

# **Chapter 4**

**Stomiiformes**

**Order Stomiiformes**

Number of suborders	(2) Gonostomatoidei; Phosichthyoidei (= Photichthyoidei, Stomioidei). Stomiiform monophyly was demonstrated by Fink and Weitzman (1982); relationships within the order are not settled, e.g., Harold and Weitzman (1996).
Number of families	4 (or 5: Harold [1998] suggested that <i>Diplophos</i> , <i>Manducus</i> , and <i>Triplophos</i> do not belong in Gonostomatidae, and Nelson [2006] provisionally placed them in a separate family, Diplophidae).
Number of genera	53
Number of species	approx. 391

**GENERAL LIFE HISTORY**

Distribution	All oceans.
Relative abundance	Rare to very abundant, depending on taxon.
Adult habitat	Small to medium size (to ca. 10–40 cm) inhabitants of epi-, meso-, and bathypelagic zones, some are vertical migrators.

**EARLY LIFE HISTORY**

Mode of reproduction All species known or assumed to be oviparous with planktonic eggs and larvae.

Knowledge of ELH Eggs known for 9 genera, larvae known for 38 genera.

ELH Characters: **Eggs:** spherical, ca. 0.6–3.6 mm in diameter, commonly with double membrane, yolk segmented, with 0–1 oil globule ca. 0.1–0.4 mm in diameter, perivitelline space narrow to wide.

**Larvae:** slender and elongate initially but some become deep-bodied (primarily some sternoptychids and stomiids); preanal length ranges from approx. 30%BL to > 70% BL, most commonly  $\geq$  about half BL, some taxa with trailing gut that can be > 100% BL; eyes strongly elliptical to round, most commonly elliptical, stalked in some species; spines lacking on head and pectoral girdle except in some sternoptychids; myomeres range from 29–164, most commonly approx. mid-30's to mid-60's; photophores form during postflexion and/or transformation stage; pigmentation absent to heavy, most commonly light.

Example species: **GONOSTOMATOIDEI:** *Diplophos taenia*, *Manducus maderensis* (Gonostomatidae, Diplophinae), *Bonapartia pedaliota*, *Cyclothone acclinidens*, *Gonostoma atlanticum*, *Margrethia obtusirostre*, *Sigmops elongatum* (Gonostomatidae, Gonostomatinae), *Araiophos eastropas*, *Argyripnus atlanticus*, *Danaphos oculatus*, *Mauroliticus*

*muelleri*, *Valenciennellus tripunctulatus* (Sternoptychidae, Maurolicinae), *Argyropelecus sladeni*, *Polyipnus polli*, *Sternoptyx* sp. (Sternoptychidae, Sternoptychinae).

PHOSICHTHYOIDEI: *Ichthyococcus irregularis*, *Pollichthys maui*, *Vinciguerria poweriae*, *Woodsia nonsuchae*, *Yarella blackfordi*, (Phosichthyidae), *Chauliodus macouni* (Stomiidae, Chauliodontinae), *Stomias atriventer* (Stomiidae, Stomiinae), *Astronesthes* sp., *Borostomias panamensis*, *Heterophotus ophisthoma*, *Neonesthes capensis* (Stomiidae, Astronesthinae), *Bathophilus filifer*, *Echiostoma barbatum*, *Eustomias bifilis*, *Flagellostomias boureei*, *Leptostomias* sp., *Melanostomias tentaculatus*, *Opostomias mitsuui*, *Photonectes margarita*, *Tactostoma macropus* (Stomiidae, Melanostomiinae), *Aristostomias scintillans*, *Photostomias guernei* (Stomiidae, Malacosteinae), *Idiacanthus antrostomus* (Stomiidae, Idiacanthinae).

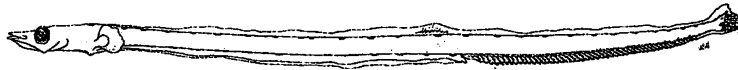
REFERENCES

Harold (1998), Nelson (2006), others listed in family sections.

Stomiiformes/Gonostomatoidei/Gonostomatidae/Diplophinae

**Diplophos**

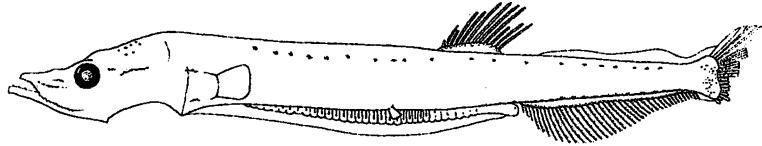
*D. taenia*  
21.5 mm  
(Watson 1996a)



**Araioi**  
*A. easti*  
(Ahlstrom 1969)

**Manducus**

*M. maderensis*  
10.0 mm  
(Smith et al. 1991)

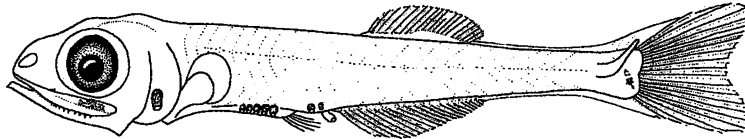


**Argyri**  
*A. atla*  
(Ahlstrom 1969)

Stomiiformes/Gonostomatoidei/Gonostomatidae/Gonostomatinae

**Bonapartia**

*B. pedaliota*  
11.5 mm  
(Ahlstrom et al. 1984c)



**Danap**  
*D. oculi*  
(Watson 1996a)

**Mauric**  
*M. muriei*  
(Okiyama 1969)

**Cyclothone**

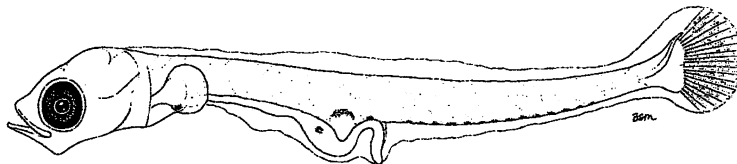
*C. acclinidens*  
5.8 mm  
(Watson 1996a)



