Climatic factors, Habitat Conditions and Nesting Behavior of White-Headed Munia (Lonchura maja) Birds

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Abstract. Scaly-breasted and white-headed Munia bird (Lonchura maja), is one of three species of Lonchura birds that live around UNY campus. Life habit and behavior is not well known. This study was done by observing the natural behavior without giving treatment to the object of research. The process of observations conducted from June to August 2017. This study aims to determine the condition of vegetation and climatic environment around UNY and the behavior of Lonchura birds, and determine ideal conditions for nesting. All data collected by visual observation. These results indicate that the vegetation condition around UNY related to Lonchura wildlife on campus, divided into 6 different locations. Each location has climatic conditions and different environmental carrying capacity resulting in species of birds that inhabit it any different. Scaly-breasted bird requires fairly dry location with an ideal temperature for the activity in the range of 27ºC, humidity is above 50% and the intensity of light that tends to light. Nesting sites of Lonchura made amid a clump of tree stands with a height at the top of the half-height of the tree. The most ideal conditions for Lonchura is the availability of feed such as grass seeds, the availability of dry grass for nest materials and also stands at over 4 meters high as nesting sites.

Keywords: Lonchura, bird, climatic, nesting and behavior.

1. Introduction
Discussion on the ecological never be separated from a discussion of the interaction between biotic and abiotic components. The existence of such interactions have meaning as their interplay. The state of abiotic components or the environment has a great influence on biotic components or living things. The environment has a great influence on the life of an organism, including the adaptation behavior. An organism will respond to the state of the environment in certain ways.

One way that is used by an organism in response to environmental conditions is to bring up a particular behavior with the aim to ensure the preservation of its kind. Reproductive behavior, feeding behavior, or other behavior in response to environmental conditions. For example, to organisms suffered high death threats from the environment on embryonic or juvenile phase, will respond to the situation by having a lot of offsprings [5].

Studies on the behavior of organisms, each organism will have a fixed pattern of behavior and procedural also. It means that pattern will be performed by all individuals of that species. Procedural patterns behavior means patterns do always correspond with successive stages and steps sequentially. Observation require the number of individuals, being one of the considerations to observe the dominant organisms in the terms of numbers. An increasing number of species in an ecosystem will
generally have a higher domination value that in addition to the importance of the organism itself in an ecosystem [5].

Birds become one of the organisms of importance in an ecosystem. Many roles are run by the bird, as described by [4] that the bird has an important value organisms is high enough. His role as pollinators, biological seed spread control or make the bird plays an important role in the food chain or in the food web in an ecosystem. An important role is causing the birds to be one kind of organism that is often observed and studied.

Lonchura, was one of the birds is quite a lot and live in colonies with a life span too wide. Area arround the Faculty of Mathematics and Sciences (FMIPA UNY) has a green open space sufficient to support bird life. As the data submitted by the Bird Observers Group (CDE) on bird life in UNY, [3], that Lonchura has the most number of individuals observed. It can be an indicator that Lonchura is a type of bird has a highly domination.

Given the ecological functions of birds as bio-indicators of environmental quality, especially indicators of biodiversity in an area, it is necessary to do research on the relationship where Lonchura with the condition or quality of the environment, both abiotic and biotic environment. Abiotic conditions mainly related to climatic conditions, while the biotic environmental conditions can be seen from its habitat conditions, ie: the condition of vegetation where this bird nesting and foraging. Environmental conditions will affect the life habit, daily behavior, and reproductive cycles. This is why doing the research on the influence of climatic and environmental factors on the behavior of nesting habitat of White-Headed Munia (*Lonchura maja*) Birds.

2. Materials and methods
   2.1. Types of research
   This research is an observational study or survey. Observations was done by the Ad-Libitum Sampling for *Lonchura maja* daily behavioral observations, as well as scanning and behavior sampling, which is observed in many individuals, but focus only observe nesting behavior of *Lonchura maja* birds.

