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# Description of a large specimen of *Paralepis elongata* (Brauer, 1906) from Angola, southeastern Atlantic Ocean (Aulopiformes: Paralepididae)

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## Abstract

The elongate barracudina, *Paralepis elongata* (Brauer, 1906), received limited attention in the past, with only a few individuals documented, mostly in publications focusing on the feeding habits of large predatory pelagic fishes. Furthermore, the taxonomic history of the species is complicated, with some earlier sources providing incorrect information that influenced subsequent works. As a result, the accurate distribution range of *P. elongata* remains uncertain. An adult male specimen of *P. elongata*, representing the largest known individual, is reported from off Angola, southeastern Atlantic. A detailed description is provided, and the literature records of the species are reviewed and discussed.

**Key words:** Ichthyology, taxonomy, biodiversity, distribution, morphology

## Introduction

The eastern tropical Atlantic barracudina *Paralepis elongata* (Brauer, 1906) was originally described based on 14 juvenile specimens collected during the German *Valdivia* Deep-Sea Expedition of 1898–1899. The type-locality, based on the lectotype (ZMB 17554, 28.5 mm SL) designation by Post (1972: 156), is roughly 200 nautical miles east of the Gabon-Congo border in the Gulf of Guinea. Ege (1933: 223) described *Paralepis danae* based on "an adolescent specimen, total length 38 mm (excl. C. 35 mm)" (ZMUC 2316968) collected by the *Dana* expedition off Cape Verde, Senegal. That name was preoccupied, however, and subsequently replaced by *Paralepis egei* Harry, 1948.

Maul (1962) examined two type specimens (ZMB 22580) of *P. elongata* and compared them with four specimens collected off Cape Verde, Senegal, including one larger individual of 190.5 mm SL. Based on his comparisons, Maul synonymized *P. danae* and *P. egei* with *Paralepis elongata*. Post (1987) reviewed the scaled paralepidid genera and recognized three valid species in *Paralepis*, namely *P. brevirostris* (Parr, 1928), *P. coregonoides* Risso, 1820 (with *P. speciosa* Bellotti, 1878 as junior synonym) and *P. elongata* (Fig. 1A). He (Post, 1987) also surveyed the distribution of *P. elongata* and concluded that "Presently *P. elongata* is represented in the tropical eastern Atlantic only."

Brauer's (1906) records of the species from the Indian Ocean and Rofen's (1966) records from the western North Atlantic were presumably based on misidentified specimens of *P. brevirostris* (which Rofen believed to be conspecific with *P. elongata*). In subsequent years, only a few records of *P. elongata* were reported from scattered localities on both sides of the Atlantic, and no adults were known.

In 2005, a large adult male of *P. elongata* (Figs. 1B–D) was collected by the Norwegian R/V *Dr. Fridtjof Nansen* during a fishery-resource assessment cruise off Angola. This specimen represents the only specimen-based record in the southeastern Atlantic and is the largest known specimen of the species. A detailed description of the Angolan specimen is herein provided.

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## Methods and materials

Methods for taking measurements and counts, and the format of the description, follow Ho *et al.* (2019). The specimen was collected by the second author on board the research vessel *Dr. Fridtjof Nansen*, fixed in formalin (4% Formaldehyde) and then changed to 70% ethanol for long term preservation at the California Academy of Sciences, San Francisco, California (CAS). Counts were made directly from the specimen and from a radiograph taken at CAS.

Abbreviations for other institutions: Københavns Universitet, Zoologisk Museum, Copenhagen, Denmark (ZMUC), Humboldt-Universität, Museum für Naturkunde, Berlin, Germany (ZMB), and Museum of Comparative Zoology, Harvard University, Massachusetts, U.S.A. (MCZ).

Ethical Statement. No living or fresh animals were used in present study.

## Results

### Paralepididae

### *Paralepis elongata* (Brauer, 1906)

Figure 1

*Omosudis elongatus* Brauer, 1906: 140, fig. 68 (type locality: Gulf of Guinea).
*Paralepis elongata* (Brauer, 1906): Maul, 1962: 539 (north of Dakar, Senegal). Post, 1972:156 (type catalog). Post, 1986: 277 (South Africa, but needs confirmation). Post, 1987: 122 (revision).
*Paralepis danae* Ege, 1933: 223 (type locality off Cape Verde, Senegal). Ege, 1953: 20, fig. 2.6. Homonym of *Paralepis pseudosphyraenoides danae* Ege, 1930.
*Paralepis egei* Harry, 1948: 221 (replacement name for *P. danae* Ege, 1933).

**Material examined.** CAS 222645, 1 specimen, 314 mm SL, R/V *Dr. Fridtjof Nansen*, 10°49'S, 13°16'E, off Angola, southeastern Atlantic, 501–504 m depth (1250 m wired out), 6 Apr. 2005, field no. NANSEN 3656, coll. T. Iwamoto.

