Diversity of bird species at teon nila serua subdistrict seram island moluccas

M R Sitanala, J CH Hitipeuw and L Latupapua

Department of Forestry at Agriculture Faculty, Pattimura University

Email: sitanalarenny@gmail.com

Abstract. The research about Diversity of Bird species at Subdistric Teon Nila Serua Seram Island was carried on several habitat types, conducted in August 2012. This research aims to compile the diversity of bird species at some habitat types and study the use of vegetation by the birds. The observation of the birds were used Variable Circular Plots (VCP), and Continuous Strip Sampling for vegetation observed. To count of the birds were used Point Count with Index Point Abundance (IPA), and to analysis of the birds diversities were used Index Shannon-Wiener. The result of research showed as much 48 bird species of 23 families; 28 species of 19 families were found in shrubs and garden, 31 species of 16 families were found in secondary forest, and 28 species of 16 families were found in primary forest. The highest bird diversity (H’ = 1.26) was found in the primary forest. The factors that affect the diversity of birds species are feed-producing vegetation, predators, human activity, and weather factors.

1. Introduction
Seram Island is one of the centers of biodiversity located in the Province of Maluku. This is related to the position of the Hogwarts that are biogeographically included in the Wallace region. Teon Nila Serua Subdistrict is one of the Transmigration Areas located on Seram Island. This area has forest cover comprising the Lowland Natural Forests, the Secondary Forest (a combination of the Fallen Wetlands and the Green Forest Semi-Forest) and the hills primary forest [1]. As a Transmigration Area, the land cover also consists of Gardens and Shrubs (ex-plantation). The differences at the land cover also affect diversity of the bird, because they are influenced by differences in habitat type, vegetation structure, and food availability [2]. Based on this, this study was conducted to determine the differences in land cover that became a habitat of birds affect diversity of the bird and compare bird species diversity in shrub and garden habitats, secondary forests, and hilly primary forests in Teon Nila Serua Subdistrict.

2. Methods
This research was conducted in August 2012. The diversity of bird species was observed in gardens and shrubs habitat, secondary Forest, and the hills primary forest. The equipment used is Location Map, GPS, Compass, Bird Identification Handbook (Brian J. Coates & K. David Bishop), Binoculars, Camera, Hagameter, Phiband, and Stopwatch. Bird observations were made at 07:00 am until 05:00 pm WIT, used the Variable Circular Plot (VCP) with a transect system and to determine the number of birds carried out by Point Count by the IPA (Index Point of Abundance). Each land cover consists of 3 transects and each transect consists of 9 observation stations, with an observation radius of 50 m. The
distance between center of the station is 50 m. The observation time at each station is 10 minutes. The data recorded is the type, number, and activities of birds. To determine the condition of the habitat used Vegetation Analysis and the parameters studied are the type, amount and diversity of vegetation. Bird analysis with Point Count uses several indexes:

a. Diversity Index [3]

\[ H' = -\sum_{i=1}^{n} \frac{ni}{N} \ln \frac{ni}{N} \]

\( H' \): Diversity index

\( ni \): number of bird species

\( N \): the number of individuals of the whole species

Mason (1980) in Astuti S (2010) if the diversity index value is smaller than 1, it means that species diversity is low if between 1 - 3 means moderate species diversity. If it is greater than 3, it means that the species diversity is high.

b. Index of Evenness [4]

\[ E = H' / \ln S \]

\( E' \): Evenness index

\( H' \): Diversity index

\( S \): total number of birds

3. Results and Discussion

3.1. Habitat Types

The habitat of shrubs and gardens was found as many as 32 types of vegetation along the observation track, with conditions that are not too tight. The dominant tree species are Cocos nucifera INP 99.21%, Mangifera indica INP 22.78%, Kenar (local name) INP 20.79%, Anthocepalus macrophyllus INP 16.79%. The diversity of vegetation is 1.105. In the Secondary Forest, habitat found 31 types of vegetation. Land cover in this area partly consists of areas of ex-fire covered with bushes and ferns, garden area in the middle of the forest planted with Cocoa and Nutmeg. The dominant tree species are Eugenia sp INP 59.96%, Lasa (local name) INP 56.75%, Myristica tubiflora INP 28.36%, Shorea sp INP 17.76%, and Samar (local name) INP 16.52%. The diversity of vegetation is 1,104. In the hills of Primary Forest habitat 42 species of vegetation were found. The dominant tree species are Eugenia sp INP 59.68%, Anthocepalus macrophyllus 28. 14% Calophyllum sp 26.03%, Siki (local name) INP 19.00%, and Dysoxylum caulostachyum 13.66%. The diversity of vegetation is 1,283.

