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Marine artificial light at night: An empirical and technical guide

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Table S2 Quantified light sensitivity thresholds of marine organisms. Given are phylum, scientific and common species, where specified life stage (currently accepted based on WoRMS database, in brackets are names as cited in reference), response measure, habitat, standardised minimum response (in $W\ m^{-2}$ based on daylight), light source and colour temperature. The list is non-exhaustive.

Phylum	Species (Taxon)	Common name	Response measure	Habitat	Standardised minimum response (in $W\ m^{-2}$ based on daylight)	Light source & colour temperature	Reference
Annelida	<i>Galeolaria caespitosa</i>	-	Negative Phototaxis (trochophore)	Pelagic	3.62E+00	5600K	Marsden, 1988
	<i>Phragmatopoma caudata</i> (<i>Phragmatopoma lapidosa</i>)	-	Positive phototaxis	Benthic	6.88E-03	300W incandescent lamp	McCarthy et al., 2002
	<i>Platynereis dumerilii</i> (larvae)	-	Positive Phototaxis	Benthic/ pelagic	5.00E-04	500nm monochromatic light	Jékely et al., 2008
	<i>Spirobranchus giganteus</i> (<i>Spirobranchius giganteus</i>)	Christmas tree worm	Positive Phototaxis (trochophore)	Pelagic	3.62E-01	5600K	Marsden, 1986
	<i>Serpula vermicularis</i>	Red tube worm	Negative phototaxis (metatrochophore)	Settlement	2.17E+00	"White" incandescent	Young & Chia, 1982

Phylum	Species (Taxon)	Common name	Response measure	Habitat	Standardised minimum response (in W m ⁻² based on daylight)	Light source & colour temperature	Reference
Arthropoda	<i>Acartia tonsa</i>	-	Positive phototaxis	Pelagic	1.01E-07	564nm Incandescent	Stearns & Forward, 1984
	<i>Anomalocera ornata</i>	-	Linear movement, no phototaxis	Pelagic	3.62E-06	500nm	Cohen & Forward, 2002
	<i>Birgus latro</i> (larvae)	Coconut crab	Positive phototaxis	Benthic/ pelagic	6.74E-04	400-660nm	Hamasaki et al., 2013
	<i>Calanopia americana</i>		Positive phototaxis	Pelagic	3.62E-07	500nm	Cohen & Forward, 2002
	<i>Calanus finmarchicus</i> (female adults)	-	Negative phototaxis	Pelagic	2.13E-06	LED (white)	Miljeteig et al., 2014
	<i>Calanus finmarchicus</i> (male adults)	-	Negative phototaxis	Pelagic	2.15E-07	LED (white)	Miljeteig et al., 2014
	<i>Calanus spp.</i> (female adults)	-	Phototactic response (dial vertical migration)	Pelagic	1.02E-07	LED (white)	Båtnes et al., 2015

Phylum	Species (Taxon)	Common name	Response measure	Habitat	Standardised minimum response (in W m ⁻² based on daylight)	Light source & colour temperature	Reference
Arthropoda	<i>Calanus spp. (male adults)</i>	-	Phototactic response (dial vertical migration)	Pelagic	1.02E-06	LED (white)	Båtnes et al., 2015
	<i>Callinectes sapidus (larvae)</i>	Chesapeake blue crab	Phototaxis (positive - low intensity, negative - high intensity)	Pelagic	3.62E-04	750W incandescent lamp	Forward et al., 1995
	<i>Centropages typicus</i>	-	Change in swimming	Pelagic	3.62E-06	500nm	Cohen & Forward, 2002
	<i>Eusegergestes arcticus (Sergestes arcticus)</i>	-	Abdominal flexion	Pelagic	3.62E-07	White slide projector	Myslinski et al., 2005
	<i>Labidocera aestiva</i>	-	Dorsal light reflex	Pelagic	3.62E-06	500nm	Cohen & Forward, 2002
	<i>Leptograpsus variegatus</i>	Purple rock crab	Optokenetic response	Benthic	1.45E-13	499nm	Doujak, 1984
	<i>Meganyctiphanes norvegica</i>	Northern krill	Abdominal flexion	Pelagic	3.62E-08	White slide projector	Myslinski et al., 2005

Phylum	Species (Taxon)	Common name	Response measure	Habitat	Standardised minimum response (in W m ⁻² based on daylight)	Light source & colour temperature	Reference
Arthropoda	<i>Meganyctiphanes norvegica</i>	Northern krill	Abdominal flexion	Pelagic	3.62E-07	White slide projector	Myslinski et al., 2005
	<i>Mysidium columbiae</i>	-	Optokinetic response	Pelagic	2.17E-04	LED (infrared)	Buskey, 2000
	<i>Pasiphaea multidentata</i>	Pink glass shrimp	Abdominal flexion	Pelagic	3.62E-08	White - Slide projector	Myslinski et al., 2005
	<i>Pleuromamma gracilis</i>	-	Negative phototaxis	Pelagic	5.07E-05	100W quartz halogen	Buskey et al., 1989
	<i>Pleuromamma xiphias</i>	-	Negative phototaxis	Pelagic	2.61E-07	100W quartz halogen	Buskey et al., 1989
	<i>Pontella karachiensis</i>	-	Polarotaxis (positive - high intensity, negative - low intensity)	Benthic/ pelagic	6.78E-04	fluorescent lamp	Manor et al., 2009
	<i>Rhithropanopeus harrisi (larvae)</i>	Harris mud crab	Positive phototaxis	Pelagic	1.00E-07	500nm	Forward & Costlow, 1974
	<i>Semibalanus balanoides</i>	Acorn barnacle	Negative phototaxis (shade seeking)	Settlement	1.01E-06	2150K	Crisp & Ritz, 1973

