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NOTE

NOTES ON THE OCCURRENCE OF A RARE PUFFERFISH, *CHELONODONTOPS LEOPARDUS* (DAY, 1878) (TETRAODONTIFORMES: TETRAODONTIDAE), IN THE FRESHWATERS OF PAYASWINI RIVER, KARNATAKA, INDIA

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Notes on the occurrence of a rare pufferfish, *Chelonodontops leopardus* (Day, 1878) (Tetraodontiformes: Tetraodontidae), in the freshwaters of Payaswini River, Karnataka, India

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The pufferfish genus *Chelonodontops* Smith, 1958 distinguishes itself from other genera of pufferfishes through the combination of the following characters: presence of two lateral lines on the flanks of the body, nasal organ with two flat skin flaps in appearance and a weakly developed skin fold that extends in the ventrolateral part of the body from the chin to the caudal fin base (Matsuura 2002; Psomadakis et al. 2018). The genus *Chelonodontops* currently consists of six valid species, viz.,: *Chelonodontops patoca* (Hamilton, 1822) widely distributed in the Indo-Pacific, *C. leopardus* (Day, 1878) known from India and Myanmar, *C. pleurospilus* (Regan, 1919) found in the eastern coast of South Africa, *C. laticeps* (Smith, 1948) also occurs along the eastern coast of South Africa to Madagascar, *C. alvheimi* Psomadakis, Matsuura & Thein 2018 reported off Myanmar, the Andaman Sea and the Bay of Bengal, and *C. bengalensis* Habib, Neogi, Oh, Lee & Kim 2018 described from Bangladesh (Fricke et al. 2019).

From India, only two species of *Chelonodontops* have been recorded till date, viz., *C. patoca* (mostly recorded as *Chelonodon patoca*) and *C. leopardus* (reported as

Arothron leopardus). Day (1878) described a pufferfish species *Tetrodon leopardus* and stated its locality as 'seas of India', but no specific locality mentioned. Furthermore, it has been listed/reported from the state of Kerala (Bijukumar & Deepthi 2009; Zeena & Beevi 2012), from Pulicat Lake (Raj et al. 2002) and Tamil Nadu coast (Krishnan et al. 2007; Ramesh et al. 2008; Barman et al. 2011) on the southeastern coast.

This study reports *Chelonodontops leopardus* from the Payaswini River located in the state of Karnataka, India about 65km upstream from the estuary.

Material: Six specimens of the species were collected from the Payaswini River (12.568°N & 75.382°E) near Sullia, Dakshina Kannada District of the state of Karnataka, southwestern India. The specimens were fixed in 10% formalin and preserved in 70% ethanol and deposited to the marine fish section of Zoological Survey of India, Kolkata and catalogued with no. ZSI F 13527/2. All measurements and counts follow Dekkers (1975). The measurements were made point to point using digital vernier callipers.

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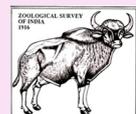
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Chelonodontops leopardus (Day, 1878)

Image 1–2

Tetrodon leopardus Day, 1878, *The fishes of India*, (4): 706, Pl. 180 (fig. 2) (type locality: seas of India)

Chelonodontops leopardus Psomadakis et al. 2018, *Ichthyological Research*, 66(1): 52. (India and Myanmar).

Material examined: ZSI F 13527/2, 6 ex., 66.7–85.5 mm SL, Payaswini River (12.568°N & 75.382°E) near Sullia, Dakshina Kannada District, Karnataka, 16.v.2018, Priyankar Chakraborty.

Description: Selected morphometric measurements are provided in Table 1. Dorsal surface covered with spinules that originate from the interorbital region and extends to a midpoint between pectoral and dorsal fin origin. Ventrally extended from the throat to the anterior portion of the anus. Two lateral lines, one extending from caudal fin base right up to the posterior region of the eye and the second one branching out from the mainline near the caudal peduncle and continues ventrolaterally posterior to the pectoral fin. Nasal organ with equal-sized flat skin flaps. The body is moderately elongated. Dorsal fin rays 11; anal fins rays 8–9; pectoral fin rays 16–18; caudal fin rays 10–11. Dorsal fin origin slightly anterior to vertical through that of the anal fin. Caudal fin truncate. Olive green dorsally with a multitude of iridescent yellow spots which turns white on the ventrolateral part of the body. Ventral side of the body white in color. Anal fin dusky, caudal fin dark brown with several rows of white spots, pectoral and dorsal fins pale. Three cross bands across the body with the one over the head shaped like a V followed by a thinner interorbital band. The second above the pectoral fin and the third one from the base of the dorsal fin.

Discussion

Francis Day described *Tetrodon leopardus* from the 'Seas of India' and no specific type locality was mentioned (Day, 1878). Ferraris et al. (2000), however, mentioned that the syntype of this species at the Australian Museum (AMS B.7722) was from Madras (=Chennai). As observed from a specimen catalogue at Zoological Survey of India, another specimen with catalogue number ZSI F2260 (currently lost) was purchased from Day and supposedly collected from Canara (=Karnataka). This species was long treated under the genus *Arothron* until Psomadakis et al. (2018) considered it as a member of the genus *Chelonodontops* and redescribed with detailed diagnostic features. It has been listed/reported as *Arothron leopardus* by many researchers across India (Jisha et al. 2004; Krishnan et al. 2007; Ramesh et al. 2008; Barman et al. 2011; Zeena & Beevi 2012).

