

**ANGUILLIFORMES****Leptocephalus Larvae**

(Castle 1969; Smith 1979)

**General features**

- Body elongate, compressed, transparent, with small head.
- Myomeres visible over lateral surface.
- Gut along ventral margin of body; simple tube or with swellings or convolutions.
- Kidney elongate; lying along top of gut.
- Vertical blood vessels extend between gut and aorta at the body midline.
- No pelvic fins.
- Dorsal and anal fins short to (usually) long, always confluent with caudal.
- Pectoral fin rays late forming but fins may be reduced or absent.
- Caudal rays total 5–11, fins may be absent in Ophichthidae.
- Larval teeth fang-like (lost at metamorphosis).

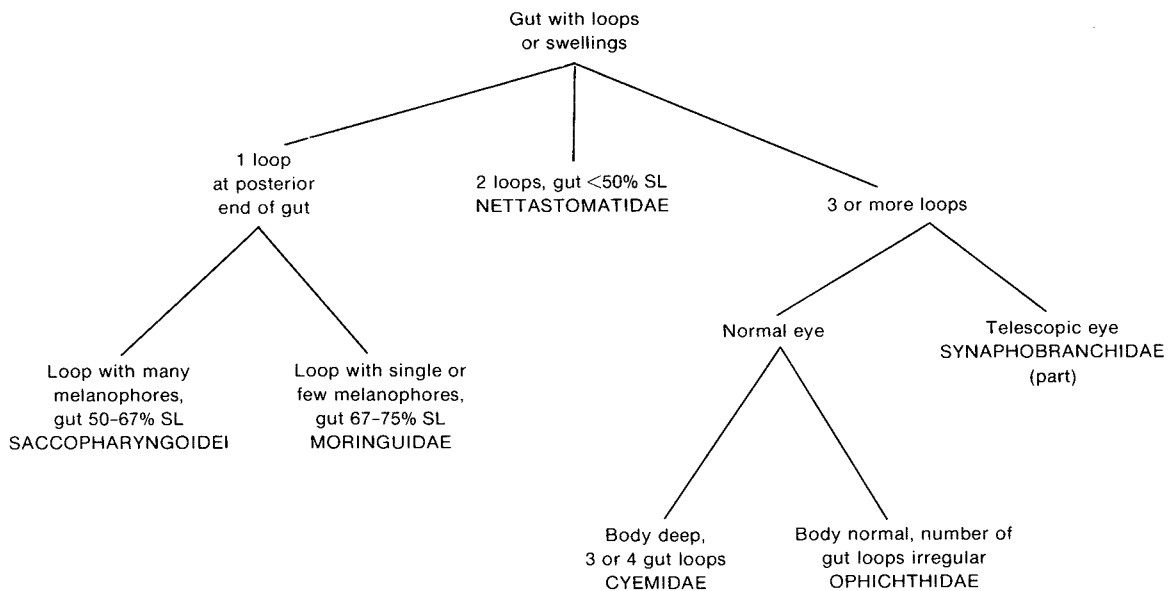
**Important identifying features**

- Shape of body, head, snout, and tail tip.
- Relative length and form of gut.
- Number of myomeres, preanal, predorsal and total.
- Position of vertical blood vessels.
- Location and extent of pigment spots.
- Size and position of nasal organ.
- Maximum size before metamorphosis.

**Note:** Leptocephalus larvae are also found in the orders Elopiformes and Notacanthiformes. Elopiform larvae have large, forked caudal fins (see Elopidae, Albulidae). Notacanthiform larvae replace the caudal fin with a long filament and have a short, anterior dorsal fin.

