Journal of Ecosystem & Ecography
ISSN: 2157-7625
Bremer, J Ecosys Ecograph 2023, 13:3
Short Communication Open Access

Water bird DNA Barcoding: A Significant Variable to Environmental Conservation Biology

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Abstract

One of the mitochondrial genes, cytochrome c oxidase I (COI), is a highly effective marker for DNA barcoding of many organisms. Using the Gene Elute DNA miniprep Kit, the COI was isolated from twelve distinct species of waterbirds. By creating a phylogenetic tree using the programme MEGA-X, the relationship between the waterbird species was evaluated. The phylogenetic tree's dendrogram revealed two main branches, with the remaining five species aligning with two subgroups based on their identical COI sequences, and the seven species of water birds aligning one group with four subgroups.

Keywords: DNA; Conservation biology; Phylogenetic

Introduction

Taxonomists typically identify avian species based on their field characteristics and behaviour, but DNA barcoding techniques have revealed different species in numerous masked and related morphological taxa (Hebert et al., 2004). Nonetheless, due to a global decline in avian taxonomy competence among zoologists, millions of species remain to be documented and classified. Taxonomists who are tasked with creating inventories and management recommendations for the enormous and changing biodiversity of the earth have access to the practical and cutting-edge instrument of DNA barcoding [1, 2].

Methods

Accumulation of organs from birds

Five distinct wetlands were used to gather the 5-10 g of tissue samples from the dead carcasses of the twelve species of water birds during fieldwork. The Cattle egret (Bulbulcus ibis), Grey heron (Ardea cinersea), and Purple heron (Ardea purpurea), as well as the Little egret (Egretta garzetta) and Phesant-tailed Jacana (Hydrophasianus chirurgus), were all collected from the Veeranam lake in the Cuddalore District (11°19′17.8″. The White-breasted waterhen (Amaurornis phoenicurus), Black-crowned night heron (Nycticorax nycticorax), and little grebe (Tachybaptus ruficollis) were captured at the Periya Kulam lake (10°47′44.8″N 78°46′36.0″E), Thiruvanmiyur, Trichirappalli District, Tamil Nadu, India [3, 4].

DNA extraction and COI gene PCR amplification

Using a kit called the Gene Elute DNA miniprep Kit, the COI gene was extracted from a small quantity of bird tissues. DNA was extracted in accordance with the manufacturer's instructions (Hebert et al., 2004). For additional analysis, the tissue samples were put into 10 l of distilled water. The following forward and reverse primers were used to amp up COI from the tissues at a region of 749 bp close to the 59 termini (Forward-TTCTCCAACCACAAAGACATTGGCAC and Reverse-ACGTGGGAGATAATTCCAAATCCTG). After that, a PCR reaction of 50 l was created using 40 l of double-distilled water, 1 l of Taq polymerase, 2.5 l of MgCl2 [5,6].

Discussion

Yet, traditionally, the genetic variances or heredities among the species were determined by utilising their ecological, morphological and behavioural data but recently are changed and reoriented by employing diverse data with a wide range of outcomes with varied interpretations. Animals that coexist in the same ecological areas, for example, have a higher chance of mating and giving rise to a new genetic group, where the closely related animals may exhibit similar phenotypic and behaviour [7,8].

Conclusion

Overall, the results of this work suggest that DNA barcoding with a COI strategy may identify known waterbird species with excellent resolution. In order to properly understand India's endemic birds about their genetic origin and their evolutionary links for better management and conservation, a thorough study with a large collection of samples covering multiple order and family levels should be conducted in the future [9,10].

Acknowledgment

The Researchers Supporting Project Number (RSP 2021/48), King Saud University, Riyadh, Saudi Arabia, is acknowledged with sincere gratitude by the authors.

Declaration of Competing Interest

The authors affirm that they have no known financial or interpersonal conflicts that would have appeared to have an impact on the research presented in this study.

References

1. Asefa A, Girma M, Tolera S, Yosef M (2019) Local and Landscape-Level Effects of Land Use Change on Bird Diversity in Abiata-Shalla Lakes National Park, Ethiopia. Afr J Ecol 57: 51-58.
2. Ayenew (2002) Recent Changes in the Level of Lake Abiyata, Central Main Ethiopian Rift. Hydrol Sci J 47: 493-503.
3. Balliett JF (2011) Wetlands: Environmental Issues, Global Perspectives. Angewandte Chemie International Edition 6: 951-952.

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Received: 03-Mar-2023, Manuscript No: jee-23-91157; **Editor assigned:** 06-Mar-2023, Pre-QC No: jee-23-91157 (PQ); **Reviewed:** 20-Mar-2023, QC No: jee-23-91157; **Revised:** 22-Mar-2023, Manuscript No: jee-23-91157 (R); **Published:** 29-Mar-2023, DOI: 10.4172/2157-7625.1000383

Citation: Bremer J (2023) Water bird DNA Barcoding: A Significant Variable to Environmental Conservation Biology. J Ecosys Ecograph 13: 383.

4. Bekele F, Estifanos S (2018) Challenges to National Park Conservation and Management in Ethiopia. J Agric Sci 10: 52-62.

5. Bhatta LD, Sunita CH, Anju P, Himlal B, Partha JD, et al. (2016) Ecosystem Service Changes and Livelihood Impacts in the Maguri-Motapung Wetlands of Assam, India. Land 5: 15.

6. Intergovernmental Panel on Climate Change (2007) Climate Change: Impacts, Adaptation and Vulnerability. Cambridge University Press, New York.

7. Dechasa F, Feyera S, Dawit D (2019) Determinants of Household Wetland Resources Use and Management Behavior in the Central Rift Valley of Ethiopia. Environ Sustain 2: 355-368.

8. Deka S, Om PT, Ashish P (2019) Perception-Based Assessment of Ecosystem Services of Ghagra Pahar Forest of Assam, Northeast India. Geol Ecol Landsc 3: 197-209.

9. Elias E, Weldemariam S, Bereket T, Wondwosen G (2019) Impact of Land Use/ Cover Changes on Lake Ecosystem of Ethiopia Central Rift Valley. Cogent Food Agric 5.

10. Liang Y, Sarkany N, Cui Y (2009) Biomass and lipid productivities of *Chlorella vulgaris* under autotrophic, heterotrophic and mixotrophic growth conditions. Biotechnol Lett 31: 1043-1049.