

## **Chapter 2**

# **Ecological Features, Coefficients, and Equations**

Various ecological projects have required basic ecological features, coefficients, or equations describing Cladocera and Copepoda; some of them are presented in Table 2.1.

**Table 2.1** Selected ecological features, coefficients, or equations describing Cladocera and Copepoda, where *C* carbon, *N* nitrogen, *P* phosphorus, *DW* dry weight, *WW* wet weight, *h* hour, *J* joule, *L* length

Parameter	Units	Cladocera	Copepoda
Mean dry weight (female)	µg	<p><i>Macrothrix</i> neonate 0.5–3.3 (*4)</p> <p><i>Macrothrix</i> adult 9.4–19.1 (*4)</p> <p><i>Eurycerus lamellatus</i> 3.87–157.0 (*8)</p> <p><i>Alona costata</i> 1.0 (*8)</p> <p><i>Sida crystallina</i> (with eggs) 112 (*8)</p> <p><i>Moina macrocopa</i> 7.1 (*8)</p> <p><i>Leydigia quadrangularis</i> 2.0 (*8)</p> <p><i>Graptoleberis testudinaria</i> 1.4 (*8)</p> <p><i>Alonella nana</i> 0.31 (*8)</p> <p><i>Dunhevedia crassa</i> 1.0 (*8)</p> <p><i>Acantholeberis curvirostris</i> 7.6 (*8)</p>	<p><i>Calanipeda aquaedulcis</i> 7.7 (*6)</p> <p><i>Neolovenula alluaudi</i>:</p> <p>With egg sac 30.8±4.0 (*7)</p> <p>Without egg sac 21.7±2.1</p> <p><i>Eudiaptomus gracilis</i>:</p> <p>With egg sac 14.9 (*8)</p> <p>Without egg sac 10.2 (*8)</p> <p><i>Acanthocyclops robustus</i>:</p> <p>With egg sac 10.4 (*8)</p> <p>Without egg sac 7.5 (*8)</p> <p><i>Cyclops abyssorum</i>:</p> <p>With egg sac 20.7 (*8)</p> <p>Without egg sac 10.3 (*8)</p> <p><i>Cyclops strenuus</i>:</p> <p>With egg sac 38.3 (*8)</p> <p>Without egg sac 26.7 (*8)</p> <p><i>Eucyclops serrulatus</i>:</p> <p>With egg sac 15.4 (*8)</p> <p>without egg sac 12.0 (*8)</p> <p><i>Macrocyclops albidus</i>:</p> <p>with egg sac 43.0 (*8)</p> <p>without egg sac 31.8 (*8)</p> <p><i>Macrocyclops fuscus</i>:</p> <p>with egg sac 67.2 (*8)</p> <p>without egg sac 45.4 (*8)</p> <p><i>Megacyclops viridis</i> with egg sac 114.3 (*8)</p> <p>without egg sac 61.0 (*8)</p>

Mean dry weight (one egg)	µg	<i>Bythotrephes longimanus</i> resting egg 25.9 (*5) <i>Leptodora kindtii</i> resting egg 10.4 (*5) <i>Daphnia ambigua</i> 0.851 <i>Daphnia galeata mendotae</i> 1.415 <i>Daphnia parvula</i> 0.986 <i>Daphnia pulex</i> 2.110	<i>Mesocyclops leuckarti</i> : with egg sac 8.8 (*8) without egg sac 7.2 (*8) <i>Paracyclops fimbriatus</i> : with egg sac 4.2 (*8) without egg sac 3.6 (*8) <i>Tropocyclops prasinus</i> : with egg sac 6.6 (*8) without egg sac 3.3 (*8) Cyclopoid Nauplii: NI L mm = 0.144 DW µg = 0.096 (*46) NII L mm = 0.162 DW µg = 0.160 (*46) NIII L mm = 0.198 DW µg = 0.200 (*46) NIV L mm = 0.234 DW µg = 0.203 (*46) NV L mm = 0.270 DW µg = 0.382 (*46) NVI L mm = 0.315 DW µg = 0.405 (*46) <i>Neolovenula alluaudi</i> 0.4±0.1 (*7) <i>Macrocyclus fuscus</i> 0.24 (*8)
DW/WW	Coefficient	DW = 10 % WW (*9) 1 mg DW = 26 J (*9)	DW = 19.3 % WW (*6) 1 mg DW = 26 J (*9)

