7 longest medially, length 0.7 times pereonites 5 and 6’s combined medial length. Pleotelson length 0.5 times width, 0.25 times body length.

Antenna I (male holotype, ZMH K-45652, Figure 26A): article 1 length 1.0 times width; article 2 length 0.6 times article 1 length, as long as distomedial lobe of article 1. Articles 3 and 4 lengths 1.0 times and 0.25 times article 2 length, respectively; articles 3 and 4 widths 0.8 times article 2 width. Flagellum broken off after article 6.

Antenna II (male holotype, ZMH K-45652, Figure 26A,B) broken off after article 4; articles 1–4 subequal in length; squama on article 3 reaching midlength of article 4, with long distal seta.

Mandible (male paratype, ZMH K-45654, Figure 27B,C) incisor with five and four cusps and spine row with nine and eight spines on right and left mandibles, respectively; lacinia mobilis of left mandible slightly shorter than incisor, with four distal teeth. Molar process distodorsally acute, with two thin setae on base of denticles. Palp length subequal to mandible body length; article 2 with three distal setae; articles 2 and 3 lengths 2.2 times and 1.1 times article 1 length, respectively. Article 3 distal seta length 1.45 times other marginal setae length and 0.5 times article 3 length.

Maxilla I (male paratype, ZMH K-45654, Figure 28A) mesial endite width 0.6 times lateral endite width, with fine distal setae and two long distomedial setae; lateral endite with 12 robust differently serrated setae.

Maxilla II (male paratype, ZMH K-45654, Figure 28B) middle endite shortest, lateral endite longest; mesial endite with tuft of distal setae, middle and lateral endites with two long and two shorter distal setae.
Figure 26. *Eurycope emmae* sp. nov. Male holotype (ZMH K-45652): (A) dorsal view; (B) ventral view; (C) uropod. Female paratype (ZMH K-45653): (D) dorsal view. Female paratype (ZMH K-45655): (E) pleopod II.
Figure 27. *Eurycope emmae* sp. nov. Male paratype (ZMH K-45654): (A) antenna I, articles 1 and 2; (B) right mandible (last palp article, incisor and molar process enlarged); (C) left mandibles (incisor and molar process enlarged).
Maxilliped (male paratype, ZMH K-45654, Figure 28C) basis length 3.0 times width; endite width 0.5 times basis width, with two coupling hooks; distal margin with three fan setae. Basis acute lateral projection near palp insertion length 0.9 times article 1 lateral length. Palp length 2.2 times width, 0.95 times basis length. Article 2 length 0.95 times width, slightly wider than basis; lateral length 1.1 times medial length, one small distolateral seta. Article 3 width 0.9 times article 2 width; medial length 0.85 times article 2 medial length; lateral length 0.3 times article 2 lateral length; medial margin denticulate, with few small setae. Article 4 lateral length 1.35 times article 3 lateral length; medial lobe as long as article 5, with four setae. Article 5 with two lateral and three distal setae. Epipod length 2.4 times width, 0.95 times basis length; width 1.2 times basis width.

Pereopod V (male holotype, ZMH K-45652, Figure 29A) length ratios of ischium–dactylus to basis: 1.0, 0.6, 1.7, 1.5, 0.7. Basis length 1.7 times width, with one long plumose distodorsal and two simple dorsal setae and one UB distoventral seta. Ischium as long and as wide as
basis, with seven plumose dorsal setae and four distoventral setae. Merus with four ventral UB and five simple distoventral setae. Carpus length 1.35 times width, with 20 dorsal and 10 ventral plumose setae; four stout UB setae distodorsally. Propodus length 1.85 times width; dorsal margin serrated with nine plumose setae ventral margin with 18 plumose setae, one stout UB seta, and one broom seta distodorsally. Dactylar dorsal claw length 0.3 times slim ventral claw length.

Figure 29. *Eurycope emmae* sp. nov. Male holotype (ZMH K-45652): (A) pereopod V; (B) pereopod VII.
Pereopod VII (male holotype, ZMH K-45652, Figure 29B) length 0.7 times pereopod V length; length ratios of ischium–dactylus to basis: 0.65, 0.4, 1.3, 1.1, 0.55. Basis length 2.15 times width with one proximodorsal seta and one UB distoventral seta. Ischium width 1.05 basis, with six dorsal plumose setae and one UB distoventral seta. Merus with one plumose dorsal seta and three UB and two simple setae. Carpus length 1.35 times width, with 15 dorsal and 13 ventral plumose setae and three UB setae distodorsally. Propodus length 1.95 times width; dorsal margin serrated with 14 plumose setae; ventral margin with eight plumose setae, one stout UB seta, and one broom seta distodorsally. Dactylar dorsal claw three times longer than tiny ventral claw.

