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CHAPTER 5

Edible-nest swiftlets of Malaysia: Conservation outlook

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Abstract: Edible-nest swiftlets are small-sized cavernicolous birds (Family Apodidae), comprising four species of swiftlets that construct nests of commercial value. This paper provides some insights into g the positive and negative aspects of human-swiftlet relationship; one which caused its demise on one hand, while another provides a safe haven in the form of swiftlet houses. Causes of swiftlet populations decline and breakdown of century-old traditional harvesting schemes driven by human greed in the 1980's and 1990's are deliberated. Comprehensive studies on the ecology of swiftlets in 1999 – 2000 greatly increase our understanding on the reproductive strategies of these intriguing birds, which enable formulation of sustainable harvesting plans. Three successful conservation initiatives are presented. Finally, the emergence of the swiftlet farming industry in Malaysia is chronologically outlined. Its overall effect on the birds' nest trade is briefly discussed.

INTRODUCTION

Swiftlets (*Aerodramus* spp. and *Collocalia* spp.) are small-sized swifts (Family Apodidae) from Indo-Pacific region that roost and nest in caves or cavern-like places (Chantler and Driessens 1995; Lim and Cranbrook 1999, 2014). Swiftlets nest in colonies, preferring remote and inaccessible areas such as vertical cave walls or ledges on overhang. Different species select different nesting sites; this choice is influenced by the ability to echolocate, or the nature of their nesting saliva. Swiftlets' nest is a cup-shaped structure supported and held together by salivary nest cement secreted from a pair of sub-lingua glands (Medway 1962a). This hardened nest cement is the edible part—the basic ingredient of bird's nest soup.

Amongst the 24 species of swiftlets in the world, only a few species produce nests of commercial interest. The bulk of edible birds' nests (EBN) traded worldwide comes from four exploited species: (i) coastal cave-dwelling Grey-rumped Swiftlets (*Aerodramus inexpectatus*), (ii) Brown-rumped Swiftlets (*A. fuciphagus*), (iii) Black-nest Swiftlets (*A. maximus*) and (iv) Glossy Swiftlets (*Collocalia esculenta*). The swiftlets that occupy man-made structures are a subspecies of Brown-rumped Swiftlets (*A. fuciphagus fuciphagus*).

The so-called "white-nest" produced by *A. fuciphagus* and *A. inexpectatus* are the most highly prized because their nests are made entirely of pure nest cement (hardened saliva of the swiftlets). Only very few small contour feathers of the swiftlet's plumage are incorporated. *Aerodramus inexpectatus* is confined to coastal caves (e.g. Tioman, Satang Islands, Mantanani and Berhala Islands). Majority of "white-nest" comes from *A. fuciphagus*, in which *A. fuciphagus* vestitus is only found in inland limestone caves (e.g. caves in middle Baram, Sarawak and Gomantong Cave, Sabah). The sub-species *A. fuciphagus fuciphagus* can be considered semi-domesticated swiftlets, whereby they readily occupy man-made structures, or purposely build bird-houses in the swiftlet farming industry. At present, nests from the swiftlet farming industry supply almost entirely the global demand for EBN.

More abundant throughout its distribution range, especially in Borneo, is the builder of the commercially inferior "black-nest", produced by the Black-nest Swiftlet. During nest building, the birds undertake frequent bouts of preening, by which they obtain the feathers

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of salivary nest cement. Each nest may contain up to 700 feathers of various sizes, hence require extensive cleaning before they can warrant for sale. The cleaned edible fractions, in the form of separated strains of nest cement, are then molded into oval-shaped bird nest chips.

At the height of the ENB industry, starting from the early 1990's, there was also a market for mossy nests constructed by Glossy Swiftlets. Nests of this species are also cup-shaped. The self-supporting mossy nest is attached to the cave wall by a basal attachment made of nest cement. At present, swiftlet farming provides a constant supply of higher grade EBN, and hence, exploitation of Glossy Swiftlets has ceased. Perhaps this is a blessing in disguise.

CONSERVATION ISSUES – DECLINING YIELD AND CONCERNS

In the past 30 to 40 years, production of EBN from caves in Sarawak has fallen dramatically because of a sharp decline in wild swiftlet populations. One major factor that caused this decline is unsustainable harvesting practices. The surge of demand from Hong Kong and skyrocketed prices in the mid-1980s' triggered frenzy harvesting by the local communities that otherwise followed a well-established traditional sustainable harvesting regime.

