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Data Article

Jellyfish and comb jellies in the Baltic Sea: Depth resolved distribution pattern along the salinity gradient of the Baltic Sea during September 2020 - dataset

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ABSTRACT

The biodiversity and distribution of gelatinous macrozooplankton was assessed in the Baltic Sea during September 2020. The dataset includes 40,601 species-specific gelatinous macrozooplankton records, representative of 236,329 gelatinous organisms caught across 73 stations in the south-western, central and northern Baltic Sea. Focus was devoted to changes in depth distributions in relation to salinity and an extended oxygen depletion event in the south-western Baltic Sea. In total, 56 Multinet-midi casts (5 depth-strata), 4 Multinet-maxi casts (9 depth-strata), as well as 17 bongo and 52 WP2 casts were performed from the surface to >3 m above the bottom. Data include depth resolved information on the abundance (m^{-3} and m^{-2}) and size structure of (*i*) the non-indigenous ctenophore *Mnemiopsis leidyi* - including larvae (1–3 mm), transitional (4-5 mm), young adult (6–9 mm) and adult (≥10 mm) ctenophores, as well as the native scyphozoan jellyfish species (*ii*) *Aurelia aurita* and (*iii*) *Cyanea capillata*. Additionally, the zooplankton community is described from WP2 nets including species-specific

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Blackfordia virginica
Size structure
Depth distribution pattern

size and biomass data. In total 40,601 individual gelatinous macrozooplankton specimens from samples and sub-samples were analyzed (raw-counts) with 39,771 *Mnemiopsis leidyi* (corrected-count 235,499), 744 *Aurelia aurita* and 86 *Cyanea capillata* records.

We provide a detailed account of catchability of different life-stages and comparison of different net types. In general, at 89 % of the stations, adult *M. leidyi* were caught, at an average (± SD) density of 1.27 ± 0.97 ind m^{-3} $station^{-1}$ (max 8.4 ind m^{-3}, Flensburg Fjord at 10-7.5m). Young *M. leidyi* adults were caught at 78 % of the stations with 3 ± 2.4 ind m^{-3} $station^{-1}$ (max 29.4 ind m^{-3}, Eckernförde Bight, south of Flensburg Fjord at 0–2.5 m), but were absent from the northern Arkona Basin and east of Bornholm. At 71 % of the stations, transitional *M. leidyi* were caught at an average density of 19.2 ± 21.8 ind m^{-3} $station^{-1}$ (max 129.2 ind m^{-3}, WP2, Kiel Bight). Transitional *M. leidyi* were additionally absent from the central Arkona Basin. *M. leidyi* larvae were present at 68 % of all stations, with the maximum density observed in Kiel Bight with 642 ind m^{-3} (WP2). Generally, high larvae densities with >500 ind m^{-3} were found in the south-western Kiel Bight, with an overall average density of 257 ± 188 ind m^{-3}. Scyphozoan jellyfish species were found at much lower densities. Maximum abundance of *A. aurita* was observed in the Arkona Basin ($n = 79$ at 4 to 6m), with abundances ranging from 0.003 to 1.7 ind m^{-3} $station^{-1}$. *A. aurita* was primarily found in the upper 30 m, while *C. capillata* was primarily present in waters >30 m (average of 0.002 to 0.07 *C. capillata* m^{-3}). The here presented data are essential to further investigate responses of jellyfish and ctenophores to climate change, especially considering salinity and low oxygen conditions, important global change pressure which are of special concern for the Baltic Sea.

Note: The non-indigenous hydromedusae *Blackfordia virginica* was only found at one station in Kiel Bight, off the Kiel Kanal exit to the SW Baltic Sea ($n = 1$, 8mm, 0.05 ind m^{-3}).

Specifications Table

Subject	Oceanography Biodiversity Systematics, Ecology and Behavior
Specific subject area	Description of key gelatinous macrozooplankton species in the Baltic Sea during an extended anoxia event: quantitative, life-stage specific, depth resolved data incl. size.
Type of data	6 Tables, 10 Figures, 3 Appendices - raw data tables for distribution(A), *M. leidyi* morphometrics (B) and physical watercolumn properties (C). Raw data, analysed and filtered data are provided.
Data collection	Gelatinous macro- and mesozooplankton was collected in the Baltic Sea with the R/V Alkor, AL544 in Sept. 2020. Abundance and size data were attained from 4 nets in up to 17 depth strata at 73 stations using either (*i*) a Multinet midi (0.25 m^2 net-opening), (*ii*) a Multinet maxi (0.5 m^2 net-opening), (*iii*) a bongo net (335, 500µm) equipped with a baby bong (150µm) or (*iv*) a WP2 net (200µm). CTD casts described the physical environment, especially oxygen. Samples were analyzed right after catch on light tables using calipers. Zooplankton was preserved in 4 % borax buffered Formalin for zooscan analyses in the laboratory.

(*continued on next page*)

Data source location	Data are collected in north-western Europe, specifically across the salinity gradient of the south-western, central and northern Baltic Sea (Fig. 1). Data is stored at the National Institute of Aquatic Resources, Technical University of Denmark, DTU Aqua, Centre for Gelatinous Plankton Ecology & Evolution, 2800 Kgs. Lyngby, Denmark, and the Helmholtz Centre for Ocean Research Kiel – GEOMAR. Department for Marine Evolutionary Ecology, 24148 Kiel, Germany.
Data accessibility	Zooplankton data have been published on the PANGAEA repository: Hauss, Helena; Jaspers, Cornelia (2023): Mesozooplankton abundance and biomass during Alkor cruise AL544 (WP2 net) [dataset]. Repository name: PANGAEA, Doi: 10.1594/PANGAEA.961791, Direct URL to data: https://doi.pangaea.de/10.1594/PANGAEA.961791. Gelatinous macrozooplankton data have been published on the zenodo repository: Jaspers, Cornelia; Hinrichsen, Hans-Harald (2025): Gelatinous zooplankton abundance and distribution in the Baltic Sea during the Alkor cruise AL544, September 2020 [dataset]. Repository name: Zenodo, Doi: 10.5281/zenodo.14719849. Direct URL to data: https://zenodo.org/records/14719849. see Appendix A. Life stage-specific morphological data have been published on the zenodo repository: Jaspers, Cornelia; Kaehler, Sarah (2025) *Mnemiopsis leidyi* morphometrics [dataset]. Repository name: Zenodo, Doi: 10.5281/zenodo.14720008. Direct URL to data: https://zenodo.org/records/14720008 see Appendix B Environmental (CTD) data from the AL544 cruise can be assessed via Appendix C.
Related research article	Andreasen, M.H., Brooks, M.E., Hauss, H., Hinrichsen, H.-H., Nielsen, T.G., Jaspers, C., Distribution of the non-indigenous ctenophore *Mnemiopsis leidyi* and the native cnidarian *Aurelia aurita* during widespread hypoxia in the Baltic Sea. Journal of Plankton Research, 2025, 1-15. 10.1093/plankt/fbae071

1. Value of the Data

- This dataset is important for assessing the biodiversity and distribution of key native and non-indigenous gelatinous macrozooplankton species in the Baltic Sea.
- The data resolve species-specific and life-stage specific distribution patterns along the horizontal and vertical salinity gradients of the Baltic Sea using multiple opening closing nets (Multinets, Hydrobios, Kiel), with a resolution of down to 2 m depth bins that were investigated.
- The data cover an extended temporary oxygen minimum zone in the south-western Baltic Sea observed during September 2020.
- The data contribute to address the impact of rising anthropogenic stressors on the biodiversity, distribution, and abundance patterns of key gelatinous macrozooplankton species of the Baltic Sea.
- This dataset is of importance to address the question if jellyfish and ctenophore populations increase in response to global change pressures.

2. Background

This dataset describes the vertical distribution pattern of jellyfish and ctenophores across the extended salinity gradient of the Baltic Sea during an oxygen depletion event. Life-stage specific distribution patterns of the non-indigenous ctenophore *Mnemiopsis leidyi* was of special interest, due to its presence in the area since 2006 [1] and very high population densities observed in the area [2]. Following the seasonal cycle of *M. leidyi* across the Baltic Sea has shown that abundances peak during autumn [2,3], with the core population being located in higher saline areas to the west as well as bottom waters in central areas [3]. We conducted an intensive vertically resolved sampling campaign in the south-western Baltic Sea during September, where high abundances were expected [2,3]. Further, the central Bornholm Basin and waters along the

Swedish east-coast were sampled to (i) confirm the range expansion of *M. leidyi* into low saline waters and (ii) to describe the depth distributions of the native jellyfish species *Cyanea capillata* and *Aurelia aurita*. The here presented dataset documents the vertical and horizontal distribution of key jellyfish and ctenophore species in the Baltic Sea at a resolution, which has never been conducted before. This data paper includes a detailed presentation of the data and the methods applied to inspire future investigations and facilitate analyses apart from [4]. This dataset is important in the context of climate change effects on jellyfish and ctenophore populations, especially considering decreasing salinity and oxygen conditions, which represent important global change pressures of the Baltic Sea.

3. Data Description

3.1. General Data Description

This dataset describes key gelatinous macrozooplankton organisms in the Baltic Sea encountered from 1st of September to 15th of September 2020 (Fig. 1). Focus was devoted to depth differences of the gelatinous macrozooplankton community, especially in relation to an extended oxygen depletion event in the south-western Baltic Sea. In total, 56 Multinet midi casts, sampling up to 5 depth strata, 4 multinet maxi casts, sampling up to 9 depth strata, as well as 17 bongo and 52 WP2 casts were performed from the surface to >3 m above the bottom. Additionally, 75 CTD casts were performed at the 73 stations to describe physical water column properties at the sampling stations. We present abundance and distribution pattern of three gelatinous macrozooplankton species encountered, namely the non-indigenous ctenophore *Mnemiopsis leidyi* and the two native scyphozoan jellyfish species *Aurelia aurita* and *Cyanea capillata. Blackfordia virginica* was only encountered at one station in Kiel Bight (SW19B). However, this record stems from the replicated multinet, which integrated from the surface to the bottom, and hence was not considered in the database.

