Preference swiftlet bird (*Aerodramus fuciphagus*) nesting at different sites in an effort to increase nest production

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**Abstract.** Nest sites were used special place of swiftlet bird. Nest of swiftlet bird are usually difficult to reach place. This study want to know the potential for nest sites in a swiftlet bird house. Four types of different nest sites were installed at nesting and roving room, made by wood, bamboo, aluminium, concrete at the swiftlet bird house. And then, the breeding swiftlet birds using the different nest sites type were recorded during the breeding season for finding the effectiveness of four different nest sites type. Nest-site with the different material were installed using materials made of wood, bamboo, aluminium and concrete. The results were that 25% (n=6) for wood material, 41.66% (n=10) for bamboo, 29.66% (n=7) for aluminium and 4.16% (n=1) for concrete. From this result, the breeding swiftlet bird showed preference for better bamboo material for nest-site when there were abundant in nesting room 83% (n=20).

**Keywords:** Swiftlet bird (*Aerodramus fuciphagus*), Nest-site material

1. Introduction

The swiftlet birds (*Aerodramus fuciphagus*), found only in the South east Asian region, make their nests during the breeding season from the saliva. A variety of bird species may reuse nests, possibly with reduced costs of nest-site selection and construction, as well as providing information about nest-site quality (Slagsvold 1985). In Indonesia, the swiftlet birds farm need human help copied from caves structure, with regulating microhabitat (Lim et al. 2002).

Swiftlet birds make a nest using saliva and attached to the walls of the cave. in the swiftlet bird house, they lay and arrange nests on wooden boards in the nesting room (Langham, 1980). Reduced energetic costs may be important, since for some species of swifts, nest construction is a considerable investment in energy and time. Reuse would then provide an advantage in reduced time and energy spent in nest construction that can then allow more rapid nesting once birds arrive on the breeding ground. Swiftlet bird build nest in the mating season that occurs in the rainy season where many energy to compose a nest and take care of the subject of the juvenile (Arnold, 2004). The nest of the white-nest swiftlet is comprised primarily of pure saliva (Cranbrook & Lim, 2002).
Swiftlet birds nest-site material are created in order to aid in increasing swiftlet birds population. This study was conducted in order to provide information for a different nest sites with different nest-site material, with the data gathered after the assessment of the rate of usage depending on nested place preferences based on the material.

2. Material and Methods

2.1 Study areas
The study was conducted in swiftlet birdhouse at Jombang. The installation of the bird nests sites were conducted in with the room divided into two sections; Room A (nesting room) is characterized by a high number population of swiftlet birds, Room B (Roving room) by close proximity to entering the door for swiftlet birds and a low number population.

2.2 Methods
Swiftlet birds nest sites were installed between September 23rd of 2018, with wood, bamboo, aluminium and concrete in room A (nesting room), and same with room B (roving room). Taking in the reproductive season into consideration. After the installation, the species and number of reproductive birds were assessed in January-February of 2019.

Nest-site with the different material was installed using some materials made of wood, bamboo, aluminium and concrete 110 x 15 cm long wooden aluminium and concrete planks mounted on the ceiling of the room with a distance of 20 cm evenly spread throughout the room, while woven bamboo sized made 35 x 35 cm in height 15 cm resembling a box-shaped cap

While the using rates of the individual study area were not assessed, only the using rates of the three types of artificial bird nests and nest-site material were analyzed with the following equation.

Using rate(%) = \( \frac{\text{No. of bred and non bred nest}}{\text{No. of total nest at room A and B}} \times 100 \)

3. Result and Discussion
The results of installing different nest-site material swiftlet birds, the using rate was 100% (n=24) for overall and 25% (n=6) for wood material, 41.66% (n=10) for bamboo, 29.66% (n=7) for aluminium and 4.16% (n=1) for concrete (Table 1). there was a major difference between the using rate of different material in swiftlet birds house. And still, this study has shown that, in the case of the different room (Room A and B), where there are 4 nest in room B (Roving room) and 20 nest in room A (Nesting room).

