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Research Article

Confirmed Record of the Two-Faced Toadfish, *Bifax Lacinia* Greenfield, Mee & Randall, 1994 (Fam. Batrachoididae) From the Southern Oman Coast of the Arabian Sea

Abstract

The presence of two-faced toadfish *Bifax lacinia* was confirmed based on a single specimen, 244 mm standard length (SL), caught in the waters of Salalah port, Oman, the Arabian Sea in February 2016. Descriptions, illustrations, meristic and morphometric data are presented. The species is considered as an endemic of the southern Oman waters. Currently, the habitat of *B. lacinia* in Salalah port is under threat of the destruction due to the planned extension of the port.

Introduction

Toadfishes, called frogfishes in Australia, are mainly marine and brackish water fish of the family Batrachoididae, occurring worldwide between about 51°N and 45°S along a coast down to a depth of at least 366 m, often burying in the sand or under rocks or coral heads where they feed on crabs, shrimps, mollusks, sea urchins, and fishes [1]. Toadfishes can be easily recognized by their toad-like shape and also well known for their ability to produce sound with their swim bladders [2]. These small to medium-sized fish (to 57 cm) [1] are not commercially exploited, but they occur incidentally in artisanal catches and very rarely are used by local fishermen as a food fish. Overall, 23 genera and 84 species of toadfishes recorded in the world [3] including two species from the waters of Oman: flat toadfish *Colletteichthys dussumieri* and two-faced toadfish *Bifax lacinia* [4]. Al-Jufaili et al. [5], also listed grunting toadfish *Allenbatrachus grunniens* in Oman fish biodiversity, however, they did not state, where the species was obtained in Oman, so these data are not confirmed.

Two-faced toadfish, *B. lacinia* is known only from the south coast of Oman [6]. During the field work in 1989, J.K.L. Mee observed three specimens in horizontal crevices at the base of very large limestone boulders in a small bay near Raysut (Salalah port) but attempts to collect the fish were unsuccessful. In 1990, J.K.L. Mee and J.E. Randall revisits the southern Oman, took underwater pictures and collected one

specimen from a crevice in the rocky wall at a depth of 8 m in Sadah bay in April 1990. In October 1993, four specimens, including holotype, were taken by J.L. Earle from the reef in the Mahallah bay (near Sadah) at a depth of 6 m and another two specimens were collected by J.P. Hoover, S.A. Shaw and D.R. Deeks at the same place from 8 m depth in November 1993. These specialists determined that this species with its unique jaw flaps does not belong to any recognized genus. In 1994, D.W. Greenfield with J.K.L. Mee and J.E. Randall described the fish as a new genus and new species *Bifax lacinia* Greenfield, Mee & Randall, 1994 [6]. So far, only these seven specimens were studied and deposited in museum collections.

During the last 23 years, this species has not been seen by specialists in the Omani waters and elsewhere. Therefore, we believe that finding this rare and endemic fish is interesting and worthy of special attention for the study and conservation and preservation of its habitat.

Materials and Methods

A single specimen of *Bifax lacinia* was collected using a fish trap at underwater rocks in a depth of about 5 m inside Salalah port (16°57'24 N, 54°00'42) located at the south coast of Oman on 19 February 2016 (Figure 1). Meristic counts generally followed Greenfield et al. [6], except for number of vertebrae and extra counts of caudal fin rays and gill rakers. Morphometric characters were taken following [6] with some

additions. Measurements were made using electronic calipers to the nearest 0.1 mm and expressed in millimeters and as percentages of standard length (SL). Counts and measurements are given in (Tables 1,2). The specimen was fixed in 10% formalin and later preserved in 70% ethanol for deposit in the fish collection of the Marine Science and Fisheries Centre, Ministry of Agriculture and Fisheries Wealth, Muscat, Sultanate of Oman.

Results and Description

Body flattened dorsoventrally, body depth 6.4 times in SL. Skin smooth, naked without scales. Head broad and greatly



Figure 1: Freshly collected (A) and fixed (B) specimen of *Bifax lacinia* (244 mm SL) caught in a fish trap off the south coast of Oman.

Table 1: Meristic characters of *Bifax lacinia*.

Meristic characteristics	Our specimen	[6]
		n=7
Dorsal fins	2	2
spines	3	3
soft rays	23	23-24
Finlets	absent	absent
Adipose fin	absent	absent
Anal fin		
spines	0	0
soft rays	17	15-18
Pectoral fin		
spines	0	0
soft-rays		20
Pelvic fin		
spines	1	.*
Caudal fin rays	14	-
Lateral lines		
upper pores	46	47-56
lower pores	38	38-48
Gill rakers		
on upper limb	1	-
on lower limb	9	-
total	10	-
Vertebrae	-	30
* Dash is no data		

Table 2: Comparisons of morphometric data for *Bifax lacinia*.

