

Scientists studying dolphins find Bay of Bengal a realm of evolutionary change

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An Indo-Pacific bottlenose dolphin calf surfacing next to its mother in the Bay of Bengal. Credit: Rubaiyat Mowgli Mansur/WCS-Bangladesh.

Marine scientists have discovered that two species of dolphin in the waters off Bangladesh are genetically distinct from those in other regions of the Indian and western Pacific Oceans, a finding that supports a growing body of evidence that the Bay of Bengal harbors conditions that drive the evolution of new life forms, according to a new study by the American Museum of Natural History (AMNH), WCS (Wildlife Conservation Society), and the cE3c - Centre for Ecology, Evolution and Environmental Changes (Universidade de Lisboa).



In the comparative study using DNA collected from both Indo-Pacific humpback dolphins (*Sousa chinensis*) and Indo-Pacific bottlenose dolphins (*Tursiops aduncus*) and data from previous genetic studies, the authors of a newly published paper in *Conservation Genetics* have found that both populations of both species are distinct from populations in other parts of the Indian Ocean and western Pacific. This discovery follows the recent

description of a possible new species of "river shark" in the same waters.

The authors of the study titled "Oceanic drivers of population differentiation in Indo-Pacific bottlenose (*Tursiops aduncus*) and humpback (*Sousa* spp.) dolphins of the northern Bay of Bengal" are: Dr. Ana R. Amaral of cE3c, Universidade de Lisboa, Portugal and AMNH's Sackler Institute of Comparative Genomics; Brian D. Smith and Rubaiyat M. Mansur of WCS; and Dr. Howard C. Rosenbaum of WCS and affiliated with AMNH.

"Our findings indicate that there is a connection between the presence of these distinct populations of dolphins and the unique oceanic habitat that is found in the Bay of Bengal," said Amaral, the lead author of the study. "The

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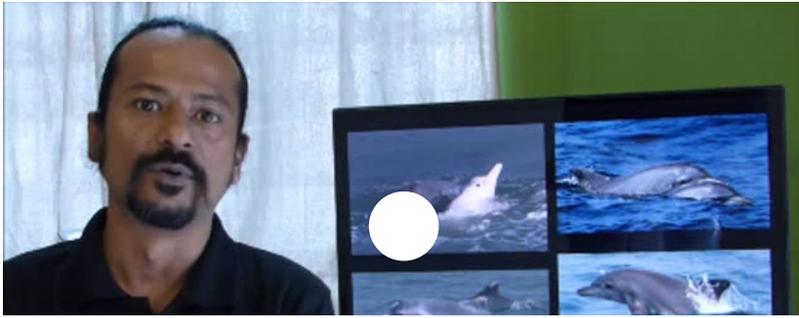
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combination of a biologically rich yet isolated seascape could be driving speciation, or the emergence of new species."



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Rubaiyat Mansur, principal researcher of WCS's Bangladesh Program, discusses the results of a study of dolphin species in the Bay of Bengal. Credit: WCS.

Located in the northern Indian Ocean, the Bay of Bengal receives vast amounts of freshwater and organic matter from the Meghna, Brahmaputra, and Ganges Rivers; the confluence also supports the world's largest mangrove forest. In deeper waters, a submarine canyon called the Swatch-of-No-Ground (SoNG) recycles nutrients through upwelling, all of which creates a biologically productive coastal region with a complex interchange of currents that creates conditions for species to become isolated from other parts of the Indian Ocean.

During the study, researchers collected skin samples from 32 coastal Indo-Pacific and humpback dolphins. Genetic sequences were then extracted from the samples for comparison with previously published sequences for both species. The researchers found both dolphins to be genetically discrete from nearby populations, a tantalizing result that the authors say merits further investigation.

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"The discovery of genetically distinct dolphin populations helps us to expand the body of knowledge of how these dolphin species have changed over time," said Howard Rosenbaum, Director of WCS's Ocean Giants Program who added that "these results have significant implications for identifying unique marine mammal populations, which in turn have important conservation implications for safeguarding the long-term biodiversity in this region."

"This is great news for Bangladesh," said Rubaiyat Mansur, Principal Researcher for WCS's Bangladesh Program. "Despite the challenges of wildlife conservation in our country, we take great pride in protecting our wildlife as evidenced by the recent declaration of Bangladesh's first marine protected area in the Swatch-of-No-Ground submarine canyon and adjacent estuarine waters."

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An adult humpback dolphin displays its characteristic pink coloration. Credit: Rubaiyat Mowgli Mansur/WCS-Bangladesh.

The Indo-Pacific bottlenose dolphin that ranges between the Indian and western Pacific Oceans is a smaller version of the better-known common bottlenose dolphin (*Tursiops truncatus*). The waters of the Bay of Bengal's SoNG canyon are home to one of the world's largest populations of Indo-Pacific bottlenose dolphins.

Humpback dolphins in particular have been a topic of much debate among taxonomists due to the variations in appearance and genetics of animals that inhabit coastal waters from western Africa to the western Pacific. The genus *Sousa* now contains four species, one of which—the Australian humpback dolphin (*Sousa sahalensis*)—was recently designated as a separate species after a number of comparative studies combining morphology and genetic markers.

While the humpback dolphins in the Bay of Bengal are currently considered as a population of Indo-Pacific humpback dolphins (*Sousa chinensis*), the population occurs right in between the known ranges of the Indo-Pacific species and the Indian Ocean humpback dolphin (*Sousa plumbea*). This study's comparison of mitochondrial DNA across populations reveals a closer connection between the Bay of Bengal's humpback dolphins and the more distantly located Australian humpback dolphin.

Both dolphin species are threatened by entanglement and death in gill nets; many of the individual dolphins photographed by researchers bear the scars of fishing gear entanglement while these are only the ones that escaped.

"The results of this study raise important questions about the exact conservation status of these small cetaceans of the Bay of Bengal," said Brian Smith, a co-author on the study and Director of WCS's Asian Freshwater and Coastal Cetacean Program. "Our findings highlight areas for further inquiry as well as the importance of protecting these marine mammals from the threat of fishing entanglement."

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More information: Ana R. Amaral et al, Oceanographic drivers of population differentiation in Indo-Pacific bottlenose (*Tursiops aduncus*) and humpback (*Sousa* spp.) dolphins of the northern Bay of Bengal, *Conservation Genetics* (2016). DOI: [10.1007/s10592-016-0913-7](https://doi.org/10.1007/s10592-016-0913-7)

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