



## Non-invasive population genetic monitoring of Indian Rhino in Assam

A pilot study to standardize protocols for dung DNA analysis. Update Report July 2008

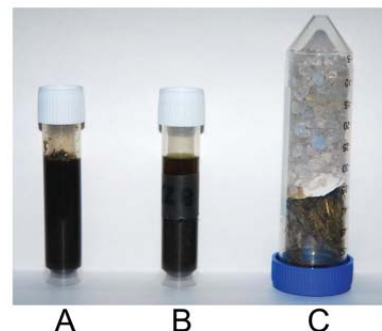
The Greater one-horned rhinoceros (*Rhinoceros unicornis*) is a schedule I species according to the Wildlife Protection Act 1972, Govt. of India, as well as listed by IUCN as an endangered species. Greater one-horned rhinoceros were once distributed throughout the range of northern floodplains and nearby foothills of the Indian subcontinent between the Indo-Myanmar border in the east and the Sindhu river basin, Pakistan in the west. Habitat destruction and rampant poaching for mythical medicinal values of its horn has led this species to confine themselves into a few isolated pockets of protected areas of India and Nepal.

Although the Greater one-horned rhinoceros is the most abundant of the three Asian rhino species that exist today, including the Javan Rhinoceros (*Rhinoceros sondaicus*) and the Sumatran Rhinoceros (*Dicerorhinus sumatrensis*) species, still its future is far from secure. Even with the mega success story of conservation in the Kaziranga National Park, Assam, doubt still persists with the genetic consequences of presently large population of 1855 individuals in an area of 859.33 sq km which comes from only a few individuals in the early twentieth century. Present rhino populations of Orang National Park with 68 individuals in an area of 78.80 sq km and Pobitora Wildlife Sanctuary with 81 individuals in an area of 38.81 sq km also descends from only a few individuals from the source population of Kaziranga National Park (Dept. of Envi-

ronment and Forests, Govt. of Assam census 2006).

In the past few years, conservation genetics has gained tremendous momentum due to the successful use of noninvasive materials such as faecal samples, urine, shed hair, sloughed skin, discarded food etc as a source of DNA. The technique involves the extraction of DNA from these materials. The methodology has been increasingly applied to a wide variety of species and has proved to be useful in several types of research, as well as in wildlife forensics, management and conservation.

DNA from faecal samples has been used for population genetic monitoring of species like elephant, tiger etc. However, no attempt has so far been made towards using dung as a source of DNA for population monitoring



Above: Rhino dung samples preserved in: A – DETs buffer; B – 90-95% ethanol; C – Silica gel

of Greater one-horned rhinoceros in India. In India, work has only been done from the blood samples of wild caught or captive rhinos from various zoos. However, physical capturing of animals for genetic samples is not practically possible for a large scale population study. Therefore, under this project, we have aimed at studying the potential use of dung as a noninvasive source of population monitoring of Greater one-horned rhinoceros in India. The study will be carried out in presently existing rhino habitats in Assam, India.

### Objectives

The major objectives of the study are:

1. Quantitative evaluation of various preservation and DNA extraction methodologies for rhino dung collected from natural habitats of Assam as a source of DNA.
2. Selection of marker for species identification of Greater one-horned rhinoceros from morphologically indistinguishable biological materials.
3. Selection of markers for gender differentiation of rhinos from dung DNA samples.
4. Selection of the minimum number of polymorphic microsatellite markers for rhino individual identification from dung samples.
5. Assessment of genotyping error from dung DNA samples.

### Collection of rhino dung samples

Dung samples have been collected from Kaziranga National Park and Orang National Park, Assam. Only fresh dung samples (from the defecation areas of known individual rhinos) were collected from the field.

For each dung sample, a Global Positioning System (GPS) reading was taken and the reading was transferred into a Geographic Information System (GIS) to establish their locations in the study area. Efforts were put towards collecting samples from geographically distant locations as possible in order to further assure samples from different individuals, thereby accounting for individual to individual variation in DNA quality.

DNA has been successfully isolated from the collected dung samples and we have found encouraging results in DNA extraction from dung preserved in Silica rather than ethanol. Further study is ongoing.

*Article: Principal Investigator Udayan Borthakur, M.Sc. Research Scholar Jyotibon Dutta, M.Sc. Technical Adviser Bibhab Kumar Talukdar, Ph.D. Implementing Agencies Aaranyak.*

*Images: Aaranyak*

## Adopt-a-Rhino Fundraiser – You can now adopt Andalas!

Andalas was the first Sumatran rhino born in captivity in more than 112 years. He is the living, breathing result of a groundbreaking research and breeding effort undertaken by American zoos, the Indonesian government, and the Sumatran Rhino Sanctuary (SRS).



Born at the Cincinnati Zoo, Ohio, Andalas moved to the SRS in February 2007 from his second home at Los Angeles Zoo. Now that he is sexually mature his keepers at the SRS have high hopes that he will soon breed with one of the three female rhinos at the sanctuary, helping to ensure the future success of the SRS rhino popula-

tion. Andalas has adjusted well to life in Sumatra. Adapting to the heat and humidity of the Indonesian rainforest, he shed some of the red-brown hair he had grown in the US.

Help us save the Sumatran rhino by adopting one today – and it's tax deductible!

All funds raised through the Asian Rhino Project's adopt-a-rhino program will be used to support the SRS in Way Kambas National Park, Sumatra.

With each adoption you will receive an attractive adoption certificate including information on your rhino and the program. You can also choose to receive quarterly updates on your rhino as well as an A4 sized photograph (extra costs apply for photos and updates).

More information on the rhinos and the program is on our website [www.asianrhinos.org.au](http://www.asianrhinos.org.au).