

Marine Bioluminescence: Why do so many animals in the open ocean make light?

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Table 1 Bioluminescent creatures found in marine, terrestrial and freshwater environments. A more complete list, using scientific nomenclature may be found in [1]. Phyla are in bold type.

Marine Environment	Terrestrial Environment	Freshwater Environment
Bacteria http://www.biolum.org/marine/biolum2/middle/ivinglights/llbaccontent.html Dinoflagellates http://lifesci.ucsb.edu/~biolum/organism/dinohome.html Radiolarians http://lifesci.ucsb.edu/~biolum/organism/pictures/radiolarian.html Sponges http://comenius.susqu.edu/bi/202/AnimalPix/grantia.htm Cnidaria <u>Scyphozoa</u> (Jellyfish) http://www.biolum.org/marine/biolum2/middle/why/whydefense6content.html <u>Hydrozoa</u> Hydroids http://www.teaching-biomed.man.ac.uk/bs1999/bs146/biodiversity/cnidl.htm Hydromedusae http://lifesci.ucsb.edu/~biolum/organism/photo.html Siphonophores http://lifesci.ucsb.edu/~biolum/organism/photo.html <u>Anthozoa</u> Sea fans http://www.mbari.org/education/cruises/Hawaii/Leg2/apr9images/apr9_07_23_37_18.jpg Soft corals http://elib.cs.berkeley.edu/cgi/img_query?special=browse&where-lifeform=Invertebrate&where-taxon=Anthomastus+ritteri Sea pens http://splash.metrokc.gov/wlr/waterres/marine/seapen.jpg Sea pansies http://www.bio.swt.edu/Lavalli/guides/renilla.htm Ctenophores (Comb jellies) http://lifesci.ucsb.edu/~biolum/organism/pictures/bathocyroe.html Nemertean s (Ribbon worms)	Bacteria http://golgi.harvard.edu/hastings/Images/bacteria.gif Fungi http://bmbiris.bmb.uga.edu/wampler/biolum/MWmushroom.JPG Molluscs Snails http://shell.kwansei.ac.jp/~shell/life/e_striata.html Annelid worms Earthworms http://bmbiris.bmb.uga.edu/wampler/biolum/worm/index.htm Arthropoda <u>Insects</u> Springtails http://www.wnrmag.com/stories/1998/dec98/snowflea.htm Fireflies http://iris.biosci.ohio-state.edu/projects/FFiles Click beetles Railroad worms http://lifesci.ucsb.edu/~biolum/forum/vviviiani2.html Glow-worms http://www.new-zealand.com/WaitomoCaves/about_glowworms.html Centipedes http://www.szgdocent.org/ff/f-centi.htm Millipedes http://bmbiris.bmb.uga.edu/wampler/biolum/milli.JPG	Molluscs Limpet (Latia)

http://orion1.paisley.ac.uk/courses/tatner/biomed/ia/pictures/ribbo.htm Molluscs Sea slugs http://lifesci.ucsb.edu/~biolum/organism/pictures/phyllirrhoe.html Boring bivalves http://www.univaq.it/~sc_amb/pesce/malleus.html Cuttle fish http://www.biolum.org/marine/biolum2/middle/livinglights/llbac3content.html Squid http://golgi.harvard.edu/hastings/Images/squid100dpi.gif Vampire squid http://www.newshour.org/wgbh/nova/abyss/life/el78.html Octopods http://www.abcnews.go.com/sections/science/DailyNews/octopus990310.html Annelid worms Polychaeta (Bristle worms) Parchment tube worms http://www.usc.edu/dept/LAS/biosci/bisc369/CHAETOP.HTML Scale worms Fireworms http://www.cbt.virginia.edu/tutorial/OTHERRHYNTHMSINFRA.html Arthropoda Pycnogonids (Sea spiders) http://www.scilib.ucsd.edu/sio/nsf/fguide/arthropoda-2.html Copepods http://www.pbrc.hawaii.edu/microangela/pleuro.htm Ostracods (Sea fireflies) http://sk01.ed.shizuoka.ac.jp/ohmiya/OhmiyaHP/hakkou/explanation/exp.html Malacostraca Opossum shrimp http://elib.cs.berkeley.edu/cgi/img_query?special=browse&where-lifeform=Invertebrate&where-taxon=Gnathophausia+ingens Amphipods http://splash.metrokc.gov/wlr/waterres/marine/cyphol.jpg Euphausiids (Krill) http://www.biolum.org/marine/biolum2/middle/livinglights/llcrust3content.html Decapod shrimp http://www.soc.soton.ac.uk/GDD/midbio/pic3.jpg Bryozoa (Sea mats) http://www.sms.si.edu/sms/IRLSpec/Membra_sa		
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[vart.htm](#)

