

Population status, Ecology, and Conservation of the Indian Swiftlet *Aerodramus unicolor* in the Western Ghats, West Coast, and Offshore Islands of Maharashtra

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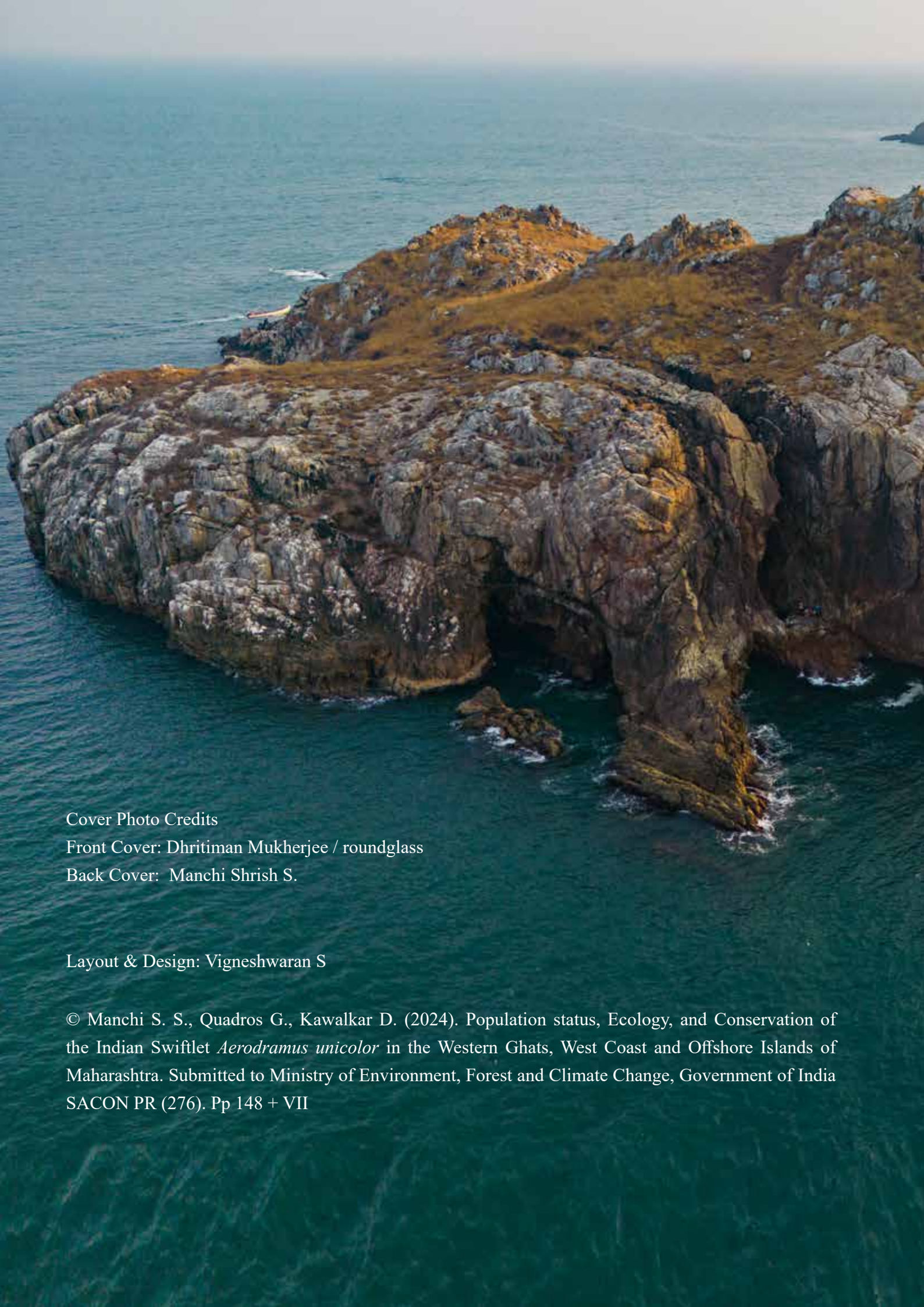
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An aerial photograph of a rugged, rocky coastline. The rocks are dark and jagged, with some patches of brownish vegetation. The ocean is a deep blue-green color, with white foam from waves crashing against the rocks. A small boat is visible in the distance, near the top left of the frame.

