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RECOMMENDATIONS ON METHODS
FOR MARINE BIOLOGICAL STUDIES
IN THE BALTIC SEA
MESOZOOPLANKTON BIOMASS
ASSESSMENT

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SECTION 1

Recommended values for individual wet weights of mesozooplankton in the Baltic Sea.

In tables 1-7, recommended values for individual wet weights of the most common copepods and cladocerans in the Baltic are presented. The tables have been compiled from the more extensive data presented in Section II and arranged in such a way that they will suit the analysis procedure recommended in the guidelines for the Baltic Monitoring Programme (Baltic Mar. Env. Prot. Comm. 1980). For copepods, each copepodite stage is therefore not treated separately but grouped into CI-CIII, CIV-CV, CVI-CVI and CVI-CVI.

In order to investigate possible geographical differences in individual weight, samples were collected in six geographical areas of the Baltic (Bothnian Bay, Bothnian Sea, Gulf of Finland, Northern Baltic proper, Southern Baltic proper and Kattegatt & transition area). However, in those cases where no significant differences were found between areas, the recommended values in tables 1-7 are grouped to cover larger areas of the Baltic.

Our aim has also been to cover all four seasons. The plankton material available was however at times insufficient in regard to coverage of area, season or developmental stages. To complete the tables for recommended values, we therefore had to insert estimated values on those occasions when field samples or certain stages were missing. The estimates are based on the closest (in time and space) available values obtained by actual measurements.

These limitations must be kept in mind when the tables are used. When greater accuracy is needed, the biomass should therefore be calculated on the basis of actual measurements using the formulas given in Section II.

Literature values for additional taxa (table 8).

Although the recommended values ought to cover the majority of the organisms occurring in zooplankton samples from the Baltic, other mesozooplankters will from time to time appear. The Working Group has therefore decided to list literature values for the weight or volume of some additional organisms in order to facilitate a total biomass assessment for samples. In those cases where the authors did not express the biomass in wet weight but in dry weight or carbon content, the values have been converted to wet weight using the factors given by Mullin (1969). When only volume was given, the density of the organisms has been assumed to be 1.

| Jug wet weight | Kattegat & transition area | | | | Southern Baltic proper | | | | Remaining Baltic Sea | | | |
|----------------|----------------------------|---------|---------|---------|------------------------|---------|---------|---------|----------------------|---------|---------|---------|
| | Jan-Mar | Apr-Jun | Jul-Sep | Oct-Dec | Jan-Mar | Apr-Jun | Jul-Sep | Oct-Dec | Jan-Mar | Apr-Jun | Jul-Sep | Oct-Dec |
| CI-III | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 9 | 4 | 4 |
| CIV-V | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 12 | 20 | 13 | 12 |
| ♂ | 15 | 20 | 20 | 20 | 15 | 20 | 20 | 20 | 15 | 20 | 20 | 20 |
| ♀ | 20 | 30 | 25 | 25 | 20 | 20 | 25 | 25 | 20 | 30 | 25 | 25 |

Table 1. Individual wet weight of *Acartia biflosa*.

| Jug wet weight | Kattegat & transition area | | | | Remaining Baltic Sea | | | |
|----------------|----------------------------|---------|---------|---------|----------------------|---------|---------|---------|
| | Jan-Mar | Apr-Jun | Jul-Sep | Oct-Dec | Jan-Mar | Apr-Jun | Jul-Sep | Oct-Dec |
| CI-III | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |
| CIV-V | 12 | 12 | 11 | 9 | 12 | 12 | 11 | 9 |
| ♂ | 18 | 20 | 15 | 15 | 18 | 15 | 15 | 15 |
| ♀ | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 |

Table 2. Individual wet weight of *A. longiremis*.