Pleopod I (male holotype, ZMH K-45652, Figure 30A) length 2.4 times basal width; distal margin projected, its width 0.3 times basal width; distomedical lobe length 0.05 times pleopod I length, not separated from distolateral weak projections; distolateral margin with 17 small setae.

Pleopod II (male holotype, ZMH K-45652, Figure 30B) protopod length 1.65 times width, 0.95 times pleopod I length; distolateral margin with few simple setae; distomedical notch length 0.3 times medial margin length. Stylet length 0.55 times protopod length, tip not reaching behind protopod tip; sperm duct opening at midlength. Exopod distal article slightly wider and shorter than basal article.

Pleopod III (male holotype, ZMH K-45652, Figure 30C) protopod length 0.65 times width, endopod length 1.3 times width, length of three distal plumose setae 0.6 times pleopod III length. Exopod subequal in length to protopod and endopod together and 0.4 times as wide as endopod, with row of fine simple marginal setae; plumose distal seta slightly shorter than endopod distal setae.

Pleopod IV (male holotype, ZMH K-45652, Figure 30D) endopod length 1.35 times width; exopod 0.9 times endopod length and 0.6 times endopod width. Stout plumose distal seta length 0.6 times exopod length.

Pleopod V (male holotype, ZMH K-45652, Figure 30E) length 1.2 times width. Uropod (male holotype, ZMH K-45652, Figure 26C) length 0.3 times pleotelson length; protopod broadening apically, length 1.0 times width, with five whip and three UB distal setae; endopod as long as protopod, width 0.5 times protopod width, with five simple, five broom, and six UB distal setae; exopod as long as endopod, width 0.5 times endopod width, with four UB and two small simple distal setae.

Female (paratype, ZMH K-45653, Figure 26D) habitus is similar to male. Body length 2.1 times pereonite 5 width.

Uropod (female holotype, ZMH K-45655, Figure 26E) length 0.7 times width, margins with about 30 small simple setae, ventral keel 0.7 times pleopod II length.

Remarks. The new species differs from other species of the complex by its broad and long rostrum in comparison to the size of antenna I article 1—it is 1.7 times longer than article 1 of antenna I.

Etymology: The name honors Sarah Schnurr’s daughter, Emma Lutz.

Distribution: Known only in the type locality in the Denmark Strait, the Norwegian Sea, and the Iceland–Faroe Ridge, featuring a depth range of 316–686 m.
3.8. *Eurycope jakobi* Schnurr & Malyutina sp. nov.

http://zoobank.org/2F7AD002-ECC6-4871-95CB-184ADC9B33A9 (accessed on 3 June 2022)

Material examined:
Holotype: male (ZMH K-45656), 3.0 mm length, used for dissection.

Paratypes: female (ZMH K-45658), 2.2 mm length, used for dissection; (ZMH K-45657), used for dissection; and 1 further specimen (see Table 1 for specimen information).

**Diagnosis:** Cephalon rostrum not tapering distally, length 1.1 times basal width, 1.5 times antenna I article I length, width 1.6 times antenna I basal width. Maxilliped endite with three coupling hooks. Basis lateral projection near palp insertion as long as article 1. Palp article 4 medial lobe length 0.8 times article 5 length. Epipod length 2.4 times
width, 0.8 times basis length, width 1.2 times basis length. Male pleopod I length 3.25 times width; distomedial lobe length 0.2 times pleopod I length, width 0.25 times pleopod I width; distolateral lobes slightly projected. Male pleopod II protopod distomedial notch length 0.25 times medial margin length. Uropod protopod length 1.0 times width; endopod length 1.2 times protopod length, width 0.75 times protopod width; exopod length 1.0 times endopod length.

