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Cover: Indian Grey Wolf *Canis lupus pallipes* and Smooth-coated Otter *Lutrogale perspicillata* sharing the territory in Chambal basin. Digital art on Procreate by Aakanksha Komanduri.



DNA Barcode based species delineation within Freshwater Garfish *Xenentodon cancila* (Hamilton, 1822) (Beloniformes: Belontiidae) reveals the existence of multiple lineages under single nominal taxon

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Abstract: The present correspondence provides the first DNA barcode-based evidence of multiple evolutionary lineages within the freshwater garfish *Xenentodon cancila* across South Asia. Taxonomically validated specimens from the Ujani Reservoir, Maharashtra, India, were analyzed with 77 publicly available mt COI sequences. Phylogenetic and species delimitation analyses revealed seven distinct clades within *Xenentodon*, substantially exceeding the currently recognized two species. The Ujani population formed a strongly supported monophyletic cluster with sequences from India, Bangladesh, and Korea, corresponding closely to the nominal *X. cancila*. Other geographically structured lineages from southern, northeastern, and central India, exhibit deep genetic divergence, indicating potential undescribed taxa. These findings highlight persistent taxonomic gaps within *Xenentodon* and emphasize the need for integrative revision combining molecular and morphological datasets.

Keywords: Cryptic diversity, freshwater biodiversity, garfish, integrative taxonomy, morphological datasets, phylogeny, polyphyletic, Ujani Reservoir.

सदर संशोधन हे दक्षिण आशियातील गोड्या पाण्यातील कुत्रा किंवा टोकली मासा म्हणून ओळखल्या जाणाऱ्या माशामध्ये असलेल्या अनेक उत्क्रांतीवादी वंशांचा पहिला डीएनए बारकोड-आधारित पुरावा सादर करते. महाराष्ट्रातील उजनी जलाशयातून गोळा केलेल्या आणि वर्गीकरणदृष्ट्या प्रमाणित केलेल्या नमुन्यांचे, सार्वजनिकरित्या उपलब्ध असलेल्या ७७ मायटोकॉन्ड्रियल COI जनुकिय क्रमांसांबत विश्लेषण करण्यात आले. वंशवृक्षीय आणि प्रजाती सीमांकन विश्लेषणातून या माशामध्ये मध्ये सात स्वतंत्र वंशसमूह आढळून आले, जे सध्या दोन मान्यताप्राप्त प्रजातींमध्ये विभागले गेले आहेत. उजनी जलाशयातील प्रजाती ही भारत, बांगलादेश आणि कोरिया येथील प्रजातींशी एक वंशीय समूह तयार करते, जी मुळ प्रजातीशी संबंधित आहे. दक्षिण, ईशान्य आणि मध्य भारतातील इतर भौगोलिकदृष्ट्या संरचित अंश गटामध्ये खोल अनुवंशिक भिन्नता दिसून येते, जे संभाव्य नव्या अज्ञात प्रजाती असल्याचे संकेत देते. कुत्रा/टोकली माशांच्या प्रजातीमधील हे संशोधन वर्गीकरणविषयक उणिवांवर प्रकाश टाकते आणि जातिवृत्तविज्ञान तसेच आकारशास्त्रीय माहितीसंच एकत्रित करून सर्वसमावेशक पुनरावलोकनाची गरज अधोरेखित करते.

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Author contributions: RM and JS designed the experiment. RM conducted the practical work. AS and KPD collected and analyzed the molecular data. RM, AS, and KPD contributed to manuscript writing. All authors have read and approved the final manuscript.

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INTRODUCTION

DNA barcoding is a widely used molecular tool, enabling rapid species identification and discovery of cryptic diversity in fishes (Hajibabaei et al. 2007; Stein et al. 2014; Rahman et al. 2019). Although extensive DNA barcode datasets are available through global repositories such as BOLD (Ratnasingham & Hebert 2007) and GenBank, significant geographic gaps persist across Asia, resulting in taxonomic uncertainties in many Indian fish species.