Chaetognaths (Arrow worms)

<http://lifesci.ucsb.edu/~biolum/organism/pictures/chaeto.html>

Echinoderms

Crinoids (Sea lilies)

<http://www.ucmp.berkeley.edu/echinodermata/crinoidea.html>

Holothurians (Sea cucumbers)

<http://www.whoi.edu/media/jelly1.html>

Asteroids (Starfish)

<http://archive.uwcm.ac.uk/uwcm/mb/living.html>

Ophiuroids (Brittle stars)

<http://lifesci.ucsb.edu/~biolum/forum/sdupont1.html>

Hemichordates (Acorn worms)

<http://comenius.susqu.edu/bi/202/AnimalPix/balanoglossus.htm>

Chordates

Tunicates

Sea squirts

http://www.usc.edu/dept/LAS/biosci/bisc369/CL_AVELIN.HTML

Pyrosomes (Fire cylinders)

<http://fp.redshift.com/pelagia/pyrosoma.htm>

Larvaceans [http://www.microscopy-](http://www.microscopy-uk.org.uk/mag/artjan01/oiko.html)

[uk.org.uk/mag/artjan01/oiko.html](http://www.microscopy-uk.org.uk/mag/artjan01/oiko.html)

Vertebrates

Sharks

http://www.sciencenews.org/sn_arc98/8_1_98/fo b5.htm

Fish

Anchovies

Gulper eels

<http://www.newshour.com/wgbh/nova/abyss/life/w31.html>

Spookfish

<http://projects.edtech.sandi.net/projects/descent/Descent48.html>

Slickheads

Shining tube shoulders

Bristelmouths

<http://www.biolum.org/marine/biolum2/middle/livinglights/llfishcontent.html>

Hatchetfish

http://elib.cs.berkeley.edu/cgi/img_query?enlarge=0091+3183+0986+0127

Viperfish

http://www.imagequest3d.com/catalogue/deepsea/pages/l013_jpg.htm

Dragonfish

<http://www.biolum.org/marine/biolum2/middle/livinglights/llfish5content.html>

Snaggletooth fish

Loosejaws

<http://lifesci.ucsb.edu/~biolum/organism/drag>

on.html Pearleye fish Lanternfish http://www.museums.org.za/sam/resource/marine/lantern.htm Morid cod http://www.dangouo.pos.to/niikura/0004.html Merluccid hake Rat-tails http://www.pfri.hr/fish/fl147.html Midshipman fish http://elib.cs.berkeley.edu/cgi/img_query?enlarge=0091+3183+0935+0112 Anglerfish http://www.biolum.org/marine/biolum2/middle/livinglights/llbac2content.html Pinecone fish http://www.selu.com/bio/wildlife/fish/pineapple/pineapple_fish01.jpg Flashlight fish http://www.divernet.co.uk/biolog/0900flash.htm Ponyfish http://www.ku.ac.th/AgrInfo/thaifish/marine/mf065.html Drums http://www.kunsan.ac.kr/old-www/fishes/fish230/fish103.html		
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