The following appendix accompanies the article

Influence of animals on turbulence in the sea

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Appendix 1. Mass, length, cruising and escape speeds, and corresponding log Reynolds number (Re) of marine organisms

Species	Common name	Mass (kg)	Length (m)	Cruising speed m s^{-1}	Cruising speed Length s^{-1}	Log Re	Escape speed m s^{-1}	Escape speed Length s^{-1}	Log Re	Source
Bacteria										
Escherichia coli		5.23×10^{-16}	1×10^{-6}	1.4×10^{-5}	14.00	−5.00				Roberts (1975)
Protozoa										
Oblea rotunda		1.10×10^{-11}	2.3×10^{-5}	3.5×10^{-4}	15.22	−2.24				Strom & Buskey (1993)
Tetrahymena sp.		3.60×10^{-11}	7.0×10^{-5}	5.0×10^{-4}	7.14	−1.60				Roberts (1981)
Didinium sp.		1.43×10^{-10}	1.3×10^{-4}	0.0013	10.00	−0.92				Roberts (1981)
Favella sp.		5.23×10^{-10}	2.0×10^{-4}	8.0×10^{-4}	4.00	−0.94				Buskey & Stoecker (1989)
Favella sp.		5.23×10^{-10}	2.0×10^{-4}	6.0×10^{-4}	3.00	−1.07				Buskey & Stoecker (1989)
Favella sp.		5.23×10^{-10}	2.0×10^{-4}	0.001	5.00	−0.85				Buskey & Stoecker (1989)
Crustacea										
Corycaeus sp.		1.50×10^{-8}	6.0×10^{-4}	0.010	16.67	0.36	0.129	215.00	1.74	Yen (1988)
Acanthocyclops robustus		1.71×10^{-8}	9.0×10^{-4}	0.0055	6.11	0.55	0.07	77.78	1.65	Morris et al. (1990)
Acartia fossae		2.00×10^{-8}	7.0×10^{-4}				0.087	124.29	1.64	Yen (1988)
Clausocalanus furcatus		2.10×10^{-8}	7.9×10^{-4}	0.008	10.13	0.65				Mazzocchi & Paffenhöfer (1999)
Acartia clausi		2.75×10^{-8}	0.001	0.006	6.00	0.63				Buskey & Mills (1983)
Acartia clausi		2.75×10^{-8}	0.001	0.002	2.00	0.15				Hardy & Bainbridge (1954)
Acartia tonsa		2.75×10^{-8}	0.001	0.0025	2.50	0.25	0.10	100.00	1.85	Buskey et al. (1986)
Acartia hudsonica		2.75×10^{-8}	0.001	0.0018	1.84	0.12				Buskey et al. (1987)
Acartia hudsonica		2.75×10^{-8}	0.001	0.0022	2.20	0.20				Buskey et al. (1987)
Pseudocalanus minutus		6.25×10^{-8}	0.0015	0.0040	2.68	0.63				Buskey et al. (1987)
Pseudocalanus minutus		6.25×10^{-8}	0.0015	0.0044	2.395	0.68				Buskey et al. (1987)
Cyclops abyssorum		7.00×10^{-8}	0.0011	0.0028	2.55	0.34				Strickler (1975)
Cyclops abyssorum		7.00×10^{-8}	0.0011	0.0055	5.00	0.64	0.08	72.73	1.93	Strickler (1975)
Centropages hamatus		9.50×10^{-8}	0.001	0.0053	5.28	0.58				Buskey et al. (1987)
Centropages typicus		9.50×10^{-8}	0.001	0.002	2.00	0.15				Lochhead (1961)
Temora longicornis		1.05×10^{-7}	0.002	0.007	3.51	1.00				Buskey et al. (1987)
Temora longicornis		1.05×10^{-7}	0.002	0.0053	2.63	0.88	0.072	36.00	2.01	Buskey et al. (1987)
Pseudocalanus minutus		1.25×10^{-7}	0.0015	0.0024	1.59	0.41				Buskey (1984)
Pseudocalanus minutus		1.25×10^{-7}	0.0015	0.0021	1.41	0.35				Buskey (1984)
Pseudocalanus minutus		1.25×10^{-7}	0.0015	0.0015	0.99	0.20				Buskey (1984)
Cyclops vicinus		2.00×10^{-7}	0.0015	0.0058	3.87	0.79	0.31	208.67	2.52	Strickler (1975)
Dioithona oculata		2.20×10^{-7}	0.0008	0.0035	4.38	0.30				Buskey (1998)
Dioithona oculata		2.20×10^{-7}	0.0008	0.018	22.50	1.01				Buskey (1998)
Dioithona oculata		2.20×10^{-7}	0.0008				0.154	192.50	1.94	Buskey et al. (1996)
Calanus finmarchicus		5.00×10^{-7}	0.0022				0.160	72.73	2.40	Haury et al. (1980)
Calanus finmarchicus		1.00×10^{-6}	0.003	0.015	5.00	1.51				Hardy & Bainbridge (1954)
Calanus finmarchicus		1.00×10^{-6}	0.003	0.007	2.33	1.18				Hardy & Bainbridge (1954)

