

Application of next-generation sequencing technology in southeast asia: a practical framework for advancing wildlife conservation

ABSTRACT

Next-generation sequencing (NGS) has transformed genomics, presenting significant potential for advancing wildlife conservation. NGS technology offers opportunities and challenges for addressing scientific questions in wildlife management. Unfortunately, there is a lack of comprehensive records on NGS implementation in Southeast Asia, particularly concerning wildlife conservation. To address this gap, we analyzed NGS studies focused on wildlife monitoring in Southeast Asia and introduced a practical framework for implementing NGS technologies in global wildlife conservation, especially in Southeast Asia. We systematically reviewed NGS studies in wildlife monitoring from the SCOPUS database. We identified 137 relevant publications from 11 countries, with Malaysia contributing 36% of the studies. The included studies were categorized into five themes: species identification, dietary assessment, health monitoring, taxonomic resolution, and whole-genome sequencing, with the majority focusing on 38 publications related to wildlife health. The framework developed in this study help the researchers and conservation practitioners with insights on NGS technology application in conservation while also addressing the benefits, limitations, and ethical considerations associated with NGS use. This review offers a brief overview of NGS usage and provides guidelines for embracing NGS as a valuable tool for effective wildlife conservation strategies in our rapidly changing world.