NOTE

Occurrence, taxonomic notes and morphometric comparison of the alligator pipefish *Syngnathoides biaculeatus* (Bloch, 1785) from the Great Nicobar Island, India

Krishnan Silambarasan* and Chandrakasan Sivaperuman

Zoological Survey of India, Andaman and Nicobar Regional Centre, Andaman and Nicobar Islands,
11 Horticulture Road, 744102 - Port Blair, India. ORCID *Krishnan Silambarasan* https://orcid.org/0000-0001-5805-1562,
Chandrakasan Sivaperuman https://orcid.org/0000-0002-3582-7767

ABSTRACT. A single female specimen (195 mm TL) of the alligator pipefish, *Syngnathoides biaculeatus* (Bloch, 1785) was recorded from the coral reef rubble habitats of Gandhi Nagar, Great Nicobar Island. The present study provides a detailed morphological description of the species, including comprehensive morphometric measurements and meristic counts. This record represents important baseline information on *S. biaculeatus* from the Great Nicobar region, with additional details on its habitat preferences and depth distribution. Previous reports from the Andaman and Nicobar islands lacked detailed taxonomic and ecological information on the species. Therefore, the present report addresses these knowledge gaps by providing detailed taxonomic documentation, morphometric data, habitat information and photographic records of *S. biaculeatus*, thereby contributing valuable baseline information to the ichthyofaunal diversity of the Great Nicobar group of Islands.

Key words: Pipefishes, Syngnathidae, seagrass beds, fish diversity, Andaman and Nicobar islands.

Presencia, notas taxonómicas y comparación morfométrica del pez pipa aligátor *Syngnathoides biaculeatus* (Bloch, 1785) de la Isla Gran Nicobar, India

RESUMEN. Se registró un único ejemplar hembra (195 mm de longitud total) del pez pipa caimán, *Syngnathoides biaculeatus* (Bloch, 1785), en los hábitats de escombros de arrecifes de coral de Gandhi Nagar, Isla Gran Nicobar. El presente estudio proporciona una descripción morfológica detallada de la especie, incluyendo mediciones morfométricas exhaustivas y recuentos merísticos. Este registro constituye información de referencia importante sobre *S. biaculeatus* en la región de Gran Nicobar, con detalles adicionales sobre sus preferencias de hábitat y distribución en profundidad. Los informes previos de las islas Andamán y Nicobar carecían de información taxonómica y ecológica detallada sobre la especie. Por lo tanto, el presente informe aborda estas lagunas de conocimiento al proporcionar documentación taxonómica detallada, datos morfométricos, información sobre el hábitat y registros fotográficos de *S. biaculeatus*, contribuyendo así con valiosa información de referencia a la diversidad ictiofaunística del archipiélago de Gran Nicobar.

Palabras clave: Peces pipa, Syngnathidae, praderas marinas, diversidad de peces, islas Andamán y Nicobar.

*Correspondence:
silambuplankton@hotmail.com

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The family Syngnathidae Bonaparte, 1831 comprises pipefishes, seahorses, sea dragons, and their relatives. Members of this family are widely distributed in tropical and temperate waters worldwide, with the Indo-West Pacif-

ic regions having the highest diversity (Dawson 1986). The family currently comprises 322 species assigned to numerous genera (Fricke et al. 2025). The genus *Syngnathoides* Bleeker, 1851 is monotypic, with only one species, *Syngnathoides biaculeatus* (Fricke et al. 2025). Pipefishes are characterized by their elongated bodies, tubular snouts, and dermal body rings (Dawson 1985). This species is typically associated with protected shallow coastal water habitats, such as seagrass meadows, algal beds, coral reef areas and floating debris, where it feeds primarily on benthic invertebrates and zooplankton (Dawson 1986; Randall et al. 1997). Although *S. biaculeatus* is most commonly found in shallow waters, it has been reported from depths ranging from 0 to 30 m (Allen and Erdmann 2012). Many pipefish species are threatened by habitat degradation caused by harmful fishing practices (e.g. bottom trawling), seafloor damage, coral reef degradation, coastal development and climate change, which are all contributing to global population declines (Chandran et al. 2020). Although, *S. biaculeatus* is currently categorized as 'Least Concern' on the IUCN Red List (Pollom 2017), documenting its distribution, habitat, and taxonomy is critical for understanding its regional occurrence and assisting future conservation efforts.

