

REPORT ON TRIGGERFISHES (FAMILY BALISTIDAE) FROM PAKISTAN

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ABSTRACT

Twelve species belonging to 8 genera of triggerfish (Family: Balistidae) are reported from Pakistan. Of these, two species whip-fin triggerfish (*Abalistes filamentosus*) and Picasso triggerfish (*Rhinecanthus assasi*) are new reports from Pakistan. Triggerfish are mainly found in the demersal habitat except rough triggerfish (*Canthidermis maculata*) and large scale triggerfish (*C. macrolepis*) which are pelagic in nature and frequently caught by tuna fishing vessels that operates in the offshore waters of Pakistan.

KEY-WORDS: Triggerfish, Family Balistidae, *Abalistes filamentosus*, *Rhinecanthus assasi*, Unusual high catches, *Canthidermis maculata*, *Odonus niger*, *Sufflamen fraenatum*.

INTRODUCTION

Member of family Balistidae which are commonly called triggerfish are known from tropical and subtropical waters of Atlantic, Pacific and Indian Oceans. Triggerfish are mainly found in relatively shallow, coastal habitats, especially at coral and reef habitats, but at least two species of Family Balistidae including rough triggerfish (*Canthidermis maculata*) and large scale triggerfish (*C. macrolepis*) are pelagic in nature and are found in open ocean.

Triggerfishes are generally caught as bycatch of trawling, bottom set gillnetting, pelagic gillnetting, hand lining and longlining in coastal and offshore areas of Pakistan. There is no dedicated study on this family in Pakistan but triggerfishes have been included in checklist of fishes of Pakistan (Bianchi, 1985, Hoda, 1985, 1988; Hussain, 2003; Jalil and Khaliluddin, 1972, 1981, Misra, 1962, Sorley, 1932). Psomadakis, *et al.* (2015) who dealt with commercially important fishes and shellfishes of Pakistan reported 6 species of Family Balistidae from Pakistan.

Present paper provides a review of the published scientific literature on triggerfish occurring in Pakistan. The paper also discusses recent increase in the landings of rough triggerfish (*Canthidermis maculata*), masked triggerfish (*Sufflamen fraenatum*) and red-tooth triggerfish (*Odonus niger*) in Pakistan. These species used to be of rare occurrence but now caught in commercial quantities.

MATERIALS AND METHODS

Records of occurrence of species of family Balistidae from Pakistan coast were obtained from scientific literature. In addition, specimens of triggerfish were collected between 1993 and 2021 from Karachi Fish Harbour. Some specimens that collected by WWF-Pakistan's observers on board tuna fishing vessels (Moazzam, 2019) were also included in the present study. Available specimens were photographed and measurement were recorded and preserved in 5 % neutralized formalin.

RESULTS AND DISCUSSION

Triggerfishes are locally known as “kako” or “kookh” in the Province of Sindh whereas it is known as “pokki”, “khar” or “har” in the Province of Balochistan. Present study reveals that there are twelve species belonging to 8 genera reported from Pakistan which are alphabetically detailed in the paper.

Abalistes filamentosus Matsuura and Yoshino, 2004
(Fig. 1)

This species may be designated as whip-fin triggerfish. The specimens collected from Karachi comes in conformity with the description given by Matsuura and Yoshino (2004) and Randall and Justine (2008). The most prominent feature of this species is the greatly produced upper and lower rays of caudal fin into filaments (Fig. 1a-

b). Its teeth are incisiform which are notched on edges (Fig. 1c). *A. filamentosus* differs from *A. stellatus* in having filamentous caudal-fin rays, 3–4 longitudinal grooves on the cheek, and the body without colourful markings.



Fig. 1. *Abalistes filamentosus* (a) lateral view; (b) tail showing filaments; (c) jaws with teeth.

This species was originally described by Matsuura and Yoshino (2004) from Off Itoman, South coast of Okinawa-jima Island, Ryukyu Islands, Japan. Its holotype (NSMT-P 65579) is housed in National Science Museum, Tokyo, Japan (Frickle *et al.*, 2022). This species is known from eastern Indian Ocean and western Pacific Ocean between Ryukyu Islands to the northwest shelf of Australia, and the Timor Sea (Matsura and Yoshino, 2004; Parenti, 2021). It is also reported from Myanmar and the Philippines by Psomadakis *et al.* (2020) and Motomura *et al.* (2017) respectively. It is also reported in New Caledonia (Randall and Justine, 2008). Present paper reports this species for the first time from Pakistan coast (Northern Arabian Sea). During the present study one specimen collected from Karachi Fish Harbour on December 14, 2016 (40 cm) was examined.