In total 40,601 individual gelatinous macrozooplankton specimens from samples and subsamples were analyzed (raw counts) and extrapolated to match abundances in the total catch (corrected counts) to generate a database with 236,329 records. The database includes raw counts of 39,771 *Mnemiopsis leidyi*, corrected to 235,499 *M. leidyi* in the total catch, 744 *Aurelia aurita* and 86 *Cyanea capillata*. For the latter two scyphozoan species, the entire sample was processed and hence no count correction was applied in the database. Zooplankton abundance and biomass data from WP2 nets are provided.

4. *Mnemiopsis leidyi* Abundance and Distribution Pattern: Data Description

4.1. M. leidyi ≥ 10 mm Adults

Across all stations and including all net types, 9,746 *M. leidyi* ≥ 10 mm were counted. Of these raw counts, 8,970 stem from total sample analyses, while 776 were from sub-sample counts, which were extrapolated to a corresponding corrected count of 10,065 in the database. This sums to a total of 19,035 *M. leidyi* ≥ 10 mm which were caught in the Baltic Sea during September 2020. However, due to the low water volume processed by the WP2 nets and 150-µm baby-bongo nets (Fig. 2), we would like to raise awareness, that those nets should be used for presence/absence analyses only. Below, data presentation did not consider these nets for quantitative analyses of adult *M. leidyi*. Hence, the total count across Multinets and bongo (335 and 500-µm), excluding WP2 and baby-bongo nets, is 8,947 *M. leidyi* adults, with a corresponding corrected count of 9,258 *M. leidyi* ≥ *10 mm*.

Maximum volume specific density was observed in Flensburg Fjord, south-western Baltic Sea with 8.4 adult *M. leidyi* m^{-3} net^{-1} (station FL1, 10-7.5 m depth strata, $n = 109$, 21 ind m^{-2}). Not

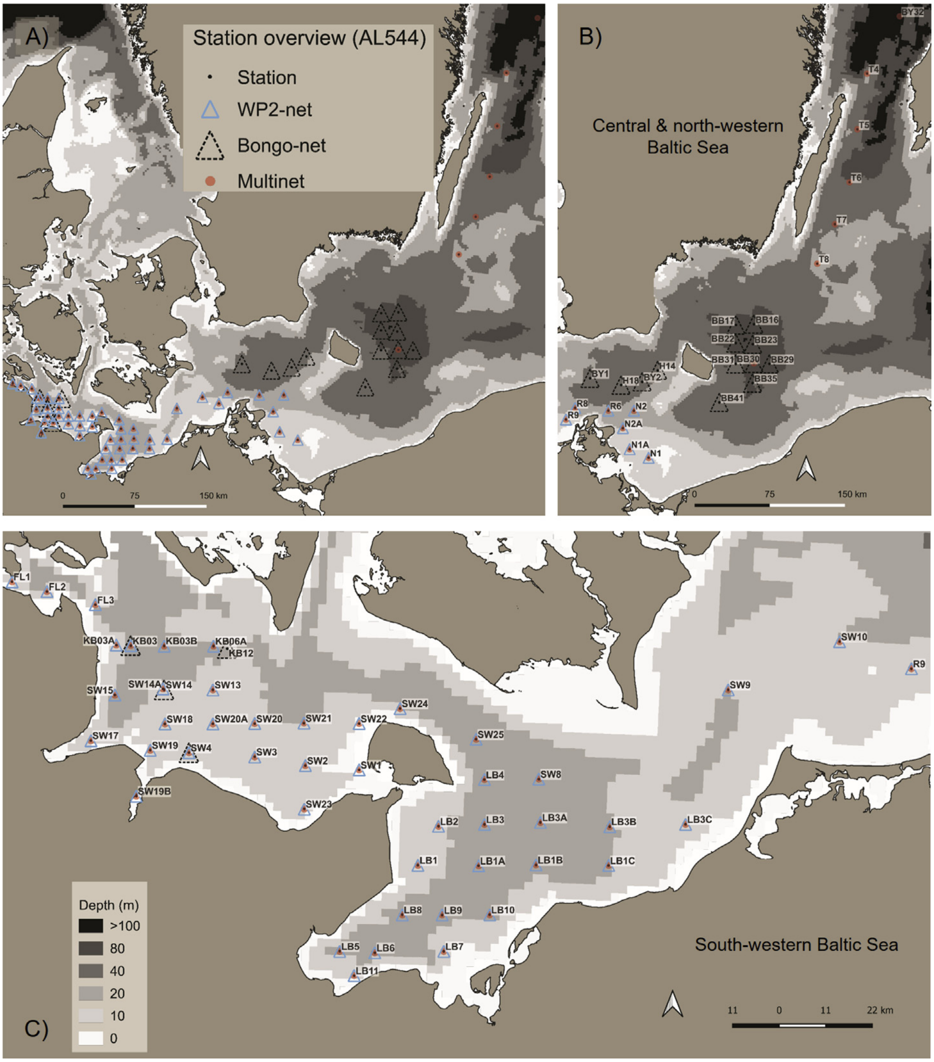

Fig. 1. Gelatinous macrozooplankton sampling stations in the Baltic Sea, north-western Europe, investigated during the R/V Alkor cruise (AL544) from 1st to 13th of September. For color interpretation, the reader is referred to the web version of this article.

considering WP2 and 150µm baby-bongo net counts for adults ($n = 799$), which represent 8 % of the raw counts. Sub-sample counts need to be added to the total counts for the respective net, as the sub-sample was processed separately from the total sample analyses (see methods). Hence, pure sum of the corrected counts column cannot be viewed in isolation, as it needs to be considered, if this is from the total analyses fraction or sub-samples (see column N in the database).

Adult *M. leidyi* were caught in 280 nets (bongo 335 and 500-µm, Multinets-maxi and -midi) with an average density across all nets of 1.37 ± 1.45 ind. m^{-3} (range: 0.003–8.38 ind. m^{-3}) or 5.5 ± 8 ind. m^{-2} (range: 0.03–69 ind. m^{-2}). At 89 % of the investigated stations ($n = 65$), adult *M. leidyi* were caught, primarily in the south-western Baltic Sea. No *M. leidyi* were recorded in waters north-east of the Bornholm Basin. Adult densities across stations ranged from 0.0035 to

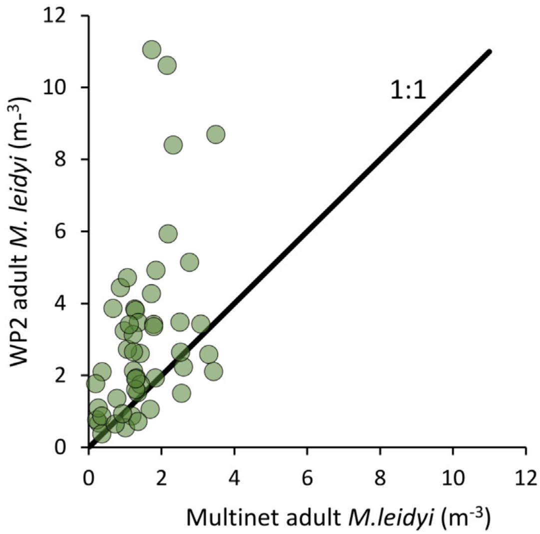

Fig. 2. Adult *M. leidyi* (≥ 10 mm) abundance estimated from Multinets and WP2 nets per station, indicating a factor 2.4 ± 1.76 (range 9.12-0.53) difference between both net-types at the same station.

3.5 *M. leidyi* m^{-3}, with an average of 1.27 ± 0.97 ind. m^{-3}. Abundance per m^{-2} ranged between 0.3 and 65.9 ind. m^{-2} with a station average of 20.6 ± 17 ind. m^{-2}. Note: Depth distribution of *M. leidyi* in the Bornholm Basin is displayed in the Scyphozoan jellyfish Section 3.2.

4.2. M. leidyi *Young Adults 6–9 mm*

Across all stations and including all net types, the raw count of young *M. leidyi* adults (6-9 mm) in samples and sub-samples was 16,985. Taking sub-sampling factors of the 1,661 raw counts in the sub-samples into account, lead to an extrapolated corrected count of 15,324 for those sub-sampled samples. Summing raw counts with sub-sample extrapolated counts lead to a total corrected count in the database of 37,331 young *M. leidyi* adults that were caught in the Baltic Sea during September 2020. Similar to the adult *M. leidyi* data presentation (Section 2.1), WP2 and 150-µm baby-bongo net counts need special consideration. Young adults (n = 2,294) represent 13.5 % of the raw counts and show a higher abundance estimation (m^{-3} and m^{-2}) compared to Multinet and bongo net casts (see Fig. 3).

Not considering WP2 and baby-bongo nets lead to a total database count of 14,691 young *M. leidyi* adults. Taking sub-sampling factors into account lead to a corrected count of 31,448 in the database. Below data presentations is based on Multinet and 335/500-µm bongo net counts only. For more specifics on sub-sampling procedures, the reader is referred to the methods section.

Maximum volume specific density of young *M. leidyi* adults was observed in Eckernförde Bight (SW17), south of Flensburg Fjord in the south-western Baltic Sea with 29.4 and 18.6 ind m^{-3} in the deppth areas of 0–2.5m and 2.5–5m, respectively.

