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## Results of the research cruises of FRV 'Walther Herwig' to South America. LXIX. *Lepidopus altifrons*, a new species of cutlassfish (Pisces, Scombroidei, Trichiuridae) from the western Atlantic Ocean.\*

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with 3 Figures and 2 Tables

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### Kurzfassung

**Ergebnisse der Forschungsreisen des FFS 'Walther Herwig' nach Südamerika. LXIX. *Lepidopus altifrons*, eine neue Art der Haarschwanzfische (Pisces, Scombroidei, Trichiuridae) aus dem Westatlantik.**

*Lepidopus altifrons* n. sp. unterscheidet sich von allen übrigen Arten ihrer Gattung, mit Ausnahme von *L. dubius*, durch einen konvexen und stark erhöhten Interorbitalbereich. Verglichen mit *L. dubius* hat sie einen stärker erhöhten Interorbitalraum, kürzere Stirngrate und höhere Zahlen der Wirbel (98-105 gegenüber 92-97) sowie der Strahlen der Rückenflosse (90-97 : 83-89) und Afterflosse (52-58 : 48-53). Das Verbreitungsgebiet der neuen Art reicht im Westatlantik von Gewässern vor Nova Scotia bis vor Südbrasilien.

### Abstract

*Lepidopus altifrons* n. sp. differs from all species of the genus except *L. dubius* in having a convex and highly elevated interorbit. It differs from *L. dubius* in having a more elevated interorbit, shorter frontal crests, and more numerous vertebrae (98-105 vs. 92-97) and dorsal and anal fin rays (90-97 vs. 83-89 and 52-58 vs. 48-53). It is found in the western Atlantic from off Nova Scotia to off southern Brazil.

\* Dedicated to Dr. Gerhard Krefft, collector of the ISH paratypes, on the occasion of his 80th birthday on 30 March 1992.

## 1. Introduction

The first known specimen of this species (FMNH 64102) was examined by TUCKER (1957) and misidentified as *Evoxymetopon taeniatus* Poey. Richard H. BACKUS, then at the Woods Hole Oceanographic Institution, examined material collected by the Bureau of Commercial Fisheries vessel OREGON from the Gulf of Mexico and Caribbean Sea and considered it to be an undescribed species which he proposed to put in a new genus. PARIN and MIKHAILIN (1981) also considered the species to be undescribed but provided no name for it. A formal description is presented at this time in order to make the name available for a catalogue of trichiuroid fishes being prepared by the first author. *Lepidopus altifrons* brings to six the number of species recognized in the genus. The others are: *L. caudatus* (Euphrasen, 1788) from the eastern Atlantic, southwestern and eastern Pacific; *L. dubius* Parin and Mikhailin, 1981 from the Gulf of Guinea; *L. calcar* Parin and Mikhailin, 1982 from the central Pacific; *L. manis* Rosenblatt and Wilson, 1987 from the Galapagos Islands; and *L. fitchi* Rosenblatt and Wilson, 1987 from the eastern Pacific.

## 2. Methods and materials

Counts of dorsal and anal fin rays and vertebrae were made from radiographs. Meristic data for other species were taken from PARIN and MIKHAILIN (1981, 1982) and ROSENBLATT and WILSON (1987). Sources of study material: **FMNH** = Field Museum of Natural History, Chicago; **ISH** = Institut für Seefischerei, Hamburg; **MCZ** = Museum of Comparative Zoology, Harvard University, Cambridge; **ROM** = Royal Ontario Museum, Toronto; **SIO** = Scripps Institution of Oceanography, La Jolla, CA; **USNM** = National Museum of Natural History, Washington, D.C.; **ZMUC** = Zoological Museum, University of Copenhagen.