The occurrence and distribution of *S. biaculeatus* in India are scattered and sporadically reported. The species was first recorded from the Lakshadweep Islands (Jones 1969), followed by reports from the Andaman Islands (Talwar 1990). Its distribution was further extended to the Palk Bay and Gulf of Mannar regions along the southeast coast of Tamil Nadu, as well as the Kerala coast (Murugan et al. 2008; Bijukumar and Deepthi 2009). Later, the species was reported from the Central west coast of Goa (Sanaye et al. 2016), adding a new locality record and expanding the known distribution of the species. However, the occurrence of *S. biaculeatus* in the Andaman Islands has so far been documented only through checklist-based reports, without detailed taxonomic descriptions, morphometric and meristic data, or information on habitat preferences. Such data are particularly important for syngnathid fishes for accurate species identification, ecological assessment and effective conservation management. Therefore, the present study addresses this knowledge gap by providing information for *S. biaculeatus* from Great Nicobar Island. These findings not only confirm the occurrence of the species in the southernmost part of the Andaman and Nicobar archipelago but also provide a valuable reference for future taxonomic, ecological, biogeographic, and conservation studies on *S. biaculeatus* in Indian waters.

A single live specimen of the alligator pipefish, *S. biaculeatus*, was collected from an intertidal coral reef rubble area at Gandhi Nagar (06° 51.056′ N-93° 53.769′ E), Great Nicobar Island, at a depth of 5 m on January 13, 2026. After collection, the specimen was photographed using a DSLR camera (3x magnification) and subsequently preserved in 80% ethanol. Counts and measurements followed the methods of Lourie et al. (1999). Morphometric measurements were taken using a digital caliper to the nearest 0.1 mm. The specimen was identified using standard systematic keys (Schultz 1939; Dawson 1985; Kuiter 2009; Murugan et al. 2008). After completion of the taxonomic examination, the specimen was deposited in the National Zoological Collection, Andaman and Nicobar Regional Centre (ANRC), Zoological Survey of India, Sri Vijaya Puram, India (Reg. No. ZSI/ANRC/M/33069) for future reference.

Family Syngnathidae Bonaparte, 1831
***Syngnathoides* Bleeker, 1851**
***Syngnathoides biaculeatus* (Bloch, 1785)**
English common name: alligator pipefish
Figures 1-3; Table 1

Material examined

ZSI/ANRC/M/33069, 195 mm TL, Gandhi Nagar, Great Nicobar Island, 13 January 2026, collected by K. Silambarasan (see Figure 4 for the collection site).



Figure 1. *Syngnathoides biaculeatus* (195 mm TL, female) collected from Great Nicobar Island, India. Lateral (A), dorsal (B), and ventral views (C).



Figure 2. Head of the examined *Syngnathoides biaculeatus* from Great Nicobar Island, India. Lateral (A), dorsal (B), and ventral views (C).



Figure 3. Meristic counts of the examined *Syngnathoides biaculeatus* from Great Nicobar Island, India. Tail without caudal fin (A), lateral view showing body rings and continues trunk ridges (B), and preanal ring counts (C).

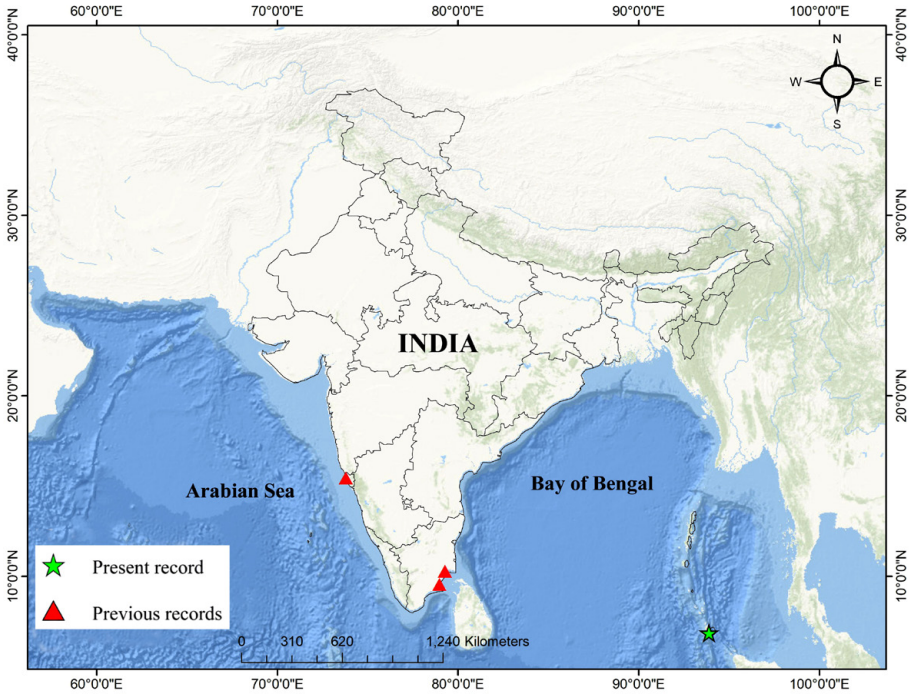


Figure 4. Distribution of *Syngnathoides biaculeatus* in Indian waters indicating previous and the new record from Great Nicobar Island.