Young adults of *M. leidyi* were caught in 237 nets (bongo 335 and 500-µm, Multinet-maxi and -midi) with an average density across all nets of 3.3 ± 3.67 ind. m^{-3} (range: 0.014–29.4 ind. m^{-3}) or 11.1 ± 14.96 ind. m^{-2} (range: 0.037–132.2 ind. m^{-2}). At 78 % of the investigated stations (n = 57), young *M. leidyi* adults were present. This size range was primarily present in the south-western Baltic Sea. In contrast, at none of the stations in the Bornholm Basin and north of the Bornholm Basin, young adult life-stages were found. Additionally, this size range was also missing from two stations in the northern Arkona Basin (BY1 and H14). The abundance

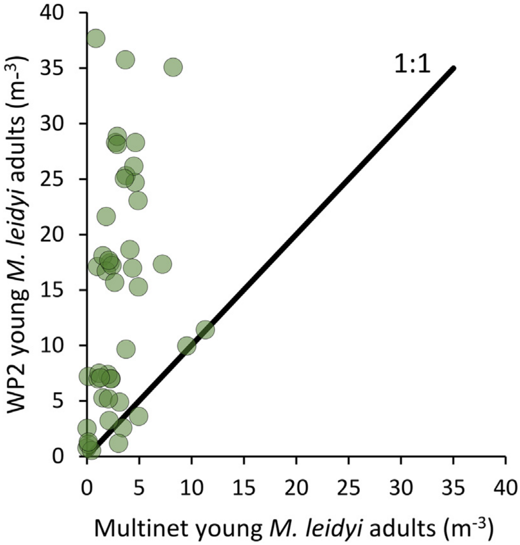

Fig. 3. Young *M. leidyi* adults (6–9 mm) abundance estimated from Multinets and WP2 nets, indicating a factor 9.4 ± 14.7 (range: 86.34-0.38) difference, comparing abundance estimates from WP with Multinets at the same station.

of young adults across stations ranged from 0.014 to 11.3 m^{-3}, with a station average of 3.0 ± 2.4 ind. m^{-3}. Abundance per m^{-2} ranged between 0.1 and 165.3 ind. m^{-2}, with a station average of 44.3 ± 34.8 ind. m^{-2}.

4.3. *Transitional* M. leidyi *4-5 mm*

Across all stations and including all net types, the raw count of transitional *M. leidyi* (4-5 mm) in the entire samples and sub-samples was 3,819, with a total corrected count of 40,914.

For 37 nets (including WP2 and 150-µm baby-bongo), the entire sample was processed and counts from the sample and sub-sample were added, leading to a total of 1,138 counts. In 239 cases, nets were only analysed for transitional animals from sub-samples, hence raw counts needed to be extrapolated to match the count in the entire sample. This has resulted in a sum of 2,681 raw counts, which were extrapolated to 39,776 corrected counts in the database. Adding the raw counts from the cases were the entire sample was processed for transitional *M. leidyi* (sum: 1,138), leads to a final database count of 40,914 transitional *M. leidyi* that were caught in the Baltic Sea during September 2020. As extrapolations bear an uncertainty, we used the total sample count, if possible, to calculate abundances m^{-3} and densities m^{-2} (n = 37). However, in most cases (n = 239) this information was not available and we estimated those parameters from the corrected count. See Fig. 4 for visualization of raw counts for different net types and abundance estimation methods.

Maximum volume specific densities were observed in the south-western Kiel Bight (SW19, SW19B), south of Eckernförde Bight, with WP2 net abundances of 129.2 and 80.2 transitional *M. leidyi* m^{-3}, respectively. Multinet abundances, averaging over the entire water column, were an order of magnitude lower at the same stations with 12.5 ± 7.4 and 4.1 ± 2.4 ind. m^{-3} at station SW19 and SW19B, respectively.

Transitional *M. leidyi* were caught in 274 nets (excluding SW9 Multinets #1 and #5 as < 6 mm *M. leidyi* were not processed, see Table 4). Combining densities attained by the WP2, bongo (150, 335 and 500-µm), as well as from the two Multinet-maxi and -midi nets leads to

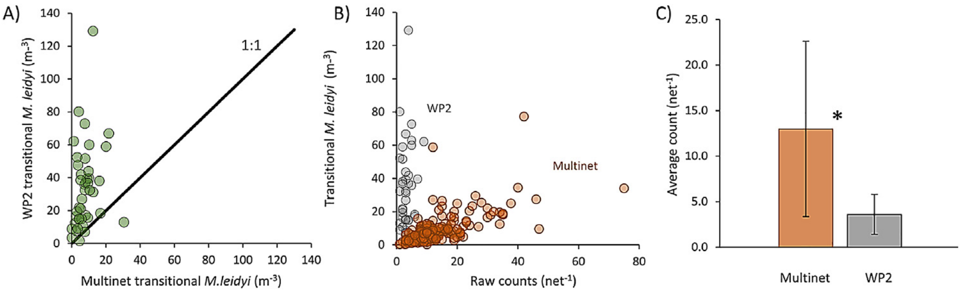

Fig. 4. Transitional *M. leidyi* (4-5 mm) abundance estimates from vertical WP2 nets and towed multinets at the same station comparing abundance m^{-3} (A), raw count data (B) and overall average of raw counts for both net types. Multinets have on average of 13 ± 9.6 counts net^{-1} (n = 194), while WP2 nets have 3.6 ± 2.2 counts net^{-1} (n = 42), leading to significantly lower counts in WP2 nets (1-way ANOVA $F_{1,235}$=39.69, p < 0.001).

an average density of 11.8 ± 16 ind. m^{-3} (range: 0.012–129.2 ind. m^{-3}) or 98.2 ± 215.2 ind. m^{-2} (range 0.13–1485.5 ind m^{-2}).

At 71 % of the investigated stations (n = 52), transitional *M. leidyi* were found. This was primarily the case in the south-western Baltic Sea. Transitional *M. leidyi* were absent for the same stations as young adults. Additionally, transitional *M. leidyi* were absent from the two stations sampled in the central Arkona Basin (BY2, H18).

Densities across stations ranged from 0.095 to 129.2 transitional *M. leidyi* m^{-3} with an average across stations of 19.2 ± 21.8 ind. m^{-3}. Abundance per m^{-2} ranged between 0.3 and 1,485.4 ind. m^{-2} with a station average of 274.5 ± 299.1 ind. m^{-2}.

4.4. Larval M. leidyi *1–3 mm*

Across all stations and including all net types, the raw count of *M. leidyi* larvae (1–3 mm) across all samples and sub-samples was 9,221, leading to a total corrected count of 138,219 (see database Appendix A). Towed nets such as Multi- and bongo nets underestimate the larvae size fraction. This is due to the large water volume processed, which results in a higher pressure on the cod end content, as well as higher overall biomass net^{-1}. To illustrate this, WP2 nets deployed during September 2020 filtered on average 4.25 ± 1.5 m^{-3} net^{-1}, while Multinets filtered on average 23.8 m^{-3} net^{-1}, with up to 9 nets per station. This is leading to 1-2 orders of magnitude larger water volumes processed by Multinets per station (107.4 ± 49 m^{-3} station^{-1}, range 12–320.5 m^{-3}) compared to WP2 nets. This needs to be considered with special attention for further analyses of the raw dataset. Below, data presentation considers WP2 nets only.

Raw counts from total sample analyses (n = 4) and sub-samples (n = 43) of *M. leidyi* larvae (1–3 mm) sum to 1,579 raw counts. Counts from sub-sample analyses (n = 1,175) have been extrapolated to a total corrected count of 46,549 in the database (see Appendix A).

M. leidyi larvae were found at 50 stations, leading to a presence at 68 % of all stations. However, larvae were found in WP2 and Multinets nets at 47 and 48 stations, respectively. Note: Station N2 in the central Arkona basin resulted in one 3 mm sized *M. leidyi* larvae in the Multinet, while no 1–3 mm sized *M. leidyi* were found in the WP2 net. Similarly, 1 larvae was found at the close by station N1 in the WP2 net, while none was found in the Multinet. Overall, abundances of early life-stages of *M. leidyi* are very low to the east of the German island Rügen. The highest abundance of *M. leidyi* larvae was observed at Station SW3 in the south-western Kiel Bight with 642 larvae m^{-3}. In general, larvae densities with more than 500 ind m^{-3} were observed in Kiel Bight, south-western Baltic Sea at the stations SW4/SW13/SW14A/SW18/SW22. The north-western most stations during the investigation, Flensburg Fjord (FL1 and FL2) were not investigated for < 10 mm life-stages in the WP2 net, but larvae and transitional animals

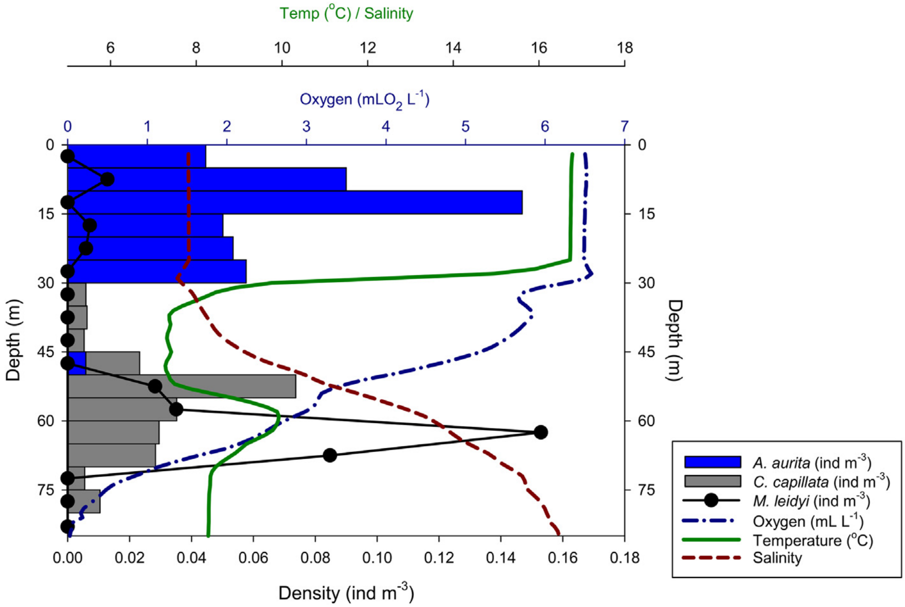

Fig. 5. Depth distribution of *Aurelia aurita, Cyanea capillata* and *Mnemiopsis leidyi* in the central Baltic Sea, Bornholm Basin. This station (BB30) was investigated in 5m depth intervals across the entire depth range and average abundance (m^{-3}) are presented along with oxygen, temperature and salinity profiles.