Abalistes stellatus (Anonymous, 1798)
(Fig. 2)



Fig. 2. *Abalistes stellatus*.

From Pakistan, *Abalistes stellatus* (starry triggerfish) was recorded by Bianchi (1985), Froese and Pauly (2022), Hoda (1985, 1988), Hutchins (1984), Misra (1962), Psomadakis *et al.* (2015), Siddiqui and Aamir (2010) and Sorley (1932). Hutchins (1984), Misra (1962), Hussain (2003) also reported this species from Pakistan as *Abalistes stellaris*

(Bloch and Schneider, 1801) which is now considered as synonym of this species. Sorley (1932) reported this species as *Balistes stellatus*. This species is frequently reported in literature as *Abalistes stellaris* (Bloch and Schneider, 1801) which is still regarded as distinct species by some authors (Fricke *et al.*, 2022).

It was originally described as *Balistes stellatus* from Mauritius by Anonymous (1798). No types is known (Fricke *et al.*, 2022). This species is widely distributed in the Indo-West Pacific area including Red Sea, East Africa, South Africa, Persian Gulf, Seychelles, Madagascar and western Mascarenes east to Palau, Fiji and Tonga, north to southern Japan, south to New South Wales-Australia (Fricke *et al.*, 2022; Froese and Pauly, 2022; Parenti, 2021). It is usually inhabitant of coastal waters as well as deep continental shelf and slope areas. In Pakistan it is caught mainly in bottom-set gillnets that are operated in open coastal and oceanic waters. There is no specific market for this species but consumed locally by Bangladeshi immigrants. During the present study two specimens collected on April 11, 2006 (39 cm) and February 24, 2010 (17 cm) from Karachi Fish Harbour were examined.

Balistes armatus Bloch and Schneider, 1801

Balistes armatus was reported from Sindh by Murray (1880). Originally it was described from Tranquebar, India by Bloch and Schneider (1801), however, no information about types is available. According to Fricke *et al.* (2022) and Parenti (2021), this species is *incertae sedis* therefore it is considered to be enigmatic taxa. No specimen of this species was examined during the present study.

Balistapus undulatus (Park, 1797)

Balistapus undulatus (orange-lined triggerfish) was reported from Buleji by Ahmed (1996) and Ahmed and Wazarat (1993), however, no other records of this species is available in Pakistan. It was originally described as *Balistes undulatus* from Sumatra, Indonesia by Park (1797). Its holotype (BMNH 1863.11.12.1) is housed in Natural History Museum, London, U. K. (Fricke *et al.* 2022)). This species is reported by Red Sea; Indo-West Pacific: East Africa, South Africa, Socotra, Aldabra, Madagascar and Mascarenes east to Line Islands, Marquesas Islands and Tuamotu Archipelago, north to southern Japan and Ogasawara Islands, south to Australia and New Caledonia; straying to Hawaiian Islands (Parenti, 2021). No specimen of this species was examined during the present study.

Canthidermis macrolepis (Boulenger, 1888)

(Fig. 3)

Canthidermis macrolepis (large-scale triggerfish) was reported from Pakistan by Psomadakis *et al.* (2015) and Moazzam *et al.* (2016). Specimens collected from Pakistan agree with the description for the species given by Gill and Randall (1997). Juveniles of *C. maculata* and *C. macrolepis* can be readily distinguished from scale morphology and coloration (Gill and Randall, 1997). Scales in juveniles of *C. macrolepis* are relatively long, branched and with fleshy outgrowths present on body and head scales.



Fig. 3. *Canthidermis marolepis* collected by tuna gillnet from offshore waters.

Boulenger (1888) originally described this species as *Balistes macrolepis* by from Muscat, Oman. Its lectotype (BMNH 1887.11.11.334) which is a stuffed specimen is housed in Natural History Museum, London, U. K. (Fricke *et al.*, 2022). It is known from Indo-West Pacific: Red Sea, Gulf of Aden, Socotra, Arabian Sea, southern Oman,

northern South China Sea, Philippines, Japan and Micronesia (Frickle *et al.*, 2022; Froese and Pauly, 2022; Parenti, 2021; Randall, 1995). In Pakistan it is caught occasionally by tuna gillnet vessels that operate in offshore waters of Pakistan (Moazzam *et al.*, 2016). During the present study four specimens collected from Gwader on March 3, 2007 (33 cm), offshore Ormara on March 22, 2013 (31 cm), Karachi Fish Harbour on March 25, 2013 (40 cm) and from offshore waters of Pakistan (21°28.900'N; 64°53.990'E) on January 29, 2014 (30 cm) were examined. All these specimens were caught by tuna gillnet vessels.

