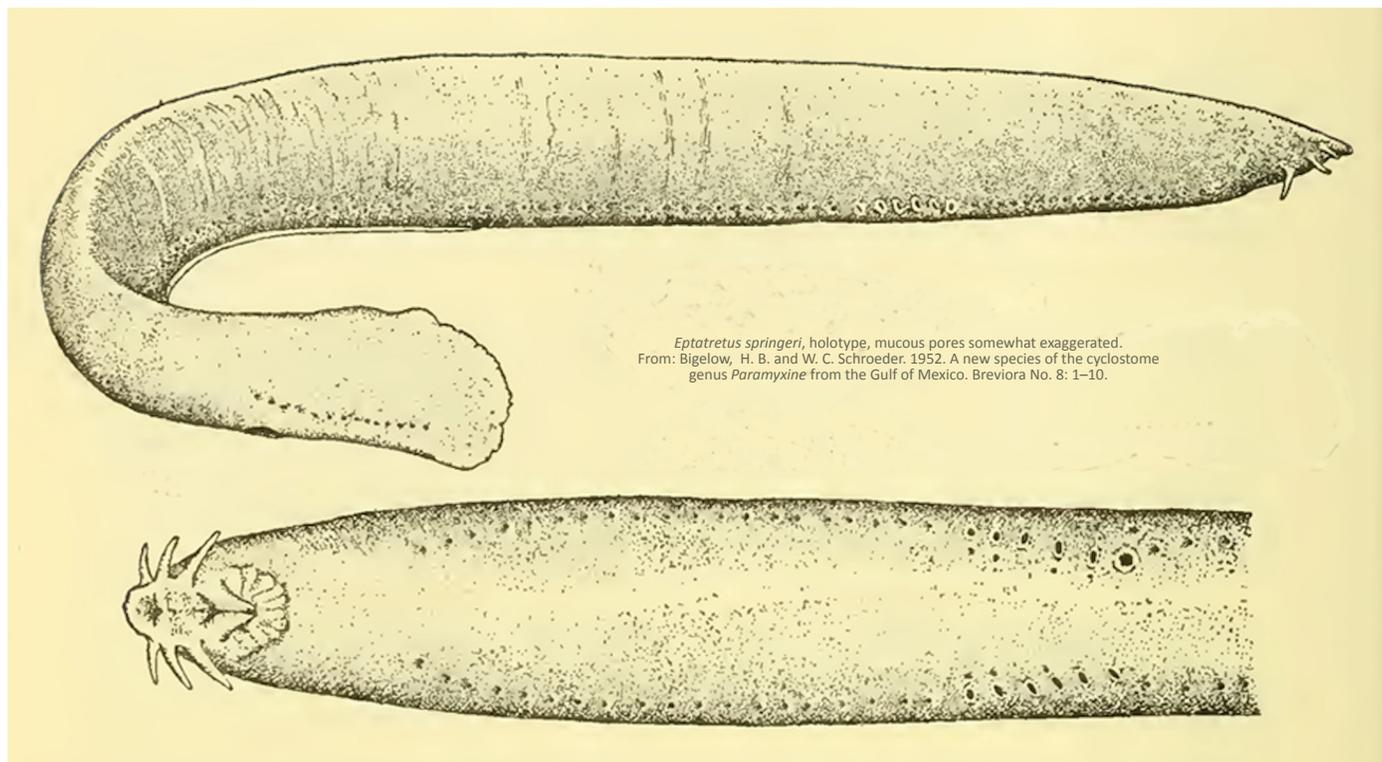


Order MYXINIFORMES

Hagfishes

Family **MYXINIDAE**

Rafinesque 1815



Eptatretus springeri, holotype, mucous pores somewhat exaggerated.
From: Bigelow, H. B. and W. C. Schroeder. 1952. A new species of the cyclostome genus *Paramyxine* from the Gulf of Mexico. *Breviora* No. 8: 1–10.

