

A new species of the deepwater cardinalfish genus *Epigonus* (Perciformes: Epigonidae) from the Gulf of Aqaba, Red Sea

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Abstract

A new species of epigonid fish, *Epigonus marisrubri*, is described, based on two specimens (134 mm and 136 mm SL), which were collected over a reef area at a depth of 52 m at the northern tip of the Gulf of Aqaba, Red Sea, Jordan. The new species differs from its congeners by the following combination of characters: dorsal rays VII + I,10; anal rays II,9; pored lateral line scales 48 or 49; gill rakers 29 or 30; pyloric caeca 10; two pterygiophores between neural spines 9 and 10; pectoral fins long, reaching level of second dorsal-fin origin; tongue with a band of teeth on glossohyal; opercle with a short, poorly ossified spine and 1-2 spinelets; otolith (sagitta) oval, elongate, with smooth rims; sulcus and cristae weakly developed. This is the first record of the family Epigonidae from the Red Sea.

Zusammenfassung

Ein neuer Tiefenwasser-Kardinalfisch, *Epigonus marisrubri*, wird anhand von zwei Exemplaren (134 mm und 136 mm SL) beschrieben. Die Typen wurden in Jordanien am nördlichen Zipfel des Golfes von Aqaba, Rotes Meer, gesammelt. Die neue Art unterscheidet sich von allen anderen Arten der Gattung *Epigonus* durch folgende Merkmalskombination: VII + I,10 Rückenflossenstrahlen; II,9 Afterflossenstrahlen; 48 oder 49 perforierte Schuppen in der Seitenlinie; 29 oder 30 Kiemenreusen; 10 Pylorusanhänge; zwei Pterygiophoren zwischen den Neuralfortsätzen 9 und 10; Brustflossen lang, die Höhe des Ansatzes der 2. Rückenflosse erreichend; Zunge mit einem Band von Zähnen auf dem Glossohyale; Kiemendeckel mit einem kurzen, schwach verknöcherten Stachel und 1-2 kleinen Dornfortsätzen; Otolith (Sagitta) oval, langgestreckt, mit glatten Rändern; Sulcus und Cristae schwach entwickelt. Dies ist der erste Nachweis der Familie Epigonidae aus dem Roten Meer.

Résumé

Une nouvelle espèce d'Epigonidé, *Epigonus marisrubri*, est décrite sur base de deux spécimens (134 mm et 136 mm de LS), collectés dans une zone récifale, à une profondeur de 52 m, à l'extrémité du golfe d'Aqaba, Mer Rouge, Jordanie. La

nouvelle espèce se distingue de ses congénères par la combinaison des caractères suivants: rayons de la dorsale VII + I,10; rayons de l'anale II,9; écailles canaliculées de la ligne latérale 48 ou 49; branchiospines 29 ou 30; caecums pyloriques 10; deux ptérygiophores entre les épines neurales 9 et 10; pectorales longues, atteignant la naissance de la seconde dorsale; langue porvue d'une rangée de dents sur le glossohyal; opercule avec une épine courte à peine ossifiée et 1-2 petites épines; otolithe (sagitta) ovale, allongé, à bords lisses; sulcus et cristae peu développés. Il s'agit de la première mention de la famille des Epigonidae pour la Mer Rouge.

Sommario

Una nuova specie di epigonide, *Epigonus marisrubri*, è descritta sulla base di due esemplari (134 mm e 136 mm SL) raccolti su un'area di barriera a profondità di 52 m presso la punta settentrionale del Golfo di Aqaba, Mar Rosso, Giordania. La nuova specie differisce dai congeneri per la seguente combinazione di caratteri: VII + I,10 raggi dorsali; II,9 raggi anali; 48 o 49 scaglie con poro lungo la linea laterale; 29 o 30 rastrelli branchiali; 10 ciechi pilorici; due pterigiofori tra la nona e la decima spina neurale; pinne pettorali allungate che arrivano a livello dell'origine della seconda pinna dorsale; lingua munita di una banda di denti sul glossoiale; opercolo con una breve spina, scarsamente ossificata e 1-2 spinule; otolite (sagitta) ovale, allungato, con margine lisci; solco e creste debolmente sviluppate. Questo ritrovamento rappresenta il primo caso di segnalazione della famiglia Epigonidae nel Mar Rosso.

