The Journal of Threatened Taxa (JoTT) is dedicated to building evidence for conservation globally by publishing peer-reviewed articles online every month at a reasonably rapid rate at www.threatenedtaxa.org. All articles published in JoTT are registered under Creative Commons Attribution 4.0 International License unless otherwise mentioned. JoTT allows unrestricted use, reproduction, and distribution of articles in any medium by providing adequate credit to the author(s) and the source of publication.

First record of African Sailfin Flying Fish

Parexocoetus mento (Valenciennes, 1847) (Beloniformes: Exocoetidae), from the waters off Andaman Islands, India

Y. Gladston, S.M. Ajina, J. Praveenraj, R. Kiruba-Sankar, K.K. Bineesh & S. Dam Roy

26 October 2020 | Vol. 12 | No. 14 | Pages: 17032–17035
DOI: 10.11609/jott.5708.12.14.17032-17035

The opinions expressed by the authors do not reflect the views of the Journal of Threatened Taxa, Wildlife Information Liaison Development Society, Zoo Outreach Organization, or any of the partners. The journal, the publisher, the host, and the partners are not responsible for the accuracy of the political boundaries shown in the maps by the authors.
First record of African Sailfin Flying Fish *Parexocoetus mento* (Valenciennes, 1847) (Beloniformes: Exocoetidae), from the waters off Andaman Islands, India

Y. Gladston, S.M. Ajina, J. Praveenraj, R. Kiruba-Sankar, K.K. Bineesh & S. Dam Roy

The family Exocoetidae comprises of 74 species belonging to seven genera and four subfamilies (Collette et al. 1984; Fricke et al. 2019). These fishes are distributed from the tropical to temperate waters (Lewallen et al. 2010; Nelson et al. 2016). This family is characterized by a prominently enlarged paired fins, which assist in gliding over the water (Davenport 1994). Based on the number of enlarged fins (either pectoral or both pectoral and pelvic) the species known to monoplane glider and biplane glider (Breder 1930). The subfamily Parexocoetinae, a monoplane glider consists of a single genus (*Parexocoetus*) with three species. The genus *Parexocoetus* is distinguished from the other members of the family by the presence of strongly protrusible mouth and having a process on the ex-occipital directly articulating with the cleithrum.

Andaman & Nicobar archipelago, a biodiversity-rich Island ecosystem, harbours around 1,434 fish species under 576 genera belonging to 165 families and 33 orders (Rajan et al. 2013). Only five species of flying fishes belonging to four genera were reported from the islands (Rajan et al. 2013). Only one species of genus *Parexocoetus*, *P. brachypterus*, commonly known as sailfin flying fish, familiar in the Andaman Islands, is captured in sardine gillnet (‘tharni net’) and marketed in the local market. *P. mento*, a species originally described from the eastern Indian ocean near Pondicherry, is recorded for the first time in the Andaman Islands showing an extended geographical distribution. A brief description of the species recorded is described herein.

Twenty-three specimens were collected from the gill net fishermen of Junglighat marine fish landing centre (11.659°N & 72.721°E), Andaman & Nicobar Islands. The specimens were caught as bycatch of sardine gill net of mesh size of 20mm and hanging coefficient of 0.55. The specimens collected were of poor quality due to the improper handling practices and their low market value. The specimens were preserved in 5% formalin solution. The morphometric measurements were taken in nearest 0.01 mm using the MitutoyoCD-6" ASX digital calliper. The terminologies used in the present study follow Parin (1996). The morphometric measurements
were transformed into ratios for size independent comparison. Both morphometric and meristic characters were compared with relevant literature. A total of 23 specimens examined are deposited in the Fisheries Museum of ICAR-CIARI, Port Blair.

Systematics

Order: Beloniformes L.S. Berg, 1937
Family: Exocoetidae Risso, 1827
Genus: Parexocoetus Bleeker, 1865
Species: Parexocoetus mento (Valenciennes, 1847) (Fig. 1; Table 1)

Materials Examined: CIARI/MF 06-29, 23.iii.2019, 23ex, 91.0–108.0mm SL, Junglighat Fish Market, Port Blair, Andaman Islands, India (11.659°N & 72.721°E), coll. Gladston & Ajina.

Description: The body is elongated and moderately compressed laterally with blunt and short snout (Fig 1A). The upper jaw is protrusible (Fig. 1B) and the lower jaw little extended when closed (Fig 1B). The entire body is covered with deciduous ctenoid scales. Caudal fin lobes unequal, and lower lobe is large and elongated. Lateral line scales well developed and passing though lower part of mid-lateral region. A well-developed lateral-line branch is present and descending from the pectoral fin base. Greatest body depth is 20–23 % of the standard length and head 22–29 % of standard length. Morphometric measurements of P. mento are given in Table 1. Body proportions are expressed as a percentage of standard length and head length.