3.2. The type of bird

Based on observations of the three habitat types was found 46 species of 39 genus and 23 families. In the Shrubs and Gardens habitat was found 28 species of 18 families with a total of animals is 365. Secondary Forest Habitat found 31 species of 16 families with a total of animals is 371. And the Primary Forest Hills found 28 species of 16 families with a total of animals is 217.

Table 1. Types of bird were found at three habitat types

| No. | Species            | A    | B   | C   |
|-----|--------------------|------|-----|-----|
| 1   | Aplonis metallica  | *    | *   | *   |
| 2   | Aplonis mysolensis | *    | *   | *   |
Table 1 shows that there are 11 species of birds were found at the three locations. This species is *Aplonis metallica*, *Aplonis mysolensis*, *Collocalia infuscata*, *Coracina ceramensis*, *Eos bornea*, *Aquila gurneyi*, *Aviceda subcristata*, *Basilornis corythaix*, *Cacatua moluccensis*, *Centropus bengalensis*, *Chalcophas indica*, *Charmosyna placenta*, *Collocalia infuscata*, *Coracina ceramensis*, *Corvus enca*, *Dicrurus bracteatus*, *Ducula bicolor*, *Ducula concinna*, *Eclectus roratus*, *Eos bornea*, *Eudynamis cyanoccephala*, *Eurystomus orientalis*, *Falco moluccensis*, *Geoffroyas geoffroyi*, *Halcyon lazuli*, *Halcyon sancta*, *Haliastur indus*, *Ictinaetus malayensis*, *Ixos affinis*, *Lonchura molucca*, *Monarcha trivirgatus*, *Muscicapa griseisticta*, *Myiagra galeata*, *Myzomela sanguinolenta*, *Nectarinia aspasia*, *Nectarinia jugularis*, *Pachycephala pectoralis*, *Philemon subcornculatus*, *Porphyrio porphyrio*, *Ptilinopus rivoli*, *Ptilinopus superbus*, *Rhipidura rufiventris*, *Rhyticeros plicatus*, *Streptopelia chinensis*, *Tanygnathus megalorynchos*, *Tanysiptera galatea*, *Trichoglossus haematodus*, *Zosterops atrifrons*.
Myiagra galeata, Myzomela sanguinolenta, Nectarinia Aspasia, Nectarinia jugularis, Trichoglossus haematodus, dan Zosterops atrifrons. The birds were found in the three habitats are, frugivore, nectarivorous, and insectivora. The presence of these species is related to the state of the three habitats as a display, eat, and a place to rest.

From 28 species were found in shrubs and gardens habitat, 8 species among them not found in other habitat. Aquila gurneyi, Centropus bengalensis, Corvus enca, Dicrurus bracteatus, Eurystomus orientalis, Halcyon sancta, Lonchura molucca, and Porphyrio porphyrio. This is related to behavior of the species. For example Centropus bengalensis, Corvus enca, and Lonchura molucca liked the shrub habitats and open grassy areas to find food on the ground or fly short distances by flapping low over the vegetation that is not tight. Besides the source of feed consisting of insects, frogs, lizards, and snakes. Porphyrio porphyrio, Eurystomus orientalis, and Halcyon sancta, found in swampy areas submerged in water during the rainy season. That situation supports this species as a place to find food.

