Diversity of Tree Insect Types in Several Habitus Types in the Lampageu Ujong Pancu Forest Area, Aceh Besar Regency

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ABSTRACT

Insects are one of the largest living creatures in the world which have a number of benefits. Insect ecosystems have an important role in maintaining ecosystem balance, namely as pollinators, decomposers and natural enemies. This research aims to identify and analyze the diversity of insect species in several types of habitus in the ecotourism secondary forest area of Lampageu Ujong Pancu village, Aceh Besar Regency. The method used by the research to determine the location for sampling was the Purpose Sampling Method, while for collecting tree insect specimens the method was used. Exploratory survey. Sampling was carried out using trap traps. Analysis was carried out using the Shannon-Weiner formula $\hat{H} = - \sum Pi \, Ln \, Pi$. The results of the research show that the level of diversity of tree insect species has different diversity in each habitat, namely: the diversity index ($\hat{H}$) in the shrub habitus type is low ($\hat{H}$= 0.59728), the shrub habitus type is medium ($\hat{H}$= 1.64671), and the tree habitus type is classified as moderate ($\hat{H}$= 1.76122)

Keywords: Insects, ecosystems, habitat

ABSTRACT

Serangga merupakan salah satu makhluk hidup dengan jumlah terbesar di dunia yang memiliki sejumlah manfaat. Ekosistem serangga mempunyai peran penting dalam menjaga keseimbangan ekosistem yaitu sebagai polinator, pengurai, dan musuh alami. Penelitian ini bertujuan untuk mengidentifikasi dan mengganalisis keanekaragaman spesies serangga pada beberapa tipe habitus di kawasan hutan sekunder ekowisata desa Lampageu Ujong Pancu Kabupaten Aceh Besar.Metode yang digunakan oleh penelitian untuk menentuan lokasi penggambilan sampel dilakukan dengan Metode Purpose Sampling sedangkan untuk penggumpulan specimen serangga pohon menggunakan Metode Survey eksploratif. Pengambilan sampel dilakukan dengan menggunakan perangkap jebak. Analisis dilakukan dengan menggunakan rumus Shannon-Weiner $H' = - \sum Pi \, Ln \, Pi$. Dari hasil penelitian menunjukkan tingkat keanekaragaman jenis serangga pohon memiliki keanekaragaman yang berbeda-beda pada setiap habitatnya yaitu: indeks keanekaragaman ($\hat{H}$) pada tipe habitus semak tergolong rendah ($\hat{H}$= 0,59728), tipe habitus perdu tergolong sedang ($\hat{H}$= 1,64671), dan pada tipe habitus pohon tergolong sedang ($\hat{H}$= 1,76122)

Keywords**:** Serangga, habitus, ekosistem

A. PENDAHULUAN

Indonesia is one of the countries with the highest plant and animal diversity (macro-biodiversity). This is due to Indonesia's location in the tropical region with a stable climate, and it is an archipelagic country situated geographically between two continents, Asia and Australia. One of the largest biodiversities in Indonesia is insects, with a total of 250,000 species, representing around 15% of Indonesia's most important biota. This group of insects primarily includes terrestrial insects. Insects are a part of our biodiversity that must be protected from extinction or decline.

Insects hold significant values such as ecological, endemic, conservation, educational, cultural, aesthetic, and economic value. The distribution of insects is limited by appropriate geological and ecological factors, leading to differences in insect species diversity. These differences are caused by variations in climate, seasons, altitude, and food sources. Insects serve as biological indicators of forest health. The use of insects as bioindicators has become increasingly important recently, with the primary aim of demonstrating the relationship between biotic and abiotic environmental factors (Niken Subekti, 2010).