Pectoral fins long, reaching to or beyond the origin of the dorsal fin, it is about 48 to 55 % of the standard length. Pectoral fin rays 10–12, mostly 12, middle elongated. Single dorsal fin with all soft rays, originated posterior to the body same line of anal fin origin. Dorsal fins with about 10–11 fin rays (mostly 10) with middle ones are elongated and reach up to the origin of upper caudal fin lobe. Pelvic fins as same as the length of

![Image 1. Parexocoetus mento collected from Junglighat market of Andaman Islands: A—whole specimen | B—extended lower jaw when mouth closed | C—protrusible mouth | D—otolith (Sagitta, the largest otolith) | E—first gill with rakers | F—spinules in gill rakers. © S.M. Ajina & Y. Gladston.](image-url)
Record of African Sailfin Flying Fish from Andaman Islands

Gladston et al.

Table 1. Morphometric measurements of Parexocoetus mento (N=23). Body proportions are expressed as a percentage of standard length and head length.

| Characters      | Mean      | Range          | CV  |
|-----------------|-----------|----------------|-----|
| TL(cm)          | 12.10     | 11.00–13.40    | 5.68|
| SL(cm)          | 9.91      | 9.10–10.80     | 4.58|
| PDL/SL          | 0.70      | 0.66–0.74      | 2.73|
| PPel/SL         | 0.53      | 0.50–0.54      | 2.67|
| PPL/SL          | 0.29      | 0.25–0.31      | 5.61|
| PAL/SL          | 0.72      | 0.69–0.75      | 2.72|
| BD/SL           | 0.21      | 0.20–0.23      | 5.11|
| Ppli/SL         | 0.28      | 0.26–0.32      | 5.93|
| pAl/SL          | 0.22      | 0.20–0.24      | 5.78|
| PL/SL           | 0.51      | 0.47–0.55      | 4.15|
| PFL/SL          | 0.20      | 0.17–0.22      | 6.47|
| AL/SL           | 0.18      | 0.16–0.20      | 6.32|
| HOD/SL          | 0.23      | 0.20–0.28      | 10.54|
| HL/SL           | 0.26      | 0.22–0.29      | 7.04|
| Snl/HL          | 0.21      | 0.15–0.27      | 14.86|
| ED/HL           | 0.36      | 0.31–0.43      | 7.54|
| IOL/HL          | 0.39      | 0.33–0.48      | 9.65|
| IOL/ED          | 1.09      | 1.00–1.38      | 7.72|
| Snl/EDE         | 0.58      | 0.44–0.78      | 14.02|

CV—coefficient of variation: TL—total length | SL—standard length | PDL—predorsal length | PPel—pre-pelvic length | PPL—pre-pectoral length | PAL—pre-anal length | BD—body depth | Ppl—distance from pectoral fin origin to pelvic fin origin | pAl—distance from pelvic fin origin to anal fin origin | PL—pectoral fin length | PFL—pelvic fin length | AL—Length of anal fin base | HOD—height of dorsal fin | pAiL—distance from pelvic fin origin to anal fin origin | ED—eye diameter | IOL—interorbital length.

anal fin base with 5–6 rays (mostly 6), with third ray is longest, inserted near to anal fin origin than the pectoral fin origin. Anal fin originated the same line or after 2–3 rays of dorsal fin, base length is same or nearer to height of dorsal fin. The anal fin number equal to the number of dorsal fin rays, 10–11 (mostly 10). Predorsal scales 16 to 20 (mostly 18). Gill rakers elongated and serrated (Fig 1F), on first arch 18–24 (mostly 21) numbers present (Fig 1E). Vomerine teeth present.

Otoliths are comparatively large and oval (Fig. 1D).

**Colour:** Dark bluish-green dorsally, silver on ventral side. A large black spot present in the dorsal fin which touches the fin base, pectoral fin greyish white to transparent in colour.

**Range:** Pelagic in nearshore and neritic waters, rare in open ocean, found in the Atlantic, Indian, and Pacific Ocean (Parin 1986; Russell & Houston 1989; Sommer et al. 1996).

The present study records *P. mento*, the first time from the Andaman Islands. The species has earlier known Red Sea, Africa, Marshall Islands, Fiji, Japan, Australia, and Mediterranean Sea (Russell & Houston 1989; Parin 1986). The original description of the species in from southeastern coast of India near Pondicherry. The existence of *P. mento* revealed additional biodiversity of fish in Andaman Islands and also shows the new geographical distribution in this region.