INTRODUCTION

Deepwater cardinalfishes of the genus *Epigonus* Rafinesque, 1810 occur in almost all oceans, from subantarctic and northern cold-temperate to tropical latitudes. They are bathydemersal, inhabiting seamounts, continental and insular slopes between 75 m and 3700 m deep, most commonly occurring between 200 m and 1400 m (McCosker & Long 1997, Gon 1999). They feed on planktonic organ-

isms. The genus was first revised by Mayer (1974) who regarded 12 species as valid. In 1983, Mochizuki & Shirakihara resurrected *E. atherinoides* Gilbert, 1905, which Mayer (1974) had placed in the synonymy of *E. occidentalis* Goode & Bean, 1896, while 12 more nominal species have been described since Mayer's revision (Mochizuki & Shirakihara 1983, Gon 1985, Parin & Abramov 1986a,b, Abramov 1987, Abramov & Manilo 1987). In a subsequent revision, Abramov (1992) recognised 25 species. More recently, two more species were described (McCosker & Long 1997, Ida et al. 2007), bringing the total number of species presently considered as valid to 27. Here we are adding another new species from the northern Red Sea.

In May 1990, during field research on Syngnathidae of the Gulf of Aqaba, Thomas Paulus, Mainz, Germany, collected two specimens of *Epigonus* in a coral reef area at a depth of only 52 m and deposited them in the Senckenberg Research Institute and Museum of Nature, Frankfurt a. M., Germany. During routine curatorial work they were identified as *E. denticulatus* Dieuzeide, 1950. While collating data for a checklist of the fishes of the Gulf of Aqaba the authors re-examined the specimens and discovered that they belong to an undescribed species.

METHODS

Methods of morphometric measurements and meristic counts follow Mayer (1974). Measurements were taken with dial callipers to the nearest 0.1 mm. Pored lateral line scales were counted to the posterior end of the hypural plate. Counts of vertebrae, which include the hypural plate as one vertebra, were made from radiographs. The type specimens are deposited in the fish collection of the

Senckenberg Research Institute and Museum of Nature (SMF) in Frankfurt a. M., Germany.

Epigonus marisrubri n. sp.

English name: Red Sea deepwater cardinalfish
(Figs 1-3, Table I)

Holotype: SMF 24661, female, 136 mm SL, Red Sea, Gulf of Aqaba, Jordan, in front of Marine Science Station, ca 29°27'30"N 34°58'30"E, gillnet on reef, 52 m depth, Thomas Paulus, 02 May 1990.

Paratype: SMF 31636, 134 mm SL, collected with holotype.

Diagnosis: *Epigonus marisrubri* is distinguished from its congeners by the following combination of characters: dorsal-fin rays VII + I,10; anal-fin rays II,9; pectoral-fin rays 18; pored lateral line scales 48 or 49; gill rakers 10+19-20; pyloric caeca 10; vertebrae 10 + 15; 2 pterygiophores between neural spines 9 and 10; pectoral fins long, reaching level of second dorsal-fin origin; caudal fin forked; tongue with a band of 2-4 rows of densely-set teeth on glossohyal; opercle with short, poorly ossified spine and 1-2 small spinelets; otolith oval, elongate, sulcus and cristae weakly developed.

Description: Data for the holotype are given first, followed by data of the paratype (if different) in parentheses. Morphometric measurements are presented as percentages of standard length (SL) in Table I.

Dorsal-fin rays VII + I,10, no dorsal spine hidden by scales or skin; anal-fin rays II,9; first dorsal and anal rays unbranched, last dorsal and anal rays split to base; pectoral-fin rays 18; principle caudal-fin rays 9 + 8; pored lateral line scales 49 (48) (counted to end of hypural plate); scales between lateral line and



Fig. 1. Ethanol-preserved holotype of *Epigonus marisrubri* n. sp., SMF 24661. Photo by S. Tränkner.

dorsal fin origin 3; scales between lateral line and anal fin origin 9; branchiostegal rays 7; gill rakers 10+20 (10 + 19), lowermost gill raker of paratype rudimentary; pyloric caeca 10; vertebrae 10 + 15 (Fig. 3); two pterygiophores between neural spines 9 and 10.

Body elongate, moderately deep, slightly compressed; anterodorsal profile convex, rising without interruption from tip of snout to origin of first dorsal fin; bony rim of orbit not raised above dorsal profile (Figs 1-2); two nostrils closely set, oval, about equal in size, posterior one with a very short dermal flap; head of medium length; snout blunt; mouth large, oblique; angle of gape moderate; lower jaw protruding beyond upper jaw, visible in dorsal view; posterior margin of maxilla extending to below centre of eye; eye slightly oval, 37.2% (36.3%) of head length; pectoral fin long, reaching level of second dorsal-fin origin; origin of anal fin vertically below first third of second dorsal fin base; caudal fin forked.