Reddish Hagfishes

Subfamily RUBICUNDINAE

Fernholm, Norén, Kullander, Quattrini, Zintzen, Roberts, Mok & Kuo 2013

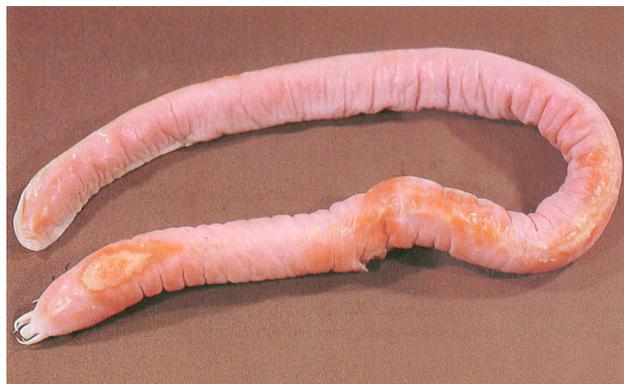
Rubicundus

Fernholm, Norén, Kullander, Quattrini,
Zintzen, Roberts, Mok & Kuo 2013

Latin for red or ruddy, referring to reddish coloration of all species

***Rubicundus eos* (Fernholm 1991)** after Eos, goddess of morning-glow, referring to its pink color

***Rubicundus lakeside* (Mincarone & McCosker 2004)** named for the Lakeside Foundation of California, for supporting Mincarone's work



Rubicundus eos, holotype, dorsal view showing general outline, pink coloration, and orange-red patches (fixation artifact) on back. From: Fernholm, B. 1991. *Eptatretus eos*: a new species of hagfish (Myxiniidae) from the Tasman Sea. *Japanese Journal of Ichthyology* 38 (2): 115–118.

***Rubicundus lopheliae* (Fernholm & Quattrini 2008)** of *Lophelia*, i.e., *Lophelia pertusa*, a deep-sea, cold-water, habitat-forming coral where holotype was collected and observed

***Rubicundus rubicundus* (Kuo, Lee & Mok 2010)** Latin for red or ruddy, referring to its pink body color

Multi-gill Hagfishes

Subfamily EPTATRETINAE

Bonaparte 1850

Eptatretus

Cloquet 1819

heptá (Gr. ἑπτὰ), seven; *trētós* (Gr. τρητός), perforated (i.e., with holes), referring to seven gill apertures on what would later be described as *Homea banksii* (= *E. cirrhatus*) [range within genus is 6–14 pairs of gill apertures]

***Eptatretus aceroi* Polanco Fernandez & Fernholm 2014** in honor of marine biologist Arturo Acero Pizarro (b. 1954), Universidad Nacional de Colombia, for his "curiosity about, and important contributions to, the study of Colombian marine fishes"

***Eptatretus alastairi* Mincarone & Fernholm 2010** in honor of Alastair Graham (b. 1964), Fish Collection Manager, CSIRO (Commonwealth Scientific and Industrial Research Organisation), Canberra, Australia, for help and hospitality offered to second author

***Eptatretus albiderma* Song & Kim 2020** *albus* (L.), white; *dérma* (Gr. δέρμα), skin, referring to its whitish skin color

***Eptatretus ancon* (Mok, Saavedra-Díaz & Acero P. 2001)** named for the

research vessel *B/I Ancon*, from which holotype was captured

***Eptatretus astrolabium* Fernholm & Mincarone 2010** Latinization of *Astrobale*, referring to Astrolabe Bay (Papua New Guinea), only known area of occurrence, which was named in 1827 by explorer Jules Sébastien César Dumont d'Urville after his ship *Astrolabe*

***Eptatretus atami* (Dean 1904)** named for Atami, west coast of Sagami Bay, Japan, type locality

***Eptatretus bischoffii* (Schneider 1880)** in honor of Schneider's colleague, anatomist and biologist Theodor Ludwig Wilhelm Bischoff (1807–1882)

