Multi-source photographic evidence to assess corridor use, crop-raiding behaviour and body injuries in Asian elephants

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The use of multi-sourced photographs, such as those from social media, camera traps, and field surveys, for individual identification of male Asian elephants to study their corridor use, crop-raiding behaviour, occurrence of musth, ranging and external body injuries in the Thirunelli-Kudrakote elephant corridor in India's Western Ghats is investigated in the present study. A total of 330 images and videos were analysed over 11 years (January 2014 to March 2024), leading to the identification of 27 male elephants from the corridor. Eleven individuals were observed across multiple years, demonstrating their fidelity to the area. Ten elephants were observed engaging in crop-raiding, with four consistently raiding crops within the corridor. The study also assessed the home range of six individuals in the corridor and adjacent landscapes based on individual identification. Overall, the study shows that identifying individual elephants across different locations and times provides valuable data and is a practical, cost-effective method for investigating a wide range of questions concerning the ecology and behaviour of Asian elephants. The findings underscore the potential of citizen science initiatives to enhance elephant research across elephant-range countries.

Keywords: Asian elephant, corridor use, human-inflicted injuries, landscape connectivity, multi-source photos.

the country are increasingly becoming disconnected, and the species now exists in small, isolated populations, primarily confined to forest areas within fragmented landscapes[5]. Given these conditions, the Indian government and international conservation organizations have prioritized identifying and conserving functional elephant corridors to maintain genetic connectivity and support population viability. In India, for instance, 101 identified 'elephant corridors' are generally narrow forest pathways connecting larger landscapes, of which 69.3% are regularly used by elephants[1]. However, many of these critical 'corridors' remain vulnerable to various anthropogenic pressures[3,6].

Individual identification of free-living wildlife species is a commonly used methodological approach for answering a range of research questions in ecology, behaviour, and evolutionary biology, crucial for species management and conservation[7,8]. The use of external body features as non-invasive markers through photo-identification stands out as a cost-effective approach for collecting data in individual-based studies within many free-ranging animal populations[8–10]. For example, individual adult elephants can be easily distinguished by their unique morphological features, allowing for effective photographic sampling[11,12]. Hence, individual recognition through image-based identification has been increasingly used to estimate various population parameters and to study the behaviour of ele-