Teeth small, conical and recurved; premaxilla bearing a single row of teeth posteriorly, and 1-2 rows anteriorly, edentulous near symphysis; teeth on den-

tary in an irregular single row near symphysis continuing as a narrow band of 2-3 rows posteriorly; vomerine teeth larger than those on jaws, arranged in a large triangular patch; teeth on palatine arranged in a band of 2-3 rows; tongue with a band of 2-4 rows of densely-set teeth on glossohyal.

Opercle with short, weak, poorly ossified spine, ventral to 1-2 small, membranous or poorly ossified spinelets; spine and spinelets separated by a shallow gap; preopercular bone with produced, rounded angle; gill rakers long, awl-shaped; scales large, weakly ctenoid, covering entire body except area anterior to rim of orbit and jaws, also present on bases of all fins, except first dorsal fin, 3 elongate axillary scales at base of pelvic fins, one large elongate median scale ventrally between pelvic fins; caudal-fin rays densely scaled almost to anterior margin; anus below origin of second dorsal fin; otolith (right sagitta of holotype) oval, elongate, high, with smooth rims; sulcus and cristae weakly developed.

Colour in alcohol: Tissue underlying scales light pinkish brown; dorsal surface of body and head

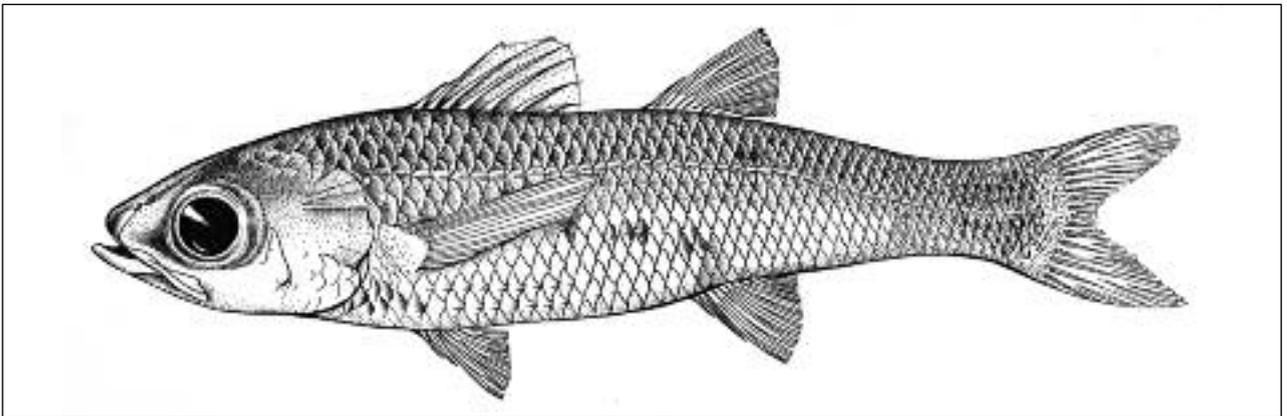


Fig. 2. *Epigonus marisrubri* n. sp., habitus of holotype. Drawing by U. Wagner.



Fig. 3. *Epigonus marisrubri* n. sp., radiograph of holotype.

Table I. Morphometric characters of *Epigonus marisrubri* n. sp. Standard length is in millimetres; other measurements are given as percentage of standard length.

	Holotype	Paratype
Total length	120.7	121.0
Fork length	108.6	107.9
Standard length [mm]	134.1	135.5
Head length	32.9	32.7
Head height	18.1	18.3
Body depth	23.3	24.5
Eye diameter	12.2	11.9
Snout length	8.1	7.7
Bony interorbital width	7.5	8.1
Maxillary length	15.1	15.0
Lower jaw length	17.4	17.3
Caudal peduncle depth	10.7	10.6
Caudal peduncle length	25.2	25.1
D ₁ I length	damaged	6.1
D ₂ I length	5.1	5.0
All length	4.3	damaged
P ₂ I length	8.1	8.5
Pectoral fin length	24.9	24.3

dark brown; changing abruptly to silvery on flanks and ventral surface below lateral midline; few, irregular dark blotches, varying considerably in size, scattered over the flanks; crescent-shaped dark brown blotch in front of eyes; posterior edges of most scales on lower half of body with a posterior margin of densely-set melanophores; scales between pectoral and pelvic fin origins densely covered with brown-black melanophores, spines, rays and membranes of both dorsal fins and caudal fin heavily pigmented; other fins with few scattered melanophores; peritoneum black, stomach and intestine whitish; colour of live specimens unknown.

