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TWO NEW FISH WITH MAXIMUM SIZE RECORDS FROM THE EASTERN COATS OF SAUDI ARABIA

SUMMARY

During the study of the health of the fish species in the vicinity of Jubail City, Saudi Arabia, 3 specimens of *Diplodus cervinus omanensis* and 3 specimens of *Acanthopagrus catenula* were collected by fishermen using 30 x 10 m drifting gill nets of 25 mm mesh size and handed over to Ministry of Agriculture officials through their twice a week visits to fish landing areas and fish markets in Jubail. *Diplodus cervinus omanensis* (Oman porgy) and *Acanthopagrus catenula* (bridled seabream) represent new records for the Eastern coasts of the Arabian Peninsula and Saudi Arabian waters. Specimens of *A. catenula* were previously reported from the Iraqi marine waters, therefore, this is the 2nd appearance for this species in this part of the world. This study verifies parts of the diversity of the coastal fish communities of the eastern coasts of the Saudi Arabian waters, but also highlights that a large proportion of this area (the norther Arabian coast) has not been explored.

INTRODUCTION

Geological speaking, the Arabian-Persian Gulf is a young sea originated about 16,000 BP, with the sea reaching its current level until around 6,000 BP during the Holocene (Sheppard *et al.*, 1992). Therefore, the contemporary ichthyofauna was founded due to the arrival of species from the Indian Ocean through the Gulf of Oman and Strait of Hormuz (Beech, 2004). In comparison with the other seas in the area, the Arabian-Persian Gulf is small in size, restricted habitat types and limited depth also restrain faunal diversity, which is mainly obvious among the families of reef fishes (Bishop, 2003). Accordingly, many shallow water taxonomic groups are completely lacking in the area and there are few endemics (Coles and Tarr, 1990).

Among the features that make the Arabian-Persian Gulf productive and more than the Red Sea is the high rate of primary production (Sheppard *et al*., 1992). In addition, the Arabian-Persian Gulf is considered as one of the most productive seas because of the high benthic productivity that resulted from this area lying within the photic zone, presence of an extensive sea grass beds and macro algal beds and cyanobacteria mats (Sheppard, 1993). Moreover, the widespread mud flats that contain organic material can supports abundant infaunal organisms (Carpenter *et al*., 1997).

The limited, but the real taxonomic work in the Arabian-Persian Gulf has started with the record of the shark *Carcharias gangeticus* by Günther (1874) from the Tigris River in the vicinity of Baghdad City, Iraq. This record was a misidentification of a bull shark *Carcharhinus leucas*. The work of Kennedy (1937) marks the start of the real ichthyological survey in the Arabian-Persian Gulf when he reported 3 marine species from the Marine waters of Iraq. Latter, the work of Blegvad (1944) was more comprehensive and include the whole Iranian coast of the Arabian-Persian Gulf. Since then, several significant works have been published to describe the fish fauna of the different countries in the area (White and Barwani, 1971; Kuronuma and Abe, 1972; 1986; Relyea, 1981; Fischer and Bianchi, 1984; Hussain *et al*., 1988; Randall, 1995).

For the marine organisms of the Saudi Arabian coasts of the Arabian-Persian Gulf, the fish groups have received less attention in regard to their taxonomy. Therefore, there is an absence of a comprehensive and extensive work that contains this fauna at present. However, only few noteworthy publications have been published on this part of the Arabian-Persian Gulf coasts (Mccain *et al*., 1984; Al-Hassan and Miller, 1987; Coles and Tarr, 1990; Krupp and Anegay, 1993; Krupp and Müller, 1995; Krupp and Al-Marri, 1996; Jawad, 2013; Jawad and Ibrahim, 2014).

The Oman porgy prefers demersal habitat from the surface down to 55 m, and its distribution were confined to the Arabian Sea coasts of Oman (Randall, 1995). No reports of this species have been on records about this species from the Arabian-Persian Gulf area (Manilo and Bogorodsky, 2003).

The bridled seabream is a marine species living in association with reefs with distribution confined to the Western Indian Ocean (Iwatsuki and Heemstra, 2011). This species has been reported for the first from the marine waters of Iraq by Al-Badri and Jawad (2014).