**Valentini**  
*V. triplicata*  
7.3 mm  
(Watson 1996a)

**Gonostoma**

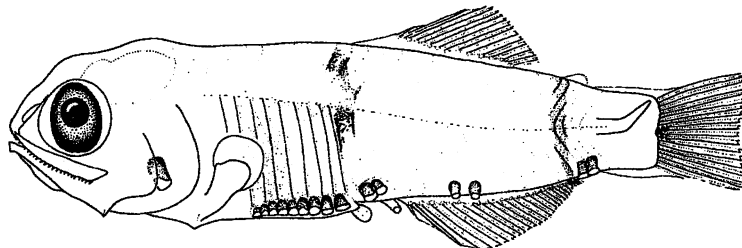
*G. atlanticum*  
6.0 mm  
(Watson 1996a)



**Argyri**  
*A. slacii*  
(Watson 1996a)

**Margrethia**

*M. obtusirostre*  
6.7 mm  
(Ahlstrom et al. 1984c)



**Polyip**  
*P. pollux*  
(Ahlstrom 1969)

**Sigmops**

*S. elongatum* 4.7 mm  
(Watson 1996a)

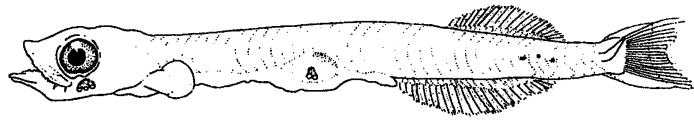


**Sternopyg**  
*S. sp.*  
(Watson 1996a)

Stomiiformes/Gonostomatoidei/Sternoptychidae/Maurolicinae

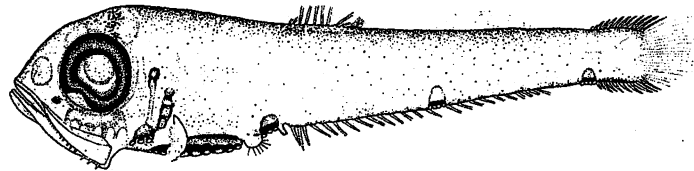
*Araiophos*

*A. eastropas* 8.8 mm  
(Ahlstrom and Moser  
1969)



*Argyripnus*

*A. atlanticus* 18.7 mm  
(Ahlstrom et al. 1984c)



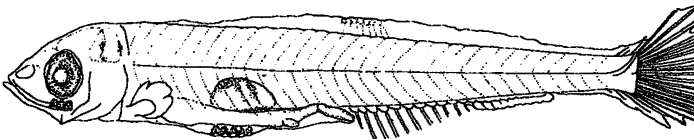
*Danaphos*

*D. oculus* 13.2 mm  
(Watson 1996a)



*Maurolicus*

*M. muelleri* 5.9 mm  
(Okuyama 1971)



*Valenciennellus*

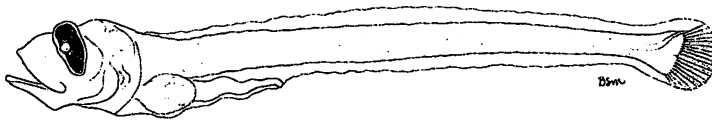
*V. tripunctulatus*  
7.3 mm  
(Watson 1996a)



Stomiiformes/Gonostomatoidei/ Sternoptychidae /Sternoptychinae

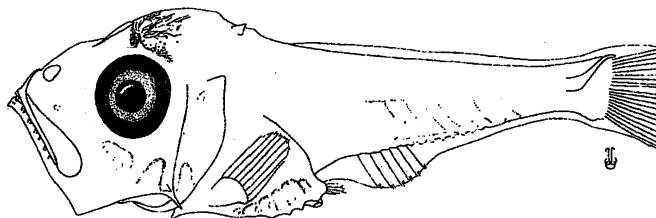
*Argyropelecus*

*A. sladeni* 9.4 mm  
(Watson 1996a)



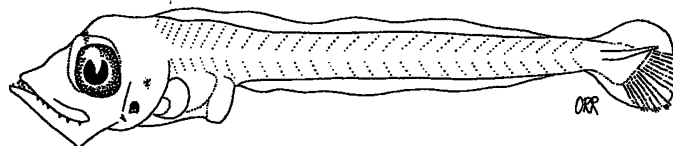
*Polyipnus*

*P. polli* 5.2 mm  
(Ahlstrom et al. 1984c)



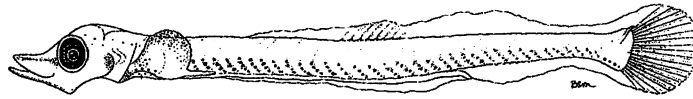
*Sternoptyx*

*S. sp.* 6.4 mm  
(Watson 1996a)

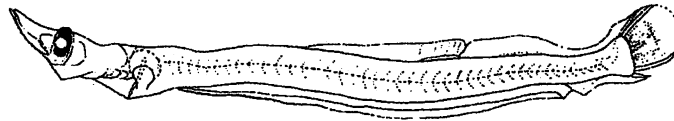


Stomiiformes/Phosichthyoidei/Phosichthyidae

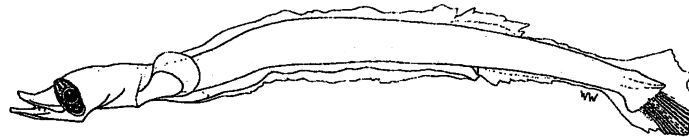
**Ichthyococcus**  
*I. irregularis* 8.8 mm  
 (Watson 1996a)



**Pollichthys**  
*P. maui* 8.4 mm  
 (Ozawa 1976)



**Vinciguerria**  
*V. poweriae* 6.6 mm  
 (Watson 1996a)



**Woodsia**  
*W. nonsuchae* 5.7 mm  
 (Watson 1996a)



**Yarella**  
*Y. blackfordi* 23.5 mm  
 (Ahlstrom et al. 1984c)



**Stomi**  
*S. atr*  
 (Kawa  
 Moser

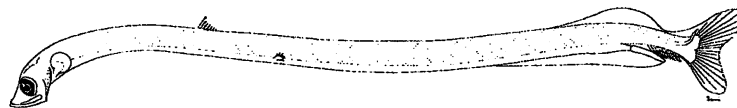
**Astron**  
*A. sp. 1*  
 (Mose

**Boros**  
*B. pan*  
 13.7 m  
 (Mose

**Heter**  
*H. oph*  
 (Ozaw

Stomiiformes/Phosichthyoidei/Stomiidae/Chauliodontinae

**Chauliodus**  
*C. macouni* 45.2 mm  
 (Kawaguchi and Moser  
 1984)

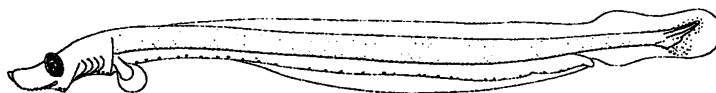


**Neone**  
*N. cap*  
 (Mose

Stomiiformes/Phosichthyoidei/Stomiidae/Stomiinae

***Stomias***

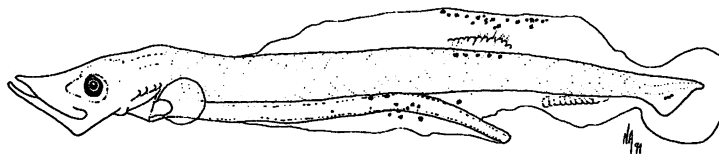
*S. atriventer* 10.0 mm  
(Kawaguchi and Moser 1984)



