

LOPHIIDAE***Lophius americanus Valenciennes*****Spawning:** Spring-summer.**Meristic features**

- Eggs**
- Pelagic, spherical, in veils.
 - Diameter: 1.61–1.84 mm.
 - Shell: smooth and transparent.
 - Yolk: homogeneous (amber).
 - Oil globules: 1.
 - O.G. diameter: 0.40–0.61 mm.
 - Perivitelline space: narrow.

Myomeres: 28–30
 Vert: 28–30
 D : 6, 11–12
 A : 9–10
 Plv : 5
 P : 25–28

- Larvae**
- Hatching occurs at 2.5–4.5 mm (first dorsal ray base forming in finfold).
 - Gut very short.
 - Dorsal and pelvic rays form early and become elongated.
 - Pectoral rays form early and pectoral fin becomes large and fan-shaped.
 - Dorsal and anal fins last to form.
 - Fin-ray counts complete by 12 mm TL.
 - Transformation occurs at >50 mm TL (elongate fins lost).
 - Pigmentation prominent (see illustrations).

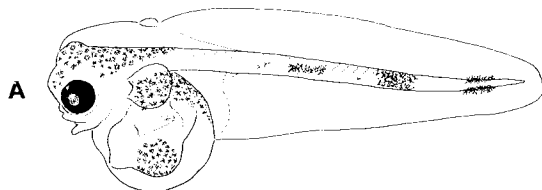
Note: Early larvae of *Brosme brosme* (p. 170) resemble *Lophius* larvae, but *Brosme* larvae have about twice the number of myomeres, an accumulation of pigment at the extreme tip of notochord, and lack the early-forming anterior dorsal rays.

Fig. — **A**, M. P. Fahay (see p. 11); **B**, Bigelow and Schroeder 1953; **C–E**, Tåning 1923 (**B–E** redrawn).

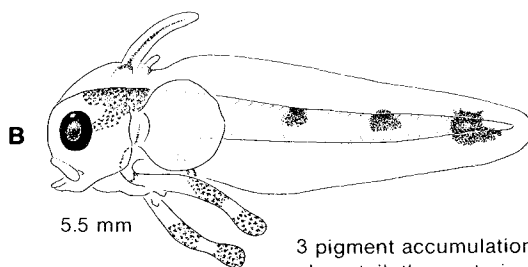
Ref. — J. H. Caruso 1981 (pers. comm.).

Lophius americanus

LOPHIIDAE

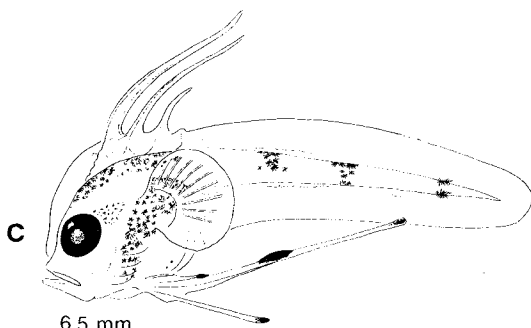


5.0 mm NL



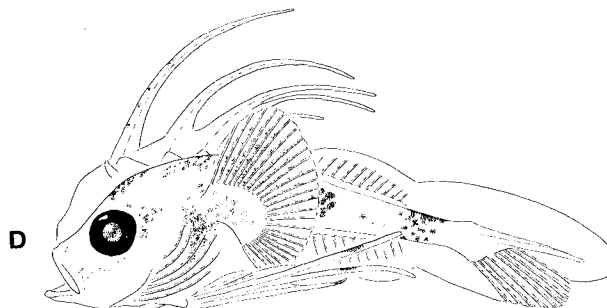
5.5 mm

3 pigment accumulations along tail, the posteriormost anterior to notochord tip

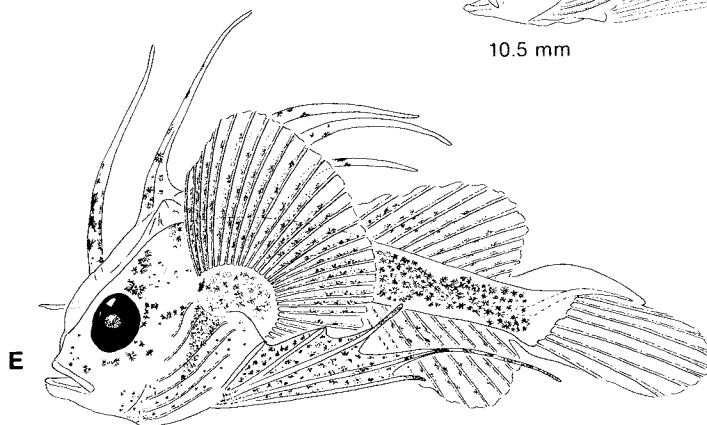


6.5 mm

Pelvic rays pigmented



10.5 mm



16.0 mm

ANTENNARIIDAE***Histrio histrio* Linnaeus**

Spawning: Year-round except February–March; eggs in veils in clumps of Sargassum weed.

Eggs — Initially oval, become spherical.
 — Diameter: 0.62–0.65 mm (greatest).
 — Shell: transparent.
 — Yolk: segmented.
 — Oil globules: none.

Larvae — Hatching occurs at 0.88–1.00 mm TL.
 — Head large, occupying 33–50% of SL.
 — Transforms to prejuvenile at about 5 mm SL.
 — Fin formation sequence: caudal, anal, dorsal (rays), pelvic and pectoral.
 — Dorsal spines last to form at about 10 mm SL (anteriormost becomes ilicium).
 — Pigment conspicuous about head and midgut.

Prejuveniles — Changes during growth (5–10 mm SL) include elongation of pelvic base at about 9 mm SL, and fading of midgut pigment.