***Eptatretus bobwisneri* Fernholm, Norén, Kullander, Quattrini, Zintzen, Roberts, Mok & Kuo 2013** replacement name of *E. wisneri* McMillan 1999, which became a junior homonym of *Paramyxine wisneri* Kuo, Huang & Mok 1994 when *Paramyxine* was subsumed into *Eptatretus*; the name continues to honor Robert (“Bob”) L. Wisner (1921–2005), McMillan's colleague at Scripps Institution of Oceanography (San Diego, California, USA), for “invaluable” assistance with her hagfish research and his other contributions to ichthyology

***Eptatretus burgeri* (Girard 1855)** in honor of German physicist and biologist Heinrich Bürger (ca. 1804–1858), who collected holotype

***Eptatretus caribbeaus* Fernholm 1982** Caribbean, specifically the western Caribbean, only known area of occurrence

***Eptatretus carlhubbsi* McMillan & Wisner 1984** a “giant hagfish” named in honor of a “giant in ichthyology,” Carl L. Hubbs (1894–1979)

***Eptatretus cheni* (Shen & Tao 1975)** in honor of vertebrate zoologist Jianshen (“Johnson”) T. F. Chen (1898–1988), Director, National Taiwan Museum (Taipei), for “important” contributions to the taxonomy of Taiwanese fishes

***Eptatretus chinensis* Kuo & Mok 1994** *-ensis*, Latin suffix denoting place: China, specifically South China Sea off southeastern Taiwan, type locality

***Eptatretus cirrhatus* (Forster 1801)** adjectival form of *cirrus* (L.), tuft of hair or fringe, i.e., having tendrils, incorrectly presumed by Forster to be a “lamprey” with barbels

***Eptatretus cryptus* Roberts & Stewart 2015** from *kryptós* (Gr. κρυπτός), hidden or secret, referring to its similar morphology to *E. cirrhatus*, with which it has been confused in the past

***Eptatretus deani* (Evermann & Goldsborough 1907)** in honor of American ichthyologist Bashford Dean (1867–1928), American Museum of Natural History (New York), for his work on the embryology of *E. stoutii*

***Eptatretus fernholmi* (Kuo, Huang & Mok 1994)** in honor of Bo Fernholm (b. 1941), Swedish Museum of Natural History, for his contributions to hagfish biology

***Eptatretus fritzi* Wisner & McMillan 1990** in honor of Frithjof (Fritz) Ohre, “friend, willing, eager, and industrious volunteer” who helped the authors collect specimens

***Eptatretus fudgei* Fernholm & Mincarone 2023** in honor of Douglas S. Fudge, Chapman University (Orange, California, USA), for his many contributions to the knowledge of the physiology, biomechanics and biometrics of hagfishes and hagfish slime

***Eptatretus goliath* Mincarone & Stewart 2006** the giant slain by David in the biblical book of Samuel, now a synonym for “giant”; at 1275 mm TL and 6.2 kg, the largest known hagfish

***Eptatretus gomoni* Mincarone & Fernholm 2010** in honor of Martin F. Gomon (b. 1945), Senior Curator, Ichthyology, Museum of Victoria (Melbourne, Australia), for “distinguished” contributions to ichthyology

***Eptatretus goslinei* Mincarone, Plachetzki, McCord, Winegard, Fernholm, Gonzalez & Fudge 2021** in honor of John M. Gosline (1944–2016), University of British Columbia, who “pioneered” work on the biomechanics of hagfish slime

***Eptatretus grouseri* McMillan 1999** in honor of McMillan's son, David

“Grouser” McMillan, a Chief Engineer in the U.S. Merchant Marine, for “continued encouragement” of Mom's hagfish studies and for his knowledge and love of ships and the sea

***Eptatretus hexatrema* (Müller 1836)** *héx* (Gr. ἕξ), six; *tréma* (Gr. τρήμα), hole, referring to six gill apertures per side

