

The following supplement accompanies the article

Plankton community properties determined by nutrients and size-selective feeding

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Supplement. Size-selective feeding data sources and Zooplankton measurements correlated with climate indices

Table S1. Sources used for feeding parameter estimates shown in Fig. 1. Taxonomic categories: C: crustacean; G: gelatinous; P: protist; O: other. Study types: FE: feeding experiments; GC: gut contents; ME: mesocosm experiments; DO: diver observations. Size notations: ^a: equivalent spherical diameter (ESD); ^b: gastrozoid length; ^c: ESD from cylindrical volume, using length:head width relationships in Pearre (1980); ^d: average of lorica length and lorica opening diameter; ^e: lorica dimensions from Urrutxurtu (2004); ^f: length; ^g: bell diameter; ^h: prosome length; ⁱ: length from Hays et al. (1994); ^j: metasome length

Predator taxon	Predator size	Prey size range	Study type	Source
Dinoflagellates (P)				
<i>Gyrodinium spirale</i> ^a	28 mm	4.4–94.5 mm	FE	Hansen (1992)
<i>Oxyrrhis marina</i> ^a	18 mm	5–10 mm	FE	Hansen et al. (1996)
<i>Gymnodinium</i> sp. ^a	7 mm	4–10 mm	FE	Jakobsen & Hansen (1997)
<i>Gyrodinium dominans</i> ^a	25 mm	6–43 mm	FE	Naustvoll (2000b)

<i>Gyrodinium fusiforme</i> ^a	13.5–18.7 mm	6–14 mm	FE	Naustvoll (2000b)
<i>Katodinium glaucum</i> ^a	17–26 mm	6–12 mm	FE	Naustvoll (2000b)
<i>Protoperidinium pallidum</i> ^a	47 mm	10–212 mm	FE	Naustvoll (2000a)
<i>Protoperidinium steinii</i> ^a	26 mm	11–37 mm	FE	Naustvoll (2000a)
<i>Zygabikodinium lenticulatum</i> ^a	36 mm	6–212 mm	FE	Naustvoll (2000a)
<i>Polykrikos kofoidii</i> ^a	44 mm	16–38 mm	FE	Jeong et al. (2001)
<i>Karlodinium armiger</i> ^a	13.1–16.7 mm	5.6–31.4 mm	FE	Berge et al. (2008)
Siphonophores (G)				
<i>Rhizophysa eysenhardti</i> ^b	2.5 mm	3–15 mm	GC	Purcell (1981)
<i>Apolesia uvaria</i> ^b	10 mm	0.2–11.7 mm	GC	Purcell (1981)
<i>Athorybia rosacea</i> ^b	2.2 mm	0.4–5 mm	GC	Purcell (1981)
<i>Forskalia</i> spp. ^b	2.5 mm	0.4–1.4 mm	GC	Purcell (1981)
<i>Nanomia bijuga</i> ^b	3 mm	0.6–5 mm	GC	Purcell (1981)
<i>Abyla trigona</i> ^b	2.5 mm	1–1.4 mm	GC	Purcell (1981)
<i>Bassia bassensis</i> ^b	0.4 mm	0.4–1.2 mm	GC	Purcell (1981)
<i>Chelophyes appendiculata</i> ^b	0.4 mm	0.2–0.8 mm	GC	Purcell (1981)
<i>Diphyes dispar</i> ^b	0.9 mm	0.4–0.9 mm	GC	Purcell (1981)
<i>Hippopodius hippopus</i> ^b	3.3 mm	0.4–1.4 mm	GC	Purcell (1981)
<i>Muggiaea atlantica</i> ^b	0.5 mm	0.1–1 mm	GC	Purcell (1981)
<i>Rosacea cymbiformis</i> ^b	3.2 mm	0.3–5.5 mm	GC	Purcell (1981)
<i>Sphaeronectes gracilis</i> ^b	0.8 mm	0.1–0.9 mm	GC	Purcell (1981)
<i>Sulculeolaria chuni</i> ^b	1.2 mm	0.2–0.8 mm	GC	Purcell (1981)
<i>Sulculeolaria quadrivalvis</i> ^b	0.8 mm	0.2–0.6 mm	GC	Purcell (1981)

