

**ORIGINAL ARTICLE**

# Confirmed record of Yellow-dabbled flounder; *Laiopteryx novaezeelandiae* (Günther, 1862), from the Northern coast of the Persian Gulf)

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## Abstract

Three specimens of yellow-dabbled flounder, *Laiopteryx novaezeelandiae* (Günther, 1862), were collected in the Iranian coastal waters of the Persian Gulf (Hormuz Island) with the trawl net in winter 2025. The COI gene sequence, in addition to morphometric and meristic characters, was used to confirm identification. The mean genetic distance between the identified COI haplotype (PV719947) and previous records of COI Haplotypes of *L. novaezeelandiae* in GenBank was 0.03 (*p*-distance) while the genetic distance among five Citharid species was 0.18-0.25. The phylogenetic tree revealed that the identified haplotype is placed in a monophyletic clade beside other haplotypes of *L. novaezeelandiae* in GenBank. This study provided the first COI molecular sequence and record of *L. novaezeelandiae*, from the Iranian coast of the Persian Gulf, and the result could lead to a better understanding of the fish fauna in this area.

**Keywords:** Citharidae, Fish Taxonomy, Persian Gulf, COI

## INTRODUCTION

The family Citharidae (largescale flounders), including four genera and six valid species (Fricke et al. 2025), which are distributed in the Mediterranean Sea and Indo-West Pacific coasts, inhabiting sandy and muddy substrates at depths between 20 and 50m in tropical and temperate areas (Randall 1995; Nelson 2006). The citharids are diagnosed by the following characters; large and ctenoid scales on eyed side, cycloid or weakly ctenoid on blind side, pelvic fin with one spine and five soft rays, no spines in the dorsal and anal fins, presence of a pelvic fin spine, dorsal fin originating at the posterior nostril of the blind side, and widely separated gill membranes (Carpenter & Niem 2001; Nelson 2006). The family is regarded as intermediate and transitional between the most primitive flatfish family Psettodidae and the main groups of flatfishes (Amaoka 1972).

The dextral flounder genus *Laiopteryx* contains only a single species: yellow-dabbled flounder; *Laiopteryx novaezeelandiae* (Günther, 1862), which inhabits sandy and muddy bottoms of the Indo-Pacific region (i.e., near river mouths) and offshore areas (Hensley 2001). It feeds on bottom-living animals, usually collected using trawls. The maximum total

length is 14 cm, though most specimens are not larger than 12 cm (Carpenter & Niem 2001).

The species, *L. novaezeelandiae* has an elliptical body, a large head and a large mouth, biserial and pointed teeth in both jaws, enlarged teeth in the anterior part of the upper jaw, long and slender gill rakers, elongated anterior dorsal rays in males, ctenoid scales on eyed side and cycloid or weakly ctenoid scales on blind side, 28 to 33 scales on lateral line, scaleless snout and jaws, yellowish or yellowish-brown color (Carpenter & Niem 2001).

Despite the wide distribution of *L. novaezeelandiae* in the Indo-Pacific area and its records from the southwestern coast of the Persian Gulf, including Bahrain, Kuwait and Qatar (Carpenter et al. 1997), there is no confirmed record from the Iranian coastal waters of the Persian Gulf.

## MATERIAL AND METHODS

Three specimens of *L. novaezeelandiae* (Fig. 1) were captured by trawl net from the coast of Hormuz Island (27°04' N, 56°28' E) (Fig. 2), the Persian Gulf, in winter 2025. The collected specimens were photographed and fixed in formalin (4%) after tissue sampling for molecular analysis. Morphometric



**Fig.1.** Specimen of *Laiopteryx novaezeelandiae* collected from the northern coast of the Persian Gulf, Hormuz Island (115mm SL).

characters were measured with a clipper (0.02mm accuracy) and meristic characters were counted under a stereomicroscope (Khajavi & Alavi-Yeganeh 2022) to compare those characters with previously reported data (Carpenter & Niem, 2001). DNA was extracted using the phenol/chloroform protocol and COI gene fragment was amplified using universal primers Fish F1 and Fish R1 (Alavi-Yeganeh & Deyrestani 2016). The identified haplotype of COI, with a length of 632 bp, was submitted in GenBank (PV719947). Genetic distance among the identified haplotype of *L. novaezeelandiae* from the Persian Gulf, other recorded haplotypes of this species from the coastal waters of China (MK617133), India (PQ803335), Malaysia (OR918674, OR918766, OR918781) and Saudi Arabia (KU499720), as well as haplotypes of four other Citharid species, were calculated using MEGA11 (Tamura et al. 2021). The cladogram for phylogenetic relationships of the identified haplotypes and other haplotypes of this family was constructed using the Maximum Likelihood (ML) method in raxmlGUI Ver. 2.0 (Elder et al. 2020).