| Jug wet weight | Kattegat & transition area | | | | Southern Baltic proper | | | | Remaining Baltic Sea | | | |
|----------------|----------------------------|---------|---------|---------|------------------------|---------|---------|---------|----------------------|---------|---------|---------|
| | Jan-Mar | Apr-Jun | Jul-Sep | Oct-Dec | Jan-Mar | Apr-Jun | Jul-Sep | Oct-Dec | Jan-Mar | Apr-Jun | Jul-Sep | Oct-Dec |
| CI-III | 7 | 12 | 10 | 7 | 7 | 8 | 10 | 10 | 7 | 8 | 10 | 10 |
| CIV-V | 20 | 35 | 30 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 |
| ♂ | 35 | 50 | 35 | 35 | 30 | 30 | 35 | 50 | 35 | 30 | 35 | 50 |
| ♀ | 50 | 60 | 50 | 55 | 50 | 45 | 50 | 55 | 50 | 45 | 50 | 55 |

Table 3. Individual wet weight of *Pseudocalanus m. elongatus*.

| Jug wet weight | Kattegat & transition area | | | | Remaining Baltic Sea | | | |
|----------------|----------------------------|---------|---------|---------|----------------------|---------|---------|---------|
| | Jan-Mar | Apr-Jun | Jul-Sep | Oct-Dec | Jan-Mar | Apr-Jun | Jul-Sep | Oct-Dec |
| CI-III | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 |
| CIV-V | 17 | 15 | 15 | 17 | 17 | 15 | 15 | 17 |
| ♂ | 45 | 40 | 40 | 45 | 45 | 40 | 40 | 45 |
| ♀ | 55 | 70 | 45 | 50 | 55 | 50 | 45 | 50 |

Table 4. Individual wet weight of *Centropages hamatus*.

| µg wet weight | Kattegat & transition area | | | | Southern Baltic proper | | | | Remaining Baltic Sea | | | |
|---------------------|----------------------------|---------|---------|---------|------------------------|---------|---------|---------|----------------------|---------|---------|---------|
| | Jan-Mar | Apr-Jun | Jul-Sep | Oct-Dec | Jan-Mar | Apr-Jun | Jul-Sep | Oct-Dec | Jan-Mar | Apr-Jun | Jul-Sep | Oct-Dec |
| C _I -III | 9 | 6 | 6 | 4 | 9 | 6 | 6 | 4 | 9 | 6 | 6 | 4 |
| C _{IV} -V | 18 | 15 | 15 | 14 | 18 | 15 | 15 | 14 | 18 | 15 | 15 | 14 |
| ♂ | 55 | 30 | 45 | 50 | 55 | 55 | 45 | 50 | 55 | 40 | 45 | 50 |
| ♀ | 60 | 50 | 40 | 50 | 60 | 65 | 40 | 50 | 60 | 65 | 60 | 50 |

Table 5. Individual wet weight of *Temora longicornis*.

| µg wet weight | All the Baltic Sea | | | |
|---------------------|--------------------|---------|---------|---------|
| | Jan-Mar | Apr-Jun | Jul-Sep | Oct-Dec |
| C _I -III | 5 | 5 | 5 | 5 |
| C _{IV} -V | 13 | 14 | 14 | 13 |
| ♂ | 20 | 40 | 20 | 20 |
| ♀ | 25 | 50 | 25 | 25 |

Table 6. Individual wet weight of *Eurytemora* spp.

| Length of animal mm | Wet weight ind. ⁻¹ (µg) | | | |
|---------------------|------------------------------------|--------------------|-------------------------|--|
| | <i>Bosmina long. maritima</i> | <i>Podona</i> spp. | <i>Evadne nordmanni</i> | |
| < 0.3 | 2.5 | 2 | 2 | |
| 0.3-0.4 | 7 | 6 | 6 | |
| 0.4-0.5 | 15 | 13 | 10 | |
| 0.5-0.6 | 25 | 25 | 20 | |
| 0.6-0.7 | 45 | 40 | 30 | |
| 0.7-0.9 | 80 | 70 | 50 | |
| 0.9-1.1 | | 140 | 90 | |
| > 1.1 | | 200 | 140 | |

Table 7. Individual wet weight of *Bosmina long. maritima*, *Podona* spp., and *Evadne nordmanni*.