***Eptatretus indrambaryai* Wongratana 1984** in honor of Thai fisheries biologist Boon Indrambarya (1907–1994), “one of the senior-most pioneer fisheries biologists of Thailand” [often dated 1983 but publication appeared in 1984]

***Eptatretus laurahubbsae* McMillan & Wisner 1984** in honor of Laura Clark Hubbs (1893–1988), friend and co-worker, who contributed to the life and works of her husband, ichthyologist Carl L. Hubbs (1894–1979)

***Eptatretus longipinnis* Strahan 1975** *longus* (L.), long; *pinnis* (scientific Neo-Latin), finned, referring to well-developed fold on ventral fins that extends to branchial region

***Eptatretus luzonicus* Fernholm, Norén, Kullander, Quattrini, Zintzen, Roberts, Mok & Kuo 2013** *-icus* (L.), belonging to: Luzon Island, Philippines, type locality [replacement name of *E. fernholmi* McMillan & Wisner 2004, which became a junior homonym of *Paramyxine fernholmi* Kuo, Huang & Mok 1994 when *Paramyxine* was subsumed into *Eptatretus*]

***Eptatretus mcconnaugheyi* Wisner & McMillan 1990** in honor of Ronald R. McConnaughey, marine technician and diver, Scripps Institution of Oceanography, who helped develop gear used to capture holotype

***Eptatretus mccoskeri* McMillan 1999** in honor of American ichthyologist John E. McCosker (b. 1945), California Academy of Sciences, for collecting holotype and for his important contributions to marine biology

***Eptatretus mendozai* Hensley 1985** in honor of Luis H. “Uchy” Mendoza, captain of the research vessel *Crawford* from which holotype was collected, for his “experiential knowledge and academic curiosity of the sea, without whose determination and nautical wisdom” the author would never have discovered this hagfish

***Eptatretus menezesi* Mincarone 2000** in honor of Naércio Aquino Menezes (b. 1937), Museu de Zoologia da Universidade de São Paulo, for his “extensive” contribution to Brazilian ichthyology

***Eptatretus minor* Fernholm & Hubbs 1981** Latin for less, referring to small size of mature specimens when compared with *E. springeri*

***Eptatretus moki* (McMillan & Wisner 2004)** in honor of Hin-kiu Mok (b. 1947), National Sun Yat-Sen University, Taiwan, for his many “outstanding” contributions to hagfish knowledge

***Eptatretus multidentis* Fernholm & Hubbs 1981** *multus* (L.), many; *dens* (L.), tooth, referring to high tooth count (three fused teeth in each row)

***Eptatretus nanii* Wisner & McMillan 1988** in honor of zoologist Alberto Nani Caputo (1913–1989), University of Buenos Aires, for his work on Chilean hagfishes, and for providing specimens

***Eptatretus nelsoni* (Kuo, Huang & Mok 1994)** in honor of ichthyologist Gareth J. Nelson (b. 1937), then with the American Museum of Natural History, for contributions to the promotion of phylogenetic systematics

***Eptatretus octatrema* (Barnard 1923)** from *októ* (Gr. ὀκτώ), eight; *tréma* (Gr. τρήμα), hole, referring to eight gill apertures per side

***Eptatretus okinoseanus* (Dean 1904)** *-anus* (L.), belonging to: Okinose, Honshu Island, Japan, type locality

***Eptatretus poicilus* Zintzen & Roberts 2015** from *poikilos* (Gr. ποικίλος), mottled or varicolored, referring to its distinctive mottled color pattern

***Eptatretus polytrema* (Girard 1855)** *poly-* (Gr. πολύ-), many; *tréma* (Gr. τρήμα), hole, referring to 16 gill apertures per side