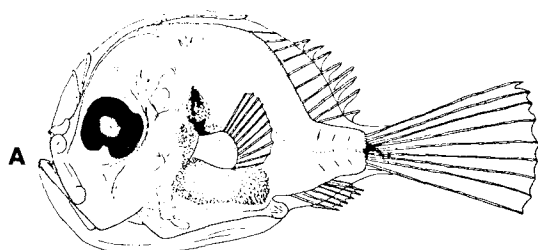
Meristic features

Myomeres: 18–19
 Vert: 10+8
 D : 3, 11–13
 A : 7–8
 Plv : 5
 P : 9–11
 C : 9*

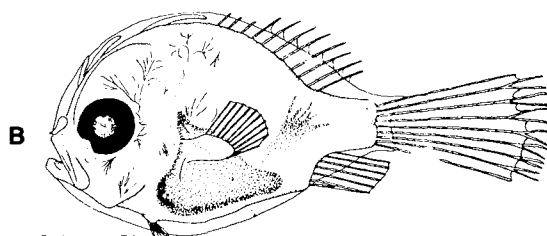
* 7 are branched.

Histrio histrio

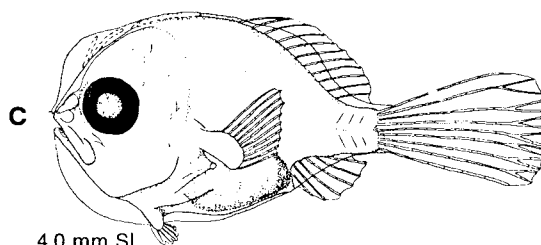
ANTENNARIIDAE



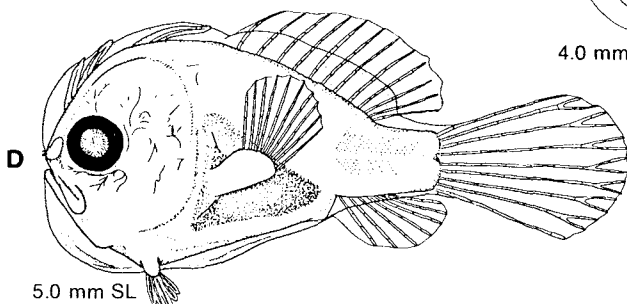
2.0 mm SL



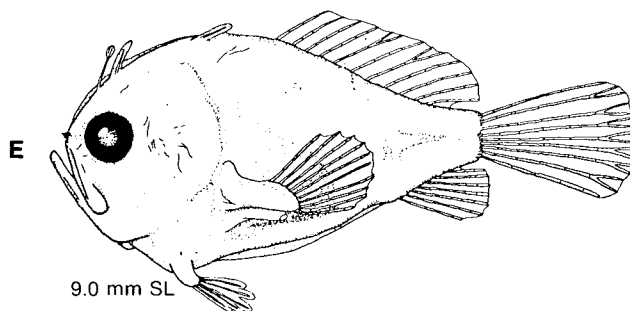
3.4 mm SL



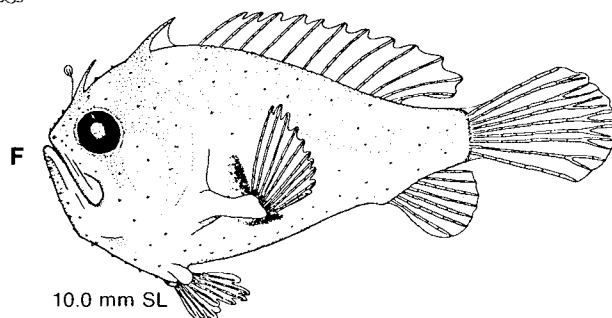
4.0 mm SL



5.0 mm SL



9.0 mm SL



10.0 mm SL

CERATIOIDEI**Ceratioid Larvae****General Features**

- Most ceratioids in the North Atlantic are summer spawners; larvae are epipelagic for several months (Mead *et al.* 1964).
- Males and females distinguishable in larval stages.
- Caudal rays usually 8 or 9, and branchiostegal rays usually 6.
- Very small larvae difficult to distinguish to family, except gigantactinids which have very large pectoral fins (even in smallest larvae observed) and no pelvic fins, and caulophrynids which have pelvic fins.

Key to Families Based on Larval Characters. (After Bertelsen 1951; Pietsch 1979; Pietsch and Seigal 1980; Pietsch and Van Duzer 1980.)

- I. Pectoral fins very large, pelvic fins present or absent.
 - A. Pelvic fins present in larvae and adult males; high dorsal ray count (14–22) except in *Robia legula* Pietsch (6 dorsal rays) Caulophrynidae
 - B. Pelvic fins absent; low dorsal ray count (3–10) Gigantactinidae
- II. Pectoral fins relatively short, no pelvic fins.
 - A. More than 10 dorsal rays.
 1. Dorsal rays 12–17, anal rays 3–5, body short and plump ... Melanocetidae
 2. Dorsal rays 11–13, anal rays 10–13, body slender Neoceratiidae
 - B. Ten or fewer dorsal rays.
 1. Body humpbacked, females with 2 or 3 caruncles on back anterior to dorsal fin; 8–9 caudal rays Ceratiidae
 - a. Well pigmented, 3 caruncles, 8 caudal rays *Cryptopsaras couesi*.
 - b. Unpigmented, 2 caruncles, 9 caudal rays *Ceratias* sp.
 2. Body straight, no caruncles, 9 caudal rays.
 - a. Females with illicium-like second cephalic ray; dorsal rays 5–6, anal rays 4, caudal rays 9 Diceratiidae
 - b. Larvae with small papilliform hyoid barbel below head; dorsal rays 5–7, anal rays 5–6, caudal rays 9 Centrophrynidae
 - c. Body elongate; branchiostegal rays 4–5, dorsal rays 3(2–4), anal rays (2)3, caudal rays 9 Linophrynidae
 - d. Skin on head and trunk highly inflated; dorsal rays 5–6, anal rays 4–5, caudal rays 9, branchiostegal rays 6 ... Himantolophidae
 - e. Body short and plump, variously pigmented, skin moderately inflated; dorsal rays 4–8, anal rays 4–7, caudal rays 9 Oneirodidae