Stomiiformes/Phosichthyoidei/Stomiidae/Astronesthinae

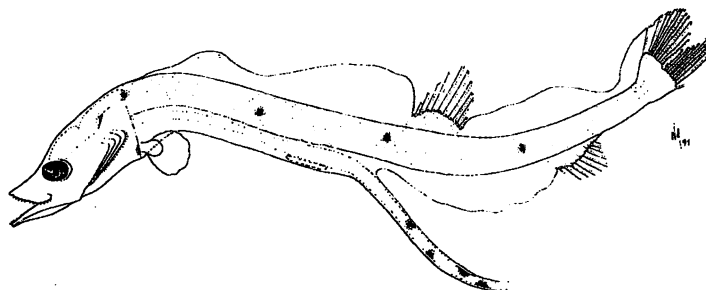
***Astronesthes***

*A. sp.* 8.1 mm  
(Moser 1996 c)



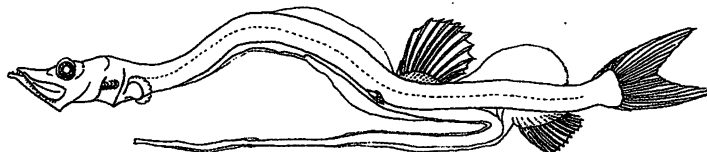
***Borostomias***

*B. panamensis*  
13.7 mm  
(Moser 1996c)



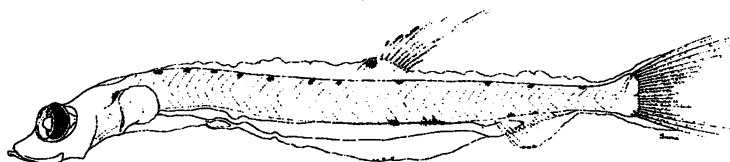
***Heterophotus***

*H. ophisthoma* 30.9 mm  
(Ozawa 1988a)



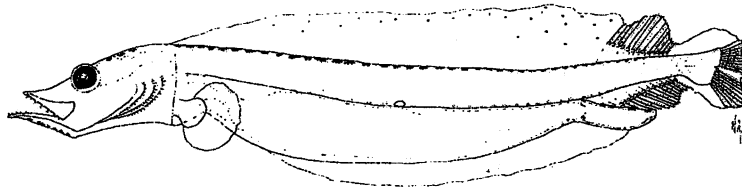
***Neonesthes***

*N. capensis* 15.2 mm  
(Moser 1996c)



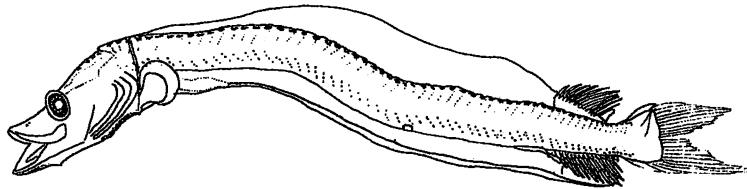
Stomiiformes/Phosichthyoidei/Stomiidae/Melanostomiinae

**Bathophilus**  
*B. filifer*  
11.1 mm  
(Moser 1996c)



**Opost**  
*O. mit*  
(Kawa  
Moser

**Echiostoma**  
*E. barbatum*  
16.4 mm  
(Ozawa and Aono  
1986)



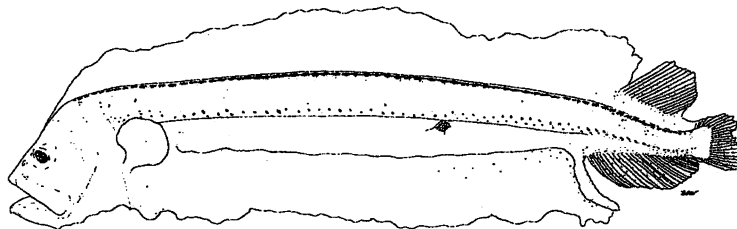
**Photor**  
*P. mar*  
(Kawa;  
1984)

**Eustomias**  
*E. sp.* 18.6 mm  
(Moser 1996 c)



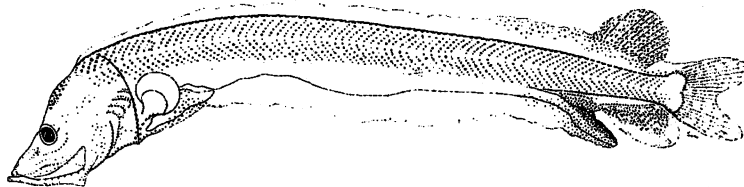
**Tactos**  
*T. mac*  
(Kawa;  
Moser

**Flagellostomias**  
*F. boureei* 36.4 mm  
(Kawaguchi and  
Moser 1984)



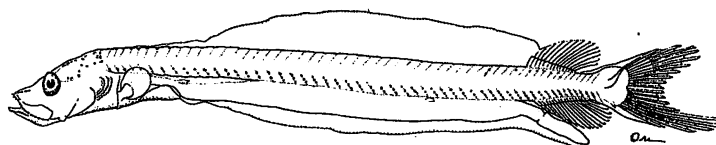
**Aristos**  
*A. scim*  
16.2 m  
(Moser

