FIRST RECORD OF THE PINK PIPEFISH, BRYX ANALICARENS (ACTINOPTERYGII: SYNGNATHIFORMES: SYNGNATHIDAE), FROM INDIAN WATERS

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Abstract. The occurrence of the pink pipefish, Bryx analicarens (Duncker, 1915), is reported for the first time from Indian waters. The geographical distribution of the species extends from east Africa, the Persian Gulf and the Gulf of Oman to Pakistan and now to the west coast of India. Although a total of 32 pipefish species have hitherto been reported from India, the presently reported finding of B. analicarens constitutes the first record of the genus from the country. Morphometric characters, like the absence of the anal fin, the number of trunk rings (15) and tails rings (34), and dorsal fin rays (25) distinguish the species from other species in the region. Bryx analicarens differs from its congeners by having alternately arranged irregular brownish and white bands along the snout. The presently reported study also emphasizes the need for a detailed study of syngnathid biodiversity and a stock assessment of the coral reef ecosystems of the Gulf of Kachchh Marine National Park and Sanctuary for developing conservation strategies.

Keywords: pipefish, first country record, Syngnathidae, taxonomy, new distribution, Gulf of Kachchh

INTRODUCTION

The family Syngnathidae (the pipefishes) comprises 319 valid species (Fricke et al. 2019a) and its representatives are characterised by having fused jaws (Kuiter 2009). They predominantly inhabit coastal waters, but rarely occur in brackish or fresh waters of temperate and tropical seas around the world (Froese and Pauly 2019). ‘Male pregnancy’ is an exceptional form of reproduction found amongst syngnathids (Wilson et al. 2001, Stölting and Wilson 2007). Pipefish look like ‘straight-bodied seahorses’ with a slender and elongate body, a tiny tube-like mouth without teeth, the presence of lobate and pore-like gills openings above the opercle, soft-rayed fins (variably present), and the body surface with a ring-like arrangement of dermal plates (Dawson 1985). They also have the capability of moving their eyes independently and of camouflaging well in their habitat. Generally, pipefishes feed on microcrustaceans such as copepods, amphipods, isopods, mysids, and cumaceans (Ryer and Orth 1987, Franzoi et al. 1993, Kitso et al. 2008).

In the ocean, syngnathids are found from exposed intertidal pools with just centimetres of water down to more than 400 m depth. Like seahorses, the pipefishes have been exploited for the preparation of medicines and aphrodisiacs, especially in the Traditional Chinese Medicine (TCM) (Murugan et al. 2008). Thus, many species are categorised as ‘highly threatened’. Moreover, seagrass and coral reef-associated species are also threatened by trawl fishing, coral reef degradation, and other direct and indirect causes of habitat destruction worldwide.

Pipefishes of the Indo-Pacific region have been reviewed by Kaup (1853, 1856), Weber and Beaufort (1922), Schultz et al. (1953), Dawson (1985), and Kuiter (1998, 2003). A total of 32 species of pipefishes have been recorded from marine, brackish and riverine habitats of the Indian sub-continent (James 1970, Dawson 1985, Murugan et al. 2008, Rajan et al. 2013, Sanaye et al. 2016). The presently reported account confirms the occurrence of the pink pipefish, Bryx...
analicarens (Duncker, 1915), in the Gulf of Kachchh along the north-west coast of India, which represents a new record of this genus from Indian waters.

MATERIALS AND METHODS

A single live specimen of the pink pipefish, Bryx analicarens, was collected from an intertidal reef flat, off Laku Point reef (22°24.032′N, 069°12.522′E), Gulf of Kachchh, Gujarat State, north-western coast of India in March 2019 (Fig. 1). Immediate after collection, the specimen was preserved in 80% ethanol. Morphological characters and morphometric details were recorded using a Leica-S8AP0 model stereo-zoom microscope. Morphometric and meristic character counts and measurements were recorded using a digital Vernier calliper following the standard protocol as given in Lourie et al. (1999). The specimen was identified using relevant publications (Dawson 1977, 1985, Senou 2013). After carrying out the taxonomic examination, the specimen was deposited at the National Zoological Collection, MBRC-Zoological Survey of India, Chennai- 600 028, India (Registration No. ZSI/MBRC/FISHES F.1998) for further reference.

