From Ivory to Genes: Unraveling the Genetic Landscape of Thai Elephants and its Conservation Significance

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Abstract: The Asian elephants (*Elephas maximus*) is an emblematic specie, so much that they are often revered and considered to be a national symbol. Their presence in diverse landscapes of South East Asia play a vital role in maintaining ecological balance and biodiversity. Habitat loss and rampant poaching of their valuable ivory critically threaten the specie, posing significant challenges to the conservation of the elephant. Furthermore, that artificial selection lead some specimen to evolve without tusks and, consequently, resulting in a loss of genetic diversity. In this study, blood samples were collected from 33 captive elephants, comprising 20 male and 13 female individuals. Among them, 11 elephants exhibited tusks, while 22 were observed to be tuskless. SNPs calling process was done by using ddRAD sequence reads obtained from the individuals. The ddRAD reads were aligned to a reference genome and subsequently indexed before being imported into the STACKS pipeline for SNP identification. The trait-specific loci were identified using the fisher association test provided by PLINK software. Moreover, these genetic markers associated with the ivory traits hold the potential to accelerate genome sequencing and offer valuable insights into their linkage with the sex chromosomes. The findings from this study will have significant implications for both in situ and ex situ conservation management, breeding strategies and the reservation of biodiversity. By enhancing our understanding of genetic factors associated with ivory traits, these findings will facilitate the development of targeted conservation action plans and drive innovations in genomic research. Ultimately, these results will contribute significantly to the advancement and success of sustainable tourism and conservation efforts, positioning Thailand as a prominent global hub for elephant research and conservation.

Keywords: Asian elephants; conservation biology; ivory-related genetic markers; genome sequencing; elephant diversity

Type 3: conservation report or project