The family Belontiidae (order Belontiiformes) comprises 47 species in 10 genera (Fricke et al. 2018). Among them, the southern and southeastern Asia endemic genus *Xenentodon* includes two recognized species, *Xenentodon cancila* (Hamilton, 1822) and *X. canciloides* (Bleeker, 1854). *X. cancila*, originally described from the Ganga River, India, is widely distributed in India, Bangladesh, Cambodia, Malaysia, Nepal, Sri Lanka, Bhutan, Laos, Myanmar, Pakistan, Vietnam, Hawaii, Hong Kong, Indonesia, and Thailand (Hossain et al. 2013), while *X. canciloides* is restricted to Cambodia, Indonesia, Laos, Thailand, and Vietnam (Froese and Pauly 2026).

The freshwater garfish *X. cancila* is an economically important fish in southern Asia and is widely traded in regional fisheries (Islam & Dutta 2018). Despite its broad distribution range and commercial significance, molecular studies have been limited and geographically fragmented (Thapliyal et al. 2013; Khedkar et al. 2014; Patil et al. 2018), resulting in its poorly resolved genetic identity. Against this backdrop, the present study examines the genetic identity of morphologically verified *X. cancila* specimens from Ujani Reservoir, Maharashtra, India, using mitochondrial Cytochrome C Oxidase subunit 1 (mt COI) barcodes to assess species monophyly of *X. cancila* through single-gene-

based phylogenetic analysis. The phylogenetic pattern recovered are discussed and ascertained through ASAP species-delimitation analysis to delineate the potential existence of cryptic species within *Xenentodon*.

MATERIALS AND METHODS

Specimens were collected and studied from the Ujani Reservoir, Maharashtra, India, during 2018–2021. The Identity of the specimens as *Xenentodon cancila* was confirmed by a taxonomic expert at the Zoological Survey of India. The studied specimens were deposited in the Zoology Museum, Modern College, Pune, and the Arts, Science and Commerce College, Indapur (ICASC/ZOO/105–106/2021–22). Fresh specimens were photographed (Image 1) before DNA-barcoding studies. Genomic DNA was extracted from white muscle or fin clips using the DNeasy Blood & Tissue Kit (Qiagen), following the manufacturer's protocol. DNA quality was assessed using a Qubit 2.0 fluorometer, and samples above 50 ng were amplified with universal mitochondrial Cytochrome C Oxidase subunit 1 (mt COI) primers. PCR was performed in a 25 µL reaction volume under the following thermal-cycling conditions: 95 °C for three min; 35 cycles of 95 °C for 30 s, 50 °C for 30 s, 72 °C for 45 s; final extension at 72 °C for three min (Patil et al. 2018). Amplified ~700 bp COI fragments were bidirectionally sequenced at Barcode Biosciences, Bengaluru, India. Raw sequence files were manually checked for quality to be used for further analysis. Additionally, 77 sequences of Belontiidae were downloaded from GenBank, cleaned, and aligned in MEGA X (Kumar et al. 2018). Maximum-Likelihood (ML) analysis was performed with 83 sequences (Table 1) in the IQ-TREE v1.6.12 web server (Trifinopoulos et al. 2016), with 1,000 ultrafast



Image 1. Lateral view of *Xenentodon cancila* from Ujani River, Maharashtra, India. © Ranjit More.

bootstraps under the GTR+F+I+G4 model selected by Bayesian information criterion (BIC). The obtained tree was visualized in FigTree v1.4. The same dataset was subjected to species-delimitation analysis using the Assemble Species by Automatic Partitioning (ASAP) method (Puillandre et al. 2021). Sequences from this study were submitted to GenBank under accessions OM865416–OM865419.

RESULTS AND DISCUSSION

The mt COI phylogenetic analysis of Belonidae revealed multiple lineages within *Xenentodon*, although with low bootstrap support indicating polyphyly of the genus (Image 2). However, *X. cancila* sequence from the Ujani Reservoir formed monophyletic clade with sequences from India, Bangladesh, and Korea. Overall,