RESULTS

Family SYNGNATHIDAE

Bryx analicarens (Duncker, 1915)

(Figs. 2, 3, 4; Table 1)

Collection details. The specimen was found underneath a dead coral boulder overgrown with macroalgae, in an exposed pool on the intertidal reef flat. The fish was a female, yellowish orange in colour when collected, fading to grey when preserved in ethanol.

Diagnosis. (according to Dawson 1981): Snout length 36.22% in head length; anal fin absent; caudal-fin rays 10; trunk rings 15; dorsal-fin rays 25; total rings 49; ridges entire.

Description of the Indian specimen. Body thin, elongate (Fig. 2), with elongate, tapering snout (Fig. 3), encased with series of bony rings (Fig. 4A). Total body length from snout to tail reaching 80.59 mm, maximum width 3.01 mm, and maximum body height 2.96 mm. Anterior part of head with tubular snout, ending with small superior mouth. Lower jaw with irregular shaped, alternatingly arranged, white and brown bands (Fig. 3). Head length ($L_h$) occupying 9.86% of total length of specimen; head slender, its width 15.61% than wider abdominal part; snout length covering 36.22% of total head length; orbit diameter (OD = 1.48 mm). Dorsal fin with 25 rays. Pectoral fin with 13 rays and caudal fin 10 with rays (Fig. 4B). Anal fin absent (Table. 1). Trunk with 15 rings, and tail with 34 pearl-white rings (colour in preserved specimen) (Fig. 4D). Superior trunk and tail ridges discontinuing near rear of dorsal-fin base (Fig. 4C). Lateral trunk and tail ridges also discontinued. Inferior trunk ridge merging with tail ridge. Opercle lobate, bearing straight ridge, not angled dorsal, complete, without prominent striae above or below. Pore-like gill opening above opercle. No brood pouch observed beneath anus.

DISCUSSION

The pink pipefish, Bryx analicarens, was originally described from the Makran coast, Beluchistan (Pakistan), the Persian Gulf and Zanzibar (Tanzania) (Duncker 1915). This species was subsequently reported from Eritrea, Red Sea (Dawson 1981, Golani and Fricke 2018), Aldabra, Seychelles (Dawson 1981), Kuwait to Abu Dhabi (Persian Gulf) (Dawson 1981), Gulf of Oman (Randall 1995), and Madagascar (Fricke et al. 2018). As Bryx clarionensis Fritzschke, 1980 is currently treated as a junior synonym of Bryx veleronis Herald, 1940 according to Dawson (1985), the genus Bryx presently includes only four valid species (see Fricke et al. 2019b) namely, Bryx analicarens (Duncker, 1915), Bryx dunckeri (Metzelaar, 1919), Bryx randalli (Herald, 1965), and Bryx veleronis Herald, 1940.

Bryx analicarens is distinguished from its congeners by having alternately arranged irregular brownish and white bands along the entire snout length (Fig. 2). The colour of the body is yellowish-orange while the ventral side of the tail is whitish. A dark, prominent band over the orbital periphery can be observed in the photograph of the presently

Fig. 1. Map showing the reef where the specimen of Bryx analicarens was collected (Gulf of Kachchh, India)
reported specimen (Fig. 3). Duncker (1915), based his description of the new species ‘Syngnathus analicarens’ on two specimens, a damaged male (115 mm long) and a female. The former was labelled as ZSI-F 14295 while the latter as ZSI-F 14297. The fish originated from India, but no detailed locality was provided. ‘Syngnathus analicarens’ is now considered a member of the genus Bryx. Therefore, the Duncker’s (1915) study was an ambiguous evidence of the distribution of B. analicarens in Indian waters, which is confirmed by the present account.

