

on a joint petition filed by Biswajit Mohanty and the Wildlife Protection Society of India seeking review of the environment clearance given to the proposed Dhamra Port Project. The said project had been cleared by the Ministry of Surface Transport under the Coastal Regulation Zone Notification without going for formal clearance to the Ministry of Environment of the Government of India. In an earlier petition the court's attention had been drawn to the lack of implementation of orders passed by the Orissa High Court on 14th May, 1998 regarding directions to the state government to regulate fishing activity by mechanised fishing trawlers for protection of sea turtles off the coast of Orissa.

The petition expressed apprehensions on the impact by the proposed Dhamra Port Project on the habitat and breeding of olive ridley Sea turtles and how migratory and reproductive patches of turtles could be affected. The petitioner further drew attention to the fact that there was reduction of the area of Bhitarkanika National Park from 367 to 145 sq. kms in the final notification by which important ecological sensitive areas were excluded. The EIA report prepared by Kirloskar Consultants, Pune and Aquaculture Foundation of

India, on the port project did not sufficiently take into account the effect on the migration routes and reproductive activities of olive ridley sea turtles. The petition discussed the effect of artificial lighting and also on the movement of large cargo ships ranging from 60,000 DWT to 1,20,000 DWT on turtle activity. The largest nesting ground of sea turtles in the world is located at Nasi Islands close to the Dhamra Port. It may be recalled that the National Environment Appellant Authority had also upheld the environmental clearance given earlier by the MOST, and the order of this Authority has also been challenged.

The most interest aspect is that the Bhitarkanika National Park consisting of 367 sq. km was constituted on 3.10.1988. The state government entered into a contract with International Sea Ports in October, 1997 for construction of Dhamra Port and in September, 1998 the State government issued the final notification constituting the Bhitarkanika National Park whereby the National Park area was reduced to 145 sq. kms allegedly to enable the construction of the port which fell right in the centre of the proposed National Park .

Conservation genetics of olive ridleys on the east coast of India

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Introduction

The study of sea turtles has largely been confined to the brief period in their life cycle when they come ashore to nest. In recent times, molecular genetic tools have played a major role in answering questions of biological and ecological interest in marine turtles. While field based tagging studies of several thousand turtles over thirty years merely provided clues of natal

homing behaviour in turtles (i.e. the return of nesting adult females to the beach where they hatched), studies using genetic markers were able to prove the theory conclusively in green turtles and other species (Bowen, 1996). Molecular genetic markers have been widely used in studying global population structure of sea turtles, in tracing the source of turtles caught in deep sea and other fisheries, and in tracing the long distance migratory routes of these species.

Olive ridleys are circumglobal in distribution, and are particularly well known for the phenomenon of mass nesting. The Orissa coast has three major mass nesting sites, of which Gahirmatha is the largest in the world with 100 to 500, 000 turtles nesting each year. In the past five years, there has been serious cause for concern due to marine fisheries related mortality on the Orissa coast (Pandav *et al.*, 1998; Shanker & Mohanty, 1999). Since 1994, more than 75,000 turtles have been counted dead on the Orissa coast and actual number dead is certain to be much higher (Pandav & Choudhury, 1999; B. Mohanty, Pers. Comm.)

Methods

We studied the population genetic structure of olive ridleys on the east coast with a view to evolving conservation strategies for these turtles. The study was a collaboration between BC Choudhury and Kartik Shanker, Wildlife Institute of India and Dr. Lalji Singh (Director) and Dr. Ramesh Aggarwal, Centre for Cellular and Molecular Biology, Hyderabad. Tissue samples were collected from three sites in Orissa and one site in Tamil Nadu. Various molecular genetic techniques - RAPD, multilocus fingerprinting, Microsatellite analysis, and Mitochondrial DNA sequencing- representing different approaches, were used to analyse DNA polymorphism. The multilocus fingerprinting showed a high degree of variation polymorphism between individuals. The microsatellite analyses did not point to any population structuring along the coast. Low population structure may point to weak natal homing in olive ridleys on the east coast of India.

Results

Mitochondrial DNA sequencing revealed the presence of five haplotypes, of which two have been previously reported from Sri Lanka by an earlier study by Dr. Brian Bowen and colleagues in the USA (Bowen *et al.*, 1998). However, we found three new haplotypes, which could be specific to the east coast of India. The dominant haplotype (K) in our study is the most ancient

lineage in ridleys suggesting that olive ridley population on the east coast of India could be the source for contemporary global populations of ridleys. This increases the conservation importance of this population. This study has raised more important questions which can be addressed using molecular genetic techniques. Specifically, the population genetic structure of olive ridleys in Indian waters needs to be addressed using more microsatellite analyses. The documentation of mitochondrial DNA sequence haplotypes for various species in Indian waters would form part of a long term global effort to trace migratory routes and to identify sources of turtles killed in deep sea fisheries.

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