31 Species was found in secondary forest, 7 of them are not found in other habitats. Chalcophaps indica, Ptilinopus rivoli, and Ducula bicolor, was found perched together on the Samar tree. This related the type of feed from these species, namely fruit eaters. Indicated vague fruit is food for these animals. Another species was found is Muscicapa griseiscta (this species migrates between August-April), be fathomed that species will migrate to a drier habitat due to the rainy season when the research was conducted. Ptilinopus rivoli, Tanygnathus megalorynchos, and Pachycephala pectoralis are generally founded in secondary forest habitats because these species like the edge of the forest which rarely cover canopy as well as the structure and composition of vegetation varies. Eudynamis cyanocephala Insectivora species whose lives solitary was found eating insects in tree trunks and insects that perch on a flowering tree. 28 Species was found in the hills primary forest, 7 of them are not found in other habitats. These species are Aviceda subcristata, Cacatua moluccensis, Eclectus roratus, Halcyon lazuli, Ictinaetus malayensis, Rhipidura rufiventris, and Rhiticeros placates. This related to the habitat needs of these bird species, where the hills primary forest habitat is more supportive of their living behavior compared to the two other habitats. For example the Rhiticeros placatus, required higher and denser types of vegetation in the forest as a place to build nests and to perch. Then Cacatua moluccensis is only found in lowland rainforest habitat and lower montane rain forest.

3.3. Diversity of the bird species

The diversity of bird species is different at some habitat types. At the habitat with a higher diversity of vegetation has a higher diversity of bird species, compared to the habitats with lower vegetation types (Dewi, 2007). Diversity of bird species in three habitat types at Teon Nila Serua Subdistrict can be seen in the following Table 2:

| Habitat               | H'     | E'     |
|-----------------------|--------|--------|
| Shrubs and Gardens    | 1.002  | 0.603  |
| Secondary Forest      | 1.233  | 0.741  |
| The Hills Primary Forest | 1.255  | 0.754  |

Table 2 shows the value of diversity index of bird species in Shrubs and Gardens habitat is 1.002, secondary forest habitat is 1.233, and the hills Primary Forest habitat is 1.255. Mason, 1980 said if the diversity index value is less than 1, it means that species diversity is low, if between 1 - 3 means moderate, and if it is greater than 3, it means that the species diversity is high. Based on this, can be seen that the diversity of bird species at the three habitat types in the medium category. This is
indicated as a result of the fairly narrow research area (0.19 ha in 1 station). This is also supported by the diversity of vegetation, which is a habitat for birds, also in moderate conditions. The diversity of vegetation types contained in habitat would support the availability food of the birds, so that if the types of vegetation that exist in a diverse habitat, birds would get more choices to choose the type of feed. Besides the climate factors also affect the presence of bird species [5]. At the time of the research, the southern part of Seram Island was in the rainy season. As a result, not much bird presence can be observed. H’ values appear to be greater in the hills of Primary Forest habitat. The high value of bird species diversity in the hills primary forest habitat is thought to be due to the favorable habitat conditions for the activities of bird species. This is in accordance with the opinion that the diversity of wildlife in primary forests is high [6].

Evenness Index values of the three habitats respectively: Shrub and Garden habitat 0.603, Secondary Forest habitat 0.74, and the hills Primary Forest habitat 0.75. From these results, it can be seen that the habitat of Shrubs and Gardens has a lower value compared to secondary and primary forest habitats. Explains that if the evenness index value is lower, it indicates a grouping of certain types [3]. This occurs due to the grouping of *Aplonis metallica* and *Aplonis mysolensis* which always look together in all three habitat types.

4. Conclusion

Teon Nila Serua Subdistrict at Seram Island has three habitat type. Shrubs and Gardens, Secondary Forests and the hills Primary Forests habitat. At the three of habitat types, found 46 species of birds of 39 genus and 23 families. 11 species of birds were found in the three locations, namely: *Aplonis metallica, Aplonis mysolensis, Collocalia infuscate, Coracina ceramensis, Eos bornea, Myiagra galeata, Myzomela sanguinolenta, Nectarinia Aspasia, Nectarinia jugularis, Trichoglossus haematodus zematosus, Zematopsus and Zematosus, Zematopsus and Zematosus*. The diversity of birds animals in all three types of habitat is in a medium condition (1.002 – 1.255), this is influenced by the diversity of vegetation that feeds these species.

Reference

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