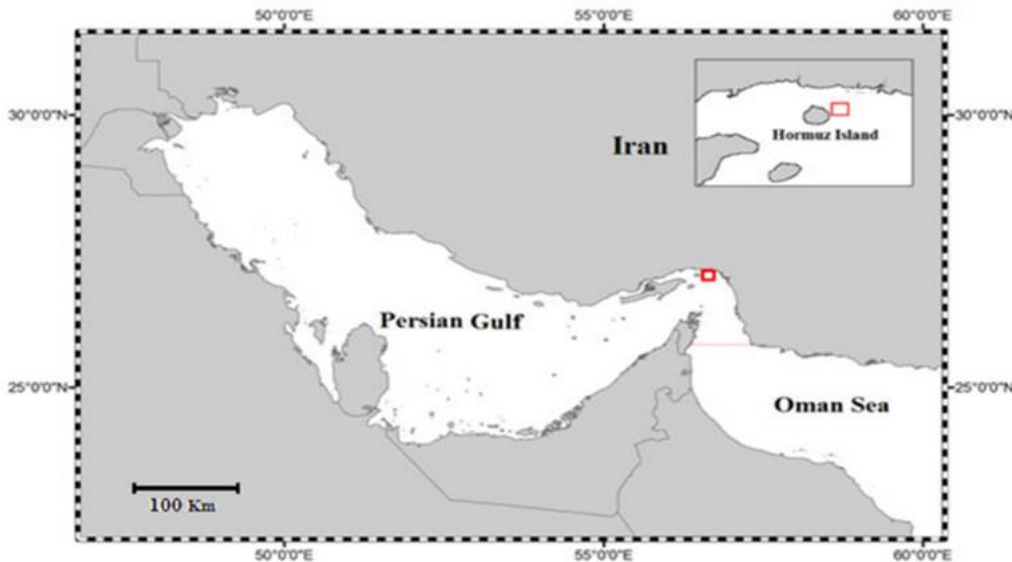
## RESULTS

The total length of the three collected specimens was 113-115mm. Eleven morphometric and meristic characters which were measured and counted in the collected specimens were concordant with previous reports by Carpenter & Niem (2001) (Table 1). The eyes were located on the right side of the head and front margin of the upper eye was anterior to front margin of lower eye. Five to six anterior rays of the dorsal fin were prolonged in male specimens. All three collected specimens were male (Fig. 1).

The mean genetic distance between the identified COI haplotype (PV719947) and previous records of COI Haplotypes of *L. novaezeelandiae* in the Genbank was 0.03 (*p*-distance) while the genetic distances within and among five Citharid species were 0.00-0.10 and 0.18-0.25 respectively (Table 2). The identified haplotype was placed in a monophyletic group alongside other haplotypes of *L. novaezeelandiae* (Fig. 3).

**Table 1.** Morphometric and meristic characters for three specimens of the yellow-dabbled flounder (*Laiopteryx novaezeelandiae*) from the Persian Gulf in comparison with previous data from Carpenter & Niem (2001).

Character	Carpenter & Niem 2001	Three specimens in this study
SL/Body depth	2.2 - 2.7	2.5 - 2.6
SL/Head length	3 - 3.6	3.6-3.8
HL/Upper jaw length	1.8- 2.0	2.0-2.1
Gill rakers	5-6 (on up side of arch)	
Dorsal fin rays	7-10 (on low side of arch)	6 (on up side of arch)
Anal fin rays	7 (on low side of arch)	
Caudal fin rays	65-77	58-68
Pectoral fin rays on eyed side	41-50	42-43
Pectoral fin rays on blind side	13-14	14-15
Pelvic fin rays	11-13	9-11
Lateral line Scale	10-13	11-12



**Fig.2.** Collection site of *Laiopteryx novaezeelandiae* from coastal water of Hormuz Island, Persian Gulf.

## DISCUSSION

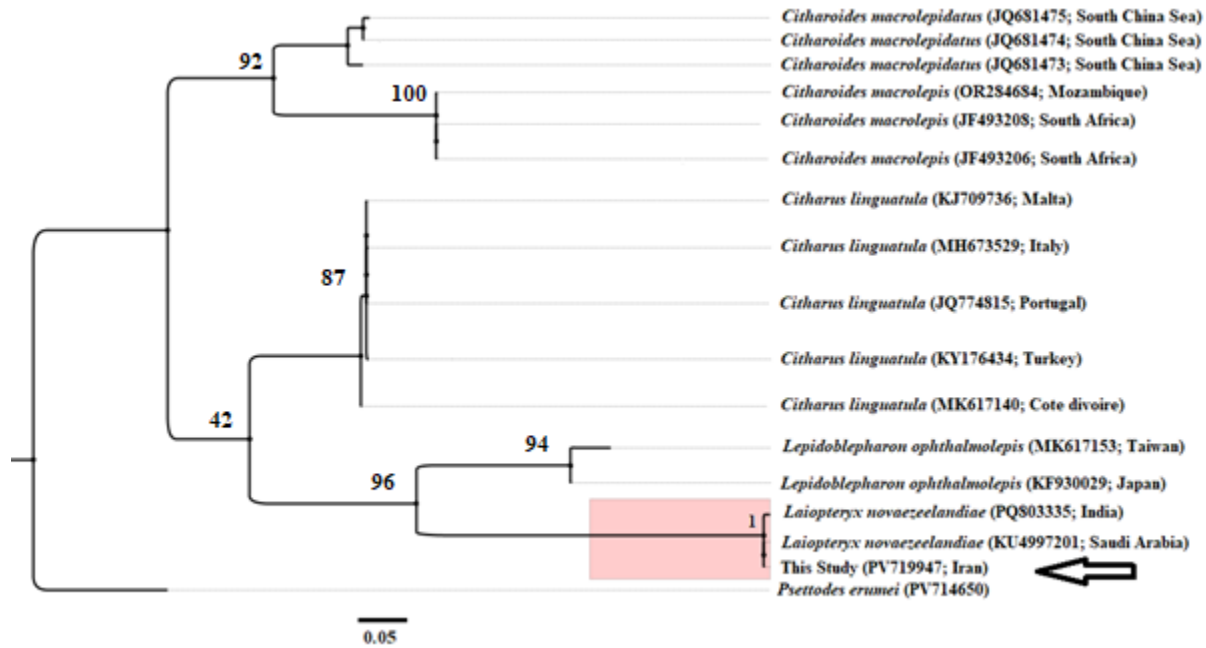
By analyzing a short sequence from a standardized region of the genome, typically the mitochondrial cytochrome oxidase I gene (COI) in animals, DNA barcoding facilitates rapid, precise, and cost-effective species identification (Hebert et al. 2003). When DNA barcoding is coupled with morphological techniques, offers comprehensive and reliable insights into biodiversity (Ward et al. 2009).

