International Journal of Progressive Sciences and Technologies (IJPSAT)
ISSN: 2509-0119.

https://ijpsat.org/
SCHOLAR AI Be Smart
Vol. 51 No. 1 June 2025, pp. 185-192

Enhancing Swiftlet Population And Nest Yield Through Homemade Aromatic Stimulants

Mohammad Hasil Tamzil[1], Budi Indarsih[1], I Gede Nano Septian[1], Kaswatul Rahman[2]

[1] Faculty of Animal Science, University of Mataram, Jalan Majapahit, number 62 Mataram Lombok, West Nusa Tenggara Indonesia

[2] Undergraduate students of Faculty of Animal Science, University of Mataram, Jalan Majapahit, number 62 Mataram Lombok, West Nusa Tenggara Indonesia.

Corresponding Author: Mohammad Hasil Tamzil. Email: m.h.tamsil@unram.ac.id

Abstract: The objective of the present study is to ascertain the impact of the administration of self-composed stimulants via spraying on the population, weight, and quality of edible bird's nests. The research was conducted over a period of four months, commencing in September 2023 and concluding in January 2024, in Tero Hamlet, Jotang Beru Village, Sumbawa Regency. The study was conducted in a three-story swiftlet house, with each floor comprising four rooms, each measuring 168m^2. On the ground floor, no stimulant aroma was administered, while on the second and third floors, each was sprayed with a homemade stimulant aroma and a local commercial stimulant aroma. The observed variables included the number of nests, the weight of the nests, and the quality of the nests. The data obtained were then subjected to tabulation and analysis using the T-test. The findings of the study indicated that the provision of a stimulant aroma in the swiftlet house environment can stimulate population growth, yet it does not exert an effect on the weight or quality of the nest. The results of the study demonstrated that the homemade stimulant aroma produced a percentage increase in the nest population that was equivalent to that of the local commercial stimulant aroma. Consequently, the utilisation of a custom-made stimulant aroma is advised to enhance the proliferation of swiftlet nests.

Keywords: Swiftlets, stimulating aroma, edible bird's nest, weight and quality of nest

Introduction

Swiftlets are wild animals that are extensively cultivated by humans for the purpose of producing edible bird's nests (EBNs), which possess a high economic value. Edible bird's nests are produced from the saliva of swiftlets, which is smeared simultaneously by both male and female birds on the walls of caves or ceilings of edible houses (Tamzil, 1997; Ma and Liu, 2012). The nest is used for three primary functions: to provide a site for egg-laying and egg-incubation, as well as a location for rearing young (Tamzil, 1997). Edible bird nests (EBNs) are utilised in the beauty, medical and food industries (Daud et al., 2019a, Daud et al., 2019b). The utilisation of EBNs in traditional Chinese medicine has a long history, dating back to the Tang dynasty (618–907 AD) and the Sung dynasty (960–1279 AD) (Koon & Cranbrook, 2002). Edible bird nests have been found to be rich in protein, carbohydrates, iron, salt and organic fibre (Quek et al., 2018). Scientific research has demonstrated the efficacy of edible bird's nest in preventing various diseases (Haghani et al., 2016), stimulating epidermis growth (Kong et al., 1987), suppressing the production of tumour necrosis factor-alpha (TNF-α) (Aswir & Wan Nazaimoon, 2011), and inhibiting viral infections (Guo et al., 2006). Additionally, it has been shown to enhance respiration and alleviate digestive issues (Wong, 2013). The utilisation of swallowtail bird's nest extract within the beauty industry is purported to facilitate the regeneration of skin cells (Kong, 1987), thereby ensuring the maintenance of skin brightness and an anti-aging effect (Koon and Cranbrook, 2002). The hypothesis that the contents of edible bird nests (EBN) are

International Journal of Progressive Sciences and Technologies (IJPSAT)
ISSN: 2509-0119.

https://ijpsat.org/
Vol. 51 No. 1 June 2025, pp. 185-192

involved in biological pathways for health is supported by the evidence that EBN contain bioactive peptides (Wong et al., 2017) and glycoproteins (Shim et al., 2016), thus enabling them to function as functional food (Shim et al., 2016).