**Description of CAS 222645.** Morphometrics: standard length (SL) 314 mm; head length (HL) 70.8 (22.5% SL); body depth at pectoral fin 24.1 (7.7%); predorsal length 200 (63.7%); prepelvic length 190 (60.5%); preanal length 250 (79.6%). Eye diameter 8.8 (12.4% HL); interorbital width 7.9 (11.2%); snout length 31.9 (45.1%); head depth 18.4 (26.0%); head width 11.8 (16.7%); pre-nostril length 22.1 (31.2%); upper jaw 26.0 (36.7%); lower jaw 36.1 (51.0%); pectoral-fin length 28.0 (39.5%); dorsal-fin base 12.2 (17.2%); anal-fin base 40.7 (57.5%); caudal-pedunclular depth (12.4%); caudal-peduncular length 20.1 (28.4%).

Meristics: dorsal-fin rays 11; pectoral-fin rays 18 (both sides); anal-fin rays 26; lateral-line scales 33/32 before pelvic fin; 35 before dorsal fin; 50/51 before anal fin; 63 in total, no small scales on rear end of lateral line. Gill rakers 4 on epibranchial, 12 on ceratobranchial and 7 on hypobranchial, 23 in total. Vertebrae: 36 prepelvic; 38 predorsal; 42 prehaemal; 54 preanal; and total 79.

Body relatively slender compared to congeners, compressed, depth at pectoral fin 13.0 times in SL. Caudal peduncle moderately long, its length 2.3 times eye diameter. No ventral adipose fin (v*iz, a*bdominal ridge, or carina, between pectoral and pelvic fins and between anus and anal fin). Anus situated slightly behind tip of appressed pelvic fin (pelvic fin damaged distally), distance from VFO to anus 3.5 times in distance between pelvic- and anal-fin origins.

Head relatively long, its length 4.4 in SL; snout long and pointed anteriorly, its length 2.2 in HL. Mouth terminal, large, its gape extending to about 1.5 times eye diameter in front of eye when mouth opened. Lower jaw slightly upturned at tip, with small distal tab of fleshy tissue. Eye large, its diameter 8.0 in HL. No light organ around eye. First suborbital bone slender, fifth and sixth bones large and well-expanded posteriorly, and seventh suborbital small. Interorbital space narrow, its width 9.0 in HL; some straight ridges present on top of head and snout. Two nostrils located about 1.0 eye diameter before eye and before posterior end of maxilla, the latter extending to about 0.6 eye diameters before anterior margin of eye. Numerous sensory canals presumed present, but most integument on head damaged.


**FIGURE 1.** *Paralepis elongata* (Brauer, 1906). A. Drawing of a 190.5 mm specimen, from Post (1987). B–C. CAS 222645, 314 mm SL, large adult male, preserved. D. Radiograph of CAS 222645. B–D. taken by J. Fong.

Dorsal fin situated well behind mid-length, predorsal length 1.6 in SL. Pectoral-fin base behind posterior margin of gill cover, upper end of fin base well below horizontal of lower margin of eye; a small pocket behind fin base. Pectoral fin small, upper rays of pectoral fin slightly longer than lower rays, its length 2.5 in HL. Pelvic fin situated slightly before dorsal-fin origin and behind mid-length, pre-pelvic fin length 1.7 in SL. No axial scale behind pelvic-fin base (probably lost during trawl operation). Anal fin originating in posterior fifth of body, preanal length 1.3 in SL. Dorsal adipose fin over rear portion of anal-fin base, its base length slightly smaller than eye diameter.

Single row of small, retrorse teeth anteriorly (about 60 in number) on premaxillary, the slender conical teeth abruptly transforming into broad, flattened, bladelike teeth over posterior half or more of bone. Vomerine teeth absent. Two or three fangs (either depressible or fixed) at front end of each lower jaw, followed by a single row of small, depressible teeth, then two rows of fangs arranged in 6 tooth pairs; those of inner row long with knife-like tip and depressible; those in outer row slightly shorter, curved, and fixed, slightly embedded in tissue. Two or three small teeth at front of palatine, followed by two rows of fangs forming 3 tooth pairs, those in inner row long and depressible, those in outer row small and fixed, followed by single row of 17 widely-spaced teeth. Single irregular row of 12 teeth on each side of tongue.

Gill rakers present on epibranchial, ceratobranchial, and hypobranchial parts of each gill arch, each raker with 3–5 short to very slender teeth, these teeth extending upward well beyond margin of gill arch. Teeth on pharyngeal arch forming a long band of slender teeth, arranged in about 3 rows at middle, on fourth arch with similar teeth arranged in oval patch with about 6 rows in middle. Long band of needle-like teeth on fifth ceratobranchial, arranged in about 3 rows at middle.