| Table 1 Breeding birds and using rate of artificial nest sites |
|---------------------------------------------------------------|
| Room Nest site | Type of nest sites | Total |
|                | wood | bamboo | aluminium | concrete |
| A (Nesting room) | 5    | 8      | 6         | 1        | 20      |
| B (Roving room) | 1    | 2      | 1         | -        | 4       |
| Breeding       | 5    | 9      | 6         | 1        | 21      |
| Non breeding   | 1    | 1      | 1         | -        | 3       |
| Using rate     | 25%  | 41.66% | 29.66%    | 4.16%    | 100%    |


The factors in constructing swiftlet farms is the stable temperature of between 25°C - 28°C. so cold bamboo surfaces cause swiftlet birds prefer bamboo as a nesting site. Bamboo was a composite material with a high strength (Lakkad, 1981). Bamboo has been used as an alternative for nesting sites because of its physical similarities to true hardwoods. Bamboo promote its strength, durability, its eco-friendliness and its natural resistance to insects and moisture. The advantages using bamboo are Eliminate the swiftlet nest angle, makes birds comfortable so that breed swiftly quickly increases population of young swiftlet, can plug off for routine cleaning, young swiftlet toenails are more comfortable sticking.

Another alternative in making nest sites is to use materials from aluminum, basically people wrap wood fins with aluminum in the hope that these wood nest site are more durable and protected from mold, so that they are not slippery, thrown by being scratched and made grooves to make birds easily landed. The advantages are very easy to install, durable and long-lasting in use, easy to install because it already has a standard groove and size, anti-fungus and pests, cold material so that swiftlet bird preferred, good sound reflection. The disadvantages are price is expensive.

Another alternative is concrete nest sites. Nowadays too many people are using this option, building permanent bird house while building a concrete board made of concrete, so there is no need to bother thinking about replacing the nest sites board as if we use wood as the medium. The advantage of concrete nest sites boards is the robustness of the bird house building and it is not easily damaged so that it will be easier for us to build to suit your taste. We also do not need to worry about replacement and maintenance because concrete nest sites are a permanent building, and also cause cold and stable temperatures so that it does not interfere with the swiftlet bird population in it.

Fig 1 Grafik different nest site
Ideally the appropriate temperature for a swiftlet bird cultivation building is around 26-29 degrees Celsius and the temperature should be stable for 24 hours. However, there are some who say the swiftlet can tolerate temperatures up to 30 degrees Celsius. Make sure the room temperature does not exceed that number to maintain swift survival.

Ideal air humidity for swiftlet bird life ranges from 70% - 95%. Similarly, the temperature discussed above that the humidity of the air in the swiftlet bird building must also be kept stable for 24 hours and may not be less or more. If the humidity is less then the swiftlet bird will find it hard to drain its saliva to make a nest, while if it is excess the saliva of the swiftlet bird will also dry out quickly and it will also be very bad for the swiftlet bird's fins. This is because it will make the fungus grow faster because the humidity is too high.

| Room Nest site | Temperature (C) | Humidity (%) | Light intensity (lux) | Size (m) | Distance inlet bird (m) | nest |
|----------------|-----------------|--------------|-----------------------|----------|-------------------------|------|
| A (Nesting room) | 26 | 89 | 0 | 4 x 5 | 0,5 | 20 |
| B (Roving room) | 29 | 70 | 3 | 3 x 4 | 12 | 4 |

Fig 2 micro habitat at birdhouse

Mardiastuti et al. (1998) states that to obtain conditions houses with 0 lux light intensity can be done by: (1) closing permanent all the doors and windows for the swift's house that come from old buildings, (2) place swift doors in the north or south, (3) minimize the number of holes, (4) minimize the size of avian inlet swift, (5) place the wooden box right inside the inlet to directing incoming light at a certain point, and (6) placing gunny sack in front of the swift's door so that the incoming light is held back by the sack.
4. Conclusion
The breeding swiftlet bird showed a preference for better bamboo material for nest-site when there were abundant breeding sites (nesting room).

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