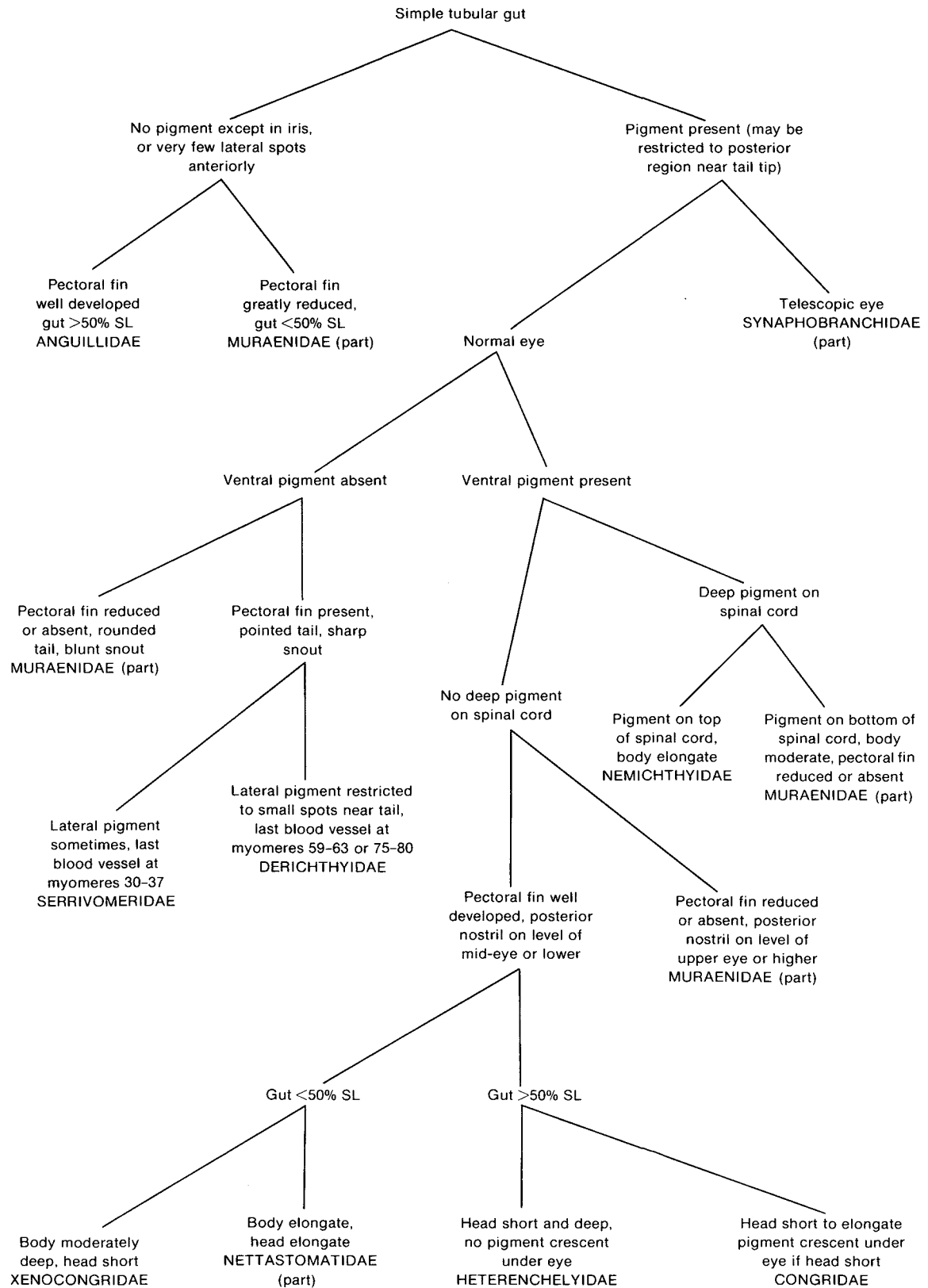
**Diagrammatic Family Key to Eel Leptocephali**

(After Smith 1979)



**Leptocephalus Larvae**

**ANGUILLIFORMES**

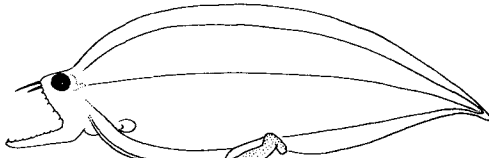


## ANGUILLIFORMES Synopsis of Family Characters

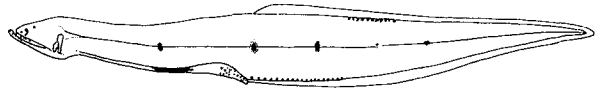
### Leptocephali with Gut Loops or Swellings

#### Monognathidae, Eurypharyngidae, Saccopharyngidae (SACCOPHARYNGOIDEI)

- One gut swelling at posterior end of gut.
- Gut length 50–67% SL.
- Body short and deep.
- Tail pointed.
- Head short and deep with elongate hyomandibular.
- Maximum leptocephalus size 30–40 mm.
- Myomeres 100–250.
- Dorsal fin origin near level of vent.
- Ventral pigment restricted to gut swelling.
- Large lateral spots in Monognathidae, absent in other 2 families.



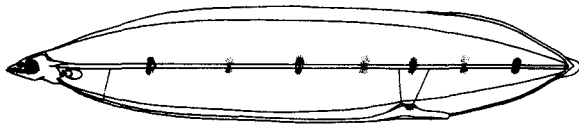
*Eurypharynx pelecanoioides*  
(Smith 1979)



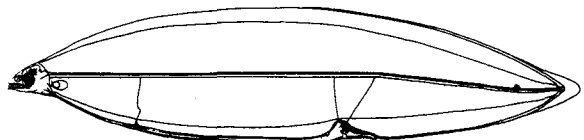
Monognathidae  
(Raju 1974)

#### Moringuidae

- One gut swelling at posterior end of gut.
- Gut length 67–75% SL.
- Body moderately deep.
- Tail moderately blunt.
- Head moderately short.
- Maximum leptocephalus size 60–70 mm.
- Myomeres 96–122.
- Dorsal fin origin near level of vent.
- Ventral pigment restricted to gut swelling.
- One lateral spot near tail or large spots on alternate sides of body.