Canthidermis maculata (Bloch, 1786)
(Fig. 4-5)



Fig. 4. *Canthidermis maculata* collected by tuna gillnet from offshore waters on February 12, 2013.

Canthidermis maculata (rough triggerfish) was reported from Pakistan by Psomadakis *et al.* (2015) and Moazzam *et al.* (2016). It was previously reported by Sorley (1932) from Sindh coast as *Balistes maculatus*. Specimens collected from Pakistan agree with the description for the species given by Randall (1995). Dorsal and anal fins especially in adults are high giving them a streamlined 'double keel' appearance whereas caudal fin is double concave (rounded in juveniles). Its colour varies from blue grey to nearly black with slightly lighter on belly and sides. Body is usually covered with small horizontally elongated white spots extending onto dorsal and anal fins and often on tails as well. In older specimens the spots may disappear.

Scales in juveniles of *C. maculata* have short fleshy outgrowths or lack them and pale spots are either absent or very small and do not form any network pattern. Juveniles (between 4 and 6 cm) were observed on a number of occasion in the offshore associated with neuston and floating debris, however, because of difficulty in collection, these could not be photographed.



Fig. 5. *Canthidermis maculata* Juvenile (21 cm) landed at Karachi Fish Harbour on January 6, 2016.

Bloch (1786) has originally described this species as *Balistes maculatus* from Tharangambadi, India. Its lectotype (ZMB 5904) which is a stuffed specimen is housed in Zoologisches Museum Berlin, Germany (Frickle *et*

al., 2022). This species has a circumglobal distribution in warm and tropical and temperate seas including Gulf of Mexico, Caribbean Sea, Sea of Japan (Frickle *et al.*, 2022; Parenti, 2021). During present one specimens collected from offshore waters of Pakistan on February 12, 2013 (29 cm), 4 specimens from Karachi Fish Harbour collected on January 28, 2013 (38 cm), February 24, 2014 (33 cm), October 10, 2014 (34 cm), January 6, 2016 (21 cm) and one specimen collected offshore waters off Ormara on April 3, 2013 (23 cm) were examined. All these specimens were caught by tuna gillnet vessels.

Odonus niger (Rüppell, 1836)
(Fig. 6)



Fig. 6. *Odonus niger*.

Odonus niger (red-toothed triggerfish) was reported from Pakistan coast only by Psomadakis *et al.* (2015). Rüppell (1836) originally described as *Xenodon (Balistes) niger* from Jeddah, Saudi Arabia, Red Sea. No holotype is known, however, lectotype (SMF 5232) is housed in Forshungs Institut und Natur Museum Senckenberg, Frankfurt, Germany (Frickle *et al.*, 2022). Randall (2005) described the red-toothed triggerfish as having a moderately and deeply compressed blue to purplish-blue body with the eyes high on the head. There is a deep groove in front of the eye. Two dark blue lines run from the front of the eye to the upturned mouth. In adults, the teeth are red and chisel-like with two of the upper teeth visible even when the mouth is closed. Triggerfish have a first dorsal fin with a spike-like spine that can be locked into place by the smaller second and third dorsal spines, all of which fit into a groove when not upright. The caudal fin is lunate with long lobes. The skin is rough to the touch with non-overlapping scales.

The red-toothed triggerfish is usually seen over outer reef slopes, often in large groups (Randall 2005), in 3 to 55 m of water (Lieske and Myers 2004). The species feeds primarily on zooplankton (Randall 2005), but also on other benthic animals such as crustaceans, sea urchins, corals, and mollusks (Lieske and Myers 2004). This species is known from Red Sea south to Durban, East Africa, Socotra, Seychelles, east to the Marquesas and Society islands, north to southern Japan, south to the southern Great Barrier Reef in Australia, Tonga, New Caledonia and throughout Micronesia (Froese and Pauly, 2022; Parenti, 2021). During present study two specimens collected from Karachi Fish Harbour on April 2, 2010 (21 cm) and from offshore waters at Khajar Creek, Indus Delta on October 10, 2013 (28 cm) were examined.