had been analysed in all Multinets (see methods). Hence, Multinet counts need special attention for the stations FL1 and FL2 for presence/absence or abundance analyses. Also, at station SW9, Multinets were not investigated for early life-stages, while 23 *M. leidyi* larvae m^{-3} were found in the WP2 net. Across all stations, WP2 nets resulted in an abundance estimation of 257.4 ± 188 larvae m^{-3} (range: 0.34–642 m^{-3}), with an average density of 3,529 ± 2,601.3 larvae m^{-2} (range: 3.5–8735.8 m^{-2}). In comparison, towed Multinets lead to an order of magnitude lower abundance across all stations with 20.1 ± 15.4 larvae m^{-3} (range 0.026–51.6 m^{-3}), with an average density of 322.2 ± 293 larvae m^{-2} (range 0.1–1,238.1 m^{-2}).

5. Scyphozoan Abundance and Distribution Pattern: Data Description

The two native scyphozoan jellyfish species observed during the investigation were *Aurelia aurita* and *Cyanea capillata*. The general depth distribution of both species, along with the non-indigenous *M. leidyi* is visualized in Fig. 5. The reader is referred to general distribution pattern of *M. leidyi* in the Baltic Sea as outlined in previous studies [e.g. 3].

5.1. Aurelia aurita

For *A. aurita*, a total of 741 individuals were caught at 32 stations using all bongo and Multinet casts. *A. aurita* was primarily found in surface waters of the central and northern Baltic Sea. Few presence observations in the south-western Baltic were probably related to timing of the cruise, as *A. aurita* had been observed in large quantities in those areas during summer 2020 (C. Jaspers pers. communication). Average density of *A. aurita* across all stations ranged between 0.006 and 0.5 ind. m^{-3} station^{-1}. Depth specific densities ranged between 0.003 and 1.7 *A. aurita* m^{-3}, with maximum abundances observed at station SW10 in the Arkona Basin ($n = 79$ *A.

aurita, depth range 4–6 m). Densities across the investigated water column ranged from 0.06 ind. m^{-2} to 6.1 ind. m^{-2}, with an average of 0.76 ± 1.28 ind. m^{-2} or 1.8 ± 1.4 ind. m^{-2}, when presence data were considered only. *A. aurita* was found in the upper 30 m of the water column, apart from one animal in the central Bornholm Basin (45–50 m, size: 48 mm) and at the northern most station off Gotland (BY32), where one animal was found between 60 and 70 m (size: 80 mm). The sizes of *A. aurita* encountered during September 2020 ranged between 10 and 210 mm. Small *A. aurita* (< 50 mm) were encountered across the entire investigation area, while the largest animals (> 150 mm) occurred within and to the east of the Arkona Basin.

5.2. Cyanea capillata

For *C. capillata*, 86 individuals were caught by all bongo and Multinet casts. *C. capillata* were present at all stations investigated in the Bornholm Basin ($n = 9$), central Baltic Sea. Further, one *C. capillata* (7 mm) was found in the south-western Baltic Sea (Kiel Bight, station SW8, depth between 5 to10 m) and three animals were caught at the northernmost station off Gotland (BY32, depth between 60 to70 m). Depth discrete sampling in the Bornholm Basin (BB30) showed that *C. capillata* was primarily present in deeper waters of > 30 m (see Fig. 10). Densities range between 0.002 and 0.07 ind. m^{-3} or 0.04 to 3.2 ind. m^{-2}. Size of *C. capillata* ranged from 4 to 98 mm.

6. Experimental Design, Materials and Methods

6.1. General Analyses Procedures

Data were collected as a part of the biological oceanography education at GEOMAR (MNF-bioc-301) during the R/V Alkor Cruise AL544. Gelatinous macrozooplankton was quantitatively collected at 73 stations across the south-western, central and northern Baltic Sea from 1st to 15th of September 2020. CTD casts were performed to describe the physical structure of the water column, especially oxygen conditions (see Appendix C).

Gelatinous macrozooplankton: Species-specific count and size data were attained from 4 different nets in up to 17 depth strata at 73 stations using either (i) a Multinet-midi (0.25 m^2 net-opening), (ii) a Multinet-maxi (0.5 m^2 net-opening), (iii) a bongo net (335, 500-µm) equipped with a baby bong (150µm). Additionally, a WP2 net was used to sample the entire water column for ctenophore larvae and zooplankton (see Table 1 for comparison).

Table 1
Size groups and sample fractions used to assess *Mnemiopsis leidyi* densities. Based on key morphological features and oral-aboral to total size ratios (see Fig. 6). Sample fraction for each life-stage within the database is also specified.

size (mm)	stage	source net	sample fraction
1–3	larvae	WP2	sub-sample
4–5	transitionals	WP2 + Multinet + bongo	sub-sample
6–9	young adults	Multinet + bongo	entire sample + sub-sample counts
≥ 10	adults	Multinet + bongo	entire sample + sub-sample counts

Note: At very few stations, sub-sampling was also applied for 10-20 mm sized *M. leidyi*, while the entire sample was processed for > 20 mm sized *M. leidyi* (see Section 4.2). Each sub-sample included a target of at least 20 individuals.

Each net was processed, which allowed to assign absence data for species not encountered at the respective station or in the respective depth strata. However, this does not hold for WP2 nets, which only filtered low water volumes of < 10 m^3 (av 4.3 ± 1.47 m^3). Due to resulting low raw count data from WP2 nets and 150-µm baby-bongo nets, these nets should be considered with special attention for rare species or life-stages with lower abundances (e.g. *M. leidyi* > 5 mm, see Figs. 2–4).

Upon net retrieval, the net was carefully washed and the sample stored in a chiller. In cases of high biomass in the sample, filtered seawater was added to dilute the sample before analyses. Entire samples were processed right after catch on light tables with dark background for scyphozoan jellyfish species and ≥ 6 mm *M. leidyi,* if not otherwise noted (see Table 1, Section 4.2). Sizes were assessed to the nearest mm using conventional callipers. All gelatinous macrozooplankton species were analysed. Absence records for the scyphozoan jellyfish species *Aurelia aurita, Cyanea capillata,* and the non-indigenous ctenophore species *Mnemiopsis leidyi* are included in the database.

For *M. leidyi,* analyses procedures were adjusted to account for abundance differences of early life-stage across the investigated salinity gradient of the Baltic Sea. Hence, at stations with few early life-stages or overall low *M. leidyi* densities, entire samples were processed, while at high abundance stations, sub-sampling was applied. This information is explicitly included in the database (column N 'sub-sample_yes(1) no(0)') and has implications for correct abundance estimations, as outlined in the data presentation of Sections 2.1 and 2.2. Further details on the *M. leidyi* analyses are outlined in Section 4.2.

Flowmeter recordings (and maximum net depths during each haul) were used to convert raw counts to volume-specific (individuals m^{-3}) and area-specific (individuals m^{-2}) abundances. In detail, for multinets, water volumes processed are recorded in the raw data files and were extracted and noted in the database. For bongo nets, calibrated analog flowmeters mounted in the mouth of each net were used to estimate water volumes processed for each net (for calculation examples see [5,6]). For WP2 nets, filtered water volumes were estimated from the net area and the deployment depth of these strictly vertical hauls, using a pressure sensor mounted to the wire above the net. Note: Distance between net mouth and pressure sensor was added to the maximum depth estimate. For each raw count, water volume processed net^{-1} and depth net^{-1} have been used to calculate abundance data. However, special attention need to be devoted to sub-sampling factors (see Sections 2.1 and 2.2). All records in this database have accompanying size information, which can be used to calculate clearance rates or biomass. Note: For few counts, average size form that station and respective development stage has been assigned as outlined in the database.

WP2 and zooplankton samples: In total, 52 vertical WP2 net casts (Ø = 60 cm, mesh size 200-µm) were performed. First, samples were diluted into 1 to 5 L fresh 0.2 µm filtered seawater. The entire sample was processed for ≥ 10 mm gelatinous macrozooplankton, which were removed and *M. leidyi* larvae densities assessed from sub-samples. After life-analyses of the WP2 nets, the entire samples were concentrated on a submerged 100-µm sieve and preserved with Borax-buffered Formaldehyde at a final concentration of 4 %. Zooplankton samples were analysed in the laboratory at GEOMAR. First, the samples were sub-sampled using a Motoda splitter and then transferred to a transparent tray. Individuals were spread out so they could be scanned using an Epson V750 Pro flatbed scanner at 2400dpi. Scans were processed using the macro set software ZooProcess7.4 for ImageJ [7]. All images were uploaded and can be accessed on EcoTaxa [8] at https://ecotaxa.obs-vlfr.fr/prj/5189. Image analyses included sorting into taxonomic categories using EcoTaxaś built-in machine learning algorithms with subsequent manual validation. Individual biomass was calculated from image area and taxonomic identity using taxon-specific slopes (b) and intercepts (a) from export files (.tsv) [9]. Data are reported as volume specific abundance and biomass and can be accessed from the repository PANGAEA [10].