In Indian waters, a total of 32 species of pipefishes, of the family Syngnathidae, divisible into 15 genera have hitherto been recorded (Table 2). The maximum number of species was documented from Andaman and Nicobar Islands (19 species) followed by Tamil Nadu coast (13 species). Maharashtra and Goa coasts recorded three species each. Likewise, the distribution of pipefishes also recorded from north-east regions riverine ecosystems (1 species) and Kerala coast (1 species). The present account adds a new distribution record of the genus Bryx found for the first time from the Indian waters. More intensive studies along the Indian coast may fetch more species from the region.

The coral reefs of the Gulf of Kachchh are unique in their isolation in sub-tropical location, experiencing large tidal amplitude fluctuations, heavy water current, and heavy sediment depositions rate. Nevertheless, they are inhabited by a diverse marine fauna especially in their vast cryptic habitats (Satyanarayana et al. 2017). Studies indicate that the habitat preferences of this species are shallow areas, not deeper than 2–5 m, with seagrass beds of Thalassia hemprichii and Cymodocea serrulata (see Steffe et al. 1989). As there are not much seagrass beds in the Gulf of Kachchh (Kamboj 2014), this species might have adapted to inhabit other cryptic habitats like underneath dead coral boulders in the Kachchh to overcome heavy sedimentation and water current. This also might be one of the reasons for the rare occurrence of B. analicarens along the Gulf of Kachchh. Currently, this species is included under the ‘least concern’ category (Pollom 2016) and all Syngnathidae are protected under the Schedule-I(Part-IIA) of Indian Wildlife (Protection) Act, 1972 (Anonymous 1972). But a detailed study needs to be conducted for evaluating their present status and actual distribution along the Indian coast.

![Fig. 2](image_url)  
**Fig. 2.** Bryx analicarens (80.59 mm TL, Female) Gujarat coast, Gulf of Kachchh

![Fig. 3](image_url)  
**Fig. 3.** Head of the specimen of Bryx analicarens from the Gulf of Kachchh. (A) lateral view; (B) ventral view; (C) dorsal view
ACKNOWLEDGEMENTS

The authors are thankful to the Authorities of the Gulf of Kachchh Marine National Park and Sanctuary, Jamnagar; and Marine National Park and Sanctuary Conservation Society (MNPS<CS), Gujarat State Forest Department, India for providing the facilities and permissions to carry out this study. Authors also grateful to K. Ramkumaran, Gem Christian, Sadhwi Senthura, Manoj Balan, and Moinuddin Ansari, researchers from the ZSI-MNPS<CS Birock coral restoration project, Jamnagar. The first author thanks the Department of Science and Technology, Science and Engineering Research Board (DST-SERB), Government of India, New Delhi, for a National Post-Doc Fellowship awarded to him.

Table 1

Comparison of morphometric and meristic characters of the collected specimen of *Bryx analicarens* with the existing species of pipefishes of the genus *Bryx*