(continued)

Table 2.1 (continued)

Parameter	Units	Cladocera	Copepoda
DW/length	WW $\mu$ g	<i>Daphnia ambigua</i> DW = $6.29 \times 10^{-7}$ L $\mu$ m <sup>2.29</sup> (*8)	Calanoida DW = $7.9 \times 10^{-7}$ L $\mu$ m <sup>2.33</sup> (*8)
WW/length	or DW $\mu$ g L $\mu$ m	<i>D. ambigua</i> DW = 5.740 L mm <sup>2.370</sup> (*45)	Cyclopoida, females with eggs: DW = $4.9 \times 10^{-8}$ L $\mu$ m <sup>2.75</sup> (*8)
	or	<i>D. galeata galeata</i> DW = $9.5 \times 10^{-8}$ L $\mu$ m <sup>2.29</sup> (*8)	Cyclopoida, females without eggs: DW = $1.1 \times 10^{-7}$ L $\mu$ m <sup>2.59</sup> (*8)
	L mm	<i>D. galeata mendotae</i> DW = 5.480 L mm <sup>2.200</sup> (*45)	Copepodites and Nauplii: DW = $1.10 \times 10^{-5}$ L $\mu$ m <sup>1.89</sup> (*8)
(Cladocera:		<i>D. parvula</i> DW = 4.740 L mm <sup>2.190</sup> (*45)	
length from the		<i>D. pulex</i> DW = 10.6740 L mm <sup>2.093</sup> (*45)	
base of the tail		<i>D. pulex</i> DW = $2.4 \times 10^{-8}$ L $\mu$ m <sup>2.29</sup> (*8)	
spine)		<i>D. magna</i> DW = $1.89 \times 10^{-6}$ L $\mu$ m <sup>2.25</sup> (*8)	
		<i>Daphnia</i> DW = $1.5 \times 10^{-8}$ L $\mu$ m <sup>2.84</sup> (*8)	
		<i>Diaphanosoma brachyurum</i> : DW = $1.76 \times 10^{-6}$ L $\mu$ m <sup>2.29</sup> (*8)	
		<i>Simocephalus vetulus</i> DW = 4.0 L $\mu$ m <sup>3.81</sup> (*8)	
		<i>Ceriodaphnia quadrangula</i> : DW = $1.70 \times 10^{-6}$ L $\mu$ m <sup>2.26</sup> (*8)	
		<i>C. reticulata</i> DW = $5.91 \times 10^{-6}$ L $\mu$ m <sup>2.02</sup> (*8)	
		<i>Scapholeberis</i> WW = 0.133 L mm <sup>2.630</sup> (*44a)	
		<i>S. mucronata</i> DW = $8.9 \times 10^{-8}$ L $\mu$ m <sup>2.70</sup> (*8)	
		Daphniidae WW = 0.075 L mm <sup>2.925</sup> (*44a)	
		<i>Moina micrura</i> DW = 6.61 L mm <sup>2.57</sup> (*8)	
		<i>Bosmina longirostris</i> DW = 26.6 L mm <sup>3.13</sup> (*8)	
		<i>Eurycerus</i> WW = 0.127 L mm <sup>3.076</sup> (*44a)	
		<i>Alona</i> WW = 0.091 L mm <sup>2.646</sup> (*44a)	
		<i>Alonella</i> WW = 0.091 L mm <sup>2.646</sup> (*44a)	
		<i>A. exigua</i> DW = $1.70 \times 10^{-4}$ L $\mu$ m <sup>1.39</sup> (*8)	
		<i>Chydorus</i> WW = 0.2031 L mm <sup>2.771</sup> (*44a)	
		<i>Ch. sphaericus</i> DW = 89.43 L mm <sup>3.93</sup> (*8)	
		Chydoridae WW = 0.140 L mm <sup>2.723</sup> (*44a)	
		<i>Acroporus harpae</i> DW = $9.05 \times 10^{-3}$ L $\mu$ m <sup>0.85</sup> (*8)	
		<i>Pleuroxus aduncus</i> DW = 35.6 L $\mu$ m <sup>2.26</sup> (*8)	
		<i>Macrothrix</i> WW = 0.083 L mm <sup>2.331</sup> (*44a)	
		<i>Macrothrix</i> DW = 0.0021 L $\mu$ m <sup>1.289</sup> (*4)	
		Macrothricidae WW = 0.140 L mm <sup>2.723</sup> (*44a)	