The aim of the present study is to record for the first time the presence of both *Diplodus c. omanensis* and *A. catenula* from the Arabian-Persian Gulf for the former species and the Saudi Arabian waters for the later species. The present record of these two sparid species comes as a result of recent fish taxonomic work in the Saudi Arabian coasts of the Arabian-Persian Gulf as a part of program to identify fish species and their status of health by the Fish Welfare Branch, Ministry of Agriculture, Saudi Arabia.

MATERIAL AND METHODS

On 20 November 2016, three specimens of *D. c. omanensis* ranging 315-321 mm in TL and *A. catenula* ranging 250- 379 mm TL (Fig. 1a,b) were collected at Jubail City on the Arabian-Persian Gulf coast of Saudi Arabia (27° 28´ 11.87″ N 49° 38´ 33.45″ E)(Fig. 2). The specimens were caught using 30 x 10 m drifting gill nets of 25 mm mesh size fishing in the vicinity of Jubail city, Saudi Arabia, and handed over to Ministry of Agriculture officials through their twice a week visits to fish landing areas and fish markets in Jubail. Fishermen usually make three to five hauls per hour. The fish were measured with dial callipers to the nearest 0.1 mm. Body measurements

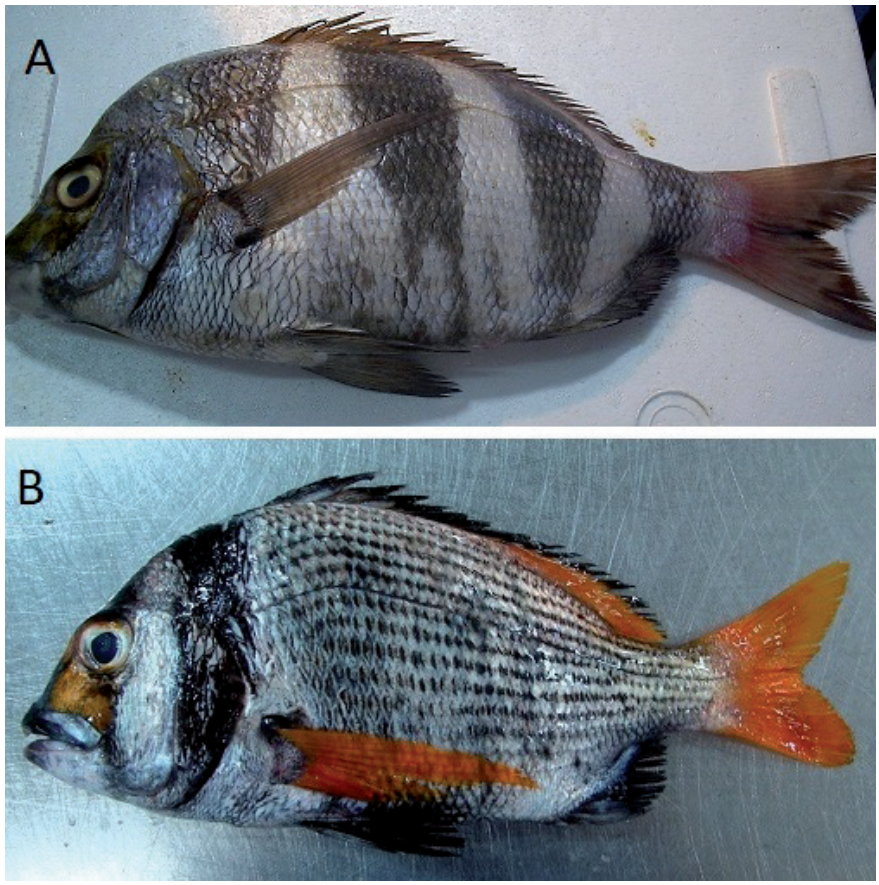

Fig. 1. A, *Diplodus cervinus omanensis*, 315 mm TL; B, Acanthopagrus *catenula*, 379 mm TL. Both fish species were collected from the Arabian Gulf waters of Jubail City, Saudi Arabia.