**Description of male** (holotype, ZMH K-45656, Figure 31A–C): Length 1.95 times pereonite 5 width. Cephalon length behind antennulae half of pereonite 1 length; interantennular distance 1.3 times antenna I basal width, 0.4 times cephalon width. Rostrum length equal width, 1.5 times antenna I article I length; medial groove deep. Pereonite 5 width 1.5 times pereonite 1 width; pereonite 7 posterior width 1.2 times pereonite 1 width. Natasome length 2.4 times anterior body part length. Pereonites 5 and 6 subequal in length; pereonite 7 longest medially, length 0.7 times pereonites 5 and 6’s combined medial length. Ventral projection of pereonites 6 and 7 0.4 times body length. Pleotelson length 0.75 times width, 0.3 times body length.

Antenna I (male holotype, ZMH K-45656, Figure 31D) article 1 length 1.2 times width; article 2 length 0.35 times article 1 length, 0.85 times distomedial lobe of article 1 length; articles 3 and 4 lengths 1.0 times and 0.33 times article 2 length, respectively; articles 3 and 4 widths 0.55 times article 2 width. Flagellum broken off.

Antenna II (male holotype, ZMH K-45656, Figure 31C) broken off after article 4; articles 1–4 subequal in length; squama on article 3 reaching midlength of article 4.

Pereopods broken off (male holotype, ZMH K-45656, Figure 31B) basis I length 0.2 times body length; bases II, V, VI, VII lengths 0.1, 0.6, 0.7, 0.7 times basis I length, respectively.

Pleopod I (male holotype, ZMH K-45656, Figure 32A) length 2.3 times basal width; distal width 0.3 times basal width margin, with distomedial lobes projected triangular; length 0.05 times pleopod I length, distolateral lobes almost not visible; distolateral margins with small setulae.

Pleopod II (male holotype, ZMH K-45656, Figure 32B) protopod length 1.55 times width, 0.95 times pleopod I length; lateral margin with one simple seta; distomedial notch length 0.25 times medial margin length. Stylet length 0.6 times protopod length, tip reaching behind protopod tip; sperm duct opening at 0.3 times length from proximal margin. Exopod distal article half as long and wide as basal article.

Pleopod III (male holotype, ZMH K-45656, Figure 32C) protopod length 0.7 times width; endopod length 1.35 times width; three distal plumose setae length 0.3 times pleopod III length; exopod as long as protopod and endopod together and 0.3 times as wide as endopod, with row of fine simple lateral setae; simple distal seta slightly shorter than endopod distal setae.

Pleopod IV (male holotype, ZMH K-45656, Figure 32D) endopod length 1.45 times width, exopod 0.95 times endopod length and 0.5 times endopod width. Stout plumose distal seta as long as pleopod III endopod distal setae.

Pleopod V (male holotype, ZMH K-45656, Figure 32E) length 1.45 times width.

**Female** (paratype, ZMH K-45658 and ZMH K-45657, Figure 33A,D) habitus is similar to male. Body length 1.9 times pereonite 5 width.

Antenna I (female paratype, ZMH K-45658, Figure 33C) broken off after article 2. Article 1 length 1.15 times width; distomedial lobe tapering distally, with one broom medial and two small medial and three small UB distal setae; one broom seta on distolateral angle. Article 2 length 1.3 times width, with one long broom and two simple small distal setae.

Antenna II (female paratype, ZMH K-45657, Figure 33A) length 1.7 times body length; articles 1–4 subequal in length; squama on article 3 half of article 4 length. Article 5 length 2.3 times articles 1–4 length, width 1.5 times article 4 width; article 6 length 1.05 times article 5 length, width 0.6 times article 5 width; flagellum as long as previous part of antenna II, of about 30 articles.
Figure 31. *Eurycope jakobi* sp. nov. Male holotype (ZMH K-45656): (A) dorsal view; (B) lateral view; (C) anterior body part, oblique view; (D) antenna I.
Figure 32. *Eurycope jakobi* sp. nov. Male holotype (ZMH K-45656): (A) pleopod I; (B) pleopod II; (C) pleopod III; (D) pleopod IV; (E) pleopod V.
Figure 33. *Eurycope jakobi* sp. nov. Female paratype (ZMH K-45657): (A) dorsal view; (B) cephalon with rostrum, basal parts of antennae I and antenna II; (C) antenna I. Female paratype (ZMH K-45658): (D) dorsal view; (E) pleopod II; (F) uropod.

