Exploring environmental DNA for Barcoding Analysis of Sumatran Rhino in Way Kambas National Park

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Introduction: Rhinos in the world

**WHITE RHINO**
*Ceratotherium simum*

Estimated Population: **~18,000**
IUCN Status: **DECREASING**

**GREATER ONE-HORNED RHINO**
*Rhinoceros unicornis*

Estimated Population: **>3,600**
IUCN Status: **INCREASING**

**BLACK RHINO**
*Dicerorhinus bicornis*

Estimated Population: **~5,630**
IUCN Status: **CRITICALLY ENDANGERED**

**JAVAN RHINO**
*Rhinoceros sondaicus*

Estimated Population: **74**
IUCN Status: **STABLE**

**SUMATRAN RHINO**
*Dicerorhinus sumatrensis*

Estimated Population: **<80**
IUCN Status: **CRITICALLY ENDANGERED**

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Introduction:
SRS Way Kambas Nat. Park and the 7 sumatran rhinos
Introduction: SRS Paddock System

https://news.mongabay.com/2019/12/sumatran-rhino-captive-breeding-indonesia-way-kambas-rs/
Introduction
Rhino’s behavior: wallowing

The sumatran rhino (*Dicerorhinus sumatrensis*) spends a large part of its day wallowing. When mud holes are unavailable, the rhino will deepen puddles with its feet and horns. One 20-month study of wallowing behaviour found they will visit no more than three wallows at any given time. After two to 12 weeks using a particular wallow, the rhino will abandon it. Typically, the rhino will wallow around midday for two to three hours at a time before foraging for food.
Introduction: Rhino’s wallow → source of eDNA

The Sumatran rhinoceros puddle is one of the sources of environmental genetic material left behind. Hoogerwerf (1970) stated that the puddle not only serves to wallow, but also serves as a place to drink and urinate.
Introduction
Types of Rhino’s puddle/wallow

Active Puddle

Abandoned/inactive Puddle
Introduction: Materials and Methods

• Collecting the source of eDNA from the puddle/wallow of sumatran rhinos

• DNA extraction
• DNA amplification
• Qualitative test of extracted DNA
Results and Discussion

No DNA band showed on digidoc visualization from raw extracted DNA samples.
Results and Discussion

Visualization results of 12 samples individual sumatran rhinoceros showed 11 positive samples and 1 negative sample (DT2 sample).

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Results and Discussion

• Rhino’s puddle containing a small number of eDNA source
• eDNA extraction was carried out to determine the presence of genetic material left in rhino puddles Sumatra in SRS
• Of the 12 DNA extracted from the puddles of the Sumatran rhinoceros in SRS, TNWK showed 11 samples were suitable for testing further steps such as the DNA sequencing stage, so that this research can support molecular-based conservation efforts.
Conclusion

- Although it contains only a few genetic sources from the Sumatran rhinoceros, eDNA studies from wallows can be optimized as a non-invasive method of sampling for genetic analysis.

- The DNA amplification stage is very necessary as a test to confirm the success of DNA extraction from genetic sources from Sumatran rhinoceros puddles.
Acknowledgement

The Institute of Research and Community Service
Universitas Lampung

Way Kambas National Park

Yayasan Badak Indonesia

Lampung Veterinary Investigation Center
Thank you...