

DNA ISOLATION ON CAPTIVE SUMATRAN ELEPHANT IN ELEPHANT TRAINING CENTER, WAY KAMBAS NATIONAL PARK: A FIRST STEP TOWARDS ITS ID CARD

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M 1a 1b 1c 2a 2b 2c 3a 3b 3c 4a 4b 4c

M 5a 5b 5c 6a 6b 6c 7a 7b 7c 8a 8b 8c

ABSTRACT

Elephant Training Center (ETC) Way Kambas National Park (WKNP) was built to support human-elephant mitigation conflict. The small population of captive sumatran elephant in ETC WKNP need a comprehensive strategy in order to maintain the genetic variation of each individual and avoid inbreeding drive. Currently, genetic studies have opened new field studies in ecology, included conservation ecology. Patterns in variation of population has been investigated by molecular method supporting species conservation effort. The captive sumatran elephant's ID Card is a necessary in database building, which included morphology, health status, and genetic profile. Genetic profile in each ID Card was filled by cytogenetic and molecular profile for RADP result, that initiated with DNA isolation. The DNA sources collected by blood sampling protocol described by Asiyah *et al.* (2016) from captive sumatran elephant in ETC, WKNP, and be carried to laboratory in cold condition. The DNA sources stored at 4°C and isolated following commercial protocol. The result of DNA isolation stored at -20°C until amplification analysis. DNA isolation was successfully done, for further individual genetic ID building.

Keywords: Conservation, DNA isolation, sumatran elephant's ID Card, WKNP



INTRODUCTION



- Elephants belongs to the order of Proboscidea with only two living genera, *Loxodonta* and *Elephas*.
- The asian elephant population has shown constant sign of decreased and in 1986 was listed as endangered species by the IUCN.
- The lost of habitat combines with high human-population density, like in Asia, has resulted in Human-Elephant Conflict
- To mitigate the conflict, the Elephant Training Centre (ETC) in Way Kambas National Park, East Lampung, Sumatera, Indonesia was established in the 1985.

INTRODUCTION



- The small population of captive sumatran elephant in ETC WKNP need a comprehensive strategy in order to maintain the genetic variation of each individual and avoid inbreeding drive.
- In WKNP, DNA bank data needs to be built (Priyambodo *et al.*, 2017) and blood sampling were carried out in collaboration with WKNP and medical teams (Rustiati *et al.*, 2017).
- Genetic studies have become one of new field studies in ecology, included conservation ecology.
- Genetic profile in each ID Card was filled by cytogenetic and molecular profile for RADP result, that initiated with DNA isolation.

METHODS



- This project is conducted under research grant from Directorate of Research and Community Services, Higher Education Indonesia.
- The DNA sources collected by whole blood sampling protocol described by Asiyah *et al.* (2016) from captive sumatran elephant in ETC, WKNP.
- DNA isolation was conducted successfully by silica gel column methods with commercial QIAGEN Dneasy and tissue kit for blood and tissue.
- Three main steps included cell preparation/lysis, DNA isolation from contaminants and DNA precipitation.
- DNA isolation success was qualitatively analysed by 1% agarose gel electrophoresis technique and observed under UV transilluminator.
- The result of DNA isolation stored at -20°C until further analysis.

RESULTS AND DISCUSSION



Figure 1. Isolated DNA genome in buffer solution

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- Twenty eight individual elephants have been whole blood sampled.
- DNA was successfully separated from protein and other component (Figure 1) and kept in -40°C . Qualitative test using agarose gel electrophoresis technique.

