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Diversity and Abundance of Soil Surface Insects in Katung Hill, West Baturaja Sub-District and its Contribution to High School Biology Learning.

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Abstract: This research aims to find out species of insects are found on the soil surface and how the diversity and abundance of insects on the surface of the ground in the Katung Hill of Baturaja Barat District. Research time starts in December 2022 - July 2023. This research employed a quantitative descriptive method. Data collection utilized an exploratory approach with the pitfall trap technique. The sampling locations were determined using stratified random sampling. The results of the study revealed a total of 1468 individuals of insects, consisting of 23 insect species. The calculation of the diversity and abundance indexes of insects in Katung hill yielded different values at each station. At station 1, the diversity index was found to be 1.744 with a species abundance value of 0.1336 individuals/m². At station 2, the diversity index was 1.026 with a species abundance value of 0.2476 individuals/m². At station 3, the diversity index was 1.223 with a species abundance value of 0.5872 individuals/m². In conclusion, this research identified 23 insect species with diversity indexes at each station falling within the moderate criteria. The species abundance at each station ranged from 0.1336 individuals/m² to 0.5872 individuals/m².

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INTRODUCTION

Insects are organisms that are very easy to find on the surface of the earth but populations tend to decline worldwide. Insects are the dominant class of animals on earth with more numbers than the number of other land animals, so insects can be easily found in various places. (Marheni et al., 2017). Insects can almost be found in all types of habitats, one of the habitats is on the ground, including in yards, forests and others. (Septa et al., 2022). Anthropogenic pressures are driving the decline of insect populations worldwide (Chowdhury et al., 2023). Insect decline, i.e. the rapid loss of insect biodiversity and species abundance, is an imminent crisis that reflects global biodiversity loss and biological extinction. Conservation scientists are therefore calling for effective public education on how to mitigate insect declines (Lampert et al., 2023). In general, the role of insects in human daily life is divided into two, namely beneficial insects and harmful insects. Insects that play an important role that can provide benefits, some examples are as pollinators of plants, as producers of products (for example honey, wax and silk), as eaters of organic materials, as research materials and others. Then insects that can be detrimental include insects that can damage plants, insects that destroy products in storage and insects that cause disease both for plants, animals and humans (Jumar, 2000).

Soil surface insects are known to parasitize other organisms and are often overlooked. (Rachmasari et al., 2016). The potential of these insects is very valuable, one of the most important roles is to help the process of decomposing soil organic matter (Marheni et al., 2017). (Marheni et al., 2017). The role of these insects is quite important to the soil ecosystem and the sustainability of vegetation life on it (Nuraeni & Mangesu, 2017). (Nuraeni & Mangesu, 2017).. Soil is an ecosystem consisting of biotic and abiotic components where the combination of the two forms a zone that functions as a habitat for various organisms, including soil surface insects. The diversity, abundance and distribution patterns of soil surface insects can be influenced by several environmental factors.

Biotic and abiotic factors in an ecosystem have an important role in determining the abundance and presence of soil surface insects. (Andrianni et al., 2017). Soil surface insects that have a function as decomposers are ants and beetles (Sanghaw et al., 2023). According to Deru et al. (2023), the moderate use of organic fertilizers with high organic matter content is part of a regeneration strategy in peat meadows with the aim of maintaining biodiversity.

Based on research results Riyanto et al. (2015) environmental factors and food availability affect the level of diversity and abundance of insects. Naveena, Subramanya and Setty (2023) that the distribution of grain-eating insects is influenced by anthropogenic factors such as the habit of sharing food grains. Changing environmental conditions result in changes in the ecosystem so that it has an impact on the diversity and abundance of insects in the ecosystem. Some other research results include by Teristiandi (2020) namely the abundance of insect species in the swamp on Soekarno Hatta Palembang road is quite diverse. Judging from the four research stations, the highest abundance of insects was found in natural swamps, namely 1002 individuals, the least abundance of insects was found in swamps that had been used as settlements, namely 498 individuals. Research results from Setiawati et al. (2021) mentioned that there were 10 species of insects that belonged to 5 different families. The number of insect individuals found at station I totaled 953 individuals, station II totaled 483 individuals and station III totaled 384 individuals. From some of these research results, it can be concluded that soil surface insects have a fairly close interaction with the environment in which they live.