Figure 1. Edible house at research site

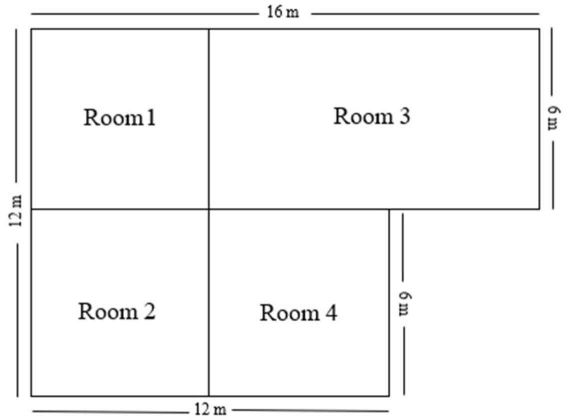

Figure 2. Floor plans of the 1st, 2nd and 3rd floors of the edible house at the research location

Figure 3. Target fin board for spraying stimulating aromas

It is particularly prevalent in Indonesia, where swiftlets houses are widely developed in rural areas. Furthermore, Indonesia has been identified as the leading importer of edible bird's nests worldwide, accounting for approximately 85% of global imports (Wahyuni et al., 2021). Edible bird's nest products originating from Indonesia are widely regarded as premium commodities, as evidenced by their superior quality when compared to those from other nations (Lee et al., 2017). As demonstrated in the seminal work of Kong et al. (2016), other countries in which swallowtail bird nests are produced include Malaysia, Thailand, Vietnam, the Philippines and China. Edible bird's nest from Indonesia are obtained from caves and houses that are edible and which are spread throughout Indonesia. Initially, swiftlets resided in caves that were isolated from human habitation. However, due to the high level of nest exploitation by edible nest hunters, swiftlets became disturbed and migrated to locations that were considered safer (Tamzil, 1997). Alternative options include old houses and/or unoccupied houses or buildings that are considered safe. The community is taking advantage of this phenomenon of edible migration by preparing buildings with construction and ecosystems similar to caves. The factors that must be considered in the design of a edible house are twofold. Firstly, the structure must be sturdy, and secondly, it must contain an ecosystem with conditions similar to those found in a edible cave (Tamzil, 1997). These conditions include

International Journal of Progressive Sciences and Technologies (IJPSAT)
ISSN: 2509-0119.

https://ijpsat.org/
Vol. 51 No. 1 June 2025, pp. 185-192

temperature, humidity and light intensity. A number of other efforts have been made to encourage the edible to visit the edible's house. These include the use of a recorded voice as a caller and the spraying of a stimulating aroma. The aim of these efforts is to encourage the survival and reproduction of the edible in the edible's house. At present, there is a plethora of commercial stimulant aromas in circulation; however, the present study will attempt to utilise stimulant aromas derived from existing local resources. The issue is that the effectiveness of this stimulant aroma has not yet been widely studied, so this research is an attempt to address this gap in the literature.

Materials and methods

1. Place and Time of Research: The research was conducted over a period of four months, from September 2023 to January 2024, in Tero Hamlet, Jotang Beru village, Sumbawa district. The research was conducted in a Swallow House (see Figure 1), a three-storey building comprising four rooms, with each room measuring 168m2. As illustrated in Figure 2, the floor plan for each storey is presented.

2. Research Method: The present study constitutes a comparative analysis, with the ground floor designated as the control (i.e. not treated with stimulants). In contrast, the second and third floors have been treated with self-mixed stimulants and a locally-sourced commercial stimulant aroma, respectively.

3. The preparation of the stimulant aroma involves the utilisation of swallowtail bird nests, chicken eggs and water. An adequate quantity of edible bird's nest is introduced into a pan containing 200 mL of water. The mixture is then subjected to boiling for a duration of 5-10 minutes. Subsequent to this, the pan is removed from the heat and allowed to cool. Thereafter, the mixture is filtered using a tea strainer. A total of 100 millilitres of filtered product is mixed with one chicken egg white and shaken vigorously until the mixture is homogeneous. The subsequent step is to transfer the substance into a spray bottle, ensuring its immediate availability for utilisation. The preparation of commercial stimulant aroma (H3N1) also employs water as a solvent, in accordance with the guidelines stipulated on the product label/packaging.

