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INDIAN STAR TORTOISE FACES TWIN CHALLENGES OF HABITAT LOSS AND GENETIC DIVERSITY, FINDS STUDY

Relevant for: Environment | Topic: Biodiversity, Ecology, and Wildlife Related Issues

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Indian Star Tortoise (*Geochelone elegans*) | Photo Credit: Special Arrangement

A recent study on the Indian star tortoise (*Geochelone elegans*) distributed across South Asia has revealed that the genetic diversity of the species as well as habitat has suffered major losses because of rampant illegal trade. The researchers behind the study have also raised concerns over unscientific translocations that have resulted in genetic mixing between different populations, posing a challenge in segregating available populations at the genetic level.

The details of the study were recently been published in a peer reviewed international journal as a research article titled ‘Mitochondrial DNA and Distribution Modelling Evidenced the Lost Genetic Diversity and Wild-Residence of Star Tortoise, Geochelone Elegans (Testudines: Testudinidae) in India’.

“The species is facing twin challenges of a threat to its habitat at one level and loss of its genetic diversity at the other. Our study calls for a proper conservation strategy to combat the fragmented distribution and explicitly recommends intensive genetic screening of founder individuals or isolated adult colonies by implementing scientific breeding,” Shantanu Kundu, a researcher with Professor Hyun-Woo Kim Lab, Pukyong National University, South Korea.

Map showing the distribution of *Geochelone elegans.* | Photo Credit: Special Arrangement

Dr. Kundu added that the Indian star tortoise, which is listed under Appendix I of the CITES (Convention on International Trade in Endangered Species) list and categorised as ‘Vulnerable’ in the IUCN (International Union for Conservation of Nature) Red List of threatened species, is one of most traded tortoise species not only across the subcontinent but across South and Southeast Asia.

The distribution modelling of *G. elegans* has provided clear evidence of the highly fragmented habitat of the species, which is greatly influenced by an increased level of urbanisation and agricultural practices throughout its range, said Tanoy Mukherjee, Department of Science and Technology-Inspire Faculty, Landscape Ecology and Wildlife Sciences Lab at the Indian Statistical Institute, Kolkata.

The paper said: “Our result suggests that about 10% of the area within the IUCN range of the Indian star tortoise is suitable for habitation; however, this area is further subjected to the impacts of human-mediated habitat degradation. Areas within the states of Gujarat and Rajasthan, followed by Tamil Nadu, Karnataka, and Andhra Pradesh, suffer the most with the highest levels of habitat fragmentation due to the rapid development of urbanization and croplands.”

Shailendra Singh, director of Turtle Survival Alliance, India explained that genetic diversity is crucial for the survival of a particular species. “In the case of Indian star tortoise, there are three major populations of the species — in the western part and the southern part of India, and in Sri Lanka — and each sub-population has genetic traits to survive in a particular landscape. If a population of Kerala is wiped out because of climate change then we cannot replace it with the population in Rajasthan,” he explained.

Dr. Singh also pointed out that because the animal is highly sought after in illegal trade, there are seizures of the species far away from the source, and often seized individuals are left with the local population, which leads to genetic fusing.

Comparative visualization of the suitable ranges for G. elegans, along with illegal wildlife trade hotspots. | Photo Credit: Special Arrangement

The publication states that due to the unscientific release of confiscated animals in the wild, and the subsequent hybridisation between different populations over the years, Indian star tortoises have lost genetic diversity and have experienced increase in the vulnerability of wild populations. “Current research recommends genetic screening to identify founder individuals or isolated adult colonies, in the wild or captive for scientific breeding, to preserve maximum genetic diversity, avoid inbreeding depression, and support the successful reintroduction of captively bred offspring to the wild to recover the lost heterozygosity of *G. elegans*,” the publication added.