*Moringua edwardsi*  
(Eldred 1968a)



*Neoconger mucronatus*  
(Eldred 1967c)

**Note:** Family examples illustrated throughout this section.

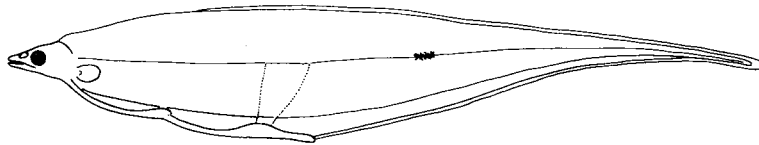
## Family Characters

## ANGUILLIFORMES

## Leptocephali with Gut Loops or Swellings (cont'd)

**Nettastomatidae** (except *Facciolella*, p. 55)

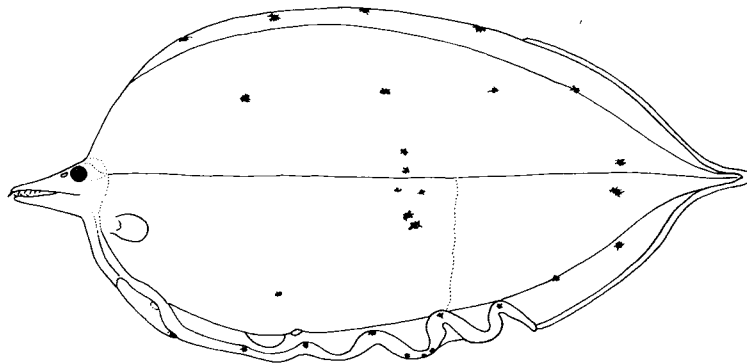
- Two swellings in gut.
- Gut length <50% SL.
- Body deep (except in *Hoplunnis*).
- Tail pointed and elongate.
- Head moderately long.
- Maximum leptocephalus size 200+ mm.
- Myomeres 190–207 in *N. melanurum*.
- Dorsal fin origin usually shortly behind head.
- Ventral, lateral pigment variable.



*Nettastoma* (= *Metopomycter*)  
 (Smith 1979; Smith *et al.* 1981  
 (See also *Hoplunnis* in Smith 1979)

**Cyemidae**

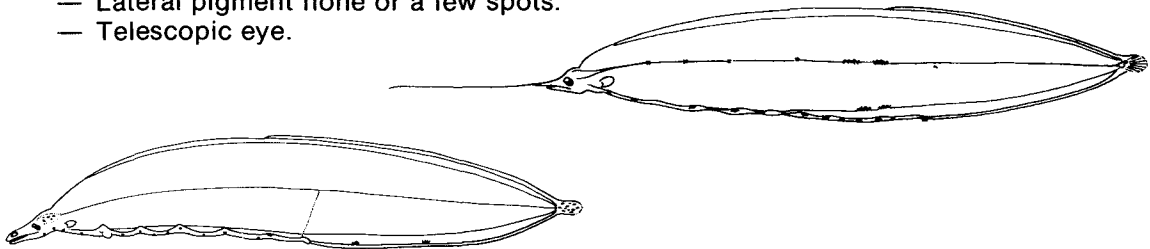
- Three or four swellings in posterior half of gut.
- Gut length about 67% SL.
- Body very deep.
- Tail pointed.
- Head long and sharply pointed.
- Maximum leptocephalus size 60–70 mm.
- Myomeres about 80.
- Dorsal fin origin near level of vent.
- Gut pigment on each swelling.
- Several lateral spots scattered or on midline.



*Cyema atrum*  
 (Smith 1979)

**ANGUILLIFORMES****Family Characters****Leptocephali with Gut Loops or Swellings (cont'd)****Synphobranchidae** (Subfamily Dysommidae)

- Several swellings along gut.
- Gut length 50–67% SL.
- Body moderately elongate.
- Tail moderate.
- Head elongate (or short with rostral filament).
- Maximum leptocephalus size about 100 mm.
- Myomeres 119–204.
- Dorsal fin origin anterior to vent.
- Gut pigmented with rather large spots.
- Lateral pigment none or a few spots.
- Telescopic eye.



Dysommidae (Smith 1979)

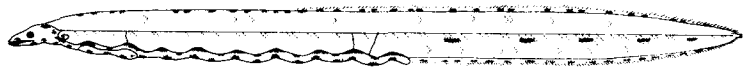
**Ophichthidae** (Leiby 1979a, 1979b, 1981, 1982)

- Three or more gut swellings.
- Gut length 50–67% SL.
- Body moderately elongate.
- Tail moderate to blunt (caudal fin often absent).
- Head moderate to elongate.
- Maximum leptocephalus size 80–180 mm.
- Myomeres 100+.
- Dorsal fin origin variable.
- Ventral pigment tends to concentrate on swellings.
- Lateral pigment variable.