4. Spraying Process: The application of artificial and commercial stimulant aromas is conducted in a uniform manner on the fin board. The spraying process was conducted on a weekly basis throughout the research period. In order to facilitate the spraying process, it is recommended that a flashlight be utilised as a source of illumination.

5. The following variables were observed: The variables observed in this study are as follows:

   a. The quantity of nests has been determined. The number of nests was determined by meticulously enumerating the nests at harvest using a hand tally counter.

   b. The following investigation will examine the percentage increase in the population of nests. The data presented herein was obtained by subtracting the number of nests present at the time of harvest from the initial number of nests recorded at the commencement of the research, subsequently multiplied by one hundred.

   c. The quantity of weight pertaining to the nest. The data pertaining to the weight of each nest was obtained by means of weighing each nest from each floor that had been harvested. The following investigation will examine the percentage increase in the population of nests. The data presented herein was obtained by subtracting the number of nests present at the time of harvest from the initial number of nests recorded at the commencement of the research, subsequently multiplied by one hundred.

   d. The quality of the nest. The quality of the nest is determined by the shape of the nest. Edible nests of the highest quality, designated as 'quality A', are characterised by a bowl-shaped morphology. Nests of the next highest quality, designated 'quality B', are those that exhibit a corner or triangular configuration. The third category, 'quality C', is assigned to nests that display a broken shape, also referred to as 'spots'.

   e. The relationship between the temperature and humidity of the environment and the edibility of bird's nest. The measurement of temperature and humidity in the edible house room is conducted through the utilisation of a thermos hygrometer..

International Journal of Progressive Sciences and Technologies (IJPSAT)
ISSN: 2509-0119.

https://ijpsat.org/
Vol. 51 No. 1 June 2025, pp. 185-192

6. Data Analysis. The data pertaining to the number of nests, nest weight and quality of swallow nests obtained were tabulated and analysed using the T test.

Results And Discussion

The impact of stimulant spraying on nest population, nest mass and nest quality is outlined in Table 1. The analysis revealed that the highest population of nests was observed in rooms that had been treated with self-mixed stimulants, followed by rooms that had not received such treatment. The lowest population was found in rooms that had been treated with a local commercial stimulant aroma. The substantial quantity of nest populations observed in rooms treated with self-mixed stimulants indicates that the application of these stimulants can effectively attract swallowtails, leading to their settlement, egg-laying, and subsequent propagation within the designated area. A comparison of the number of nests produced in rooms that were sprayed with commercial stimulant aromas (on the 3rd floor) with the number of nests produced in rooms that did not receive stimulant aroma sprays (on the ground floor) revealed that the former was lower, though not significantly different. The low number of nest populations is attributable to the fact that the third floor is the room with the highest light intensity, due to its direct connection to the bird's entrance. As Saleh et al. (2022) demonstrate, the presence of high light intensity in a room has been shown to have a negative effect on the behaviour of swiftlets. The optimal ambient temperature for the storage of edibles is a range between 0.5 and 2 fc (Tamzil, 1995; Budiman, 2011), with a temperature ranging from 26 to 28°C and relative humidity between 85 and 98% (Mardiastuti et al., 1997). However, an examination of the rate of increase in the nest population reveals that the percentage increase in the nest population in rooms that were sprayed with self-mixed stimulants and local commercial stimulant aroma was relatively equivalent to, and in some cases higher than, the percentage increase in nest populations in rooms that did not receive stimulant sprays. Indeed, the room that was not subjected to the stimulant aroma spraying treatment exhibited the lowest light intensity (darkest), with a room temperature of 27°C and relative humidity of 85%, in accordance with the recommendations of Mardiastuti (1997), namely a temperature between 26–28°C and a relative humidity of 85–98%. In the experimental rooms treated with self-mixed stimulants and local commercial stimulant aroma, higher temperatures and relative humidity were recorded, specifically between 30-32°C and relative humidity between 70-80%. The results of the T-test demonstrated a statistically significant difference in the level of nest production between rooms that did not receive the stimulant aroma spray and those treated with self-mixed stimulant aroma spraying and commercial stimulant aromas ($P < 0.05$). However, no statistically significant difference was observed between rooms that received the self-mixed stimulant aroma spraying and those that received the commercial stimulant aroma spray ($P > 0.05$). Consequently, the level of nest production in a room with high light intensity, but given a stimulant aroma spray, is equivalent to the level of nest production in a room with low light intensity. It can thus be concluded that, in order to increase the number of nest populations in rooms that are directly connected to bird holes that have high light intensity, the implementation of a stimulating aroma spray is an effective solution.