**Leptostomias**  
*L. sp.*  
24.5 mm  
(Kawaguchi and  
Moser 1984)



**Photosi**  
*P. guerr*  
(Ozawa

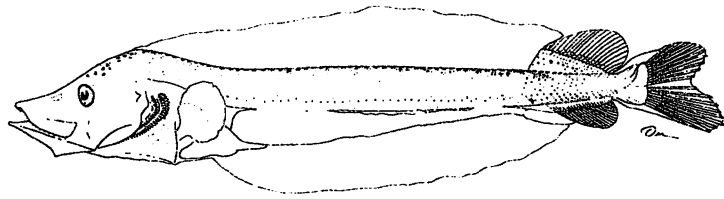
**Melanostomias**  
*M. sp.* 16.0 mm  
(Kawaguchi and  
Moser 1984)



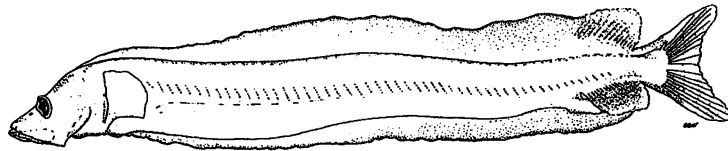
**Idiacan**  
*I. antro*  
21.8 mr  
(Moser



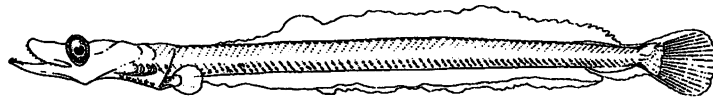
*Opostomias*  
*O. mitsuui* 15.0 mm  
 (Kawaguchi and Moser 1984)



*Photonectes*  
*P. margarita* 22.2 mm  
 (Kawaguchi and Moser 1984)

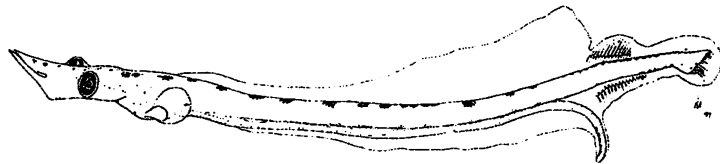


*Tactostoma*  
*T. macropus* 13.5 mm  
 (Kawaguchi and Moser 1993)

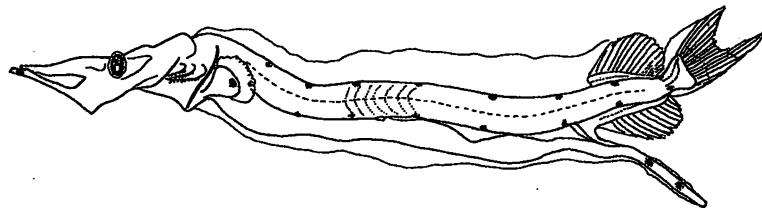


Stomiiformes/Phosichthyoidei/Stomiidae/Malacosteinae

*Aristostomias*  
*A. scintillans*  
 16.2 mm  
 (Moser 1996c)

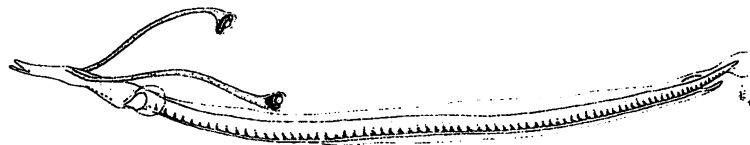


*Photostomias*  
*P. guernei* 14.3 mm  
 (Ozawa 1988a)



Stomiiformes/Phosichthyoidei/Stomiidae/Idiacanthinae

*Idiacanthus*  
*I. antrostomus*  
 21.8 mm  
 (Moser 1996c)



## Chapter 4

### Order Stomiiformes

Suborder                      Gonostomatoidei

Family                        **Gonostomatidae (Bristlemouths)**

Number of genera            8

Number of species         30–31

#### GENERAL LIFE HISTORY

Distribution                All oceans.

Relative abundance        Common; *Cyclothone* may be among the most abundant of fishes; larvae typically common in oceanic ichthyoplankton samples.

Adult habitat               Small (most species  $\leq 20$  cm) inhabitants of epi- to bathypelagic (primarily mesopelagic) zones over deep ocean to ocean basins.

#### EARLY LIFE HISTORY

Mode of reproduction      Oviparous with planktonic eggs and larvae.

Knowledge of ELH         Eggs poorly known (2 species), larvae known for all genera except *Triplophos*.

ELH Characters:            **Eggs:** spherical, ca. 0.8–1.2 mm in diameter, segmented yolk with single oil globule ca. 0.1–0.2 mm diameter.

**Larvae:** hatch at  $\leq$  ca. 3 mm, notochord flexes at approx. 4–7 mm, transformation at approx. 10–20 mm in gonostomatines, larger in diplophines (hatch at approx. 4–5 mm, flex at approx. 18–20 mm, transform at approx. 40 mm in *Diplophos*), slender and elongate, preanal length approx. 40–70% BL, eyes slightly to strongly elliptical, becoming approx. round by transformation, no spines on head or pectoral girdle, no fin-spines, myomeres 29–100 ( $< 50$  in gonostomatines,  $> 50$  in diplophines), photophores form during transformation, none united in common glands, pigmentation usually light, primarily on gas bladder, gut and ventrum (prominent dorsal pigment in *Diplophos* and *Manducus*).

Example species:         *Cyclothone signata* (eastern and central Pacific region).

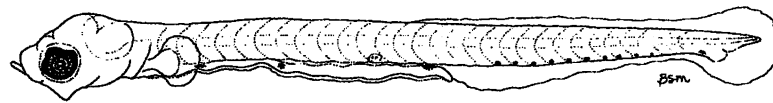
Meristics:                 D: 13–14, A: 18–20, P1: 8–10, P2: 6 (abd.), V: 13+17–19=30–32, C: 6–8, 10+9, 5–7.

#### REFERENCES

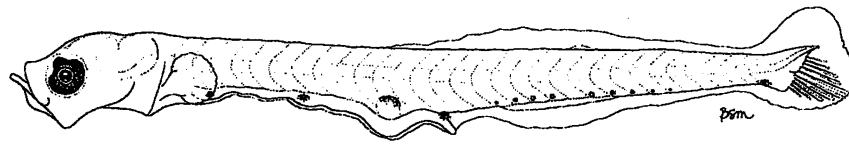
Ahlstrom 1974, Ahlstrom et al. 1984c, Badcock 1977, Beltrán-León and Herrera 2000, Fahay 2007a, Gorbunova 1982, Jespersen and Tåning 1919, 1926, Kawaguchi and Marumo 1967, Matarese et al. 1989, Mukacheva 1964, Ozawa 1986a, 1988a, Ozawa and Oda 1986a, b,

Richards 2001, 2006b, Rudometkina 1980, 1981, Sanzo 1931a, Smith et al. 1991, Watson 1996a.