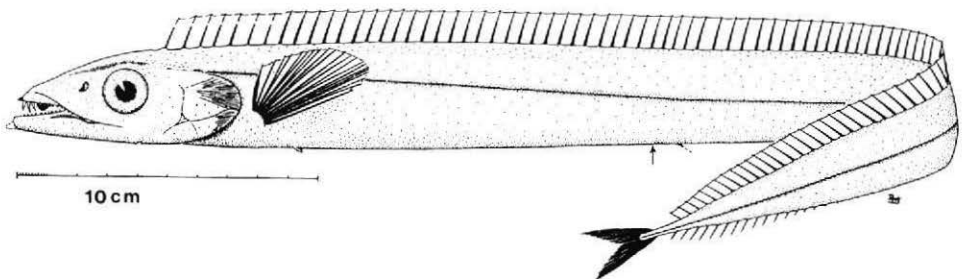


Figure 1: *Lepidopus altifrons* n. sp.; paratype, FMNH 64102, 435 mm SL. From TUCKER, 1957.

### 3. Systematics

*Lepidopus altifrons*, new species

*Evoxymetopon taeniatus*, not of Poey, 1863: Tucker, 1957: p.425, Fig., description (**FMNH 64102**).

*Lepidopus* sp.: Parin and Mikhailin, 1981: p.403, Fig. 2c (compared with *L. dubius*).

*Benthodesmus elongatus*, not of Clarke, 1879: Scott and Scott, 1988: pp.447, 643 (*partim*, photograph of a specimen 47.5 cm SL from off Nova Scotia at 43°09'N, 61°32'W; **ROM** uncatalogued).

### Holotype

**USNM 317977** (ripe female, 664 mm SL), OREGON Sta.11493, Gulf of Mexico, 28°49'N, 86°38'W, 443 m.

### Paratypes

Western North Atlantic (15):

**ISH 30-1970** (2, 175-292), WALTHER HERWIG sta. 184/70; 40°03'N, 70°31'W, 190-205 m. **MCZ 41518** (1, 328), DELAWARE, 39°57'N, 71°27'W, 200 m. **MCZ 63115** (1, 393), ALBATROSS IV, 36°36'N, 74°42'W, 247-278 m. **MCZ 64835** (1, 219), ALBATROSS IV, cruise 71-06, Sta. 184, 41°28.5'N, 67°19'W. **MCZ 64836** (1, 302), ALBATROSS IV, 36°19'N, 74°48'W, 174-201 m. **MCZ 75996** (3, 458-496), ALBATROSS IV, 34°45'N, 75°30'W, 313-328 m. **MCZ 99449** (4, 305-398), DELAWARE II, Sta. 91-10: 032, 35°41'N, 74°49'W, 137-175m. **ROM 64548** (1, 460), 43°09'N, 61°32'W, 100m. **USNM 150381** (1, 525), N edge of Georges Bank.

Gulf of Mexico (12):

**FMNH 64102** (1, 435), OREGON Sta. 1565, 29°11'N, 88°02'W, 480 m. **FMNH 64490** (1, 325), OREGON Sta. 1963, 29°11'N, 88°03'W, 480 m. **MCZ 57374** (3, 361-381), OREGON II, Sta. 100996, 19°16'N, 92°50'W, 300 m. **USNM 317978** (1, 545), OREGON Sta. 10345, 27°37'N, 93°13'W, 315 m. **USNM 317979** (2, 335-363), OREGON Sta. 4013, 29°04.5'N, 88°26.5'W, 340 m. **USNM 317980** (1, 439), OREGON Sta. 10951, 23°20'N, 97°16'W, 340 m. **USNM 317981** (1, 380), OREGON Sta. 11494, 28°52'N, 86°31'W, 407 m. **USNM 320001** (1, 479), OREGON Sta. 10958, 20°30'N, 96°30'W, 370 m. **USNM 320003** (1, 398), OREGON Sta. 3677, 29°11'N, 88°06'W, 360 m.