RESULTS AND DISCUSSION

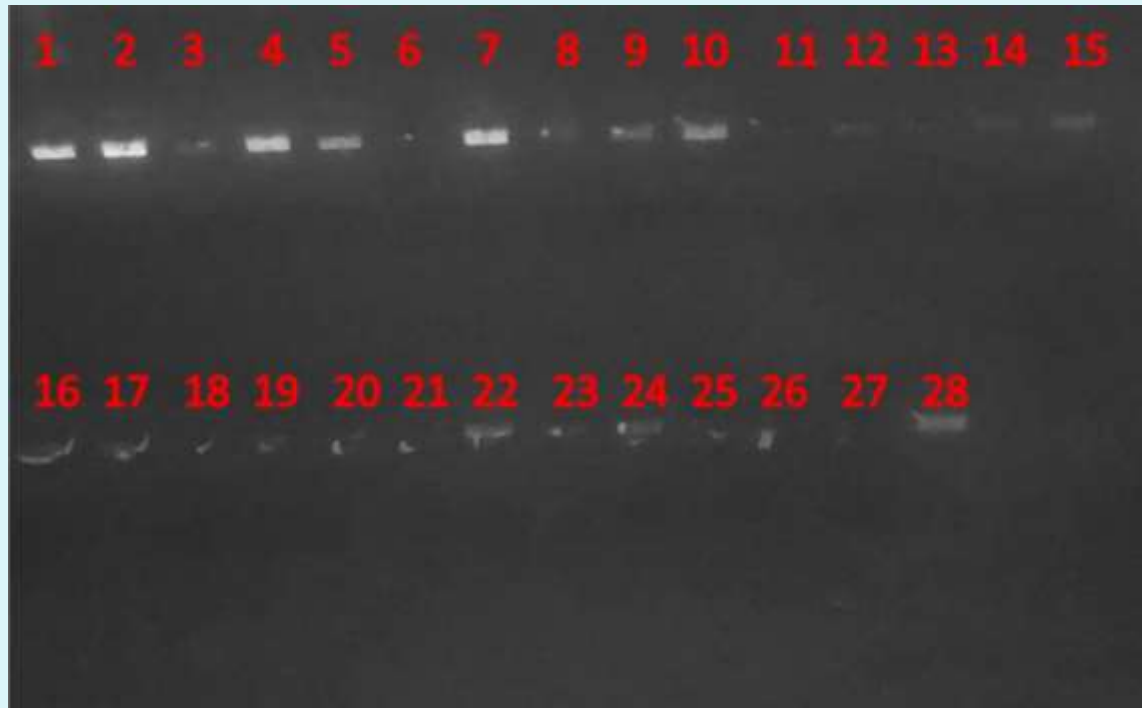


Figure 2. Visualization of qualitative test for isolation of DNA genome under UV transilluminator

RESULTS AND DISCUSSION

- In electrophoresis process 1% agarose gel was applied as stationer phase, and Tris-acetate EDTA (TAE) as movement phase.
- DNA genome was separated in agarose gel based on electro mobility of its negative charge of DNA molecule in certain distance.
- Loading dye addition on DNA may clarify migration distance.
- Sumatran elephant's DNA genome was predicted more than 10kb. It is shown by its short migration distance from the well.
- Isolated DNA will be used for further molecular analysis, PCR-RAPD and DNA sequencing.

CONCLUSION

- Twenty eight whole blood samples have been successfully prepared for isolation of DNA. DNA samples were available for further individual genetic ID building, and kept in -20°C .

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REFERENCES

- Asiyah, S. 2016. Teknik pengambilan sampel darah gajah sumatera (*Elephas maximus sumatranus*) di Pusat Latihan Gajah, Taman Nasional Way Kambas. Laporan kerja Praktek.
- Fernando, P., Vidya, T.N.C., Payne, J., Stuewe, M., Davison, G., Alfred, R.J., Andau, P., Bosi, E., Kilbourn, A. & Melnick, D.J. 2003. DNA analysis indicates that Asian elephants are native to Borneo and are therefore a high priority for conservation. *PLoS Biology*, **1(1)**: 110-115.
- Priyambodo, E.L. Rustiati, N. Nurcahyani, D. Candra, S. Asiyah. 2017. Pembuatan bank DNA gajah sumatera (*Elephas maximus sumatranus*) di Pusat Latihan Gajah, Taman Nasional Way Kambas. Oral Presentation on Semirata BKS PTN Barat Bidang MIPA tahun 2017.
- Rustiati, E.L., Priyambodo, S. Asiyah, F. N. Islami, E. D. Krismurniati, D. Chandra, D. E. Anggraini. 2017. Pemahaman perilaku dalam pemeriksaan dan pengambilan sampel darah gajah sumatera di penangkaran, Pusat Latihan Gajah, Taman Nasional Way Kambas. Oral Presentation on Semirata BKS PTN Barat Bidang MIPA tahun 2017.
- Stiles, D. 2004. The ivory trade and elephant conservation. *Environmental Conservation*, **31(4)**: 309-321.
- Sukumar, R. 2006. A brief review of the status, distribution and biology of wild Asian elephants (*Elephas maximus*). *International ZooYearbook*, **40**: 1-8.
- Vidya, T.N.C., Fernando, P., Melnick, D.J. & Sukumar, R. 2005. Population differentiation within and among Asian elephant (*Elephas maximus*) populations in southern India. *Heredity*, **94(1)**: 71-80.
- Wittemyer, G., J. B. A. Okello, H. B. Rasmussen, P. Arctander, S. Nyakaana, I. Douglas-Hamilton and H. R. Siegismund. 2016. Where sociality and relatedness diverge: the genetic basis for hierarchical social organization in African elephants. *Proceeding of Royal Society B*: 1-10