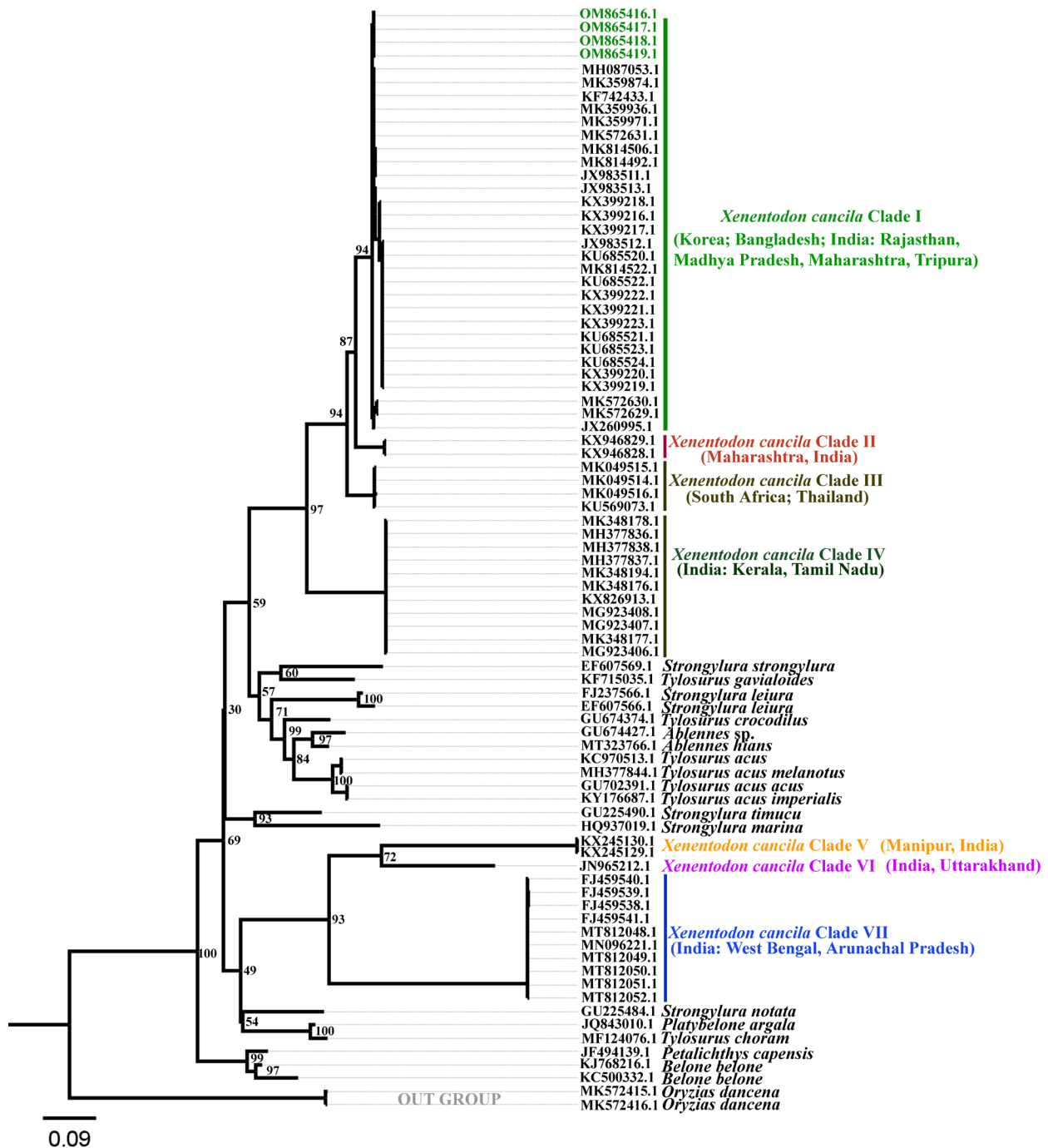


Image 2. Maximum likelihood analysis of Belonidae using 600 bps partial fragment of mitochondrial COI gene data.

Table 1. Sequences details of 600 bps fragment of mt COI gene data used in maximum likelihood IQ tree construction.