The earlier distribution of the species known from Mediterranean coast of Palestine (Bruun 1935), Aegean Sea (Kosswig 1950; Ben-Tuvia 1966; Fischer & Bianchi 1984; Parin 1986) Gulf of Sidra (Ben-Tuvia 1966; South-east Mediterranean Sea (Ben-Tuvia 1966, 1985; Fischer & Bianchi 1984; Parin 1986; Golani 1996) and from Albania (Fischer & Bianchi 1984; Parin 1986).

This species was originally described from the Pondicherry waters by Valenciennes in 1847. The further taxonomic description, systematic position, and distribution of the species from the Mediterranean Sea given by Ben-Tuvia (1966) and Parin (1986). According to Parin (1986) the adults of *P. mento* can be distinguished by a combination of characters including elongate, compressed body rounded ventrally, with the presence of pectoral branch of the lateralline, protractile upper jaw and subequal rays in dorsal and anal fins. Since it is a characteristic of the genus, these characters are similar in *P. brachypterus* (Fischer & Bianchi 1984). The major difference between the two species is the dorsal fin height which reaches till caudal fin lobe in *P. mento*, whereas it extends far beyond in *P. brachypterus*. In both the species, middle ray is longest in dorsal and pectoral fins. Similarly the lower jaw of the *P. mento* is little extended while in *P. brachypterus* both the jaws are sub equal when closed. The dark black spot in the dorsal fin is also a comparable character between the species; it is big and dark in *P. mento* reaching the base while smaller in *P. brachypterus* which not extended to the base of fins. In both the species, however, pectoral fins long but not reaching beyond the posterior part of anal fins. Pelvic fins medium-sized, reaching not far beyond anal fin origin, their insertion closer to anal fin origin than to pectoral fin insertion in both the species.

Dorsal and anal fin rays of *P. mento* in the present collection is 10 to11 which is within the range of 9–12 by Parin, 1986 while in *P. brachypterus* it is reported as 12–14 (Fischer & Bianchi 1984). Pre-dorsal scale of 16–20 was recorded in the present study, while it is 20–24 in *P. brachypterus* (Fischer & Bianchi 1984). According to this comprehensive examination and comparison of diagnostic morphological characters, it is confirmed the distribution of *P. mento* in Andaman waters.
Although the species is known to Western Pacific and Indian ocean from Marshall island to Japan to southern Africa and Red Sea; eastern Mediterranean from port Said to Gulf of Sirda and Near Rhodes Islands (Ben- Tuvia 1966; Fischer & Bianchi 1984; Parin 1986), the present study records a new geographic distribution of *P. mento*. Hence the Andaman waters as mentioned previously may harbour two *Parexocoetus* species, *P. brachypterus* and *P. mento*, similar as per the conclusion of Fischer & Bianchi (1984) from the Mediterranean Sea.

In Andaman & Nicobar Islands, both the species are caught in selective lesser sardine gill nets as bycatch. The present record on the species is an additional species to biodiversity database of fishes of Andaman waters.

References

Ben-Tuvia, A. (1966). Red Sea fishes found in the Mediterranean. *Copeia* 2: 254–275. [https://doi.org/10.2307/1441133](https://doi.org/10.2307/1441133)

Ben-Tuvia A. (1985). The impact of the Leiseesian (Suez Canal) fish migration on the eastern Mediterranean ecosystem, pp. 367–375. In: *Mediterranean Marine Ecosystems*. Part of the NATO Conference Series book series (NATOCS, volume 8). Springer Science+Business Media, New York. [https://doi.org/10.1007/978-1-4899-2248-9_17](https://doi.org/10.1007/978-1-4899-2248-9_17)

Breder C.M. (1930). On the structural specialization of flying fishes from the stand point of aero-dynamics. *Copeia* 4: 114–121. [https://doi.org/10.2307/1436467](https://doi.org/10.2307/1436467)

Bruun F.A. (1935). *Parexocoetus* a Red Sea flying fish in the Mediterranean. *Nature* 136: 553. [https://doi.org/10.1038/136553b0](https://doi.org/10.1038/136553b0)

Collette B.B., G.E. Mc Gowen, N.V. Parin & S. Mito (1984). Beloniformes: development and relationships, pp. 334–354. In: Moser, H.G., W.J. Richards, D.M. Cohen, M.P. Fahay, A.W. Kendall, Jr. & S.L. Richardson (eds.) *Ontogeny and Systematics of Fishes*. American Society of Ichthyologists and Herpetologists. Publication 1, 762pp.

