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# A Compilation of Biometric Conversion Factors for Benthic Invertebrates of the Baltic Sea

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Heye Rumohr<sup>1</sup>, Thomas Brey<sup>1</sup> and Sven Ankar<sup>2</sup>

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## Introduction

There have been a number of attempts to relate basic physical measurements of aquatic invertebrates i.e. length and weight to each other and to other measures that are easy to obtain (i.e. Slobodkin & Richmond 1961, Brawn et al. 1968, Lie 1968, Prus 1970, Kreutzberg & v.Oertzen 1973, Tyler 1973, Lappalainen & Kangas 1975, Bast & v.Oertzen 1976, Petersen 1977, Chambers & Milne 1979, Norrbin & Bamstedt 1984).

An important reason for this is to reduce laboratory work required for preparing data for benthic production studies.

This paper presents a compilation of published and unpublished data on conversion factors with special reference to Baltic invertebrates, supplemented by data from other marine areas. General conversion factors for main macrobenthic taxa have been computed and their validity assessed.

Beside the general importance of such a compilation of conversion factors they may also serve Baltic benthos investigators to convert "old" wet weight biomass data into more appropriate units of biomass: dry weight, ash free dry weight or energy content (Joule).

This study was promoted by the Baltic Marine Biologists Working Group 11 ("Secondary Production"), to facilitate comparative benthic production studies.

During the preparation of this compilation many members of the working group and other colleagues have opened their drawers and hidden files to supply us with their unpublished results (H. Cederwall, S. Hansson, P. Kangas, N. Kautsky, A. Lappalainen, J. Ostrowski, E. Persson, B. Saebø, M. Weigelt; see also list of contributors in Appendix II).

The collected conversion factors are presented at three levels of precision:

- (1) Average conversion factors 'weight -> weight' and 'weight -> energy content' for main taxonomic groups.
- (2) Conversion factors 'weight -> weight' and 'weight -> energy content' for individual Baltic species.
- (3) Length - weight - relationships for individual Baltic species.

The applicability of these factors is discussed in the light of seasonal variations and geographic gradients which include factors like exposition, spawning cycles and other biotic and abiotic influences. Following the results of this study tentative recommendations will be proposed that will also go into the revised edition of the BMB-recommendations.

## Methods

A variety of methods have been applied by various authors to obtain many kinds of conversion factors. The methods used for the data in this compilation are listed in Appendix II.

A critical factor in comparing different studies concern whether fresh or formalin preserved material was used since all preservation media have a distinct influence on the weight (e.g. Mills et al. 1982, Brey 1986).

Further, it is necessary to know the time of exposition and the temperature used in drying and combustion since the weight can be altered quite significantly when certain limits are passed (e.g. Winberg 1971).

The most important question concerns the date at which the sample was taken, since the spawning season and other seasonal influences have distinct effects on the weight to length ratio of many species.

Geographical information is also needed, especially when the limits of distribution of a certain species are reached, and when hydrographical features differ considerably between the sampling areas.

Additionally laboratory methods have to be considered carefully since even the measuring technique may be a source of error in a study.



## Results

The results are presented in Appendix I in groups according to their precision.

- (1) Average conversion factors 'weight -> weight' and 'weight -> energy content' for main taxonomic groups.

Data on Gastropoda, Bivalvia, Crustacea and Polychaeta have been analyzed. Bivalves with extraordinary thick shells like *Arctica islandica* and *Astarte* spp., and crustaceans with heavy calcareous skeletons as well as very large species and juveniles have been neglected.

Appendix I: 1.1. shows the average conversion factors for wet weight -> shell free dry weight (WW -> SFDW), dry weight -> ash free dry weight (DW -> AFDW) in molluscs, and the factors for WW -> DW, DW -> AFDW and WW -> AFDW for crustaceans and polychaetes. The WW -> AFDW factors have been calculated from the others.

Appendix I: 1.2. shows the average conversion factors for DW -> Joule/mg, SFDW -> Joule/mg and AFDW -> Joule/mg for the different taxonomic groups.

- (2) Conversion factors 'weight -> weight' and 'weight -> energy content' for individual Baltic species.

Summary data for 92 species are presented in Appendix I: 2., 29 mollusc species, 33 crustacean species, 14 polychaete species and 17 species of other taxa. All data available, including seasonal and geographical variations, are presented.

- (3) Length - weight - relationships for individual Baltic species. These data (Appendix I: 3.) are for 44 species (21 mollusc species, 15 crustacean species, 4 polychaete species and 4 species of other taxa).

## Discussion

The average conversion factors for main taxa have small confidence limits (see Chapter 1.1. and 1.2. in Appendix I), although very different methods have been used (see Appendix II) to determine weights and energy content.

The factors for converting WW to AFDW, which are calculated here from the other factors, are close to the factors published by Lie (1968). Lie found the average AFDW in %WW factors for bivalves, crustaceans and polychaetes to be 5.5, 15.0 and 13.3. The factors computed in this paper are 6.9, 14.5 and 13.2, respectively. Only the conversion factors for bivalves differ markedly. We assume this to be related to geographical effects, because Lie's data refer to animals from the Pacific coast of the USA, whereas the greater part of the data compiled here is from the Baltic Sea with lower salinity and unsaturated with  $\text{CaCO}_3$ . The shells of bivalves are usually thinner in areas with lower salinity (e.g. Arntz & Weber 1970) and this leads to a higher AFDW/WW ratio.

The conversion factors for the species (Appendix I, 2.) show that even in single species there is a wide range of values due to geographical, seasonal and individual differences, and possibly also to interannual variations in the condition (see e.g., Lappalainen & Kangas 1975 [Fig.2] or Davis & Wilson 1983 [Fig.1]).

This is especially true for the conversion of weight into energy, where seasonal differences in condition, different life stages or sex result in large differences in energy content. Throughout the course of a year, maximum to minimum flesh weight of a given size may differ seasonally by a factor of 2 or 3 (e.g. Beukema & deBruin 1977, Chambers & Milne 1979).

The length - weight relationships (Appendix I, 3.) show the largest variation among the data compiled here, although the relationships given by individual workers indicate always a strong correlation between length and weight.

Length - weight relationships show the same effects as mentioned above, but additional factors influencing the equations should be noted.

Length measurements are certainly not standardized, e.g. in the literature one can find that either shell length or shell height of bivalves have been correlated with weight. Some investigators stretch bent animals before measuring, others do not, etc. There is a lot of variation in body length determinations, all affecting the calculation of the length - weight equations.

The relationships obtained are also influenced by the size range measured as well as by the weighing procedure, e.g. sometimes the

shell halves of bivalves are opened and the water in the mantle cavity is removed before weighing. In other cases, especially in small bivalves, this is impossible without damaging the animal. Furthermore, the equations are only valid for the body length intervals which they are based on, and should not be used outside this size range.

The equations should be used with caution, if data on sampling date, geographic sampling area, life stages, sex, size range and laboratory methods used are missing.

Beside all these variations, which are induced either by nature or by the methods used, benthic investigators should consider some basic statistical problems of length - weight relationships:

Length - weight relationships are usually established by fitting a linear regression to the logarithmic data:

$$\log(w_i) = a + b * \log(l_i)$$

The estimates of the slope  $b$  and the  $y$ -axis intercept  $a$  by a "prediction model" could be seriously biased. They should be substituted by an estimate through a "functional model" according to Ricker (1973) or corrected by a factor according to Baskerville (1972) and Sprugel (1983).

## Conclusions

It is obvious that much information is still required. Data are particularly required for DW -> AFDW and AFDW -> energy relations in polychaetes. Also AFDW -> energy relations of the following species are scarce or even lacking: Arctica, Astarte, Crangon, Nephtys, Terebellides, Spionids (no data!), Priapulids.

These gaps should be filled in the near future, to make model computations more easy and reliable.

How to use this compilation:

- (1) Average conversion factors 'weight -> weight' and 'weight -> energy content' for main taxonomic groups.

These factors seem to be hard facts. They will be useful in all cases where the aim of the investigations carried out is above the species level, e.g. community biomass or biomass of

trophic groups.

- (2) Conversion factors 'weight -> weight' and 'weight -> energy content' for individual Baltic species.

The general validity of factors which depend on any term including calcareous parts (e.g. WW and DW of Molluscs) is poor because shell weight is related to salinity.

Geographical, seasonal and individual differences should always be taken into account, if any conversion factor for single species is used.

- (3) Length - weight - relationships for individual Baltic species. Individual weight is usually only required for a high level of precision in benthic research work. Therefore, the equations compiled here must be used with utmost care. In many cases, it may be preferable for workers who need such relationships, to produce their own.

References (see also Appendix II)

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- Sprugel, D.G. (1983): Correcting for bias in log-transformed allometric equations. Ecology 64: 209-210.

## Appendix I: Data

(In the following the sign '#' indicates a reference number, e.g. #10 is reference No 10 in Appendix II.)

### 1. Average conversion factors for main taxonomic groups

The average conversion factors for main taxonomic groups (which are Gastropoda, Bivalvia, Crustacea, Polychaeta) are compiled in two tables in chapter 1.1. (conversion factors weight -> weight), and chapter 1.2. (conversion factors weight -> energy content). In the case of the weight -> energy content factors, the median is used instead of the arithmetic mean, because some of the data sets are not normal distributed.

We did not include DW -> energy content factors for Bivalvia and Gastropoda, because these data are scarce and show strong dispersion. However, an additional conversion factor AFDW -> Joule/mg for all taxa was computed.

We did not calculate any general factor for Echinodermata, because there are large differences in body composition (e.g. CaCO<sub>3</sub>-content) in this group.

The 'number of species' given for each conversion factor refers to the minimum number of species included. Due to the fact that many authors published factors related to higher taxonomic groups (e.g. family or genus), the real number of species included here may be distinctly higher.

# 1.1. Average conversion factors: weight -> weight.

Arithmetic mean and 95% confidence interval.

WW = wet weight, AFDW = ash free dry weight

DW = dry weight, SFDW = shell free dry weight

1) AFDW%WW is calculated from the other factors.

2) except *Arctica islandica* and *Astarte* spp.

3) except *Balanomorpha*, large Decapoda and juvenile stages.

| Taxon                   | type      | factor<br>%        | 95%-conf.<br>interval | number<br>values | number<br>species | references |
|-------------------------|-----------|--------------------|-----------------------|------------------|-------------------|------------|
| Bivalvia <sup>2)</sup>  | SFDW%WW   | 8.1                | ±1.1                  | 53               | 24                | < a >      |
|                         | AFDW%DW   | 15.6               | ±1.5                  | 31               | 18                | < b >      |
|                         | AFDW%SFDW | 81.3               | ±2.1                  | 53               | 22                | < c >      |
|                         | AFDW%WW   | 6.9 <sup>1)</sup>  | -                     | -                | -                 | -          |
| Gastropoda              | SFDW%WW   | 10.2               | ±1.1                  | 46               | 27                | < d >      |
|                         | AFDW%DW   | 23.5               | ±7.3                  | 8                | 6                 | < e >      |
|                         | AFDW%SFDW | 83.7               | ±1.9                  | 49               | 27                | < f >      |
|                         | AFDW%WW   | 8.5 <sup>1)</sup>  | -                     | -                | -                 | -          |
| Crustacea <sup>3)</sup> | DW%WW     | 20.2               | ±1.0                  | 65               | 39                | < g >      |
|                         | AFDW%DW   | 71.7               | ±3.4                  | 53               | 35                | < h >      |
|                         | AFDW%WW   | 14.5 <sup>1)</sup> | -                     | -                | -                 | -          |
| Polychaeta              | DW%WW     | 17.6               | ±1.2                  | 80               | 59                | < i >      |
|                         | AFDW%DW   | 75.2               | ±3.4                  | 69               | 48                | < k >      |
|                         | AFDW%WW   | 13.2 <sup>1)</sup> | -                     | -                | -                 | -          |

< a >: #5, #7, #10, #13, #49.

< b >: #14, #32, #33, #41, #51, #54.

< c >: #10, #17, #49.

< d >: #10, #13, #17.

< e >: #14, #32.

< f >: #10, #17, #36.

< g >: #5, #7, #10, #13, #32, #33, #39, #41, #49, #50, #51, #54.

< h >: #10, #12, #14, #15, #32, #33, #37, #39, #49, #51.

< i >: #5, #7, #10, #13, #15, #32, #33, #41, #44, #49, #51.