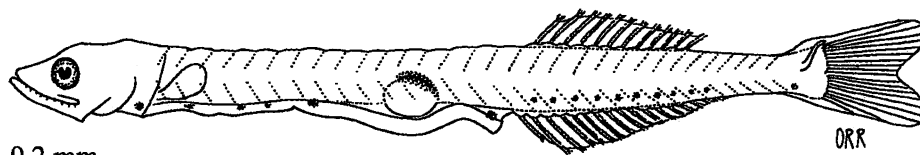
Stomiiformes/Gonostomatoidei/Gonostomatidae/Gonostomatinae  
*Cyclothone signata*  
from: Watson 1996a



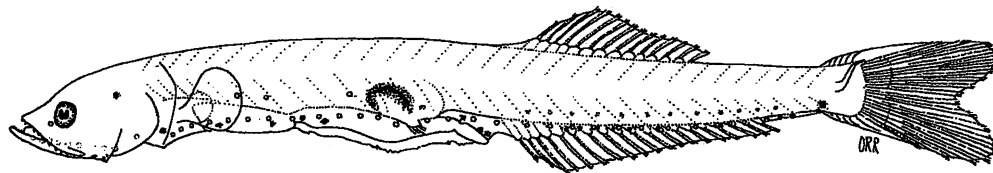
5.0 mm



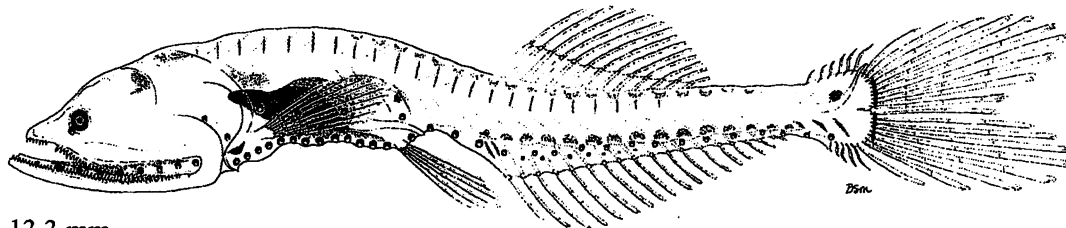
5.2 mm



9.2 mm



13.4 mm



13.3 mm

**Order Stomiiformes**

Suborder	Gonostomatoidei
Family	<b>Sternoptychidae (Marine Hatchetfishes)</b>
Number of genera	10
Number of species	approx. 67

**GENERAL LIFE HISTORY**

Distribution	Temperate to tropical regions of all oceans.
Relative abundance	Uncommon to locally abundant, depending on species; larvae of some species commonly occur in oceanic plankton samples.
Adult habitat	Small (usually < 10 cm) inhabitants of meso- and bathypelagic zones ( <i>Maurolicus</i> and <i>Polyipnus</i> epi- to upper mesopelagic, associated with islands and continental margins [ <i>Maurolicus</i> ]).

5.

**EARLY LIFE HISTORY**

Mode of reproduction	Oviparous with planktonic eggs and larvae.
Knowledge of ELH	Eggs known for two genera ( <i>Argyropelecus</i> , <i>Maurolicus</i> ), larvae known for all genera except <i>Sonoda</i> and <i>Thorophos</i> .

**ELH Characters:**

**Eggs:** spherical, 0.9–2.0 mm in diameter with segmented yolk and single oil globule ca. 0.2–0.3 mm in diameter, chorion smooth or sculptured (polygonal ridges in *Maurolicus*).

**Larvae:** hatch at approx. 2–3 mm, notochord flexes at approx. 5–12 mm, transformation at approx. 7–24 mm (*Argyropelecus* shrinks during transformation); initially slender and elongate with preanal length approx. 30–50% BL; PAL shortens in most during transformation and sternoptychines become deep-bodied (maurolicines remain relatively slender); eyes elliptical to round (narrow in most); maurolicines lack head spines, sternoptychines usually develop some during postflexion or transformation stage; myomeres 27–48; photophores form gradually during postflexion and transformation stages, those in at least some groups united in common glands; most with little or no pigmentation before late postflexion stage, primarily internally on head and/or gas bladder/gut when present.

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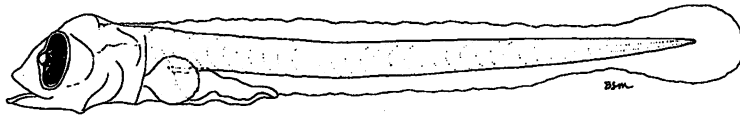
Example species: *Argyropelecus sladeni* (worldwide, seaward of the continental shelf).

Meristics: D: 8–9, A: 11–12, P1: 10–11, P2: 6 (abd.), V: 11+25–28=35–39, C: 9–10, 10+9, 5.

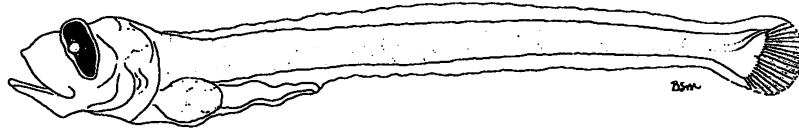
REFERENCES

Ahlstrom 1974, Ahlstrom et al. 1984c, Badcock 1977, Beltrán-León and Herrera 2000, Belyanina 1983, 1984, Fahay 2007a, Jespersen and Tåning 1919, 1926, Matarese et al. 1989, Mito 1961a, 1966, Okiyama 1971, Olivar and Fortuño 1991, Ozawa 1988a, Richards 2001, 2006a, Robertson 1976, Sanzo 1931a, Watson 1996a.

