Short Communication

ACTA ZOOLOGICA BULGARICA
Acta zool. bulg., 70 (1), 2018: 121-124

First Record of Goldstripe Ponyfish, *Karalla daura* (Cuvier, 1829) (Perciformes: Leiognathidae) from the Iranian Coast of the Oman Sea

Mohammad Sadegh Alavi-Yeganeh [*] ***& Ghazaleh Bahmani***

Department of Marine Biology, Faculty of Marine Sciences, Tarbiat Modares University, Nur, Iran

Abstract: Goldstripe ponyfish (*Karalla daura*), a species with distribution in the Indian and Western Pacific Oceans, was recorded from the Iranian coast of the Oman Sea, Chabahar Bay. DNA barcoding based on cytochrome c oxidase and morphological data of collected specimen are provided.

Key words: *Karalla daura*, Chabahar Bay, Goldstripe ponyfish

Introduction

The genus *Karalla* Chakrabarty & Sparks, 2008 (Perciformes: Leiognathidae) contains two small-sized (adults<140 mm SL) species: *K. daura* (Cuvier, 1829) and *K. dussumieri* (Valenciennes, 1835). Both are native to the Indian and Western Pacific Oceans. The goldstripe ponyfish (*K. daura*) was recorded in many places in the Indo-West Pacific including the coasts of Somalia (Sommer et al. 1996), the Arabian Sea off Oman (Randall 1995) and off Pakistan (Robins et al. 1991), in the east to the coast of Hong Kong (Ni & Kwok 1999) and the Philippines (Conlu 1986). In this study, we report *K. daura* in Iranian waters of the Oman Sea for the first time, as evidenced through both morphologic and genetic examination.

Materials and Methods

In February 2016, two specimens of *K. daura* (61.6-63.9 mm SL) were collected by cast net from 5 m depth contour in Chabahr Bay in the Oman Sea (25°18'N, 60°37'E; Fig. 1). After taking photo, the specimens were preserved in 96% ethanol and catalogued in the Tarbiat Modares University Aquatic Animal Collection (TAC1062F). All measurements and counts followed Alavi-Yeganeh & Deyrestani (2016). Measurements were taken point to point with a digital calliper to an accuracy of 0.01 mm. The morphometric and meristic characters were compared with previously reported data (Chakrabarty et al. 2008, Abraham et al. 2011; Table 1). To ensure taxonomic identification of the specimens, DNA was extracted from the pectoral fin tissue and partial sequence of the mitochondrial Cytochrome c Oxidase subunit I (COI) gene (644 bp) has been amplified by FishF1-TCAACCAACCACAAAGACATTGGCAC, and FishR1-TAGACTTCTGGGTGGCCAAAGAATCA (Ward et al. 2005).

The polymerase chain reaction product was sequenced by commercial service (Source Bioneer, Seoul, South Korea) and aligned with the already published COI sequence from this species DQ028024 and EU148520 (Sparks et al. 2005, Lakra et al. 2011) and the sequence deposited in NCBI GenBank of its sister species (*K. dussumieri*) DQ028028 and DQ028029 (SPARKS *et al.* 2005). Our COI sequences were deposited in GenBank under accession number KX641601. Calculating genetic distances and construction of phyloge-

[*]Corresponding author: malavi@modares.ac.ir

netic tree of COI sequences with the Maximum likelihood (ML) methods (Alavi-Yeganeh et al. 2014) were carried out using Mega 6 (Tamura et al. 2013). The best fit models of DNA substitution (HKY) was chosen based on the Akaike Information Criterion (AIC) approach by Modeltest 3.7 (Posada & Crandall 1998). Sequence of *Nuchequlla gerreoides* (KT325540) (Alavi-Yeganeh & Deyrestani 2016) was used as out group.

Results

We provide the first evidence of the presence of *K. daura* off the Iranian coast of Oman Sea. Morphometric and meristic characteristics of the two captured specimens (61.6 and 63.9 mm SL) corresponded with those from previous records from the west coast of India (Abraham et al. 2011) and the coast of Sri Lanka (Chakrabarty et al. 2008). However, three characters including predorsal length/SL%, head width/SL% and caudal peduncle lengths/SL% were outside the known range, probably because of using smaller specimens for biometric measurements and consequently growth allometry effect. The genetic difference between COI sequences of *K. daura* vs. *K. dussumieri* was 11.8% whereas the average genetic distances within haplotypes of both species was 0.3%. Also, in the phylogentic tree, the sequenced haplotype in this study grouped with the previous COI haplotypes of *K. daura* from the waters of India and Sri Lanka. Both morphological and genetic evidences confirmed the captured specimens were *K. daura* (Fig. 2, Table 1).