< k >: #10, #14, #15, #16, #32, #33, #37, #49, #51.

## 1.2. Average conversion factors: weight -> energy content.

Median and 95% confidence limits of energy content (Joule/mg).

DW: dry weight, SFDW: shell free DW, AFDW: ash free DW.

1 Joule = 0.239 cal, 1 cal = 4.187 Joule.

1) except Balanomorpha, large Decapoda and juvenile stages.

2) except large Decapoda and juvenile stages.

| Taxon      | weight<br>type | median<br>[Joule/mg] | 95%-conf.-limits |       | number<br>values | number<br>species | ref.  |
|------------|----------------|----------------------|------------------|-------|------------------|-------------------|-------|
| Bivalvia   | SFDW           | 18.85                | 18.63            | 19.33 | 50               | 38                | < a > |
|            | AFDW           | 22.79                | 22.07            | 23.45 | 37               | 32                | < b > |
| Gastropoda | SFDW           | 17.16                | 16.49            | 18.29 | 44               | 43                | < c > |
|            | AFDW           | 22.63                | 21.77            | 23.58 | 42               | 42                | < d > |
| Crustacea  | DW 1)          | 15.25                | 14.49            | 16.89 | 60               | 45                | < e > |
|            | AFDW2)         | 22.45                | 21.51            | 23.44 | 45               | 40                | < f > |
| Polychaeta | DW             | 16.46                | 14.19            | 17.50 | 36               | 28                | < g > |
|            | AFDW           | 23.33                | 22.22            | 24.89 | 19               | 17                | < h > |
| All taxa   | AFDW           | 22.78                | 21.95            | 23.33 | 143              | 131               | < i > |

< a >: #13, #15, #22, #30, #37, #42, #49, #50.

< b >: #10, #15, #17, #18, #24, #25, #29, #30, #37, #41, #42, #49.

< c >: #22, #37, #42, #49.

< d >: #10, #18, #37, #42, #49.

< e >: #12, #13, #15, #18, #20, #22, #29, #30, #37, #41, #42, #49, #50.

< f >: #10, #12, #15, #18, #29, #30, #37, #41, #49, #50.

< g >: #12, #13, #15, #18, #22, #30, #37, #41, #49, #50.

< h >: #10, #12, #15, #17, #18, #37, #42, #49.

< i >: #10, #12, #15, #17, #18, #20, #24, #25, #29, #30, #37, #41, #42, #43, #49, #50.



## 2. Conversion factors for individual Baltic species

### Abbreviations:

WW = wet weight, DW = dry weight  
AFDW = ash free dry weight, SF = shell free  
N = number of values included,  
[additional number in brackets = number of individuals]  
1 Joule = 0.239 cal, 1 cal = 4.187 Joule

If two values are connected by a hyphen, these two values are the lower and upper limit of the whole range of values given.  
If two values are separated by a slash, these values represent two measurements.

### 2.1. Mollusca

#### 2.1.1. Bivalvia

Abra spp. (*A. alba*, *longicallus*, *nitida*)

##### - *A. (Syndosmva) alba*

DW = 31.3 % WW (N=104 [1345 ind], #51)  
SFDW = 12.4 - 16.5 % SFWW (seasonal var., #15)  
AFDW = 83.6 - 88.0 % SFDW (seasonal var., #15)  
= 85.9 (mean, #15)  
AFDW = 18.0 % DW (N= 217 [2246 ind], #51)  
Joule/mg SFDW: 17.02 - 20.26 (seasonal var., #15)  
18.80 (mean, #15)  
Joule/mg AFDW: 20.23 - 23.61 (seasonal var., #15)  
21.89 (mean, #15)

##### - *A. longicallus*

AFDW = 16.8 % DW (#54)

##### - *A. nitida*

AFDW = 18.5 % DW (#54)

Arctica islandica

|                |   |                    |                        |
|----------------|---|--------------------|------------------------|
| SFWW           | = | 19.3 - 22.2 % WW   | (#9)                   |
|                | = | 12.8               | (#40)                  |
| DW             | = | 53.2 % WW          | (N= 45 [153 ind], #51) |
| SFDW           | = | 3.3 % WW           | (#8)                   |
| SFDW           | = | 13.9 - 19.5 % SFWW | (Jun.-Nov., #44)       |
| AFDW           | = | 2.9 % WW           | (#8)                   |
|                | = | 3.4                | (#44)                  |
| AFDW           | = | 11.9 % SFWW        | (#44)                  |
| AFDW           | = | 9.1 % DW           | (N= 11[42 ind], #14)   |
|                | = | 10.0               | (N=583, #51)           |
| AFDW           | = | 88.4 % SFDW        | (#8)                   |
| Joule/mg WW:   |   | 0.63               | (#8)                   |
| Joule/mg SFDW: |   | 18.76              | (#8)                   |
|                |   | 16.88              | (#50)                  |
| Joule/mg AFDW: |   | 21.22              | (#8)                   |

Astarte spp. (*A. borealis*, *elliptica*, *montagui*, *sulcata*)

- *A. borealis*

|                |   |               |                    |
|----------------|---|---------------|--------------------|
| DW             | = | 69.9 % WW     | (N= 56, #41)       |
|                | = | 72.9          | (N= 19, #51)       |
| SFDW           | = | 5.0 % WW      | (Aug., #10)        |
| AFDW           | = | 7.2 % DW      | (N=127, #51)       |
| Joule/mg AFDW: |   | 21.27 / 22.83 | (N=3/3, Aug., #10) |

- *A. elliptica*

|      |   |           |              |
|------|---|-----------|--------------|
| DW   | = | 76.6 % WW | (N= 20, #51) |
| SFDW | = | 2.1 % WW  | (N=105, #46) |
| SFDW | = | 3.1 % DW  | (N= 98, #46) |
| AFDW | = | 7.7 % DW  | (N=106, #51) |

- *A. montagui*

|                |   |           |                   |
|----------------|---|-----------|-------------------|
| DW             | = | 70.6 % WW | (N= 12, #51)      |
| SFDW           | = | 3.0 % WW  | (Aug., #10)       |
| AFDW           | = | 7.1 % DW  | (N= 85, #51)      |
| Joule/mg AFDW: |   | 21.96     | (N= 2, Aug., #10) |

- A. sulcata

AFDW = 77.0 % SFDW (N= 7, #37)  
 Joule/mg SFDW: 18.35 (N= 7, #37)  
 Joule/mg AFDW: 23.84 (N= 7, #37)

Cardium spp. (C. edule, fasciatum, glaucum, hauniense)

- C. edule

AFDW = 90.4 - 94.3 % SFDW (seasonal var., #17)  
 = 92.2 (mean, #17)  
 Joule/mg DW: 2.26 - 5.57 (#22)  
 Joule/mg SFDW: 19.13 (#22)  
 18.62 - 19.48 (seasonal var., #17)  
 19.08 (mean, #17)  
 Joule/mg AFDW: 20.02 - 21.53 (seasonal var., #17)  
 20.59 (mean, #17)

- C. fasciatum

DW = 31.7 % WW (N= 26, #51)  
 AFDW = 14.9 % DW (N= 41, #41)  
 = 22.9 (N= 79, #51)  
 Joule/mg DW: 2.72 - 5.07 (#22)  
 Joule/mg SFDW: 18.63 (#22)

- C. glaucum

DW = 52.7 % WW (N= 49, #32)  
 = 54.1 (N= 95, #32)  
 = 56.5 (N= 34, Oct., #41)  
 SFDW = 12.1 / 19.7 % SFWW (Jul./Dec., #44)  
 AFDW = 4.4 % DW (Dec., #44)  
 AFDW = 16.8 % SFWW (Dec., #44)  
 AFDW = 11.5 % DW (N= 23, #32)  
 = 9.7 (N= 38, #32)  
 AFDW = 85.3 % SFDW (#44)  
 Joule/mg DW: 15.5 (#30)  
 14.49 (N= 12, Oct., #41)

- C. hauniense

SFWW = 36.0 % WW (N= 30, Oct., #7)  
SFDW = 7.2 % WW (N= 30, Oct., #7)

Corbula (Aloidis) gibba

DW = 56.7 % WW (N= 41 [222 ind], #51)  
AFDW = 6.0 % WW (N= 8 [406 ind], #14)  
= 6.5 (#51)  
AFDW = 12.2 % DW (N= 41 [1879 ind], #14)  
= 11.5 (N=329 [12142 ind], #51)

Leda pernula

SFDW = 20.5 / 18.3 % SFWW (Mar./Jul., #44)  
AFDW = 3.9 % WW (Mar., #44)  
AFDW = 14.1 % SFWW (Mar., #44)

Macoma spp. (M. balthica, calcarea)

- Macoma balthica

SFWW = 40.8 % WW (N=137, #9)  
DW = 48.2 % WW (N=295, #32)  
= 52.8 (N= 15, Apr., #41)  
= 53.5 (M. balthica & M. calcarea, #55)  
SFDW = 6.1 % WW (N=137, #9)  
= 6.5 (0.556-1.620mm length, N= 9, #7)  
SFDW = 13.3 % SFWW (N= 19, #39)  
SFDW = 17.0 % DW (#6)  
AFDW = 12.0 % SFWW (N= 19, #39)  
AFDW = 11.4 % DW (N= 58 [8447 ind], #14)  
= 16.7 - 22.8 (seasonal var., #32)  
= 21.0 (mean, #32)  
AFDW = 18.5 % DW (N= 84 [873 ind], #51)  
AFDW = 76.9 - 97.2 % SFDW (seasonal var., #32)  
= 91.1 (mean, #32)  
= 90.4 (N= 19, #39)  
Joule/mg WW: 1.64 / 1.72 (#49)  
Joule/mg DW: 4.90 - 12.06 (#22)  
15.44 (N= 9, Oct., #41)

(Macoma continued)

Joule/mg SFDW: 16.12 - 19.05 (seasonal var., #17)  
                   17.79               (mean, #17)  
                   20.60               (#22)  
                   16.73 / 19.08 (#49)  
 Joule/mg AFDW: 18.93 - 22.23 (seasonal var., #17)  
                   19.97               (mean, #17)  
                   16.95               (#21)  
                   18.39 / 24.18 (#49)

- M. calcarea

SFDW     =       1.8       % DW     (N= 7, #33)  
 AFDW     =       14.4     % DW     (N= 7, #33)  
           =       19.2               (N= 16 [90 ind], #51)  
           =       90.4               (N= 18, #39)

Modiola modiolus

SFDW     =       15.4     % SFWW (Apr., #44)  
 AFDW     =       3.2     % WW    (Apr., #44)  
 AFDW     =       12.4     % SFWW (Apr., #44)

Mya spp. (M. arenaria, truncata [1 value])

SFWW     =       51.3     % WW    (N= 26, Apr., #5)  
 DW       =       53.8     % WW    (N= 52, #32)  
           =       45.2               (N=129, Aug., #41)  
           =       34.2               (M. trunc., N= 11 [18 ind], #51)  
 SFDW     =       7.6     % WW    (N= 26, Apr., #5)  
 SFDW     =       14.8     % SFWW (N= 26, Apr., #5)  
 SFDW     =       14.7     % DW    (N= 26, Apr., #5)  
 AFDW     =       6.3     % WW    (N= 11, #33)  
 AFDW     =       15.7     % DW    (N= 44 [3053 ind], #14)  
           =       15.4               (N= 29, #32)  
           =       16.1               (N= 11, #33)  
           =       19.9               (N=135, #51)  
 Joule/mg DW:     4.35 - 6.82 (#22)  
                   14.01               (N= 8, Oct., #41)  
 Joule/mg SFDW: 19.30               (#22)  
                   18.87               (#30)

Myrsella (Montacuta) bidentata

|      |   |      |      |                         |
|------|---|------|------|-------------------------|
| DW   | = | 47.9 | % WW | (N= 44 [609 ind], #51)  |
| AFDW | = | 5.2  | % WW | (N= 5 [795 ind], #14)   |
|      | = | 7.2  |      | (#51)                   |
| AFDW | = | 11.3 | % DW | (N= 35 [3650 ind], #14) |
|      | = | 15.1 | % DW | (N=327 [5151 ind], #51) |