Appendix 1 (continued)

Species	Common name	Mass (kg)	Length (m)	Cruising speed m s^{-1}	Cruising speed Length s^{-1}	Log Re	Escape speed m s^{-1}	Escape speed Length s^{-1}	Log Re	Source
Euchaeta rimana		1.50×10^{-6}	0.0024	0.0075	3.13	1.11	0.36	150.00	2.79	Yen (1988)
Pleuromamma xiphias		1.00×10^{-5}	0.006	0.015	2.50	1.81	0.30	50.00	3.11	Morris et al. (1985)
Euphausia pacifica		2.80×10^{-5}	0.015	0.025	1.67	2.43	0.097	6.47	3.02	Torres & Childress (1983)
Euphausia pacifica		3.65×10^{-5}	0.015	0.025	1.67	2.43	0.2	13.33	3.33	Torres & Childress (1983)
Meganyctiphanes norvegica		8.00×10^{-5}	0.028	0.100	3.57	3.30				Kils (1979)
Palaemon adspersus		1.20×10^{-4}	0.027	0.045	1.67	2.94				Ivlev (1963)
Euphausia superba	Antarctic krill	2.00×10^{-4}	0.030	0.180	6.00	3.59				Kils (1979)
Gnathophausia ingens		7.18×10^{-4}	0.052	0.075	1.44	3.44				Cowles & Childress (1988)
Euphausia superba	Antarctic krill	8.50×10^{-4}	0.047	0.050	1.06	3.22	0.50	10.64	4.22	Kils (1979)
Euphausia superba	Antarctic krill	0.001	0.050	0.060	1.20	3.33	0.50	10.00	4.25	Kils (1979)
Gnathophausia ingens		0.00127	0.062	0.086	1.39	3.58				Cowles & Childress (1988)
Penaeus mergueinsis		0.00874	0.100	0.200	2.00	4.15				Dall et al. (1990)
Callinectes sapidus		0.0168	0.050	0.100	2.00	3.55	1.00	20.00	4.55	Houlihan et al. (1985)
Callinectes sapidus		0.0419	0.080	0.160	2.00	3.96				Houlihan et al. (1985)
Cephalopoda										
Loligo opalescens	Squid	0.041	0.20	0.37	1.85	4.72				O'Dor (1982)
Pisces										
Rutilis rutilis	Roach	5.00×10^{-6}	0.010	0.05	5.00	2.55				Kaufmann (1990)
Chalcaburnus chalcoides	Danubian bleak	1.00×10^{-5}	0.012	0.07	5.83	2.78				Kaufmann (1990)
Gasterosteus aculeatus	Stickleback	1.20×10^{-5}	0.011				0.47	42.73	3.57	Garenc et al. (1999)
Clupea harengus	Atlantic herring	2.00×10^{-5}	0.010				0.08	8.00	2.76	Batty et al. (1993)
Gasterosteus aculeatus	Stickleback	1.60×10^{-4}	0.027				0.68	24.19	4.12	Garenc et al. (1999)
Rutilis rutilis	Roach	3.00×10^{-4}	0.030	0.11	3.67	3.37				Kaufmann (1990)
Chalcaburnus chalcoides	Danubian bleak	5.00×10^{-4}	0.041	0.12	2.93	3.55				Kaufmann (1990)