Ash content	% of dry weight	<p><i>Daphnia</i> 10 (*10)</p> <p><i>Daphnia cucullata</i> 10.6–14.0 (*44a)</p> <p><i>Daphnia hyalina</i> 12.0–12.5 (*44a)</p> <p><i>Daphnia longispina</i> 22 (*44a)</p> <p><i>Daphnia pulex</i> 7.6–25.8 (*44a)</p> <p><i>Daphnia pulicaria</i> 2.5 (*17)</p> <p><i>Bosmina longispina</i> 4.8 (*44a)</p> <p><i>Bythotrephes longimanus</i> 5.2–5.6 (*44a)</p> <p><i>Ceriodaphnia quadrangula</i> 4.6 (*44a)</p>	<p><i>Diaptomus cyaneus</i> 3.8 (*17)</p> <p><i>Cyclops abyssorum</i> 2.4 (*17)</p> <p>Copepoda:</p> <p>Nauplii 16.2 (*12)</p> <p>Copepodites 17.0 (*12)</p> <p>Adult 7.3 (*12)</p>
Body fat	% of dry weight	<p><i>Daphnia umbra</i> 23 (48)</p> <p><i>Bythotrephes longimanus</i> 20 (48)</p> <p><i>Bosmina</i> 18 (48)</p>	<p><i>Eudiaptomus graciloides</i> 67 (48)</p> <p><i>Cyclops abyssorum</i> 30 (48)</p>
Body fat	µg mg C <sup>-1</sup>	<p>EFA—essential fatty acid:</p> <p><i>Daphnia umbra</i> 137 (48)</p> <p><i>Bythotrephes longimanus</i> 83 (48)</p> <p><i>Bosmina</i> 54 (48)</p> <p>FAME—total fatty acid methyl esters:</p> <p><i>Daphnia umbra</i> 243 (48)</p> <p><i>Bythotrephes longimanus</i> 186 (48)</p> <p><i>Bosmina</i> 138 (48)</p>	<p>EFA—essential fatty acid:</p> <p><i>Eudiaptomus graciloides</i> 455 (48)</p> <p><i>Cyclops abyssorum</i> 137 (48)</p> <p>FAME—total fatty acid methyl esters:</p> <p><i>Eudiaptomus graciloides</i> 716 (48)</p> <p><i>Cyclops abyssorum</i> 317 (48)</p>
Ca	mg Ca gDW <sup>-1</sup> or [% DW]	<p><i>Acroperus harpae</i> 3.6–5.6 (50)</p> <p><i>Alonella excisa</i> 3.6–5.6 [0.4%] (50)</p> <p><i>Chydorus piger</i> 3.6–5.6 (50)</p> <p><i>Chydorus brevilabris</i> 3.6–5.6 (50)</p> <p><i>Daphniopsis ephemeralis</i> 3.6–5.6 [0.6%] (50)</p> <p><i>Disparalona</i> spp. 23.2 [2.3%] (50)</p> <p><i>Alona rectangularis</i> 14.7 [1.5%] (50)</p> <p><i>Pleuroxus truncatus</i> 21.5 [2.2%] (50)</p> <p><i>Scapholeberis rammeri</i> 17.0 [1.7%] (50)</p> <p><i>Daphnia</i> spp. [2.5–7.7 %] (50)</p> <p><i>Bosmina</i> spp. [0.2–0.4 %] (50)</p> <p><i>Holopedium gibberum</i> [0.2–0.4 %] (50)</p>	<p>Copepods 0.05–0.5 % (53)</p>

(continued)

Table 2.1 (continued)