	Accessions	Name in GenBank	Locality as per GenBank	References
1	OM865416.1	<i>Xenentodon cancila</i>	Ujani reservoir, Maharashtra, India	This study
2	OM865417.1	<i>X. cancila</i>	Ujani reservoir, Maharashtra, India	This study
3	OM865418.1	<i>X. cancila</i>	Ujani reservoir, Maharashtra, India	This study
4	OM865419.1	<i>X. cancila</i>	Ujani reservoir, Maharashtra, India	This study
5	MH087053.1	<i>X. cancila</i>	Bangladesh	Unpublished
6	MK359874.1	<i>X. cancila</i>	Korea	Unpublished
7	KF742433.1	<i>X. cancila</i>	Maharashtra, India	Unpublished
8	MK359936.1	<i>X. cancila</i>	Korea	Unpublished
9	MK359971.1	<i>X. cancila</i>	Korea	Unpublished
10	MK572631.1	<i>X. cancila</i>	Moulvibazar, Sylhet, Bangladesh	Rahman et al. 2019
11	MK814506.1	<i>X. cancila</i>	Rajasthan, India	Unpublished
12	MK814492.1	<i>X. cancila</i>	Rajasthan, India	Unpublished
13	JX983511.1	<i>X. cancila</i>	Narmada river, Dindori, MP, India	Khedkar et al. 2014
14	JX983513.1	<i>X. cancila</i>	Narmada river, Dindori, MP, India	Khedkar et al. 2014
15	KX399218.1	<i>X. cancila</i>	Tripura, India	Unpublished
16	KX399217.1	<i>X. cancila</i>	Tripura, India	Unpublished
17	KX399216.1	<i>X. cancila</i>	Tripura, India	Unpublished
18	JX983512.1	<i>X. cancila</i>	Narmada river, Dindori, MP, India	Khedkar et al. 2014
19	KU685520.1	<i>X. cancila</i>	Tripura, India	Unpublished
20	MK814522.1	<i>X. cancila</i>	Rajasthan, India	Unpublished
21	KX399222.1	<i>X. cancila</i>	Tripura, India	Unpublished
22	KU685522.1	<i>X. cancila</i>	Tripura, India	Unpublished
23	KX399223.1	<i>X. cancila</i>	Tripura, India	Unpublished
24	KX399221.1	<i>X. cancila</i>	Tripura, India	Unpublished
25	KU685524.1	<i>X. cancila</i>	Tripura, India	Unpublished
26	KX399220.1	<i>X. cancila</i>	Tripura, India	Unpublished
27	KX399219.1	<i>X. cancila</i>	Tripura, India	Unpublished
28	KU685521.1	<i>X. cancila</i>	Tripura, India	Unpublished
29	KU685523.1	<i>X. cancila</i>	Tripura, India	Unpublished
30	JX260995.1	<i>X. cancila</i>	Maharashtra, India	Unpublished
31	MK572630.1	<i>X. cancila</i>	Bangladesh	Rahman et al. 2019
32	MK572629.1	<i>X. cancila</i>	Bangladesh	Rahman et al. 2019
33	KX946829.1	<i>X. cancila</i>	Maharashtra, India	Patil et al. 2018
34	KX946828.1	<i>X. cancila</i>	Maharashtra, India	Patil et al. 2018
35	MK049515.1	<i>X. cancila</i>	Thailand	Panprommin et al. 2019
36	MK049514.1	<i>X. cancila</i>	Thailand	Panprommin et al. 2019
37	MK049516.1	<i>X. cancila</i>	Thailand	Panprommin et al. 2019
38	KU569073.1	<i>Xenentodon sp.</i>	South Africa	Unpublished
39	MK348178.1	<i>X. cancila</i>	Ashtamudi lake, Kerala, India	Unpublished
40	MH377838.1	<i>X. cancila</i>	Kerala, India	Unpublished
41	MH377837.1	<i>X. cancila</i>	Kerala, India	Unpublished
42	MH377836.1	<i>X. cancila</i>	Kerala, India	Unpublished
43	MK348194.1	<i>X. cancila</i>	Ashtamudi lake, Kerala, India	Unpublished
44	MK348176.1	<i>X. cancila</i>	Ashtamudi lake, Kerala, India	Unpublished
45	KX826913.1	<i>X. cancila</i>	Tamil Nadu, India	Unpublished
46	MG923408.1	<i>X. cancila</i>	Vembanad Lake, Kerala, India	Unpublished
47	MG923407.1	<i>X. cancila</i>	Vembanad Lake, Kerala, India	Unpublished
48	MK348177.1	<i>X. cancila</i>	Ashtamudi lake, Kerala, India	Unpublished
49	MG923406.1	<i>X. cancila</i>	Vembanad Lake, Kerala, India	Unpublished
50	EF607569.1	<i>S. strongylura</i>	China	Unpublished
51	KF715035.1	<i>Tylosurus gaviaoides</i>	Philippines	Unpublished
52	EF607566.1	<i>Strongylura leiura</i>	China	Zhang 2011
53	FJ237566.1	<i>Strongylura leiura</i>	India	Lakra et al. 2011
54	GU674374.1	<i>Tylosurus crocodilus</i>	Indonesia	Unpublished
55	GU674427.1	<i>Ablennes sp.</i>	Indonesia	Unpublished
56	MT323766.1	<i>Ablennes hians</i>	Gulf of Mexico	Unpublished
57	KC970513.1	<i>Tylosurus acus</i>	Philippines	Unpublished
58	MH377844.1	<i>Tylosurus acus melanotus</i>	India	Unpublished
59	GU702391.1	<i>Tylosurus acus acus</i>	Brazil	Unpublished
60	KY176687.1	<i>Tylosurus acus imperialis</i>	Turkey	Unpublished
61	GU225490.1	<i>Strongylura timucu</i>	Mexico	Unpublished
62	HQ937019.1	<i>Strongylura marina</i>	USA	April et al. 2011
63	KX245130.1	<i>X. cancila</i>	India	Unpublished
64	KX245129.1	<i>X. cancila</i>	India	Unpublished
65	JN965212.1	<i>X. cancila</i>	Dehradun, India	Thapliyal et al. 2013
66	FJ459540.1	<i>X. cancila</i>	India	Unpublished
67	FJ459539.1	<i>X. cancila</i>	India	Unpublished
68	FJ459538.1	<i>X. cancila</i>	India	Unpublished
69	FJ459541.1	<i>X. cancila</i>	India	Unpublished
70	MT812048.1	<i>X. cancila</i>	Arunachal Pradesh, India	Unpublished
71	MN096221.1	<i>X. cancila</i>	West Bengal, India	Unpublished