Menidia menidia	Silverside minnow	0.0010	0.023	0.21	9.13	3.54	1.4	30.68	4.36	Billerbeck et al. (2001)
Gasterosteus aculeatus	Stickleback	1.60×10^{-3}	0.059				1.3	22.03	4.74	Garenc et al. (1999)
Liza microlepis	Mullet	0.0083	0.105	0.21	2.00	4.20				Kutty (1969)
Oncorhyncus nerka	Sockeye salmon	0.0085	0.100	0.28	2.80	4.30				Brett (1964)
Engraulis mordax	Northern anchovy	0.009	0.09	0.211	2.34	4.13				Boggs (1991)
Trematomus bernacchii		0.023	0.128				1.12	8.75	5.01	Wilson et al. (2001)
Trematomus centronotus		0.027	0.136				0.98	7.21	4.98	Wilson et al. (2001)
Lepomis gibbosus	Pumpkinseed sunfish	0.030	0.119	0.18	1.51	4.18				Brett & Sutherland (1965)
Cymatogaster aggregata	Shiner perch	0.030	0.120	0.14	1.17	4.08	1.20	10.00	5.01	Gordon et al. (1989)
Cymatogaster aggregata	Shiner perch	0.035	0.143	0.26	1.82	4.42				Webb (1975)
Oncorhyncus nerka	Sockeye salmon	0.055	0.188	0.31	1.65	4.62	1.32	7.02	5.25	Brett (1964)
Oxyjulis californica	Senorita	0.070	0.170	0.20	1.18	4.39				Gordon et al. (1989)
Tilapia nilotica	Tilapia	0.080	0.210	0.41	1.95	4.79				Farmer & Beamish (1969)
Pagothenia borchgrevinki		0.092	0.22				1.21	5.50	5.28	Wilson et al. (2001)
Sphyrna tiburo	Hammerhead shark	0.095	0.340	0.28	0.82	4.83				Parsons (1990)
Salmo gairdneri	Steelhead trout	0.100	0.225	0.69	3.07	5.04				Madan Mohan Rao (1971)
Carassius auratus	Goldfish	0.100	0.180	0.12	0.67	4.19				Smit et al. (1971)
Micropterus salmoides	Largemouth bass	0.150	0.225	0.42	1.87	4.83				Beamish (1970)
Melanogrammus aeglefinus	Haddock	0.156	0.248	0.25	1.01	4.65				Tytler (1969)
Morone saxatilis	Striped bass	0.212	0.254	0.43	1.69	4.89				Freadman (1979)
Pomatomus saltatrix	Bluefish	0.225	0.254	0.51	2.01	4.97				Freadman (1979)
Anguilla japonica	Japanese eel	0.225	0.557	0.24	0.43	4.98				Azuma (1992)
Salmo gairdneri	Steelhead trout	0.264	0.292	0.28	0.96	4.77				Webb (1971a,b)
Oncorhyncus mykiss	Sockeye salmon	0.264	0.292	0.28	0.96	4.77	3.30	11.30	5.84	Webb (1971a,b)
Coregonus artedii	Lake whitefish	0.28	0.29	0.23	0.79	4.68				Bernatchez & Dodson (1985)
Scomber japonicus	Chub mackerel	0.35	0.24	0.295	1.23	4.70				Schaefer (1986)

Appendix 1 (continued)