Insects belong to the phylum Arthropoda, which has the largest number of members, making up more than 72% of all animals classified as insects. They are part of our biodiversity that needs protection from extinction. Insect diversity is believed to be useful as a bioindicator of ecosystem status (Hasmi, 2009). Their food sources come from the types of trees that insects inhabit. Tree species are typically characterized as single-stemmed woody plants that grow very tall, generally over 15 meters high. Trees are commonly used as protective plants. Insects on trees obtain food from various parts of the tree, such as roots, stems, branches, and leaves. Insects that feed on these parts of the tree have relationships that can be competitive or symbiotic.

Ujong Pancu is an area located in the Peukan Bada District in the west of Aceh Besar Regency. This area faces the Strait of Malacca and is surrounded by hills with a variety of flora. Ujong Pancu's coastal location makes it a strategic place for people to live as fishermen. The surrounding hills also benefit the community for creating rice fields in the valleys. The Ujong Pancu area is close to the equator, with an average temperature ranging from 26.42°C to 28.26°C, classifying it as a tropical region. The topography of Aceh Besar Regency is predominantly hilly and coastal, with 10% of villages located on the coast and a small portion on islands. The observation site is in the Ujong Pancu area, which is in two adjacent Mukims:

Mukim Lampageu, consisting of four Gampongs, and Mukim Lamteungoh, consisting of nine Gampongs.

Research on insect diversity has been widely conducted, especially on the island of Sumatra; however, it has not been evenly distributed across all regions, particularly in Aceh. Insect diversity in the Lampageu Ujong Pancu area has not been previously studied, thus creating a need for a database. Based on these issues, the researcher is interested in conducting a study titled: **"Diversity of Tree Insect Species in Several Habitats in the Lampageu Ujong Pancu Forest Area, Aceh Besar Regency."**

B. METODE PENELITIAN

Rancangan Penelitian

This research uses an exploratory survey method, which is conducted to gather preliminary information that is still unclear by searching for types of habitats such as shrubs, trees, and bushes. The shrub habitat type refers to plants that are relatively small, branching close to the ground or even below the soil surface (Tjitrosoepomo, 2007). The bush habitat type consists of woody plants that have branching structures, grow low near the ground, and do not have upright trunks. Woody plants have a smaller structure compared to trees (Anonim, 2017). Lastly, the tree habitat type includes tall plants with woody trunks that branch far from the ground (Tjitrosoepomo, 2007). Tree heights can reach dozens of meters, with the diameter increasing due to the presence of cambium (Rosanti, 2013). The study concludes by recording the species found around the Ujong Pancu coast, conducted through several stages as follows:

1. Conduct observations at the research site.
2. Prepare for the initial stages of the research.
3. Determine the boundaries of the research area.
4. Capture species.
5. Conduct the identification process.

Place and Time of Research

This research was conducted in the Lampageu Ujong Pancu forest area, Aceh Besar Regency, and the identification was carried out at the Biology Education Laboratory of UIN Ar-Raniry Banda Aceh. The research took place on June 18, 2023.

Tools and Materials

Tools

The tools used in this research are:

1. Writing instruments
2. Modules
3. Observation tables
4. Film bottles
5. Camera

Materials

The materials used in this research are:

1. Insects

Data Collection Method

a. Sample Collection Location

The determination of sample collection locations was conducted using the purposive sampling method. Sampling was carried out in several types of habitats.

b. Insect Sample Collection

The collection of tree insect specimens was done using a wandering and capturing method, employing film bottles.

Analisis Data

The data from the identification results were analyzed descriptively and quantitatively. The diversity of tree insect species in several types of habitats in the Lampageu Ujong Pancu forest area, Aceh Besar Regency, was assessed. To determine the species diversity value, the Shannon-Wiener diversity index was calculated (Syahputra, 2015), as follows:

$$\hat{H} = - \sum Pi \, Ln \, Pi$$

Description:

$\hat{H}$ = Diversity Index

Pi = Importance Value

Criteria:

- $\hat{H} < 1$ = diversity index is categorized as low.
- $\hat{H}$ 1-3 = diversity index is categorized as moderate.
- $\hat{H} > 3$ = diversity index is categorized as high.