*Myrophis punctatus*  
(Fahay and Obenchain 1978)

Subfamily Myrophinae: third gut swelling  
largest, kidney expanded over vent.

See note on *Acromycter alcocki*, p. 57.

*Ophichthus cruentifer*  
(Fahay and Obenchain 1978)

Subfamily Ophichthinae: second gut swelling  
largest, kidney not expanded over vent (p. 60).

**Family Characters****ANGUILLIFORMES****Leptocephali with Simple Tubular Guts****Synaphobranchidae** (s.f. Synaphobranchinae)

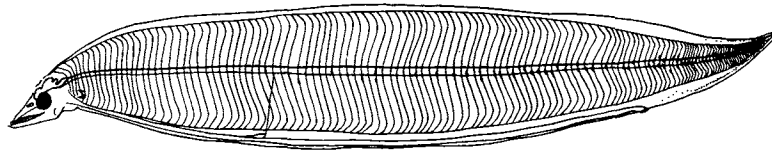
- Gut length about 75% SL.
- Body moderately elongate.
- Tail moderate.
- Head short and pointed.
- Maximum leptocephalus size 130–170 mm.
- Myomeres 126–151.
- Dorsal fin origin anterior to vent.
- No ventral pigment.
- Lateral pigment usually restricted to tail tip.
- Central portion of myomeres more opaque than dorsal and ventral portions.
- Eye telescopic.



Synaphobranchinae  
(Smith 1979)

**Serrivomeridae**

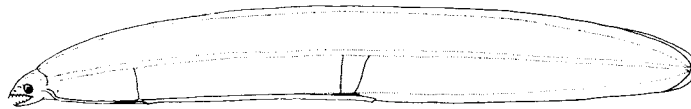
- Gut length 67–75% SL.
- Body moderate.
- Tail pointed.
- Head sharp, slightly concave.
- Maximum leptocephalus size about 60 mm.
- Myomeres 150–170.
- Dorsal fin origin anterior to vent.
- No ventral pigment.
- Lateral pigment none or few small spots on midline.
- Preanal myomeres about 89–125.
- Small nasal organ close to eye.
- Last blood vessel at myomeres 30–37.



*Leptocephalus lanceolatus*  
(= *Serrivomer beani*)  
(Bauchot 1959)

**ANGUILLIFORMES****Family Characters****Leptocephali with Simple Tubular Guts (cont'd)****Muraenidae (*Anarchias*)**

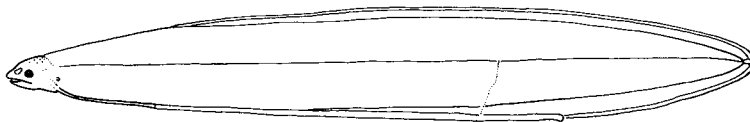
- Gut length <50% SL.
- Body moderate.
- Tail blunt.
- Head short and blunt.
- Maximum leptocephalus size about 50 mm.
- Myomeres 107–114.
- Dorsal (and anal) fin origin in extreme posterior region.
- No ventral pigment.
- Few internal spots near head.
- Pectoral fin greatly reduced or absent.



*Anarchias yoshiae*  
(Eldred 1968b)

**Muraenidae**

- Gut length 50–75% SL.
- Body moderately deep.
- Tail broadly rounded.
- Head short and snout blunt.
- Maximum leptocephalus size 60–70 mm.
- Myomeres about 114–174.
- Dorsal fin origin variable (confined to extreme posterior region in *Uropterygius* and *Anarchias*)
- Gut pigment present.
- No lateral pigment.
- Pectoral fin greatly reduced or absent.



*Gymnothorax nigromarginatus*  
(Smith 1979)

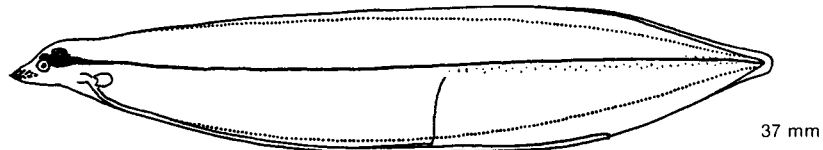
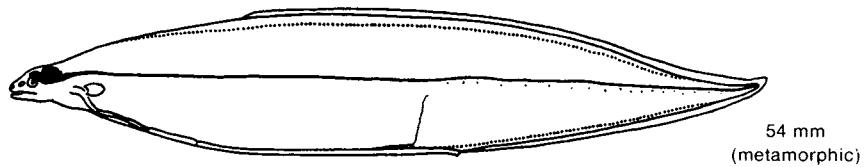
## Family Characters

## ANGUILLIFORMES

## Leptocephali with Simple Tubular Guts (cont'd)

**Derichthyidae** (*Derichthys*)

- Gut length about 75% SL.
- Body moderate.
- Tail sharp.
- Head short and slightly concave.
- Maximum leptocephalus size 50–60 mm.
- Myomeres 126–134.
- Dorsal fin origin anterior to midbody.
- No ventral pigment.
- Few lateral spots near tail tip.
- Preanal myomeres 76–83.
- Last blood vessel at myomeres 59–63.