***Eptatretus profundus* (Barnard 1923)** Latin for deep, referring to its capture at 732 m

Eptatretus sheni (Kuo, Huang & Mok 1994) in honor of Shih (or Shieh)-Chieh Shen, National Taiwan University, for his contributions to the knowledge of Taiwanese fishes

Eptatretus sinus Wisner & McMillan 1990 Latin for bay or gulf, referring to its apparent restriction to the midriff area of the Gulf of California, México

Eptatretus springeri (Bigelow & Schroeder 1952) in honor of American shark biologist Stewart Springer (1906–1991), then with the U.S. Fish and Wildlife Service, “who discovered this interesting cyclostome”

Eptatretus stoutii (Lockington 1878) in honor of Arthur B. Stout (1814–1898), surgeon and corresponding secretary of the California Academy of Sciences [see box, below]

Eptatretus strahani McMillan & Wisner 1984 in honor of Australian zoologist Ronald Strahan (1922–2010), for “important” contributions to the study of hagfishes

Eptatretus strickrotti Møller & Jones 2007 in honor of Bruce Strickrott (b. 1964), pilot of the deep-submergence vehicle *Alvin*, who captured this and other mobile hydrothermal vent animals with a slurp gun

Eptatretus taiwanae (Shen & Tao 1975) of Taiwan, off the coasts of which this species occurs

Eptatretus wadgensis Augustina, Sreeram, Sukumaran, Sreekumar, Jose, Joshi & Gopalakrishnana 2022 *-ensis*, Latin suffix denoting place: Wadge Bank, Lakshadweep Sea, India, type locality

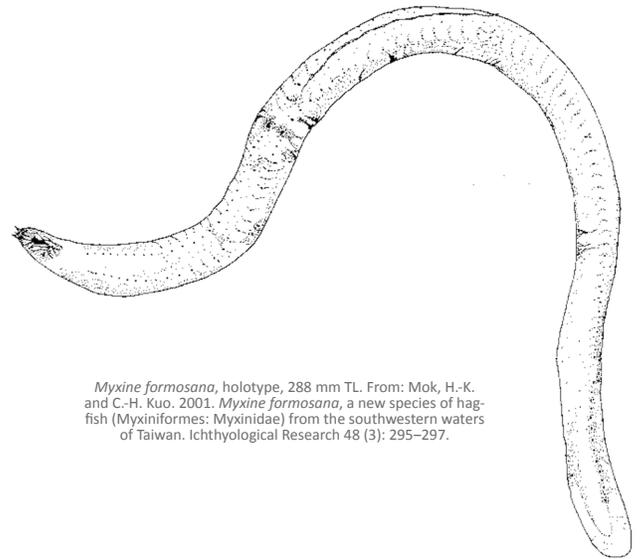
Eptatretus walkeri (McMillan & Wisner 2004) in honor of Harold J. Walker, Jr., Collections Manager, Scripps Institution of Oceanography (San Diego, California, USA), for help in providing hagfish specimens and data, and for contributions to ichthyology

Eptatretus wandoensis Song & Kim 2020 *-ensis*, Latin suffix denoting place: Wando-gun, Jeollanam-do, Republic of Korea, type locality

Eptatretus wayuu Mok, Saavedra-Díaz & Acero P. 2001 named for the Wayuu aborigines who live on the Guajira Peninsula of Colombia, type locality

Eptatretus wisneri (Kuo, Huang & Mok 1994) in honor of American ichthyologist Robert L. Wisner (1921–2005), Scripps Institution of Oceanography (San Diego, California, USA) for his contributions to hagfish biology

Eptatretus yangi (Teng 1958) in honor of Hung-Jia (spelled Hung-Chia



Myxine formosana, holotype, 288 mm TL. From: Mok, H.-K. and C.-H. Kuo. 2001. *Myxine formosana*, a new species of hagfish (Myxiniformes: Myxinidae) from the southwestern waters of Taiwan. Ichthyological Research 48 (3): 295–297.