Mytilus edulis

|                |   |               |        |                             |
|----------------|---|---------------|--------|-----------------------------|
| SFWW           | = | 30.5          | % WW   | (#7)                        |
| DW             | = | 43.6 / 40.2   | % WW   | (N=389/123, #32)            |
|                | = | 33.9          |        | (N=301, Oct., #41)          |
|                | = | 38.2          |        | (N= 18 [58 ind], #51)       |
| SFDW           | = | 5.0 / 5.0     | % WW   | (Aug., #10)                 |
|                | = | 4.6           |        | (#26)                       |
| SFDW           | = | 14.0 - 17.7   | % SFWW | (N= 29, seasonal var., #24) |
|                |   | 15.9          |        | (mean, #24)                 |
| SFDW           | = | 15.0          | % DW   | (#19)                       |
| AFDW           | = | 3.9           | % WW   | (Dec., #44)                 |
| AFDW           | = | 17.7 - 21.2   | % DW   | (seasonal var., #32)        |
|                | = | 20.0 / 22.5   |        | (N=114/65, #32)             |
|                | = | 23.8          |        | (N= 63 [230 ind], #51)      |
| AFDW           | = | 88.0 / 86.0   | % SFDW | (#10)                       |
|                | = | 83.2          |        | (Dec., #44)                 |
|                | = | 90.9 - 93.9   |        | (seasonal var., #17)        |
|                |   | 92.1          |        | (mean, #17)                 |
| Joule/mg DW:   |   | 3.56 - 8.46   |        | (#22)                       |
|                |   | 14.88         |        | (N= 15, Oct., #41)          |
| Joule/mg SFDW: |   | 20.78         |        | (#8)                        |
|                |   | 19.99 - 20.89 |        | (seasonal var., #17)        |
|                |   | 20.45         |        | (mean, #17)                 |
|                |   | 21.73         |        | (#22)                       |
|                |   | 20.73 - 23.41 |        | (N= 28, seasonal var., #24) |
|                |   | 21.50         |        | (mean, #24)                 |
|                |   | 20.98 - 21.35 |        | (#30)                       |

(Mytilus continued)

Joule/mg AFDW: 21.74 - 22.53 (seasonal var., #17)  
22.18 (mean, #17)  
21.61 - 24.63 (N= 28, seasonal var., #24)  
22.46 (mean, #24)  
23.59 / 23.80 (N=3/3, Aug., #10)

## 2.1.2. Gastropoda

### Apporhais pespelicani

SFDW = 24.0 / 25.1 % SFWW (Aug., #44)  
 AFDW = 4.7 % WW (Aug., #44)  
 AFDW = 20.4 % SFWW (Aug., #44)  
 AFDW = 85.0 % SFDW (Aug., #44)

### Buccinum undatum

SFDW = 22.6 / 24.3 % SFWW (Jul./Dec., #44)  
 AFDW = 11.1 % WW (Dec., #44)  
 AFDW = 22.0 % SFWW (Dec., #44)  
 AFDW = 90.5 % SFDW (Dec., #44)

### Hydrobia spp.

SFWW = 43.7 % WW (N= 30, Apr., #5)  
 DW = 67.0 % WW (N= 30, Apr., #5)  
 = 65.6 / 65.9 (N=114/215, #32)  
 SFDW = 10.7 % WW (N= 30, Apr., #5)  
 SFDW = 24.5 % SFWW (N= 30, Apr., #5)  
 SFDW = 15.6 % DW (N= 30, Apr., #5)  
 AFDW = 20.5 % DW (N= 35 [3650 ind], #14)  
 = 15.1 - 17.9 (#22)  
 = 17.9 / 15.1 (N= 28/ 86, #32)  
 = 20.5 (N= 45 [209 ind], #51)  
 Joule/mg AFDW: 24.61 (#20)

### Littorina littora

AFDW = 87.0 - 92.0 % SFDW (seasonal var., #17)  
 90.7 (mean, #17)  
 Joule/mg SFDW: 18.70 - 21.41 (seasonal var., #17)  
 19.76 (mean, #17)  
 Joule/mg AFDW: 21.03 - 22.99 (seasonal var., #17)  
 21.77 (mean, #17)



Lymnaea spp. (L. spp., peregra)

|      |   |      |        |                       |
|------|---|------|--------|-----------------------|
| SFWW | = | 37.2 | % WW   | (L. spp., N= 74, #32) |
| SFDW | = | 6.9  |        | (L. peregra, #20)     |
| SFDW | = | 28.5 | % SFWW | (L. peregra, #20)     |
| AFDW | = | 38.3 | % DW   | (L. spp., N= 25, #32) |
|      | = | 40.5 |        | (L. peregra, #20)     |

Paludetrina (Potamopyrgus) jenkinsi

|      |   |             |      |                   |
|------|---|-------------|------|-------------------|
| DW   | = | 51.8 / 52.7 | % WW | (N= 23 / 66, #32) |
| AFDW | = | 22.3        | % DW | (N= 14, #32)      |
|      | = | 24.9        |      | (#20)             |

Theodoxus fluviatilis

|      |   |             |      |                  |
|------|---|-------------|------|------------------|
| DW   | = | 62.0        | % WW | (#7)             |
|      | = | 67.6 / 70.5 | % WW | (N=239/62, #32)  |
| SFDW | = | 6.2         | % WW | (#7)             |
|      | = | 4.6         |      | (#26)            |
| SFDW | = | 9.3         | % DW | (#26)            |
| AFDW | = | 12.9 / 15.3 | % DW | (N= 24/77, #32)  |
|      | = | 15.4        |      | (Jul.-Oct., #20) |

## 2.2. Crustacea

### 2.2.1. Amphipoda

#### Bathyporeia pilosa

|              |   |       |      |                    |
|--------------|---|-------|------|--------------------|
| DW           | = | 24.0  | % WW | (N=188, Aug., #41) |
| Joule/mg DW: |   | 13.47 |      | (N= 2, Oct., #41)  |

#### Corophium spp. (C. volutator, insidiosum)

##### - C. volutator

|                |   |               |      |                      |
|----------------|---|---------------|------|----------------------|
| DW             | = | 21.9          | % WW | (N= 70, #32)         |
|                | = | 13.7          |      | (N= 39, Oct., #41)   |
|                | = | 21.2          |      | (N= 35, #5)          |
|                | = | 71.1 - 81.6   |      | (seasonal var., #17) |
|                | = | 77.3          |      | (mean, #17)          |
|                | = | 74.5          |      | (N= 29, #32)         |
| Joule/mg DW:   |   | 13.27 - 16.85 |      | (seasonal var., #17) |
|                |   | 15.41         |      | (mean, #17)          |
|                |   | 11.79         |      | (N= 6, Oct., #41)    |
| Joule/mg AFDW: |   | 18.68 - 20-90 |      | (seasonal var., #17) |
|                |   | 19.90         |      | (mean, #17)          |

##### - C. insidiosum

|      |   |      |      |                        |
|------|---|------|------|------------------------|
| DW   | = | 12.9 | % WW | (N= 9 [ 30 ind], #51)  |
| AFDW | = | 79.7 | % DW | (N= 16 [454 ind], #14) |
|      | = | 83.8 |      | (N= 22 [ 72 ind], #51) |

#### Gammarus spp. (G. spp, duebeni, oceanicus, salinus, zaddachi)

|      |   |             |      |                            |
|------|---|-------------|------|----------------------------|
| DW   | = | 15.4 - 26.4 | % WW | (G. spp., N= 34, #24)      |
|      | = | 19.2        |      | (G. spp., N= 99, #32)      |
|      | = | 18.2        |      | (G. spp., N=391, #32)      |
|      | = | 19.1        |      | (G. oceanicus, N=205, #32) |
|      | = | 21.1        |      | (G. salinus, N= 74, #32)   |
|      | = | 21.7        |      | (G. zaddachi, N= 38, #32)  |
| AFDW | = | 71.9        | % DW | (G. spp., N= 76, #32)      |
|      | = | 71.8        |      | (G. oceanicus, N= 46, #32) |
|      | = | 71.2        |      | (G. zaddachi, #12)         |

(Gammarus continued)

| Joule/mg<br>DW | Joule/mg<br>AFDW |                                  |
|----------------|------------------|----------------------------------|
| 10.23          | -                | (G. sp., N= 34, Oct., #41)       |
| 16.11          | -                | (G. spp., #7)                    |
| 13.75-16.68    | 18.69-21.74      | (G. spp., #24)                   |
| 19.66          | 27.57            | (G. spp., juv. 4mm, #26A)        |
| 18.64          | 24.84            | (G. spp., juv. 2-5 mm, #12)      |
| 18.47          | 21.50            | (G. duebe., females + eggs, #30) |
| 15.90          | 19.49            | (G. ocean., males 6-14mm, #12)   |
| 16.12          | 20.16            | (G. salin., males 5-11mm, #12)   |
| 15.72          | 22.07            | (G. zadda., juv. 2-5 mm, #12)    |
| 16.37          | 20.51            | (G. zadda., females 5-10mm, #12) |
| 15.57          | 22.18            | (G. zadda., males 7-18mm, #12)   |
| 12.97          | 20.92            | (G. zadda., males 12-19mm, #12)  |

Haploops tubicola

|      |   |      |      |             |
|------|---|------|------|-------------|
| DW   | = | 24.2 | % WW | (Feb., #44) |
| AFDW | = | 17.4 | % WW | (Feb., #44) |
| AFDW | = | 71.9 | % DW | (Feb., #44) |

Phoxocephalus holboelli

|      |   |      |      |                         |
|------|---|------|------|-------------------------|
| DW   | = | 13.6 | % WW | (N= 4 [319 ind], #14)   |
| AFDW | = | 11.7 | % WW | (N= 4 [319 ind], #14)   |
| AFDW | = | 84.9 | % DW | (N= 33 [2431 ind], #14) |

Pontoporeia spp. (P. affinis, femorata)

- P. affinis

| DW             | =                | 19.4 | % WW | (N=517, May/Aug., #41) |
|----------------|------------------|------|------|------------------------|
|                | =                | 23.6 |      | (N= 37, Aug., #7)      |
| Joule/mg<br>DW | Joule/mg<br>AFDW |      |      |                        |
| 14.6           | -                |      |      | (N= 8, Oct., #41)      |
| 19.01/27.22    | 23.95/32.57      |      |      | (adult/juv, #27)       |
| 22.3           | -                |      |      | (N= 1, #7)             |

(Pontoporeia continued)

- P. femorata

|      |   |      |      |                        |
|------|---|------|------|------------------------|
| DW   | = | 19.2 | % WW | (N=292, May/Aug., #41) |
|      | = | 15.5 |      | (N= 50, #39)           |
|      | = | 18.0 |      | (#52)                  |
|      | = | 20.9 |      | (N= 22, Aug., #7)      |
| AFDW | = | 13.8 | % WW | (N= 50, #39)           |
| AFDW | = | 88.6 | % DW | (N= 50, #39)           |
|      | = | 84.5 |      | (N=104 [350 ind], #51) |

2.2.2. Isopoda

Asellus aquaticus

|      |   |      |      |              |
|------|---|------|------|--------------|
| DW   | = | 20.7 | % WW | (N= 37, #32) |
| AFDW | = | 68.2 | % DW | (N= 15, #32) |

Idothea spp. (I. spp., aleutica, baltica, chelipes, ochotensis)

|      |               |      |                                |
|------|---------------|------|--------------------------------|
| DW   | ≈ 22.6 / 23.0 | % WW | (I. spp., N=159/36, #32)       |
|      | ≈ 20.6        |      | (I. baltica, N= 55, Apr., #41) |
|      | = 21.0 - 24.0 |      | (I. chelipes, fem., #47)       |
|      | = 22.3        |      | (mean, #47)                    |
| AFDW | = 90.0        | % DW | (I. spp., N= 35, #32)          |
|      | = 75.9        |      | (I. balt., N= 5 [42 ind], #51) |

Joule/mg

Joule/mg

DW

AFDW

|             |             |                                   |
|-------------|-------------|-----------------------------------|
| 24.87       | 25.92       | (I. aleutica, eggs, #12)          |
| 23.45       | 24.70       | (I. aleut., embryos, #12)         |
| 21.98       | 24.41       | (I. aleut., 0 days old, #12)      |
| 25.33       | 26.46       | (I. balt. basteri, eggs, #12)     |
| 23.24       | 25.12       | (I. balt. bast., embryos, #12)    |
| 20.47       | 24.95       | (I. balt. bast., 0 days old, #12) |
| 8.63/10.22  | -           | (I. balt., juv. 0/20 days, #12)   |
| 6.70/11.26  | 8.71/17.92  | (I. balt., juv. 1.95/4.0mm, #12)  |
| 13.98       | -           | (I. balt., #22)                   |
| 14.19       | 20.94       | (I. balt. bast., all sizes, #12)  |
| 13.13/17.54 | 18.01/19.68 | (I. chel., juv. 2-5/4mm, #12)     |
| 16.60       | 21.66       | (I. chel., fem. & eggs, #12)      |