   2.2. The location and time of the study
   The research located around the Universitas Negeri Yogyakarta (UNY) campus, Karangmalang, Yogyakarta. Observations climatic environmental conditions, habitat, and behavior were conducted during April - October 2017, while the nesting behavior observations, carried out in April - August 2017.

   2.3. Object of research
   The research object is a *Lonchura maja* birds, the study population is the whole population of *Lonchura maja* in FMIPA UNY campus area. Sampling was done by purposive based on the location of plants for nesting.

   2.4. Research variable
   Climatic factors in the *Lonchura maja* bird's nest, the parameters measured are air temperature, air humidity, light intensity, and wind speed. Habitat conditions, the measured parameter is the plant
species nesting site, frequency of attendance nest in the same tree species within the scope of observation, and the presence of plant species their feed source and nesting behavior *Lonchura maja*.

2.5. The research instrument
Observation sheets used for Ad-Libitum Sampling [1]. Sampling and behavior observation sheet scan sampling. Climatic data collection sheet and edafic. Equipment to measure climatic factors: lux-meter, hygrometer, air thermometer and anemometer.

2.6. Data collection
Ad-libitum, *Lonchura maja* thoroughly observed during the biological clock activity. Scan sampling, daily behavior observed as a whole within a certain time in the time-period specified. Behavior sampling, only nesting behavior are observed procedural focus. Observed as a whole in the process of making a nest.

2.7. Measurement of climatic condition and nesting environment.
At each point of the discovery of the nest, measured climatic conditions, the air temperature, humidity, light intensity, and wind speed. Measurements were performed on a weekly basis, performed from beginning to the end of the study (April-August), then the results were made weekly average. Measurements were taken at the same time every week (consistently).

2.8. Observations habitat conditions
Observations habitat conditions by identifying the types of trees / plants where the discovery of a nest *Lonchura maja*, frequency of attendance *Lonchura maja* nest on trees / plants the same, and the types of plants around the nest their feed source.

2.9. Data analysis
Behavior data collected was assessed to be made ethogram.

3. Results and Discussion
3.1. Ad-libitum observation data sampling
Basically the Scaly-breasted birds are diurnal birds that many activities during the day. Observations with ad-libitum sampling at 05:00 to 18:00. Daily activities of Lonchura were observed if birds amounted to more than 5 heads.

Activity populations are located mainly Lonchura at 08:30 to 10:00 in the morning and 14:30 to 15:30 in the afternoon. When these observations, it is often observed birds fly and leaving eastward the yard of D.02 FMIPA UNY buildings. The forecast is that we have built is that the flying to FIP or FIS faculty area. Often there are several birds also seen coming from the east. Our observed that Lonchura were the same with the left the D.02 building yard, meaning that ecological area Lonchura was in D.02 building of FMIPA area extends to other faculties area. Birds in the FMIPA laboratory area for the observation were very few visible individual.

Based on our ad-libitum observation data, observations shows the population of Lonchura do activity at the next stage, and we continued observe using scan sampling method.
3.2. Scan observation data sampling

In this observation, we try to find out what activities are being carried out by the population of Lonchura. This relates to the activities of these birds are influenced by the seasons. Based on data from [2], Scaly-breasted bird and Javanese Lonchura show nest building activity in February-March. Such assumptions are built of many individual sightings Javanese and Peking Lonchura collect dry grass as the main material nest. Departing from this, the research team assumes that the birds have a tendency reproductive cycles are not much different from the other two types Lonchuras. The trend is based on that of birds Lonchura often seen doing activities together with other types of sparrows (*Passer montanus*).

Observations by scan sampling showed some activity of the population Lonchura. This activity diverse as the population and the other one is often different and it depends on the time and weather. At the same time and with different weather, Lonchura also exhibiting a different behavior.