Gill filaments present on all four gill arches. Fourth arch mostly connected to gill chamber wall by membranes. Pseudobranchs present, their anterior halves included in a deep pocket.

Body covered with small scales (almost all lost with but scale pockets remained), except for a single row of large lateral-line scales extending from above pectoral girdle to point above approximately 2/3 length of anal-fin base. Morphology of lateral-line scales as described by Post (1987); no small scales at rear end of lateral line.

No light organ and luminescent duct.

**Coloration.** Body overall brown-gray after long-term preservation, assumed darker originally. Black pigments on snout, chin, around eye, gill cover, fins and lateral line. Melanophores unevenly distributed in mouth cavity and gill chamber; tongue black; gill arches pale without pigmentation. Peritoneal membrane black.

## Discussion

Our specimen was identified as *P. elongata* based on the following diagnostic characteristics: 79 total vertebrae; 23 total gill rakers; posterior end of maxilla behind a vertical through nostrils; and snout more than twice of eye diameter.

Only few previous works have focused on the taxonomy of *Paralepis*, and published information on *P. elongata* is somewhat confusing. For example, Rofen (1966) published an extensive treatment of what he called *P. elongata*, with detailed description, illustrations, and information on life history, development, distribution, and abundance. However, it turns out that he erroneously synonymized *P. brevirostris* with *P. elongata* (Post, 1987: 125), which obfuscates the situation and renders much of Rofen's data as untenable.

Maul (1962) examined the syntypes of *P. elongata* and the holotype of *P. danae,* and also provided detailed description and drawings of a large (190.5 mm SL) specimen that he identified as *P. elongata*. It is notable that the drawing (*op. cit.,* fig. 6) of that specimen depicts the pelvic-fin origin slightly anterior to that of the dorsal fin. This is confirmed by his measurement of the prepelvic length: it is shorter than the predorsal length, which indicates that the pelvic-fin origin is in front of the dorsal fin in his specimen.

Post (1986) cited Maul's (1962) figure and stated that the species "Attains at least 21 cm. The specimen from Natal… is lost; and the occurrence of *P. elongata* in our area thus needs confirmation." Actually, the specimen Post cited should have been 190.5 mm SL (20 cm in the figure legend) based on Maul (1962), and no other publication reports specimens exceeding that size.

Post (1987) reviewed the genus and provided new data on *P. elongata* from the eastern Atlantic Ocean. He (*op. cit.,* p. 125) stated that Brauer's type specimens of *P. elongata* possibly included both *P. brevirostris* and *P. elongata*, and since "Most specimens of the type series have been lost, consequently part of the Atlantic and all Indian Ocean specimens are doubtful as to which of the two species they belong." He went on to say: "Presently *P. elongata* is represented in the tropical eastern Atlantic only." The drawing of a 190 mm specimen (ISH 427/68, but his largest specimen listed as 190.5 mm in his Table 11) has its pelvic-fin origin clearly before the dorsal fin, which agrees with the drawing of Brauer's (1906) type. Post noted (*op. cit*., p, 124) that "The largest specimen known is not mature, but it shows a slight increase of melanin in the skin, thus indicating a terminal size of 200 to 250 mm." Accordingly, our specimen exceeds the predicted size made by Post (1987).

Sutton *et al*. (2020) provided a key and a drawing of *P. elongata* with the pelvic-fin origin slightly behind the dorsal fin, which does not match the definition of the species.Their data are probably taken from the above-mentioned references. The voucher of their drawing (21.0 cm TL) is uncertain and its identification needs further investigation. As a result, no additional information on adults of the species was added after Post (1987), and the largest known specimen is 190.5 mm SL.

*Paralepis elongata* was reported as food of tunas (Maul 1962; Kornilova 1980) and longnose lancetfish (Romanov *et al*. 2008) in the Indian Ocean. Menezes *et al*. (2003) listed *P. elongata* in Brazil and provided a voucher (MCZ 68501). Moore *et al*. (2003) listed the species from the New England region. However, two of these specimens (MCZ

68501 and MCZ 86988) were reidentified as *P. brevirostris* by examining the photographs and another specimen (MCZ 38042) has uncertain identification. With such scattered records and possible misidentifications, the true distribution range of the species needs further verification.

Our specimen has developed testis and is recognized as a mature male. Compared to the data provided by Post (1987), our specimen has more pectoral-fin rays (18, the first two rays closely attached, vs. 16–17) and more total vertebrae (79, vs. 74–77; note that Post did not include the urostyle). Our specimen also has a smaller head (22.5%, vs. 22.9–25.5% SL), a smaller prepelvic length (60.5%, vs. 61.1–63.2% SL), a smaller eye (2.8%, vs. 3.2–4.2% SL), a shorter upper jaw (8.3%, vs. 8.9–9.1% SL). These may be attributed to geographic variation or allometric growth as our specimen is much larger than any previous record.

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