Consequently, the swiftlets' nests are being harvested more frequently. As a result, species that had withstood traditional exploitation for more than a century began to diminish rapidly because of short-term monetary gain. Countless numbers of eggs and nestlings are destroyed in the process. The interval between harvests is too short to permit any nestlings to fledge, thereby denying the recruitment of young swiftlets into the old and dying populations.

One example with a long recorded history of edible bird nest harvesting is Niah Caves in Sarawak. It used to be a major producer of "black-nest" in the 1980's. In 1935, the swiftlet population at Niah was calculated to be in the range of 1.7 million individuals (Banks 1935). Sixty years later in 1995, surveys placed the population at around 200,000 birds, or 88% decline (Sarawak Wildlife Master Plan 1996). Elsewhere in middle Baram, the Brown-rumped Swiftlet population also suffered a 69% reduction between 1948 and 1997 (Lim 1999).

Prior to 1997, there is not much information available on the breeding periodicity of the swiftlets. Main references then are the works done by the Earl of Cranbrook at Niah Caves in the late 1950's and early 1960's (Medway 1962b,1962c). Acting upon the recommendations from the 1996 Surabaya CITES Technical Workshop, the Sarawak Government incorporated the conservation of the edible-nest swiftlets into its Wildlife Master Plan. Subsequently, a comprehensive 12-month study on the annual breeding periodicity of Brown-rumped Swiftlet was conducted at middle Baram, Sarawak (Lim 1999). A similar study was also conducted on the Black-nest Swiftlet at Bukit Sarang in 2000 (Lim 2000). Both studies produced a tremendous amount of practical information with significant management implications.

Swiftlets annual breeding periodicity

The annual breeding season of the Brown-rumped Swiftlet and Black-nest Swiftlet is a protracted event, lasting at least nine months from August to March. There are three breeding bouts within this period (Figure 1). One breeding bout is defined as the first nest deposition until completion of the nest, followed by laying, incubation, and brooding until the nestlings are strong enough to fledge. Each breeding bout lasts between 86 and 116 days (30 days of nest building, 19 – 32 days incubation, 37 – 54 days brooding to fledging), or roughly 4 months.

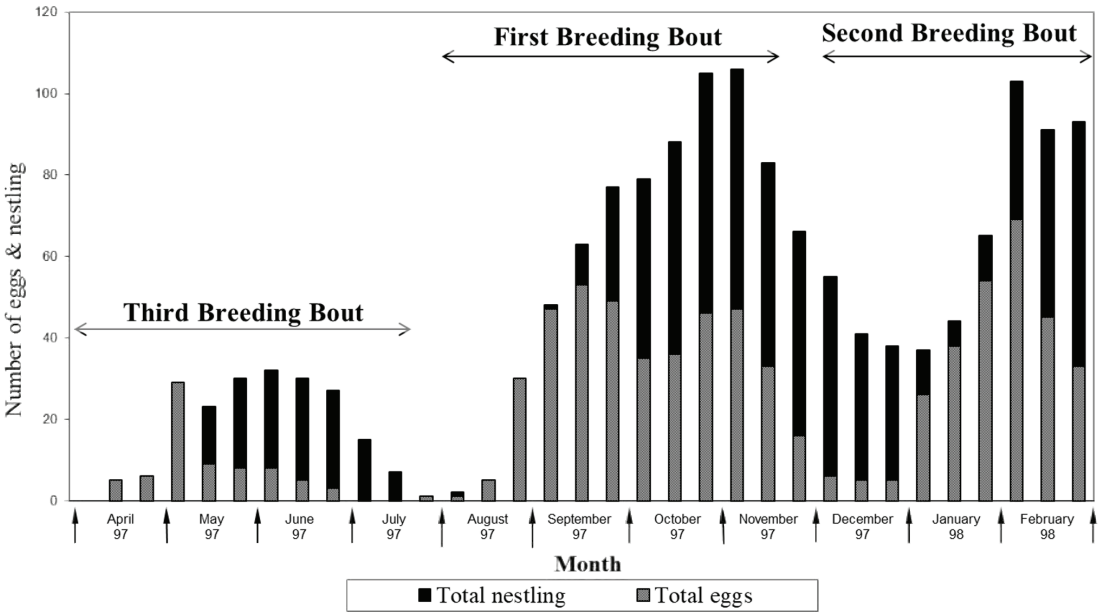

Figure 1. Three distinctive peaks represent three breeding bouts of Brown-rumped Swiftlets (*A. fuciphagus vestitus*) at Lubang Salai, middle Baram, Sarawak.