*Derichthys serpentinus*  
(Castle 1970)

**Derichthyidae** (*Nessorhamphus*)

- Gut length to 90% SL.
- Body deepest behind midpoint.
- Tail sharp and pointed.
- Head rather long.
- Maximum leptocephalus size 70–80 mm.
- Myomeres 149–159.
- Dorsal fin origin at midbody.
- No ventral pigment.
- Few lateral spots near tail tip.
- Preanal myomeres >100.
- Last blood vessel at myomeres 75–80.

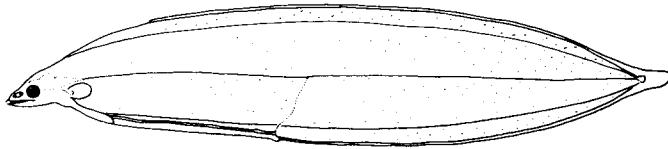


*Nessorhamphus ingolfianus*  
(Smith 1979)

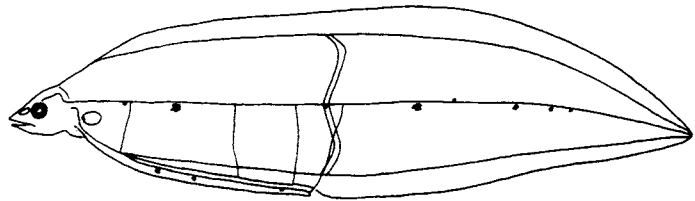


**ANGUILLIFORMES****Family Characters****Leptocephali with Simple Tubular Guts (cont'd)****Xenocoagridae**

- Gut length  $\leq 50\%$  SL.
- Body moderately deep.
- Tail moderate.
- Head moderately short.
- Maximum leptocephalus size about 90 mm.
- Myomeres 98-141.
- Dorsal fin origin 1-2 head lengths behind head.
- Gut pigment variable.
- Lateral pigment variable.
- Crescentic pigment sometimes under eye.



*Kaupichthys hyoproroides*  
(Smith 1979)



*Robinsia catherinae*  
(Smith 1969)

**Anguillidae**

- Gut length about 67% SL.
- Body moderately deep.
- Tail moderate.
- Head with rather short snout.
- Maximum leptocephalus size about 80 mm.
- Myomeres 104-111 or 111-119.
- Dorsal fin origin anterior to vent.
- No pigment.



*Anguilla rostrata* (p. 58)  
(Smith 1979)

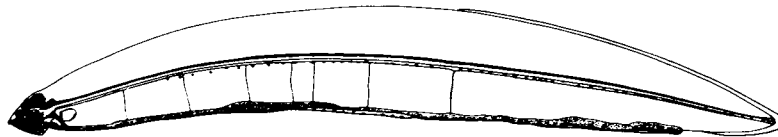
## Family Characters

## ANGUILLIFORMES

## Leptocephali with Simple Tubular Guts (cont'd)

## Heterenchelyidae

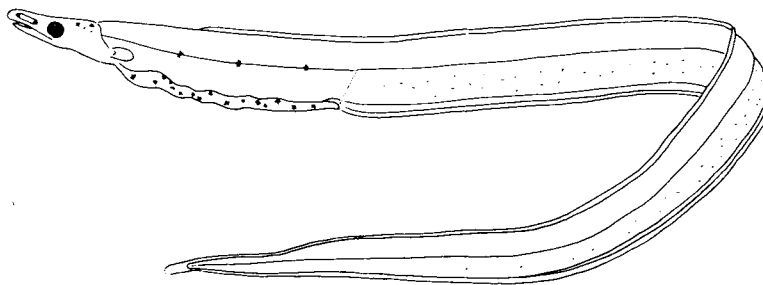
- Gut length 80-90% SL.
- Body moderately elongate.
- Tail moderately blunt.
- Head short and deep, snout becomes blunt with growth.
- Maximum leptocephalus size 60-70 mm.
- Myomeres about 108-109.
- Dorsal fin origin at about midbody.
- Gut pigment present.
- Single row of lateral spots.
- Larva of the single western Atlantic species, *Pythonichthys sanguineus*, undescribed.