Table 1. Effect of spraying stimulant aroma on swallow nest production

Variable	Treatment		
	Without any stimulating aroma	**Homemade stimulant**	**Local commercial stimulant**
1. Nest production (noun)	495	522	448
2. Increase in the number of nests (%)	6.38	7.73	7.02
3. Nest weight/harvest (g)	3508	3701	3000
4. Nest weight distribution (g/nest)			
• Mean±sd	7.1±0,88	7.1±1,03	6.7±0,51
• Median	7	7	7

International Journal of Progressive Sciences and Technologies (IJPSAT)
ISSN: 2509-0119.

https://ijpsat.org/
Vol. 51 No. 1 June 2025, pp. 185-192

• Modus	7		7		7	
• Lowest value	4		4		4	
• Highest value	9		9		8	
5. Nest quality:						
	Noun	**%**	**Noun**	**%**	**Noun**	**%**
A	219	44	229	44	197	44
B	200	40	220	42	191	43
C	76	16	73	14	60	13
	495	100	522	100	448	100

Note: No stimulant aroma spraying (ground floor). Homemade stimulant aroma spraying (2nd floor). Local commercial stimulant aroma spraying (3rd floor)

As demonstrated in Table 1, the data indicates that the average weight of nests originating from rooms that received commercial stimulant aroma spraying was lower and more uniform in comparison to the average weight of nests originating from rooms that received self-mixed stimulant aroma spray and from rooms that did not receive any stimulant aroma spraying treatment. The low level of nest weight can also be seen from the highest nest weight value, which only reached a weight of 8 grams per nest. By contrast, the weight of nests produced from rooms that were treated with self-concocted stimulant aroma spraying and from rooms that did not receive stimulant aroma spraying treatment could reach 9 grams per nest. The productivity of the nest is contingent upon the capacity to produce saliva. It has been demonstrated that an environment with elevated light intensity will increase the ambient temperature and reduce humidity levels, and vice versa (Budiman, 2011). Conversely, a low light intensity (darkness) in the environment has been shown to provide the avian subject with a sense of comfort and security, as it is perceived to offer protection from potential predation. The impact of this intervention is that the swiftlets becomes calmer and saliva secretion runs normally or smoothly, resulting in a normal nest weight (Turaina, 2016). The mean weight of nests resulting from this research is consistent with the mean weights of nests from previous research, ranging from 8-9 grams per nest (Susilo et al., 2016), while the mean weight of swallow nests ranges from 4-9 grams per nest (Daud et al., 2021).

The data presented in Table 1 also demonstrates that the treatment of spraying self-mixed stimulants and local commercial stimulant aroma resulted in the same percentage of A quality nests, yet increased the percentage of B quality nests and decreased the percentage of C quality nests. The observed discrepancy was not attributable to the stimulant aroma spraying treatment. Rather, it was predominantly influenced by extrinsic factors, such as the location of the nest site and the presence of feathers in the nest. A nest constructed in the corner of a building will typically manifest as a triangular structure, exhibiting a consistent size (Warisman et al., 2020; Adelina, 2023). The classification of swallow nests is determined by the location of the nest on the fin. If the nest is positioned on a straight fin, it is categorised as class A and produces a bowl-shaped nest. If the nest is positioned on a corner of the fin, it is categorised as class B and produces a corner-shaped nest. However, if the nest exhibits a physical condition that is broken and polluted with feathers, it is categorised as class C (Budiman, 2011).