RESULTS AND DISCUSSION

The diversity data of tree insects found in several habitat types in Ujong Pancu, Aceh Besar District, can be seen in Table 1.1

Table 1.1
Insect species found around the coastal area of Ujong Pancu.

No	Family	Nama Ilmiah	Tipe Habitus					
			I		II		III	
			N	H	N	H	N	H
1	*Anisolabididae*	*Euborellia annulipes*	-	-	10	-0,33921	5	-0,25993
2	*Pisauridae*	*Dolomedes minor*	-	-	7	-0,29551	-	-
3	*Formicidae*	*Odontomachus monticola*	15	-0,0605	-	-	6	-0,28457
4	*Disderidae*	*D.krokata*	5	-0,36348	-	-	-	-
5	*Inchneumonidae*	*Diadegma Majal*	-	-	3	-0,18576	-	-
6	*Pentatomidae*	*Erthesina Fullo*	-	-	2	-0,1427	-	-
7	*Formicidae*	*Tetraponera atrata*	-	-	-	-	13	-0,36528
8	*Formicidae*	*Anoplopennis*	-	-	9	-	5	-0,25993

		gracilipes				0,32734		
9	*Ichneumonidae*	*Cremastinae mating*	-	-	-	-	1	-0,09222
10	*Formicidae*	*Nylanderia fulva*	-	-	12	-0,35617	7	-0,30502
11	*Formicidae*	*Camponotus ligniperda*	-	-	-	-	3	-0,19427
12	*Formicidae*	*Nylanderia pubens*	1	-0,17329	-	-	-	-

Description:
N: Number of Individuals
Ĥ: Diversity Index
I: Shrub
II: Bush
III: Tree

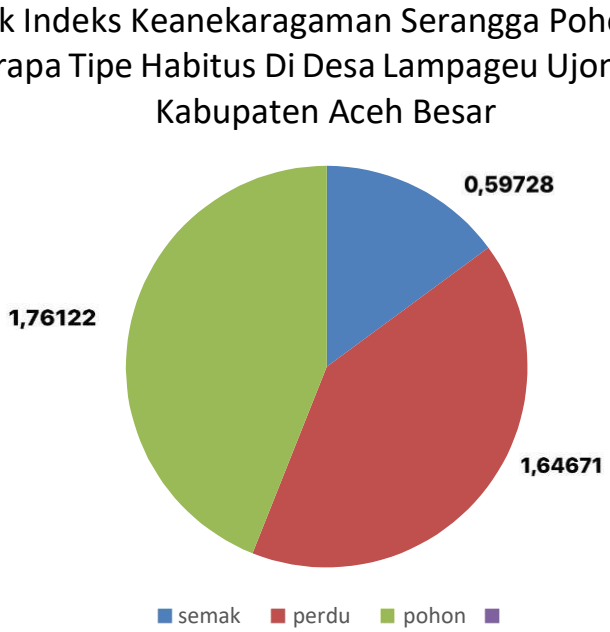


Figure 1. Graph of Tree Insect Diversity Index in Several Habitat Types in Lampageu Ujong Pancu Village, Aceh Besar Regency (Research Data, 2024).

Based on the observations conducted, insects from trees, shrubs, and bushes were found. A total of 104 individual insects were identified, consisting of 6 families and 12 species, namely: Euborellia annulipes with 10 individuals in the shrub habitat and 5 individuals in the tree habitat. Dolomedes minor with 7 individuals in the shrub habitat, Odontomachus monticola with 15 individuals in the bush habitat and 6 individuals in the tree habitat. D. krokata had 5 individuals in the bush habitat. Diadegma majalis had 3 individuals in the shrub habitat. Erthesina fullo had 2 individuals in the shrub habitat, and Tetraponera atrata had 13 individuals in the tree habitat.