<i>Sulculeolaria quadrivalvis</i> ^b	0.8 mm	0.2–2.5 mm	GC	Purcell (1981)
Flagellates (P)				
<i>Ochromonas</i> sp. ^a	2.5 mm	0.15–1.05 mm	FE	Andersson et al. (1986)
Unspecified ^a	5–20 mm	1.1–5.3 mm	FE	Sherr et al. (1991)
Bodonid ^a	4.4–4.9 mm	0.6–1.2 mm	FE	Šimek & Chrzanowski (1992)
Chrysomonad ^a	3.4 mm	0.6–1.2 mm	FE	Šimek & Chrzanowski (1992)
Chaetognaths (O)				
<i>Sagitta elegans</i> ^c	0.18–0.31 mm	0.04–0.12 mm	GC	Pearre (1980)
<i>Sagitta elegans</i> ^c	0.31–1.5 mm	0.05–0.4 mm	GC	Pearre (1980)
<i>Sagitta elegans</i> ^c	1.5–3.1 mm	0.1–0.4 mm	GC	Pearre (1980)
<i>Sagitta elegans</i> ^c	3.1–6.2 mm	0.14–0.5 mm	GC	Pearre (1980)
<i>Sagitta elegans</i> ^c	0.18–0.31 mm	0.04–0.15 mm	GC	Pearre (1980)
<i>Sagitta elegans</i> ^c	0.31–1.5 mm	0.05–0.6 mm	GC	Pearre (1980)
<i>Sagitta elegans</i> ^c	1.5–3.1 mm	0.15–1.5 mm	GC	Pearre (1980)
<i>Sagitta elegans</i> ^c	3.1–6.2 mm	0.2–1.5 mm	GC	Pearre (1980)
<i>Sagitta enflata</i> ^c	0.08–3.8 mm	0.09–0.9 mm	GC	Pearre (1980)
<i>Sagitta friderici</i> ^c	0.55–2.8 mm	0.1–0.7 mm	GC	Pearre (1980)
<i>Sagitta hispida</i> ^c	0.24–1.3 mm	0.07–0.25 mm	GC	Pearre (1980)
<i>Sagitta hispida</i> ^c	1.3–2.7 mm	0.14–0.4 mm	GC	Pearre (1980)
<i>Sagitta minima</i> ^c	0.22–4.3 mm	0.05–0.5 mm	GC	Pearre (1980)
<i>Sagitta setosa</i> ^c	0.24–1.5 mm	0.08–0.4 mm	GC	Pearre (1980)
<i>Sagitta setosa</i> ^c	1.5–2.4 mm	0.15–0.7 mm	GC	Pearre (1980)
<i>Sagitta elegans</i> ^c	0.5–0.8 mm	0.25–0.75 mm	GC	Saito & Kiørboe (2001)

<i>Sagitta elegans</i> ^c	0.8–1.2 mm	0.2–1.0 mm	GC	Saito & Kiørboe (2001)
<i>Sagitta elegans</i> ^c	1.2–1.6 mm	0.25–1.7 mm	GC	Saito & Kiørboe (2001)
<i>Sagitta elegans</i> ^c	1.6–2.0 mm	0.1–2.3 mm	GC	Saito & Kiørboe (2001)
<i>Sagitta elegans</i> ^c	1.6–2.0 mm	0.05–2.7 mm	GC	Saito & Kiørboe (2001)
Ciliates (P)				
<i>Stenosemella ventricosa</i> ^{d,e}	62 mm	1.3–27 mm	FE	Rassoulzadegan & Etienne (1981)
<i>Lohmanniella oviformis</i> ^a	25 mm	1.4–11.2 mm	FE	Kivi & Setälä (1995)
<i>Strobilidium</i> sp. ^a	40 mm	1.4–26.6 mm	FE	Kivi & Setälä (1995)
<i>Strobilidium spiralis</i> ^a	50–60 mm	1.4–16.8 mm	FE	Kivi & Setälä (1995)
<i>Strombidium</i> sp. ^a	20 mm	1.4–5.6 mm	FE	Kivi & Setälä (1995)
<i>Strombidium</i> spp. ^a	25 mm	1.4–9.8 mm	FE	Kivi & Setälä (1995)
<i>Tintinnopsis beroidea</i> ^{d,e}	54 mm	1.4–8.4 mm	FE	Kivi & Setälä (1995)
<i>Balanion comatum</i> ^a	17 mm	4–10 mm	FE	Jakobsen & Hansen (1997)
<i>Halteria</i> cf. <i>grandinella</i> ^a	19.3 mm	0.5–4.23 mm	FE	Jürgens & Šimek (2000)
<i>Favella ehrenbergii</i> ^d	130 mm	6–43 mm	FE	Kamiyama & Arima (2001)
<i>Favella taraikaensis</i> ^d	79 mm	5–43 mm	FE	Kamiyama & Arima (2001)
Ctenophores (G)				
<i>Pleurobrachia bachei</i> ^f	8 mm	0.22–3 mm	FE	Greene et al. (1986)
<i>Mnemiopsis leidyi</i> ^a	46–67 mm	1–10 mm	ME	Cowan & Houde (1993)
<i>Bolinopsis infundibulum</i> ^f	6–60 mm	0.5–11 mm	FE	Martinussen & Båmstedt (1999)
Scyphomedusae (G)				
<i>Chrysaora quinquecirrha</i> ^a	3.5–6.3 cm	0.1–1 cm	ME	Cowan & Houde (1993)
<i>Chrysaora quinquecirrha</i> ^g	0.1–2.5 cm	0.1–25 cm	FE	Purcell & Cowan (1995)

