

Breeding Ecology of the Edible-nest Swiftlet *Aerodramus fuciphagus* and the Glossy Swiftlet *Collocalia esculenta* in the Andaman Islands, India

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Summary

The intriguing biological feat of making nest with its saliva is threatening the survival of the edible-nest swiftlet. Ever since the 16th century when bird's nest became a delicacy in Chinese cuisine and an important item in their pharmacy, edible nest swiftlets are found overexploited all over. In the past two to three decades the production of the edible bird's nests has reduced drastically because of over-exploitation and uncontrolled harvesting that is directly affecting the population of this cave-dwelling species. The high demand in the international markets has put so much pressure that despite strict regulations on nest collection, the wild populations of the edible-nest swiftlets is plummeting by as much as 80% to 90% and has reached local extinction across some of their ranges.

India has four species of swiftlets: the Indian Edible-nest Swiftlet *Aerodramus unicolor* (Jerdon 1840), the Himalayan Swiftlet *Aerodramus brevirostris* (McLelland 1840), the Glossy Swiftlet *Collocalia esculenta* (Beavan 1867) and the Edible-nest Swiftlet *Aerodramus fuciphagus* (Hume 1873). Edible-nest swiftlet, the producer of edible nests, is distributed only in the oriental region of the world and the Andaman and Nicobar Islands of the Indian Territory. The collection of these commercially valuable nests started in the Andaman and Nicobar Islands in the 18th century. International demand led to widespread and uncontrolled nest collection in these islands leading to a serious fall in population.

A program to conserve the edible-nest swiftlet in the Andaman and Nicobar Islands commenced in 1995, and is being implemented by the Department of Environment and Forests, Andaman & Nicobar Islands (ANF) and Sálím Ali Centre for Ornithology and Natural History (SACON) since 2001. The program is implemented in 28 caves at Chalis-ek, Pattilevel, North Andaman Island and in 1 cave at Interview Islands Wildlife Sanctuary, Middle Andaman Islands. These 29 caves hosting colonies of the edible-nest swiftlet are protected during the breeding season between January and August. The species *Aerodramus fuciphagus inexpectatus* (Hume 1873) was studied in its natural habitat as part of the program. Though data collection began in 2001, it was largely

collected between 2004 and 2007. As the glossy swiftlet *Collocalia esculenta affinis* (Beavan 1867) of the island group has a major role to play in the *ex-situ* conservation of edible nest swiftlet in urban areas, wild populations of this species were initially studied along with the edible-nest swiftlet to know the ecology of these species in their natural habitats.

The two sympatric species, i.e. the edible-nest swiftlet and the glossy swiftlet were studied for their breeding ecology with reference to their habitat requirements and the impact of protection on the population of the edible-nest swiftlet in the Andaman and Nicobar Islands.

To understand the nest-site requirements of the species, their nest-site characters, preference and the relationship with nesting success were studied. Results showed that the edible-nest swiftlet and the glossy swiftlet are cave dwelling troglodytes and do not nest randomly inside the caves. The ability to echolocate allows the edible-nest swiftlets to nest and roost in the dark zones of the caves. The glossy swiftlet does not echolocate and therefore builds its nests near cave openings in the dim-lit zones of the cave. The edible-nest and glossy swiftlet have shown their preference for rough and slightly rough textured rocks, inwardly inclined walls, with a presence or absence of supports and the different combinations of these characteristics during nest-site selection. These preferred characteristics and their combinations contribute substantially in nesting success among edible-nest swiftlet. Micrometeorological parameters were studied inside the caves. The mean temperature showed a negative relationship with nesting success, while relative humidity showed a positive relationship in the case of edible-nest swiftlets. This information gives clear solutions to engineer better *ex-situ* swiftlet houses for edible nest swiftlets.

Foraging habitat requirements were studied near the breeding colonies of the species at Chalis-ek. The aerial and foraging behaviours and their occurrence in different habitats and microhabitats helped to estimate the foraging habitat requirements of both species. Both these exclusively aerial foraging species showed noticeable difference in their

foraging habitat requirements near their breeding sites. The edible-nest swiftlets depend on forest canopy to a great extent, whereas the glossy swiftlets forage in both forest and open land habitats. Edible-nest swiftlets preferred heights above the canopy level and also close to the top of the canopy. Glossy swiftlets were seen foraging close to the canopy top in forested areas and below canopy levels in the loose vegetations along stream-sides in the deforested open patches. The current rate of deforestation can severely affect the populations of the edible-nest swiftlets, whereas the glossy swiftlets are much better adapted to forest alterations.

Nests of both the species were visited daily to study their breeding seasonality and chronology. The study shows that the edible-nest swiftlets in the Andaman and Nicobar Islands have well marked breeding season with two broods from December to August, whereas, the glossy swiftlets in the wild breed throughout the year and fledge almost four broods per year. The breeding seasonality in the edible-nest swiftlet is linked with rainfall. Glossy swiftlets do not show any relation with meteorological parameters. Edible-nest swiftlets use only saliva as the nest material whereas the glossy swiftlets use moss, twigs, grass, vegetation matter etc. glued together with their saliva. The behavioural study of the edible-nest swiftlets showed that they copulate mostly on the nests and have a slightly longer incubation and fledgling period as compared to the glossy swiftlets. Both the species have a normal clutch size of two eggs. In both the species the first clutch is more successful than the second clutch. Detailed information on the breeding biology of the species provides support for planning the fostering program and also to predict the hatching and fledging success of the edible-nest swiftlet eggs in the glossy swiftlet nests. This information can be utilized for proper scheduling of cave protection and nest harvest timings and to develop a protection system for *in-situ* conservation.

The continuous improvement in the population growth has proved that the strategy of protecting the populations of edible-nest swiftlet in their natural habitat with the involvement of motivated nest collectors is a successful method of conserving edible-nest swiftlets in the Andaman and Nicobar Islands. However, a population decline of over

73% in the unprotected caves and local extinction from more than 60% of the unprotected caves surveyed within a decade is alarming. This calls for the expansion of the edible-nest swiftlet conservation program all over the islands arc to prevent the extinction of the species.

Since the species was included in the Scheduled-I of the Wildlife Protection Act, 1972 in September 2003, the post-breeding harvest of the bird's nests is not possible. As a result, the protectors deputed at the cave mouths are getting demoralized. It is to be noted that the protectors were nest collectors who worked for the protection of the colonies with an incentive to harvest the nests at the end of the breeding season. Their de-motivation could hinder the expansion of the *in-situ* conservation program. It is imperative to consider the removal of the species from the schedules and to ensure the survival of the species through sustainable practices, local participation and the scientific management.