	Accessions	Name in GenBank	Locality as per GenBank	References
72	MT812049.1	<i>X. cancila</i>	Arunachal Pradesh, India	Unpublished
73	MT812050.1	<i>X. cancila</i>	Arunachal Pradesh, India	Unpublished
74	MT812052.1	<i>X. cancila</i>	Arunachal Pradesh, India	Unpublished
75	MT812051.1	<i>X. cancila</i>	Arunachal Pradesh, India	Unpublished
76	GU225484.1	<i>Strongylura notata</i>	Mexico	Unpublished
77	JQ843010.1	<i>Platybelone argala</i>	Trinidad and Tobago	Weigt et al. 2012
78	MF124076.1	<i>Tylosurus choram</i>	Israel	Unpublished
79	JF494139.1	<i>Petalichthys capensis</i>	South Africa	Unpublished
80	KJ768216.1	<i>Belone belone</i>	Portugal	Landi et al. 2011
81	KC500332.1	<i>Belone belone</i>	Turkey	Keskin & Atar 2014
82	MK572415.1	<i>Oryzias dancena</i>	Bangladesh	Rahman et al. 2019
83	MK572416.1	<i>Oryzias dancena</i>	Bangladesh	Rahman et al. 2019

seven distinct clades were recovered, far beyond the two currently recognized *Xenentodon* species. Species delimitation using ASAP (Image 3) corroborated the phylogenetic pattern, supporting the existence of multiple independently evolving lineages.

Although mt COI inference has limited utility for resolving deeper phylogenetic relationships, it remains valuable marker for detecting lineage diversity and identifying taxonomic hypotheses for further taxonomic revisions (Kalawate et al. 2022). Notably, most publicly available *Xenentodon* sequences are from India but lack associated voucher-specimen data, limiting taxonomic assignment with confidence.