<table>
<thead>
<tr>
<th>Character</th>
<th><em>Bryx analicarens</em> (Duncker, 1915)</th>
<th><em>Bryx dunckeri</em> (Metzelaar, 1919)</th>
<th><em>Bryx randalli</em> (Herald, 1965)</th>
<th><em>Bryx veleronis</em> (Herald, 1940)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reference</td>
<td>This study</td>
<td>Dawson 1981</td>
<td>Robertson and Van Tassell 2019</td>
<td>Dawson 1985</td>
</tr>
<tr>
<td>Total length (TL) [mm]</td>
<td>80.59</td>
<td>≤108.5</td>
<td>≤100</td>
<td>46–93</td>
</tr>
<tr>
<td>Maximum body width (ih)</td>
<td>3.01</td>
<td>—</td>
<td>2.4</td>
<td>—</td>
</tr>
<tr>
<td>Minimum body width (ih)</td>
<td>1.84</td>
<td>—</td>
<td>1.6</td>
<td>—</td>
</tr>
<tr>
<td>Head length (L&lt;sub&gt;H&lt;/sub&gt;) in%TL= 9.864%</td>
<td>8.20%–9.861%</td>
<td>9%–12.7%</td>
<td>9.03%–10.43%</td>
<td>7.6%–10.3%</td>
</tr>
<tr>
<td>Snout length (L&lt;sub&gt;S&lt;/sub&gt;) in%L&lt;sub&gt;H&lt;/sub&gt; 36.22%</td>
<td>21.49%–24.29%</td>
<td>22.04%–29.13%</td>
<td>24.74%–28.86%</td>
<td>—</td>
</tr>
<tr>
<td>Snout depth (D&lt;sub&gt;S&lt;/sub&gt;)</td>
<td>2.54</td>
<td>2.9–3.6</td>
<td>0.7–2.2</td>
<td>2.8–3.7</td>
</tr>
<tr>
<td>Dorsal fin rays No.</td>
<td>25</td>
<td>28–33</td>
<td>21–27</td>
<td>22–27</td>
</tr>
<tr>
<td>Caudal fin rays No.</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>No. of pectoral fins</td>
<td>12</td>
<td>13–14</td>
<td>9–13</td>
<td>12–14</td>
</tr>
<tr>
<td>No. of trunk bony rings</td>
<td>15</td>
<td>16–18</td>
<td>15–18</td>
<td>17–18</td>
</tr>
<tr>
<td>No. of tail bony rings</td>
<td>34</td>
<td>35–39</td>
<td>30–36</td>
<td>30–33</td>
</tr>
<tr>
<td>Anal fin</td>
<td>Absent</td>
<td>Absent</td>
<td>Absent</td>
<td>Absent</td>
</tr>
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</table>

Fig. 4. Body and tail of the specimen of *Bryx analicarens* from the Gulf of Kachchh, India; (A) anterior body, dorsal view, arrow indicates ring of bony plates (1); (B) tail with caudal fin; (C) lateral view of side of body, arrows indicate anus (2), lateral trunk and tail ridges (3), and discontinued superior trunk and tail ridges (4); (D) ventral view of body, arrow indicates ventral bony plates (5)
Table 2