(Idothea continued)

| Joule/mg | Joule/mg |                               |
|----------|----------|-------------------------------|
| DW       | AFDW     |                               |
| 14.66    | 19.25    | (I. chel., males 5-15mm, #12) |
| 24.16    | 25.54    | (I. ochotensis, eggs, #12)    |
| 20.68    | -        | (I. ochot., embryones, #12)   |
| 19.00    | 23.57    | (I. ochot., 0 days old, #12)  |

Jaera albifrons

|      |   |      |      |                             |
|------|---|------|------|-----------------------------|
| DW   | = | 13.3 | % WW | (N= 24, May/Aug./Oct., #41) |
|      | = | 23.3 |      | (N= 63, #32)                |
| AFDW | = | 70.8 | % DW | (N= 10, #32)                |

Mesidotea entomon

|             |   |             |      |                         |
|-------------|---|-------------|------|-------------------------|
| DW          | = | 19.9        | % WW | (N= 42, May/Aug., #41)  |
|             | = | 22.2        |      | (N= 36, #32)            |
| AFDW        | = | 65.2        | % DW | (Jul.-Oct., #20)        |
| Joule/mg    |   | Joule/mg    |      |                         |
| DW          |   | AFDW        |      |                         |
| -           |   | 24.36       |      | (Aug., #10)             |
| 27.55/23.07 |   | 28.89/26.46 |      | (eggs/juv. 0 days, #12) |

2.2.3. Mysidacea

Mysidae

|      |   |      |      |              |
|------|---|------|------|--------------|
| DW   | = | 19.9 | % WW | (N= 90, #32) |
| AFDW | = | 90.0 | % DW | (N= 10, #32) |

Gastrosaccus spinifer

|      |   |      |      |                        |
|------|---|------|------|------------------------|
| DW   | = | 18.0 | % WW | (N= 11 [30 ind], #51)  |
| AFDW | = | 12.2 | % WW | (N= 5 [10 ind], #14)   |
| AFDW | = | 83.6 | % DW | (N= 37 [324 ind], #14) |
|      | = | 86.9 |      | (N= 84 [182 ind], #51) |

Mysis spp. (*M. mixta*, *relicta*)

- *M. mixta*

DW = 13.3 % WW (N= 16, May/Aug./Oct., #41)

Joule/mg DW: 15.12 (N= 5, Oct., #41)

- *M. relicta*

AFDW = 90.0 - 92.5 % DW (seasonal var., embryos, #23)

= 89.9 - 92.5 ( " ", juveniles, #23)

= 90.5 - 92.5 ( " ", females + eggs, #23)

= 91.9 - 93.4 ( " ", females, #23)

= 88.4 - 94.0 ( " ", males, #23)

Joule/mg AFDW: 30.47 (embryos, #23)

22.73 (juveniles, #23)

23.50 (females + eggs, #23)

*Neomysis integer*

DW = 12.8 % WW (N= 16, May/Aug./Oct., #41)

Joule/mg DW: 14.97 / 13.54 (N= 4/ 24, Oct., #41)

2.2.4. Other Crustacea

Balanus spp. (*B. balanoides*, *balanus*, *crenatus*, *improvisus*)

- *B. balanoides*

Joule/mg SFDW: 19.86 (N= 11, #49)

Joule/mg AFDW: 22.20 (N= 11, #49)

- *B. balanus*

Joule/mg SFDW: 15.46 (N= 6, #10)

Joule/mg AFDW: 22.57 (N= 6, #10)

- *B. crenatus*

DW = 47.4 % WW (Feb., #44)

AFDW = 3.9 % WW (Feb., #44)

AFDW = 8.2 % DW (Feb., #44)

- B. improvisus

|      |   |      |      |              |
|------|---|------|------|--------------|
| DW   | = | 50.7 | % WW | (N= 44, #32) |
| SFDW | = | 3.2  | % WW | (#26)        |
| SFDW | = | 8.9  | % DW | (#26)        |
| AFDW | = | 3.9  | % WW | (#26)        |
| AFDW | = | 10.8 | % DW | (N= 10, #32) |

Crangon spp. (*C. crangon*, *septemspinosus*)

|                |   |               |      |                                                         |
|----------------|---|---------------|------|---------------------------------------------------------|
| DW             | = | 19.1          | % WW | ( <i>C. crangon</i> , N= 48, Dec., #41)                 |
|                | = | 26.0 / 24.0   |      | ( <i>C. septemspinosus</i> ,<br>Spring / November, #50) |
| AFDW           | = | 90.7          | % DW | ( <i>C. crang.</i> , N= 9 [11 ind], #51)                |
| Joule/mg DW:   |   | 17.41         |      | ( <i>C. crang.</i> , #12)                               |
|                |   | 17.25         |      | ( <i>C. crang.</i> , #22)                               |
|                |   | 11.42         |      | ( <i>C. crang.</i> , N= 26, Oct., #41)                  |
|                |   | 17.90 / 17.12 |      | ( <i>C. septe.</i> , Spring / Nov., #50)                |
| Joule/mg AFDW: |   | 20.39         |      | ( <i>C. crang.</i> , #12)                               |

Diastylis rathkei

|              |   |               |      |                          |
|--------------|---|---------------|------|--------------------------|
| DW           | = | 20.8          | % WW | (#12)                    |
|              | = | 19.9          |      | (N=101, Aug., #41)       |
|              | = | 17.2          |      | (#55)                    |
|              | = | 11.8          |      | (N= 61 [8293 ind], #51)  |
| AFDW         | = | 14.0          | % WW | (#30)                    |
| AFDW         | = | 56.7          | % DW | (N= 20 [916 ind], #14)   |
|              | = | 59.6 - 69.0   |      | (seasonal var., #15)     |
|              | = | 65.7          |      | (mean, #15)              |
|              | = | 66.5          |      | (N=438 [31530 ind], #51) |
| Joule/mg DW: |   | 14.58 - 17.69 |      | (seasonal var., #15)     |
|              |   | 16.55         |      | (mean, #15)              |
|              |   | 15.12         |      | (#22)                    |
|              |   | 12.02         |      | (N= 19, Oct., #41)       |

(Diastylis continued)

|                |       |   |       |                        |
|----------------|-------|---|-------|------------------------|
| Joule/mg AFDW: | 24.47 | - | 25.64 | (seasonal var., #15)   |
|                | 25.19 |   |       | (mean, #15)            |
|                | 25.1  |   |       | (eggs, #43)            |
|                | 16.9  |   |       | (juv., #43)            |
|                | 18.7  |   |       | (males & females, #43) |
|                | 16.4  |   |       | (females, #43)         |
|                | 19.0  |   |       | (females & eggs, #43)  |

Eupagurus bernhardus

|      |   |      |      |             |
|------|---|------|------|-------------|
| DW   | = | 27.1 | % WW | (Nov., #44) |
| AFDW | = | 16.7 | % WW | (Nov., #44) |
| AFDW | = | 61.6 | % DW | (Nov., #44) |

Hyas coarctatus

|      |   |      |      |             |
|------|---|------|------|-------------|
| DW   | = | 38.1 | % WW | (Feb., #44) |
| AFDW | = | 22.8 | % WW | (Feb., #44) |
| AFDW | = | 59.8 | % DW | (Feb., #44) |

Ostracoda

|                |   |         |      |                                |
|----------------|---|---------|------|--------------------------------|
| DW             | = | 44.0    | % WW | (Cyprideis litoralis, #7)      |
|                | = | 63.0    |      | (Heterocyprideis sorbyana, #7) |
|                | = | 61.0    |      | (Paracyprideis fennica, #7)    |
| AFDW           | = | 8.0     | % WW | (Candona spp., #7)             |
| AFDW           | = | 20.0    | % DW | (Cyprideis litoralis, #7)      |
|                | = | 46 / 50 |      | (N=130/70, Aug., #53)          |
| Joule/mg AFDW: |   | 25.10   |      | (Cyprideis litoralis, #7)      |
|                |   | 24.62   |      | (Candona spp., #7)             |



## 2.3. Polychaeta

### 2.3.1. Polychaeta errantia

#### Aphrodite aculeata

|      |   |      |      |             |
|------|---|------|------|-------------|
| DW   | = | 22.4 | % WW | (Jul., #44) |
| AFDW | = | 15.6 | % WW | (Jul., #44) |
| AFDW | = | 69.6 | % DW | (Jul., #44) |

#### Eteone longa

|      |   |      |      |                        |
|------|---|------|------|------------------------|
| AFDW | = | 13.6 | % WW | (N= 6 [40 ind], #14)   |
|      | = | 25.1 |      | (N= 32 [30 ind], #51)  |
| AFDW | = | 83.3 | % DW | (N= 38 [623 ind], #14) |
|      | = | 83.1 |      | (N= 27 [ 50 ind], #51) |

#### Harmothoe sarsi

|              |   |       |      |                         |
|--------------|---|-------|------|-------------------------|
| DW           | = | 15.3  | % WW | (N= 21, #7)             |
|              | = | 13.5  |      | (N= 48, Apr.-Aug., #41) |
|              | = | 14.7  |      | (N= 37 [110 ind], #51)  |
| AFDW         | = | 15.7  | % WW | (N= 9 [108 ind], #14)   |
| AFDW         | = | 79.1  | % DW | (N= 24 [291 ind], #14)  |
|              | = | 90.6  |      | (N=356 [1303ind], #51)  |
| Joule/mg DW: |   | 15.29 |      | (N= 3, Oct., #41)       |

#### Nephtys spp. (N. spp., ciliata, incisa)

|      |   |             |      |                        |
|------|---|-------------|------|------------------------|
| DW   | = | 14.4 - 17.8 | % WW | (seasonal var., #15)   |
|      | = | 16.8        |      | (mean, #15)            |
|      | = | 21.8        |      | (N. incisa, Apr., #44) |
|      | = | 17.1        |      | (N= 3, #11)            |
|      | = | 11.4        |      | (#33)                  |
|      | = | 18.0        |      | (N= 37 [341 ind], #51) |
| AFDW | = | 17.5        | % WW | (N. incisa, Apr., #44) |
| AFDW | = | 69.4        | % DW | (N= 42 [429 ind], #14) |
|      | = | 70.7 - 82.6 |      | (seasonal var., #15)   |
|      | = | 78.3        |      | (mean, #15)            |
|      | = | 69.4        |      | (N= 3, #11)            |
|      | = | 76.2        |      | (#33)                  |
|      | = | 74.2        |      | (N= 37 [341 ind], #51) |

(Nephtys continued)

|                |   |               |      |                               |
|----------------|---|---------------|------|-------------------------------|
| AFDW           | = | 80.3          | % DW | (N. incisa, Apr., #44)        |
| Joule/mg DW:   |   | 17.00         |      | (N. ciliata, N= 3, #13)       |
|                |   | 15.50 - 19.75 |      | (seasonal var., #15)          |
|                |   | 17.52         |      | (mean, #15)                   |
|                |   | 15.80 / 17.40 |      | (N. incisa,                   |
|                |   |               |      | all seasons / Aug - Dec, #44) |
| Joule/mg AFDW: |   | 19.60 - 25.10 |      | (seasonal var., #15)          |
|                |   | 22.17         |      | (mean, #15)                   |

Nereis spp. (N. diversicolor, pelagica)

- N. diversicolor

|                |   |               |      |                      |
|----------------|---|---------------|------|----------------------|
| DW             | = | 15.7          | % WW | (N= 93, #32)         |
|                | = | 15.5          |      | (N= 47, Aug., #41)   |
|                | = | 18.1          |      | (Dec., #44)          |
|                | = | 18.0          |      | (N= 20, Apr., #5)    |
| AFDW           | = | 14.9          | % WW | (Dec., #44)          |
| AFDW           | = | 75.3 - 88.1   | % DW | (seasonal var., #17) |
|                | = | 82.8          |      | (mean, #17)          |
|                | = | 84.4          |      | (#32)                |
|                | = | 82.3          |      | (Dec., #44)          |
| Joule/mg DW:   |   | 21.45         |      | (N= 5, #12)          |
|                |   | 16.48 - 19.70 |      | (seasonal var., #17) |
|                |   | 18.04         |      | (mean, #17)          |
|                |   | 15.35         |      | (Oct., #41)          |
| Joule/mg AFDW: |   | 23.33         |      | (N= 5, #12)          |
|                |   | 20.90 - 22.47 |      | (seasonal var., #17) |
|                |   | 21.76         |      | (mean, #17)          |