| Species | Area/season | Cop. Sg | Length mm | Size | | Wet weight (µg) | Dry weight (µg) | Carbon content (µg) | References |
|--------------------------|----------------|---------|-----------|--------------------------------|-------|-----------------|-----------------|---------------------|------------|
| | | | | Body volume (µm ³) | | | | | |
| <i>Synchaeta</i> spp. | HelSinki | n | 0.25 | 3.0 x 10 ⁶ | 3.0 | | | 13 | |
| " | " | n | 0.25-0.30 | 3.5 x 10 ⁶ | 3.5 | | | " | |
| " | " | n | 0.30-0.40 | 4.5 x 10 ⁶ | 4.5 | | | " | |
| " | " | n | 0.40 | 5.5 x 10 ⁶ | 5.5 | | | 4 | |
| <i>S. monopus</i> | " | n | 0.25 | 3.0 x 10 ⁶ | 3.0 | | | 13 | |
| <i>Okopjeura dioica</i> | Baltic | n | | | 250 | | | 2 | |
| <i>Frillaria bor.</i> | N. Baltic | 9 | | 10 x 10 ⁶ | 10 | | | 1 | |
| " | G. of Finl. | n | | 10 x 10 ⁶ | 10 | | | 9 | |
| <i>Oithona similis</i> | Baltic | n | | | 1.5 | | | 2 | |
| " | " | cop | | | 4.0 | | | " | |
| " | " | ad | | | 9.0 | | | " | |
| " | " | n | | | 10.2* | 1.39 | | 11 | |
| " | " | ♀ | 0.48 | 8 x 10 ⁶ | 6.0* | 0.82 | | " | |
| " | " | ♂ | 0.45 | 7 x 10 ⁶ | | | | " | |
| <i>Limnocalanus mac.</i> | Baltic | I-VI | | 3 x 10 ⁶ | 3.0 | | | 1 | |
| " | G. of Finl. | ad | | 1000 x 10 ⁶ | 1000 | | | 5 | |
| " | " | n | | 1 x 10 ⁶ | 1 | | | 9 | |
| " | " | cop | | 50 x 10 ⁶ | 50 | | | " | |
| " | " | ad | | 400 x 10 ⁶ | 400 | | | " | |
| " | " | ♀ | 1.7 | 590 x 10 ⁶ | 590 | | | 12 | |
| " | " | ♂ | 1.8 | 758 x 10 ⁶ | 758 | | | " | |
| " | " | ♀ | 1.9 | 697 x 10 ⁶ | 697 | | | " | |
| " | " | ♂ | 1.7 | 517 x 10 ⁶ | 517 | | | " | |
| " | N. Baltic Jul. | ♀ | 1.9 | 810 x 10 ⁶ | 810 | | | " | |
| " | " | ♂ | 1.6 | 454 x 10 ⁶ | 454 | | | " | |
| " | Bothnian Bay | n | 0.34 | | 6* | | 0.3 | 7 | |
| " | " | I-III | 0.64 | | 28* | | 1.4 | " | |
| " | " | IV-V | 1.19 | | 96* | | 4.7 | " | |
| " | " | ♀ | 1.78 | | 185* | | 9.5 | " | |
| " | " | ♂ | 1.72 | | 169* | | 8.8 | " | |
| <i>Pseudocalanus</i> sp. | Baltic | n | | | 3 | | | 2 | |
| <i>Centropages</i> sp. | " | n | | | 2.5 | | | " | |
| <i>Temora longicorn.</i> | " | n | | | 3 | | | " | |
| <i>Eurytemora hir.</i> | " | n | | | 2 | | | " | |
| <i>Acartia</i> sp. | " | n | | | 2 | | | " | |

* Length of copepods = length of prosome
 * Converted value assuming a carbon content of 5.2% and dry weight 13 % of wet weight (Mullin 1969).

Table 8. Additional values on individual volume and weight of mesozooplankton appearing in the Baltic Sea.