in Pinyin) Yang, Taiwanese Fisheries Research Institute (Kaohsiung), who collected type series

Hagfishes
Subfamily MYXININAE
Rafinesque 1815

Myxine
Linnaeus 1758

from *mýxa* (Gr. μύξα), mucus or slime, and, correspondingly, *myxínos* (μυξίνος), that which produces mucus or slime

Myxine affinis Günther 1870 Latin for related, presumably referring to its similarity to *M. glutinosa*

Myxine australis Jenyns 1842 Latin for southern, referring to its distribution in the Straits of Magellan (southern Chile)

Myxine capensis Regan 1913 *-ensis*, Latin suffix denoting place: Cape of Good Hope, South Africa, type locality

Myxine circifrons Garman 1899 *circi-*, presumably from *circularis* (L.), round; *frons* (L.) face or brow, referring to “rounded” labrum, com-

Has a hagfish ever been named for a “slimy” person?

Hagfishes are noted for the copious amounts of slime they produce. Which got us wondering: Has any species of hagfish been named after a “slimy” (i.e., creepy, oily, unctuous) person? We don’t know if Arthur B. Stout qualifies as slimy, but he certainly held some unpleasant views.

The Pacific Hagfish *Eptatretus stoutii* was described by English zoologist William Neale Lockington (1840–1902) in 1878. Lockington was the curator of the California Academy of Sciences (CAS) museum from 1875 to 1881. He named the hagfish after Arthur B. Stout (1814–1898), a surgeon and corresponding secretary of CAS. Stout was well known in San Francisco for his racist views (back in the day when being a racist was considered a noble and desirable trait). Stout was especially anti-Chinese. In 1862, he published *Chinese Immigration and the Physiological Cause of the Decay of the Nation*. In it he wrote that China was seeding America with various diseases, including tuberculosis, scrofula, syphilis, and “mental alienation.” He also said that welcoming Chinese (as well as African) people into American society would create a “cancer” in the country’s “biological, social, religious, and political systems.”

“By intermingling with Europeans,” Stout went on, “we are but reproducing our own Caucasian type; by commingling with the Eastern Asiatics, we are creating degenerate hybrids.”

Slime notwithstanding, hagfishes are honorable, fascinating creatures that deserve to be named after less-odious humans than Dr. Stout. We can only hope that he contributed more to the California Academy of Sciences than he did to humankind.

pared with “acute” labrum of *M. acutifrons* (= *australis*) proposed in the same publication

***Myxine debueni* Wisner & McMillan 1995** in honor of Spanish ichthyologist and oceanographer Fernando de Buen y Lozano (1895–1962), for his “extensive work” on South American fishes

***Myxine fernholmi* Wisner & McMillan 1995** in honor of Bo Fernholm (b. 1941), Swedish Museum of Natural History, for his work on hagfish anatomy, physiology and systematics

***Myxine formosana* Mok & Kuo 2001** -*ana* (L.), belonging to: Formosa, historical name of Taiwan, type locality

***Myxine garmani* Jordan & Snyder 1901** in honor of American ichthyologist-herpetologist Samuel Garman (1843–1927), Harvard University, for his “excellent work” on *Myxine*

***Myxine glutinosa* Linnaeus 1758** Latin for viscous or sticky, referring to its ability to produce copious amounts of slime or mucus

***Myxine greggi* Mincarone, Plachetzki, McCord, Winegard, Fernholm, Gonzalez & Fudge 2021** in honor of John Gregg, founder and president of the Western Flyer Foundation, an “ardent supporter of marine biology research and a hagfish enthusiast. He joined the team during part of the Galapagos expedition and was on the boat when the specimens were collected.”