Research on insect diversity and abundance has been widely reported, but currently there is no research conducted in the area of Bukit Katung, West Baturaja sub-district, Ogan Komering Ulu Regency which can be used as preliminary data. Bukit Katung itself is currently used as one of the tourist destinations in West Baturaja sub-district. The conversion of the hill area into a tourist destination can affect the diversity and abundance of insects that inhabit the ecosystem. Therefore, research is needed on the abundance of ground surface insects in katung hill to be used as information or preliminary data that is useful as an inventory of ground surface insects found in the katung hill area. Based on the description above, this study was conducted to determine the types of insects found and how the diversity and abundance of insects in Katung Hill, Baturaja District.

METHODOLOGY

This research was conducted in December 2022 - July 2023. The research location was in Bukit Katung, West Baturaja sub-district, Ogan Komering Ulu (OKU) South Sumatra. Insect identification was carried out at the Laboratory of FKIP Biology Indralaya Sriwijaya University. This research uses quantitative descriptive method. Data collection uses the exploration method, which is observation or sampling directly from the observation location. The sampling technique is to use a *pitfall trap* (Saji et al., 2021).

The tools and materials used include: *Pitfall trap*, *Global Positioning System* (GPS), meter, *luxmeter, thermometer, hygrometer, soil tester*, stereo microscope, stemmed needle, petri dish, lup, tweezers, sieve, stationery, camera, sample bottle, crowbar, chisel, white cardboard, label paper, scissors, detergent solution, sugar and 70% alcohol.

Before determining the research location, field observations were made to determine the initial condition of the field. Determination of insect sampling locations was carried out using the *stratified random sampling* method in the katung hill area which has different heights. The height of the hill was measured using the "GPS Test" application (Laver, Powell and Alexand, 2015). Measurement of hill height was carried out at station I, station II and station III.

The sampling technique used *pitfall tr*aps to trap insects moving on the ground. Three stations were observed and used as sampling locations. Sampling was done by setting 15 traps at each station which was divided into 3 plots with each plot measuring 50x50m. The 50x50m plot was used because it was considered to be representative of the study area. In each plot, 5 *pitfall traps* were placed, with a total of 45 traps used at each station (Kinasih et al., 2017). To be able to trap and capture ground level insects, namely by using *Pitfall traps* made of plastic cups about 8.5 cm in diameter and 10 cm high then filled with ¼ solution of detergent and sugar. Then make a hole 10 cm deep and then install the glass trap that has been prepared and make sure the surface of the glass trap is parallel to the ground surface, at the top of the glass trap is given a cover with a buffer as high as about 10 cm from the ground surface so that insects can enter the trap, this buffer also aims to avoid rainwater entering the trap, then this trap is left for 24 hours with three repetitions. The soil surface insects trapped in the *pitfall trap* were poured into a sieve and washed using water, then the soil surface insects were put into a sample bottle that had been filled with 70% alcohol. Then identification of the types of insects that have been obtained in the laboratory (Setiawati et al., 2021).

The parameters observed include the number of species, number of individuals, abundance and diversity of soil insects. Supporting parameters observed in this study include light intensity, air temperature and humidity, and soil pH. Light intensity was measured using a *luxmeter*, temperature was measured using a *thermometer* and air humidity was measured using a *hygrometer* while soil pH was measured using a soil *tester* (Rafael, Daud, and Hungu, 2022).

Data analysis was done descriptively quantitatively. Descriptive analysis was conducted to describe the identified soil surface insects. Quantitative analysis was conducted to explain the diversity and abundance of soil

insects. To determine the abundance and diversity of insects, the abundance formula and diversity index Shannon-Wiener (Odum, 1996; Suin, 2012) were used. Then for the validation of LKPD using the kappa coefficient formula.

Some of the formulas used include the species abundance formula, relative abundance, Shannon-Wiener diversity index and Kappa Coefficient Formula. The abundance of species is the number of individuals per unit area where the formula is Ki = $\frac{Jumlah\ individu\ jenis\ A}{Jumlah\ unit\ contoh/luas/volume}$ (Suin, 2012). Then the relative abundance is the ratio between the number of individual species and the total number of individuals of all species where the formula is KR = (Suin, 2012). $\frac{Kelimpahan\ Jenis\ A}{Jumlah\ kelimpahan\ semua\ jenis} x100\%$ (Suin, 2012). The formula used next is the Shannon-Wiener diversity index, namely H' = -Σ Pi Ln Pi where Pi = -Σ Pi Ln Pi. $\frac{ni}{N}$ then the results obtained can be categorized into 3 categories, namely if H' < 1 then the diversity index is categorized as low if H' 1 < H' < 3 then the diversity index is categorized as moderate and if H' > 3 then the diversity index is categorized as high. The last formula used is the kappa coefficient formula through a validity test to determine the feasibility of LKPD. Validation of LKPD was carried out by 2 validators, namely Biology Education Lecturer and Biology Teacher. The scores of the validation results were then compared and analyzed using the Kappa coefficient formula where K = 0. $\frac{Po-Pe}{1-Pe}$ (Viera & Garrett, 2005)