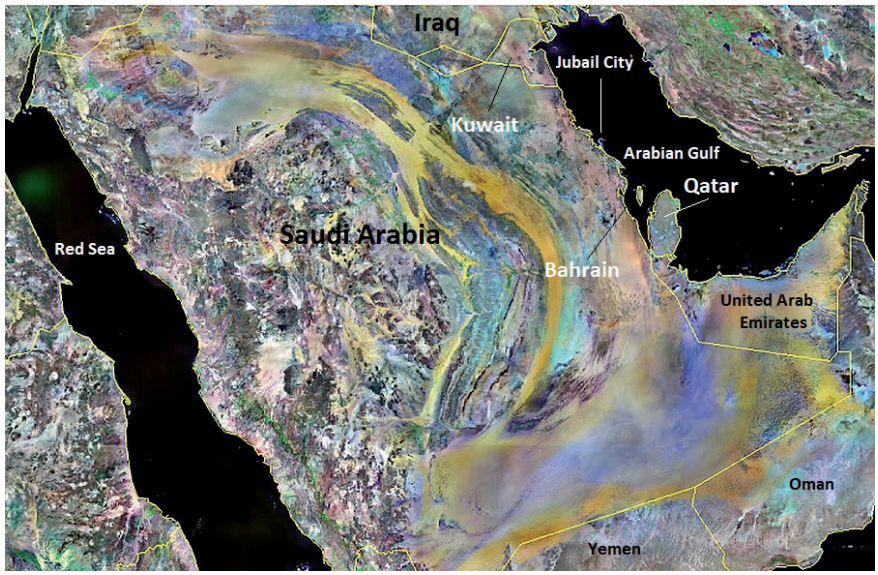

Fig. 2. Map showing the location of Jubail City, Saudi Arabia, where the fish specimens were collected.

were made using method suggested in Fischer and Bianchi (1984) (Table 1, 2). Fish specimens were identified following Randall (1995) for *D. c. omanensis* and Iwatsuki and Heemstra (2011) for *A. catenula*. Eschmeyer (2018) and Fricke (2015) were used for the taxonomic status of the species.The specimens were then fixed in 10% formalin and later preserved in 70% ethanol for deposition in the fish collection of the Fish Welfare Branch, Ministry of Agriculture, Al-Jubail, Saudi Arabia.

RESULTS

The specimens of *D. c. omanensis* have shown the following set of characters, which are in agreement with those given by Randall (1995): convex dorsal profile of head; small, horizontal mouth; maxilla reaching below anterior margin of eye; five pairs of incisor teeth in upper jaw; four pairs in lower jaw; forked caudal fin; pectoral fin reaching above third anal spine; body silvery color with four broad black bars; two short narrow black bars on ventral side; black bar on head passing through eye; yellowish snout.

The specimens of *A. catenula* have appeared to have the following diagnostic characters that are in agreement with those given by Iwatsuki and Heemstra (2011): body compressed and deep; mouth oblique with thick lips;

Table 1. *Acanthopagrus catenula*. Morphometric and meristic characteristics in the Arabian Gulf waters of Saudi Arabia compared with specimens from the literature (TL, total; NA, not available; SL, standard length).