Mandible (female paratype, ZMH K-45658, Figure 34A,B) incisor with four and three cusps and spine row with nine and eight spines on right and left mandibles, respectively; lacinia mobilis of left mandible visibly shorter than incisor, with three distal teeth; molar process distodorsally acute, with four thin setae on base of denticles. Proximoventral
margin and lateral margin of palp article 1 denticulated. Palp length subequal to mandible body length; article 2 with three distal setae; articles 2 and 3 lengths 1.9 times and 1.0 times article 1 length, respectively. Article 3 distal seta length 2.5 times other marginal setae and 0.7 times article 3 length.

Figure 34. *Eurycope jakobi* sp. nov. Female paratype (ZMH K-45658): (A) left mandible, (B) right mandible; (C) maxilla I; (D) maxilla II; (E) maxilliped (all mouth parts with enlarged distal parts).
Maxilla I (female paratype, ZMH K-45658, Figure 34C) mesial endite width 0.6 times lateral endite width, with fine distal setae and stout long distomedial seta; lateral endite with 12 robust differently serrated setae.

Maxilla II (female paratype, ZMH K-45658, Figure 34D) middle endite shortest; mesial endite with fine distal setae, middle and lateral endites with two long and two shorter distal setae.

Maxilliped (female paratype, ZMH K-45658, Figure 34E) basis length 3.4 times width; endite width 0.5 times basis width, with three coupling hooks; distal margin with four fan setae. Basis acute lateral projection near palp insertion as long as lateral projection on article 1. Palp length 2.1 times width, 0.7 times basis length. Article 2 length 0.8 times width; width 1.1 times basis width; lateral length equal to medial length; three small distal setae laterally and medially. Article 3 width 0.9 times article 2 width; medial length 0.95 times article 2 medial length; lateral length 0.4 times article 2 lateral length; medial margin denticulate, with few small setae. Article 4 equal to article 3 in lateral length, with two lateral setae; medial lobe length 0.8 times article 5 length, with three distal setae. Article 5 with four lateral and five long distal setae. Epipod length 2.4 times width, 0.8 times basis length; width 1.2 times basis width.

Pleopod II (female paratype, ZMH K-45657, Figure 33E) length 0.75 times width; lateral margins with two small simple setae, distolateral margins with 10 setae; ventral keel 0.7 times pleopod II length.

Uropod (female paratype, ZMH K-45658, Figure 33F) length 0.3 times pleotelson length; protopod broadening distally, length 1.0 times width, with one UB and one broom distal setae; endopod length 1.1 times protopod length, width 0.5 times protopod width, with two simple, three broom, and six UB distal setae; exopod as long as endopod, width 0.5 times endopod width, with five UB and two small simple distal setae.

Etymology: The name honors Sarah Schnurr’s son, Jakob Lutz.

Distribution: Known only from the type locality in the Iceland Basin and the Irminger Basin, featuring a depth range of 1385–1588 m.

3.9. Eurycope mathiasi Schnurr & Malyutina sp. nov.

http://zoobank.org/F8A0C3CC-3792-46AB-9D8E-6AD4388149D5 (accessed on 3 June 2022)

Material examined:

Holotype: female (ZMH K-45660), 2.95 mm length.

Paratypes: female (ZMH K-45662), used for dissection; female (ZMH K-45663), used for dissection; and 2 further specimens (see Table 1 for specimen information).

Diagnosis: Cephalon rostrum tapering distally, length 0.75 times basal width, 1.15 times antenna I article I length, width 1.4 times antenna I basal width, distomedial lobe of antenna 1 not reaching tip of rostrum. Maxilliped endite with three coupling hooks. Basis lateral projection near palp insertion length 1.1 times article 1 length. Palp article 4 medial lobe length 1.2 times article 5 length. Epipod length 2.1 times width, 0.9 times basis length; width 1.2 times basis width. Uropod protopod length 1.4 times width; endopod length 1.05 times protopod length, width 0.5 times protopod width; exopod length 0.8 times endopod length.

Description of female (holotype, ZMH K-45660, Figure 35): Body length 1.75 times pereonite 5 width. Cephalon behind antennulae half as long as pereonite 1; interantennular distance 1.5 times antenna I basal width, 0.5 times cephalon width. Rostrum length 0.8 times basal width, 1.15 times antenna I article I length; medial groove small; distal width 0.55 times basal width, small setae distally. Pereonite 5 width 1.55 times pereonite 1 width; pereonite 7 posterior width 1.2 times pereonite 1 width. Natasome length 2.2 times anterior body part length. Pereonites 5 and 6 subequal in length; pereonite 7 longest medially. Pereonite 7 medial length 0.65 times pereonites 5 and 6’s combined medial length. Ventral projection of pereonite 6 0.35 times body length. Pleotelson length 0.8 times width, 0.35 times body length.
Figure 35. *Eurycope mathiasi* sp. nov. Female holotype (ZMH K-45660): (A) lateral view; (B) dorsal view; (C) pleotelson ventral view.