Caribbean Sea and off Surinam (10):

**FMNH 64493** (1, 292), OREGON St. 2023, 07°15'N, 53°21'W. **SIO 9216** (1, 590), OREGON Sta. 4911, 11°50'N, 73°05'W, 310-340 m. **USNM 159241** (1, 523), OREGON Sta. 1984, 09°45'N, 59°45'W, 400 m. **USNM 265891** (1, 425); OREGON Sta. 2008, 07°38'N, 54°43'W, 250 m. **USNM 317982** (4, 355-407), OREGON Sta. 5037, 11°36.5'N, 62°46.5'W, 360-430 m. **USNM 320002** (1, 615); OREGON Sta. 4859, 11°09'N, 76°26'W, 320-350 m. **USNM 320004** (1, 448), OREGON Sta. 4922, 12°16'N, 72°40'W, 360 m.

### Western South Atlantic (17):

**ISH 1015-1966** (1, 292), WALTHER HERWIG Sta. 208/66, 35°02'S, 52°12'W, 260-280 m. **ISH 1733-1968** (4, 286-334), WALTHER HERWIG Sta. 44/68, 33°42'S, 51°00'W, 200 m. **ISH 1882-1968** (4, 371-572), WALTHER HERWIG Sta. 82/68, 25°25'S, 45°01'W, 300 m. **ISH 1925-1968** (2, 492-512), WALTHER HERWIG Sta. 90/68, 24°21'S, 43°54'W, 500 m. **ISH 1947-1968** (2, 465-497), WALTHER HERWIG Sta. 96/68, 23°44'S, 42°08'W, 500 m. **ISH 2022-1968** (1, 298), WALTHER HERWIG Sta. 22/68, 28°43'S, 47°20'W, 500 m. **ZMUC P73196-198** (3, 337-407), WALTHER HERWIG Sta. 62/68, 30°11'S, 48°10'W, 350 m.

### *Diagnosis*

A species of *Lepidopus* with a convex and highly elevated interorbit (concave in other species except *L. dubius*). It differs from *L. dubius* in its more elevated interorbit, shorter frontal crests, and in its more numerous vertebrae (98-105 vs. 92-97) and dorsal and anal fin rays (90-97 vs. 83-89 and 52-58 vs. 48-53).

### *Description of holotype*

D 90; A 1, I, 55; P<sub>1</sub> 12; P<sub>2</sub> 1,2. Vertebrae 38 + 62 = 100. Body elongate and compressed, its width 3.1 in depth at level of anus. Upper profile of head almost straight, gently rising from above snout to dorsal origin. Ethmofrontal region elevated, interorbit convex. Frontal ridges not prominent, close together anteriorly, converging just behind the level of anterior margin of eye and merging into saggital crest which continues onto the nape. Eye large but orbit not reaching upper profile of head.

Mouth large, maxilla sheathed by preorbital, ending just before anterior margin of orbit. Cartilaginous process present on upper jaw only. Lower jaw projecting. Nostril a subvertical slit about one-fifth snouth-length before eye. Teeth flattened, lanceolate. Anterior maxillary fangs strong, three (two immovable and one movable) on each side of jaw. Outer tooth row on maxilla with about 15-20 teeth. Dentary with about 18-21 teeth. A longitudinal series of a few minute teeth on palatines. Gill rakers lanceolate, 4+1+13.

Dorsal fin originates just behind the level of posterior margin of eye. All dorsal rays soft but not segmented. (In large ISH specimens, 7 or 8 anterior dorsal rays seem more slender than the following rays). Origin of anal fin anterior to the middle of body length, under 40th dorsal ray. First anal spine degenerate, second spine triangular, flattened, twice shorter than distance from its origin to anus, its surface covered by skin. Soft anal fin incomplete, rays present on about the last 19 pterygiophores. Terminations of dorsal and anal fins subopposite. Rays of both fins correspond precisely to adjacent vertebrae. Caudal peduncle slender, depth 7.4 in its length. Caudal fin well developed, forked. Pectoral fins low on body, their lower rays longer than upper. Pelvic fins inserted 0.6 eye diameter behind posterior end of pectoral base, each fin consists of a flattened scale-like spine and two minute rays.

Lateral line originates at upper corner of opercle, gradually descends to midline of body and terminates near the posterior end of anal fin base.

