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Monitoring wetland biodiversity in central Sudan with emphasis on the black crowned crane (*Balearica pavonina*) in central Sudan

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Sudan is characterized by various types of natural habitats. Among those the most important habitats are the wetlands, represented mainly by the Nile, its tributaries, inland lakes, seasonal rivers, red sea waters and the network of the irrigation canals in agricultural schemes. Wetland in the Sudan contributes profoundly to the national economy and support life for the local inhabitants. The main objectives of this study are to monitor wetland biodiversity in central Sudan with emphasis on the Black Crowned Crane using remote sensing and GIS. The two techniques are used because of their effectiveness in the coverage of large inaccessible areas easily, beside the possibility for detecting changes by comparing images at different times. Classification of wetlands, detection of ecological changes and economic and social valuation were obtained by the analysis of satellite images coupled by ground surveys. The study revealed remarkable changes in some ecological parameters, mainly, the rainfall, woody and herbaceous plant cover, cultivation and bare areas and the rangelands, beside steady decline in crane population. It concluded that, those ecological changes contributed to the deterioration of the wetlands and shrinkage of the crane geographic range in the Sudan. The study recommended that wetlands in central Sudan need to be rehabilitated and sustainably utilized for the welfare of the local inhabitants and conservation of the wetland and the crane.

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Genetic structure and demographic history among Philippine populations of *Stichopus* cf. *horrens* based on mtDNA CO1 and multilocus microsatellite data

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The increasing global demand for dried sea cucumber products (*beche-de-mer*) coupled with lack of policy regulations to regulate harvesting from natural populations has resulted in decreased capture production across the Philippines. *Stichopus* cf. *horrens* locally known as 'hanginan' is one of the commercially-exploited sea cucumber species needing management intervention which would benefit from the availability of genetic data for delineation of management stocks. Phylogenetic analysis of mitochondrial DNA cytochrome oxidase I (CoI) sequences from *S. cf. horrens* identified two mitochondrial lineages (Clade A and Clade B). Clade A individuals which are more abundant and geographically widespread, were studied to examine demographic history and population genetic structure across the Philippine archipelago. We used partial *CO1* gene sequences and multilocus microsatellite data to investigate historical and contemporary regional scale population structure and gene flow patterns across the archipelago. Analysis of mitochondrial data and microsatellite loci demonstrated significant genetic structure among Clade A individuals ($\Phi ST = 0.37109$, P=0.00; FST=0.0788, P=0.00) and identified seven distinct populations (K=7) which is consistent with the basin isolation hypothesis and pre-identified marine biogeographic regions in the country. Genetic markers also suggest a retained historical structure due to stable demography during the Pleistocene epoch. Despite the high dispersal potential for *S. cf. horrens*, due to long planktonic phase (27-30 days), the presence of unique oceanographic and ecological barriers in the country restricts connectivity in the country. Stock delineation is crucial for the identification of putative management units and conservation of *S. cf. horrens*. This may aid in the formulation of policies for science-based management of fishery resources in the country.

Notes:

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