

Genetic Analysis Reveals Sharks Of Conservation Concern In Tanzanian Fish Markets

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Background

Sharks are an important source of protein and income for coastal communities around the world. However, many populations of sharks have declined drastically due to increasing fishing pressure and overfishing, driven by high demand for shark fins on the global market. Despite all initiatives to protect sharks by various international treaties and the Tanzanian Government, shark populations continue to decline. This is because the protected species are still traded illegally in form of processed shark products, such as meat, oil, and dried fins. Such products lack key morphological diagnostic features to be identified by the law enforcers who rely on morphological identification. This study was conducted to assess to the composition of shark species landed at fish markets in Tanzania

Method

This study was conducted along the Tanzanian coast, specifically in Tanga, Mtwara, Kilwa, Dar es salaam, Nungwi. These sites were selected because the main shark landing sites and markets are in these areas. Fin tissue samples of individual sharks were obtained from landing sites, fish markets, and artisanal processors and stored in 99.9% ethanol for further analysis. Genomic DNA was extracted from the 92 sampled fin tissue by using the Quick-DNA™ Miniprep Plus Kit (Zymo Research Inc., CA, USA) according to the instructions of the manufacturer. The quality of the DNA extracts was checked on a 1% agarose gel. Fragments of the Cytochrome Oxidase Subunit 1 gene (COI) were amplified from the DNA extracts of each sample in a T100™ Thermal cycler machine (Bio-Lab Inc, GA, USA). The quality of each the PCR products were checked on a 1% agarose gels. The successful PCR amplicons were sanger sequenced by Macrogen Europe Lab in the ABI 3730XL. CO Sequence editing and was performed by MEGA ver. 6.0 Software. The taxonomic identity of each shark was revealed by comparing each edited COI sequence with the COI barcode records published in the GenBank nucleotide database, using the Basic Local Alignment Search Tool (BLAST).

Results

From the 92 examined specimens, DNA barcoding identified 23 different shark species. The species with highest abundance were the Whitetip reef shark (*Triaenodon obesus*; 18 %) and scalloped hammerhead shark (*Sphyrna lewini*; 15%). In general, 74 % of the identified specimens are categorised as threatened by the International Union for Conservation of Nature (IUCN) and 45 % are listed in Appendix 2 by the Convention on International Trade in Endangered Species (CITES).

Conclusion

This study revealed shark species of conservation concern in fish markets in Tanzania. This calls for quick and proper fisheries management and conservation measures to maintain shark populations for the benefits of the current and coming generations. The results of this study could be used by the Tanzanian authorities to monitor and track illegal trade in protected shark species.