Davenport, J. (1994). How and why do flying fish fly? *Reviews in Fish Biology and Fisheries* 4(2): 184–214. [https://doi.org/10.1007/BF00044128](https://doi.org/10.1007/BF00044128)

Fischer, W. & G. Bianchi (1984). FAO species identification sheets for fishery purposes: Western Indian Ocean (Fishing Area 51). v. 1: Introductory material. Bony fishes, families: Acanthuridae to Clupeidae.-v. 2: Bony fishes, families: Congiopodidae to Lophotidae.-v. 3:... families: Lutjanidae to Scaridae.-v. 4:... families: Scatophagidae to Trichiuridae.-v. 5: Bony fishes, families: Triglidae to Zeidae. Chimaeras. Sharks. Shrimps and pawns. Sea turtles. v. 6: Alphabeticol index of scientific names and vernacular names.

Fricke, R., W.N. Eschmeyer & R. Van der Laan (2019). Catalogue of Fishes: Genera, Species, References. Electronic version accessed 2019, available online at [http://researcharchive.calacademy.org/research/ichthyology/catalog/fishcatmain.asp](http://researcharchive.calacademy.org/research/ichthyology/catalog/fishcatmain.asp) [details]

Kosswig, C. (1950). Erythrean fish in the Mediterranean Sea and on the border of the Aegean Sea. *Syllogonema Biologica*. Festschrift Kleinschmidt, Leipzig: Academie Verlag, 203–212

Leewallen E.A., R.L. Pitman, S.L. Kjartanson & N.R. Lovejoy (2010). Molecular systematics of flyingfishes (Teleostei: Exocoetidae): evolution in the epipelagic zone. *Biological Journal of the Linnean Society* 102(1): 161–174. [https://doi.org/10.1111/j.1095-8312.2010.01550.x](https://doi.org/10.1111/j.1095-8312.2010.01550.x)

Nelson, J.S., T.C. Grande & M.V. Wilson (2016). *Fishes of the World*. John Wiley & Sons, 752pp.

Parin, N.V. (1986). *Exocoetidae*, pp. 612–619. In: Whitehead, P.J.P., M.L. Bauchot, J.C. Hureau, J. Nielsen & E. Tortonese (eds.). *Fishes of the North-eastern Atlantic and the Mediterranean*. Vol. 2. UNESCO, Paris, France.

Parin, N.V. (1996). On the species composition of flying fishes (*Exocoetidae*) in the west-central part of tropical Pacific. *Journal of Ichthyology* 36(5): 357–364.

Rajan, P.T., C.R. Sreeraj & T. Immanuel (2013). Fishes of Andaman Andaman and Nicobar Islands: a checklist. *Journal of Andaman Science Association* 18(1): 47–87.

Russell, B.C. & W. Houston (1989). Offshore fishes of the Arafura Sea. *Beagle* 6(1): 69–84.

Sommer, C., W. Schneider & J.M. Poutiers (1996). FAO species identification field guide for fishery purposes. The living marine resources of Somalia. FAO, Rome, 376pp.
Elevational pattern and seasonality of avian diversity in Kaligandaki River Basin, central Himalaya
– Juna Neupane, Laxman Khanal, Basant Gyawali & Mukesh Kumar Chalise, Pp. 16927–16943

Species diversity and feeding guilds of birds in Malaysian agarwood plantations
– Nor Nasibah Mohd Jamil, Husni Ibrahim, Haniza Hanim Mohd Zain & Nur Hidayat Che Musa, Pp. 16954–16961

Evaluating performance of four species distribution models using Blue-tailed Green Darter Anax guttatus (Insecta: Odonata) as model organism from the Gangetic riparian zone
– Krittish De, S. Zeeshan Ali, Niladri Dasgupta, Virendra Prasad Uniyal, Jeyaraj Antony Johnson & Syed Ainul Hussain, Pp. 16962–16970

Butterfly species richness and diversity in rural and urban areas of Sirajganj, Bangladesh
– Sheik Muhammad Shaburul Imam, Amit Kumer Neogi, M. Ziaur Rahman & M. Sabbir Hasan, Pp. 16971–16978

Chroococcal blue green algae from the paddy fields of Satara District, Maharashtra, India
– Sharada Jagannath Ghadage & Vaneeta Chandrashekhar Karande, Pp. 16979–16992

A highway to hell: a proposed, inessential, 6-lane highway (NH173) that threatens the forest and wildlife corridors of the Western Ghats, India
– H.S. Sathyia Chandra Sagar & Mrunmayee, Pp. 16993–16999