Pseudobalistes fuscus (Bloch and Schneider, 1801)
(Fig. 7)

Pseudobalistes fuscus (yellow-spotted triggerfish) was reported from Pakistan coast only by Psomadakis *et al.* (2015). Bloch and Schneider (1801) originally described as *Balistes fuscus* possibly from Indian Ocean (no locality mentioned) and from Jeddah, Saudi Arabia, Red Sea by Rüppell (1836). No holotype is known, however, syntypes housed in Museum National d'Historie Naturelle, Paris, France (Frickle *et al.*, 2022). It is known from Red Sea south to Durban, South Africa, East Africa and Socotra, Seychelles, Madagascar and Mascarenes east to Marshall Islands and Tuamotu Archipelago, north to southern Japan and Ogasawara Islands, south to Australia and New Caledonia. (Froese and Pauly, 2022; Parenti, 2021).

This species is found in clear shallow lagoons and seaward reefs; sandy areas near reef patches of reef edge are preferred (Froese and Pauly, 2022). It feed on other triggerfish, shellfish, and other bottom-dwelling invertebrate including sea urchins, crustaceans, mollusks, dead fish, tunicates or corals (Cornic, 1987). During the present study,

two specimens collected from off Balochistan on January 24, 2011 (41 cm) and Karachi Fish Harbour on April 8, 2014 (47 cm) were examined.



Fig. 7. *Pseudobalistes fuscus*.

Rhinecanthus aculeatus (Linnaeus, 1758)

Rhinecanthus aculeatus (white banded triggerfish) was reported by Hoda (1985, 1988), Hussain (2003) and Jalil and Khalil (1972, 1981) from Pakistan without mentioning any specific location. It was also reported from Balochistan coast as *Balistes aculeatus* by Zugmayer (1913). There is no recent record of occurrence of this species in Pakistan. Linnaeus (1758) originally described as *Balistes aculeatus* from Indo-West Pacific Sea however, no type is known (Frickle *et al.*, 2022). This species is commonly found in subtidal reef flats and shallow protected lagoons (Froese and Pauly, 2022). It feeds on algae, detritus, mollusks, crustaceans, worms, sea urchins, fishes, corals, tunicates and eggs (Randall, 1985). It is known from Eastern Atlantic (Senegal and South Africa) and Indo-West Pacific area spreading from East Africa, Seychelles, Comoros, Madagascar and Mascarenes east to Pitcairn Group, north to southern Japan and Ogasawara Islands, south to southern New South Wales (Australia) and Lord Howe Island (Frickle *et al.*, 2022). No specimen of this species was examined during the present study.

Rhinecanthus assasi (Forsskål, 1775)
(Fig. 8-9)



Fig. 8. *Rhinecanthus assasi* collected from Jiwani (Courtesy Ghulam Nabi).



Fig. 9. *Rhinecanthus assasi* showing striking colour pattern (Courtesy Ghulam Nabi).

Rhinecanthus assasi (Picasso triggerfish) is reported for the first time from Pakistan coast. Forsskål (1775) originally described this species as *Balistes assasi* by from Jeddah, Saudi Arabia, Red Sea. Its holotype is not known (Frickle et al., 2022). The Picasso triggerfish, strictly localized in the western Indian Ocean, is present only in the Red Sea, in the Gulf of Aden, Somali coast, Socotra, the Persian Gulf and the Gulf of Oman (Eagderi et al., 2019; Parenti, 2021) and now from Pakistan. It is known to inhabit shallow sandy and rubble areas of coral and feeds on benthic invertebrates (Sommer et al., 1996). One specimen that was caught by handline in Daran, Jiwani on January 11, 2010 (41 cm) was photographed. Since the specimen was alive, therefore, after measurement and photography it was released in rocky shore of Daran, Jiwani. The photographs were examined which revealed that it is Picasso triggerfish (*Rhinecanthus assasi*) which is not previously known from Pakistan.

Its body is flat and the head, massive, occupies about one third of the whole length, with the eyes placed at the top, far from the spines of the sea urchins which is one of its preferred diet. The lips are fleshy with 2 solid teeth per jaw to which add, in the upper one, six pharyngeal flat teeth having a grinding function. The back has the characteristic erectile trigger, three spines. The lips are yellow and the “V” in Picasso’s style, black trait, that start from the base of the pectoral fins towards the snout and the eyes. An elegant black paintbrush stroke that, passing over the head, divides in three marked bands with blue border and red-orange eyes. Its caudal peduncle have three keeled spiny lines.