3.3. Behavioral observation data sampling

Observations on the nesting behavior of Lonchura on FMIPA campus area based on the reference to other types of behavior. During this time birds known to begin to build nests in February. It is an indicator of the entry of the breeding season. Nesting behavior refers to the behavior that is conducted during the nesting period later ripening period eggs until the eggs hatch and continue until the offsprings care in the nest. When seedlings are already out of the nest, the behavior is no longer included in the nesting behavior, but be nurturing behavior. There are also other opinions that separates the nesting behavior with parenting behavior with hatching chicks. So nesting behavior just until the eggs hatched chicks, when the chicks are hatched then it is referred to as a nurturing behavior while still being in the nest.

Assuming that time, the population has entered a caring period when the observations were made from July to August. One indicator is the discovery of some nests that are believed to nest Lonchura empty nest. Observations remain to be done and the expanded area of his observations to the FIP and FIS faculty areas. In some locations in FIP and FIS areas we found a nest that was believed to be the nest of Lonchura but also empty.

The assumption that mutual birds take over nests were also observed in the nest located in the pine trees in front yard of D.02 FMIPA UNY building. This nest was observed was visited by howl bird, but soon peking it away. After some time Lonchura come in to the nest, though shortly afterwards and went.

3.4. Environmental Climatic conditions and their effects on wildlife of Lonchura.

Indicators of climatic conditions that we use is the ambient temperature, humidify the air and light intensity. This is what we assume to be the main factor affecting the nesting behavior of Lonchura birds. As stated earlier that the Scaly-breasted bird has a tendency to choose nest sites in the environment humidity is not too high a temperature the same relative to the ambient temperature.

Many faculties of UNY campus, have several locations "unique", relation to wild life on campus. There shady garden, yard western and southern of D.08 FMIPA UNY building, central park...
of laboratory buildings, garden of ORMAWA, and D.02 FMIPA UNY building yard, each location has different climatic conditions. Scaly-breasted bird itself is more often seen in the yard and garden of D.02 central laboratory building. It is closely related to the availability of feed and nest material availability.

3.5. Vegetation conditions and its effects on wildlife Lonchura.

The Faculty of Mathematics and Sciences UNY, has several locations of Bird. This location is different from one another, partly because of differences in vegetation that resulted in differences in species of birds that can be observed. The Lonchura, this bird species observed activity in the laboratory central park and also the front page of the D.02 building. Lonchura has tendency observed at the site is due to the availability of feed and nest material and the availability of the stand as a location to make a nest.

Scaly-breasted bird eating graminaceae (grasses) seeds. This grass than as a provider of feed, also play a role as a provider of nest material. Dry grass is the main material for nesting of Javanese Lonchura. Based on the needs of dry grass as nest material provider, it is assumed that the Lonchura prefer locations with high light intensities low humidity exception to the nesting sites are more likely to be in the thick foliage.

Lonchura observed nests are in the palm stands in FMIPA laboratory building yard area. It was observed also in other locations such as FIP and FIS faculty areas. FIP is also observed at the nest of Lonchura which are on the stand of palm squirrels. On D.02 FMIPA UNY building yard area, observed nests on mountain pine stands. Lonchura observed nest has a height of more than 3 meters from the ground.

3.6. Ideal conditions Lonchura maja nesting.

To find out the conditions under which fits with wildlife Lonchura, we did some climatic data measurements. Our measurements were done at locations close to the nest and also the location of bird activity. Because at the time of our observations, the most populous bird at D.02 FMIPA UNY building area, then we did climatic measurements only at that location.

Lonchura has many activities in the branches or the tree tops are exposed to direct sunlight. Especially for fur browse activity. Other activities such as parenting, find a mate, twitter and many other do around the peak of stands have a tendency to locations that are exposed to light. The average climatic conditions and the location of nesting activity contained in the following table:

| Climatic indicators   | The location near the nest | Location for Activity |
|-----------------------|----------------------------|-----------------------|
| Ambient temperature   | 27°C                       | 27 °C                 |
| Humidity              | 53.25%                     | 51.12%                |
| Light intensity       | 8305                       | 9475                  |

From this table, it appears that Lonchura maja has a tendency to choose a location that is "reasonably dry".
3.7. Ethogram nesting behavior.