Morphometric characters (mm)	Present study N=3	Iwatsuki & Heemstra (2011) N=3	Jawad et al. (2012) N=10	Al-Badri and Jawad (2014) N=5
Total length	250-379	NA	150–331	250 - 345
Fork length %TL	210-320 (84-84.6)	101–364 (Na)	111–257 (74–77.6)	211 - 306 (84.4 - 88.7)
Standard length %TL	234-341 (93.6-94.1)	NA	135–300 (90–90.6)	235-330 (94 - 95.8)
Head length %SL	46-118 (19.7-50.4)	NA (31–38)	37–97.9 (33.3–38.1)	45 - 112 (21.2-29.5)
Preorbital length %SL	16-38 (6.9-16.3)	NA (12–18 %SL)	11.1–30.4 (30–31.1)	14 – 35 (30.9-31.4)
Eye diameter %SL	13-28 (5.6-11.9)	NA (9–14 %SL)	9.4–17.7 (25.4–18.1)	12 – 23 (26.5-26.9)
Postorbital length %SL	44-110 (18.8-47.0)	NA	17.2– 49.5 (46.5–50.6)	14 – 35 (30.9-31.4)
Predorsal length %SL	27-60 (11.5-25.6)	NA (44–51)	36.6–84.8 (32.7–33)	42 – 97 (19.7-21.7)
Postdorsal fin length %SL	113-241 (48.3)	NA	101.2–226 (87.9–91.2)	110 – 234 (52.0-59.7)
Prepectoral fin length %SL	52-121 (22.4-50.3)	NA	47.4–112.5 (42.7–43.8)	53 – 117 (25.4-26.8)
Pectoral fin length %SL	15-160 (7.8-69.5)	NA (38–44)	45.5–100.3 (39–41)	56 – 112 (26.2-27.5)
Preanal fin length %SL	95-201 (42.3-86.5)	NA (66–72)	89.3–187 (72.8–80.5)	93 – 198 (44.3-56.8)
Postanal fin length %SL	109-229 (96.7-88.6)	NA	104.3–226 (87.9–94)	110 – 231 (52.6-59.8)
Caudal peduncle length %SL	17-38 (8.4-17.8)	NA	NA	NA
Maximum body depth %SL	64-141 (28.7-61.2)	NA (48–53)	57.7–126.5 (49.2–52)	63 – 135 (29.7-34.2)
Meristic characters				
Number of dorsal fin spines	11-12	11-12	11-12	11
Number of dorsal fin rays	13-14	13-14	12-14	13
Number of pelvic fin spines	1	1	1	-
Number of pelvic fin rays	15	15	15	-
Number of pectoral fin rays	14-15	14-15	14-15	14-15
Number of anal fin spines	3	3	3	3
Number of anal fin rays	10	10	10	10
Number of pored lateral line scales	46-48	45-49	45-49	-

Table 2. *Diplodus cervinus omanensis*. Morphometric and meristic characteristics in the Arabian Gulf waters of Saudi Arabia (TL, total; NA, not available; SL, standard length).

Morphometric characters (mm)	Present study N=3
Total length	315-321
Fork length %TL	250-259 (78.2-81.4)
Standard length %TL	200-220.1 (64.3-69.2)
Head length %SL	63-65.7 (26.2-30.1)
Preorbital length %SL	17-18.6 (8.9-8.5)
Eye diameter %SL	13-14.3 (7.3-7.9)
Postorbital length %SL	27-28.6 (14.2-13.2)
Predorsal length %SL	83-85.7 (42.5-44.3)
Postdorsal fin length %SL	190-192.9 (96.1-97.3)
Prepectoral fin length %SL	57-60.7 (29.3-30.3)
Pectoral fin length %SL	76-78.6 (38.6-39.2)
Preanal fin length %SL	181-185.7 (91.2-92.4)
Postanal fin length %SL	45-47.9 (23.5-24.1)
Caudal peduncle length %SL	17-19.3 (8.9-9.2)
Caudal peduncle depth %SL	23-25 (12.1-13.)
Maximum body depth %SL	86-89.3 (44.3-45.1)
Meristic characters	
Number of dorsal fin spines	11
Number of dorsal fin rays	12
Number of pectoral fin rays	15
Number of anal fin spines	3
Number of anal fin rays	10-11
Number of lateral line scales	62-63
Number of gillrakers	10+9-10

maxilla reaching to vertical at rear edge of pupil in adult fish; six distinct incisor-like teeth; lower jaw with six canines; six anterior molar tooth rows in upper jaw; four molar tooth rows in lower jaw; four to five transverse rows of cheek scales; curved occipital profile; strong, heteracanthous, dorsal fin.

DISCUSSION

The range of the total length of the specimens of both Oman porgy (310- 315 mm TL) and bridled seabream (373- 379 mm TL) are appeared to me a new maximum length for both species studied. The maximum length given for Oman porgy and bridled seabream were 300 mm and 364 mm TL respectively (Randall, 1995; Iwatsuki and Heemstra, 2011).