Selected proportional measurements in % SL: head 15.4, eye 3.0, snout 6.0, maxilla 5.7, interorbit 2.0, maximum body depth (between P<sub>1</sub> and P<sub>2</sub> insertions) 9.2, depth above anus

7.2, caudal peduncle depth 0.5, snout to dorsal origin 11.4, snout to anal spine 48.2, snout to anus 46.5, snout to pectoral base 16.4, snout to pelvic insertion 19.2, length of pectoral fin 8.0, length of pelvic fin 1.0, length of second anal spine 0.8.

*Color in alcohol*

Body light brown, darker along lateral line. Inside of gill cavity black.

*Variation in paratypes*

There is variation from region to region in some characters (Table 1), but no clear pattern emerges.

Table 1: Geographic variation in selected characters in *Lepidopus altifrons*.

Samples	W. North Atlantic n=8-10	Gulf of Mexico n=12	N. South America n=10	W. South Atlantic n=14
Precaudal vertebrae	38-40 ( $\bar{x}$ 38.5)	37-40 ( $\bar{x}$ 38.1)	37-39 ( $\bar{x}$ 38.0)	36-38 ( $\bar{x}$ 36.7)
Caudal vertebrae	61-67 ( $\bar{x}$ 62.9)	61-64 ( $\bar{x}$ 62.6)	61-63 ( $\bar{x}$ 61.9)	64-67 ( $\bar{x}$ 65.2)
Total vertebrae	99-107 ( $\bar{x}$ 101.4)	99-103 ( $\bar{x}$ 100.8)	98-102 ( $\bar{x}$ 99.9)	100-105 ( $\bar{x}$ 101.9)
Dorsal fin rays	90-98 ( $\bar{x}$ 92.9)	90-95 ( $\bar{x}$ 92.5)	90-93 ( $\bar{x}$ 91.9)	92-97 ( $\bar{x}$ 93.7)
Soft anal fin rays	53-54 ( $\bar{x}$ 54.8)	52-57 ( $\bar{x}$ 55.4)	53-55 ( $\bar{x}$ 54.4)	55-58 ( $\bar{x}$ 56.2)
Snout to anal spine distance (%SL)	49.0-52.3 ( $\bar{x}$ 50.5)	48.2-52.3 ( $\bar{x}$ 50.4)	49.3-52.8 ( $\bar{x}$ 51.3)	46.3-49.7 ( $\bar{x}$ 47.9)
Snout to pelvic fin distance (%SL)	19.2-22.7 ( $\bar{x}$ 20.3)	19.0-20.8 ( $\bar{x}$ 19.9)	19.2-20.5 ( $\bar{x}$ 19.9)	18.4-20.4 ( $\bar{x}$ 19.3)
Number of dorsal rays before anal spine	39-40 ( $\bar{x}$ 39.5)	37-40 ( $\bar{x}$ 38.6)	38-40 ( $\bar{x}$ 38.8)	36-40 ( $\bar{x}$ 37.8)