Species diversity and feeding guilds of birds in Malaysian agarwood plantations
– Pranoy Kishore Borah, Avrajjal Ghosh, Bikash Sahoo & Aniruddha Datta-Roy, Pp. 16944–16953

A frog that eats foam: predation on the nest of Polypedates spp. (Rhacophoridae) by Euphlyctis sp. (Dicroglossidae)
– Lalremsanga, Pp. 17023–17027

New distribution record of the Lesser Adjutant Leptoptilos javanicus (Horsfield, 1821) (Ciconiiformes: Ciconiidae) from Sindhuli District, Nepal
– Juna Neupane, Laxman Khanal, Basant Gyawali & Mukesh Kumar Chalise, Pp. 16927–17006

First distributional record of the Greater Adjutant Leptoptilos dubius (Otth, 1847) (Ciconiiformes: Ciconiidae), from the waters off Andaman Islands, India
– Sankarshan Rastogi, Ram Kumar Raj & Bidesh Kumar Chauhan, Pp. 17024–17027

First record of African Sailfin Flying Fish Parexocoetus mento (Valenciennes, 1847) (Beloniformes: Exocoetidae), from the waters off Andaman Islands, India
– Y. Gladston, S.M. Ajina, K. Praveenraj, K.K. Bineesh & S. Dam Roy, Pp. 17032–17035

A first distribution record of the Indian Peacock Softshell Turtle Nilssonia hurum (Gray, 1830) (Reptilia: Testudines: Trionychidae) from Mizoram, India
– Gospel Zothanmawia Hmar, Lalbiakzuala, Lalmuansanga, Badri Baral, Vanlalhruaia, Hmar Betlu Ramengmawii, Kulendra Chandra Das & Hmar Tlawmte Lalremhsanga, Pp. 17036–17040

Notes
A rare camera trap record of the Hisdip Has Procapra hispidus from Dudhwa Tiger Reserve, Terai Arc Landscape, India
– Sankarshan Rastogi, Ram Kumar Raj & Bidesh Kumar Chauhan, Pp. 17024–17027

First distributional record of the Lesser Adjutant Leptoptilos javanicus (Horsfield, 1821) (Ciconiiformes: Ciconiidae) from Sindhuli District, Nepal
– Badri Baral, Sudeep Bhandari, Saroj Koirala, Parashuram Bhandari, Ganesh Magar, Dipak Raj Basnet, Jeevan Rai & Hem Sagar Baral, Pp. 17028–17031

First record of African Sailfin Flying Fish Parexocoetus mento (Valenciennes, 1847) (Beloniformes: Exocoetidae), from the waters off Andaman Islands, India
– Y. Gladston, S.M. Ajina, K. Praveenraj, K. Kiruba-Sankar, K.K. Bineesh & S. Dam Roy, Pp. 17032–17035

A first distribution record of the Indian Peacock Softshell Turtle Nilssonia hurum (Gray, 1830) (Reptilia: Testudines: Trionychidae) from Mizoram, India
– Gospel Zothanmawia Hmar, Lalbiakzuala, Lalmuansanga, Badri Baral, Vanlalhruaia, Hmar Betlu Ramengmawii, Kulendra Chandra Das & Hmar Tlawmte Lalremhsanga, Pp. 17036–17040

A frog that eats foam: predation on the nest of Polypedates spp. (Rhacophoridae) by Euphlyctis sp. (Dicroglossidae)
– Pranoy Kishore Borah, Avrajal Ghosh, Bikash Sahoo & Aniruddha Datta-Roy, Pp. 17041–17044

New distribution record of two endemic plant species, Euphorbia kadalapensis Sarojin. & R.V.R. Raju (Euphorbiaceae) and Lepidagathis keralensis Madhus. & N.P. Singh (Acanthaceae), for Karnataka, India
– P. Raja, N. Dhatchanamoorthy, S. Soosairaj & P. Jansirani, Pp. 17045–17048

Cirsium wallichii DC. (Asteraceae): a key nectar source of butterflies
– Bitupan Boruah, Amit Kumar & Abhijit Das, Pp. 17049–17056

Hypecoum pendulum L. (Papaveraceae: Ranunculaceae): a new record for the flora of Haryana, India
– Naina Palria, Nidhan Singh & Bhoo Dev Vashistha, Pp. 17057–17059

Addendum
Erratum and addenda to the article ‘A history of primatology in India’
– Mewa Singh, Mridula Singh, Honnavalli N. Kumara, Dilip Chetry & Santanu Mahato, Pp. 17060–17062