- N. pelagica

|                |   |               |      |                            |
|----------------|---|---------------|------|----------------------------|
| DW             | = | 16.6 / 15.4   | % WW | (N= 3 / 3, Nov./Feb., #49) |
| Joule/mg DW:   |   | 24.51 / 21.99 |      | (N= 3 / 3, " , #49)        |
| Joule/mg AFDW: |   | 27.71 / 24.40 |      | (N= 3 / 3, " , #49)        |

Scoloplos armiger

|      |   |      |      |                         |
|------|---|------|------|-------------------------|
| DW   | = | 14.9 | % WW | (N= 40 [2065 ind], #51) |
|      | = | 12.4 |      | (N= 7, #55)             |
| AFDW | = | 11.2 | % WW | (N= 8 [393 ind], #14)   |
| AFDW | = | 56.3 | % DW | (N= 22 [1024 ind], #14) |
|      | = | 79.3 |      | (N=236 [7803 ind], #51) |

2.3.2. Polychaeta sedentaria

Arenicola marina

|      |   |      |      |             |
|------|---|------|------|-------------|
| DW   | = | 18.2 | % WW | (Sep., #44) |
| AFDW | = | 13.7 | % WW | (Sep., #44) |
| AFDW | = | 75.3 | % DW | (Sep., #44) |

Aricidea spp. (*A. jeffreysii*, *suecia*)

|      |   |      |      |                                             |
|------|---|------|------|---------------------------------------------|
| DW   | = | 13.6 | % WW | ( <i>A. suecia</i> , N= 30, Apr.-Oct., #41) |
|      | = | 13.7 |      | ( <i>A. jeffr.</i> , N= 6, #55)             |
| AFDW | = | 72.8 | % DW | ( <i>A. jeffr.</i> , N= 19 [190 ind], #14)  |
|      | = | 80.3 |      | ( <i>A. jeffr.</i> , N= 40 [115 ind], #51)  |

Pectinaria spp. (*P. hypoboreia*, *koreni*)

|                |   |               |      |                                           |
|----------------|---|---------------|------|-------------------------------------------|
| DW             | = | 19.2          | % WW | ( <i>P. hypo.</i> , #13)                  |
|                | = | 6.9 - 11.3    |      | ( <i>P. kor.</i> , seasonal var., #15)    |
|                | = | 39.6          |      | ( <i>P. kor.</i> , N= 17 [43 ind], #51)   |
| AFDW           | = | 50.5 - 85.7   | % DW | ( <i>P. kor.</i> , seasonal var., #15)    |
|                | = | 52.0          |      | ( <i>P. kor.</i> , N=318 [2841 ind], #51) |
| Joule/mg DW:   |   | 14.21         |      | ( <i>P. hypo.</i> , N= 5, #13)            |
|                |   | 13.68 - 19.75 |      | ( <i>P. kor.</i> , seasonal var., #15)    |
|                |   | 16.72         |      | ( <i>P. kor.</i> , mean, #15)             |
|                |   | 13.02         |      | ( <i>P. kor.</i> , #22)                   |
| Joule/mg AFDW: |   | 18.62 - 25.82 |      | ( <i>P. kor.</i> , seasonal var., #15)    |
|                |   | 22.22         |      | ( <i>P. kor.</i> , mean, #15)             |

Pygospio elegans

|      |   |      |      |                         |
|------|---|------|------|-------------------------|
| DW   | = | 24.4 | % WW | (N= 20, #32)            |
| AFDW | = | 11.1 | % WW | (N= 6 [1857 ind], #14)  |
| AFDW | = | 61.9 | % DW | (N= 23 [7224 ind], #14) |

Polydora spp.

|      |   |      |      |                         |
|------|---|------|------|-------------------------|
| DW   | = | 20.3 | % WW | (N= 42 [264 ind], #51)  |
| AFDW | = | 83.5 | % DW | (N=167 [3645 ind], #51) |

Sosane gracilis

|      |   |      |      |             |
|------|---|------|------|-------------|
| DW   | = | 21.4 | % WW | (Feb., #44) |
| AFDW | = | 18.7 | % WW | (Feb., #44) |
| AFDW | = | 87.4 | % DW | (Feb., #44) |

Terebellides stroemi

|                |   |       |      |                         |
|----------------|---|-------|------|-------------------------|
| DW             | = | 19.6  | % WW | (T. spp., #13)          |
|                | = | 17.0  |      | (N= 4, Nov., #5)        |
|                | = | 15.5  |      | (N=134, Aug., #41)      |
|                | = | 13.6  |      | (N= 38 [1850 ind], #51) |
|                | = | 13.8  |      | (N= 7, #55)             |
| AFDW           | = | 60.9  | % DW | (N=110 [1099 ind], #51) |
| Joule/mg DW:   |   | 10.47 |      | (T. spp., N= 3, #10)    |
|                |   | 17.34 |      | (T. spp., #13)          |
| Joule/mg AFDW: |   | 24.95 |      | (T. spp., N= 3, #10)    |

## 2.4. Other Taxa

### 2.4.1. Turbellaria

|      |   |      |      |                    |
|------|---|------|------|--------------------|
| DW   | = | 23.6 | % WW | (N= 69, #32)       |
| AFDW | = | 78   | % DW | (N= 92, Aug., #53) |

### 2.4.2. Nematoda

|      |   |         |      |             |
|------|---|---------|------|-------------|
| DW   | = | 23.0    | % WW | (#7)        |
| AFDW | = | 80.0    | % DW | (#7)        |
|      | = | 76 - 93 |      | (Aug., #53) |

### 2.4.3. Nemertini

|                |      |      |      |                                 |
|----------------|------|------|------|---------------------------------|
| DW             | =    | 20.5 | % WW | (Prostoma obscurum, N= 27, #32) |
|                | =    | 25.5 |      | (N= 15 [39 ind], #51)           |
|                | =    | 12.2 |      | (N= 7, #55)                     |
| AFDW           | =    | 22.0 | % WW | (#51)                           |
| AFDW           | =    | 86.2 | % DW | (N= 62 [127 ind]. #51)          |
| Joule/mg DW:   | 21.3 |      |      | (P. obscurum, Jul., #26A)       |
| Joule/mg AFDW: | 22.5 |      |      | (P. obscurum, Jul., #26A)       |

### 2.4.4. Priapulida

#### Halicyrptus spinulosus

|      |   |      |      |                        |
|------|---|------|------|------------------------|
| DW   | = | 19.0 | % WW | (Apr., #7)             |
|      | = | 9.2  |      | (N= 7, #55)            |
|      | = | 8.2  |      | (N=139, #41)           |
|      | = | 7.6  |      | (N=52 [293 ind], #51)  |
| AFDW | = | 6.5  | % WW | (#51)                  |
| AFDW | = | 86.1 | % DW | (N=368 [1117ind], #51) |

#### Priapulys caudatus

|    |   |     |      |                         |
|----|---|-----|------|-------------------------|
| DW | = | 8.8 | % WW | (#55)                   |
|    | = | 6.2 |      | (N= 36, Apr./Aug., #41) |

#### 2.4.5. Oligochaeta

|                |   |       |      |                                      |
|----------------|---|-------|------|--------------------------------------|
| DW             | = | 18.0  | % WW | (Nais elinguis, N=10, Apr., #7)      |
|                | = | 13.0  |      | (Clitello arenarius, N=10, Apr., #5) |
|                | = | 19.0  |      | (N= 13, #32)                         |
| Joule/mg DW:   |   | 22.79 |      | (Dina microstoma, #42)               |
|                |   | 21.51 |      | (Limnodrilus sp., #42)               |
|                |   | 22.11 |      | (Tubifex tubifex, #42)               |
| Joule/mg AFDW: |   | 23.23 |      | (T. tubifex, #42)                    |

#### 2.4.6. Insecta

##### Chironomida Larvae

|                |   |             |      |                 |
|----------------|---|-------------|------|-----------------|
| DW             | = | 19.5 / 19.0 | % WW | (N= 67/34, #32) |
|                | = | 21.0        |      | (N= 30, #7)     |
| Joule/mg DW:   |   | 22.30       |      | (N= 9, #29)     |
|                |   | 22.33       |      | (N= 3, #30)     |
| Joule/mg AFDW: |   | 24.28       |      | (N= 9, #29)     |
|                |   | 23.34       |      | (N= 2, #30)     |

##### Trichoptera Larvae

|    |   |      |      |              |
|----|---|------|------|--------------|
| DW | = | 19.8 | % WW | (N= 50, #32) |
|----|---|------|------|--------------|

#### 2.4.7. Echinodermata

##### Asterioidea (Asterias spp., rubens, vulgaris)

|                |   |               |      |                                |
|----------------|---|---------------|------|--------------------------------|
| DW             | = | 24.3          | % WW | (A. vulg., #13)                |
| AFDW           | = | 56.0 / 42.0   | % DW | (A. spp., Aug., #10)           |
|                | = | 50.6          |      | (A. rub., N= 13, #22)          |
|                | = | 50.7          |      | (A. rub., N= 5, #37)           |
|                | = | 38.0          |      | (A. rub., N= 21 [39 ind], #51) |
| Joule/mg DW:   |   | 8.55          |      | (A. vulg., #13)                |
|                |   | 5.23 - 11.81  |      | (A. rub., #22)                 |
|                |   | 10.50         |      | (A. rub., N= 5, #37)           |
|                |   | 8.92          |      | (A. spp., N= 7, #19)           |
| Joule/mg AFDW: |   | 21.10         |      | (A. rub., N= 5, #37)           |
|                |   | 23.60 / 22.12 |      | (A. spp., N=3/3, Aug., #10)    |

Ophiuroidea (Ophiura albida; Amphiura chiajei, filiformis)

Joule/mg AFDW: 20.94 - 24.83 (3 different species, Aug., #10)

- Ophiura albida

DW = 66.0 / 61.7 % WW (Nov./Apr., #44)  
= 55.7 (N= 13 [43 ind], #51)  
AFDW = 8.4 / 8.6 % WW (Nov./Apr., #44)  
AFDW = 12.7 / 13.9 % DW (Nov./Apr., #44)  
= 12.7 (N=230 [1793 ind], #51)

- Amphiura chiajei

DW = 44.9 - 52.9 % WW (seasonal var., #44)  
AFDW = 12.2 - 13.5 % WW (seasonal var., #44)  
AFDW = 25.0 - 30.1 % DW (seasonal var., #44)

- Amphiura filiformis

DW = 38.6 - 43.6 % WW (seasonal var., #44)  
= 40.2 (juv., #44)  
AFDW = 13.7 - 17.0 % WW (seasonal var., #44)  
= 14.1 (juv., #44)  
AFDW = 33.3 - 39.0 % DW (seasonal var., #44)

Echinoidea (Echinocardium; Echinocyamus; Strongylocentrotus)

- Echinocardium cordatum

DW = 17.7 - 21.9 % WW (seasonal var., #44)  
AFDW = 2.9 - 3.1 % WW (seasonal var., #44)  
AFDW = 14.2 - 16.4 % DW (seasonal var., #44)

- Echinocyamus pusillus

DW = .47.9 % WW (Sep., #44)  
AFDW = 7.2 % WW (Sep., #44)  
AFDW = 15.0 % DW (Sep., #44)

- Strongylocentrotus spp.

|                |       |             |
|----------------|-------|-------------|
| Joule/mg DW:   | 12.06 | (N= 3, #10) |
|                | 3.69  | (#13)       |
| Joule/mg AFDW: | 23.66 | (N= 3, #10) |

Holothuroidea (Cucumaria)

- Cucumaria spp. (C. elongata, frondosa)

|              |   |       |      |                                               |
|--------------|---|-------|------|-----------------------------------------------|
| DW           | = | 47.8  | % WW | (C. elong., Jul., #44)                        |
| AFDW         | = | 8.2   | % WW | (C. elong., Jul., #44)                        |
| AFDW         | = | 17.2  | % DW | (C. elong., Jul., #44)                        |
| Joule/mg DW: |   | 12.86 |      | (C. frond. [without CaCO <sub>3</sub> ], #13) |



### 3. Length - weight - relationships

Usual log-log-regression form of length-weight-relations:

$$\log_B(w) = b * \log_B(l) + a ; \quad r, N$$

B = basis of logarithm,

usually 10 unless otherwise stated

l = length

w = weight (WW, SFWW, DW, SFDW, AFDW; see 1.1)

b = slope

a = y-axis intercept

r = correlation coefficient

N = number of values included

an additional number in brackets [] is the number  
of individuals included.

