



Genetic census of Greater One-horned Rhino in Gorumara National Park, West Bengal, India

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Effective management and long term conservation of Greater One-horned Rhinoceros (*Rhinoceros unicornis*) may in future take benefits of a multidisciplinary approach, including the use of molecular tools in genetic monitoring of natural populations. For the first time in the history of Greater One-horned Rhino census, advanced genetic tools have been used in Gorumara National Park of West Bengal, India. As part of a project undertaken by Aaranyak with financial support from Asian Rhino Project, Australia, dung DNA analysis based techniques have been used to determine minimum number of rhinos present in Gorumara and to understand the contemporary extent of genetic diversity in the population.

Gorumara National Park is one of the two rhino bearing protected areas in the state of West Bengal in India. Gorumara is situated in Northern West Bengal and is a part of the Eastern Himalayan submontane Terai belt and falls into the Indomalayan ecozone. The Park with 79.99 km lies in the floodplains of Mukti and Raidak rivers. The major river in the Park is Jaldhaka, a tributary to the Brahmaputra. Gorumara has a known small population size of rhinos (42, according to the census conducted by the Forest Department in the year 2012), with a reported skewed sex ratio with higher number of males than the females. Moreover, According to the Ministry of Environment and Forests, Govt. of India, in the year 2009, Gorumara is one of the best managed National Parks in the country.

Aaranyak conducted a field survey for dung collection in April 2011, with active support from the Gorumara Forest Department. The area was surveyed using elephants, by a team of two Researchers from Aaranyak accompanied

by the staff of Gorumara Forest Department. Laboratory work was carried out in the Wildlife Genetics Laboratory of Aaranyak situated at Guwahati, Assam, India. Unique "genetic profiles" of individual rhinos, popularly known as DNA fingerprints were determined from dung DNA extracts using a set of polymorphic microsatellite markers. In this process, candidate markers were tested on rhino samples of known individual identity, in order to determine the minimum number of such markers needed for identifying individuals from unknown samples. Through this process, the total number of individuals present in the collected dung samples was determined, which shows 43 individual rhinos in the area in April 2011.

Further, sex identity of all the individuals was determined using genetic markers developed by Wildlife Genetics Laboratory of Aaranyak and Centre for Conservation and Research of Endangered Wildlife, Cincinnati Zoo and Botanical Garden, USA. Results show a male to female sex ratio of 4:1, confirming earlier reports of the skewed ratio. Further, this study reveals low genetic diversity of Gorumara population in comparison to what has been observed in other rhino populations in India.

This study exemplifies how genetic analysis of dung can successfully be used for identification of individual rhinos and their sex, which can be used for long term monitoring of the natural populations. Aaranyak is working further in generating genetic information from the rhino population in Jaldapara Wildlife Sanctuary and to understand spatial distribution of genetic diversity to assist genetic management of the species in future.