- Note:**
- (1) The family Thaumatchthyidae is present in the Gulf of Mexico, Florida Straits, and Caribbean Sea. Larvae are unique among known ceratioids in that entire head and body are densely pigmented, except pectoral fin base and distal end of caudal peduncle. (See Bertelsen and Struhsaker, 1977.)
 - (2) Throughout the ceratioid section (p. 194–207), larval series have been assembled from all oceans. (See Bertelsen (1951) for specific locations.)

***Caulophryne jordani* Goode and Bean CAULOPHRYNIDAE**

- Larvae** — Body short, skin very inflated.
 — Only genus with pelvic fins (long in larvae).
 — Pectoral fins very large, reaching beyond dorsal and anal fins.

Note: *C. polynema* Regan also occurs in the western North Atlantic, but its larvae are undescribed; fin ray counts are dorsal 19–22, anal 17–19, pectoral 15–18, and caudal 8.

Meristic features

D : 16–19
 A : 14–18
 Piv : 3–4*
 P : 16–18
 C : 8

* In larvae and adult males.

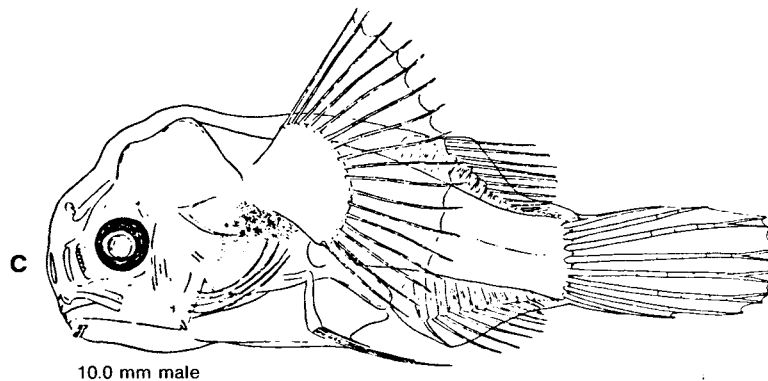
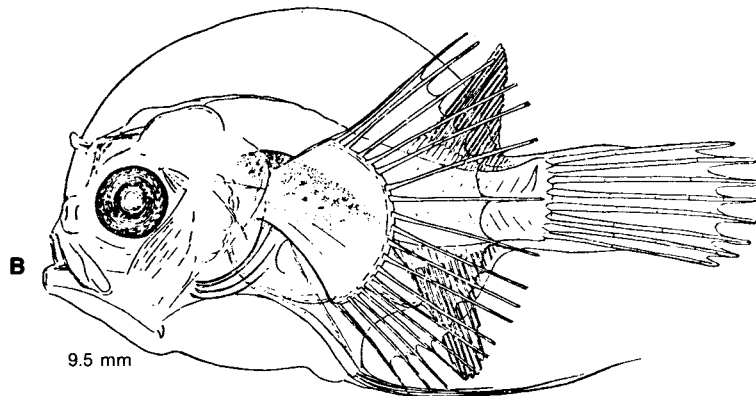
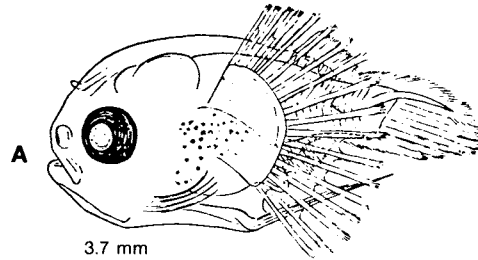


Fig. — A-C, Bertelsen 1951.

Ref. — Pietsch 1979.

MELANOCETIDAE**Generic Characters**

- Larvae** — Body ovoid, short and plump.
 — Skin moderately inflated.
 — No pelvic fins.
 — Pectoral fins normal size, not extending posteriorly beyond dorsal and anal fins.

Meristic features

D : 12-17
 A : 3-5
 P : 15-23
 C : 9

***Melanocetus johnsoni* Günther**

- Larvae** — Lateral pigment on peduncle, separate from dorsal pigment in small specimens, but merges with dorsal pigment in larger individuals.
 — Anterior part of body unpigmented.

Meristic features

D : 13-17
 A : (3)4(5)
 P : 17-23
 C : 9

***Melanocetus murrayi* Günther**

- Larvae** — Caudal peduncle unpigmented, but dorsal pigment may spread to peduncle in larger larvae.
 — Gill cover faintly pigmented.

Meristic features

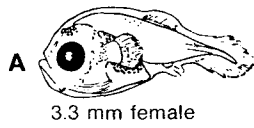
D : 12-14
 A : 4
 P : 15-20
 C : 9

Fig. — A-M, Bertelsen 1951.

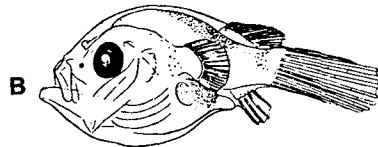
Ref. — Pietsch and Van Duzer 1980.