Morphometric characters	Our specimen		[6]
	mm	% in SL	(n=7) % in SL
Standard length	244	100.0	94.1-280 mm
Total length	281	115.2	-
Head length	78	32.0	29.73-36.4
Head depth	38	15.6	12.0-15.79
Head width	68	27.9	28.8-32.3
Preorbital (snout) length	15	6.6	4.0-7.14
Eye diameter	7.5	3.1	3.7-5.84
Postorbital length	56	23.0	-
Length of upper jaw	39	16.0	14.7-16.6
Length of lower jaw	50	20.5	-
Width of maxilla	5	2.0	-
Interorbital width	34	13.9	8.3-13.9
Length of mouth flap	20	8.2	7.5-8.93
Predorsal fin length 1 st	80	32.8	32.5-35.7
Predorsal fin length 2 nd	110	45.1	41.6-47.86
Length of first dorsal fin base	22	9.0	4.25-6.3
Length of second dorsal fin base	126	51.6	49.3-54.4
Length of caudal peduncle dorsal	5	2.0	-
ventral	6	2.5	-
Length of mid-caudal fin rays	43	17.6	15.4-21.57
Prepectoral fin length	92	37.7	-
Prepelvic fin length	69	28.3	-
Prianus length	147	60.2	-
Prianal fin length	161	66.0	62.59-67.23
Anal fin base	75	30.7	26.86-32.09
Maximum body depth	41	16.8	13.18-16.1
Body width	78	32.0	-
Caudal peduncle depth	13.5	5.5	5.7-6.4
Pectoral fin length	35	14.3	16.75-18.7
Pelvic fin length	32	13.1	11.9-20.83
Distance between pelvic-fin bases	34	13.9	10.3-14.9

depressed, 3.1 times in SL. A striking feature is a large fleshy flap with an eye spot extending laterally on each side of the mouth under the eyes (Figure 1A). Two fleshy whitish barbels present on the tip of snout and two on the chin. Snout short and round; mouth large, terminal; lower jaw with 3 rows of pointed teeth anteriorly, narrowing to a single row posteriorly; upper jaw with 3 rows of pointed teeth in anterior portion and a single row on sides, a single row of teeth on palatines. Maxilla reaches posteriorly to vertical beyond the middle of the eye. Eyes are round and relatively small. Gill cover armed with one large and 4 smaller spines, usually hidden under the skin. Gill membranes with 6 branchiostegal rays. Gill rakers on the first arch: upper limb 1, lower limb 9 (Total 10). Two lateral lines along the side of the body represented by a series of small pores, the upper with 46 pores, and the lower with 38 pores. Two dorsal fins, the first small with 3 spines hidden inside the skin, located just behind the head; second fin long-based with 23 soft rays. Anal fin long with 17 soft rays. Pectoral fin rounded with 20 rays, located in front of the first dorsal fin. The pelvic

fins are fleshy with 1 spine and invisible and impalpable soft rays, located under the throat. Caudal fin rounded with 14 rays.

Coloration

Body dorsally grey-brown, shading to white ventrally; front of head and upper lip bright yellow; first and second dorsal, pectoral, anal and caudal fins grey-brown at the base matching color of the body, grading into yellow on the tips, pelvic fins whitish; the outer part of cephalic flaps yellow; fleshy flaps with a black eye spot on the lower part of anterior side and dark rim behind; dark rim on the fleshy base of these pelvic fin.

Remarks

The meristic and morphometric characters of the specimen agree well with the data given by Greenfield et al. [6], Additionally, we counted the number of rays in the caudal fin and gill rakers, and measured following lengths: total, postorbital, lower jaw, caudal peduncle, prepectoral fin, prepelvic fin and preanus as well as the greatest body width and the width of maxilla, which is new data for this species. Some differences with previous data [6] were found only in number of pores in upper lateral line (46 vs. 47-56), orbit diameter, length of first dorsal-fin base, the greatest body depth and pectoral fin length.

Toadfishes have demersal eggs that are laid in a nest that is guarded by the male [7]. After hatching, unlike most other demersal spawners, the larvae do not move up into the water column to disperse, but rather stay attached to the substratum until most of the yolk sac has been absorbed, at a size of about 12 to 16 mm total length [7]. So toadfishes have limited dispersal ability, because they have demersal eggs and lack pelagic larvae [1].

The species *Bifax lacinia* has a very limited geographic distribution, because it was found only in the Raysut bay of Salalah port in 1989 and at the same site in our study in 2016, and approximately 120 kilometers toward the northeast near Sadah in 1990 and 1993. Thus, *B. lacinia* can be considered as an endemic and endangered species of Oman.

It must be stressed here that the Ministry of Transport and Communications of Oman has started implementing the plan of expansion of Salalah port and the project will include the construction of new berths in the place where we collected our specimen. So, it may result in permanent destruction of the habitat of *B. lacinia* in the Salalah port. It is desirable to conduct a special survey and to estimate abundance and distribution of *B. lacinia* as well as other endemic species along the coast of Oman.

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