***Myxine hubbsi* Wisner & McMillan 1995** in honor of American ichthyologist Carl L. Hubbs (1894–1979), “primarily for his foresight in instigating the worldwide study on hagfishes”

***Myxine hubbsoides* Wisner & McMillan 1995** -*oides*, Neo-Latin from *éidos* (Gr. εἶδος), form or shape: referring to similarity to *M. hubbsi*

***Myxine ios* Fernholm 1981** acronym for Institute of Oceanographic Sciences, Wormley, Surrey, England, which supplied holotype

***Myxine jespersenae* Møller, Feld, Poulsen, Thomsen & Thormar 2005** in honor of biologist Åse Jespersen (b. 1955), University of Copenhagen, for her contributions to the reproductive biology of hagfishes

***Myxine knappi* Wisner & McMillan 1995** in honor of American ichthyologist Leslie W. Knapp (1929–2017), National Museum of Natural History, Smithsonian Institution (Washington, D.C.), for supplying the authors with study material

***Myxine kuoi* Mok 2002** in honor of molecular biologist Chien-Hsien Kuo, National Chiayi University (Taiwan), for his contributions to hagfish taxonomy

***Myxine limosa* Girard 1859** Latin for muddy, referring to its seafloor habitat

***Myxine martinii* Mincarone, Plachetzki, McCord, Winegard, Fernholm, Gonzalez & Fudge 2021** in honor of Frederic (Ric) Martini, “who for many years taught at the Shoals Marine Laboratory (University of New Hampshire, Cornell University) and introduced many students to the wonders of hagfish through his lectures and his research publications”

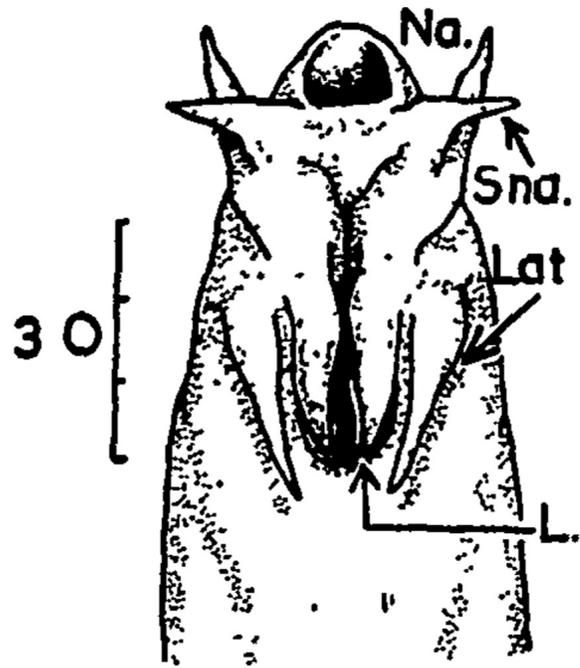
***Myxine mccoskeri* Wisner & McMillan 1995** in honor of American ichthyologist John E. McCosker (b. 1945), California Academy of Sciences, for his work on Caribbean and Panamanian fishes, and for providing holotype

***Myxine mcmillanae* Hensley 1991** in honor of marine biologist Charmion B. McMillan (b. 1925), Scripps Institution of Oceanography, for her “fine” contributions to hagfish science

***Myxine paucidens* Regan 1913** *paucus* (L.) few; *dens* (L.) tooth, referring to 13 total teeth compared to 15–24 teeth in similar species

***Myxine pequenoi* Wisner & McMillan 1995** in honor of German Pequeño Reyes (b. 1941), Universidad Austral de Chile, for his work on Chilean fishes and for providing holotype

***Myxine phantasma* Mincarone, Plachetzki, McCord, Winegard, Fernholm, Gonzalez & Fudge 2021** *phántasma* (Gr. φάντασμα), apparition, phantom or ghost, referring to its transparent skin, the only species of *Myxine* known to lack melanin-based pigments



Nemamyxine elongata, ventral view of head. L = labial tentacle. Lat = lateral tentacle. Na. = nasal barbel. Sna. = subnasal barbel. Scale is in mm. From: Richardson, L. R. 1958. A new genus and species of Myxinidae (Cyclostomata). Transactions of the Royal Society of New Zealand 85 (2): 283–287.