Type locality of *X. cancila* is the Ganga River, India (Hamilton 1822), whereas that of *X. canciloides* is the Kapuas River, Indonesia (Bleeker 1854) (Image 4). Considering the proximity of sequences origin location and respective type localities tentatively Clade I can be assigned to *X. cancila* (sequences from

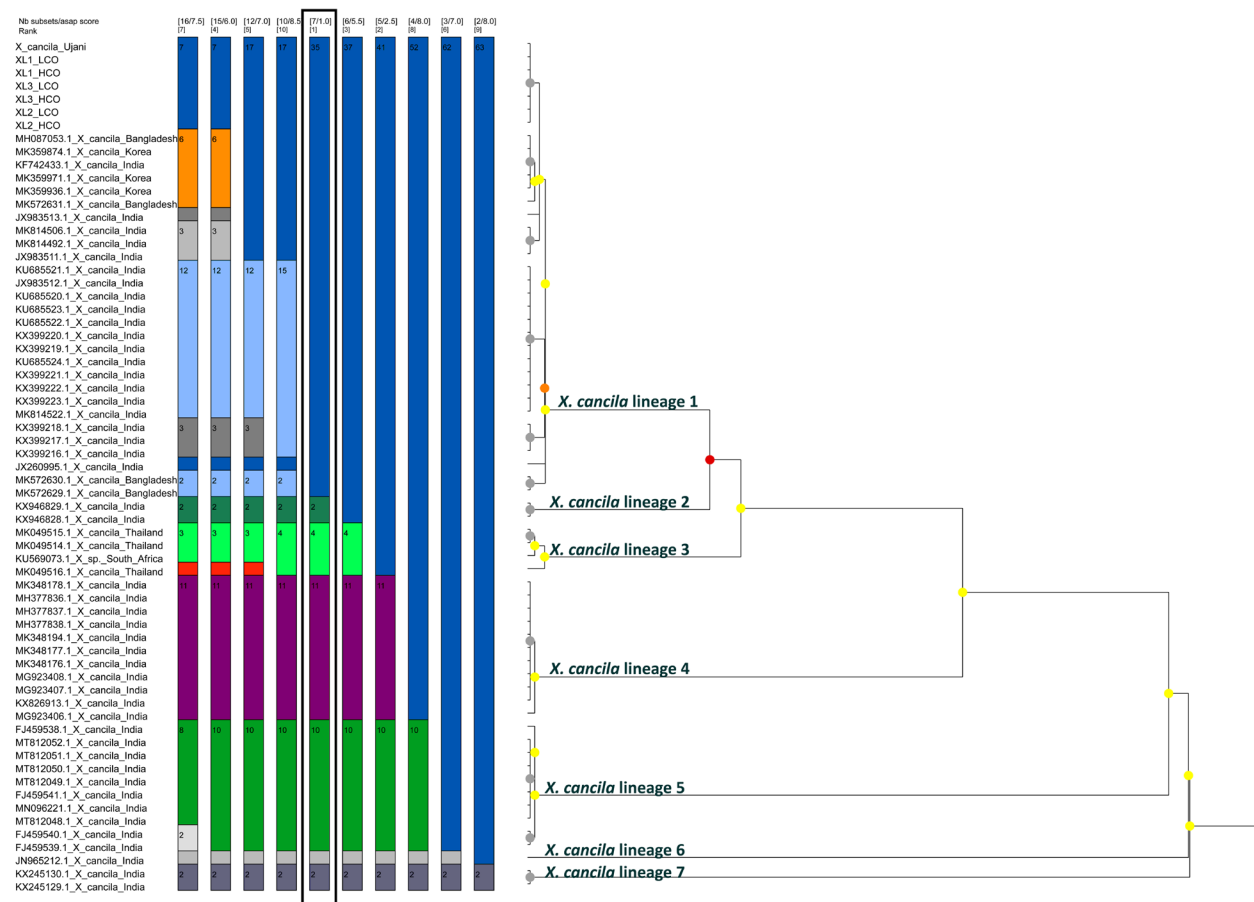


Image 3. Species delimitation analysis of *Xenentodon cancila* sequences using ASAP method with best partition marked in black (Number of subsets: 7, ASAP score 1).