6.2. Analyses Procedures for M. leidyi

To cover the entire size range of the non-indigenous ctenophore *M. leidyi*, which spans from 1 to 86 mm in this dataset, a combination of methods with different net types and sub-sampling approaches was applied. For size estimations, we first differentiated animals into 4 life-stage groups that show different morphometric properties. These groups include larvae (1–3 mm), transitional animals (4-5 mm), young adults (6–9 mm) and adults ($\geq$ 10 mm). In detail, the heart shaped cydippid larvae grows lobes starting at > 2-3 mm. Lobe formation and onset of metamorphosis leads to a change in the body morphology, which is characteristic for the transitional size range. Once animals reach $\geq$ 6 mm, they resemble adults but the proportions are still under development, such as auricle growth and extension of the lobes towards the aboral pole. Once animals are $\geq$ 10 mm, they proportionally resemble full adults.

6.3. *Morphometric Analyses of* M. leidyi

To confirm morphological changes during development of *M. leidyi*, we here includ a dataset where oral-aboral and total lengths have simultaneously been assessed (n = 1,708) including the northern and southern invasive range. These data stem from laboratory reared animals of known age (n = 1,387), laboratory cultured animals (n = 225) as well as freshly caught animals from the field (n = 97). Size within this dataset ranges between 425 µm for newly hatched larvae to adults with a total and oral-aboral length of 78 and 57.5 mm, respectively (Appendix B). Data originate from previously published [11,12] and unpublished [13] sources (Appendix B). Oral-aboral and total lengths were either assessed from direct measurements at the stereomicroscope using ocular rulers or calibrated images taken with a macro-lense and subsequent image analyses with the software ImageJ (https://imagej.net/ij/).

M. leidyi hatches as heart shaped cyddipid larvae without lobes with an initial oral-aboral length of ca. 0.4 mm (Appendix B). First at ca > 2 mm oral-aboral length, lobes start to develop (see electronic supplement in [14]). We used a change in the ratio between oral-aboral to total length as a proxy for change in body morphology and hence development stage. For the initial larvae stage, we observed that the ratio changed from 1 (no lobes at all for 1mm sized larvae) to 0.99 $\pm$ 0.04 and 0.89 $\pm$ 0.13 for 2 and 3mm sized animals, respectively (Fig. 6). Following this initial lobe formation, which onsets at 2 to 3 mm, *M. leidyi* undergoes a rapid change in body morphology, which is associated with a drastic change in the ratio between oral-aboral to total length. Hence, between 4 and 5 mm, the ratio rapidly decreases to 0.76 $\pm$ 0.13 and 0.72 $\pm$ 0.12 (Fig. 6). This is associated with a change of feeding mode from initially being a passive ambush predator via fanned out tentacles, towards an active feeding current predator. The feeding current is produced by ciliated auricles, which direct the feeding current over capture surfaces along the inner side of the lobes as well as the area between the lobes margins and the body core, which are covered by tentillae [15]. At 6mm, the ratio is further decreased to 0.68 $\pm$ 0.1, but change in the ratio slow down, as metamorphosis is completed and body structures only increase in size and extend (Fig. 6). While we detected an overall significant difference between the ratios (Kruskal-Wallis 1-way Analysis of Variance on Ranks $p < 0.001$, $H_{13} = 1{,}056$), this was primarily driven by differences between larvae (1–3 mm), transitional animals (4-5 mm) and young adults (6-9 mm). Pairwise multiple comparisons (Dunnś method) showed that transitional size ratios (4-5 mm) are significant different ($p < 0.01$) from all young adult size ratios (6-9 mm), apart from comparing size 5 mm vs 6 mm ($p > 0.9$). Similarly, all larvae (1-3 mm) are significant different ($p < 0.001$) from all transitional animals (4 5 mm) as well as young adults (6-9 mm) and adults (> 10 mm). Comparing within the larvae size range shows no difference of ratios between 1 vs 2 mm and 2 vs 3 mm ($p > 0.1$), while 1 vs 3 mm is significantly different ($p = 0.001$). Note: 3mm size range is significant different to all other size pairs ranging from 4 to >14 mm ($p < 0.001$). No significant difference could be observed within the young adult size range (6–9 mm), apart from comparing 6 vs 9 mm ($p = 0.042$). Soto-Angel et al. [16] referred to this size range as transitional stage II, with the adult stage being reached at > 12 mm oral-aboral length [16]. We could not detect a significant change in the ratio between 7 and 13 mm ($p > 0.05$) and therefore keep the final adult size range at $\geq$ 10 mm. Based on morphological characteristics, size estimation and sub-sampling had been adjusted.

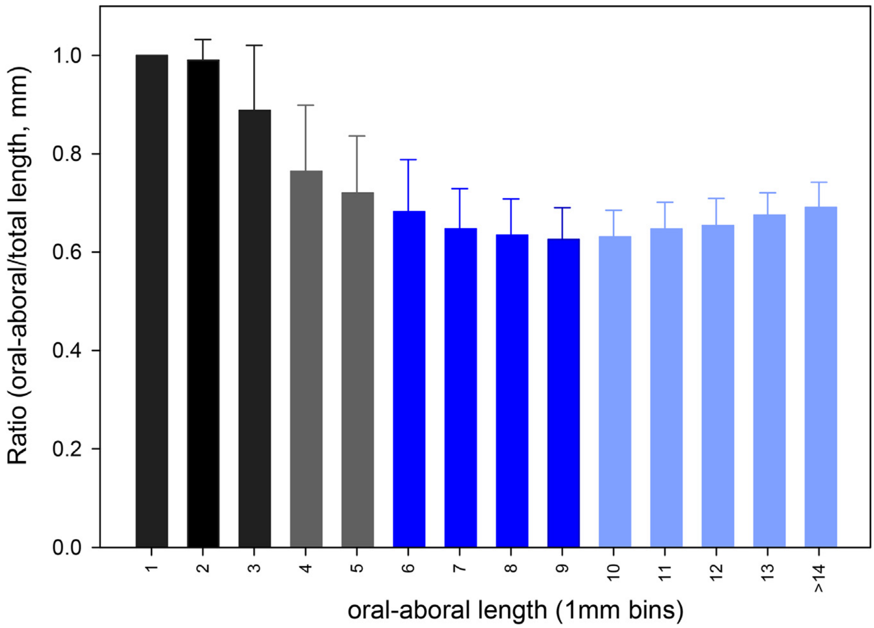

Fig. 6. Morphological change in *M. leidyi* illustrated by displaying ratio changes between oral-aboral and total lengths using 1 mm size bins. Larvae (1–3 mm, black), transitional stage (4-5 mm, grey), young adults (6–9 mm, dark blue) and adults ($\geq$ 10 mm, light blue) are color-coded. For color interpretation, the reader is referred to the web version of this article.

Note: During the cruise all samples were analysed on light tables. Hence, the very first lobe formation could not be detected and all 3 mm sized animals are therefore grouped together with 1 and 2 mm sized *M. leidyi* as larvae, in contrast to [14]. Due to above outlined statistical analyses, this grouping is reasonable and leads to the following overall classifications of life-stage specific size groups applied in this dataset (Fig. 7):

6.4. Detailed Methodological Description of the Data

This section outlines special considerations, important when analysing the here presented database. This includes exceptional sampling stations, problems encountered during the cruise that need to be considered for the analyses of the data as well as a comparison of the sub-sampling methods and net-types used for abundance estimations of all *M. leidyi* life-stages. This section is essential for the correct interpretation of the data and includes metadata tables for all individual nets.

Multinet specifics: Bornholm basin station BB30 was sampled with Bongo net and Multinet-maxi casts to resolve the water column in up to 17 discrete depth intervals. In detail, total water depth at station BB30 was 92 m and we sampled from 86 m to the surface in 5 m depth intervals apart from the deepest net, which integrated over a 6 m interval from 86 to 80 m. Note: This procedure leads to one net which integrates over the entire water column – Multinet net #9 from the 1st cast (0–86 m). Hence, this sample needs to be discarded or viewed as replicate for the bongo net cast. Comparing the resulting densities from Multinet maxi (#9, 1st cast) with densities generated from the bongo net at this station leads to the following macrozooplankton densities (Table 2):

Table 2
Gelatinous macrozooplankton density (individuals m^{-3}) estimates from Multinet maxi (#9, 1st cast) versus Bongo-nets at the 92 m deep station BB30 in the central Bornholm Basin.

	Multinet	Bongo net	
	335 Ind. m^{-3}	500 Ind. m^{-3}	335 Ind. m^{-3}
Aurelia aurita	0.016	0.036	0.037
Cyanea capillata	0.008	0.024	0.012
Mnemiopsis leidyi	0.02	0.02	0.012

It is important to note that due to the shallow water depth of the south-western Baltic Sea, several nets have to be viewed as replicated nets as outlined above. This is the case for Multinet net #1 at the stations LB10/LB9/LB8/LB5/LB7/LB1A/N1A as well as #1 and #2 at station SW19B. To avoid that this information is missed in future investigations, we have deleted those records from the database (Appendix A).