Table 1. Morphometric and meristic data of *Syngnathoides biaculeatus* from Great Nicobar Island, compared with previous records from Goa and Palk Bay.

	This study	Sanaye et al. (2016)	Murugan et al. (2008)
	Great Nicobar (N = 1)	Goa (N = 1)	Palk Bay (N = 30)
Measurements (mm)			
Total length (TL)	195	179	185 ± 13.35
Maximum body height (H)	9	6	7 ± 0.46
Maximum body width (iH)	6	9	12 ± 0.70
Minimum body width (ih)	4	3.5	5 ± 0.38
Antero-dorsal distance (aD)	74	63	63 ± 4.92
Post dorsal distance (pD)	90	80	88 ± 6.61
Length of dorsalfin bais (1D)	34	30	25 ± 1.51
Height of dorsalfin (Hd)	5	4	3 ± 0.39
Length of analfin basis (1A)	1	1	1 ± 0.00
Height of anal fin (hA)	3	2	2 ± 0.00
Length of pectoralfin (IP)	4	5	6 ± 0.50
Head length (HL)	35	36	35 ± 2.19
Occipital height or head (OHH)	8	7	8 ± 0.73
Head width (Hw)	7	6	7 ± 0.48
Snout length (SnL)	21	18	17 ± 1.20
Snout Depth (SnD)	3	3	2 ± 0.44
Mouth width (MW)	3	2.5	2 ± 0.22
Eye diameter (ED)	7	6	6 ± 0.48
Postorbital length (Po)	11	12	12 ± 0.73
Counts			
Number of rays in dorsalfin (D)	40	40	39 ± 1.20
Number of rays in analfin (A)	4	4	4 ± 0.00
Number of rays in pectoralfin (P)	21	21	21 ± 1.10
Number of preanal rings (PaR)	15	16	17 ± 0.00
Number of postanal rings (PoAR)	35	35	47 ± 1.17
Wet weight (gm)	5	3.7	4.228 ± 0.47

Description

Dorsal fin rays 40; anal fin rays 4; pectoral fin rays 21 (Table 1). Preanal rings 15, postanal rings 35. Body elongated, depressed and tetragonal; trunk compressed dorso-ventrally, broadest near the middle of trunk, with body ridges continuous with tail ridges. The head length (HL) was contained 5.57 times in the total length (TL), indicating a relatively small head compared to body size. Snout length was contained 1.67 times in the HL, while snout depth was contained 7 times in the snout length, suggesting a slender and elongated snout. Dorsal fin originated on the trunk; a pair of

small, branched barbels were present on the chin; caudal fin absent, tail prehensile. Dermal flaps were present on the head and body.

Colour when fresh

The body was brown in coloration with variable darker markings, and a distinct dark stripe is present on the operculum.

Morphometric and diagnostic characters of the Great Nicobar specimen closely agreed with previous description of *S. biaculeatus* reported by Kuiter (1996), Murugan et al. (2008) and Sanaye et al. (2016). Key identifying features, such as the number of preanal and postanal rings, continued tail ridges, and the presence of small barbels on the chin were found to be consistent with earlier published description of the species. Comparison of morphometric measurements among the present Great Nicobar specimen with those from Goa and Palk Bay, revealed noticeable variations in body proportions and meristic counts among three localities (Table 1). The Great Nicobar specimen exhibited a greater total length (195 mm), body height, snout length, and dorsal fin base length, than the Goa specimen. In contrast, the Goa specimen exhibited comparatively smaller body dimensions and lower wet weight. As these observations are based on single specimens, differences should be interpreted with caution and may reflect individual or age-related variation rather than population level differences. Palk Bay specimens, represented by a larger sample size (N = 30), displayed broader body width, longer pectoral fins, and a significantly higher number of postanal rings (47 ± 1.17) compared to the Great Nicobar and Goa specimens (35). However, fin ray counts including dorsal, anal, and pectoral rays, remained largely similar across locations. These morphometric differences may be associated with local environmental conditions, habitat characteristics, prey availability, or differences in age and growth among populations. In particular, the relatively undisturbed coastal habitats of Great Nicobar Island, characterized by clear waters, extensive coral reefs, and seagrass beds, may provide favorable habitat conditions, including prey densities and effective shelters from predators. These factors could account for the increased growth and bigger body size observed in the Great Nicobar specimen. However, the present study is based on one sample, and further studies involving larger sample sizes are required to determine whether these differences represent population-level variation or individual phenotypic variation.