Melanocetus johnsoni

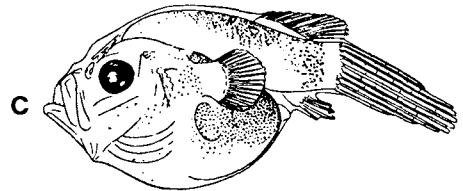
MELANOCETIDAE



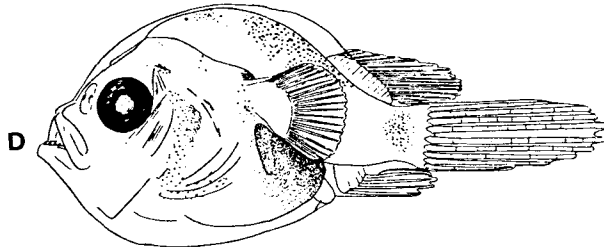
3.3 mm female



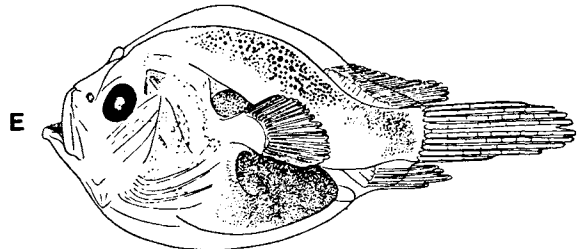
6.5 mm female



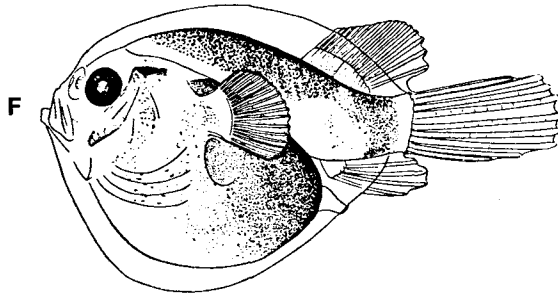
8.5 mm male



13.0 mm male



17.0 mm female

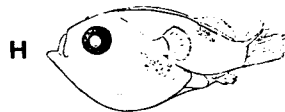


15.5 mm male

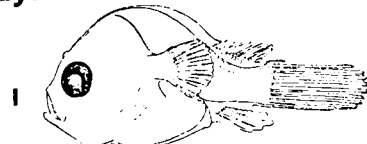
Melanocetus murrayi



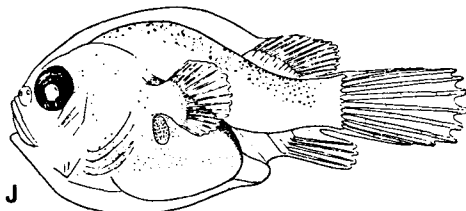
3.0 mm male



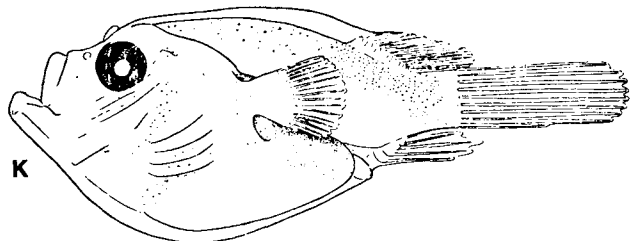
4.0 mm female



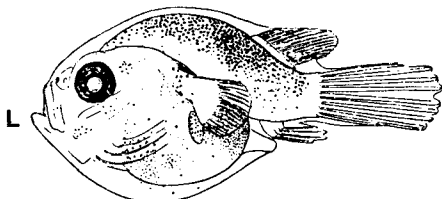
6.3 mm female



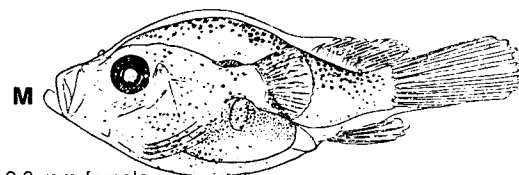
8.5 mm male



13.0 mm female



8.0 mm male



9.0 mm female

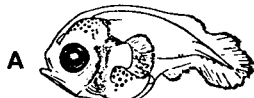
Note: L and M represent the dark type.

HIMANTOLOPHIDAE *Himantolophus groenlandicus* Reinhardt

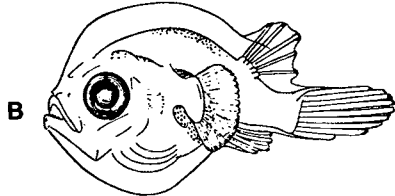
- | | | |
|---------------|--|--|
| Larvae | <ul style="list-style-type: none">— Body nearly globoid.— Skin on head and body anterior to dorsal and anal fins very inflated, except in small larvae (<4 mm) when skin features about the same as in other genera.— No hyoid barbel.— Pectoral fins normal size, not extending posteriorly beyond dorsal and anal fins.— No pelvic fins.— Pigmentation: melanophores in distinct groups; dorsal pigment present; peduncle pigment present in 5-6 mm larvae and merges with dorsal pigment under dorsal fin by 8-10 mm; lower jaw rarely pigmented. | Meristic features <ul style="list-style-type: none">D: 5-6A: 4-5P: 15-18C: 9 |
|---------------|--|--|