Stomiiformes/Gonostomatoidei/Sternoptychidae/Sternoptychinae  
*Argyrolepecus sladeni*  
from: Watson 1996a



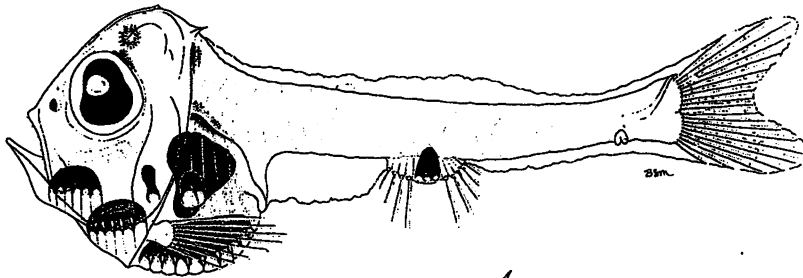
5.2 mm



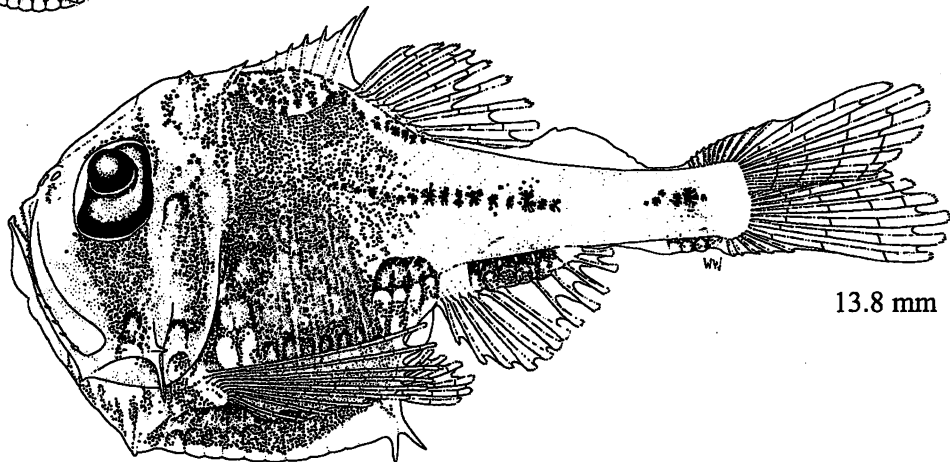
9.4 mm



10.0 mm



8.2 mm



13.8 mm

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**Order Stomiiformes**

Suborder Phosichthyoidei (= Photichthyoidei, Stomioidei)

Family **Phosichthyidae (= Photichthyidae) (Lightfishes)**

Number of genera 7

Number of species approx. 22

**GENERAL LIFE HISTORY**

Distribution Temperate to tropical waters of all oceans.

Relative abundance *Vinciguerria* may be among the most abundant of fishes, with larvae common in oceanic ichthyoplankton samples; other genera typically uncommon.

Adult habitat Small (most < 10 cm) inhabitants of meso- and bathypelagic zones (*Vinciguerria* is a meso- epipelagic vertical migrator; some *Polymetme* apparently are benthic on continental slopes).

**EARLY LIFE HISTORY**

Mode of reproduction Oviparous, with planktonic eggs and larvae.

Knowledge of ELH Eggs known for *Ichthyococcus* and *Vinciguerria*, larvae known for all genera except *Phosichthys* and *Polymetme*.

**ELH Characters:**

**Eggs:** spherical, approx. 0.6–0.9 mm in diameter with segmented yolk and 0–1 oil globule approx. 0.2 mm in diameter; smooth chorion; separate inner membrane present in some species.

**Larvae:** hatch at 2–4 mm, notochord flexes at 6–9 mm, transformation at 19–22 mm (*Vinciguerria* shrinks during transformation); slender and elongate with preanal length about 66–75% BL; gut may trail slightly in some (e.g., *Ichthyococcus*); eyes usually elliptical initially, becoming round in postflexion or transformation stage; no spines on head or pectoral girdle; myomeres about 37–54, pigmentation absent (e.g., *Pollichthys*, some *Vinciguerria*) to moderately heavy (e.g., *Woodsia*, *Yarella*); usually some pigment present, primarily on lower half of body.

Example species: *Vinciguerria lucetia* (warm waters of eastern Pacific Ocean, seaward of shelf).

Meristics: D: 13–16, A: 13–17, P1: 10, P2: 7 (abd.), V: 22–24+16–19=39–43, C: 7–10, 10+9, 4–5.

REFERENCES Ahlstrom 1974, Ahlstrom and Counts 1958, Ahlstrom et al. 1984c,

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Beltrán-León and Herrera 2000, Fahay 2007a, Gorbunova 1981, Jespersen and Tåning 1926, John and Zelck 1999, Matarese et al. 1989, Miller et al. 1979, Ozawa 1973, 1976, 1988a, Richards 2001, 2006a, Rudometkina 1975, Sanzo 1930, 1931a, Silas and George 1969, Watson 1996a.

Stomiiformes/Phosichthyoidei/Phosichthyidae  
*Vinciguerrria lucetia*  
from: Watson 1996 a

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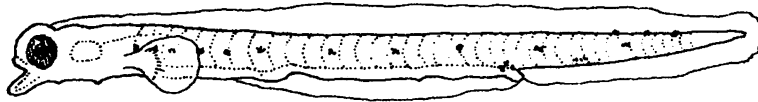
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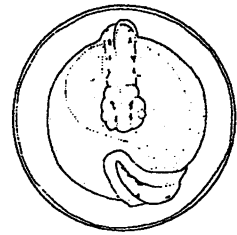
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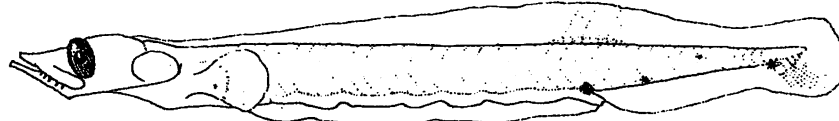
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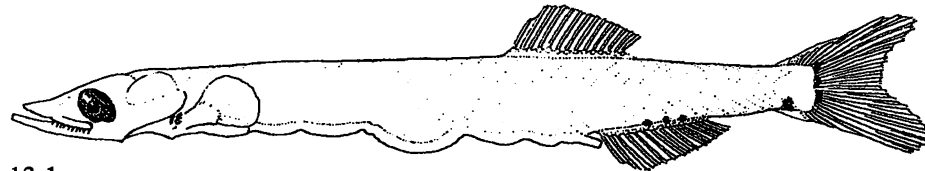
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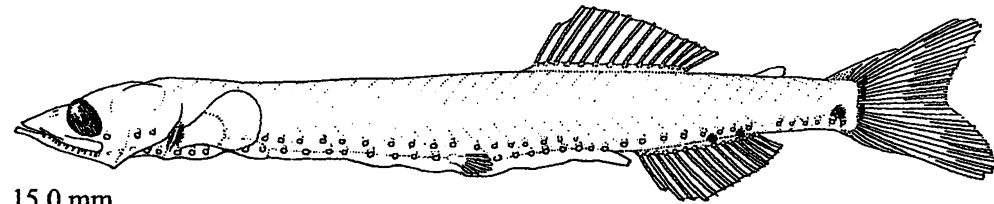
0.6-0.7 mm