Antenna I (female paratype, ZMH K-45662, Figure 36A) broken off, article 1 length 1.2 times width, with two broom dorsal setae, one small UB seta, and one small simple seta distomedially; article 2 length 1.4 times width, 0.45 times article 1 length, tip not reaching tip of distomedial lobe of article 1; two broom and three UB distal setae; articles 3 broken off.
Figure 36. *Eurycope mathiasi* sp. nov. Female paratype (ZMH K-45662): (A) antenna I, articles 1 and 2. Female paratype (ZMH K-45663): (B) maxilliped.

Antenna II (female holotype, ZMH K-45660, Figure 35B) broken off after article 4; articles 1–4 subequal in length; squama on article 3 reaching midlength of article 4.

Maxilliped (female paratype, ZMH K-45663, Figure 36B) basis length 2.9 times width; endite width 0.6 times basis width, with three coupling hooks; distal margin straight, with three fan setae. Basis acute lateral projection near palp insertion length 1.1 times article 1 lateral length. Palp length 2.1 times width, 0.8 times basis length. Article 2 as long as wide, slightly wider than basis; lateral length 1.15 times medial length; lateral and medial margins with four small setae each. Article 3 almost as wide as article 2; medial margin denticulate, with 10 small setae; medial length 0.85 times article 2 medial length; lateral margin with two small simple setae, length 0.35 times article 2 lateral length. Article 4 equal lateral length 0.8 times article 3 length; medial lobe length 1.2 times article 5 length, with four long distal setae. Article 5 with four lateral and five long distal setae. Epipod length 2.1 times width, 0.9 times basis length; width 1.2 times basis width.

Pereopods broken off.

Pleopod II (female paratype, ZMH K-45662, Figure 37A) length 0.85 times width; lateral margin with one small simple seta; distolaterally three small simple setae; ventral keel 0.7 times pleopod II length.
Figure 37. *Eurycope mathiasi* sp. nov. Female paratype (ZMH K-45662): (A) pleopod II; (B) pleopod III; (C) pleopod IV; (D) pleopod V; (E) uropod.

Pleopod III (female paratype, ZMH K-45662, Figure 37B) protopod length 0.5 times width; endopod length 1.25 times width; three distal plumose setae length 0.4 times pleopod III length; exopod reaching slightly behind endopod distal margin, 0.4 times as wide as
endopod, with row of fine simple lateral setae; distal simple seta length slightly shorter than endopod distal setae.

Pleopod IV (female paratype, ZMH K-45662, Figure 37C) endopod length 1.45 times width; exopod 0.9 times endopod length and 0.45 times endopod width. Stout plumose distal seta length 1.3 times length of pleopod III endopod distal setae.

Pleopod V (female paratype, ZMH K-45662, Figure 37D) length 1.35 times width.

Uropod (female paratype, ZMH K-45662, Figure 37E) length 0.3 times pleotelson length; protopod broadening apically, length 1.1 times width, with one UB and five whip distal setae; endopod length 1.05 times protopod length, width 0.5 times protopod width, with four simple, four broom, and six UB distal setae; exopod length 0.8 times endopod length, width 0.5 times endopod width, with four distal setae.

**Etymology:** The name honors Sarah Schnurr’s husband, Mathias Lutz.

**Distribution:** Known only from the type locality in the Irminger Basin, featuring a depth range of 214–698 m.

4. Discussion

4.1. Molecular Taxonomy

Taxonomists, evolutionary biologists, ecologists, and conservationists rely on a solid knowledge on species [45,46]. Underestimation of biodiversity due to morphologically similar species and cryptic species is a known issue [47], especially in the deep sea. Thus, a solid backbone of taxonomy is needed. An integrative approach combining molecular and morphological data has shown to help to reveal diversity and “unknowns” within benthic samples. However, formal descriptions of species are a time-consuming process and must be conducted by taxonomic experts of the field. The current study disentangles the morphological diversity of the *E. producta* complex within Icelandic waters. However, the type specimens of *E. producta* and *E. dahli* were not suitable for genetic studies. Thus, genetic data rely only on newly collected specimens of the IceAGE1 and IceAGE2 expeditions, since those samples were fixed in 96% nondenatured ethanol, which makes them suitable for genetic analyses.