Phylum	Species (Taxon)	Common name	Response measure	Habitat	Standardised minimum response (in W m ⁻² based on daylight)	Light source & colour temperature	Reference
	<i>(Balanus balanoides)</i>						
Arthropoda	<i>Semibalanus balanoides</i> <i>(Balanus balanoides)</i> <i>(larvae)</i>	Acorn barnacle	Phototactic response	Pelagic	1.01E-07	2150K	Crisp & Ritz, 1973
	<i>Semibalanus balanoides</i> <i>(Balanus balanoides)</i> <i>(larvae)</i>	Acorn barnacle	Orientation towards light (settlement)	Settlement	1.01E-07	2150K	Crisp & Ritz, 1973
	<i>Semibalanus balanoides</i> <i>(Balanus balanoides)</i> <i>(larvae)</i>	Acorn barnacle	Positive Phototaxis	Pelagic	2.70E-02	480nm	Lang et al., 1979
	<i>Uca spp.</i>	-	Negative phototaxis	Pelagic	3.62E-06	1000W incandescent lamp	Tankersley et al., 1995

Phylum	Species (Taxon)	Common name	Response measure	Habitat	Standardised minimum response (in W m ⁻² based on daylight)	Light source & colour temperature	Reference
Chaetognatha	<i>Ferosagitta hispida</i> (<i>Sagitta hispida</i>)	-	Positive phototaxis	Pelagic	2.17E-05	500nm slide projector	Sweatt & Forward Jr., 1985
Chordata	<i>Ascidia callosa</i>	-	Change in swimming	Benthic/pelagic	2.17E-03	100W incandescent bulb	Young & Chia, 1985
	<i>Ascidia mentula</i>	-	Negative phototaxis (shade seeking)	Settlement	2.17E-04	20 W fluorescent tubes	Svane & Dolmer, 1995
	<i>Caretta caretta</i>	Loggerhead sea turtle	Positive phototaxis	Pelagic	9.13E-04	500nm (green)	Young et al., 2012
	<i>Caretta caretta</i>	Loggerhead sea turtle	Positive phototaxis	Pelagic	1.80E-03	580nm (yellow)	Young et al., 2012
	<i>Caretta caretta</i>	Loggerhead sea turtle	Positive phototaxis	Pelagic	2.45E-02	450nm (blue)	Young et al., 2012
	<i>Ciona intestinalis</i>	Sea vase	Change in swimming	Benthic/pelagic	5.00E-03	494nm slide projector	Tsuda et al., 2003
	<i>Hippoglossus hippoglossus</i>	Atlantic halibut	Positive phototaxis	Demersal/pelagic	2.01E-03	fluorescent tube	Naas & Mangor-Jensen, 1990

Phylum	Species (Taxon)	Common name	Response measure	Habitat	Standardised minimum response (in W m ⁻² based on daylight)	Light source & colour temperature	Reference
Chordata	<i>Polyandrocarpa zorritensis</i>	-	Larval preference for lit area	Benthic	1.30E-01	Sunlight	Forward et al., 2000
	<i>Polyandrocarpa zorritensis</i>	-	Positive phototaxis (during settlement)	Settlement	1.05E+00	Sunlight	Forward et al., 2000
	<i>Pyura chilensis</i>	-	Negative phototaxis	Settlement	3.62E+00	Sunlight	Manríquez & Castilla, 2007
Cnidaria	<i>Cyanea capillata</i>	Lion's mane jellyfish	Negative phototaxis (during settlement)	Settlement	7.25E-02	20 W fluorescent tubes	Svane & Dolmer, 1995
	<i>Dipsastraea favus (Favia favus)</i>	-	Polyp retraction	Benthic	6.52E+00	400-520nm	Levy et al., 2003
	<i>Eusmilia fastigiata</i>	Smooth flower coral	Polyp retraction	Benthic	4.35E-04	blue-green actinic	Gorbunov & Falkowski, 2002
	<i>Montastraea cavernosa</i>	Great star coral	Negative phototaxis (Polyp retraction)	Benthic	4.35E-04	blue-green actinic	Gorbunov & Falkowski, 2002
	<i>Plerogyra sinuosa</i>	Bubble coral	Polyp retraction	Benthic	6.52E+00	400-540nm	Levy et al., 2003
	<i>Plerogyra sinuosa</i>	Bubble coral	Polyp retraction	Benthic	6.52E+00	400-520nm	Levy et al., 2003

Phylum	Species (Taxon)	Common name	Response measure	Habitat	Standardised minimum response (in W m ⁻² based on daylight)	Light source & colour temperature	Reference
Echinodermata	<i>Ophiomastix wendtii</i> (<i>Ophiocoma wendtii</i>)	-	Negative phototaxis (arm movement)	Benthic	1.45E+00	555nm	Hendler, 1984
Platyhelminthes	<i>Prostheceraeus crozieri</i> (<i>Maritigrella crozieri</i>) (larvae)	-	Positive Phototaxis (high intensity)	Pelagic	6.52E-02	300W incandescent	Johnson & Forward, 2003
	<i>Prostheceraeus crozieri</i> (<i>Maritigrella crozieri</i>) (larvae)	-	Negative Phototaxis (low intensity)	Benthic/ pelagic	6.74E-03	420-640nm	Johnson & Forward, 2003
Porifera	<i>Amphimedon queenslandica</i>	-	Negative phototaxis	Benthic/ pelagic	2.17E-01	3200K Fibre Optical Light	Leys & Degnan, 2001

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