Anoplopennis gracilipes had 9 individuals in the shrub habitat and 5 individuals in the tree habitat. Cremastinae mating had 1 individual in the tree habitat. Nylanderia fulva had 12 individuals in the shrub habitat and 7 individuals in the tree habitat, Camponotus ligniperda had 3 individuals in the tree habitat, and Nylanderia pubens had 1 individual in the bush habitat.

The most abundant insect species found was Nylanderia fulva (raspberry ant), with a total of 19 individuals. A total of 40 individuals were found in the tree habitat, 43 individuals in the shrub habitat, and 21 individuals in the bush habitat. The high population of Nylanderia fulva is attributed to the open area and the presence of suitable vegetation for the survival of this insect.

(a)

(b)

(c)

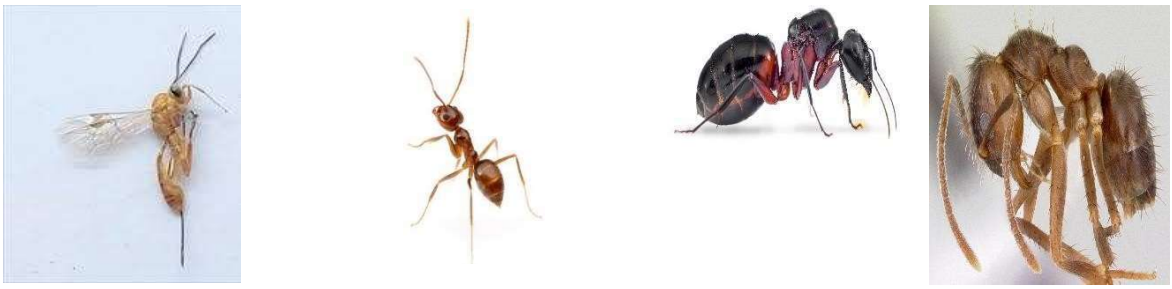
(d)

(e)

(f)

(g)

(h)



Gambar 1. Spesies serangga yang ditemuka disekitar pinggiran pantai Ujong Pancu. a. *Dermaptera*, b.*Dolomedes minor*, c.Odontomachus monticola, d. *D.krokata*, e. *Diadegma majale*, f. *Erthesina fullo*, g.*Tetraponera atrata*, h. *Anoplopennis gracilipes* i. *Cremastinae mating,* j. *Nylanderia fulva,* k. Camponotus ligniperda, l. *Nylanderia pubens*

C. Conclusion

The conclusions of this study are as follows:

1. A total of 34 individual insects were identified, consisting of 6 families and 12 species. These include Euborellia annulipes with 5 individuals in the shrub habitat and 2 individuals in the tree habitat. Dolomedes minor had 1 individual in the shrub habitat, while Odontomachus monticola had 1 individual in the bush habitat and 3 individuals in the tree habitat. D. krokata, Nylanderia pubens, and Nylanderia fulva each had 1 individual in the bush habitat. Diadegma majalis had 1 individual in the shrub habitat. Erthesina fullo had 2 individuals in the shrub habitat, while Tetraponera atrata was dominant with 8 individuals in the tree habitat. Anoplopennis gracilipes had 5 individuals in the shrub habitat and 2 individuals in the tree habitat. Cremastinae mating had 1 individual in the tree habitat, and Camponotus ligniperda had 1 individual in the tree habitat.
2. 2. The level of insect diversity in tree habitats varies by location. The diversity index (H') for the bush habitat was classified as low (H' = 0.59728), the shrub habitat as moderate (H' = 1.64671), and the tree habitat as moderate (H' = 1.76122).

D. RECOMMENDATIONS

1. For the local community, efforts should be made to conserve plants, particularly in habitats such as bushes, shrubs, and trees, where the area is dominated by trees.
2. For future researchers, it would be beneficial to study a greater variety of species and additional habitats.

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