*Pythonichthys microphthalmus*  
(Blache 1977)

Nettastomatidae (*Facciolella*)

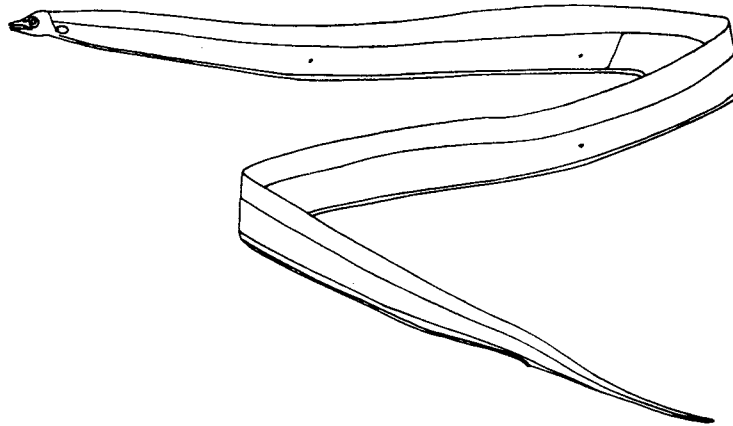
- Gut simple and thick.
- Gut length <50% SL.
- Body elongate.
- Tail sharp.
- Head long and pointed.
- Maximum leptocephalus size about 200 mm.
- Myomeres 235-250 (?)
- Dorsal fin origin shortly behind head.
- Pigment scattered over gut.
- Lateral pigment scattered over lower side.
- Nasal organ large, not near the eye.



*Facciolella* sp.  
(Smith 1979)

**ANGUILLIFORMES****Family Characters****Leptocephali with Simple Tubular Guts (cont'd)****Nemichthyidae**

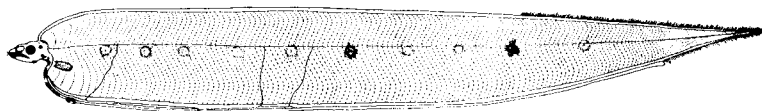
- Gut length about 90% SL.
- Body elongate.
- Tail moderate to sharp.
- Snout sharp, profile concave.
- Maximum leptocephalus size 300–400 mm.
- Myomeres 170–300+.
- Dorsal fin origin anterior to vent.
- Gut pigment on bottom of gut anteriorly, top of gut posteriorly.
- Lateral pigment none or few widely-spaced spots below midline.
- Spots along top of spinal cord.
- Small nasal organ close to eye.



*Nemichthys scolopaceus*  
(Smith 1979)

**Muraenesocidae**

- Closely related to Congridae.
- Larvae similar to congrid larvae.



*Paraxenomystax* sp.  
(Fahay 1976)

## Family Characters

## ANGUILLIFORMES

## Leptocephali with Simple Tubular Guts (cont'd)

## Congridae

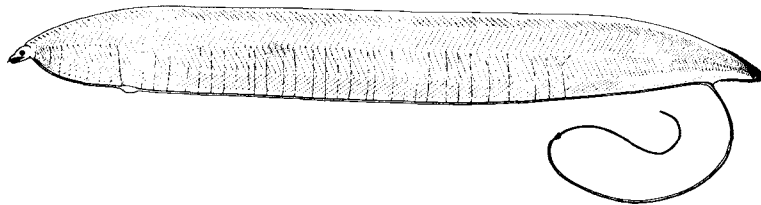
- Gut length 75% SL or more.
- Body moderate to elongate.
- Tail moderate.
- Head moderately elongate.
- Maximum leptocephalus size about 100 mm in most but 200–300 mm in some.
- Myomere range wide.
- Dorsal fin origin variable.
- Gut pigment always present.
- Lateral pigment variable, sometimes absent.



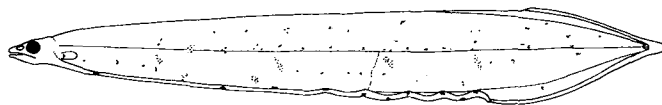
*Ariosoma balearicum*  
(Smith 1979)



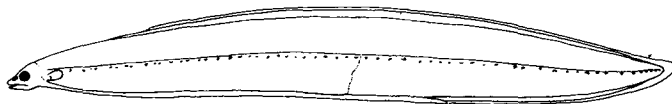
*Uroconger syringinus*  
(Smith 1979)



Bathymyrinae  
(M. P. Fahay, see p. 11)



*Pseudophichthys splendens*  
(Smith 1979)



Heterocongrinae  
(Smith 1979)

- Note:** (1) See also *Paraconger*, *Conger*, *Rechias* and *Hildebrandia* in Smith (1979).  
 (2) See Smith and Leiby (1980) for description of larval *Acromycter alcocki*, a congrid leptocephalus with swellings along the gut as in ophichthids; this species has been collected near Bermuda, the Bahamas, and in the Gulf of Mexico.

**ANGUILLIDAE*****Anguilla rostrata* (Lesueur)**

**Spawning:** January–July, presumably in the Sargasso Sea or farther south.

**Meristic features**

Myomeres: 102–111

**Eggs** — Undescribed.

**Larvae** — Leptocephalus.

— Gut straight and long (about 70–75% TL), shortens at metamorphosis.