The present report represents the first detailed study on the morphometric measurements and meristic counts of *S. biaculeatus* from the Andaman and Nicobar Islands. Although the species was previously listed from the Andaman Islands by Talwar (1990), detailed information on morphometric characters, habitat preference, modern taxonomic images and distributional aspects were lacking. The present study fills this gap by providing new baseline data from Great Nicobar Island and comparing the findings with earlier records from the Indian mainland, including Goa and Palk Bay. The known distribution of this species indicates that it is native to Indo-Pacific region (Dawson 1985; Froese and Pauly 2026). Earlier published records from Indian waters are limited and fragmented (Dhanya et al. 2005; Murugan et al. 2008; Sanaye et al. 2016). Subsequently, Bijukumar and Deepthi (2009) recorded low catch occurrence of this species along the Kerala coastal waters. Randall et al. (1997) indicated that this species is mainly associated with seagrass beds and coral reef habitats.

Great Nicobar Island is an important biogeographic region located between the eastern Indian Ocean and Southeast Asia, showing strong faunal affinities with the Indo-Malayan region and Sundaland hotspot (Sankaran 1998; Venkataraman et al. 2012; Raghunathan et al. 2013). The present record of *S. biaculeatus* from Great Nicobar Island is biogeographically significant, contributing to understanding species connectivity between southeast Asia and Indian Ocean marine fauna. Furthermore, the present record provides valuable baseline information on the morphology, habitat

and distribution of the species from the Andaman and Nicobar archipelago and highlights the need for further ecological and molecular studies on syngnathid fishes in Indian waters. Molecular confirmation using DNA barcoding would complement traditional morphological taxonomy by validating species identifications, resolving taxonomic ambiguities, and clarifying understanding of phylogenetic relationships. Therefore, future studies should incorporate DNA barcoding and other molecular approaches to confirm the identity of *S. biaculeatus* from Great Nicobar Island and to assess its genetic diversity, population structure and connectivity throughout its distribution range. Finally, these findings emphasize the ecological importance of coral reefs and seagrass habitats for the conservation of *S. biaculeatus*.

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Author contributions

Krishnan Silambarasan: sampling collections; identification; writing the manuscript. Chandrakasan Sivaperuman: conceptualization; writing; editing; supervision.

REFERENCES

Allen GR, Erdmann MV. 2012. Reef fishes of the East Indies. Vol. I-III. 2nd ed. Perth: University of Hawai'i Press, Tropical Reef Research.

Bijukumar A, Deepthi GR. 2009. Mean trophic index of fish fauna associated with trawl bycatch of Kerala, southwest coast of India. J Mar Biol Assoc Ind. 51 (2): 145-157.

Chandran R, Thanappan V, Satyanarayana C, Chandra K, Senthilkumaran R, Fricke R. 2020. First record of the pink pipefish, *Bryx analicarens* (Actinopterygii: Syngnathiformes: Syngnathidae), from Indian waters. Acta Ichthy Piscat. 50 (1): 113-120. DOI: https://doi.org/10.3750/AIEP/02766

Cho SH, Myoung JG, Kim JM, Lee JH. 2001. Fish fauna associated with drifting seaweed in the coastal area of Tongyeong, Korea. Trans Am Fish Soc. 130: 1190-1202.

David Wells RJ, Rooker JR. 2004. Distribution, age, and growth of young-of-the-year greater amberjack (*Seriola dumerili*) associated with pelagic *Sargassum*. Fish Bull. 102: 545-554.

Dawson CE. 1985. Indo-Pacific Pipefishes (Red Sea to the Americas). Gulf Coast Research Laboratory, Ocean Springs, Mississippi.

Dawson CE. 1986. Syngnathidae. In: Smith MM, Heemstra PC, editors. Smiths' sea fishes. Berlin: Springer-Verlag. p. 445-458.

Dhanya S, Rajagopal S, Ajmal Khan S, Balasubramanian T. 2005. Embryonic development in alligator pipefish*, Syngnathoides biaculeatus* (Bloch, 1785). Curr Sci. 88 (1): 178-181.

Foster SJ, Vincent ACJ. 2004. Life history and ecology of seahorses: implications for conservation and management. J Fish Biol. 65: 1-61.