Maximum likelihood and Bayesian inference tree construction of the different *Eurycope producta* species complex datasets by Schnurr et al. [28] revealed identical tree topologies, each clade being well-supported by high posterior probabilities and bootstrap support (see Figure 2 for tree topologies of the concatenated dataset. Single gene trees can be retrieved from Schnurr et al. [28]). It has been shown previously that the eight potential genetic species clades are also well-supported by species delimitation methods and hence, further repetition of molecular evidence will be avoided. However, the previous molecular analyses strongly support the distinct species clades of *E. producta* sensu stricto and *E. dahli*, as well as the six herein newly described species *E. mishkai* sp. nov., *E. nikitai* sp. nov., *E. gordeyi* sp. nov., *E. emmae* sp. nov., *E. jakobi* sp. nov., and *E. mathiasi* sp. nov. Thus, the evaluated specimens of the *E. producta* complex represent eight not only genetically, but also morphologically different species.

4.2. Taxonomy

The species of the *E. producta* complex differ from all *Eurycope* species by having a broad and long rostrum, which is subequal in length and width to article 1 of antenna I, with a medial groove, lateral keels are serrated anteriorly. The large, almost rectangular rostrum of the *E. producta* complex is similar in the genus *Disconectes*, though *Disconectes* differs in having pereonites 5 and 6 dorsally fused, which are free in all *Eurycope* species. The above-described elaborate species diagnoses of the eight species of the *E. producta* complex feature specific morphological characters, serving to distinguish them from each other.

Our morphological evaluation shows that the species of the *E. producta* complex can be divided into two subgroups. The first subgroup consists of the species: *E. producta* sensu stricto, *E. dahli*, *E. mishkai* sp. nov., and *E. nikitai* sp. nov., whereas the second subgroup includes: *E. gordeyi* sp. nov., *E. emmae* sp. nov., *E. jakobi* sp. nov., and *E. mathiasi* sp. nov.
The first group is characterized by a relatively narrow tapering rostrum, which is not broader than article 1 of antenna I, a truncate distal margin of the male pleopod I, with distomedial and distolateral lobes of equal length. The species of the second group have a rostrum which is longer than the distomedial lobe of antenna I article 1 and broader than antenna I article 1; in this group the male pleopod I tapers distally and distomedial lobes are elongated, much protruded beyond tiny distolateral lobes.

The most useful diagnostic characters for distinguishing species were revealed. These are the relative size and shape of the rostrum, the correlation between length and width of the rostrum and of article 1 of antenna I, as well as the shape of the distal margin of the male pleopod I. Maxilliped and its palp articles proportions—especially the relation of article 4 distomedial lobe and article 5—can also be used to separate the species from each other.

4.3. Distribution

The elucidated species of the herein-evaluated dataset are geographically much more restricted than previously assumed (see Figure 1 for the assumed distribution prior to Schnurr et al. [28] and also for distribution maps of each resolved species). The resolved species feature much smaller ecological niches than the complex. *Eurycope dahli* was the only species restricted to the deep areas north of the GSR, whereas *E. mishkai*, *E. nikitai*, *E. jakobi*, and *E. mathiasi* were restricted to the deep areas south of the GSR. *Eurycope emmae* occurred along the northern side of the GSR and across the Iceland–Faroe Ridge, whereas *E. gordeyi* occurred only across the Iceland–Faroe Ridge. Thus, the GSR or factors related to this massive submarine ridge system seem to have an effect on the distribution of most of the herein-evaluated species, except for *E. producta* sensu stricto. *Eurycope producta* sensu stricto is the only species, which occurred on both sides of the GSR, showing a trans-GSR distribution and a depth range of over 1000 m.