tion, phantom or ghost, referring to its transparent skin, the only species of *Myxine* known to lack melanin-based pigments

***Myxine robinsorum* Wisner & McMillan 1995** -*orum*, commemorative suffix (L.), plural: in honor of American ichthyologists C. Richard Robins (1928–2020) and his wife Catherine, for their work on the fishes of the tropical western Atlantic [originally spelled *robinsi*; emended spelling is in prevailing usage]

***Myxine sotoi* Mincarone 2001** in honor of Jules Marcelo Rosa Soto (b. 1970), Universidade do Vale do Itajaí, for his work on the Brazilian marine fauna and for encouraging Mincarone to study hagfishes

Nemamyxine

Richardson 1958

nēma (Gr. νῆμα), thread, i.e., a thin, elongate *Myxine*

***Nemamyxine elongata* Richardson 1958** Latin for prolonged, referring to its extremely slender form

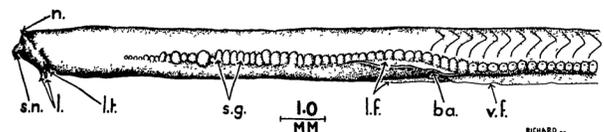
***Nemamyxine krefftii* McMillan & Wisner 1982** in honor of German ichthyologist-herpetologist Gerhard Krefft (1912–1993), Institute für Seefischerei (Hamburg), on the occasion of his 70th birthday, for his many “valuable” contributions to oceanic ichthyology; Krefft also loaned holotype to the authors [not to be confused with his great uncle, German-born Australian adventurer and zoologist Johann Ludwig (Louis) Gerard Krefft (1830–1881), for whom several fishes are named]

Neomyxine

Richardson 1953

néos (Gr. νέος), new, i.e., a new genus related to *Myxine*

***Neomyxine biniplicata* (Richardson & Jowett 1951)** *bini* (L.) two by two; *plicata* (L.) folded, referring to paired fin-folds extending anteriorly



Neomyxine biniplicata, head and pharyngeal region. Illustration by Richard Barwick. ba. = branchial aperture. l. = lateral, l.f. = lateral fin-folds, n. = nasal, and s.n. = subnasal tentacles. l.f. = lateral and v.f. = ventral fin-folds. s.g. = mucous glands. From: Richardson, L. R. 1953. *Neomyxine* n. g. (Cyclostomata) based on *Myxine biniplicata* Richardson and Jowett 1951, and further data on the species. Transactions of the Royal Society of New Zealand 81 (3): 379–383.



Notomyxine tridentiger, ventral view of head and anterior body, show external gill openings, external orifice of esophageal-cutaneous duct, mucous pores, and dental series projecting outwards. From: Nani, A. and F. S. Gneri. 1951. Introducción al estudio de los Mixinoideos Sudamericanos. I. Un nuevo género de "Babosa de mar," *Notomyxine* (clase Myxini, familia Myxinidae). Revista del Instituto Nacional de Investigación de las Ciencias Naturales anexo al Museo Argentino de Ciencias Naturales "Bernardino Rivadavia." Ciencias zoológicas 2 (4): 183–224, Pls. 1–3.

from behind branchial apertures

Neomyxine caesiovitta Stewart & Zintzen 2015 *caesius* (L.), blue gray; *vitta* (L.), ribbon or band, referring to distinctive blue band along sides

Notomyxine

Nani & Gneri 1951

nótos (Gr. νότος), south (from *Nótos*, Greek god of the south wind), i.e., a southern genus (restricted to the Antarctic Ocean) related to *Myxine*

Notomyxine tridentiger (Garman 1899) *tri-* (L.), three; *dens* or *dent-* (L.), tooth; *-ger*, Latin suffix meaning to bear or carry, i.e., having three united anterior oral cusps