Sub-sampling was conducted for very abundant *M. leidyi* life-stages (i.e. larvae and transitional animals, occasionally also for < 10 mm or < 20 mm sized *M. leidyi,* as outlined in Tables 4–6). Sub-sampling factors are included in the database and have been used to extrapolate to total species counts per sample. For example, for the WP2 net at Station LB10, the total sample volume was 8L, while the sub-sample volume was 0.27L (270 mL). This leads to an analyses fraction of 3.4 % and a correction factor of 29.63, which was used for estimating the total count of larvae and transitional size classes caught within the net. Sometimes, sub-sampling volume still contained a large number of small sized animals. Hence, when a normal and robust size distribution for the smallest *M. leidyi* size classes was reached (1–5 mm), remaining animals in this size range were only counted. To allow for biomass estimations, those counts were assigned an average size from the respective size distribution of this net for each development stage (larvae or transitional *M. leidyi*). Those average sizes were calculated in a separate column (Appendix A - column Z) and can therefore be filtered from the dataset. All ≥6 mm sized animals were measured in the entire sub-sample, if not otherwise noted in Tables 4–6. Note: Counts for ≥ 6 mm sized M. *leidyi* from the sub-sample should be added to the entire sample

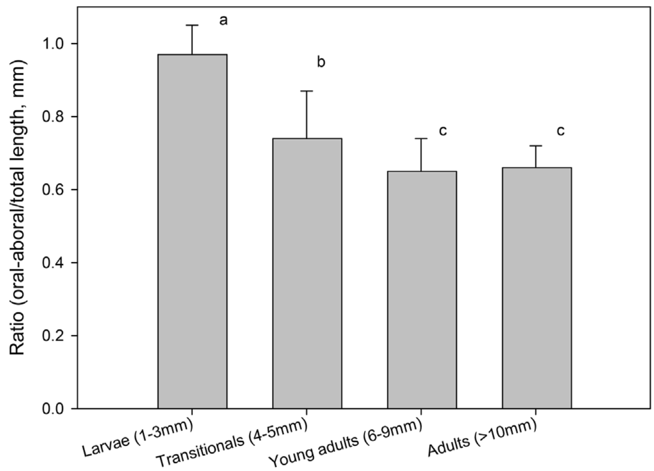

Fig. 7. *M. leidyi* life-stages with significant differences in ratios across life-stages (1-way ANOVA; $F_{31,707} = 1{,}360$, $p < 0.001$). Pairwise multiple comparisons show significant different ratios for all groups (Holm-Sidak, $p < 0.001$), apart from young adults vs adults ($p = 0.08$), indicating that > 6 mm sized *M. leidyi* morphologically resemble adults.

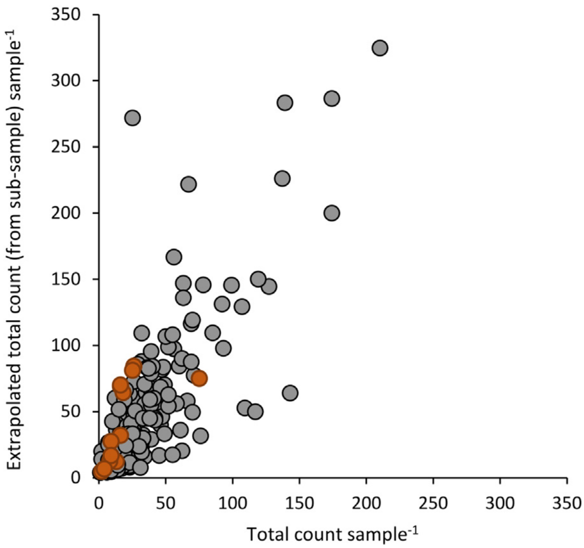

Fig. 8. Total counts from the entire sample compared to total counts estimated from sub-sample counts (and analyses fraction) for WP2 (red) and Multinet (grey) nets, considering ≥10 mm *M. leidyi* only. For color interpretation, the reader is referred to the web version of this article.

count to estimate abundances for young adults (6–9 mm) and adults ≥ 10 mm. A separate column specifies if counts are based on a sub-sample (1) or stems from the entire sample without the sub-sample (0). For details see column N in Appendix A.

As different nets used in this study filter different amounts of water, certain net types cannot be used for reliable abundance estimations for certain *M. leidyi* life-stages (see sections above). For example, out of 52 WP2 net casts, 58 % had total counts of ≤ 10 *M. leidyi* adults (≥ 10 mm). Hence, WP2 nets should not be considered for adult *M. leidyi* density estimations. Similarly, for the larger sized scyphozoans, WP2 and 150-µm baby-bongo nets should not be considered, as the count data are too low. Irrespectively, we left those species records in the dataset and advised to treat those presence data with special considerations.

Sub-sampling has been applied for most nets to quantify different life-stages, as those life-stages vary by orders of magnitude in densities. As such, results from the sub-sample and total sample analyses can be used for comparison of abundance estimates between both methodologies. However, note that the total sample has only been analyzed for adults (≥ 10 mm) and young adults (6–9 mm). Hence, counts in the database from the sub-sample need to be added to the counts for the entire sample to allow for quantitative comparisons. We exemplify this for ≥ 10 mm sized *M. leidyi* (adults) from the WP2 and multinet casts, where difference of abundance estimation from sub-sample compared to the total sample analyses is visualized for WP2 nets (Fig. 8, red dots) and Multinets (Fig. 8, grey dots). Overall, sub-sample analyses leads to a higher count, on average overestimating the actual number of animals present in the net by factor 1.4 for Multinets and 2.35 for WP2 nets. Note: Especially in WP2 sub-samples, counts for large size fractions of *M. leidyi* (≥ 6 mm) are very low, and uncertainty due to low count values need to be considered.

To further illustrate this, we include an example where abundances have been estimated for all life-stages at station (KB03) in order to facilitate replication of our sampling and analyses design and use of this dataset in future analyses (Table 3, Figs. 9, 10). Metadata for all nets are provided in Tables 4–6.

Geo-referenced data were visualized using the freeware program QGIS 3.36.2 Prizen (https://www.qgis.org/en/site/index.html). Latitude and Longitude for all sampled stations are provided

Table 3
Data example showing comparison of abundance and size information from samples and sub-samples of towed Multinet and vertical WP2 nets for different *M. leidyi* life-stages. Note: Counts of sub-samples for the groups 6–9 mm and ≥10 mm need to be included in total sample calculations as indicated by *M. leidyi* (count). Also, note low raw counts for larger size fractions in the WP2 net. < 6 mm sized animals were not analysed in the total sample fraction of this Multinet and left blank.

Size group(mm):		≥10 mm			6–9 mm			4-5 mm			1–3 mm		
KB03A		size, av (mm)	*M. leidyi* (ind m^{-3})	*M. leidyi* (count)	size, av (mm)	*M. leidyi* (ind m^{-3})	*M. leidyi* (count)	size, av (mm)	*M. leidyi* (ind m^{-3})	*M. leidyi* (count)	size, av (mm)	*M. leidyi* (ind m^{-3})	*M. leidyi* (count)
Multinet #4	sub-sample	13.3	8.2	7	6.17	7	6	4.27	17.46	15	2.08	43.1	37
	total	14.7	3.5	21 (14+7)	6.41	8.5	51 (45+6)						
WP2	sub-sample	0	0	0	6.5	39.3	2	4.3	58.9	3	1.7	314.4	16
	total	12.9	2.6	7	6.3	10	27 (25+2)						

Table 4
Gelatinous macrozooplankton catch details for Multinet samples with haul number, position in decimal degrees, bottom as well as gear depth (m) and water volume processed (m^{-3}) for Multinet-midi (net-opening: 0.25 m^2) with up to 5 nets (#1-5) and Multinet-maxi (net-opening: 0.5 m^2) with up to 9 nets (#1-9). Samples attained at 59 out of 73 stations across the south-western, central and northern Baltic Sea. Note: Stations SW10, SW9, SW8, LB1, < 10 mm *M. leidyi* were not measured, hence size information groups (1-3, 4-5, 6-9) taken from close by stations. See footnotes for details.

Station	Multi-Net	Haul nr.	Position(DD_N)	Position(DD_E)	Bottom (m)	Gear (m)	#1	#2	#3	#4	#5	#6	#7	#8	#9
T8	midi	1	55.972	16.718	35	28.3	26	5	10	10	55				
T7	midi	2	56.302	16.982	48.5	40	120	134	123	102	100				
T6	midi	3	56.649	17.201	78.8	70	166	228	100	110	105				
T4	midi	4	57.532	17.462	46	40	167	109	129	151	121				
SW10[**]	midi	5	54.700	12.700	20.5	14	78	48	62	46	96				
SW9[*,Æ]	midi	6	54.600	12.300	17.5	12	50	50	54	52	50				
SW8[*]	midi	7	54.414	11.620	23.5	20	70[***]	58	63	119[***,a]	10.5[***,b]				
LB1[*]	midi	8	54.233	11.186	14	9.2	22[***,c]	34[¤]	63	49[¤]	42[¤]				
LB3	midi	9	54.319	11.425	22.5	18.5	21	40	24[#]	28	44[#]				
LB2	midi	10	54.315	11.260	20	15	44	21	34	30	39				
LB4	midi	11	54.413	11.425	22.5	17	18	36	33[§]	30	60				
SW25	midi	12	54.497	11.395	28	25	27	31	25	25	33				
SW24	midi	13	54.561	11.122	23.8	19	25[Ø]	25	32	39	35				
SW23	midi	14	54.351	10.778	16	11.5	23	22	21	30	49				
SW1	midi	15	54.433	10.975	10.5	6.5	17	20	29	22	35				
SW2	midi	16	54.442	10.782	11	7	25	15	17	25	46				
SW22	midi	17	54.530	10.975	11	6.2	11	18	14	19	15				
SW21	midi	18	54.531	10.777	19.8	16.6	32	22	21	19	31				
SW3	midi	19	54.460	10.600	18	13	21	39	44	22[&]	19				
SW20	midi	20	54.530	10.600	16.8	11.8	21	25	19	18	42				
FL1	midi	21	54.824	9.729	23.9	19.1	19	30[§]	13	28	27[§]				

(*continued on next page*)

Table 4 (*continued*)