Species	Common name	Mass (kg)	Length (m)	Cruising speed m s^{-1}	Cruising speed Length s^{-1}	Log Re	Escape speed m s^{-1}	Escape speed Length s^{-1}	Log Re	Source
Cynoscion nebulosus	Spotted seatrout	0.35	0.30	0.81	2.70	5.24				Wakeman & Wohlschlag (1982)
Sciaeniops ocellata	Red drum	0.35	0.30	0.90	3.00	5.29				Wakeman & Wohlschlag (1982)
Chilomycterus schoepfi	Striped burrfish	0.35	0.30	0.51	1.70	5.04				Wakeman & Wohlschlag (1982)
Archosargus probatocephalus	Sheepshead	0.35	0.30	0.99	3.30	5.33				Wakeman & Wohlschlag (1982)
Coregonus clupeaformis	Whitefish	0.364	0.34	0.46	1.35	5.05				Bernatchez & Dodson (1985)
Katsuwonus pelamis	Skipjack tuna	0.30	0.35	0.56	1.60	5.15				Gooding et al. (1981)
Sphyrna lewini	Hammerhead shark	0.64	0.55	0.46	0.84	5.26				Lowe (2002)
Scomber scombrus	Atlantic mackerel	0.72	0.31				5.5	17.74	6.09	Wardle & He (1988)
Thunnus albacares	Yellowfin tuna	0.79	0.32	0.31	0.97	4.85				Dewar & Graham (1994)
Scomber scombrus	Atlantic mackerel	0.90	0.34	0.34	1.00	4.92				He & Wardle (1988)
Euthynnus affinis	Kawakawa tuna	1.08	0.36	0.79	2.19	5.31				Magnuson (1970)
Salmo salar	Atlantic salmon	1.25	0.50	2.00	4.00	5.85	4.20	8.40	6.18	Colavecchia et al. (1998)
Gadus morhua	Atlantic cod	1.42	0.53	0.58	1.09	5.34	1.45	2.74	5.74	Reidy et al. (2000)
Thunnus albacares	Yellowfin tuna	1.65	0.42	0.48	1.14	5.16				Dewar & Graham (1994)
Euthynnus affinis	Kawakawa tuna	1.70	0.42	0.63	1.50	5.28				Magnuson (1970)
Thunnus albacares	Yellowfin tuna	2.37	0.48	0.87	1.81	5.47				Dewar & Graham (1994)
Euthynnus lineatus	Skipjack tuna	2.50	0.50	0.74	1.48	5.42				Magnuson (1970)
Katsuwonus pelamis	Skipjack tuna	3.80	0.60	0.72	1.20	5.49				Gooding et al. (1981)
Sphyrna tiburo	Hammerhead shark	4.65	0.95	0.48	0.51	5.51				Parsons (1990)
Thunnus albacares	Yellowfin tuna	77	1.57	1.30	0.83	6.16	4.1	2.61	6.66	Brill et al. (1999)
Thunnus thynnus	Atlantic bluefin tuna	136	2.10	0.94	0.45	6.15	6.9	3.29	7.01	Lutcavage et al. (2000)
Thunnus thynnus	Atlantic bluefin tuna	318	2.83	1.30	0.46	6.42	8.6	3.04	7.24	Lutcavage et al. (2000)
Thunnus thynnus	Atlantic bluefin tuna	600	3.5	2.50	0.71	6.80				Davis & Stanley (2002)
Carcharodon carcharias	White shark	1250	5.0	3.0	0.60	7.03	16	3.20	7.76	Klimley et al. (2001)
Reptilia										
Pelamis platurus	Sea snake	0.037	0.51	0.32	0.63	5.07				Graham et al. (1987)
Chelonia mydas	Sea turtle	0.735	0.24	0.26	1.08	4.65				Prange (1976)
Chelonia mydas	Sea turtle	1.15	0.29	.049	1.69	5.01				Butler et al. (1984)
Aves										
Eudypytula minor	Little blue penguin	1.20	0.40	0.70	1.75	5.30				Baudinette & Gill (1985)
Spheniscus demersus	African penguin	3.17	0.65	0.86	1.32	5.60				Nagy et al. (1984)
Aptenodytes forsteri	Emperor penguin	30.0	0.94	1.64	1.74	6.04				Clark & Bemis (1979)
Mammalia										
Zalophus californianus	California sea lion	22.5	1.31	1.66	1.27	6.19				Feldkamp (1987)
Enhydra lutris	Sea otter	25	1.30	0.64	0.49	5.77	2.60	2.00	6.38	Kenyon (1981)
Phoca vitulina	Harbor seal	33	1.30	1.61	1.24	6.17				Davis et al. (1985)
Arctocephalus gazella	Antarctic fur seal	40	1.30	1.80	1.38	6.22				Boyd (1996)
Phoca vitulina	Harbor seal	42.5	1.25	1.25	1.00	6.05				Davis et al. (1985)
Phoca vitulina	Harbor seal	63	1.50	2.08	1.39	6.35				Craig & Påsche (1980)
Stenella longirostris	Spinner dolphin	65	2.00	2.08	1.04	6.47				Perrin & Gilpatrick (1994)
Stenella longirostris	Spinner dolphin	65	2.00	0.72	0.36	6.01	4.13	2.07	6.77	Perrin & Gilpatrick (1994)
Sotalia guaianensis	Tucuxi dolphin	85	2.50	2.45	0.98	6.64				Videler & Kamermans (1985)
Stenella longirostris	Spinner dolphin	91	2.00	2.55	1.28	6.56	11.03	5.52	7.20	Perrin & Gilpatrick (1994)