Sufflamen chrysopterum (Bloch and Schneider, 1801)

Sufflamen chrysopterum (halfmoon triggerfish) was reported from Pakistan by Hoda (1985, 1988), Hussain (2003) and Jalil and Khalil (1972, 1981) as *Hemibalistes chrysophrys*, however, there is no recent record of its occurrence in Pakistan. Bloch and Schneider (1801) originally described this species as *Balistes chrysopterus* from East Indies and Coromandel by No holotype is known, however, syntypes are housed in Zoologisches Museum, Humboldt Universität, Berlin, Germany (Frickle et al., 2022). It is known to widely distributed in Indo-West Pacific including East Africa, South Africa, Persian Gulf, Socotra, Seychelles, Comoros, Madagascar and Mascarenes east to Samoa, north to central Japan and Ogasawara Islands, south to Australia, Lord Howe Island and New Caledonia (Frickle et al., 2022; Froese and Pauly, 2022; Parenti, 2021). It is known to inhabit coastal to outer reefs as well as in shallow lagoon and seaward reefs. No specimen of this species was examined during the present study.

Sufflamen fraenatum (Latreille, 1804) (Fig. 10-11)

Sufflamen fraenatum (masked or bridled triggerfish) was reported from Pakistan by Ahmed et al. (1973), Hoda (1985, 1988) and Psomadakis et al. (2015). Latreille (1804) originally described this species as *Balistes fraenatus*. No type locality or type specimen are known (Frickle et al., 2022). Ahmad et al (1973) reported this species as *Sufflamen capistratis*. It inhabit coastal rocky reefs, often silty habitats and in lagoons on open sand and feed on echinoids, fishes, mollusks, tunicates, crustaceans, algae and polychaete worms. It is widely distributed in the Indo-West Pacific including Red Sea, East Africa, South Africa, Socotra, Madagascar and Mascarenes east to Hawaiian Islands and Pitcairn Group, north to southern Japan and Ogasawara Islands, south to Australia, New Caledonia, Lord Howe Island and Norfolk Island (Parenti, 2021). During present study, three specimen each collected from Karachi

Fish Harbour on July 12, 2013 (30 cm), Churna Island by a sport fishermen on February 13, 2017 (27 cm) and Astola Island on December 24, 2019 (24 cm) were examined.



Fig. 10. *Sufflamen fraenatum*.



Fig. 11. *Sufflamen fraenatum* caught by handline at Astola Island (Balochistan).

DISCUSSION

Triggerfishes belonging to family Balistidae are primarily inhabitant of shallow waters on coral reefs and similar habitats. Most species of this family are demersal in nature, however, *Canthidermis macrolepis* and *C. maculata* are pelagic and found in oceanic waters. Globally this family has 42 species belonging to 12 genera whereas this paper which is first review of this family from Pakistan, reports occurrence of 12 species belong to 8 genera. Most of the members of the family Balistidae are solitary in nature and usually not found in large numbers. However, in the last 10 years unusual increase in landings of some triggerfishes such *Canthidermis maculata* (Fig. 121), *Odonus niger* (Fig. 13) and *Sufflamen fraenatum* (Fig. 14) was observed. Similar increase was noticeable in the landings of this species in India (Froese and Pauly, 2022). In India also **unprecedented** increase in the landings of redtoothed triggerfish (*Odonus niger*) was noticed as its landings is reached a level of 274 tonnes in 2019 as compared to only 72 tonnes in 2018 (CMFRI, 2020). Although *Odonus niger* was of extremely rare occurrence in the past in Pakistan but major increase in landings of was noticed in the recent years as well.



Fig. 12. Commercial landings of *Canthidermis maculata* at Karachi Fish Harbour (October 22, 2015).

Unusual increase in landings of unicorn leather jacket (*Aluterus monoceros*) belonging to family Monacanthidae was noticed in Pakistan (Moazzam and Osmany, 2016) In India, also *A. monoceros* appearing in commercial catches in 2004 (Chavan *et al.*, 2004; Ghosh *et al.*, 2011; Kanthan *et al.*, 2011, Saleela *et al.*, 2011; Varghese *et al.*, 2011). Increase in landings of *Canthidermis maculata* and *Odonus niger* is may be attributed to similar increase in landings of *Aluterus monoceros*. The reason of such increase in the species of families Monacanthidae and Balistidae is not fully understood.



Fig. 13. Commercial landings of *Odonus niger* at Karachi Fish Harbour (March 7, 2016).



Fig. 14. Commercial landings of *Sufflamen fraenatum* at Karachi Fish Harbour (November 13, 2018).

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