Station	Multi-Net	Haul nr.	Position(DD_N)	Position(DD_E)	Bottom (m)	Gear (m)	#1	#2	#3	#4	#5	#6	#7	#8	#9
FL2	midi	22	54.804	9.854	20.5	15.1	25	15	12[§]	17	23				
FL3	midi	23	54.777	10.028	29.1	25.1	17	16	9	16[§]	20[§]				
KB03A	midi	24	54.693	10.103	14.6	10	17[§]	14[§]	8[§]	6	27[§]				
KB03	midi	25	54.692	10.155	14	10	9	20	23	24[§]	19				
KB03B	midi	26	54.691	10.275	23	19	18	15[§]	25	10	14				
KB06A	midi	27	54.691	10.452	19.3	15	25	30[§]	27	30	52[§]				
SW13	midi	28	54.600	10.450	17.3	13.4	23	14	15[§]	16	25[§]				
SW17	midi	29	54.494	10.012	25	20.5	24[Å]	24	35[§]	15[§§]	22[Ü]				
SW15	midi	30	54.589	10.098	25.2	20	42[§]	20	14	10	13[§]				
SW14A	midi	31	54.602	10.271	17.2	14	17[§]	8[§§]	9	6	13				
SW18	midi	32	54.529	10.278	16	10.7	14	22[§§]	11	19[§]	16[§]				
SW20A	midi	33	54.529	10.450	18.3	13.1	20	18	17	19[§]	24				
SW19	midi	34	54.474	10.225	18.3	13.2	23[§§]	16	12	8	20[§]				
SW19B[1]	midi	35	54.378	10.175	12	8	*19*[§,!]	*11*[§,!]	18	10	14				
SW4	midi	36	54.469	10.364	17.6	13	25[§§]	11	14[§§]	8	34				
LB1A[2]	midi	37	54.232	11.404	21.4	15	*19*[*,!]	24[§]	14[§]	6	13				
LB9[3]	midi	38	54.129	11.273	25.3	21	*34*[*,!]	14	24	27[§]	44				
LB8[4]	midi	39	54.129	11.130	22.4	17.5	*44*[*,!]	27	21	25[§]	24				
LB5[5]	midi	40	54.052	10.905	22.2	18	*58*[*,@,!]	20	15	14	17[§]				

(*continued on next page*)

Table 4 (*continued*)

Station	Multi-Net	Haul nr.	Position(DD_N)	Position(DD_E)	Bottom (m)	Gear (m)	#1	#2	#3	#4	#5	#6	#7	#8	#9
LB11	midi	41	54.001	10.957	20.7	16	20[§]	22	22[§,@]	20[§]	22				
LB6	midi	42	54.049	11.031	23.3	19	23[Å]	24[§]	25	28[§]	20				
LB7[6]	midi	43	54.052	11.279	14	10	26[,!]	24	16	29	25				
LB10[7]	midi	44	54.129	11.444	21.2	17	*38*[!]	26	16	24	29				
N1	midi	45	54.311	14.194	15.8	11.2	14	21	12	13	14				
N1A[8]	midi	46	54.386	13.910	14.6	9	*20*[!]	17	13	13	20				
N2A	midi	47	54.570	13.809	21.3	16.5	21	9	22	22	33				
N2	midi	48	54.721	13.975	28.3	23	12	6	30	28	28				
R6	midi	49	54.721	13.592	38.8	33.7	23	18	25	30	44				
R8	midi	50	54.744	13.095	25	19.2	12	12	22	8	46				
R9	midi	51	54.644	12.958	16.9	12	14	17	23	30	33				
LB3C	midi	52	54.319	12.147	17.4	13.8	28	18[§]	14	13	19[§]				
LB3B	midi	53	54.314	11.875	20	15	18[§]	11[§]	16	15[§]	22				
LB1C	midi	54	54.233	11.871	20	16	37[§]	9[§]	10	14	12[§]				
LB1B	midi	55	54.234	11.610	25.2	21	28[§]	25[§]	27	12	23[§]				
LB3A	midi	56	54.323	11.626	24.7	20	40	22	23	12	22				
BY32	maxi	1	57.990	17.951	205.2	180	707	200	183	171	151	283	208	189	277
T5	maxi	2	57.082	17.318	73.9	65	42	281	148	147	125	218	146	140	123
BB30[9]	maxi	3	55.127	15.770	92	86	173	177	171	170	177	184	193	182	*245*[!]
BB30	maxi	4	55.127	15.770	92	45	191	162	172	174	169	140	157	156	135

[*]< 10 mm not quantified; [**]very few < 10 mm *M. leidyi;*[***]< 10 mm counted, not measured; [Æ]< 6 mm not considered
[a]≤ 5 mm (n = 165, av. size 3.97 mm from n = 32 sizes), < 10-6 mm (n = 59, av. size 7.17 mm from n = 23 sizes), < 20-10 mm (n = 2, av. size = 14.04 mm from n = 77 sizes) counts were assigned av. sizes from measurements of this net; [b]≤ 5 mm (n = 110, av. size 4.32 mm from n = 32 sizes), < 10-6 mm (n = 139, av. size 7.21 mm from n = 28 sizes) and < 20-10 mm (n = 8, av. size = 13.71 mm from n = 51 sizes) counts were assigned av. sizes from measurements of this net; [c]< 10 mm (n = 93) only counted, sizes assigned from average of multinet #2/3/4/5 for the size groups < 10-6 mm (n = 36, av. size 7.2mm), 4-5 mm (n = 36, av. size 4.4 mm) and 1-3 mm (n = 21, av. size = 2.4mm); [¤]size ratio assigned to counts < 10 mm after stable size distribution was reached; [&]sub-sample factor assigned from average sub-sample volumes at that station; [#]< 6 mm only counted, av. size assigned based on % contribution of different life-stages at that station; [##]< 6 mm measured and ratio assigned for remaining counts; [1-9]stations, where one replicated net(!),integrated over several other nets and was removed from the database; [@]< 20-10 mm were counts were assigned average size from size measurements of this net; [!]replicated net, deleted; [Ø]sub-sample lost (no < 6 mm *M. leidyi*); [§]< 10-6 mm total sample: counted, after stable size distribution was reached, and av. size assigned; [Ü]Sub-sample 6-15 mm, total sample only for ≥ 15 mm *M. leidyi*

Table 5
Gelatinous macrozooplankton catch details for bongo net samples including haul number, position in decimal degree, bottom as well as gear depth (m) and water volumes processed (m^{-3}) for bongo nets with mesh sizes of 500-µm, 335-µm and baby-bongo with 150-µm. 17 out of 73 stations were sampled with bongo nets. Note: 150-µm baby-bongo filters 1 order of magnitude less water.

Station	Net	Haul nr.	Position(DD_N)	Position(DD_E)	Bottom (m)	Gear (m)	500-µm (m^{-3})	335-µm (m^{-3})	150-µm (m^{-3})
SW4	Bongo	1	54.469	10.364	18.6	12.0	60.7	60.6**	5.5
KB03	Bongo	2	54.692	10.155	18	14	42.3**	45.5*	3.2**
KB12	Bongo	3	54.686	10.501	27.8	22	53.6***Å	52.3	5.3**Å
SW14	Bongo	4	54.600	10.275	23	17	81.0	79.9	8.1**
BY1	Bongo	5	55.000	13.319	45	39	149.6	152.4	13.0
H18	Bongo	6	54.941	13.783	48	40	148.1	147.4	14.3
BY2	Bongo	7	54.969	14.098	46	40	138.5	136.0	12.6
H14	Bongo	8	55.068	14.330	45.6	40	131.3	134.8	11.8
BB41	Bongo	9	54.792	15.253	68	60.4	216.4	208.8	20.6
BB35	Bongo	10	54.958	15.750	79.2	72	270.4	264.7	27.5
BB29	Bongo	11	55.123	16.001	87.5	82	236.5	229.7	25.0
BB30	Bongo	12	55.127	15.770	89	81.8	252.7	245.1	26.6
BB23	Bongo	13	55.291	15.753	96.2	90	271.9	267.2	27.2
BB16	Bongo	14	55.462	15.770	86	79.4	354.0	348.5	37.1
BB17	Bongo	15	55.455	15.501	85.8	79.2	298.8	288.2	31.3
BB22	Bongo	16	55.301	15.498	94.2	87.1	332.6	326.3	35.2
BB31	Bongo	17	55.123	15.498	67.6	59.6	211.6	206.3	22.2

*Not analyzed quantitatively, deleted from database; **counted after reliable size distribution was reaches and average size of this applied to all < 10 mm young adult counts (6–9 mm); ***< 10 mm only counted, average size from 335-µm bongo-net applied; Å> 10 mm analysed from sub-sample only.

Table 6
Zooplankton and *M. leidyi* larvae (1-3 mm) catch details for WP2 net samples, see Table 3 for details. Note: SW4 and KB03 were first sampled with a bongo net cast and 1 week later sampled again using Multinet and WP2 net casts.