To make ethogram requires considerable behavioral data that is done repeatedly. The behavior exhibited should also complete and intact from such behavior. Nesting behavior, [3] states only since the creation of the nest by the male looking material indicator nest until the females eggs are incubated and hatch in the nest. Since the eggs hatch then the activity has entered the care activities.

Nesting activity begins from couple of a male and a female, then they choose the location where the nest will be built. After that, the stud was finding and collecting nest material to the female will remain in the location of nesting to assemble and ensure nest shape [3]. After the nest almost complete that females start laying eggs and incubating eggs in a nest. Until the eggs hatch the behavior is still included in nesting behavior. [3], explained that when the eggs are hatched then already includes behaviors for nestling and fledgling chicks for breeding and nurturing behavior.

Observed nesting behavior is not much when we make observations. There are several factors which we assume to be the cause of the limited our observations on nesting behavior. The first and most likely is due to the month of June to August is no longer the optimal range for Lonchura nesting, although [6], reported that the Lonchura can anytime reproductive activity. This is possible because of the availability of feed that is depleted in arround of FMIPA UNY areas, so not much population of bird visible activity. The second reason is because when the main point of observation, ie page D.02 FMIPA UNY buildings since a few months earlier had prepared for the construction of new buildings. It certainly disrupt the activities of Lonchurabirds because of human activities and heavy equipment on the D.02 FMIPA UNY building yard. Scaly-breasted bird become more frequent switching, it is observed from the number of individuals who fly towards FIP and FIS faculty areas.

Such disorders adds to our difficulties to observe nesting behavior because the assumption is that the birds will choose a location that is conducive or minimal disturbance for nesting. Data successfully nesting behavior observations we collect becomes very less for the process of preparing Ethogram. So we did not make the Lonchura Ethogram nesting behavior.

4. Conclusion

Climatic conditions in the Science Faculty areas are generally divided into six locations by distinct types of vegetation. Vegetation in the Faculty UNY areas are also vary based on the type of vegetation growing in each location. This vegetation type that acts as a provider of bird feed. The influence of climatic conditions on the behavior of Lonchurabirds nesting, indicated from humidity, ambient temperature and light intensity. Climatic conditions of the locations Lonchurapopulation had a mean 27ºc ambient temperature, air humidity above 50%, with a light intensity over 8,000 Luxs. The limited observational data from the lonchura, which reveal birds nesting behavior causes a lack of nesting behavior data, so it can not be produced in the form of a flow chart Ethogram of Lonchura maja birds nesting behavior.

5. Suggestion

One of the current limitations of observations is limited equipment. Currently only a binocular observation tool, monoculars and other observation tools from a far the process of observation is limited to general behavioral observations in a visible place. Behavior is behind lush foliage will be difficult to obtain. Observations were carried out without any limitation of time and sustained for a full year to find Lonchura reproductive cycle in general. However, further research needs to be done to answer the formulation of questions about the nesting behavior of Lonchura maja birds.
References

[1] Crews, Janet., Braude, Stan., Stephenson, Carol., Clardy, Terrilyn. (2002). The Ethogram and Animal Behaviors Research. Washington University in Saint Louis. USA.

[2] KPB Bionic, Zulfikar Ahmad Abdullah, Zulqarnain Assiddiqi. (2016). Burung Kampus Karangmalang UNY, Yogyakarta. Juridik Biologi FMIPA. Universitas Negeri Yogyakarta Yogyakarta.

[3] Restall, Robin. (1996). Munias and Mannikins. Russel Friedman Books CC. PICA Press Sussex. South Africa.

[4] Sow, Mehmet Ali and Ayvas, Joseph. (2010). Ecological Importance of Birds. ISSD 2010 science book p560-P565. 2nd International Symposium on Sustainable Development. June 8-9, 2010, Sarajevo.

[5] Odum, Eugene P. (1971). Fundamentals of Ecology, Third Edition. WB Saunders Company. Philadelphia. USA.