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Identification of Bird Diversity in the Campus Landscape of Institut Teknologi Sumatera (ITERA) As an Approach for Sustainable Campus Planning and Development

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Institut Teknologi Sumatera (ITERA) is a campus that has the concept of developing a forest campus. Campus landscape which is quite extensive has the potential as the lungs of the city, supports the academic atmosphere and provides a comfortable space for campus residents. A healthy campus environment was characterized by a high level of biodiversity. One indicator of environmental health was the presence of birds. Birds are indicator species that are easily observed. The diversity of birds in the campus landscape illustrates the level of campus environmental health. This research aims to identify the diversity of birds in the ITERA campus landscape. This research has obtained 26 species of campus birds. The results of this study are expected to provide recommendation for sustainable campus planning and development.

Keywords: Bird diversity, forest campus, ITERA, landscape.

1. INTRODUCTION

Development of an area will be sustainable if it is through a process and stages are carried out well. Often the development of an area damages the ecosystems in the area. Campus is a potential area for biodiversity. ITERA is a developing campus and requires the support of good facilities and infrastructure to become quality universities. A good campus is planned in a sustainable manner by applying sustainable concepts. One of the considerations in planning and building campus physical infrastructure is the biodiversity of the place where the campus is built. Bird is easy indicator of ecosystem sustainability. By conserving birds, it also conserves the habitat where the birds are. The sustainable development of the ITERA campus by preserving local biodiversity is a valuable asset to support academic activities and research. Habitat is an area that consists of various components, both physical and biotic, which is a single entity and is used as a place to live and breed for wildlife [1].

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Identification of diversity of bird species needs to be done to determine important habitats that need to be considered in campus development. Information about the diversity of bird species will be very valuable as input for planners as well ITERA campus developer. This research is a basic research that is expected to inspire other research related to the diversity of campus birds. The study is expected to realize ITERA to become a forest-based biodiversity campus.

2. METHODOLOGY

A. Study Site

The study was conducted for 8 months from March to October 2019 on the campus landscape of the Sumatra Institute of Technology. The study site was located in Way Hui Village, Jati Agung District, South Lampung Regency, Lampung Province, Indonesia (see Figure 1).

Figure 1. Aerial ITERA Campus Photographs

B. Point Count Method

The method used in this study uses the point count method. During these observations, observers identified species and recorded observable bird biodata. In this study the data collection of species used for identification is from the morphology and behavior (morphological and animal behavior identification method). The identification method is carried out through a series of directed notes (focal sampling) and taking photos and videos. This method refers to MacKinnon and Phillips [2, 3]. Observations were made using binoculars and cameras.

Point Count observations are made at points that have a concentration of bird activity. Based on its frequency, birds tend to have peak activity in the morning and near dusk, ranging from 06:00-09.00 and 15.00-18.00. Observations were made at selected points, such as large puddles, fruiting and flowering trees, and grasslands. When observing, the observer is required to be camouflaged before the bird is present at the observation point [3, 4, 5]. Observations were made in positions on the ground or in the branches of the tree canopy. The encounter with birds is marked by a point using GPS.

After that the object of observation is matched with a bird survey observation book (field guide). The point of encounter then plotted into the map to determine the distribution of birds in the campus area.

Measurements of air quality level performed only one time at each measurement point. In this study, two test points were taken that represented the area of high pollution concentration and carried out from noon for one hour per test point. The tools was arranged to make one data every five minutes, so there were twelve datas in one hous. The tools can read data at intervals of every second, minute to hour. But the time interval does not affect the results because it will be estimated according to the actual measurement time.

3. RESULT AND DISCUSSION

A. Landscape Characteristics of ITERA

The landscape characteristics on the ITERA campus have an area of 275 ha with a relatively flat topography with elevation between 80-90 meters above sea level, 30% includes a body of water, and the rest is in the form of shrubs, fields, a little rubber plantations (see Figure 2). The ITERA campus landscape is still very open and minimal will stand trees. Existing buildings in the current landscape are only around 10% of the total campus area. The campus area is bordered by settlements and rubber plantations.

Figure 2. The character of the campus landscape

This Research has been conducted by observing at several points of observation. Observations were made starting from the northern area of the campus to the southern part of the campus. In these observations a collection of points of encounter with birds has been made (Fig. 3)

Figure 3. Distribution of birds on ITERA Campus

Field observations made in several areas of the ITERA campus have been found in several species of birds presented in Table 2. Birds that were found ranging from species of coastal gardens, rice fields, rivers and streams, and lowland forest. There were 26 species of birds during the observations made in this study. Most of the birds found are terrestrial birds. However, observations also found several types of waterbirds. These water birds include: Halcyon smyrnensis, Todiramphus chloris, Ixobrychus cinnamomeus, Ardeola speciose, Ardea alba, Ardea purpurea, Amaurornis phoenicurus, Gallirallus striatus, Ardeola bacchus, and Egretta garzetta. The discovery of waterbirds can be caused by the large and wide amount of water body land cover in the campus landscape in the form of reservoirs.