Fricke R, Eschmeyer WN, Van der Laan R, editors. 2025. Catalog of fishes: genera, species, references. San Francisco: California Academy of Sciences. [accessed 2026 May 17]. https://researcharchive.calacademy.org/research/ichthyology/catalog/fishcatmain.asp.

Froese R, Pauly D. 2026. FishBase. World Wide Web electronic publication. Version 02/2026.

Jagatap TG. 1991. Distribution of seagrasses along Indian coast. Aqua Bot. 40: 379-386.

Jones S. 1969. Catalogue of fishes from the Lac-

cadive Archipelago in the reference collections of the Central Marine Fisheries Research Institute. Bull CMFRI. 8: 1-32.

Kuiter RH. 1996. Guide to sea fishes of Australia. London: New Holland Publishers.

Kuiter RH. 2009. Seahorses and their relatives. Seaford: Aquatic Photographics. 334 p.

Lourie SA, Vincent ACJ, Hall HJ. 1999. Seahorses: an identification guide to the world's species and their conservation. London: Project Seahorse.

Murugan A, Dhanya S, Rajagopal S, Balasubramanian T. 2008. Seahorses and pipefish of the Tamil Nadu coast. Curr Sci. 95: 253-260.

Ohta I, Tachihara K. 2004. Larval development and food habits of the marbled parrotfish, *Leptoscarus vaigiensis*, associated with drifting algae. Ichthyol Res. 51 (1): 63-69. DOI: https://doi.org/10.1007/s10228-003-0197-z

Ooi BL, Lim YL, Lim ACO, Chong VC. 2017. Habitat choice and hunting behaviour of the alligator pipefish, *Syngnathoides biaculeatus*, in captivity. Etho Ecol Evol. 29 (6): 542-551.

Pollom R. 2017. *Syngnathoides biaculeatus*. The IUCN Red List of Threatened Species 2017: e.T40715A67622796. [accessed 2026 May 17]. DOI: https://dx.doi.org/10.2305/IUCN.UK.2017-2.RLTS.T40715A67622796.en

Raghunathan C, Venkataraman K, Davidar, P. 2013. Biodiversity and biogeography of Andaman and Nicobar Islands. In: Chandra K, Raghunathan C, editors. Faunal diversity of biogeographic zones of India. Zoological Survey of India. p. 1-24.

Randall JE, Allen GR, Steene, RC. 1997. Fishes of the Great Barrier Reef and Coral Sea. 2nd ed. Bathrust: Crawford House Publishing. 557 p.

Ryer CH, Orth RJ. 1987. Feeding ecology of the northern pipefish, *Syngnathus fuscus*, in a seagrass community of the lower Chesapeake Bay. Estuaries. 10 (4): 330-336.

Sanaye SV, Rivonker CU, Ansari ZA, Sreepada RA. 2016. A new distributional record of alligator pipefish, *Syngnathoides biaculeatus* along Goa, central west coast of India. Ind J Geo Mar Sci. 45 (10): 1299-1304.

Sankaran R. 1998. The ecology and biogeography of the Nicobar Islands. In: Andaman and Nicobar islands: environmental impact assessment and conservation strategies. New Delhi: Oxford University Press.

Schultz LP. 1939. Fishes of the Phoenix and Samoan islands collected in 1939 during the expedition of the U. S. S. "Bushnell". Bull US Nat Mus. 180. p. 316. DOI: https://doi.org/10.5479/si.03629236.180.i

Talwar PK. 1990. Fishes of the Andaman and Nicobar Islands: a synoptic analysis. J Andaman Sci Assoc. 6 (2): 71-102.

Tutman P, Burić M, Skaramuca B. 2012. First substantiated record of the black-striped pipefish, *Syngnathus abaster* (Actinopterygii: Syngnathiformes: Syngnathidae), in the freshwaters of Bosnia and Herzegovina. Acta Ichthy Piscat. 42 (3): 259-262. DOI: https://doi.org/10.3750/AIP2011.42.3.11

Vandendriessche S, Messiaen M, O'Flynn S, Vincx M, Degraer S. 2007. Hiding and feeding in floating seaweed: floating seaweed clumps as possible refuges or feeding grounds for fishes and crustaceans. Estuar Coast Shelf Sci. 71 (3-4): 691-703. DOI: https://doi.org/10.1016/j.ecss.2006.09.017

Venkataraman K, Rajan PT, Raghunathan C. 2012. Marine biodiversity of Andaman and Nicobar Islands. Kolkata: Zoological Survey of India.