Image 4. Type locality map for the two species of *Xenentodon* in India and Thailand to their closest region based on available original description.

India and Bangladesh) (Images 2 & 3) and Clade III to *X. canciloides* (sequences from Thailand) tentatively (Images 2 & 3). The Remaining lineages corresponding to Clade II (from Maharashtra, India), Clade IV (from Kerala and Tamil Nadu, India), Clade V (from Manipur, India), Clade VI (from Uttarakhand, India), and Clade VII (from Arunachal Pradesh, West Bengal, India) (Images 2 & 3) likely represent undescribed species, warranting 'Integrative Taxonomic Studies' with broader sampling from respective localities and taxonomic revision of the group.

CONCLUSION

The genetic heterogeneity among populations suggests that current knowledge of species distribution and diversity is far from complete. This brings into attention multiple lineages and the need to revisit and re-evaluate riverine and watershed-based biogeographic patterns of *Xenentodon* species across southern Asia,

primarily in India and Bangladesh, to better understand the diversity, distribution, evolutionary relationships, and ecology.

Data availability statement

All relevant data supporting the findings of this study are included within the manuscript. No additional datasets were generated or analyzed during the current study.

REFERENCES

- April, J. et al. (2011). Genetic calibration of species diversity among North America's freshwater fishes. *Proceedings of the National Academy of Sciences* 108(26): 10602–10607. <https://doi.org/10.1073/pnas.1016437108>
- Bleeker, P. (1854). Vijfde bijdrage tot de kennis der ichthyologische fauna van Celebes. *Natuurkundig Tijdschrift voor Nederlandsch Indië* 7: 225–260.
- Fricke, R. et al. (2018). *Catalog of fishes: genera, species, references*. California Academy of Sciences, San Francisco, CA, USA. <http://researcharchive.calacademy.org/research/ichthyology/catalog/fishcatmain.asp>. Accessed on 16.x.2025.