4.4. Key to the Studied Species of the *E. producta* Complex within Icelandic Waters

1. (8) Rostrum not broader than article 1 of antenna I, distal margin of male pleopod I truncate, distomedial and distolateral lobes of subequal length
2. (3) Rostrum visibly shorter than article 1 of antenna I, pleopod III with six distal plumose setae.  
   *E. dahli* Svavarsson, 1987
3. (2) Rostrum equal or longer than antenna I article I, pleopod III with three distal plumose setae
4. (5) Maxilliped basis lateral projection near palp insertion length shorter than article 1 (0.85 times). Palp article 4 distomedial lobe longer than article 5 (1.25 times). Pleopod I distal margin straight.  
   *E. mishkai* sp. nov.
5. (4) Maxilliped basis lateral projection near palp insertion length not shorter than article 1. Palp article 4 distomedial lobe shorter than article 5. Pleopod I distal margin not straight.
6. (7) Pereonites 5–7 equal in medial length. Maxilliped endite with two coupling hooks, basis lateral projection near palp insertion as long as article 1. Article 4 distomedial lobe length 0.6 times article 5 length. Pleopod I with light rounded notch between distomedial and distolateral lobes.  
   *E. nikitai* sp. nov.
7. (6) Pereonites 5 and 6 equal in medial length, pereonite 7 longest. Maxilliped endite with three coupling hooks, basis lateral projection near palp insertion length 1.2 times article 1 length. Article 4 distomedial lobe length 0.75 times article 5 length. Pleopod I distal margin rounded.  
   *E. producta* G.O. Sars, 1868
8. (1) Rostrum broader than article 1 of antenna I, distal margin of male pleopod I tapering; distomedial lobes elongated, protruding significantly beyond tiny distolateral lobes.
9. (10) Rostrum slightly tapering distally. Maxilliped basis lateral projection near palp insertion longer than article 1 (1.1 times), palp article 4 medial lobe longer than article 5 (1.2 times)

E. mathiasi sp. nov.

10. (9) Rostrum not tapering distally, almost rectangular. Maxilliped basis lateral projection near palp insertion not longer than article 1, palp article 4 medial lobe not longer than article 5.

11. (12) Rostrum 1.2 times antenna I article 1 length, width 1.1 times antenna I basal width. Maxilliped endite with five coupling hooks. Palp article 4 medial lobe subequal in length to article 5.

E. gordeyi sp. nov.

12. (11) Rostrum 1.5 times antenna I article 1 length, width > 1.1 times antenna I basal width. Maxilliped endite with less than five coupling hooks.

13. (14) Rostrum width 1.7 times antenna I article 1 width. Maxilliped endite with two coupling hooks. Basis lateral projection near palp insertion length 0.9 times article 1 lateral length. Palp article 4 medial lobe subequal in length to article 5.

E. emmae sp. nov.

14. (13) Rostrum width 1.6 times antenna I basal width. Maxilliped endite with three coupling hooks. Basis lateral projection near palp insertion as long as article 1. Palp article 4 medial lobe length 0.8 times article 5 length.

E. jakobi sp. nov.

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Abbreviations

GSR = Greenland–Scotland Ridge; UB = unequal bifid seta
References

1. Sanders, H.L.; Hessler, R.R.; Hampson, G.R. An introduction to the study of deep-sea benthic faunal assemblages along the Gay Head-Bermuda transect. Deep-Sea Res. Oceanogr. Abstr. 1965, 12, 845–867. [CrossRef]

2. Sanders, H.L.; Hessler, R.R. Ecology of the Deep-Sea Benthos. Science 1969, 163, 1419–1424. [CrossRef] [PubMed]

3. Brandt, A.; Gooday, A.J.; Brandao, S.N.; Brix, S.; Brokeland, W.; Cedhagen, T.; Choudhury, M.; Cornelius, N.; Danis, B.; De Mesel, I.; et al. First insights into the biodiversity and biogeography of the Southern Ocean deep sea. Nature 2007, 447, 307–311. [CrossRef]

4. Brix, S.; Held, C.; Kaiser, S.; Jennings, R.M.; Driskell, A.; Brandt, A. Evolution and phylogeny of the deep-sea isopod families Desmosomatidae Sars, 1897 and Nannoniscidae Hansen, 1916 (Isopoda: Asellota). Org. Divers. Evol. 2021, 21, 691–717. [CrossRef] [PubMed]

5. Hansen, B.; Østerhus, S. North Atlantic-Nordic Seas exchanges. Prog. Oceanogr. 2000, 45, 109–208. [CrossRef]
30. Jochumsen, K.; Schnurr, S.M.; Quadfasel, D. Bottom temperature and salinity distribution and its variability around Iceland. *Deep-Sea Res. PT I* **2016**, *111*, 79–90. [CrossRef]

31. Rothlisberg, P.C.; Pearcy, W.G. An epibenthic sampler used to study the ontogeny of vertical migration of *Pandalus jordani* (Decapoda, Caridea). *Fish. Bull.* **1977**, *74*, 994–997.