Parameter	Units	Cladocera	Copepoda
Chitin	% of dry weight	<i>Daphnia</i> 7 (*10) <i>Daphnia pulicaria</i> 2.2 (*17)	<i>Eurytemora</i> 11.08 (*11) <i>Diaptomus cyaneus</i> 5.4 (*17) <i>Cyclops abyssorum</i> 3.9 (*17)
Carbon content	% of dry weight	Cladocera 8 % of WW (*14) <i>Daphnia pulicaria</i> 58.7 ± 0.9 (*17)	Copepoda 6 % of WW (*14) Copepoda 45.58 ± 0.73 % of DW (*13) <i>Mixodiaptomus laciniatus</i> : Nauplii 36.3 % (*15) Copepodites 51.55 % (*15) Adult 55.8 % (*15) <i>Diaptomus cyaneus</i> 56.9 ± 1.2 % (*17) <i>Cyclops abyssorum</i> 58.8 ± 1.0 % (*17)
	Weight µg Length mm	<i>Daphnia pulex</i> C = 2.957 L <sup>2.962</sup> (*51) <i>Daphnia pulicaria</i> 5.22–15.68 µg C (*52) <i>Daphnia thorata</i> 9.06–12.93 µg C (*52) <i>Bosmina</i> 1.34–2.17 µg C/female (*60) <i>Daphnia</i> 0.79–1.39 µg C/female (*60)	<i>Eudiaptomus gracilis</i> 2.79–6.5 µg C/female (*60) <i>Eurytemora</i> 2.11–3.51 µg C/female (*60)
Lipid	% of dry weight	<i>Daphnia pulicaria</i> 53.5 ± 2.6 (*17)	<i>Diaptomus cyaneus</i> 35.5 ± 5.5 (*17) <i>Cyclops abyssorum</i> 51.6 ± 2.9 (*17)
Nitrogen content	% of dry weight	<i>Daphnia</i> 5.82–8.63 (*10) <i>Daphnia pulicaria</i> 9.9 ± 0.5 (*17)	Copepoda 11.45 ± 0.36 (*13)
Phosphorus content	% of dry weight	<i>Daphnia</i> (range) 1.11–1.80 (*10) <i>Daphnia</i> (mean) 1.43 ± 0.27 (*10) <i>Daphnia pulicaria</i> 0.47 ± 0.04 (*17)	Copepoda 0.65 ± 19 (*10) <i>Mixodiaptomus laciniatus</i> : Nauplii 0.98 (*15) Copepodites CII 1.2 (*16) Copepodites 0.87 (*15) Adult 0.51 (*15)

C:N:P	Ratio	<i>Daphnia longispina</i> 85:14:1 (*10) <i>Daphnia pulicaria</i> adult 229:19:1 (*17) <i>Daphnia pulicaria</i> eggs 259:38:1 (*17)	<i>Acanthodiaptomus denticornis</i> 212:39:1 (*10) <i>Mixodiaptomus laciniatus</i> : Nauplii 99:3:1 (*15) Copepodites 165:13:1 (*15) Adult 243:25:1 (*15) <i>Cyclops abyssorum</i> : Adult 400:50:1 (*17) Eggs 273:28:1 (*17) <i>Diaptomus cyaneus</i> : Adult 368:54:1 (*17) Eggs 213:26:1 (*17)
Sestonic C:P, somatic grow threshold	Ratio	<i>Daphnia</i> ~350 (*18) (P deficiency if C:P > 350) (*18)	<i>Parabroteas sarsi</i> 138–267 (*54)
Defecation interval	s, min	<i>Drepanothrix</i> 22–45 s (*19) <i>Lathonura</i> 10–15 min (*20)	Copepoda 20–120 min (*21)
Excretion fraction of grazing	Day <sup>-1</sup>	Cladocera 0.11 (*14)	Copepoda 0.13–0.30 (*14)
Excretion of P (PO <sub>4</sub> )	µg P per mg DW <sup>-1</sup> h <sup>-1</sup>	Cladocera 0.25 (*57)	<i>Limnocalanus macrurus</i> 0.145 (*55) Copepoda 0.031–0.588 (*56) Copepoda 0.25 (*57)
Excretion of N (NH <sub>4</sub> )	µg N per mg DW <sup>-1</sup> h <sup>-1</sup>	Cladocera 0.05–0.15 (*57)	<i>Limnocalanus macrurus</i> 0.617 (*55) Copepoda 0.056–1.050 (*56) Copepoda 0.05–0.15 (*57)
Fecal pellet fraction of grazing	Day <sup>-1</sup>	Cladocera 0.05 (*14)	Copepoda 0.10 (*14)
Filtration rate (grazing rate)	mL ind. <sup>-1</sup> h <sup>-1</sup>	<i>Simocephalus vetulus</i> 8.96 (*23) <i>Daphnia galeata</i> 37 (*1) Cladocera (5 spp.) 0.5–3.0 (*25) <i>Bosmina longirostris</i> 0.17 (*26) <i>Daphnia longispina</i> 0.25–0.86 (*26)	<i>Diaptomus</i> 0.11–09 (*22) <i>Eurytemora affinis</i> 1.0 (*24) <i>Cyclops vicinus</i> 0.28–0.36 (*26) <i>Acanthocyclops denticornis</i> 0.28–0.51 (*26)