<i>Chrysaora quinquecirrha</i> ^g	2–5 cm	0.3–1 cm	FE	Suchman & Sullivan (1998)
<i>Cyanea capillata</i> ^g	3.4–29 cm	0.1–8 cm	FE	Martinussen & Båmstedt (1999)
<i>Aurelia aurita</i> ^g	0.35–7.5 cm	0.05–1.1 cm	FE	Martinussen & Båmstedt (1999)
Invertebrate larvae (O)				
<i>Mytilus edulis</i> ^f	260–264 mm	1–9 mm	FE	Sprung (1984)
<i>Philine aperta</i> ^f	149 mm	1.74–7.33 mm	FE	Hansen (1991)
<i>Philine aperta</i> ^f	239–274 mm	1.74–17.04 mm	FE	Hansen (1991)
<i>Philine aperta</i> ^f	392 mm	1.74–18.18 mm	FE	Hansen (1991)
<i>Crassostrea virginica</i> ^f	106–124 mm	1–16 mm	FE	Baldwin (1995)
<i>Crassostrea virginica</i> ^f	203–220 mm	1–18 mm	FE	Baldwin (1995)
<i>Crassostrea virginica</i> ^f	260–290 mm	2–30 mm	FE	Baldwin (1995)
<i>Jehlius cirratus</i> nauplii ^f	460 mm	8–60 mm	FE	Vargas et al. (2006)
<i>Balanus flosculus</i> nauplii ^f	860 mm	8–50 mm	FE	Vargas et al. (2006)
<i>Concholepas concholepas</i> ^f	247 mm	5–80 mm	FE	Vargas et al. (2006)
<i>Concholepas concholepas</i> ^f	1700 mm	5–120 mm	FE	Vargas et al. (2006)
Rotifers (O)				
<i>Brachionus angularis</i> ^f	100–140 mm	1–12 mm	FE	Rothhaupt (1990)
<i>Brachionus rubens</i> B ^f	200–260 mm	1–18 mm	FE	Rothhaupt (1990)
<i>Brachionus rubens</i> F ^f	120–180 mm	1–12 mm	FE	Rothhaupt (1990)
<i>Brachionus calyciflorus</i> ^f	220–285 mm	3–18 mm	FE	Rothhaupt (1990)
Krill (C)				
<i>Euphausia hansen</i> ^f	18–30 mm	0.1–1.46 mm	GC	Barange et al. (1991)
<i>Nematoscelis megalops</i> ^f	14–26 mm	0.1–1.63 mm	GC	Barange et al. (1991)