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A land of welcoming people, plentiful resources, and abundant biodiversity, working in Konkan was a privilege.

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PART - II

PREFACE

Birds play a crucial role in the functioning of ecosystems and offer a wide range of advantages. Among the various ecosystem services, birds play a key role as bio-pest controllers. Among them are the aerial insectivores. The Swifts and Swiftlets (Family: Apodidae, Order: Caprimulgiformes) are the least researched among all the aerial insectivores. Internationally, there are a total of 112 species, belonging to 19 different genera. According to the information provided by the IUCN Red List in 2023, 2.7% of these species are classified as Near Threatened, 6.2% are Vulnerable, 3.6% have insufficient data to determine their status, 66.1% are considered to be of Least Concern, and the status of approximately 21.4% is unknown. Swiftlets, specifically the *Collocalia* and *Aerodramus* genera, have been extensively exploited for their nests for centuries among all the Apodids. There are a total of 39 species of swiftlets worldwide. Among these, India is home to four specific species: the Himalayan Swiftlet (*Aerodramus brevirostris*), the Indian Swiftlet (*Aerodramus unicolor*), the Plume-toed Swiftlet (*Collocalia affinis*), and the Edible-nest Swiftlet (*Aerodramus fuciphagus*). Extensive research has been carried out on the Plume-toed Swiftlet and Edible-nest Swiftlet. However, a notable lack of research or conservation efforts focused on the Himalayan Swiftlet and Indian Swiftlet. Among the various species of swiftlets found in India, only the Indian Swiftlet is legally safeguarded by being listed in Schedule-I of the Indian Wildlife Protection Act, 1972. However, it is categorized as "Least Concern" according to the IUCN Red List.

The saliva-based nests of certain swiftlet species in the Genus *Aerodramus* are highly prized in specific East Asian markets, especially in China. In Traditional Chinese Medicine, the nests are incorporated into a soup to address various ailments and debilities. Although there is insufficient evidence regarding the effectiveness of traditional medicine, premium bird's nest is priced at \$2,000 to \$4,000 per kilogram (Thorburn 2014, 2015). The sustainable harvesting of these nests can be achieved (Medway 1966). Nevertheless, there have been apprehensions in recent years due to a significant rise in the number of nests being harvested, which is a direct result of the growing demand for the product. The Indian Swiftlet is found in the Western Ghats of India and Sri Lanka and is known for its black nest. Consequently, for numerous years, the Indian Swiftlet faced a significant threat from illegal trade until it was finally halted in Maharashtra in 2004. Only one attempt was made between 2000 and 2006 by the Zoological Survey of India and Sahyadri Nisarga Mitra (Chiplun, Ratnagiri) to study the population of Indian Edible-nest Swiftlet in the Western Ghats, West Coast, and Islands in the Arabian Sea, India. Thus, there arose an urgent necessity to reexamine the available information (regarding population status, distribution, behavior, etc.) concerning the species. After a gap of 14 years, this ongoing project aims to comprehensively study the population dynamics, ecological characteristics, and conservation efforts for the Indian Swiftlet in the Western Ghats, West Coast, and Offshore Islands of Maharashtra.

In 2003, due to the decreasing population of the Edible-nest Swiftlet in the Andaman and Nicobar Islands, all the Edible-nest Swiftlets were included in Schedule-I of the Wildlife Protection Act, 1972 at the national level. Therefore, recognizing that the species is safeguarded legally but lacks monitoring,

the study will furnish baseline data to commence conservation efforts. Therefore, this study represents the initial efforts to comprehensively and scientifically understand the ecological aspects of the Indian Swiftlet. The findings of this study will play a crucial role in the ongoing efforts to conserve the species in Maharashtra over the long term. The study will enhance the scientific comprehension of the species and establish a foundation for safeguarding, monitoring, and preserving the species across its distribution range. The Indian Swiftlet is unique because it exclusively inhabits the Western Ghats in India and Sri Lanka and is known for producing a valuable edible nest. The Indian Swiftlet Conservation Plan (ISCP), the most significant output of this ecologically significant study on this economically valuable species, is a preliminary roadmap to initiate conservation strategies, both *in-situ* and *ex-situ*. In addition to contributing to the research and conservation of Indian Swiftlets, the study directly contributes to the country's least comprehended field of speleological research by identifying and exploring the unknown caves while searching for the Indian swiftlets in western Maharashtra. It additionally provides a foundation to explore the unique cave-dwelling flora and fauna, which are typically known for having a high number of unique species and limited geographic ranges.