Himantolophus groenlandicus

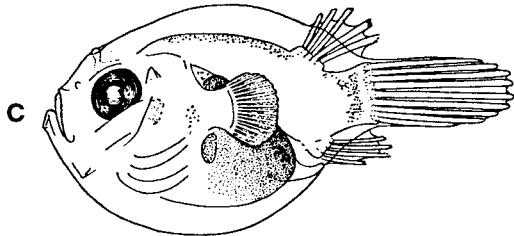
HIMANTOLOPHIDAE



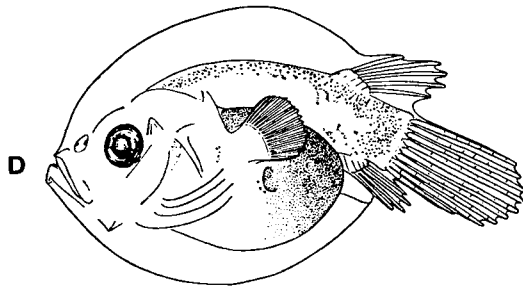
2.4 mm male



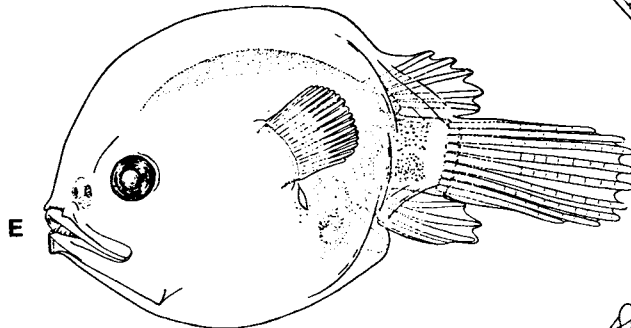
5.7 mm male



9.0 mm female

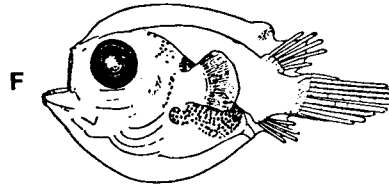


13.0 mm male

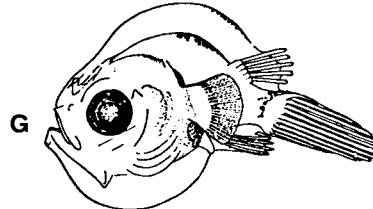


24.0 mm male

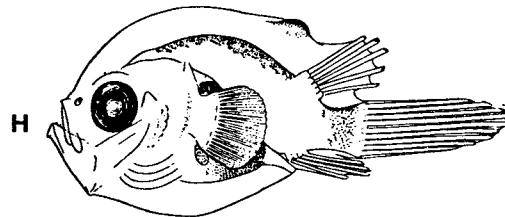
A-E (common type)



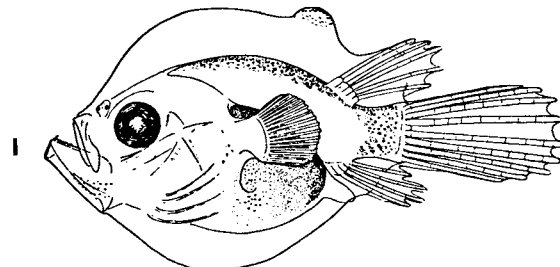
5.6 mm male



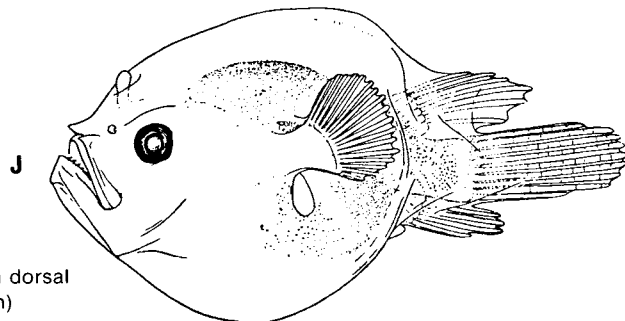
5.0 mm female



8.2 mm male



10.7 mm male



22.0 mm female

F-J (less common type with dorsal spot of pigment on skin)

ONEIRODIDAE**Family Characters**

- General** — Largest ceratioid family, containing about 50% of all ceratioids.
 — Skin moderately inflated.
 — Melanophores in distinct groups.

Meristic features

D: 4-8
 A: 4-7
 P: 14-30
 C: 8-9

***Dolopichthys* sp.**

- Larvae** — Branchiostegal pigment very dark.
 — Peduncle pigment separated into dorsal, lateral and ventral groups.
 — No dark spot beneath suboperculum.

Meristic features

D: (4?)5-9
 A: (4)5-6
 P: 18-22
 C: 9

Chaenophryne draco* (group)

- Larvae** — Gill-cover pigment very faint.
 — Peduncle unpigmented.
 — Separate dorsal group of pigment spots on anterior part of body.

Meristic features

D: 6-8
 A: 5-6
 P: 16-19
 C: 9

* May include more than one species.

***Oneirodes* sp.**

- Larvae** — Gill cover evenly dark-pigmented.
 — Peduncle unpigmented.
 — Pigment on anterior part of body meeting peritoneal pigment.
 — Lower jaw usually pigmented in larger larvae.

Meristic features

D: (4)5-7
 A: (3)4(5)
 P: (12)13-19
 C: 9

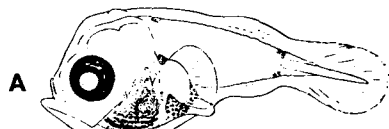
Note: *Leptacanthichthys gracilispinis* (Regan) occurs in the western North Atlantic, but its larvae are undescribed; fin rays counts are dorsal 4-6, anal 5-6, pectoral 18-21, and caudal 9.

Fig. — A-J, Bertelsen 1951.

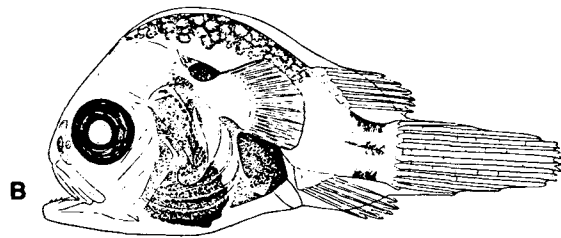
Ref. — Pietsch 1974, 1978.

Dolopichthys sp.