Additional parameters included here (if available) are:

- units = units of weight / length,  
in mg / mm unless otherwise stated
- range = range of length included in regression
- area and time of sampling

### 3.1. Mollusca

#### 3.1.1. Bivalvia

| species                               | weight | b     | a      | r     | N   | range  | area       | time | ref.           |
|---------------------------------------|--------|-------|--------|-------|-----|--------|------------|------|----------------|
| <u>Abra alba</u><br>(=Syndosmya alba) | WW     | 2.94  | -0.842 | -     | -   | -      | Kiel Bay   | -    | #15            |
| <u>A. nitida</u>                      | DW     | 2.702 | -1.403 | 0.971 | 196 | 4 - 13 | W.Norway   | -    | #54            |
|                                       | AFDW   | 2.786 | -2.221 | 0.934 | 146 | 4 - 13 | W.Norway   | -    | #54            |
| <u>A. longicallus</u>                 | DW     | 3.008 | -1.597 | 0.956 | 148 | 7 - 20 | W.Norway   | -    | #54            |
|                                       | AFDW   | 3.016 | -2.379 | 0.962 | 111 | 7 - 20 | W.Norway   | -    | #54            |
| <u>Arctica islandica</u>              | WW     | 3.08  | -0.779 | -     | -   | -      | Kiel Bay   | -    | #15            |
|                                       | SFWW   | 2.888 | -9.590 | 0.96  | -   | -      | Atlantic   | -    | #36 loge, g/mm |
| <u>Astarte borealis</u>               | WW     | 3.034 | -0.813 | 0.996 | 56  | 7 - 26 | Hanß Bight | -    | #41            |
|                                       |        | 3.035 | -0.617 | 0.999 | 47  | -      | Kiel Bay   | June | #46            |
| <u>A. montagui</u>                    | WW     | 3.475 | -0.888 | 0.997 | 18  | -      | Kiel Bay   | June | #46            |
| <u>A. elliptica</u>                   | WW     | 2.878 | -0.498 | 0.998 | 53  | -      | Kiel Bay   | June | #46            |
|                                       |        | 3.087 | -0.835 | 0.999 | 57  | -      | Kiel Bay   | June | #46            |
|                                       | DW     | 2.853 | -0.643 | 0.997 | 46  | -      | Kiel Bay   | June | #46            |
|                                       | SFDW   | 2.791 | -2.084 | 0.995 | 49  | -      | Kiel Bay   | June | #46            |

Bivalvia (continued)

| species              | weight | b     | a      | r     | N        | range    | area       | time | ref. |              |
|----------------------|--------|-------|--------|-------|----------|----------|------------|------|------|--------------|
| <u>Cardium edule</u> | SFDW   | 3.108 | -1.972 | 0.99  | 29       | -        | Ythan -    | Nov. | #17  | shell-height |
|                      |        | 3.752 | -2.919 | 0.99  | 28       | -        | Estuary    | Jan. | "    | "            |
|                      |        | 3.709 | -2.907 | 0.99  | 21       | -        | "          | Mar. | "    | "            |
|                      |        | 3.412 | -2.336 | 0.99  | 21       | -        | "          | May  | "    | "            |
|                      |        | 3.125 | -2.078 | 0.99  | 29       | -        | "          | Jul. | "    | "            |
|                      |        | 3.209 | -2.090 | 0.99  | 24       | -        | "          | Sep. | "    | "            |
|                      | AFDW   | 2.479 | -1.354 | 0.999 | 16 [90]  | >= 2     | Kiel Bay   | Jul. | #14  |              |
|                      |        | 2.412 | -1.222 | 0.991 | 20 [619] |          | "          | Aug. | "    |              |
|                      |        | 2.662 | -1.403 | 0.999 | 12 [60]  |          | "          | Dec. | "    |              |
|                      | AFDW   | 3.458 | -3.854 | 0.992 | 18       | 2 - 6    | Skagerrak  | Aug. | #34  | loge         |
|                      |        | 3.401 | -5.225 | 0.998 | 38       | 4 - 21   | "          | Nov. | "    | "            |
| <u>C. glaucum</u>    | WW     | 3.634 | -1.263 | 0.964 | 34       | 5 - 12   | Hanö Bight | -    | #41  |              |
|                      |        | 2.916 | -0.503 | 0.996 | 75       | 5.6-25.5 | Askö       | Aug. | #5   |              |
|                      | DW     | 3.655 | -1.403 | 0.945 | 34       | 5 - 12   | Hanö Bight | -    | #41  |              |
|                      |        | 2.848 | -0.867 | 0.987 | 75       | 5.6-25.5 | Askö       | Aug. | #5   |              |
|                      | SFDW   | 3.274 | -2.538 | 0.967 | 55       | -        | Tvärminne  | Jul. | #28  |              |
|                      |        | 2.792 | -2.032 | 0.974 | 58       | -        | Tvärminne  | Aug. | #28  |              |
| <u>C. hauniense</u>  | WW     | 2.932 | -0.553 | 0.998 | 30       | 1.66-7.9 | Askö       | Nov. | #5   |              |
|                      | DW     | 2.760 | -0.782 | 0.993 | 30       | 1.66-7.9 | Askö       | Nov. | #5   |              |

Bivalvia (continued)

| species                | weight | b     | a      | r     | N   | range    | area       | time   | ref. |              |
|------------------------|--------|-------|--------|-------|-----|----------|------------|--------|------|--------------|
| <u>Macoma balthica</u> | WW     | 3.127 | -0.964 | 0.999 | 15  | 2 - 21   | Hanö Bight | Apr.   | #41  |              |
|                        |        | 3.049 | -0.814 | 0.998 | 137 | 2 - 19   | Askö       | -      | #7   |              |
|                        |        | 3.049 | -6.962 | 0.995 | 9   | 556-1620 | Askö       | -      | #7   | µg/µm        |
|                        | SFWW   | 2.486 | -0.476 | 0.99  | 50  | 2 - 22   | Gdansk Bay | -      | #39  |              |
|                        | DW     | 3.165 | -1.307 | 0.996 | 137 | 2 - 19   | Askö       | Aug.   | #6   |              |
|                        |        | 3.307 | -1.481 | 0.993 | 44  | 5 - 18   | Hanö Bight | Apr.   | #41  |              |
|                        | SFDW   | 2.846 | -1.534 | 0.96  | 126 | -        | Ythan      | Feb. 9 | #17  | shell-height |
|                        |        | 2.825 | -1.565 | 0.94  | 116 | -        | Estuary    | Mar. 7 | "    | "            |
|                        |        | 2.434 | -1.208 | 0.96  | 118 | -        | "          | Apr.11 | "    | "            |
|                        |        | 2.260 | -0.876 | 0.90  | 97  | -        | "          | May 4  | "    | "            |
|                        |        | 1.839 | -0.327 | 0.92  | 71  | -        | "          | Jun. 6 | "    | "            |
|                        |        | 3.088 | -1.540 | 0.99  | 66  | -        | "          | Jul.13 | "    | "            |
|                        |        | 3.134 | -1.892 | 0.98  | 72  | -        | "          | Aug.11 | "    | "            |
|                        |        | 2.950 | -1.452 | 0.99  | 66  | -        | "          | Sep. 6 | "    | "            |
|                        |        | 2.941 | -1.454 | 0.97  | 54  | -        | "          | Nov.22 | "    | "            |
|                        |        | 2.943 | -1.928 | 0.964 | 87  | -        | Tvärminne  | Jul.   | #28  |              |
|                        |        | 2.897 | -1.544 | 0.987 | 59  | -        | "          | Jul.   | "    |              |
|                        |        | 2.897 | -1.780 | 0.990 | 50  | 2 - 22   | Gdansk Bay | -      | #39  |              |
|                        | AFDW   | 3.192 | -2.158 | 0.997 | 112 | 1.5-19.5 | Kiel Bay   | May    | #14  |              |
|                        | SFAFDW | 2.847 | -1.754 | 0.99  | 50  | 2 - 22   | Gdansk Bay | -      | #39  |              |

Bivalvia (continued)

| species               | weight | b     | a      | r     | N   | range     | area      | time | ref. |      |
|-----------------------|--------|-------|--------|-------|-----|-----------|-----------|------|------|------|
| <u>Mya arenaria</u>   | SFWW   | 2.993 | -1.498 | 0.992 | 26  | 13 - 63   | Askö      | Apr. | #5   |      |
|                       |        | 2.945 | -2.259 | 0.986 | 26  | 13 - 63   | Askö      | Apr. | #5   |      |
|                       |        | 3.179 | -2.635 | 0.985 | 66  | -         | Tvärminne | Aug  | #28  |      |
|                       | AFDW   | 2.134 | -3.163 | 0.951 | 19  | 1 - 3     | Skagerrak | Jul. | #34  | loge |
|                       |        | 2.680 | -3.804 | 0.993 | 30  | 4 - 10    | "         | Aug. | "    | "    |
|                       |        | 2.749 | -3.553 | 0.995 | 42  | 4 - 25    | "         | Nov. | "    | "    |
|                       |        | 2.770 | -4.425 | 0.996 | 13  | 35 - 77   | "         | Apr. | "    | "    |
|                       |        | 2.605 | -3.741 | 0.992 | 15  | 34 - 75   | "         | Jun. | "    | "    |
|                       |        | 2.797 | -4.410 | 0.997 | 16  | 33 - 62   | "         | Oct. | "    | "    |
|                       |        |       |        |       |     |           |           |      |      |      |
|                       |        |       |        |       |     |           |           |      |      |      |
| <u>Mytilus edulis</u> | WW     | 2.328 | -0.354 | 0.986 | 253 | 3 - 42    | Hanö B.   | -    | #41  |      |
|                       | DW     | 2.476 | -1.059 | 0.979 | 48  | 9 - 39    | Hanö B.   | -    | #41  |      |
|                       | SFDW   | 2.468 | -1.789 | 0.949 | 155 | mean 13.7 | Tvärminne | -    | #28  |      |

Bivalvia (continued)

| species               | weight | b     | a      | r    | N  | range | area | time    | ref.         |
|-----------------------|--------|-------|--------|------|----|-------|------|---------|--------------|
| <u>Mytilus edulis</u> | SFDW   | 2.630 | -2.075 | 0.99 | 39 | -     | Askö | Jan. 4  | #29 4m depth |
|                       |        | 2.709 | -2.175 | 0.99 | 35 | -     | "    | Feb. 9  | " "          |
|                       |        | 2.678 | -2.147 | 0.99 | 39 | -     | "    | Mar. 1  | " "          |
|                       |        | 2.444 | -1.838 | 0.99 | 38 | -     | "    | Mar. 21 | " "          |
|                       |        | 2.636 | -1.905 | 0.99 | 35 | -     | "    | Apr. 23 | " "          |
|                       |        | 2.630 | -1.925 | 0.99 | 35 | -     | "    | May 22  | " "          |
|                       |        | 2.265 | -1.573 | 0.99 | 35 | -     | "    | Jun. 28 | " "          |
|                       |        | 2.300 | -1.623 | 0.99 | 31 | -     | "    | Aug. 2  | " "          |
|                       |        | 2.437 | -1.843 | 0.99 | 33 | -     | "    | Sep. 5  | " "          |
|                       |        | 2.665 | -2.099 | 0.99 | 35 | -     | "    | Oct. 9  | " "          |
|                       |        | 2.562 | -1.942 | 0.99 | 35 | -     | "    | Nov. 21 | " "          |
|                       |        | 2.587 | -2.001 | 1.00 | 32 | -     | Askö | Mar. 8  | " 15m depth  |
|                       |        | 2.502 | -1.663 | 1.00 | 35 | -     | "    | Apr. 3  | " "          |
|                       |        | 2.761 | -1.936 | 0.99 | 19 | -     | "    | Apr. 17 | " "          |
|                       |        | 2.534 | -1.621 | 0.98 | 20 | -     | "    | May 3   | " "          |
|                       |        | 2.481 | -1.641 | 0.89 | 20 | -     | "    | May 29  | " "          |
|                       |        | 2.695 | -1.936 | 0.99 | 20 | -     | "    | Jun. 6  | " "          |
|                       |        | 2.064 | -1.262 | 0.99 | 20 | -     | "    | Jun. 19 | " "          |
|                       |        | 2.365 | -1.731 | 1.00 | 35 | -     | "    | Aug. 19 | " "          |
|                       |        | 2.614 | -2.013 | 0.98 | 19 | -     | "    | Sep. 2  | " "          |
|                       |        | 2.571 | -1.915 | 1.00 | 35 | -     | "    | Dec. 7  | " "          |