In general, this project takes a comprehensive approach to comprehending the population status and ecology and formulating a conservation plan to protect the population and ensure the long-term survival of the Indian Swiftlet in the Western Ghats of India.



ABSTRACT

The swiftlets, have significant economic value, are arguably one of the most enigmatic avian species. The initial investigation of the Indian Swiftlet population was conducted from 2001 to 2006. Since then, there has been no research or monitoring conducted on the species. As a result, there was an urgent requirement to review the existing knowledge and initiate a detailed scientific exploration of the species, including its population status, distribution, breeding biology, habitat ecology, etc. Therefore, this study is the first to specifically examine the Indian Swiftlet (*Aerodramus unicolor*), found exclusively in the Western Ghats of India and Sri Lanka.

Between December 2020 and December 2022, we conducted distribution surveys in the six coastal districts of Maharashtra (Palghar, Thane, Mumbai, Raigad, Ratnagiri, and Sindhudurg). We covered a distance of 3210 km and survey 350 points. We encountered the Indian Swiftlet in 11 different locations within the south coastal Sindhudurg district, specifically in the areas of Malwan, Vengurla, and Kudal tehsil. We conducted a species distribution analysis using 1) primary data collected through distribution surveys and ii) secondary data obtained from GBIF.org. The current scenario reveals the geographical distribution of the Indian Swiftlet along the Western Ghats in India and Sri Lanka. However, the distribution of the species is limited to the central Ratnagiri and southern region of the Sindhudurg district in Maharashtra. In the future, the distribution will be limited to the coastal region of Sindhudurg. The distribution in the Western Ghats will be concentrated mainly in the southern regions of Tamil Nadu and Kerala. The distribution in Sri Lanka is limited to the central, western, and southern regions. Visits to various potential breeding habitats, including forts, natural caves, and man-made caves revealed that the Indian Swiftlet populations are exclusively breeding in a sea cave on Burnt Island and the Old Lighthouse on a neighbouring island of the Vengurla Rocks Archipelago. The Indian Swiftlet populations in Western Maharashtra have experienced significant fluctuations and were severely impacted by cyclone Tauktae, reaching a critical threshold. Hence, it is imperative to furnish supplementary breeding habitat.

Based on our data from January 2021 to December 2022, it is evident that the breeding season commences in mid-December and extends until June. The daily nest survival rates during the egg-hatching period were 87% in 2021 and decreased to 57% in 2022. The impact of tropical cyclone Tauktae on the Indian Swiftlet population is expected to have indirectly affected the swiftlet's daily survival rates. The foraging range of the Indian Swiftlet is observed to be within a radius of 0 to 16km during both the breeding and non-breeding seasons. The bird inhabits various types of habitats including mangroves, forests, laterite plateaus, wetlands, rocky islands, and most notably, mango, cashew, coconut, and kokum plantations.

We recorded various threats by utilizing existing literature, conducting social surveys, and organizing multi-stakeholder meetings. The primary threat to swiftlet populations worldwide is the excessive exploitation and illicit trade of their edible nests. The extensive harvesting at the Vengurla rocks also had a negative impact on the Indian Swiftlet populations, resulting in a 28% decline prior to 2001. Our routine visits verified that there is currently no active bird nest trade in the Vengurla rocks area. During the social surveys, it became evident that the local communities lacked knowledge about the birds'

nest trade on Burnt Island, believing it related to tern guano. It has been noted that the communities are encountering challenges related to their means of living and, as a result, are actively searching for alternative solutions to maintain their livelihoods. After the multi-stakeholder meeting, it has become evident that the conservation of the Indian Swiftlet necessitates the involvement of several stakeholders, including the Forest Department, Police Department, Agriculture Department, Fruit and Research Centre, Revenue Department, Maharashtra Maritime Board, Directorate of Lighthouses and Lightships, Local Gram Panchayats, and Fisherman organizations. Using the findings of the present study, we have developed the Indian Swiftlet Conservation Plan (ISCP) for the species that encompasses international, regional, national, and local stakeholder perspectives. We suggest that implementing the ISCP will be beneficial for effectively monitoring, protecting, and conserving the species and its habitats in Maharashtra and across its distribution range.