(continued)

Table 2.1 (continued)

Parameter	Units	Cladocera	Copepoda
Ingestion rate (grazing rate)	Cell or $\mu\text{g}$	<i>Simocephalus vetulus</i> $1.04\text{--}1.92 \times 10^6 \text{ cell ind.}^{-1} \text{ h}^{-1}$ (*27)	Copepoda $1.17\text{--}4.87 \mu\text{g C h}^{-1}$ (*28) <i>Acanthocyclops americanus</i> : Nauplii $0.43 \times 10^6 \text{ cells h}^{-1}$ (*2)
Predation rate (feeding rate)	Prey ind. $\text{h}^{-1}$	<i>Leptodora</i> $0.4\text{--}1.25$ (*29)	<i>Acanthocyclops americanus</i> : 2.55 (feeding on nauplii) (*2) 2.73 (feeding on cladoceran neonate) (*2)
Minimum dissolved oxygen tolerance	$\text{mg O}_2 \text{ dm}^{-3}$	Cladocera $1.0$ (*14) <i>Daphnia</i> $0.5$ (*47)	Copepoda $1.5$ (*14) (marine) <i>Gaussia</i> $0.2$ (*47)
Filtration rate threshold— if oxygen concentration falls below	$\text{mg O}_2 \text{ dm}^{-3}$	<i>Daphnia magna</i> $3.0$ (*30) <i>Daphnia pulex</i> $3.0$ (*30)	Copepoda, lethal effect at hypoxia $<2.0$ (*58)
Upward swimming if oxygen concentration falls below	$\text{mg O}_2 \text{ dm}^{-3}$	<i>Chydorus sphaericus</i> $2.5$ (*30) <i>Pseudochydorus globosus</i> $1.25$ (*30) <i>Daphnia magna</i> $2.7$ (*30)	
Respiration rate per biomass	$\mu\text{g O}_2 \text{ mg DW}^{-1} \text{ h}^{-1}$	<i>Leptodora kindtii</i> embryos $1.2\text{--}2.2$ (*31) <i>Bythotrephes longimanus</i> $0.5$ (*31)	<i>Calanipeda aquaedulcis</i> $\mu\text{g O}_2 \text{ mg WW}^{-1} \text{ h}^{-1}$ $1.59 \pm 0.25$ female (*6) $\mu\text{g O}_2 \text{ mg WW}^{-1} \text{ h}^{-1}$ $3.02 \pm 0.52$ male (*6)
Respiration rate per individual	$\mu\text{g O}_2 \text{ ind.}^{-1} \text{ h}^{-1}$ or $\mu\text{L O}_2 \text{ ind.}^{-1} \text{ h}^{-1}$	<i>Ceriodaphnia dubia</i> $0.002\text{--}0.076 \mu\text{L}$ (*49)	<i>Calanipeda aquaedulcis</i> : $0.079 \pm 0.011 \mu\text{g female}$ (*6) $0.057 \pm 0.009 \mu\text{g male}$ (*6)
P/B ratio (production/ biomass)	Daily, annual	Cladocera mean P/B = $15.9$ (*32)	Copepoda P/B = $11.6$ (*32) Copepoda P = $9.097\text{B}^{1.23}$ (*33) <i>Calanipeda aquaedulcis</i> : Daily = $0.09$ Annual $31.48$ (*34)