<i>Euphausia lucens</i> ^f	14–16.5 mm	0.31–2.60 mm	FE	Stuart & Huggett (1992)
<i>Meganyctiphanes norvegica</i> ^f	5–9	0.35–1.95 mm	GC	Båmstedt & Karlson (1998)
<i>Euphausia superba</i> larvae ^f	5.9–8.5 mm	0.01–0.22 mm	FE	Meyer et al. (2002)
<i>Euphausia superba</i> juveniles ^f	28–38 mm	0.01–5 mm	FE	Atkinson et al. (2002)
<i>Euphausia superba</i> adults ^f	48–58 mm	0.01–5 mm	FE	Atkinson et al. (2002)
Cladocerans (C)				
<i>Daphnia longispina</i> juveniles ^f	700 µm	0.5–16 mm	FE	Børsheim & Andersen (1987)
<i>Daphnia longispina</i> adults ^f	2400 µm	0.5–30 mm	FE	Børsheim & Andersen (1987)
<i>Bosmina longispina</i> ^f	460 µm	0.8–16 mm	FE	Børsheim & Andersen (1987)
<i>Daphnia cucullata</i> ^f	810 µm	5–25 mm	FE	Bern (1990)
<i>Penilia avirostris</i> ^f	680 ±44 µm	2.5–150 mm	FE	Katechakis & Stibor (2004)
<i>Podon intermedius</i> ^f	569 ±48 µm	1–205 mm	FE	Katechakis & Stibor (2004)
<i>Evadne nordmanni</i> ^f	690 ±31 µm	1–210 mm	FE	Katechakis & Stibor (2004)
<i>Penilia avirostris</i> ^f	680 ±44 µm	2.5–100 mm	FE	Katechakis et al. (2004)
Copepods (C)				
<i>Neocalanus plumchrus</i> CV ^h	3.8 mm	2.8–36 mm	FE	Frost et al. (1983)
<i>Neocalanus plumchrus</i> CV ^h	3.8 mm	2.2–36 mm	FE	Frost et al. (1983)
<i>Neocalanus cristatus</i> CV ^h	6.5 mm	3.6–36 mm	FE	Frost et al. (1983)
<i>Neocalanus cristatus</i> CV ^h	6.5 mm	2.2–36 mm	FE	Frost et al. (1983)
<i>Diaptomus sicilis</i> ^a	0.58 mm	3.7–46 mm	FE	Vanderploeg et al. (1984)
<i>Euchata elongata</i> ^f	6.3–7.4 mm	0.22–3 mm	FE	Greene & Landry (1985)
<i>Corycaeus anglicus</i> ⁱ	1 mm	0.2–2.45 mm	FE	Landry et al. (1985)
<i>Diaptomus sicilis</i> ^f	1.2 mm	6–35 mm	FE	Vanderploeg & Paffenhöfer (1985)

<i>Paracalanus</i> sp. ^j	0.7 mm	10–35 mm	FE	Vanderploeg & Paffenhöfer (1985)
<i>Eucalanus pileatis</i> ^j	1.9 mm	10–70 mm	FE	Vanderploeg & Paffenhöfer (1985)
<i>Cyclops scutifer</i> ^f	0.9 mm	0.8–5 mm	FE	Børsheim & Andersen (1987)
<i>Calanus finmarchicus</i> ^h	2.68 mm	10–50 mm	FE	Levinsen et al. (2000)
<i>Calanus finmarchicus</i> ^h	2.68 mm	13–54 mm	FE	Levinsen et al. (2000)
<i>Calanus hyperboreus</i> ^h	6.45 mm	13–50 mm	FE	Levinsen et al. (2000)
<i>Calanus hyperboreus</i> ^h	6.45 mm	15–50 mm	FE	Levinsen et al. (2000)
<i>Acartia clausi</i> ^f	920 ± 31 mm	7.5–210 mm	FE	Katechakis et al. (2004)
Doliolids (G)				
<i>Dolioletta gegenbauri</i> ^f	10 mm	0.2–102 mm	FE	Crocker et al. (1991)
<i>Doliolum denticulatum</i> ^f	1.48 ± 0.13 mm	1–75 mm	FE	Katechakis et al. (2004)
Salps (G)				
6 species ^f	5–10 cm	1–1000 mm	DO	Madin (1974)
<i>Cyclosalpa bakeri</i> ^f	1–10 cm	5–100 mm	GC	Madin & Purcell (1992)
<i>Thalia democratica</i> ^f	7.7 mm	1–62 mm	FE	Vargas & Madin (2004)
<i>Salpa cylindrica</i> ^f	4.1 mm	3–130 mm	FE	Vargas & Madin (2004)
<i>Cyclosalpa affinis</i> ^f	13.7 mm	1 to 138 mm	FE	Vargas & Madin (2004)