The subspecies *D. c. omanensis* has one sister subspecies *D. c. hottentosus*, which is found in Mozambique only (Randall, 1995). The broad dark banding on the body and absence of dark spot on the caudal peduncle are two distinctive characters that separate this species from the other species of the genus *Diplodus*.

The bridled seabream is distinguished from other species of *Acanthopagrus* in having the head with two conspicuous vertical black bars, wide black margin on dorsal fin, especially clear in distal spinous part of dorsal fin, proximal part of dorsal fin yellow, anal-fin rays III, 10, and large orbit diameter in adults (Iwatsuki and Heemstra, 2011).

Several factors can explain the non-record of *D. c. omanensis* from the Arabian-Persian Gulf waters previously. It may be due to the lack of ichthyological investigation in the area. A global climate change, however, such as rising of sea water temperature may have caused a recent natural colonisation along the northern coast of the Indian Ocean.

Acanthopagrus catenula was previously recorded in the Arabian Sea (Iwatsuki and Heemstra 2011), Gulf of Oman (Jawad *et al*., 2012), and Arabian-Persian Gulf (Al-Badri and Jawad, 2014). Thus, from a mere geographical point of view, its presence was to be expected in the Arabian-Persian Gulf waters of Saudi Arabia. However, climatic, hydrological and ecological differences between these three areas, including contrasting seasonal changes, result in some discrepancies in the local ichthyofauna.

Therefore, the present records are important for the understanding of zoogeographical patterns in the area. The capture during this study should not be regarded as accidental, as 3 individuals of each species were collected, indicating the presence of a self-sustaining population of this species in the Arabian-Persian Gulf waters of Iraq.

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REFERENCES

Al-Badri M. E., Jawad L. A., 2014- New fish records from the marine waters of Iraq. *Cahier do Biologia Marine*, **55**: 431-436.

Al-Hassan L. A. J., Miller P. J., 1987- *Rhinogobius brunneus* (Gobiidae) in the Arabian Gulf. *Japanese Journal of Ichthyology*, **33**: 405-408.

Beech M J., 2004- *The fish fauna of Abu Dhabi Emirate*. In: Loughland RA, Al Muhairi FS, Fadel SS, Al Mehdi AM, Hellyer P (eds.) Marine atlas of Abu Dhabi. Emirates Heritage Club, Abu Dhabi, pp. 158-183.

Bishop J. M., 2003- History and current checklist of Kuwait's ichthyofauna. *Journal of Arid Environment*, **54**: 237-256.

Blegvad H., 1944- *Fishes of the Iranian Gulf*. Einar Munksgaard, Copenhagen. 247 pp., XII pls. (1999 translation into Farsi by E. Etemad and B. Mokayyer with supplement, Tehran University Publications No. 1744:26 + 416 pp., XI pls.).

Carpenter K. E., Krupp F., Jones D. A., Zajonz U., 1997- *FAO species identification guide for fishery purposes. The living resources of Kuwait, eastern Saudi Arabia, Bahrain, Qatar, and the United Arab Emirates*. FAO, Rome, pp. 293.

Coles S. L., Tarr A. B., 1990- Reef fish assemblages in the western Arabian Gulf: A geographically isolated population in an extreme environment. *Bulletin of Marine Science*, **47**: 696-720.

Eschmeyer W. N. (Ed.), 2018- Catalog of fishes, electronic version (20 December 2019). Internet publication, San Francisco (California Academy of Sciences). http://research.calacad emy.org/research/Ichthyology/Catalog/fishcatmain.asp.

Fischer W., Bianchi G. (eds.), 1984- *FAO species identification sheets for fishery purposes. Western Indian Ocean (Fishing Area 51)*. Prepared and printed with support of the Danish International Development Agency (DANIDA). FAO, Rome, Vol. 1-6.

Fricke R. (Ed.), 2015- References in the catalog of fishes. Online version, updated 05 October 2014. Internet publication, San Francisco (California Academy of Sciences). http://research.calacademy.org/research/Ichthyology/Catalog/fishcatmain.asp.

Günther A., 1874- A contribution to the fauna of the River Tigris. *The Annals and Magazine of Natural History*, **14**: 36-37.