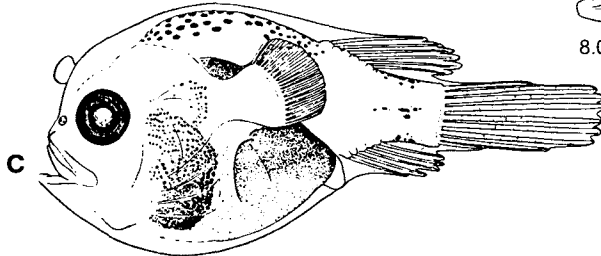
ONEIRODIDAE



2.6 mm female

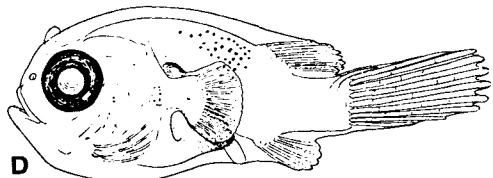


8.0 mm male

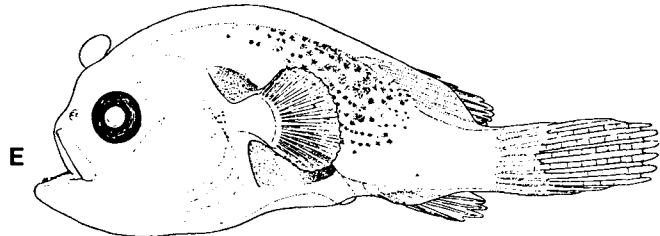


10.4 mm female

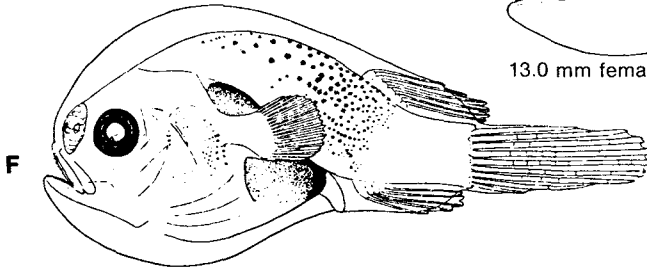
Chaenophryne draco (group)



5.7 mm female

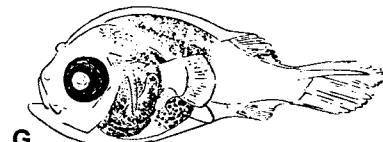


13.0 mm female

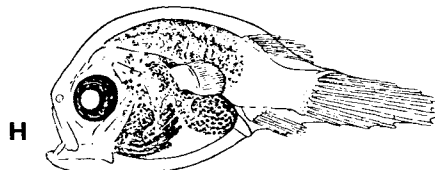


12.4 mm male

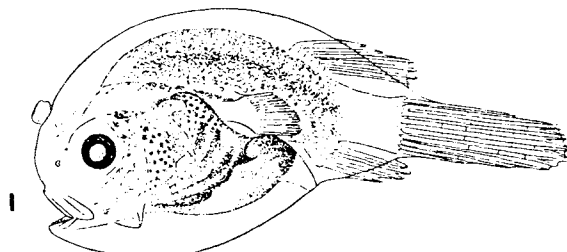
Oneirodes sp.



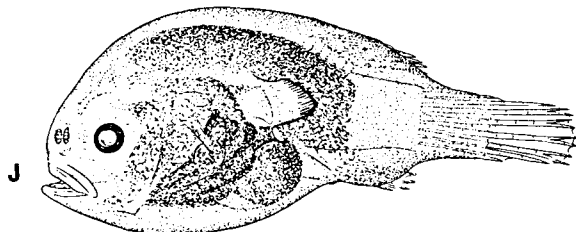
3.0 mm female



4.5 mm male



12.0 mm female



11.5 mm male (metamorphic)

GIGANTACTINIDAE***Gigantactis* sp.**

- | | | |
|---------------|---|---------------------------------------|
| Larvae | <ul style="list-style-type: none"> — Body short; skin very inflated. — No pelvic fins. — Pectoral fins very large; may extend to or beyond the base of the caudal fin. — Dorsal pigment may be absent, weak or well developed; if present, it is not contiguous with peritoneal pigment. — No distinct pigment at base of pectoral lobe. — Type A: Dorsal and peritoneal pigment well developed; no large spots on caudal peduncle; 5–7 dorsal and 3–7 anal rays. — Type B: Dorsal and peritoneal pigment weak or absent; 5–7 dorsal and 5–7 anal rays. — Type C: Dorsal and peritoneal pigment weak or absent; 8–10 dorsal and 5–8 anal rays (= <i>G. longicirra</i> Waterman). — Type D: Dorsal and peritoneal pigment well developed; 3–4 large subcutaneous spots on dorsal and ventral surfaces of caudal peduncle; 5–7 dorsal and 5–7 anal rays (not illustrated). | Meristic features |
| | | D: 4–10
A: 4–8
P: 14–22
C: 9 |

Note: Larvae of the genus *Rhynchactis* have been collected in the western Atlantic south of 30° N. Dorsal pigment is strongly developed, contiguous with peritoneal pigment, but not extending posteriorly to dorsal fin base. Dorsal rays 3–5 and anal rays 3–4. Other characters as for family Gigantactinidae (see Ceratioidei, p. 194).

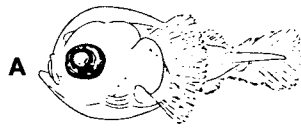
Fig. — A-I, Bertelsen 1951.

Ref. — Bertelsen *et al.* 1981.

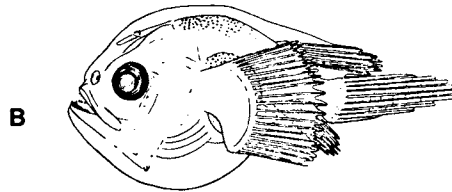
Gigantactis sp.