- Froese, R. & D. Pauly (eds.) (2026). FishBase. www.fishbase.org. Accessed in vi.2026.
- Hamilton, F. (1822). An account of the fishes found in the river Ganges and its branches, Vol. 1. Archibald Constable, Edinburgh.
- Hajibabaei, M. et al. (2007). DNA barcoding: how it complements taxonomy, molecular phylogenetics and population genetics. *Trends in Genetics* 23(4): 167–172. <https://doi.org/10.1016/j.tig.2007.02.001>
- Hossain, M.Y. et al. (2013). Life-history traits of the freshwater garfish *Xenentodon cancila* (Hamilton, 1822) (Belontiidae) in the Ganges River, northwestern Bangladesh. *Sains Malaysiana* 42(9): 1207–1218. <https://www.semanticscholar.org/paper/Life-history-traits-of-the-freshwater-garfish-1822-Hossain-Jewel/af3b257c2386728d31c58e912dd307a34ed91698>
- Islam, M.S. & P. Dutta (2018). Food, feeding habit and reproductive biology of freshwater garfish (*Xenentodon cancila*) from south-western Bangladesh: implications to fishery management. *Journal of Fisheries and Life Sciences* 3(2): 26–33.
- Jayaram K.C. (1999). The freshwater fishes of the Indian region. Narendra Publishing House, Delhi, 551 pp.
- Kalawate, A.S. et al. (2022). Morphological characterization and mt DNA barcode of a tiger moth species, *Asota ficus* (Fabricius, 1775) (Lepidoptera: Noctuoidea: Erebiidae: Aganainae) from India. *Journal of Threatened Taxa* 14(1): 20503–20510. <https://doi.org/10.11609/jott.7638.14.1.20503-20510>
- Keskin, E. & H.H. Atar (2013). DNA barcoding commercially important fish species of Turkey. *Molecular Ecology Resources* 13(5): 788–797. <https://doi.org/10.1111/1755-0998.12120>
- Khedkar, G.D. et al. (2014). DNA barcodes for the fishes of the Narmada, one of India's longest rivers. *PLoS ONE* 9(7): e101460. <https://doi.org/10.1371/journal.pone.0101460>
- Kumar, S. et al. (2018). MEGA X: molecular evolutionary genetics analysis across computing platforms. *Molecular Biology and Evolution* 35(6): 1547–1549. <https://doi.org/10.1093/molbev/msy096>
- Lakra, W.S. et al. (2011). DNA barcoding Indian marine fishes. *Molecular Ecology Resources* 11(1): 60–71. <https://doi.org/10.1111/j.1755-0998.2010.02894.x>
- Landi, M. et al. (2014). DNA barcoding for species assignment: the case of Mediterranean marine fishes. *PLoS ONE* 9(9): e106135. <https://doi.org/10.1371/journal.pone.0106135>
- Panprommin, D. et al. (2019). DNA barcodes for the identification of species diversity in fish from Kwan Phayao, Thailand. *Journal of Asia-Pacific Biodiversity* 12(3): 382–389. <https://doi.org/10.1016/j.japb.2019.05.003>
- Patil, T.S. et al. (2018). DNA barcode based delineation of freshwater fishes from northern Western Ghats of India, one of the world's biodiversity hotspots. *Biodiversity and Conservation* 27(13): 3349–3371. <https://doi.org/10.1007/s10531-018-1604-0>
- Puillandre, N. et al. (2021). ASAP: assemble species by automatic partitioning. *Molecular Ecology Resources* 21(2): 609–620. <https://doi.org/10.1111/1755-0998.13281>
- Rahman, M.M. et al. (2019). Building a DNA barcode library for the freshwater fishes of Bangladesh. *Scientific Reports* 9: 9382. <https://doi.org/10.1038/s41598-020-58810-0>
- Ratnasingham, S. & P.D.N. Hebert (2007). BOLD: The Barcode of Life Data System. *Molecular Ecology Notes* 7(3): 355–364. <https://doi.org/10.1111/j.1471-8286.2007.01678.x>
- Stein, E.D. et al. (2014). Is DNA barcoding actually cheaper and faster than traditional morphological methods: results from a survey of freshwater bioassessment efforts in the United States? *PLoS ONE* 9(4): e95525. <https://doi.org/10.1371/journal.pone.0095525>
- Thapliyal, M. et al. (2013). DNA barcoding of fishes from River Song, Dehradun, Uttarakhand using mitochondrial cytochrome-c Oxidase-I gene. *Environment Conservation Journal* 14(3): 113–121. <https://doi.org/10.36953/ECJ.2013.14320>
- Trifinopoulos, J. et al. (2016). W-IQ-TREE: a fast online phylogenetic tool for maximum likelihood analysis. *Nucleic Acids Research* 44: W232–W235. <https://doi.org/10.1093/nar/gkw256>
- Weigt, L.A. et al. (2012). Using DNA barcoding to assess Caribbean reef fish biodiversity: expanding taxonomic and geographic coverage. *PLoS ONE* 7(7): e41059. <https://doi.org/10.1371/journal.pone.0041059>
- Zhang, J. (2011). Species identification of marine fishes in China with DNA barcoding. *Evidence-Based Complementary and Alternative Medicine* 2011: 978253. <https://doi.org/10.1155/2011/978253>



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– P.M. Osman Javid & Sajad H. Parey, Pp. 29776–29780

Notes

Striped Hyena *Hyaena hyaena* (Linnaeus, 1758) carrying a carcass of a Rusty-spotted Cat *Prionailurus rubiginosus* (I. Geoffroy Saint-Hilaire, 1831) in Rajasthan, India
– Akshay Jain, Debashish Panda, Rajasekar Rajaraman, Sanjeev Sharma, Sugna Ram Jat & Kamlesh K. Maurya, Pp. 29781–29783

Toil in the soil: putative nest excavation by an adult female Panther Chameleon *Furcifer pardalis* (Cuvier, 1829) in moist, clayey soil on Nosy Komba, Madagascar
– Hinrich Kaiser & Przemysław Zdunek, Pp. 29784–29786

***Amomum pauciflorum* Baker (Zingiberaceae), an addition to the flora of Manipur, India**
– Lolia Hepuni, Adani Lokho & A.A. Mao, Pp. 29787–29790

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Threatened Taxa