— Pectoral fin rays form late; pelvic fin absent.

— Maximum size before metamorphosis about 70 mm.

— Lower jaw protrudes in glass eel and elver.

— Elvers arrive in Mid-Atlantic Bight estuaries during the spring.

— Pigmentation: none, except in eye, until glass eel stage.

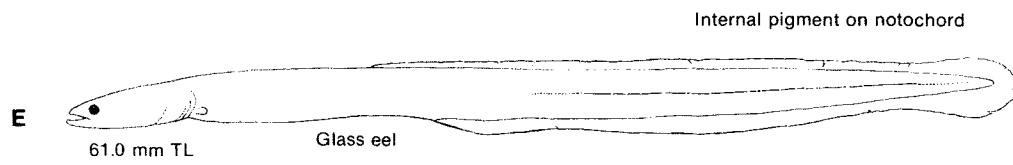
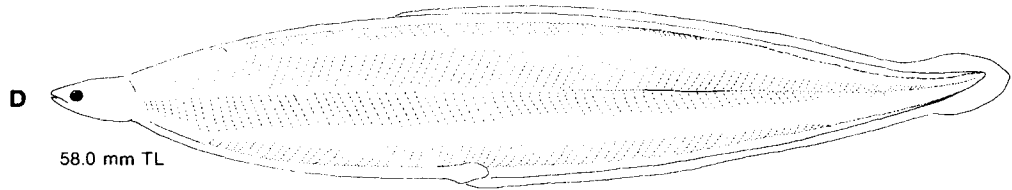
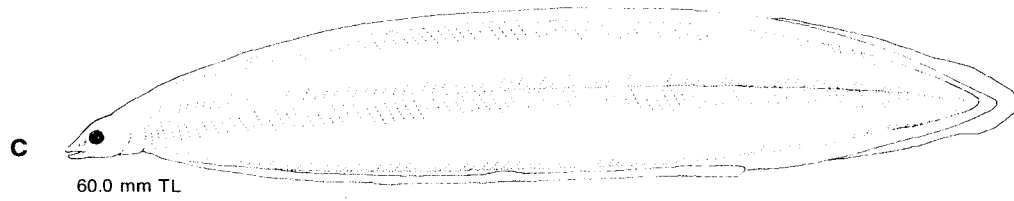
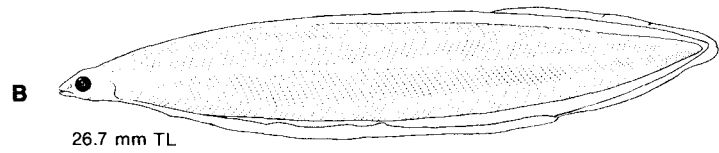
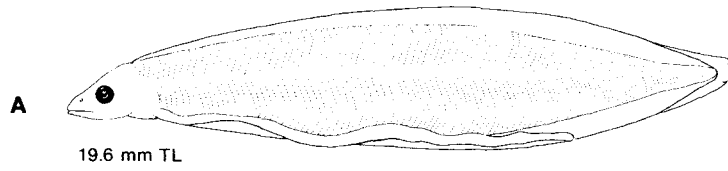
- Note:**
- (1) *Anguilla anguilla* (Linnaeus), the European eel, is similar and may be collected in the western North Atlantic; myomeres 111–119 (Vladykov and March 1975).
  - (2) The only other unpigmented leptocephalus reported from the western North Atlantic is *Anarchias yoshiae* (Fig. F opposite), a muraenid with 107–114 myomeres, the posterior nostril near upper margin of eye, pectoral fin totally lacking, gut about 50% TL, and a blunt tail. Leptocephali may have a few internal pigment spots near the brain (Smith 1979), and inconspicuous spots along the ventral margin of the spinal cord.

**Fig.** — A–B, Vladykov 1955; C–E, Schmidt 1916; F, Eldred 1968b (A–E redrawn).

**Ref.** — Eldred 1968c.

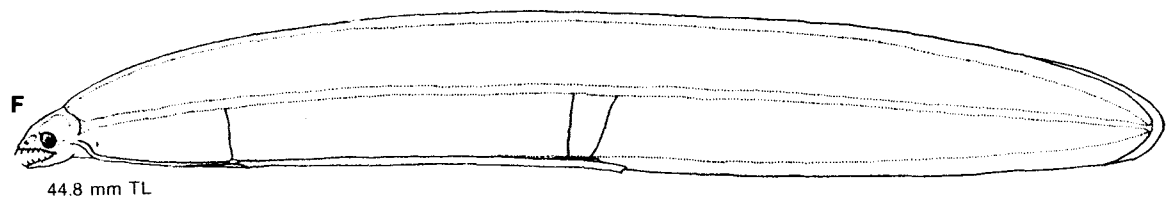
***Anguilla rostrata***

**ANGUILLIDAE**



---

***Anarchias yoshiae***



**OPHICHTHIDAE**      ***Ophichthus cruentifer* (Goode and Bean)**

**Spawning:** This is the only ophichthid eel which spawns in the Mid-Atlantic Bight, in summer near edge of continental shelf.