Bivalvia (continued)

| species             | weight | b    | a     | r    | N | range | area      | time    | ref. |
|---------------------|--------|------|-------|------|---|-------|-----------|---------|------|
| <u>Pisidium</u> sp. | DW     | 2.56 | -0.81 | 0.99 | - | 1 - 6 | Bothn.Bay | Jul-Oct | #20  |

### 3.1.2. Gastropoda

| species                | weight | b     | a      | r     | N  | range   | area       | time     | ref. |
|------------------------|--------|-------|--------|-------|----|---------|------------|----------|------|
| <u>Hydrobia</u> spp.   | WW     | 2.308 | -0.543 | 0.94  | 30 | 1.2-5.3 | Askö       | Apr.     | #7   |
|                        | DW     | 2.237 | -0.660 | 0.983 | 30 | 1.2-5.3 | Askö       | Apr.     | #5   |
| <u>H. ulvae</u>        | DW     | 2.416 | -0.750 | 0.99  | 54 | -       | Askö       | May      | #31  |
|                        |        | 2.676 | -0.908 | 0.99  | 54 | -       | "          | Jul.     | "    |
|                        |        | 2.573 | -0.841 | 0.99  | 93 | -       | "          | May, Jul | "    |
|                        | SFDW   | 2.363 | -1.587 | 0.93  | 32 | -       | Ythan Est. | Nov. 1   | #17  |
|                        |        | 2.228 | -1.457 | 0.85  | 29 | -       | "          | Jan. 3   | "    |
|                        |        | 2.174 | -1.392 | 0.86  | 24 | -       | "          | Mar. 4   | "    |
|                        |        | 1.972 | -1.326 | 0.89  | 22 | -       | "          | May 6    | "    |
|                        |        | 1.414 | -1.108 | 0.87  | 23 | -       | "          | Jul. 2   | "    |
|                        |        | 3.353 | -1.994 | 0.88  | 21 | -       | "          | Sep. 2   | "    |
| <u>Littorina litt.</u> | SFDW   | 3.594 | -2.510 | 0.99  | 26 | -       | Ythan Est. | Nov. 1   | #17  |
|                        |        | 3.422 | -2.299 | 0.96  | 16 | -       | "          | Jan. 3   | "    |
|                        |        | 3.609 | -2.518 | 0.98  | 23 | -       | "          | Mar. 4   | "    |
|                        |        | 3.058 | -1.940 | 0.96  | 22 | -       | "          | May 6    | "    |
|                        |        | 4.333 | -3.449 | 0.94  | 17 | -       | "          | Jul. 2   | "    |
|                        |        | 3.879 | -2.799 | 0.99  | 25 | -       | "          | Sep. 2   | "    |



Gastropoda (continued)

| species                                       | weight | b     | a      | r     | N  | range    | area      | time    | ref. |
|-----------------------------------------------|--------|-------|--------|-------|----|----------|-----------|---------|------|
| <u>Lymnaea peregra</u>                        | DW     | 2.61  | -1.02  | 0.99  | -  | 1 - 20   | Bothn. B. | Jul-Oct | #20  |
| <u>Potamopyrgus jenkinsi</u><br>(Paludestina) | WW     | 2.594 | -0.629 | 0.985 | 30 | 1.45-5.3 | Askö      | Nov.    | #5   |
| <u>Theodoxus fluviat.</u>                     | DW     | 2.80  | -0.54  | 0.99  | -  | 2 - 8    | Bothn. B. | Jul-Oct | #20  |
| <u>Valvata piscinalis</u>                     | DW     | 2.48  | -0.40  | 0.98  | -  | 1 - 5    | Bothn. B. | Jul-Oct | #20  |

### 3.2. Crustacea

#### 3.2.1. Amphipoda

| species                    | weight | b     | a      | r     | N   | range | area       | time | ref.                              |
|----------------------------|--------|-------|--------|-------|-----|-------|------------|------|-----------------------------------|
| <u>Bathyporeia pilosa</u>  | WW     | 1.788 | -0.816 | 0.971 | 188 | 2 - 7 | Hanö Bight | Aug. | #41                               |
| <u>B. sarsi</u>            | DW     | 2.02  | 2.86   | 0.976 | 6   | -     | Kiel Bay   | -    | #3 $\mu\text{g}/\text{mm}$ , loge |
| <u>Corophium volutator</u> |        |       |        |       |     |       |            |      |                                   |
| males                      | WW     | 2.933 | -1.473 | 0.943 | 11  | 5 - 9 | Askö       | -    | #5                                |
| females + juv.             | WW     | 2.709 | -1.443 | 0.986 | 22  | 2 - 8 | "          | -    | "                                 |
| fem. + males + juv.        | WW     | 2.989 | -1.574 | 0.984 | 35  | 2 - 9 | "          | -    | "                                 |
| males                      | DW     | 3.273 | -2.422 | 0.934 | 11  | 5 - 9 | Askö       | -    | #5                                |
| females + juv.             | DW     | 2.567 | -2.040 | 0.970 | 22  | 2 - 8 | "          | -    | "                                 |
| fem. + males + juv.        | DW     | 2.938 | -2.220 | 0.973 | 35  | 2 - 9 | "          | -    | "                                 |
|                            |        | 2.443 | -1.709 | 0.98  | 41  | -     | Ythan Est. | Nov. | #17                               |
|                            |        | 2.514 | -1.702 | 0.95  | 40  | -     | "          | Jan. | "                                 |
|                            |        | 3.419 | -2.488 | 0.96  | 37  | -     | "          | Mar. | "                                 |
|                            |        | 3.140 | -2.197 | 0.97  | 40  | -     | "          | May  | "                                 |
|                            |        | 2.700 | -1.932 | 0.96  | 29  | -     | "          | Jul. | "                                 |
|                            |        | 2.507 | -1.773 | 0.99  | 32  | -     | "          | Sep. | "                                 |
|                            |        | 2.440 | -1.881 | 0.943 | 39  | 3 - 9 | Hanö B.    | Oct. | #41                               |
| <u>C. insidiosum</u>       | DW     | 2.72  | 1.70   | 0.997 | 28  | -     | Kiel Bay   | -    | #3 $\mu\text{g}/\text{mm}$ , loge |

## Amphipoda (continued)

| species                    | weight | b     | a      | r     | N   | range   | area         | time    | ref. |             |
|----------------------------|--------|-------|--------|-------|-----|---------|--------------|---------|------|-------------|
| <u>Gammarus</u> spp.       | WW     | 2.760 | -1.447 | 0.99  | 43  | 2 - 24  | Askö         | Apr.    | #7   |             |
|                            |        | 2.219 | -0.795 | 0.962 | 302 | 3 - 25  | Hanö B.      | May-Oct | #41  |             |
|                            | DW     | 2.140 | -1.659 | 0.993 | 89  | 3 - 25  | Hanö B.      | Aug.    | #41  |             |
| <u>G. salinus</u>          | DW     | 2.44  | 0.81   | 0.98  | 23  | -       | Kiel Bay     | -       | #3   | µg/mm, loge |
| <u>Microdeutopus</u>       |        |       |        |       |     |         |              |         |      |             |
| <u>gryllotalpa</u>         | DW     | 2.44  | 1.95   | 0.966 | 15  | -       | Kiel Bay     | -       | #3   | µg/mm, loge |
| <u>Pontoporeia affinis</u> | WW     | 3.060 | -1.619 | 0.997 | 37  | 2.9-8.7 | Askö         | Aug.    | #7   |             |
|                            |        | 2.105 | -1.123 | 0.906 | 81  | 3 - 9   | Hanö B.      | May     | #41  |             |
|                            |        | 2.116 | -1.097 | 0.973 | 134 | "       | "            | May     | "    |             |
|                            |        | 2.417 | -1.268 | 0.979 | 302 | 2 - 8   | "            | Aug     | "    |             |
|                            | DW     | 2.853 | -2.281 | -     | -   | -       | Bothnian Sea | Jul.    | #1   |             |
|                            |        | 3.269 | -2.729 | -     | -   | -       | Bothnian Bay | Jul.    | #1   |             |
|                            |        | 3.075 | -2.258 | 0.992 | 37  | 2.9-8.7 | Askö         | Aug.    | #5   |             |
|                            |        | 3.086 | -2.715 | 0.97  | -   | -       | Askö         | Feb. 3  | #16  |             |
|                            |        | 3.845 | -3.004 | 0.99  | -   | -       | "            | Aug. 8  | "    |             |
|                            |        | 2.732 | -2.117 | 0.99  | -   | -       | "            | Dec. 4  | "    |             |
|                            |        | 2.836 | -2.340 | 0.99  | -   | -       | "            | Jan. 17 | "    |             |
|                            |        | 2.021 | -1.735 | 0.91  | -   | -       | "            | Apr.    | "    |             |
|                            |        | 3.006 | -2.340 | 0.99  | -   | -       | "            | Jul. 26 | "    |             |

(Amphipoda continued)

| species            | weight | b      | a      | r     | N        | range     | area      | time | ref. |
|--------------------|--------|--------|--------|-------|----------|-----------|-----------|------|------|
| <u>Pontoporeia</u> |        |        |        |       |          |           |           |      |      |
| <u>femorata</u>    | WW     | 3.012  | -1.598 | 0.996 | 22       | 2.9-9.2   | Askö      | Aug. | #7   |
|                    |        | 2.662  | -1.218 | 0.99  | 50       | 2 - 11    | Gdansk B. | -    | #39  |
|                    |        | 2.342  | -1.225 | 0.982 | 74       | 3 - 9     | Hanö B.   | May  | #41  |
|                    |        | 2.302  | -1.073 | 0.944 | 55       | "         | "         | Aug. | "    |
|                    |        | 2.434  | -1.135 | 0.973 | 154      | "         | "         | Aug. | "    |
| DW                 | 3.003  | -2.281 | 0.988  | 22    | 2.9 -9.2 | Askö      | Aug.      | #5   |      |
|                    |        | 2.992  | -2.347 | 0.98  | 50       | 2 - 11    | Gdansk B. | -    | #39  |
| AFDW               | 3.042  | -2.444 | 0.98   | 50    | 2 - 11   | Gdansk B. | -         | #39  |      |

### 3.2.2. Other Crustacea

| species                   | weight | b     | a      | r     | N   | range   | area      | time     | ref. |        |
|---------------------------|--------|-------|--------|-------|-----|---------|-----------|----------|------|--------|
| <u>Crangon crangon</u>    | DW     | 2.848 | -2.452 | 0.988 | 48  | 10 - 35 | Hanö B.   | Dec.     | #41  | g / mm |
| <u>Diastylis rathkei</u>  | WW     | 3.130 | -2.216 | -     | -   | -       | Kiel Bay. | -        | #15  |        |
|                           |        | 2.973 | -2.229 | 0.974 | 101 | 5 - 14  | Hanö B.   | Aug.     | #41  |        |
|                           | DW     | 3.259 | -3.166 | 0.945 | 101 | 5 - 14  | Hanö B.   | Aug.     | #41  |        |
| <u>Idothea baltica</u>    | DW     | 2.623 | -1.869 | 0.975 | 55  | 6 - 15  | Hanö B.   | -        | #41  |        |
| <u>Mesidothea entomon</u> | WW     | 2.629 | -1.430 | 0.995 | 42  | 5 - 56  | Hanö B.   | May, Aug | #41  |        |
| (=Saduria)                | DW     | 2.78  | -2.12  | 0.98  | -   | 5 - 50  | Lulea     | -        | #20  |        |
|                           |        | 2.50  | -1.66  | -     | -   | 33 - 49 | Bothn. B. | -        | #28  |        |
| <u>Jaera spp.</u>         | WW     | 2.682 | -1.249 | 0.988 | 24  | 2 - ?   | Hanö B.   | -        | #41  |        |
| females                   | WW     | 2.722 | -1.271 | 0.935 | 17  | 2.9-4.2 | Askö      | Apr.     | #5   |        |
| males                     | WW     | 3.399 | -1.402 | 0.895 | 8   | 1.5-2.4 | Askö      | Apr.     | #5   |        |
| mixed                     | WW     | 2.473 | -1.126 | 0.96  | 25  | 1.5-4.2 | Askö      | Apr.     | #7   |        |
| females                   | DW     | 2.911 | -1.813 | 0.970 | 16  | 2.9-4.2 | Askö      | Apr.     | #5   |        |
| males                     | DW     | 2.569 | -1.650 | 0.876 | 8   | 1.5-2.4 | Askö      | Apr.     | #5   |        |
| mixed                     | DW     | 2.868 | -1.648 | 0.981 | 25  | 1.5-4.2 | Askö      | Apr.     | #5   |        |
| <u>Mysis mixta</u>        | WW     | 3.233 | -2.481 | 0.990 | 16  | 11 - 22 | Hanö B.   | May-Oct  | #41  |        |
| <u>Neomysis intiger</u>   | WW     | 2.722 | -1.873 | 0.972 | 16  | 10 - 18 | Hanö B.   | Aug-Oct  | #41  |        |