Growth rate (time from egg to adult primipara)	Days	<i>Daphnia galeata</i> at 10 °C 22–30 (*35) <i>Daphnia galeata</i> at 20 °C 7–29 (*35) <i>Daphnia magna</i> at 15 °C 9–63 (*35) <i>Daphnia magna</i> at 25 °C 4–28 (*35) <i>Bosmina longiremis</i> at 10 °C 16 (*35) <i>Bosmina longiremis</i> at 20 °C 5 (*35) <i>Macrothrix</i> at 23 °C 4.9 (*36)	<i>Diaptomus</i> at 10 °C 14–31 (*35) <i>Diaptomus</i> at 20 °C 7–15.5 (*35) <i>Acanthocyclops americanus</i> at 20 °C 28 (*3)
Specific growth rate (body mass increase)	Rate/day	Cladocera 0.01–1.50 (*37) <i>Ceriodaphnia quadrangula</i> 0.08–0.29 (*37)	<i>Calanus pacificus</i> 0.312–0.576 (*59)
Instars	Number	<i>Daphnia magna</i> 27 (*38) <i>Daphnia pulex</i> 24 (*38) <i>Daphnia cristata</i> 17 (*38) <i>Daphnia hyalina</i> 20 (*38) <i>Simocephalus</i> 20–23 (*38) <i>Moina micrura</i> 19 (*38) <i>Macrothrix rosea</i> 13 (*38)	Copepoda 6 naupliar instars (*61) N1—orthonauplius (*62) N2–N6—nauplius (*62) C1–C5 (copepodites 1–5) (*62)
Molting	Per female/ week	<i>Ceriodaphnia quadrangula</i> 1.59–8.43 (*37)	No molt in adult copepods (*62)
Life span	Days	<i>Daphnia magna</i> 68.4 (*38) <i>Daphnia pulex</i> 65.5 (*38) <i>Daphnia cristata</i> 29.2 (*38) <i>Daphnia hyalina</i> 35.2 (*38) <i>Simocephalus</i> 29–92 (*39) <i>Moina micrura</i> 19.1 (*38) <i>Macrothrix</i> 33–37 (*38) Cladocera 28–42 (*63)	Copepoda 30–180 (*63)
(continued)			

Table 2.1 (continued)

Parameter	Units	Cladocera	Copepoda
Egg development rate	Days	<i>Daphnia galeata</i> at 10 °C 9.1 (*35)	<i>Diaptomus</i> at 10 °C 12.4 (*35)
		<i>Daphnia galeata</i> at 20 °C 2.6 (*35)	<i>Diaptomus</i> at 20 °C 6.2 (*35)
		<i>Daphnia magna</i> at 15 °C 5.5 (*35)	
		<i>Daphnia magna</i> at 25 °C 2.5 (*35)	
		<i>Bosmina longiremis</i> at 10 °C 6.5 (*35)	
Egg number	Per female	<i>Bosmina longiremis</i> at 20 °C 2.0 (*35)	
		<i>Daphnia galeata</i> 2–10 (*35)	<i>Diaptomus</i> 12 (*35)
		<i>Daphnia magna</i> 5–30 (*35)	Neolovenula alluaudi 20 ± 3 (*7)
		<i>Daphnia parvula</i> 3–8 (*40)	<i>Cyclops abyssorum</i> 8–15 (*64)
		<i>Bosmina longiremis</i> 3–9 (*35)	
Fecundity	Per female/day	<i>Macrothrix</i> 4–20 (*38)	
		<i>Ceriodaphnia quadrangula</i> 0.67–3.00 (*37)	<i>Eurytemora velox</i> 2–11 (*21)
			<i>Arctodiaptomus alpinus</i> 76 (*41)
			<i>Mixodiaptomus tairicus</i> 41 (*41)
			<i>Acanthocyclops denticornis</i> 17 (*41)
Reproduction (total eggs number during life span)	Per female		<i>Eudiaptomus graciloides</i> 6 (*41)
		<i>Daphnia magna</i> 567 (*38)	<i>Eurytemora affinis</i> 117 (21)
		<i>Daphnia pulex</i> 402 (*38)	<i>Eurytemora velox</i> 109–311 (21)
		<i>Simocephalus</i> 361–447 (*38)	
		<i>Moina micrura</i> 101 (*38)	
Population size doubles	Days	<i>Macrothrix</i> 122 (*38)	
		<i>Macrothrix</i> 0.99 (*38)	
		<i>Bosmina</i> 1.2 (*42)	Nauplii 0.3 (*42)
		<i>Daphnia pulex</i> 1.5 (*42)	coepodites 1.4 (*42)
		<i>Daphnia magna</i> 0.6–1.2 (*42)	<i>Cyclops scutifer</i> 3.2 (*42)
Swimming speed	mm s <sup>-1</sup>	<i>Diaphanosoma</i> 0.3–0.7 (*42)	<i>Cyclops bicuspidatus</i> 1.7 (*42)
		<i>Polypheumus</i> 7.6 (*42)	<i>Cyclops abyssorum</i> 3.6 (*42)
		<i>Lathonura</i> 0.002–0.011 (*20)	<i>Cyclops vicinus</i> 3.8 (*42)
			<i>Acanthodiaptomus</i> 0.9–1.2 (*42)