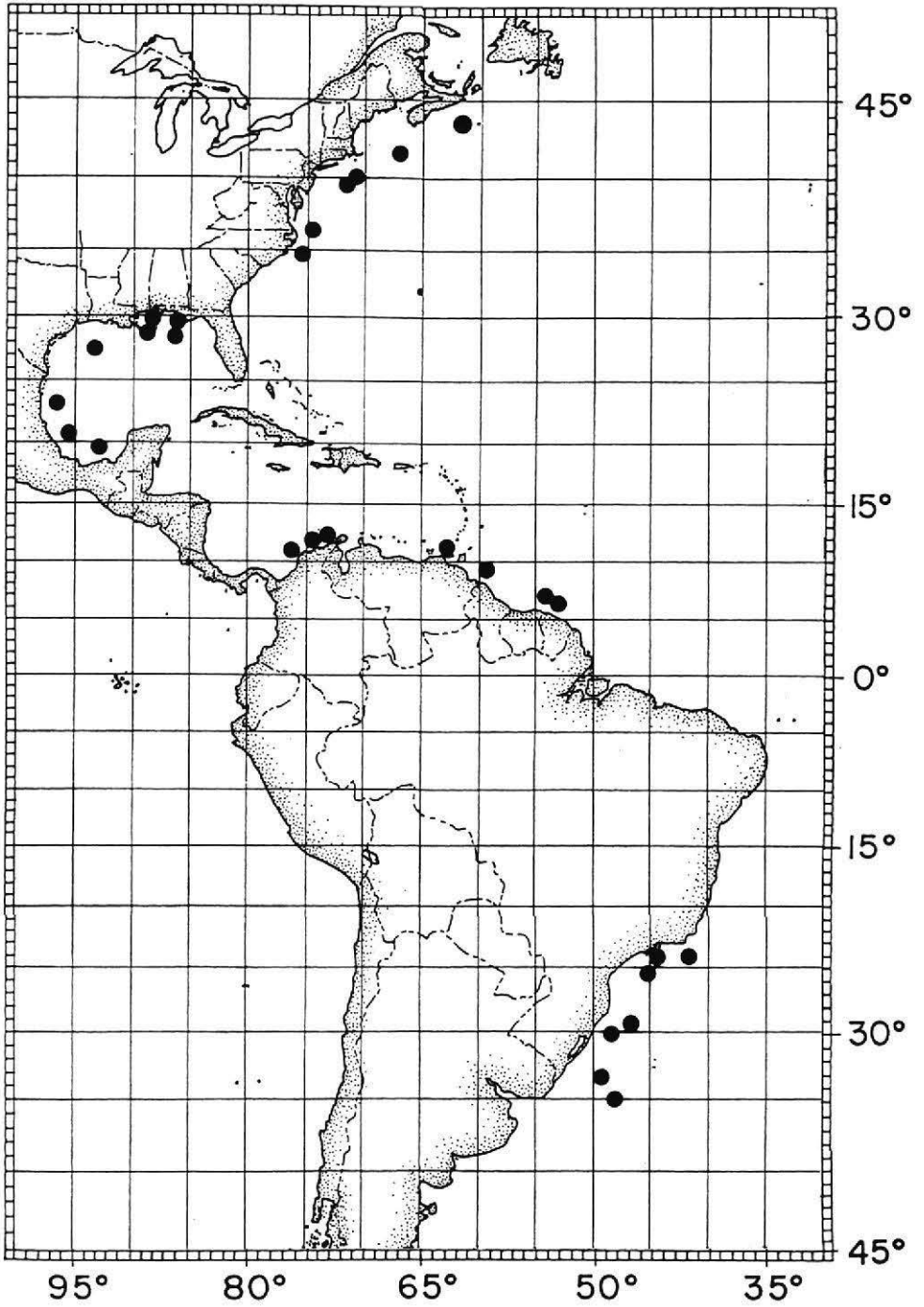


Figure 2: Range of *Lepidopus altifrons*.

*Etymology*

Named in reference to the highly elevated forehead and interorbit (Latin *altus*, deep or high, *frons*, forehead).

*Distribution*

Western Atlantic Ocean from 43°09'N off Nova Scotia to 35°02'S off southern Brazil at 200-500 m, usually 300-400 m (Fig. 2). All specimens, except three small ones (175-292 mm SL, ISH 30-1970 and 1015-1966), were taken by bottom trawls on the upper continental slope, and we consider the species as a member of the upper mesobenthopelagic community.

**4. Comparative remarks**

The first specimen of *L. altifrons* reported from the western Atlantic Ocean (Gulf of Mexico) was identified by TUCKER (1957) as *Evoxymetopon taeniatus* but this identification, based mostly on similarities in meristic characters, proved to be incorrect (PARIN and MIKHAILIN, 1981). *Lepidopus altifrons* (Fig. 3c) differs from *E. taeniatus* (Fig. 3d) in having the upper head profile much less steep and the saggital crest not running from the snout to the dorsal fin origin as well as more vertebrae (98-105 vs. 92-95) and dorsal fin rays (90-97 vs. 86-88).