32. Brenke, N. An Epibenthic Sledge for Operations on Marine Soft Bottom and Bedrock. *Mar. Technol. Soc. J.* **2005**, *39*, 10–19. [CrossRef]

33. Brandt, A.; Elsner, N.; Brenke, N.; Golovan, O.A.; Riehl, T.; Schwabe, E.; Würzberg, L. Epifauna of the Sea of Japan collected via a new epibenthic sledge equipped with camera and environmental sensor systems. *Deep-Sea Res. PT II* **2013**, *86–87*, 43–55. [CrossRef]

34. Riehl, T.; Brenke, N.; Driskell, A.; Kaiser, S.; Brand, A. Field and laboratory methods for DNA studies on deep-se isopod crustaceans. *Pol. Polar Res.* **2014**, *35*, 203–224. [CrossRef]

35. Hessler, R.R. The Desmosomatidae (Isopoda, Asellota) of the Gay Head-Bermuda Transect. *Bull. Scripps Inst. Oceanogr.* **1970**, *15*, 1–185.

36. Wilson, G.D.F. A review of taxonomic concepts in the Nannoniscidae (Isopoda, Asellota), with a key to the genera and a description of *Nannoniscus oblongus* Sars. *Zootaxa* **2008**, *1680*, 1–24. [CrossRef]

37. Wilson, G.D.F.; Hessler, R.R. Taxonomic characters in the morphology of the genus *Eurycope* (Crustacea, Isopoda) with a redescrioption of *E. cornuta* Sars, 1864. *Calc. Biol. Mar.* **1980**, *21*, 241–263.

38. Wilson, G.D.F. Systematics of a species complex in the deep-sea genus *Eurycope*, with a revision of six previously described species (Crustacea, Isopoda, Eurycopidae). *Bull. Scripps Inst. Oceanogr.* **1982**, *25*, 1–64.

39. Latreille, P.A. Histoire Naturelle des Crustacés et des Insectes. *Orthoptera* **1802**, *3*, 267–284.

40. Sars, G.O. On some additional Crustacea from the Caspian Sea. *Annu. Du Musée Zool. De L’Académie Impériale Des Sci. St. Pétersbourg* **1897**, *2*, 273–305.

41. Malyutina, M.V.; Kussakin, O.G. Additions to the Polar Sea bathyal and abyssal Isopoda (Crustacea, Malacostraca). Part 3. Asellota: Munnopsidae. *Zoosystematica Ross.* **1996**, *5*, 13–27.

42. Malyutina, M.; Golovan, O.A. The first record of Asellota (Isopoda) from hydrothermal vent biotopes of the submarine Piip Volcano, Bering Sea, with descriptions of two new species of Munnopsidae. *Deep-Sea Res. PT II* **2022**, *105137*. [CrossRef]

43. Sars, G.O. An account of the Crustacea of Norway with short descriptions and figures of all the species. Isopoda. *Bergen Mus. Bergen* **1899**, *2*, 1–270.

44. Kussakin, O.G. Marine and Brackishwater Like-Footed Crustacea (Isopoda) from the Cold and Temperate Waters of the Northern Hemisphere. III. Suborder Asellota. Part 3. Family Munnopsidae; Izdavaemye Zoologicheskim Institutom Rossiiskoy Akademy Nauk, 171; Nauka: St. Petersburg, Russia, 2003; pp. 1–381.

45. Harrison, R.G. Linking evolutionary pattern and process. The relevance of species concepts fo the study of speciation. In *Endless Forms: Species and Speciation*; Howard, D.J., Berlocher, S., Eds.; Oxford University Press: New York, NY, USA, 1998; pp. 19–31.

46. Kunz, W. Taking more care in using different species concepts—An opinion. *Parasitol Res.* **2001**, *87*, 413–416. [CrossRef] [PubMed]

47. Vrijenhoek, R.C. Cryptic species, phenotypic plasticity, and complex life histories: Assessing deep-sea faunal diversity with molecular markers. *Deep-Sea Res. PT II* **2009**, *56*, 1713–1723. [CrossRef]