International Journal of Progressive Sciences and Technologies (IJPSAT)
ISSN: 2509-0119.

https://ijpsat.org/
Vol. 51 No. 1 June 2025, pp. 185-192

Figure 4. A: A quality nest, B: B quality nest, C: C quality nest

Conclusions and Recommendations

The provision of self-concocted stimulant aromas in the edible's house has been demonstrated to increase the population of the nest, yet this does not affect the weight and quality of the nest. It is therefore recommended that a stimulating aroma be used in an effort to increase the attractiveness of swiftlets to live and reproduce in the edible house.

Acknowledgements

The highest gratitude and appreciation are conveyed to Mr. Kaharuddin (owner of the swallow house) for the facilities provided, so that this research can run smoothly.

REFERENCES

[1]. **Adelina W 2023** Analisis Kualitas Produk dan Strategi Pemasaran Sarang Burung Walet di Kecamatan Pelaihari Kabupaten Tanah Laut (Analysis of Product Quality and Marketing Strategy for Swallow's Nests in Pelaihari District, Tanah Laut Regency). Diss. STIE Indonesia Banjarmasin, 2023.

[2]. **Aswir R, Mahmud WNW 2011** Effect of Edible Bird's Nest on Cell Proliferation and Tumor Necrosis Factor-Alpha (TNF-α) Release in Vitro. International Food Research Journal 18: 1123–1127.

[3]. **Budiman A 2011** Memproduksi Sarang Burung Walet Kualitas Terbaik (Producing Top Quality Swallow Nests). Jakarta: Penebar Swadaya

[4]. **Daud NA, Sarbini SR, Babji AS, Yusop SM, Lim SJ 2019a** Characterization of Edible Swiftlet's Nest as a Prebiotic Ingredient Using a Simulated Colon Model. Annals of Microbiology 69(12): 1–12. https://doi.org/10.1007/s13213-019-01507-1

[5]. **Daud NA, Yusop SM, Babji AS, Lim SJ, Sarbini SR, Yan HT 2019b** Edible Bird's Nest: Physicochemical Properties, Production, and Application of Bioactive Extracts and Glycopeptides. Food Reviews International 1-20. https://doi/full/10.1080/87559129.2019.1696359

[6]. **Daud M, Hikmah H, Alamsyah A 2021** Ciri-ciri dan Produksi Burung Walet Sarang Putih (Collocalia fuciphaga) Hasil Budidaya Burung Walet di Desa Binanga Karaeng Kecamatan Lembang Kabupaten Pinrang (Characteristics and Production of White Nest Swallows (Collocalia fuciphaga) from Swallow Cultivation Products in Binanga Karaeng Village, Lembang District, Pinrang Regency). Fahutan Proceedings. 2.02 (2021).

[7]. **Guo C Takahashi T Bukawa W, Takahashi N, Yagi H, Kato K, Hidari KI, Miyamoto D, Suzuki, T, Suzuki, Y 2006** Edible Bird's Nest Extract Inhibits Influenza Virus Infection. Antiviral Research 70: 140–146. Https://doi.org/10.1016/j.antiviral.2006.02.005

[8]. **Haghani A, Mehrbod P, Safi N, Aminuddin NA, Bahadoran A, Omar AR, Ideris A 2016** In vitro and in vivo mechanism of immunomodulatory and antiviral activity of edible Bird's Nest (SBW) against influenza a virus (IAV) infection. Journal of ethnopharmacology. 185: 327-340. https://doi.org/10.1016/j.jep.2016.03.020

[9]. **Kong HK, Wong KH, Lo SCL 2016** Identification of peptides released from hot water insoluble 212 Wahyuni et al. http://www.journal.ipb.ac.id/indeks.php/actavetindones fraction of edible bird's nest under simulated gastrointestinal conditions. Food Research International 85: 19–25. https://doi.org/10.1016 /j.foodres.2016.04.002

[10]. **Kong YC, Keung WM, Yip TT, Ko KM, Tsao SW, Ng MH 1987** Evidence that Epidermal Growth Factor Is Present in Swiftlet's (Collocalia) Nest. Comparative Biochemistry and Physiology B. 87(2): 221–226. https://doi.org/10.1016/0305-0491(87)90133-7

[11]. **Koon LC, Cranbrook 2002** Swiftlets of Borneo – Builders of Edible Nests.). Natural History Publication (Borneo) SDN. B.H.D. Sabah, Malaysia. 1-171

[12]. **Lee TH, Wani WA, Koay YS, Kavita S, Tan ETT, Shrea S 2017** Recent advances in the identification and authentication methods of edible bird's nest. Food Research International 100: 14–27. https://doi.org/10.1016/j.foodres.2017.07.036

[13]. **Ma FC, Liu DC 2012** Extraction and Determination of Hormones in the Edible Bird's Nest. Asian Journal of Chemistry 24(1): 117–120.