If the nest is not collected after the nestlings have fledged, or deteriorated due to damp surrounding, the same pair will re-use it. If the nest is removed, another replacement nest will be built on the same site. If eggs are lost during incubation, another replacement clutch will be laid. If breeding is successful and the nestlings have fledged, the parent will produce a subsequent clutch.

All species of Aerodramus lay a 2-egg clutch, except for the Black-nest Swiftlet that produces a single egg clutch. Swiftlets employ a multi-brooded reproductive strategy, meaning they will attempt to produce as many clutches and raise as many young as possible within the favorable breeding season. On average, with three breeding bouts, each pair of Brown-rump Swiftlet and Black-nest Swiftlet can produce three and two nestlings per year, respectively.

Successful conservation stories

A thorough understanding of the swiftlets' breeding biology is crucial in formulating sustainable harvesting practices that strike a balance between nest exploitation and conservation. The scientific basis for sustainable harvest, applicable to both species, dictates a mandatory 4-month no-harvesting period every year to allow each pair to raise one brood of nestlings. There are three examples of how declining swiftlet populations were reversed years after sustainable harvest was implemented.

The first example is a well-documented cave, i.e. Lubang Salai, in middle Baram, Sarawak. This cave is inhabited by the subspecies of Brown-rumped Swiftlet (*A. fuciphagus vestitus*). After sustainable harvest was adopted in 1998, the swiftlet population increased over the years as shown in Table 1. This government endorsed sustainable harvesting plan calls for a compulsory closed season from January to April every year. This 4-month closure is sufficient to achieve a full breeding cycle. Thereafter, the local communities are allowed up to five nest harvests per year.

Table 1. Data showing increase in the Brown-rumped Swiftlet populations in Lubang Salai, middle Baram Sarawak after sustainable harvest was implemented in 1998.

Year	Population Size	Increment
1997	1,398	–
1998	1,339	– 4 %
1999	1,524	+ 9 %
2000	1,976	+ 41 %
2001	2,400	+ 72 %
2002	3,240	+ 132 %
Fast forward to 2019		
2019	8,366	+ 498 %

The story of exploitation and conservation of Black-nest Swiftlets is more complicated because of anthropological issues. Outright total ban on harvesting is pointless when an area could not be effectively guarded. Illegal harvesting easily defeats any conservation efforts. Furthermore, it also fails to address the social-economical plights of the local communities. In Sarawak, most of the caves inhabited by Black-nest Swiftlets are communally shared. As such, tragedy of the common sets in.

A new concept of managing communal caves, where the traditional system has failed, was introduced at Bukit Sarang, Bintulu Division (Lim 2000), and at Niah National Park (Lim and Haidar 2003). The appointmentemergence of a cave manager under a unified group consolidates control, overseeing several areas combined under a larger, stronger and more efficient management. Only then can sustainable harvest be implemented. The outcome is a win-win situation for all parties, including the swiftlets. Swiftlets populations at these two locations have increased significantly over the years after a sustainable harvest regime was implemented as shownshowed in the Table 2 and Table 3 below.

Table 2. Data showing significant increase of Black-nest Swiftlet populations at Bukit Sarang, Bintulu Division, Sarawak (sustainable harvest implemented in 2000).

Year	Population Size	Increment
2000	8,528	–
2001	8,905	+ 4 %
2002	9,356	+ 10 %
2003	10,000	+ 17 %
2004	12,000	+ 41 %
2005	13,400	+ 57 %
2006	14,000	+ 64 %
2007	15,800	+ 85 %

Table 3. Recovery of Black-nest Swiftlet populations at Lubang Perintah, Niah National Park over a period of 21 years.

Year	Population Size	Increment
2002	2,974	–
2003	3,056	+ 3 %
2004	3,122	+ 5 %
2005	3,526	+ 20 %
2006	3,594	+ 23 %
2007	3,814	+ 30 %
Fast forward to 2023		
2023	9,174	+ 208 %

It is safe to state that at least some edible-nest swiftlets populations in Sarawak are sustainably managed and conserved. More importantly, the local communities having rights to these swiftlet colonies continue to derive livelihood from this valuable wildlife resource in a sustainable manner. In addition, Gomantong Cave in Sabah, where both Black-nest Swiftlets and Brown-rumped Swiftlets occur, is also reportedly being sustainably managed. Finally, a once balanced human-swiftlet relationship that was wrecked by human greed is now restored in few places.