Table S2. Examples of relationships between generalist predators and temperature or climate index from ≥ 5 yr time series. The winter/spring North Atlantic Oscillation (NAO) is positively correlated with temperature in the North Atlantic, and the Pacific Decadal Oscillation (PDO) is positively correlated with temperature in the northeast Pacific. T: temperature; NS: North Sea; CCS: California Current System. ^a: Relationships were apparent graphically but were not quantified statistically

Taxon/measure	(Relation) Variable	System	Study period	Source
Cladocerans				
<i>Bosmina</i> spp.				
Abundance	(+) Spring NAO	2 European lakes	1979–1994	Straile & Adrian (2000)
Date of peak abundance	(–) Winter NAO	German lake	1979–1999	Gerten & Adrian (2000)
<i>Daphnia</i> spp.				
Abundance	(+) Spring NAO	2 European lakes	1979–1994	Straile & Adrian (2000)
Date of peak abundance	(–) Spring T	German lake	1979–1999	Gerten & Adrian (2000)
Date of peak abundance	(–) T, PDO	L. Washington, USA	1976–2002	Winder & Schindler (2004)
<i>Leptodora kindtii</i>				
Biomass	(+ ^a) T	German reservoir	1982–1999	Wagner & Benndorf (2007)
Ctenophores				
<i>Mnemiopsis leidyi</i>				
Abundance	(+ ^a) Min. winter T	Black Sea	1992–1997	Shiganova (1998)
Date of appearance	(– ^a) T, NAO	Narragansett Bay	1950–1999	Sullivan et al. (2001)
Peak abundance	(+ ^a) T, NAO	Narragansett Bay	1950–1999	Sullivan et al. (2001)
Jellyfish				
<i>Aurelia aurita</i>				
Max., median abundance	(–) Winter NAO	NS, W of N Denmark	1971–1986	Lynam et al. (2005)
Median abundance	(–) Winter NAO	NS, E of Scotland	1971–1986	Lynam et al. (2005)
Max. abundance	(+) Winter NAO	NS, N of Scotland	1971–1986	Lynam et al. (2005)
<i>Cyanea capillata</i>				

Median abundance <i>Cyanea lamarckii</i>	(-) Winter NAO	NS, E of Scotland	1971–1986	Lynam et al. (2005)
Max., median abundance	(-) Winter NAO	NS, W of N Denmark	1971–1986	Lynam et al. (2005)
Max. abundance <i>Chrysaora quinquecirrha</i>	(+) Winter NAO	NS, N of Scotland	1971–1986	Lynam et al. (2005)
Presence	(+) T	Chesapeake Bay	1987–2000	Decker et al. (2007)
Abundance	(+ ^a) T	Chesapeake Bay	1987–2000	Decker et al. (2007)
Abundance <i>Pelagia noctiluca</i>	(-) Winter NAO	Chesapeake Bay	1960–1995	Purcell & Decker (2005)
Occurrence Unspecified	(+) Summer T	W Mediterranean	1875–1986	Goy et al. (1989)
Biomass	(+ ^a) Mean T	Bering Sea	1979–1997	Brodeur et al. (1999)
Frequency	(+) Winter NAO	Central North Sea	1958–2000	Attrill et al. (2007)
Krill <i>Euphausia gibboides</i> , <i>E. recurva</i> , <i>E. eximia</i> , <i>Nyctiphanes simplex</i>				
Spring abundance <i>Euphausia pacifica</i>	(+) PDO	CCS, S California	1950–2002	Brinton & Townsend (2003)
Spring abundance	(-) PDO	CCS, S California	1950–2002	Brinton & Townsend (2003)
Salps <i>Cyclosalpa affinis</i> , <i>Pegea socia</i> , <i>C. bakeri</i> , <i>Salpa maxima</i>				
Biomass <i>Thalia domocratica</i>	(- ^a) PDO	CCS, S California	1951–2002	Lavaniegos & Ohman (2003)
Abundance	(+ ^a) T	NW Mediterranean	1974–1999	Licandro et al. (2006)

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