Etymology. The new species is named *marisrubri*, the Latin translation of “Red Sea”. The epithet is composed of the noun *mare* (sea, genitive case = *maris*) and the adjective *rubrum* (red, genitive case = *rubri*).

Distribution. The species is only known from the type locality, a coral reef area in front of the Marine Science Station in Aqaba, Jordan, at the northern tip of the Gulf of Aqaba, Red Sea, where it was found at a depth of only 52 m. It is the first record of the family Epigonidae from the Red Sea, representing the northernmost occurrence in the Indian Ocean.

Comparative remarks. The new species is very distinct, which justifies a description based on two specimens only. *Epigonus marisrubri* is clearly distinguished from most of its known congeners by its combination of meristic characters. Meristic counts

are within the range of *E. pandionis* (Goode & Beanand, 1881) and *E. denticulatus*. *Epigonus pandionis* is an amphi-Atlantic species, occurring in the Caribbean, Gulf of Mexico and Gulf of Guinea (Mayer 1974), which differs from *E. marisrubri* in dentition pattern (tongue edentulous vs tongue with 2-4 rows of teeth). *Epigonus denticulatus* is the only cosmopolitan species in the genus. Originally described from the western Mediterranean, it has subsequently been reported from the Caribbean, Gulf of Mexico, Western Africa, South Africa, Reunion Island, southern Japan, Australia and New Zealand (Mayer 1974, Abramov 1992). *Epigonus marisrubri* differs from *E. denticulatus* in lacking membranous projections on the operculum, by its dentition pattern, (vomerine teeth in 1-4 irregular rows vs forming a large triangular patch, tongue usually edentulous vs with band of teeth). According to Mayer (1974) *E. denticulatus* occasionally has small patches of teeth on the glossohyal. The otoliths from *E. marisrubri* were in poor condition. The specimens had obviously been kept in formalin for an extended period of time before being transferred to ethanol. For this reason the otoliths are not illustrated here. The sagitta is oval and elongate, while that of *E. denticulatus* is rhomboid, about as long as wide, with well-developed cauda, ostium and crista superior. In addition to the toptypical population in the western Mediterranean, the population of *E. denticulatus* closest to the type locality of *E. marisrubri* is the one recorded from Reunion Island in the south-western Indian Ocean. We assume that *E. marisrubri* is of Indo-Pacific origin. Within the Western Indian Ocean, *E. marimonticolus* Parin & Abramov, 1986, which has been described from near the Socotra Archipelago, is the Indo-Pacific *Epigonus* record closest to the type locality of *E. marisrubri*. This species, however, has fewer pyloric caeca, and more pectoral fin rays.

Based on meristic characters, *E. marisrubri* appears to be most closely related to Abramov’s (1992) *E. denticulatus* group. Studies of molecular markers and a thorough phylogenetic analysis of the genus, however, are still pending.

Most previously described species of *Epigonus* have been recorded from depths below 120 m (usually below 200 m). In this regard, *E. marisrubri* occurs in remarkably shallow water. Only one species, *E. cavaticus* Ida, Okamoto & Sakaue, 2007 has been reported from even shallower water. It was found in a cave at a depth of 20 m in a fringing reef area in Palau (Ida et al. 2007). Previously, the shallowest

record for the group was *E. telescopus*, which was collected at a depth of 75 m in the North Atlantic (Mayer 1974).

Epigonus marisrubri is expected to occur in other parts of the Red Sea at greater depths. It is a well-documented phenomenon that deep-water species occur in much shallower waters in the Gulf of Aqaba than in other parts of the Red Sea (Krupp & Paulus 1991, Sheppard et al. 1992). Examples are *Photoblepharon palpebratum* (Anomalopidae), *Apolemichthys xanthis* (Pomacanthidae) and *Pseudanthias heemstrai* (Serranidae). The penetration of deep-water fishes into shallower waters in the Gulf of Aqaba has been attributed to lower surface temperatures (Ormond et al. 1984). Another possible explanation is niche expansion in the absence of certain competitors (Sheppard et al. 1992). The present record brings the number of deep-dwelling species recorded from the Jordanian coast to 81, and increases the number of families to 57 (see Khalaf & Zajonz 2007).

The holotype is a mature female with well-developed gonads. The paratype has not been sexed. Nothing is known about the reproduction and life history of *E. marisrubri*.

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