Appendix 1 (continued)

Species	Common name	Mass (kg)	Length (m)	Cruising speed m s^{-1}	Cruising speed Length s^{-1}	Log Re	Escape speed m s^{-1}	Escape speed Length s^{-1}	Log Re	Source
Eumetopias jubatus	Steller sea lion	128	2.33	3.40	1.46	6.75				Stelle et al. 2000)
Sousa spp.	Humpback dolphin	130	2.20	1.33	0.60	6.32				Ross et al. (1994)
Tursiops truncatus	Bottlenose dolphin	145	2.25	4.00	1.78	6.81				Williams et al. (1991)
Trichecus manatus	Atlantic walrus	200	2.50	1.11	0.44	6.30	6.90	2.76	7.09	Caldwell & Caldwell (1985)
Tursiops truncatus	Bottlenose dolphin	215	2.58	3.35	1.30	6.79	11.5	4.46	7.33	Fish (1998)
Dugong dugon	Dugon	250	2.30	1.30	0.57	6.33	5.33	2.32	6.94	Nishiwaki & Marsh (1985)
Zalophus californianus	California sea lion	392	2.25	2.00	0.89	6.51				Odell (1981)
Kogia breviceps	Pygmy sperm whale	408	3.40	1.67	0.49	6.61				Caldwell & Caldwell (1989)
Pseudorca crassidens	False killer whale	539	3.75	3.10	0.83	6.92	7.5	2.00	7.30	Fish (1998)
Trichecus manatus	Atlantic walrus	600	4.50	2.78	0.62	6.95	6.90	1.53	7.35	Caldwell & Caldwell (1985)
Dephinapterus leucas	Beluga whale	671	3.64	1.55	0.43	6.61	5.85	1.61	7.18	Fish (1998)
Odobenus rosmarus	Pacific walrus	1.22×10^3	3.15	1.94	0.62	6.64	9.7	3.08	7.34	Fay (1981)
Orcinus orca	Killer whale	1.65×10^3	4.76	3.95	0.83	7.13	13.95	2.93	7.68	Fish (1998)
Caperea marginata	Pygmy right whale	2.85×10^3	5.50	2.50	0.45	6.99				Baker (1985)
Berardius bairdii	Baird's beaked whale	8.85×10^3	10.0	1.78	0.18	7.10				Balcomb (1989)
Eschrictius robustus	Gray whale	1.50×10^4	11.5	2.25	0.20	7.27				Sumich (1983)
Eschrictius robustus	Gray whale	1.60×10^4	12.0	2.22	0.19	7.28	4.44	0.37	7.58	Wolman (1985)
Physeter macrocephalus	Sperm whale	1.99×10^4	12.5	2.08	0.17	7.27	8.33	0.37	7.87	Rice (1989)
Megaptera novaeangliae	Humpback whale	2.70×10^4	12.9	3.40	0.26	7.50	7.50	0.58	7.84	Winn & Reichley (1985)
Balaenoptera musculus	Blue whale	6.40×10^4	22.4	5.28	0.23	7.93	13.3	0.59	8.33	Yochem & Leatherwood (1985)

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