Discussion

There are no previous records of *K. daura* from the Oman Sea (Fischer & Bianchi 1984, Randall 1995, Assadi & Dehghani 1997, Froese & Pauly 2016). The genus *Karalla* can be distinguished from the other eight ponyfish genera (*Aurigequula*, *Equulites*, *Eubleekeria*, *Gazza*, *Leiognathus*, *Nuchequula*, *Photopectoralis* and *Secutor*) by a scaled nuchal region and the elongated rhomboid body (Chakrabarty & Spark 2008). Also members of *Karalla* possess a distinct golden or deep yellowish-green coloration that differs from the bright yellow coloration of some species of the genus *Nuchequula*. *Karalla daura* could be easily identified by the presence of prominent black marking on the dorsal fin from the only other species of this genus *K. dussumieri* where this marking is missing. For *K. dussumieri* is characteristic the greenish-yellow tint of the body with dark vertical vermiculate lines present on the dorsal flank vs. entirely silver body with a broad golden-yellow horizontal band extending from the orbit across the lateral line in *K. daura* (see Chakrabarty et al. 2008). The high degree of genetic differences between the collected specimen and *K. dussumieri* as well as the tree topology (Fig. 2) confirm the identity of *K. daura*. Sequenced haplotype in this study (KX641601) was identical with already published sequence of *K. daura* from India (EU148520) and in close relationship with previously reported sequence of this species from Sri Lanka (DQ028024). The values for the genetic distances are similar to the genetic differences reported between and among other species within the family Leiognathidae (Zhang & Hanner 2012). The lack of confirmed records of *K. daura*

Fig. 1. *Karalla daura* collected from the Iranian coast of the Oman Sea (TAC1062F, 63.9 mm SL).

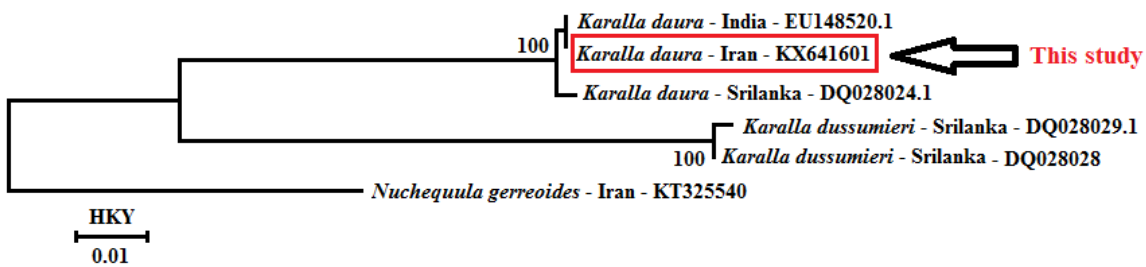

Fig. 2. Maximum likelihood estimates of phylogenetic relationships of *Karalla daura* with congeneric taxon (*Karalla dussumieri*) using COI sequences (644 bp). Nodes are labelled with bootstrap support.

Table 1. Morphometric measurements and meristic characters of *Karalla daura* from the Iranian coast of the Oman Sea (two specimens, TAC1062F) in comparison with previously reported data (Chakrabarty et al. 2008, Abraham et al. 2011). Bold values denote characters outside of the previously known range.

Morphological characters	**Chakrabarty et al. (2009), Abraham et al. (2011)**	**Present study (n=2)**
Standard length (mm)	65-97.8	61.6-63.9
Percentage of SL		
Head length	28.7 (26.8-30.8)	27.4 (26.9-27.9)
Body Depth	42.7 (37.2-47.5)	45.8 (45.6-46.1)
Predorsal length	48.0 (45.3-55.0)	**44.1 (43.5-44.6)**
Preanal length	53.1 (40.9-56.3)	55.2 (54.7-55.8)
Prepelvic length	42.3 (37.5-54.1)	39.5 (39.3-39.8)
Head width (max.)	15.2 (14.5-16.0)	**13.9 (13.5-14.4)**
Caudal peduncle length	7.9 (5.1-9.1)	**9.2 (9.1-9.3)**
Caudal peduncle depth	6.5 (5.8-7.4)	6.3 (6.3-6.4)
Pectoral-fin length	19.3 (17.3-21.6)	20.1 (19.8-20.4)
Pelvic-fin length	14.1 (10.7-20.1)	13.7 (13.6-13.9)
Dorsal-fin Height	21.0 (18.6-25.3)	20.9 (20.2-21.6)
Anal-fin Height	15.0 (13.86-17.24)	15.6 (14.8-16.4)
Percentage of HL		
Snout length	33.4 (25.0-31.2)	30.3 (30.1-30.5)
Orbit diameter	33.7 (27.3-38.6)	34.45 (32.7-36.2)
Upper jaw length	35.8 (29.6-43.1)	29.85 (29.7-30.0)
Lower jaw length	45.0 (34.0-53.2)	45.9 (45.7-46.1)
Interorbital width	35.2 (33.2-37.4)	34.4 (33.8-35.1)
	Meristics	
Dorsal fin rays	VIII, 16	VIII, 16
Pectoral fin rays	18-20	18-20
Ventral fin rays	I, 5	I, 5
Anal fin rays	III, 14	III, 13-14
Caudal fin rays	15	15-16
Lateral line sales	64–69	64-65

from the Oman Sea may be related to still inaccurate knowledge of the area. Confusing and misidentification with the morphologically similar species like *Nuchequlla gerroides*, which is also sometimes misidentified as *Leiognathus bervirostris* (Alavi-Yeganeh & Deyrestani 2016), is another possible explanation why *K. daura* was discovered only now. The Chabahar Bay is close to the Chabahar Port, which is only oceanic port of Iran. Therefore, the introduction of *K. daura* could be attributed to ballast waters from shipping.