Although *L. novaezeelandiae* appeared as the sister taxon to *Lepidoblepharon ophthalmolepis* in this study, the phylogenetic position of this species within the family Citharidae is not explicitly detailed.

The possible reason for the lack of previous records of *L. novaezeelandiae* from the Iranian coast of the Persian Gulf could be related to the difficulties in sampling of specimens as a bed-associated species and patchy distribution of this species in the area. Lack of data and records, resulting from the difficulty in

**Table 2.** Genetic distances ( $p$ -distance) between and within haplotypes of five Citharid species and obtained haplotype in this study (PV719947).

Species	1	2	3	4	5	6
1 (This study)	n/c					
2 <i>Citharus linguatula</i>	0.22	0.02				
3 <i>Citharoides macrolepis</i>	0.25	0.21	0.00			
4 <i>Citharoides macrolepidotus</i>	0.25	0.22	0.18	0.07		
5 <i>Lepidoblepharon ophthalmolepis</i>	0.23	0.20	0.23	0.23	0.10	
6 <i>Laiopteryx novaezeelandiae</i>	0.03	0.22	0.24	0.24	0.23	0.03

**Fig.3.** Maximum likelihood analysis based on the mitochondrial cytochrome c oxidase subunit I (COI) sequences of Citharid species. All reference sequences were obtained from GenBank with their accession numbers and collection area indicated within the parentheses. The arrow is in front of identified haplotype from the Persian Gulf in this study. Bootstrap values are mentioned on nodes.

sampling fish specimens associated with muddy bed, reef colonies, or burrowing behavior, have been reported as a possible reasons for the absence of records of several other species in the Persian Gulf and the Oman Sea, such as *Acanthocephala abbreviata*, *Helcogramma ellioti*, *Pseudochromis persicus* and *Trypauchen vagina* (Alavi-Yeganeh et al. 2015; 2024a; 2024b; Sharifinia et al. 2021). The data provided could be useful for improving the understanding and management of fish biodiversity in the Persian Gulf.

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## مقاله کامل

# گزارش تأیید شده از گونه *Laiopteryx novaezeelandiae* (Günther, 1862) در آب‌های ایرانی خلیج فارس با استفاده از خط شناسه DNA

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**چکیده:** سه نمونه از گونه کفشک ماهی زرد رنگ *Laiopteryx novaezeelandiae* (Günther, 1862) با استفاده از تور ترال از آب‌های ساحلی جزیره هرمز در زمستان سال ۱۴۰۳ جمع‌آوری شد. توالی ژن COI علاوه بر ویژگی‌های اندازه‌شی و شمارشی برای تأیید شناسایی استفاده شد. میانگین فاصله ژنتیکی بین هاپلوتیپ شناسایی شده (PV719947) و سوابق قبلی سایر هاپلوتایپ‌های ثبت شده از گونه *L. novaezeelandiae* در بانک ژن ۰/۰۳ (فاصله  $p$ ) بود، در حالی که فاصله ژنتیکی بین پنج گونه از خانواده Citharidae، ۰/۲۵-۰/۱۸ محاسبه شد. درخت تبارشناسی نشان داد که هاپلوتیپ شناسایی شده در یک شاخه تک تبار در کنار سایر هاپلوتیپ‌های مربوط به *L. novaezeelandiae* در بانک ژن قرار گرفت. در این مطالعه اولین توالی مولکولی ژن COI، *L. novaezeelandiae* از سواحل ایرانی خلیج فارس ثبت شد و نتایج می‌تواند به درک بهتر از فون ماهیان این منطقه منجر شود.

**کلمات کلیدی:** COI، جزیره هرمز، آرایه‌شناسی ماهیان، Citharidae