Birds that are often found in coastal areas can also be found because the distance of the ITERA campus is not too far from the coast such as Sterna bengalensis prinia inornate and Actitis hypoleucos. The birds were found around the area of the reservoir. Passerines found were Lanius schach bentet, Pycnonotus, Pycnonotus aurigaster, Anthus novaeseelandiae, Prinia inornata, and Collocalia esculenta. They were found in bushes and tree branches around the campus road. Another bird found was of the raptor type, Elanus caeruleus. The eagle is found when it is perched on a tree trunk and is soaring. In this study, the most common birds were in the area bordering plantations rubber over a large reservoir.

No.	Local Bird Name	Latin Name	Habitat
1	*Bubut alang-alang*	Centropus bengalensis	Bush
2	*Cangak merah*	Ardea purpurea	Rice Fields / Wetlands
3	*Pentet*	Lanius schach bentet	Roadside
4	*Bondol tunggir putih*	Lonchura striata	Agro Forests, Rice Fields
5	*Gereja*	Passer montanus	Settlements, Agro Forests
6	*Cerukcuk*	Pycnonotus goiavier	Primary Forest, Secondary Forest
7	*Perkutut jawa*	Geopelia striata	Secondary Forests, Settlements
8	*Puyuh*	Coturnix chinensis	Shrubs, Paddy Fields, Dry Fields
9	*Kutilang*	Pycnonotus aurigaster	Bush, Dry Field
10	*Tekukur biasa*	Streptopelia chinensis	Agro Forests, Rice Fields
11	*Apung tanah*	Anthus novaeseelandiae	Grassland, Bush
12	*Cabak kota*	Caprimulgus affinis	Bushes, Dry Fields
13	*Cekakak belukar*	Halcyon smyrnensis	Agro Forest, Settlement
14	*Cekakak sungai*	Todiramphus chloris	Settlement, Coastal
15	*Elang tikus*	Elanus caeruleus	Rice Fields, Grasslands
16	*Bambangan merah*	Ixobrychus cinnamomeus	Rice Fields / Wetlands
17	*Blekok sawah*	Ardeola speciosa	Rice Fields / Wetlands
18	*Kuntul Besar*	Ardea alba	Coastal, Rice Fields
19	*Dara laut bengala*	Sterna bengalensis	The Coast
20	*Cici padi/perenjak padi*	Prinia inornata	Rice Fields, Grasslands
21	*Walet*	Collocalia esculenta	Meadow, Mangrove
22	*Kareo padi*	Amaurornis phoenicurus	Swamps, Rice Fields
23	*Mandar Padi Sintar*	Gallirallus striatus	Swamps, Rice Fields
24	*Blekok Cina*	Ardeola bacchus	Swamp, Rice Fields
25	*Kuntul Kecil*	Egretta garzetta	Swamp, Rice Fields
26	*Trinil Pantai*	Actitis hypoleucos	Coastal, Riverbanks

4. CONCLUSIONS

The ITERA campus landscape has a relatively flat topographic character with land cover that is still open, vegetation of shrubs, there are many bodies of water, and there are agricultural fields with tree stands that are still minimal. The diversity of birds in the ITERA campus landscape is not too much. Observations have been made to find 26 species of birds. The bird includes several species of birds, namely: coastal gardens, paddy fields, rivers and streams, and lowland forests. The slight diversity can be caused by the type of cover of campus landscape vegetation that is minimal in tree stands and relatively homogeneous.

Further research on important wildlife habitats needs to be done to maintain the sustainability of the campus environment. Future planning and development of ITERA campus is expected to consider the existence of habitats for wildlife, especially the campus bird habitat. Increasing trees in open areas is needed as a place to perch and nest for birds. Habitat connectivity is needed in planning campus development. Habitat connectivity can be facilitated by creating ecological corridors by considering vocal species, their habitat characteristics and their distribution.

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References

[1]. H.S. Alikodra. Ekologi Banteng (Bos javanicus d'Alton) di Taman Nasional Ujung Kulon [disertasi]. Bogor (ID): Fakultas Pascasarjana, Institut Pertanian Bogor. **(1983)**

[2]. J. Mackinnon and K. Phillips. *A Field Guide to the Birds of Sumatra, Java and Bali*. Oxford University Press, Oxford. **(1993)**

[3]. W.R. Marian, T.E. O'Meare and D.S. Maehr.. Use of Playback in Sampling Elusive or Secretive Birds. *Studies in Avian Biology* 6: 81–85. **(1981)**

[4]. Q. Phillipps and K. Phillipps. Birds of Borneo. John Beaufoy Publishing Ltd. Oxford. **(2014)**

[5]. J.A. Hilty, W.Z. Lidicker Jr. and A.M. Merenlender. *Corridor ecology: the science and practice of linking landscape for biodiversity conservation.* Island Press. Washington **(2006)**

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