Acknowledgments: We thank Dr. Seraj Bita for his assistance during this study.

References

Abraham K. J., Joshi K. K. & Sriramachandra Murty V. 2011. Taxonomy of the fishes of the family Leiognathidae (Pisces, Teleostei) from the West coast of India. Zootaxa 2886: 1-18.

Alavi-Yeganeh M. S., Keyvani Y., Seyfabadi J., Kazemi B. & Wallis G. P. 2014. Taxonomic validity and phylogenetic relationships of a newly-described tooth-carp, *Aphanius mesopotamicus* Coad, 2009 (Teleostei: Cyprinodontidae). Zootaxa 3780: 594-600.

Alavi-Yeganeh M. S. & Deyrestani A. 2016. New record of decorated ponyfish *Nuchequula gerreoides* (Bleeker, 1851) (Perciformes: Leiognathidae) in Iranian coast of the Persian Gulf. Zoology and Ecology 26 (3): 173-175.

Assadi H. & Dehghani R. P. 1997. Atlas of the Persian Gulf and the Sea of Oman fishes. Tehran: Iranian Fisheries Research Organization, 226 p.

Chakrabarty P. & Spark J. S. 2008. Diagnoses for *Leiognathus* Lacepede 1802, *Equula* Cuvier 1815, *Equulites* Flower 1904, *Eubleekeria* Flower 1904, and a New Ponyfish Genus (Teleostei: Leiognathidae). American Museum Novitates 3623: 1-11.

Chakrabarty P., Amarasinghe T. & Sparks J. 2008. Rediscription of ponyfishes (Teleostei: Leiognathidae) of Sri Lanka and the status of *Aurigequula* Fowler, 1918. Ceylon Journal of Science (Biological Sciences) 37 (2): 143-161.

Conlu P. V. 1986. Guide to Philippine flora and fauna. Fishes. Vol. 9. Quezon City: Natural Resources Management Center. 495 p.

Ni I. H. & Kwok K. Y. 1999. Marine fish fauna in Hong Kong waters. Zoological Studies 38 (2): 130-152.

Fischer W. & Bianchi G. 1984. FAO species identification sheets for fishery purposes: Western Indian Ocean (Fishing Area 51). Vol. 5., Roma: FAO.

Froese R. & Pauly D. 2016. Fishbase: World Wide Web electronic publication. www.fishbase.org, version (01/2016).

Lakra W. S., Verma M. S., Goswami M., Lal K. K., Mohindra V., Punia P., Gopalakrishnan A., Singh K. V., Ward R. D. & Hebert P. 2011. DNA barcoding Indian marine fishes. Molecular Ecology Resources 11 (1): 60-71.

Posada D. & Crandall K. A. 1998. Modeltest: testing the model of DNA substitution. Bioinformatics 14 (9): 817-818.

Randall J. E. 1995. Coastal fishes of Oman. Honolulu, Hawaii: University of Hawaii Press. 439 p.

Robins C. R., Bailey R. M., Bond C. E., Brooker J. R., Lauchner E. A., Lea R. N. & Scott W. B. 1991. World fishes important to North Americans. Exclusive of species from the continental waters of the United States and Canada. American Fisheries Society special publication, (21): 243 p.

Sommer C., Schneider W. & Poutiers J. M. 1996. FAO species identification field guide for fishery purposes. The living marine resources of Somalia. Roma: FAO. 376 p.

Sparks J. S., Dunlap P. V. & Smith W. L. 2005. Evolution and diversification of a sexually dimorphic luminescent system in ponyfishes (Teleostei: Leiognathidae), including diagnoses for two new genera. Cladistics 21 (4): 305-327.

Tamura K., Stecher G., Peterson D., Filipski A. & Kumar S. 2013. MEGA6: Molecular Evolutionary Genetics Analysis version 6.0. Molecular Biology and Evolution 30 (12): 2725-2729.

Ward R. D., Zemlac T. C., Innes B. H., Last P. R. & Hebert P. D. N. 2005. DNA barcoding Australia's fish species. Philosophical Transactions of the Royal Society B: Biological Sciences 360 (1462): 1847-1857.

Zhang J. & Hanner R. 2012. Molecular approach to the identification of fish in the south China Sea. PloS One 7 (2): 1-9.

Received: 04.11.2016
Accepted: 20.03.2017