Historical development of swiftlet farming industry

Swiftlet farming is similar to apiculture but instead of hives, humans build specially designed buildings that imitate cave-like environments to lure swiftlets to roost and nest. Indonesia is the birthplace of this industry, where the first of such houses was reported in Sedayu, East Java, in 1880 (Mardiastuti 1996). The initial approach was passive colonisation of buildings by the swiftlets. Nothing is done to improve the conditions within these houses.

As the price of EBN appreciated in the 1980's, people started to modify any buildings occupied by the swiftlets to make them more conducive for these wealth-creating inhabitants. Fundamental techniques and innovative modifications to emulate a cave-like atmosphere, as we see today in the swiftlet farming industry, were developed. The modern swiftlet farming era is epitomised by acoustic manipulation of swiftlets' social vocalisations associated with colonial nesting or courtship behavior. Play-back of swiftlet calls are used to excite and entice or lure the swiftlet into newly constructed buildings specifically designed for this purpose.

Spontaneous colonisation of old shop-houses by *A. fuciphagus fuciphagus* throughout Peninsular Malaysia occurred as early as 1940's and 50's (Cranbrook *et al.* 2013). The earliest published record of a swiftlet house in Malaysia is in Penang (Langham 1980). Intensive swiftlet farming only started around 1995/96, and truly took off during the Asian financial crisis in 1997/98, because so many completed shop-houses remain unsold, sitting empty unutilised. Many took this opportunity to convert them into swiftlet houses. About the same time, detached swiftlet houses erected on agricultural land also began to mushroom across sub-urban and rural areas across Peninsular Malaysia.

Prior to the Asian financial crisis, it was estimated that there were only roughly 150 or so swiftlet houses throughout Peninsular Malaysia. By 2000, the number had increased to about 800 houses, and between 5,000 to 8,000 houses in 2003. By 2006, this number had exceeded the tens of thousands mark. The rapid expansion of swiftlet farming in Malaysia also coincides with the rise of China's economic boom. The rise of affluent and middle classes in China pushed the demand for EBN to a new level. However, the peak of this industry was from 2010 to 2015, thereafter the swiftlet populations in houses also started to decline.

The EBN industry suffered a severe blow with the nitrite crisis in 2011, when China, the biggest EBN market, banned the import due to high levels of nitrite found in some nests. This crisis was partially resolved in 2012. The total ban was only lifted by the Chinese government in 2014. Although the export of EBN to China has resumed, the industry has been unable to attain export volumes compared to the golden-years era.

Kota Kinabalu

DILEMMA AND CHALLENGES AHEAD

One caveat for the success of conservation stories is that the caves must be able to be guarded effectively. As such, significantly more Black-nest Swiftlets caves across its distribution ranges are not so secured. Most populations are still being decimated by over-harvesting. One saving clause, however, is that with better quality EBN produced from swiftlet houses at comparable price, demand for "black-nest" almost come to a standstill in the last 2 years, with prices drop by almost 85%. Hopefully, this will provide some respite for the Black-nest Swiftlets.

The species that is currently in dire state is the Grey-rumped Swiftlets (*A. inexpectatus*). Its distribution in Peninsular Malaysia is mainly confined to the east coast islands of Terengganu-Pahang-Johor archipelago, e.g. Pulau Nyireh (Terengganu), Tioman (Pahang), Pulau Tinggi (Johor). In Sarawak, this species is found in Pulau Satang Island and Lakei, while in Sabah it has been recorded from Pulalu Mantanani off the coast of Kota Belud, and Pulau Berhala in Sandakan Bay. Repeated trips by Earl of Cranbrook in 2010's to these islands failed to spot any (pers. com.), suggesting our greatest fear of local extinction.

On the swiftlet farming front, it appears that populations of the semi-domesticated *A. fuciphagus fuciphagus* have been artificially increased by the countless number of bird houses constructed across Malaysia. No doubt the populations in swiftlet houses had exploded during the initial flourishing phase. Nonetheless, in recent years, overall EBN productions from swiftlet farming are also in the decline, but pose no immediate existential threat to this sub-species.

This leads to the next important question. What is the future outlook for edible bird's nest industry? Answer to this question will also provide insight into the future threat to the edible-nest swiftlets. China is the main consumer of EBN; intricately woven into the Chinese gastronomic ethos and beliefs. But will the younger Gen-Z embrace such indulgence? Or will EBN suffers similar demise as shark-fin soup? Rejected by personal conscious. Many say this is a sunset industry; already passed its golden era.

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