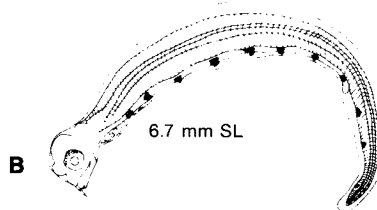
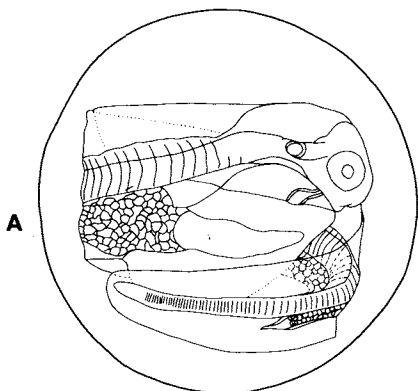
**Meristic features**  
Myomeres: 142-162

- Eggs**
- Pelagic, large, no pigmentation.
  - Diameter: 1.90-2.89 mm (smallest newly spawned).
  - Shell: smooth and clear.
  - Perivitelline space: wide.
  - Yolk: segmented.
  - Oil globules: 1.
  - O.G. diameter: 0.26-0.65 mm.

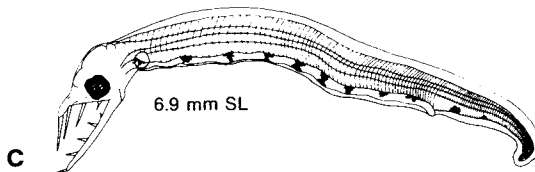
- Larvae**
- Leptocephalus; hatching size  $6.5 \pm 0.8$  mm.
  - Gut long and undulating with 9 peaks or loops; length decreases from 76% SL at 5.8 mm to 53% SL at 83.5 mm.
  - Preanal myomeres 66-75; predorsal myomeres 44-57.
  - Predorsal length decreases from about 50% SL at 30 mm to 38% SL at 80 mm.
  - Pectoral fin late forming; pelvic fin absent.
  - Maximum size before metamorphosis 83.5 mm.
  - Larvae caught off Long Island and New Jersey average 154 myomeres; those caught off Virginia Capes average 148 myomeres.
  - Pigmentation: tip of lower jaw, top of head, snout; dorsal edge of body; dorsal patches on gut loops, ventral patches added after about 20 mm, and spots develop between loops in larger larvae; myosepta sporadically pigmented along midline; 5-7 subcutaneous spots ventral to midline on tail; few spots on flank on upper and lower angles of some myosepta; anal base pigment in short linear clusters.

*Ophichthus cruentifer*

OPHICHTHIDAE



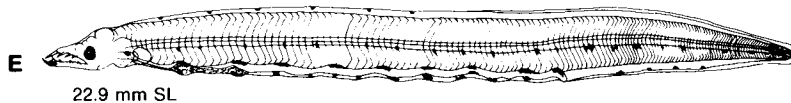
6.7 mm SL



6.9 mm SL

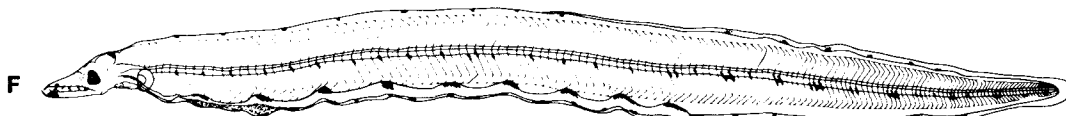


12.9 mm SL



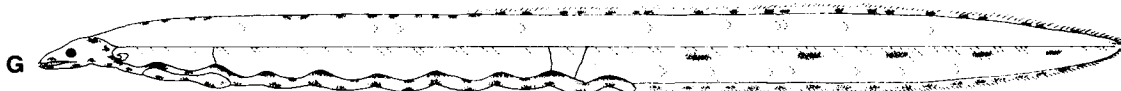
22.9 mm SL

Tip of lower jaw pigmented

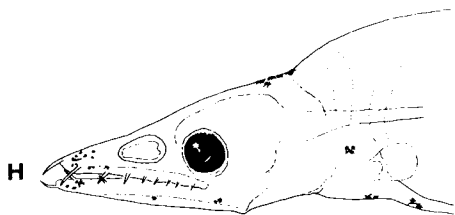


32.1 mm SL

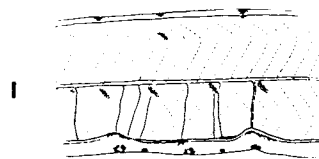
Spots along dorsal edge of body



59.0 mm TL



52.0 mm TL



52.0 mm TL (midsection of body)