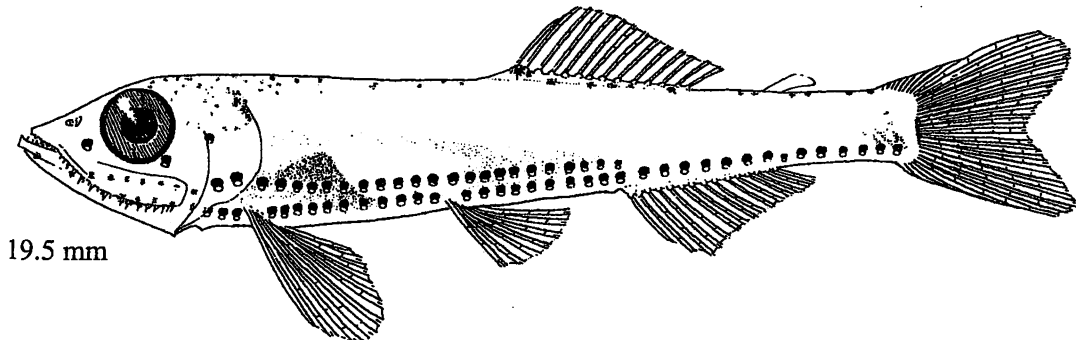
6.0 mm



13.1 mm



15.0 mm



19.5 mm

**Order Stomiiformes**

Suborder Phosichthyoidei (= Photichthyoidei, Stomioidei)

Family **Stomiidae (Barbeled Dragonfishes)**

Number of genera 28

Number of species approx. 273

**GENERAL LIFE HISTORY**

Distribution All oceans.

Relative abundance Larvae generally not abundant; some taxa can be locally common (e.g., *Chauliodus*, *Idiacanthus*) and others are rare (e.g., astronesthines, some melanostomiines) in oceanic ichthyoplankton.

Adult habitat Small to medium-size (to ca. 40 cm) predators in the epi-, meso- and bathypelagic zones, some possibly benthopelagic; most taxa meso- and/or bathypelagic.

**EARLY LIFE HISTORY**

Mode of reproduction Oviparous, with planktonic eggs and larvae.

Knowledge of ELH Eggs known for 3 genera (*Chauliodus*, *Stomias*, *Tactostoma*), larvae known for 18 genera representing all 6 subfamilies; several distinct larval types also known (see Kawaguchi and Moser 1984; Moser 1996c; Richards 2001, 2006a) but not currently identifiable below level of subfamily.ELH Characters: **Eggs:** spherical, approx. 0.9–3.6 mm in diameter with segmented yolk, no oil globule (*Chauliodus*) or 1 globule approx. 0.2–0.4 mm (*Stomias*, *Tactostoma*); chorion smooth, inner membrane usually present; perivitelline space moderate to large.**Larvae:** elongate, initially slender; some become moderately deep-bodied owing to voluminous gut and well developed finfold (e.g., some *Bathophilus*); preanal length usually  $\geq 70\%$  BL, gut trails and gut length may be  $> 100\%$  BL in some taxa; eyes slightly to strongly elliptical, may be stalked, commonly small; no spines on head or pectoral girdle; myomeres ca. 33–164; pigment absent (e.g., *Chauliodus*) to heavy (e.g., *Leptostomias*); each subfamily has distinctive larval characters:**Chauliodontinae** very elongate with long, non-trailing gut (PAL approx. 90–95% BL), small head with slightly oval eyes, dorsal fin far anterior (near head), myomeres ca. 51–62, unpigmented, large size at hatching, flexion and transformation (ca. 6–7, 15–20, 40–50 mm, respectively).**Stomiinae** very elongate with long, non-trailing gut (PAL approx. 80–

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90% BL), small head with slightly oval eyes, dorsal fin posterior, above anal fin, myomeres ca. 64–164, pigment primarily ventral along full length of body, ranging from marginal to covering lower half, large size at flexion and transformation (ca. 10–15 and 30 mm).

**Astronesthinae** elongate with long, non-trailing or slightly trailing gut (PAL approx. 80% BL), or with long, trailing gut that deflects a little before to well behind mid-body, moderate size head with oval eyes, dorsal fin near mid-body, anterior to anal fin, myomeres ca. 42–67, pigment absent to heavy, usually at least some laterally on body.

**Melanostomiinae** compressed and elongate with long, straight, non-trailing or slightly trailing gut with distinct, muscular terminal section, gut may become voluminous by postflexion stage, moderately large head with small, oval eyes, dorsal fin far posterior, above anal fin, myomeres ca. 33–83, pigment moderate to heavy, usually present on dorsum and on ventrum or lower half of body.

**Malacosteinae** elongate and slender with long, trailing gut (> 100% BL), moderately large, slightly to strongly depressed head with small, oval eyes, dorsal fin far posterior, above anal fin, myomeres ca. 44–58, pigment light to moderate, usually with distinctly separate melanophore pairs or patches on dorsal and ventral margins and gut.

**Idiacanthinae** very elongate and slender with long, trailing gut (> 100% BL), elongate, strongly depressed head with oval eyes on long, slender stalks, dorsal fin posterior initially, insertion just ahead of anal-fin origin, rays added anteriorly, myomeres ca. 78–85, pigment primarily a hypaxial melanophore on each myomere and series on isthmus and trailing section of gut.

Example species: *Bathophilus flemingi* (Gulf of Alaska to central Baja California, offshore).