[14]. **Mardiastuti A 1997** Pemanfaatan Sarang Burung Walet secara Berkelanjutan. Makalah pada Seminar Pemanfaatan Potensi Burung untuk Mendukung Pembangunan Nasional, Taman Burung Taman Mini Indonesia Indah Jakarta (Sustainable Use of Swallow's Nests. Paper at the Seminar on Utilizing Bird Potential to Support National Development. Taman Mini Indonesia Indah Bird Park) 29 April 1997.

[15]. **Saleh MM, Ambarraras WP, Hadi I 2022** Kontribusi Usaha Sarang Burung Walet Dalam Meningkatkan Pendapatan Perekonomian Masyarakat dalam Perspektif Ekonomi Syariah (Contribution of the Swallow's Nest Business in Increasing Community Economic Income According to a Sharia Economic Perspective) Bisnis dan Keuangan Islam 3.1

[16]. **Shim EK, Chandra GF, Pedireddy S, Lee SY 2016** Characterization of swiftlet edible bird nest, a mucin glycoprotein, and its adulterants by Raman microspectroscopy. Journal of food science and technology 53(9): 3602-3608. https://doi.org/10.1007/s13197-016-2344-3

[17]. **Susilo, Heru, Latif H, Ridwan Y 2016** Application of washing method under running water to reduce nitrite level of edible bird's nest. Veterinary Journal-Indonesian Journal of Veterinary Sciences. 10.2 (2016): 95-97.

[18]. **Tamzil MH 1997** Mengenal burung walet dan upaya mencegah penurunan populasi dan produksi sarang (Getting to know swallows and efforts to prevent population decline and nest production). ORYZA. Vol, III (10): 69-84

[19]. **Turaina A, Dani G, Indrawati Y 2016** Identifikasi habitat dan produksi sarang burung Walet (Collocalia Fuciphaga) di Kabupaten Lampung Timur (Collocalia Fuciphaga) (Nest production and habitat identification at East Lampung district). Padjadjaran University, Bandung

[20]. **Wahyuni DS, Latif H, Sudarwanto MB, Basri C 2022** Swiftlet rearing patterns on the main islands producing swiftlet nests in Indonesia. Journal of Veterinary Science, 40(2), 117-127.

[21]. **Warisman, Wahyudi B, Ilham W, Asysyifa A 2020** Analisis kekurangan dan kelebihan dari usaha sarang burung walet di Kelurahan Angsau Kecamatan Pelaihari Kabupaten Tanah Laut (Analysis of the Disadvantages and Advantages of the

Swallow's Nest Business in Angsau Village, Pelaihari District, Tanah Laut Regency). Sylva Scientae Journal 3.4 (2020): 594-601.

[22]. **Wong RSY 2013** Edible Bird’s Nest: Food or Medicine. Chinese journal of integrative medicine 19(9), 643–649. https://doi.org/10.1007/s11655- 013-1563-y

[23]. **Wong F, Chan GK, Zhang M, Yao P, Lin HQ, Dong TTX, Li G, Lai XP, Tsim KWK 2017** Characterization of Edible Bird’s Nest by Peptide Fingerprinting with Principal Component Analysis. Food Quality and Safety 1(1): 83–92. https://doi.org/10.1093/fqsafe/fyx002

[24]. **Quek MC, Chin NL, Yusof YA, Law, CL, Tan SW 2018** Characterization of edible bird’s nest of different production, species and geographical origins using nutritional composition, physicochemical properties and antioxidant activities. Food Research International 109: 35–43. https://doi.org/10.1016/j.foodres.2018.03.078