Pipefishes hitherto recorded from Indian waters

<table>
<thead>
<tr>
<th>Species Name</th>
<th>Habitat</th>
<th>Locality</th>
<th>Reference</th>
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</thead>
<tbody>
<tr>
<td>Bhanotia fasciolata</td>
<td>Marine</td>
<td>Andaman Islands</td>
<td>Dawson 1978</td>
</tr>
<tr>
<td>Bryx analicarens</td>
<td>Marine</td>
<td>Andaman Islands</td>
<td>Rajan et al. 2013</td>
</tr>
<tr>
<td>Choeroichthys scultus</td>
<td>Marine</td>
<td>Nicobar Islands</td>
<td>Dawson 1985</td>
</tr>
<tr>
<td>Corythoichthys ampleus</td>
<td>Marine</td>
<td>Andaman and Nicobar</td>
<td>Rajan et al. 2013</td>
</tr>
<tr>
<td>Corythoichthys beneadetto</td>
<td>Marine</td>
<td>Andaman and Nicobar</td>
<td>Rajan et al. 2013</td>
</tr>
<tr>
<td>Corythoichthys haematopterus</td>
<td>Marine</td>
<td>Tamil Nadu; Andaman and Nicobar</td>
<td>Dawson 1985</td>
</tr>
<tr>
<td>Corythoichthys intestinalis</td>
<td>Marine</td>
<td>Andaman and Nicobar</td>
<td>Rajan et al. 2013</td>
</tr>
<tr>
<td>Corythoichthys ocellatus</td>
<td>Marine</td>
<td>Andaman and Nicobar</td>
<td>Rajan et al. 2013</td>
</tr>
<tr>
<td>Corythoichthys schultzii</td>
<td>Marine</td>
<td>Andaman and Nicobar</td>
<td>Rajan et al. 2013</td>
</tr>
<tr>
<td>Doryichthys martensii</td>
<td>Freshwater</td>
<td>Andaman and Nicobar</td>
<td>Rajan et al. 2013</td>
</tr>
<tr>
<td>Dunckerocampus dactylophorus</td>
<td>Marine</td>
<td>Andaman and Nicobar</td>
<td>Rajan et al. 2013</td>
</tr>
<tr>
<td>Doryrhamphus excisus</td>
<td>Marine</td>
<td>Andaman and Nicobar</td>
<td>Rajan et al. 2013</td>
</tr>
<tr>
<td>Halicampus grayi</td>
<td>Marine</td>
<td>Tamil Nadu coast</td>
<td>Murugan et al. 2008</td>
</tr>
<tr>
<td>Halicampus macrorhynchus</td>
<td>Marine</td>
<td>Andaman and Nicobar</td>
<td>Rajan et al. 2013</td>
</tr>
<tr>
<td>Halicampus mataefae</td>
<td>Marine</td>
<td>Andaman and Nicobar</td>
<td>Rajan et al. 2013</td>
</tr>
<tr>
<td>Hippichthys cyanospilos</td>
<td>Marine and brackish waters including mangroves channels and estuaries</td>
<td>Tamil Nadu coast</td>
<td>Suresh 1997</td>
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<td>Hippichthys spicifer</td>
<td>Marine</td>
<td>Tamil Nadu; Andaman and Nicobar</td>
<td>Rajan et al. 2013</td>
</tr>
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<td>Hippichthys penicillus</td>
<td>Marine</td>
<td>Tamil Nadu</td>
<td>Murugan et al. 2008</td>
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<td>Hippichthys heptagonus</td>
<td>Marine and estuary</td>
<td>Andaman and Nicobar</td>
<td>Rajan et al. 2013</td>
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<td>Ichthyocampus carne</td>
<td>Freshwater</td>
<td>Maharashtra</td>
<td>Dawson 1985</td>
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<td>Micrognathus andersonii</td>
<td>Marine</td>
<td>Tamil Nadu coast</td>
<td>Dhanya et al. 2007</td>
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<td>Micrognathus brevirostris</td>
<td>Marine</td>
<td>G. of Mannar, and Kachchh (list only)</td>
<td>James 1970</td>
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<td>Microphis brachyurus</td>
<td>Marine and freshwater</td>
<td>Andaman and Nicobar</td>
<td>Rajan et al. 2013</td>
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<td>Microphis cuncalus</td>
<td>Freshwater and brackish</td>
<td>Maharashtra; Tamil Nadu</td>
<td>Dawson 1985</td>
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<td>Microphis deocata</td>
<td>Freshwater</td>
<td>Darjeeling, Assam</td>
<td>Sen 2000</td>
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Table continues on next page.
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<thead>
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<th>Species Name</th>
<th>Habitat</th>
<th>Locality</th>
<th>Reference</th>
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<td>Microphis insularis</td>
<td>Freshwater</td>
<td>Andaman Islands</td>
<td>Dawson 1985</td>
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<td>Nannocampus pictus</td>
<td>Marine</td>
<td>Tamil Nadu coast</td>
<td>Dawson 1985</td>
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<td>Phoxocampus belcheri</td>
<td>Marine</td>
<td>Tamil Nadu coast</td>
<td>Dawson 1985</td>
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<td>Phoxocampus tetrophthalmus</td>
<td>Marine</td>
<td>Andaman and Nicobar</td>
<td>Dawson 1985</td>
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<tr>
<td>Syngnathoides biaculeatus</td>
<td>Marine</td>
<td>Tamil Nadu coast</td>
<td>Dawson 1985</td>
</tr>
<tr>
<td>Trachyrhamphus bicoarctatus</td>
<td>Marine</td>
<td>Tamil Nadu coast</td>
<td>Dawson 1985</td>
</tr>
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<td>Trachyrhamphus longirostris</td>
<td>Marine</td>
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<td>Dawson 1985</td>
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<td>Trachyrhamphus serratus</td>
<td>Marine</td>
<td>Tamil Nadu coast</td>
<td>Dawson 1985</td>
</tr>
</tbody>
</table>

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Received: 17 July 2019
Accepted: 7 October 2019
Published electronically: 1 March 2020