Hussain N. A., Na'ama A. K., Al-Hassan L. A. J., 1988- Annotated Check-list of the fish fauna of Khor al-Zubair, north west of the Arabian Gulf, Iraq. *Acta Ichthyologia et Piscatoria*, **18**: 17-24.

Iwatsuki Y., Heemstra P. C., 2011- A review of the *Acanthopagrus bifasciatus* species

complex (Pisces: Sparidae) from the Indian Ocean, with re-descriptions of *A. bifasciatus* (Forsskål, 1775) and *A. catenula* (Lacepède, 1801). *Zootaxa*, **3025**: 38-50.

Jawad L. A., 2013- Confirmed record of *Monodactylus argenteus* (Linnaeus, 1758) (Family Monodactylidae) from Jubail, Saudi Arabia, Arabian Gulf. *Arxius de Miscel· lània Zoològica*, **11**: 157-161.

Jawad L. A., Ibrahim M., 2014- Confirmed Record of Whitebarred Rubberlip, *Plectorhinchus playfairi* (Pellegrin, 1914) (Pisces: Haemulidae) from Jubail, Saudi Arabia, Arabian Gulf. *International Journal of Marine Science*, **4**: 194-196.

Jawad L. A., Al–Shogebai S., Al–Mamry J. M., 2012- First record of *Atractoscion aequidens* (Sciaenidae) from the Arabian Sea Coasts of Oman and *Acanthopagrus catenula* (Sparidae) from the Oman Sea (Gulf of Oman), northwestern Indian Ocean (Teleostei, Sciaenidae, Sparidae). *Arxius de Miscellània Zoològica*, **10**: 9-15.

Kennedy W. P., 1937- Some additions to the fauna of Iraq. *Journal of Bombay Natural History Society*, **39**: 745-749.

Krupp F., Al-Marri M. A., 1996- Fishes and fish assemblages of the Jubail marine wildlife sanctuary. In: Krupp, F., Abuzinada, A.H. and Nader, I. A. (eds.), *A marine wildlife sanctuary for the Arabian Gulf: environmental research and conservation following the 1991 Gulf war oil spill*. NCWCD, Riyadh and Senckenberg, Research Institute, Frankfurt a. M., pp. 339-350.

Krupp F., Anegay F., 1993- Habitats and species composition in subtidal areas north of Abu Ali, Saudi Arabia. In: the R/V MT. Mitchell Cruise in the ROPME Sea Area 2: 174-184. Kuwait, ROPME.

Krupp F., Müller T., 1994- The status of fish populations in the northern Arabian Gulf two years after the 1991 Gulf War oil spills. *Courier Forschungsinstitut Senckenberg*, **166**: 67-75.

Kuronuma K., Abe Y., 1972- Fishes of Kuwait. pp. 123. Kuwait, KISR.

Kuronuma K., Abe Y., 1986- *Fishes of the Arabian Gulf*. pp. **357**. Kuwait, KISR.

Manilo L. G., Bogorodsky S. V., 2003- Taxonomic composition, diversity and distribution of coastal fishes of the Arabian Sea. *Journal of Ichthyology*, **43**: S75.

Mccain J. C., Tarr A. B., Carpenter K. E., Cole S. L., 1984- Marine ecology of Saudi Arabia. A survey of coral reefs and reef fishes in the northern area, Arabian Gulf, Saudi Arabia. *Fauna of Saudi Arabia*, **6**: 102-126

Randall J. E., 1995- *Coastal fishes of Oman*. Crowford house Publishing Pty Ltd., Bathurst, Australia, pp. 439.

Relyea K., 1981- *Inshore Fishes of the Arabian Gulf*. George Allen & Unwin, London. pp. 149.

Sheppard C. R. C., 1993- Physical environment of the Gulf relevant to marine pollution: an overview. *Marine Pollution Bulletin*, **27**: 3-8.

Sheppard C. R. C., Price A. R. G., Roberts C., 1992- *Marine ecology of the Arabian region: patterns and processes in extreme tropical environments*. Academic, London, 359 pp.

White A. W., Barwani M. A., 1971- *Common Sea fishes of the Arabian Gulf and Gulf of Oman*. Trucial States Council, Dubai, 170 pp.