Heart rate	Per minute	Cladocera 190–320 (*44) <i>Ilyocryptus agilis</i> 120 (*44) <i>Daphnia magna</i> 240–600 (*43)	<i>Euchaeta</i> 126–794 (*65)
<p><b>*References:</b> (1) Pires et al. (2007), (2) Enriquez-Garcia et al. (2013), (3) Garcia et al. (2011), (4) Guntzel et al. (2003), (5) Andrew and Herzig (1984), (6) Svetlichny et al. (2012), (7) Parra et al. (2003), (8) Dumont et al. (1975), (9) Morgan et al. (1980), (10) Andersen and Hessen (1991), (11) Birge and Juday (1922), (12) Theilacker (1984), (13) Ara (2001), (14) Bruce et al. (2006), (15) Villar-Argaiz et al. (2002), (16) Villar-Argaiz and Sterner (2002), (17) Ventura and Catalan (2005), (18) Becker and Boersma (2003), (19) Fryer (1974), (20) Sergeev (1971), (21) Mauchline (1998), (22) Richman et al. (1980), (23) Brito et al. (2006), (24) Lionard et al. (2005), (25) McCauley (1985), (26) Marvalín and Lazarek (1988), (27) Brito et al. (2006), (28) Karakoelyue and Franks (2012), (29) Mordukhai-Boltovskaja (1958), (30) Myers (1980), (31) Andrew and Herzig (1984), (32) Brylinsky (1980), (33) Morgan et al. (1980), (34) Zaika (1968), (35) Wright et al. (1980), (36) Guntzel et al. (2003), (37) Taghavi et al. (2013), (38) Huang et al. (2011), (39) Khalaf et al. (1977), (40) Riccardi et al. (2004), (41) Jersabek et al. (2007), (42) Gerritsen (1980), (43) Baylor (1942), (44) Smimov (2014) (44a) Various authors according to Smimov (2014), (45) Lynch et al. (1986), (46) Culver et al. (1985), (47) James (1987), (48) Eloranta et al. (2013), (49) James (1987), (50) Shapiera et al. (2011) (51) Lampert (1977), (52) Duncan (1985), (53) Waervagen et al. (2002), (54) Laspoumaderes et al. (2015), (55) Oliver et al. (2015), (56) Korstad (1983), (57) Migal (2011), (58) Elliott et al. (2013), (59) Huntley (1985), (60) Vasama and Kankaala (1990), (61) Elgmork and Langeland (1970), (62) Dussart and Defaye (2001), (63) Kulkarni et al. (2013), (64) Antonsson (1992), (65) Borgmann (1973)</p>			



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Błędzki, L.A.; Rybak, J.I.  
2016, XV, 918 p. 715 illus., 1 illus. in color., Hardcover  
ISBN: 978-3-319-29870-2