### 3.3. Polychaeta

#### 3.3.1. Polychaeta errantia

| species                    | weight | b     | a      | r     | N  | range    | area      | time     | ref.          |
|----------------------------|--------|-------|--------|-------|----|----------|-----------|----------|---------------|
| <u>Harmothoe sarsi</u>     | WW     | 2.672 | -1.376 | 0.96  | 21 | 1.9-17.0 | Askö      | Nov.     | #7            |
|                            |        | 2.870 | -1.727 | 0.976 | 48 | 5.0-24.0 | Hanö B.   | Apr, Aug | #41           |
|                            |        | 3.333 | -1.268 | 0.996 | 22 | 2 - 10   | Tvärminne | Aug.     | #45 l=breadth |
|                            | DW     | 2.415 | -2.060 | 0.96  | 21 | 1.9-17.0 | Askö      | Nov.     | #5            |
|                            |        | 3.254 | -1.863 | 0.994 | 84 | 1 - 6    | Tvärminne | Aug.     | #45 l=breadth |
|                            | AFDW   | 3.398 | -2.000 | 0.993 | 84 | "        | "         | "        | "             |
| <u>Nereis diversicolor</u> | WW     | 2.388 | -1.612 | 0.99  | 20 | 9.9-57.0 | Askö      | Apr.     | #7            |
|                            |        | 2.341 | -1.609 | 0.976 | 47 | 5.0-24.0 | Hanö B.   | Aug.     | #41           |
|                            | DW     | 2.500 | -2.517 | 0.97  | 20 | 9.9-57.0 | Askö      | Apr.     | #5            |

#### 3.3.2. Polychaeta sedentaria

|                                       |    |       |        |       |     |          |          |      |     |
|---------------------------------------|----|-------|--------|-------|-----|----------|----------|------|-----|
| <u>Aricidea suecia</u>                | WW | 2.833 | -3.060 | 0.953 | 134 | 10 - 21  | S.Baltic | -    | #41 |
| <u>Terebellides</u><br><u>stroemi</u> | WW | 2.410 | -1.511 | 0.986 | 4   | 6.3-20.0 | Askö     | Nov. | #5  |
|                                       |    | 2.407 | -1.574 | 0.989 | 134 | 7.0-24.0 | Hanö B.  | Aug. | #41 |
|                                       | DW | 2.417 | -2.309 | 0.962 | 4   | 6.3-20.0 | Askö     | Nov. | #5  |

### 3.4 Other Taxa

| species | weight | b | a | r | N | range | area | time | ref. |
|---------|--------|---|---|---|---|-------|------|------|------|
|---------|--------|---|---|---|---|-------|------|------|------|

#### 3.4.1. Priapulida

##### Halicryptus

|                   |           |       |        |       |     |           |         |         |     |                  |
|-------------------|-----------|-------|--------|-------|-----|-----------|---------|---------|-----|------------------|
| <u>spinulosus</u> | adults WW | 1.037 | -0.480 | 0.99  | 13  | 1.7-39.0  | Askö    | Apr.    | #7  | l = 1 * $\phi^2$ |
|                   | "         | 2.972 | -1.419 | 0.968 | 139 | 2.0-25.0  | Hanö B. | Aug,Oct | #41 |                  |
|                   | larvae WW | 3.244 | -7.778 | 0.99  | 3   | 1200-1300 | Askö    | Oct.    | #7  | $\mu g / \mu m$  |

|                           |    |       |        |       |    |          |         |         |     |  |
|---------------------------|----|-------|--------|-------|----|----------|---------|---------|-----|--|
| <u>Priapulus caudatus</u> | WW | 2.429 | -0.890 | 0.925 | 36 | 2.0-30.0 | Hanö B. | Apr-Oct | #41 |  |
|---------------------------|----|-------|--------|-------|----|----------|---------|---------|-----|--|

#### 3.4.2. Insecta

|                   |           |       |        |       |    |          |      |      |    |  |
|-------------------|-----------|-------|--------|-------|----|----------|------|------|----|--|
| <u>Chironomus</u> | larvae WW | 2.831 | -2.350 | 0.981 | 30 | 5.3-16.4 | Askö | Apr. | #5 |  |
|-------------------|-----------|-------|--------|-------|----|----------|------|------|----|--|

#### 3.4.3. Echinodermata

|                        |      |       |       |       |    |   |          |         |    |                      |
|------------------------|------|-------|-------|-------|----|---|----------|---------|----|----------------------|
| <u>Asterias rubens</u> | DW   | 0.871 | 0.786 | 0.983 | 68 | - | Kiel Bay | Jun-Aug | #4 | l= $\phi$ [cm], loge |
|                        | AFDW | 0.938 | 0.323 | 0.978 | 68 | - | "        | "       | "  | "                    |

## Appendix II:

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Table of applied methods

| refer.<br>No | storage              | DW<br>°C / h     | AFDW<br>°C / h    | calorimeter<br>type | area                    |
|--------------|----------------------|------------------|-------------------|---------------------|-------------------------|
| 1.           | ?                    | ?                | -                 | -                   | Baltic, Gulf of Bothnia |
| 2.           | Fresh                | 60/>24           | ?                 | -                   | Baltic, Askö            |
| 3.           | Formalin             | 105/ 12          | -                 | -                   | Baltic, Kiel Bay        |
| 4.           | Formalin             | 80/ ?            | 500/ 3            | -                   | Baltic, Kiel Bay        |
| 5.           | Fresh                | 60/>24           | -                 | -                   | Baltic, Askö            |
| 6.           | Fresh                | 60/24            | -                 | -                   | Baltic, Askö            |
| 7.           | Fresh                | 60/24            | -                 | -                   | Baltic, Askö            |
| 8.           | Fresh                | 80/ 24           | 250/ 1<br>+550/ 1 | Phillipson          | Baltic, Kiel Bay        |
| 9.           | Formalin             | -                | -                 | -                   | Baltic, Kiel Bay        |
| 10.          | Fresh                | 100/12-24        | 500/ 16           | Parr                | Canadian Arctic         |
| 11.          | Formalin             | ?                | ?                 | -                   | Pacific, Seattle        |
| 12.          | Fresh                | 60/ 24           | 500/ 6            | MBC-3               | Baltic, incl Lit.       |
| 13.          | Fresh                | 75/->c           | -                 | Parr                | Atlantic, N. Scotia     |
| 14.          | Formalin             | 85/ 24           | 520/ 24           | -                   | Baltic, Kiel Bay        |
| 15.          | Fresh                | 80/ 24           | 250/ 1<br>+550/ 1 | Phillipson          | Baltic, Kiel Bay        |
| 16.          | Fresh                | 60/336           | -                 | -                   | N. Baltic Proper        |
| 17.          | Fresh                | freeze-<br>dried |                   | Gallenkamp          | North Sea, Scotland     |
| 18.          |                      |                  |                   |                     |                         |
| 19.          | Formalin/<br>Alcohol | 100/10-<br>48    | 550/ 6-<br>24     | -                   | North Sea, Norway       |
| 20.          | Fresh                | 60/>24           | 525/ 4.3          | -                   | Lulea Archipelago       |
| 21.          | Fresh                | 70/ 24           | -                 | Phillipson          | Atlantic, Massachu.     |
| 22.          | Fresh                | 80/ 24           | 550/ 24           | Phillipson          | Baltic, Kiel Bay        |
| 23.          | ?                    | ?                | ?                 | ?                   | S. Finland              |
| 24.          | Fresh                | 60/>24           | ?                 | Gallenkamp          | Baltic, Askö            |
| 25.          | Fresh                | 50/ 48           | 500/ 2            | Gallenkamp          | Irish Sea, N. Wales     |
| 26A          | Fresh                | 60/>24           | ?                 | Phillipson          | Baltic, Askö            |
| 26.          | Fresh                | 60/ 24           | -                 | -                   | Baltic, Tvärminne       |
| 27.          | Fresh                | 60/ ?            | ?                 | ?                   | Lake Ontario            |
| 28.          | Fresh or<br>Formalin | 70/24            | -                 | -                   | Baltic, Tvärminne       |

| refer.<br>No | storage                  | DW<br>°C / h                | AFDW<br>°C / h            | calorimeter<br>type | area                  |
|--------------|--------------------------|-----------------------------|---------------------------|---------------------|-----------------------|
| 29.          | Fresh                    | 60/>24                      | -                         | -                   | Baltic, Askö          |
| 30.          | -                        | -                           | -                         | -                   | Baltic, Literature    |
| 31.          | Fresh or<br>Formalin     | 60/ 24                      | -                         | -                   | Baltic, Askö          |
| 32.          | Formalin                 | 70/ 24                      | 350-400/2<br>+500-550/3   | -                   | Baltic, Tvärminne     |
| 33.          | Formalin                 | 95/4-8                      | 200-500/8.5<br>+ 500 / 16 | -                   | Pacific, Puget Sound  |
| 34.          | ?                        | 80/to<br>const. weight      | 550/ 5                    | -                   | Skagerrak             |
| 35.          | ?                        | -                           | 550/ ?                    | -                   | Oresund               |
| 36.          | Fresh                    | -                           | -                         | -                   | Atlantic              |
| 37.          | Fresh                    | 60/ 48                      | 500/ ?                    | Phillipson          | Koster Fjord          |
| 38.          | ?                        | ?                           | ?                         | -                   | Baltic, Mecklenb.     |
| 39.          | Fresh                    | ?                           | ?                         | -                   | Baltic, Gdansk Bay    |
| 40.          | Fresh                    | -                           | -                         | -                   | North Sea             |
| 41.          | Formalin<br>or 60/ ?     | 100/ ?                      | -                         | -                   | Baltic, Hanö Bight    |
| 42.          | -                        | -                           | -                         | -                   | Literature            |
| 43.          | Formalin                 | ?                           | ?                         | Phillipson          | Baltic & North Sea    |
| 44.          | Fresh                    | 105/ 12                     | 550/ 5                    | -                   | ?                     |
| 45.          | Fresh or<br>Formalin     | 60/ 24                      | 500/ 3                    | -                   | Baltic, Tvärminne     |
| 46.          | Fresh                    | 80/ 24                      | -                         | -                   | Baltic, Kiel Bay      |
| 47.          | Formalin                 | ?                           | -                         | -                   | Baltic, Gulf of Finl. |
| 48.          | Fresh                    | ?                           | ?                         | ?                   | ?                     |
| 49.          | Fresh<br>or freeze-dried | 60/ ?                       | -                         | Phillipson          | Atlantic              |
| 50.          | Fresh                    | 60/ 5                       | -                         | Parr                | Atlantic              |
| 51.          | Formalin                 | 80/ 24                      | 520/ 24                   | -                   | Baltic, Kiel Bay      |
| 52.          | Fresh                    | 60/>24                      | ?                         | Gallenkamp          | Baltic, Askö          |
| 53.          | Formalin                 | 60/ 12                      | 550/ 4                    | -                   | Gullmar Fjord         |
| 54.          | Fresh                    | 100/ 24                     | 550/ 24                   | -                   | Norway                |
| 55.          | Formalin                 | according to BMB-recommend. |                           |                     | Baltic, Bornholm      |