Meristics: D: 14–16, A: 15–17, P1: 4–8, P2: 15–19 (abd.), V: 42–45+3–4=44–48, C: 5–6, 10+9, 2–3.

*Idiacanthus antrostomus* (temperate to tropical eastern Pacific, temperate northwestern Pacific).

Meristics: D: 54–66, A: 28–33, P1: 0, P2: 6 (abd.), V: 81–85, C: 11–14, 10+9, 7–10.

#### REFERENCES

Amaoka et al. 1992, Beebe 1934, Beebe and Crane 1939, Beltrán-León and Herrera 2000, Belyanina 1977, 1982, Ege 1918, Evseenko and Suntsov 1995, Fahay 2007a, Kawaguchi and Moser 1984, 1993, Matarese and Sandknop 1984, Matarese et al. 1989, Mito 1961, Moser 1981, 1996c, Novakova 1967, Ozawa 1988a, Ozawa and Aono 1986, Pertseva-Ostroumova and Rass 1973, Richards 2001, 2006a, Sanzo 1912, 1915, 1931a, Weihs and Moser 1981.

Stomiiformes/Phosichthyoidei/Stomiidae/Melanostomiinae  
*Bathophilus flemingi*  
from: Moser 1996c



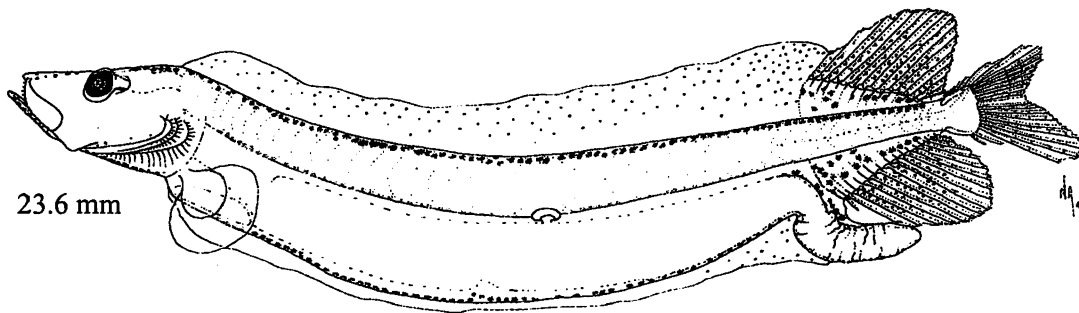
3.7 mm



5.6 mm

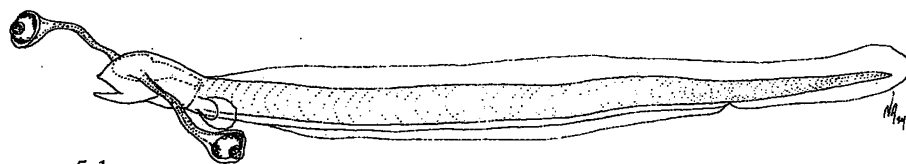


13.0 mm



23.6 mm

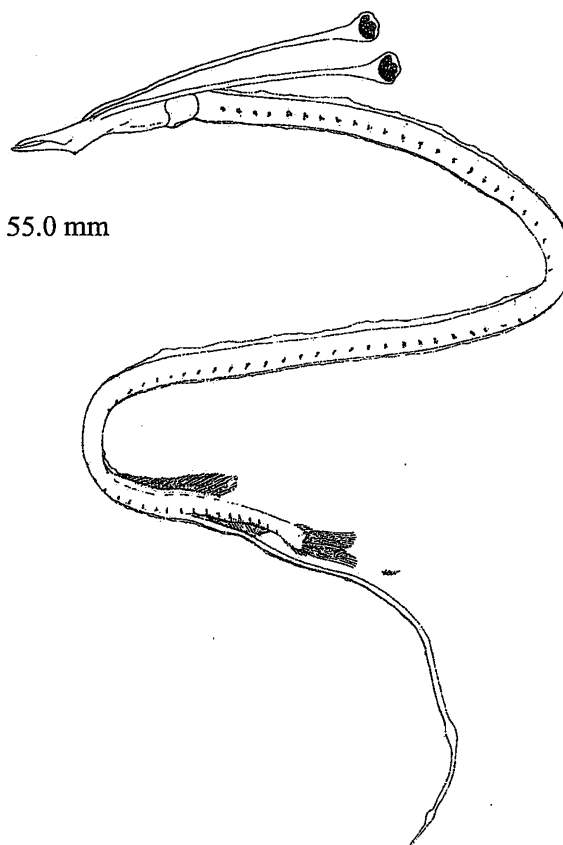
Stomiiformes/Phosichthyoidei/Stomiidae/Idiacanthidae  
*Idiacanthus antrostomus*  
from: Moser 1996c



5.1 mm



21.8 mm



55.0 mm

**IDENTIFICATION OF EGGS AND LARVAE OF MARINE FISHES**  
edited by Arthur W. Kendall, Jr.

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## Contributors

**David A. Ambrose**

2333 Shadyridge Ave., Escondido, CA  
92029, USA

**Deborah M. Blood**

NOAA, NMFS, AFSC, 7600 Sand Point  
Way, NE Seattle, WA 98115, USA

**Morgan S. Busby**

NOAA, NMFS, AFSC, 7600 Sand Point  
Way, NE Seattle, WA 98115, USA

**Sharon R. Charter**

NOAA, NMFS, SWFSC, 8604 La Jolla  
Shores Drive, La Jolla, CA 92037, USA

**Denice Drass**

NMFS MS Laboratory, 3209 Frederic  
Street, Pascagoula, MS 39567, USA

**Michael P. Fahay**

241 Sabine Road, West Booth Bay, ME  
04530-6711, USA

**Arthur W. Kendall, Jr.**

635 Wanapum Drive, La Conner, WA  
98257, USA

**Jeffrey M. Leis**

Australian Museum, 6 College Street,  
Sydney, NSW 2010, Australia

**Ann C. Matarese**

NOAA, NMFS, AFSC, 7600 Sand Point  
Way, NE Seattle, WA 98115, USA

**H. Geoffrey Moser**

PO Box 466, Bozeman, MT 59771, USA

**William Watson**

NOAA, NMFS, SWFSC, 8604 La Jolla  
Shores Drive, La Jolla, CA 92037, USA