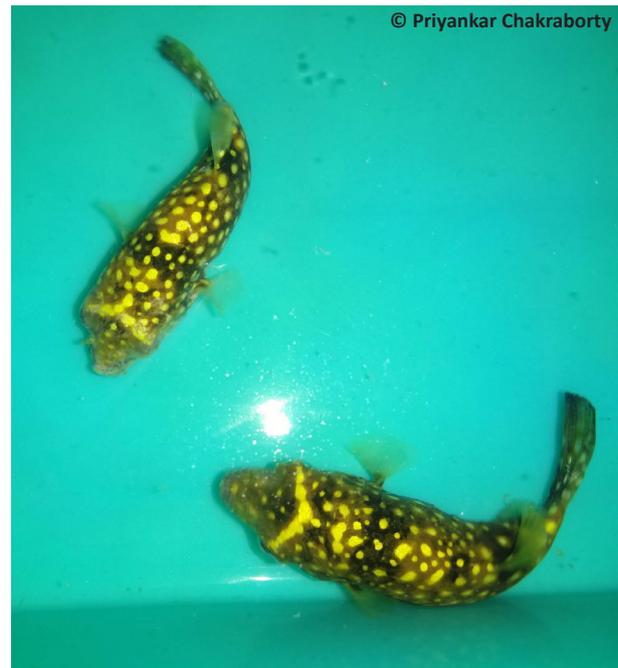


Image 1. *Chelonodontops leopardus* live (dorsum) coloration photographed soon after collection.



Image 2. *Chelonodontops leopardus*: coloration under preservation (85.5mm SL)

Psomadakis et al. (2018) examined materials of *C. leopardus* and placed them in the genus *Chelonodontops* with the redescription of the species based on only two specimens. They further mentioned that the syntype (AMS B.7722) from Chennai(?) is a smaller individual and hence ontogenical and geographical differences maybe indicative of variation among populations.

It is interesting to note that the fish presently under discussion were collected from inland freshwater body roughly 65km from the nearest estuarine zone. Mastuura (2017) suggested that 'many marine dwelling pufferfishes enter estuaries and rivers'. Among the pufferfishes occurring in India, few species such as *Carinotetraodon imitator* Britz & Kottelat 1999, *C. travancoricus* (Hora &



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Image 3. 'Yellow-spotted Pufferfish' in aquarium trade.

Table 1. Morphometric characters of examined *Chelonodontops leopardus* from Payaswini River, Sullia, Karnataka.

Characters	Percentage of SL/HL
Standard length (SL)	-
Head length (HL) in % of SL	33.9–42.5
Predorsal length in % of SL	66.5–78.3
Dorsal fin length in % of SL	17.8–22.3
Pectoral fin length in % of SL	13.2–17.1
Anal fin length in % of SL	16.3–19.1
Caudal fin length in % of SL	25.3–30.2
Caudal peduncle depth in % of SL	13.6–14.3
Eye diameter in % of HL	29.8–35.7
Interorbital width in % of HL	54.9–61.1

Nair 1941), *C. patoca* (Hamilton 1822), *Dichotomyctere fluviatilis* (Hamilton 1822), *D. nigroviridis* (Marion de Procé 1822), *Leiodon cutcutia* (Hamilton 1822), and *Pao palembangensis* (Bleeker 1851), are known from freshwater regions.

Chelonodontops patoca have been reported from the freshwaters of Karnataka and Kerala (Arunachalam et al. 1999, 2009). In both these reports, the diagnosis of

species does not include any information about spinules on back, which is a major distinguishing character from *C. leopardus*. While *C. patoca* has spinules on the dorsal surface of head and body extending from behind interorbital space nearly to dorsal fin origin, in *C. leopardus* that extends from interorbital region to midpoint between pectoral fin and dorsal fin origin (Pomadakis et al. 2018). The original delineation of *C. patoca* by Hamilton (1822) does not have any spot on the caudal fin, while both the figures provided by Arunachalam et al. (1999, 2009) have caudal fin bearing spots similar to the body which is a character close to that of *C. leopardus*. Further examination of *C. patoca* materials, mentioned in Arunachalam et al. (1999, 2009), are needed to clarify the taxonomic status or morphological variant. Also, a similar species dubbed as the Yellow-spotted pufferfish (Image 3) sometimes occur in the aquarium trade. It adheres to the description of *C. leopardus* in possessing spots in the caudal fin region. The Payaswini River originates from Patti Ghat Hills in Coorg District of Karnataka, which flows through Sullia Town (Dakhin Karnataka), enters Kerala, and finally reaches Kasaragod Town where it drains into the Arabian Sea. The present material obtained near Sullia Town is far away in upland

than those of Arunachalam et al. (2009) collected from the same river.

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