Station	Net	Haul nr.	Position (DD_N)	Position (DD_E)	Bottom (m)	Gear (m)	Volume (m^{-3})
SW10*[a]	WP2	1	54.700	12.700	20.5	15.2	4.30
SW9*[b]	WP2	2	54.600	12.300	18	14	3.96
SW8	WP2	3	54.414	11.620	24.4	19	5.37
LB1*[c]	WP2	4	54.233	11.186	13.5	9.5	2.69
LB3	WP2	5	54.319	11.425	22.5	17.5	4.95
LB2	WP2	6	54.315	11.260	19.6	14	3.96
LB4	WP2	7	54.413	11.425	22.3	17.5	4.95
SW25	WP2	8	54.497	11.395	28	21.5	6.08
SW24	WP2	9	54.561	11.122	21.8	17.4	4.92
SW23	WP2	10	54.351	10.778	16	11	3.11
SW1	WP2	11	54.433	10.975	10.5	6	1.70
SW2[&]	WP2	12	54.442	10.782	11.5	6.5	1.84
SW22	WP2	13	54.530	10.975	11.3	6.5	1.84
SW21[&]	WP2	14	54.531	10.777	19.8	15	4.24
SW3[&]	WP2	15	54.460	10.600	18.4	13	3.68
SW20	WP2	16	54.530	10.600	16.3	11.2	3.17
FL1**	WP2	17	54.824	9.729	22.5	17.5	4.95
FL2**	WP2	18	54.804	9.854	21.1	16	4.52
FL3	WP2	19	54.777	10.028	30.1	25	7.07
KB03A	WP2	20	54.693	10.103	14.5	9.6	2.71
KB03	WP2	21	54.692	10.155	31	26.5	7.49
KB03B	WP2	22	54.691	10.275	23	18.1	5.12
KB06A[§]	WP2	23	54.691	10.452	21.3	16.7	4.72
SW13[§]	WP2	24	54.600	10.450	17.3	11.6	3.28
SW17[§]	WP2	25	54.494	10.012	23.6	18.6	5.26
SW15[§]	WP2	26	54.589	10.098	24.7	19.7	5.57
SW14A[§]	WP2	27	54.602	10.271	16.6	12.2	3.45
SW18	WP2	28	54.529	10.278	14.14	9.4	2.66
SW20A[§]	WP2	29	54.529	10.450	18.2	13.5	3.82
SW19[§]	WP2	30	54.474	10.225	16.5	11.5	3.25
SW19B	WP2	31	54.378	10.175	12.2	8	2.26
SW4[§]	WP2	32	54.469	10.364	16.1	11	3.11
LB1A	WP2	33	54.232	11.404	15.5	11	3.11
LB9[§]	WP2	34	54.129	11.273	24.2	19	5.37
LB8	WP2	35	54.129	11.130	22.4	16.7	4.72
LB5[§]	WP2	36	54.052	10.905	22.2	17.2	4.86
LB11	WP2	37	54.001	10.957	20.7	15.1	4.27
LB6	WP2	38	54.049	11.031	23.2	18.2	5.15
LB7	WP2	39	54.052	11.279	18.1	13.2	3.73
LB10	WP2	40	54.129	11.444	21.2	16.2	4.58
N1	WP2	41	54.311	14.194	15.9	10.5	2.97
N1A	WP2	42	54.386	13.910	14.3	9.3	2.63
N2A	WP2	43	54.570	13.809	21.5	16.2	4.58
N2	WP2	44	54.721	13.975	28.4	23.5	6.64
R6	WP2	45	54.721	13.592	37.8	32.5	9.19
R8	WP2	46	54.744	13.095	24.3	19	5.37
R9	WP2	47	54.644	12.958	16.7	11	3.11
LB3C	WP2	48	54.319	12.147	18	13	3.68
LB3B	WP2	49	54.314	11.875	20.2	15.2	4.30
LB1C	WP2	50	54.233	11.871	19.7	14.7	4.16
LB1B	WP2	51	54.234	11.610	25.2	20.2	5.71
LB3A	WP2	52	54.323	11.626	24.8	19.8	5.60

*[a]stable size distribution of $n = 79$ *M. leidyi* measured and used to assign <10mm counts ($n = 221$) to size bins of 1: 1-3 mm, 2: 4-5 mm, 3: 6-9 mm, based on % contributions (1: 73.4 %, $n = 58$; 2: 16.5 %, $n = 13$; 3: 10.1 %, $n = 8$), av. sizes was also assigned;*[b]stable size distribution of $n = 92$ *M. leidyi* measured and used to assign < 10 mm counts ($n = 59$) to size bins of 1: 1-3 mm, 2: 4-5 mm, 3: 6-9 mm, based on % contributions (1: 60.9 %, $n = 56$; 2: 32.6 %, $n = 30$; 3: 6.5 %, $n = 6$), av. sizes was also assigned, *[c]$n = 250$ *M. leidyi* $\leq$ 5 mm only counted, no WP2 measurements for this size group. % contribution from multinet #5/4/3/2 used to assign $\leq$ 6 mm counts for transitionals (4-5 mm, $n = 159$, av. size = 4.4 mm) and larvae (1-3 mm, $n = 91$, average size = 2.4 mm); **not investigated for < 10 mm *M. leidyi*, take multinet data instead; [&]conservative sub-sample volume assigned (200 mL, overall average 190 ± 84 mL); [§]< 10-6 mm counted after a stable size distribution was reached in the total sample fraction and av. size applied to those counts (6-9 mm).

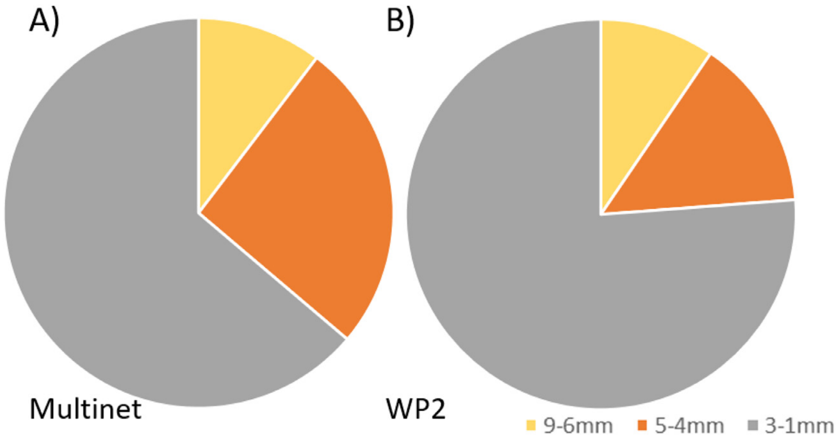

Fig. 9. Relative contribution of different *M. leidyi* life-stages (larvae: 1–3 mm, transitionals: 4-5 mm, young adults: ≥ 10 mm) from (A) towed Multinet-midi net#4 (6 m^{-3}, 2 to 4 m), compared to (B) vertical WP2 net (2.7 m^{-3} integrating from 0 to 9.6m). Station: KB03A see Tables 4–6 for details.

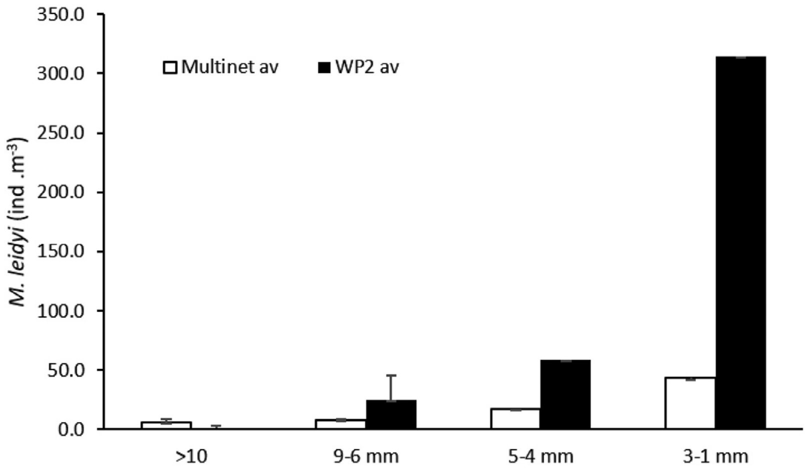

Fig. 10. Absolute contribution of different *M. leidyi* life-stages (larvae: 1-3 mm, transitionals: 4-5 mm, young adults: 6–9 mm and adults ≥10 mm) using the same net-data as outlined in Fig. 9.

in decimal degrees. CTD data, especially oxygen, are available in [4] and Appendix C. All gelatinous macrozooplankton data [17] are available in the supplement (Appendix A) and on Zenodo with the doi 10.5281/zenodo.14719849. All morphometric data [18] are available in the supplement (Appendix B) and on the repository zenodo https://zenodo.org/records/. Zooplankton data are deposited on PANGAEA https://doi.pangaea.de/10.1594/PANGAEA.961791 see Specifications Table.

Limitations

We did not conduct molecular analyses to confirm that the ctenophore larvae caught during our cruise were 100 % *M. leidyi*. It is well known that the native ctenophore species *Mertensia ovum* exists in the Baltic Sea [14]. However, given the documented inverse relationship between salinity and temperature of *M. ovum* and *M. leidyi* in the Baltic Sea [14] makes it unlikely that *M. ovum* larvae were present in our samples. Also, given that no other ctenophore species were present during the investigation, as well as the large number of adult *M. leidyi* present during the investigation, make it unlikely that other species contributed to the 1–3 mm ctenophore size fraction.

Ethics Statement

The authors have read and follow the ethical requirements for publication in Data in Brief and confirming that the current work does not involve human subjects, animal experiments, or any data collected from social media platforms.

CRediT Authorship Contribution Statement

Cornelia Jaspers: Conceptualization, Methodology, Funding acquisition, Data generation and curation, Formal analysis, Supervision, Writing - original draft. **Helena Hauss:** Data curation, Formal analysis, Writing - review & editing. **Hans Harald Hinrichsen:** Conceptualization, Methodology, Funding acquisition, Data curation, Writing - review & editing.

Data Availability

Jaspers, Cornelia; Kaehler, Sarah (2025) Mnemiopsis leidyi morphometrics [dataset] (Original data) (zenodo).

Jaspers, Cornelia; Hinrichsen, Hans-Harald (2025): Gelatinous zooplankton abundance and distribution in the Baltic Sea during the Alkor cruise AL544, September 2020 [dataset] (Original data) (zenodo).

Hauss, Helena; Jaspers, Cornelia (2023): Mesozooplankton abundance and biomass during Alkor cruise AL544 (WP2 net) [dataset]. (Original data) (PANGAEA).

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Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Supplementary Materials

Supplementary material associated with this article (Appendices A, B, C) can be found, in the online version, at doi:10.1016/j.dib.2025.111511.

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