GIGANTACTINIDAE

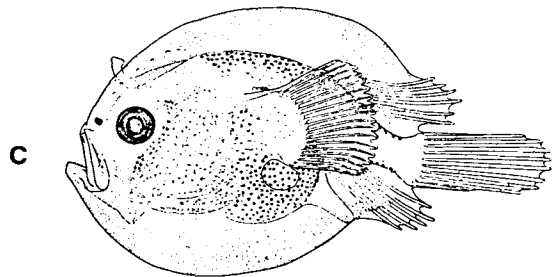
Type A



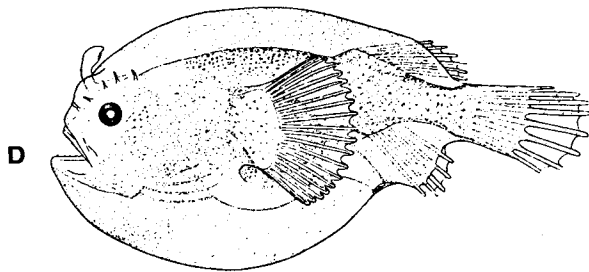
2.8 mm male



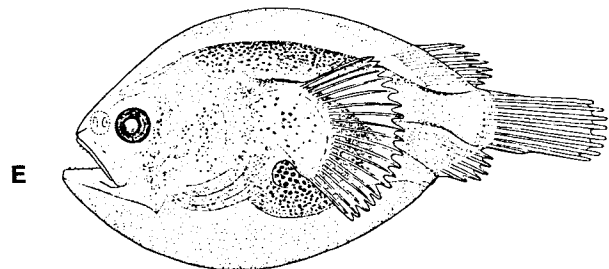
8.0 mm male



12.5 mm female

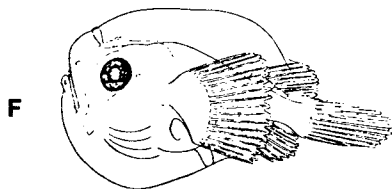


25.0 mm female (metamorphic)

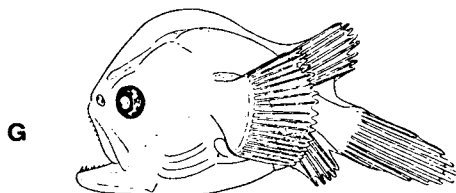


17.0 mm male (metamorphic)

Type C

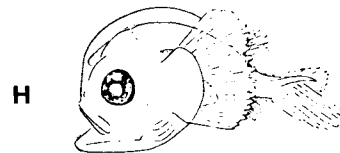


6.3 mm female

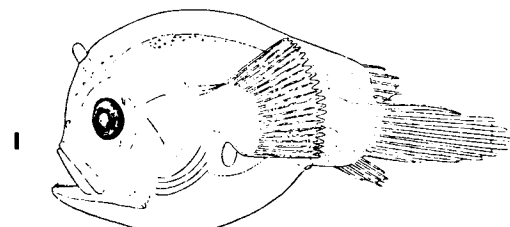


7.3 mm male

Type B



4.0 mm male



12.0 mm female

CERATIIDAE**Family Characters**

- Larvae** — Body humpbacked.
 — Skin moderately inflated.
 — Mouth subvertical.
 — Less than 9 dorsal rays.
 — Pectoral fins do not extend posteriorly past dorsal and anal fins.
 — Females with caruncles on back.

Meristic features

D: 3-5
 A: 3-5
 C: 8-9

***Ceratias holboelli* Krøyer**

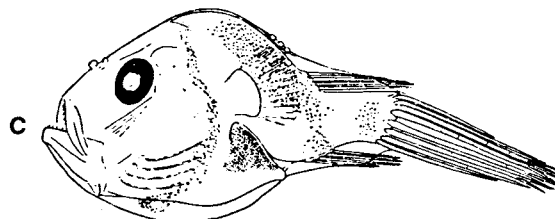
- Larvae** — Females with 2 caruncles on back.
 — Body unpigmented.

***Cryptopsaras couesi* Gill**

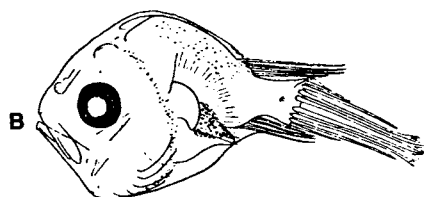
- Larvae** — Females with 3 caruncles on back.
 — Band of pigment posteriorly on head extends along each side from occipital region along margin of gill cover and meets anteriorly on isthmus.
 — In larger larvae, dorsal pigment meets laterally with pigment spreading from base of anal fin.
 — Isolated pigment on caudal peduncle.
 — Peritoneum pigmented dorsally.



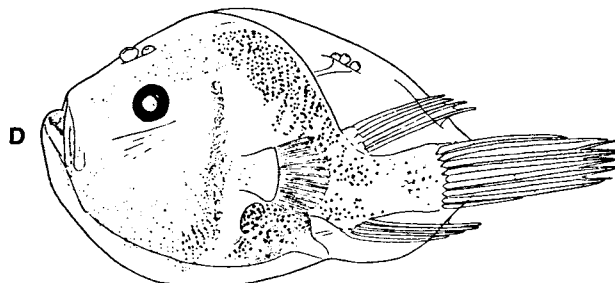
3.2 mm female



7.5 mm female



4.1 mm female



11.8 mm female

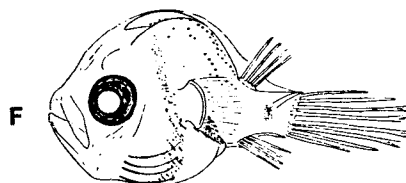
Fig. — A-N, Bertelsen 1951.