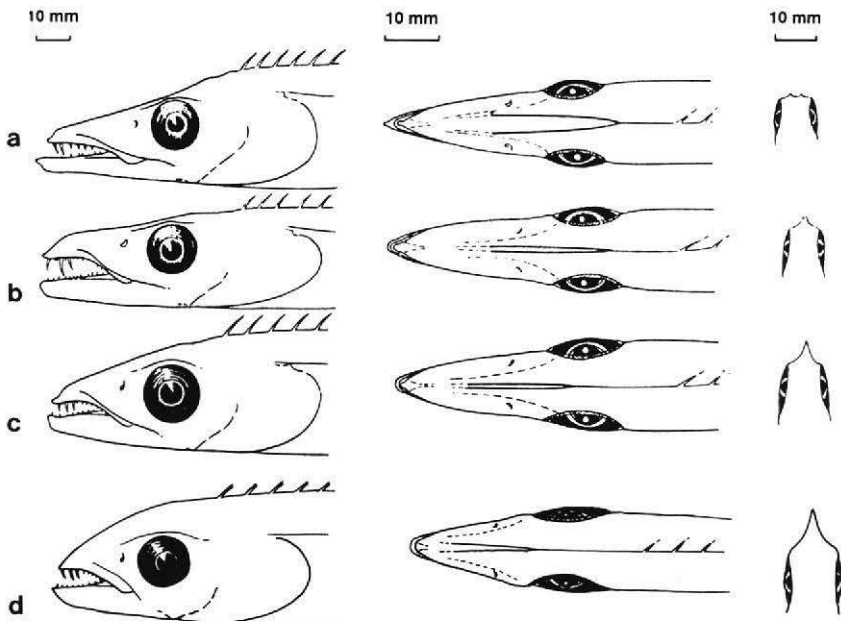


Figure 3: Head shape in four species of Lepidopinae. a) *Lepidopus caudatus*, 411 mm SL; b) *L. dubius*, 434 mm SL; c) *L. altifrons* n. sp., 364 mm SL; d) *Evoxymetopon taeniatus*, USNM 321690, 194 mm SL. Left, lateral view; middle, dorsal view; right, cross-section of interorbital region at mid-orbit. From PARIN and MIKHAILIN, 1981, fig. 2.

Placement of this species in *Lepidopus* is rather arbitrary. It does not fit TUCKER'S (1956) definition of this genus in two important diagnostic characters, having the interorbit not concave but strongly convex and the saggital crest not confined by the nape but beginning shortly behind the level of the anterior margin of the orbits. However, as has become evident from recent species descriptions (PARIN and MIKHAILIN 1981, 1982; ROSENBLATT and WILSON 1987), both characters are objects of gradual change in the series (*L. manus* + *L. fitchi*) → (*L. caudatus* + *L. calcar*) → *L. dubius* → *L. altifrons* (see Fig. 3) and we prefer, consequently, to place all these species in *Lepidopus*, until its redefinition, which seems to be needed.

Comparison of some meristic characters among the species of *Lepidopus* is given in Table 2.

Table 2: Number of vertebrae (including urostyle) and fin rays in six species of *Lepidopus*.

Species	Vertebrae (precaudal + caudal)	Dorsal fin rays	Soft anal fin rays
<i>L. altifrons</i>	(36-38) + (61-67) = 98-105	90-97	52-58
<i>L. calcar</i>	(43-44) + (54-57) = 98-100	91-93	44-47
<i>L. caudatus</i>			
N. Atlantic	(41-44) + (68-72) = 110-114	104-110	63-66
S. Hemisphere	(38-41) + (65-70) = 105-110	98-104	59-64
<i>L. dubius</i>	(33-37) + (56-62) = 92-97	83-89	48-53
<i>L. fitchi</i>	(32-37) + (48-57) = 84-93	78-87	41-50
<i>L. manis</i>	37 + 57 = 94	89	50

## 5. Acknowledgments

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