***Cryptopsaras couesi* (cont'd)**

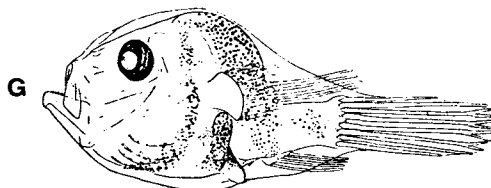
CERATIIDAE



3.1 mm male

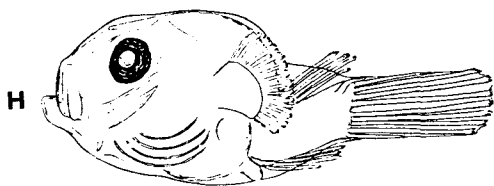


4.5 mm male

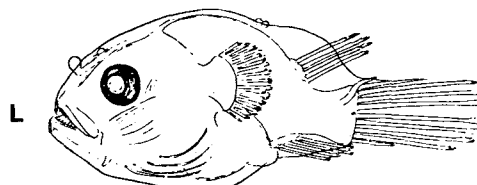


7.7 mm male

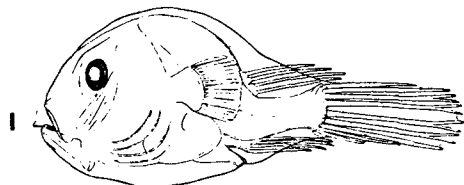
Ceratias holboelli



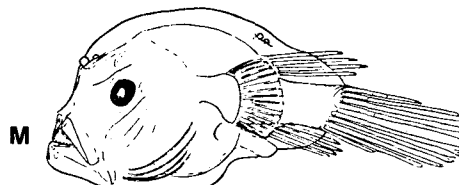
4.3 mm male



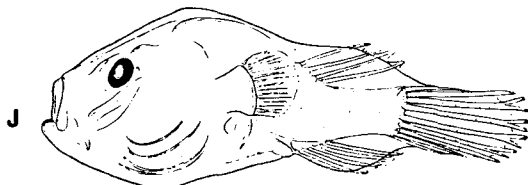
4.5 mm female



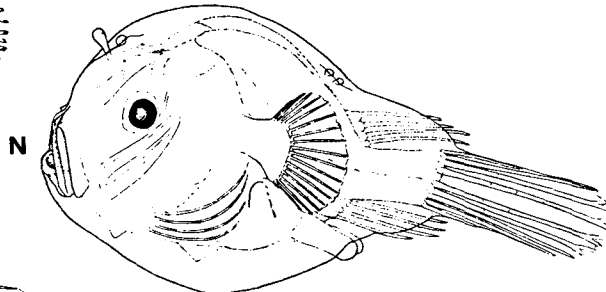
8.5 mm male



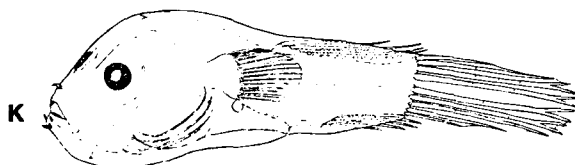
8.1 mm female



9.4 mm male



11.9 mm female



10.4 mm male (metamorphic)

LINOPHRYNIDAE***Linophryne macrorhinus* (group)***

- Larvae**
- Body fairly elongate, skin very inflated.
 - Body depth <60% SL (including inflated skin).
 - Long sphenotic spines.
 - Branchiostegal rays 4-5.
 - Pigment never present on dorsal part of body.
 - Usually a group of melanophores on caudal peduncle (rarely unpigmented).

Meristic features

D: (2)3(4)

A: (2)3

P: 13-19

C: 9

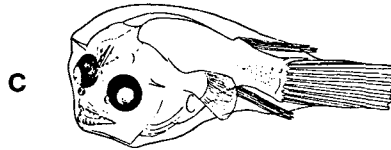
* May include more than one species.

Linophryne macrorhinus (group)

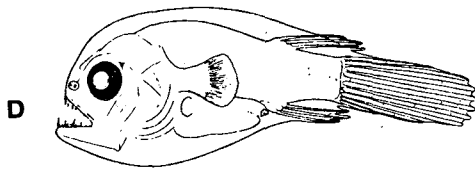
LINOPHRYNIDAE



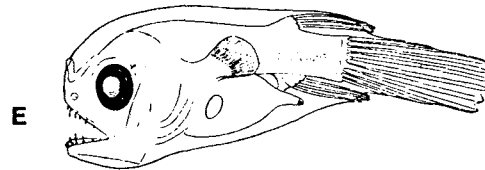
3.5 mm female



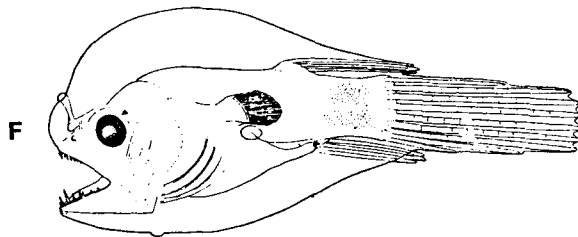
5.5 mm male



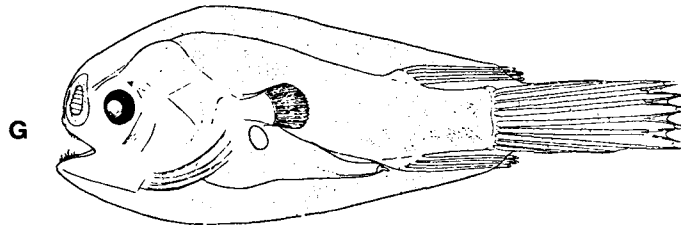
9.0 mm male



9.0 mm female



17.0 mm female



22.5 mm male (metamorphic)