According to (Viera & Garrett, 2005)LKPDs that can be used by researchers if the Kappa Coefficient value is ≥ 0.61 with the Kappa interpretation can be seen in Table 1.

Table 1. Kappa Interpretation

Kappa coefficient	Interpretation
0.01 - 0.20	Bad
0.21 - 0.40	Simply
0.41 - 0.60	Medium
0.61 - 0.80	Good
0.81 - 0.99	Almost Perfect
1	Perfect

If the Kappa Coefficient value ≥ 0.61 then the LKPD can be used. If the Kappa Coefficient value ≤ 0.61, the LKPD will be revised again until the Kappa coefficient ≥ 0.61 and the LKPD is ready to use.

RESULTS

The results of observations of the abundance and diversity of ground surface insects in Katung Hill, West Baturaja sub-district, Ogan Komering Ulu can be seen in Table 3. Based on observation data, 1468 insects were found consisting of 23 insect species. The 23 insect species are: *Ateuchus lecontei, Blaptica dubia, Brassolis* sp, *Camponotus* sp, *Dinomyrmex gigas, Dolichoderus thoracicus, Drosophila* sp, *Euborellia annulipes, Hemithyrsocera palliata, Lasiophanes* sp, *Legnotus picipes, Leptocorisa oratorius, Loboptera* sp, *Macrotermes gilvus, Mantis* sp, *Oxypoda acuminata, Parcoblatta* sp, *Prosopocera* sp, *Solenopsis* sp, *Solenopsis geminata, Velarifictorus micado, Volucella* sp, and *Xantholinus* sp.

At station 1 the total number of individuals found amounted to 334 insects with 16 species. The most common insect species found at station 1 is *Lasiophanes* sp. At station 2 the total number of individuals found amounted to 619 insects with 10 species. The most common insect species found at station 2 is *Dolichoderus thoracicus.* At station 3 the total number of individuals found amounted to 515 insects with 16 species. The most common insect species found at station 3 is *Camponotus* sp. (Table 2).

Table 2: Ground Insect Species Found in Katung Hill, West Baturaja Subdistrict, OKU, South Sumatra.

No.	Insect Species	Station 1	Station 2	Station 3	Σ Total
1.	*Ateuchus lecontei*	2	1	7	10
2.	*Blaptica dubia*	13	7	14	34
3.	*Brassolis* sp.	0	0	2	2
4.	*Camponotus* sp.	99	30	360	489
5.	*Dinomyrmex gigas*	0	0	24	24
6.	*Dolichoderus thoracicus*	54	422	37	513**
7.	*Drosophila* sp.	3	0	4	7
8.	*Euborellia annulipes*	0	0	2	2

9.	*Hemithyrsocera palliata*	1	0	0	1*
10.	*Lasiophanes* sp.	113	122	45	280
11.	*Legnotus picipes*	0	0	1	1*
12.	*Leptocorisa oratorius*	4	0	2	6
13.	*Loboptera* sp.	10	7	4	21
14.	*Macrotermes gilvus*	1	0	1	2
15.	*Mantis* sp.	0	2	0	2
16.	*Oxypoda acuminata*	2	0	0	2
17.	*Parcoblatta* sp.	1	0	0	1*
18.	*Prosopocera* sp.	0	1	0	1*
19.	*Solenopsis* sp.	4	0	1	5
20.	*Solenopsis geminata*	0	5	0	5
21.	*Velarifictorus micado*	25	22	8	55
22.	*Volucella* sp.	1	0	0	1*
23.	*Xantholinus* sp.	1	0	3	4
Σ Insects		334	619	515	1468 Individuals
Σ Insect Species		16	10	16	23 Species

Note:
** = Number of individuals at most.
* = Least number of individuals.

Data analysis calculations for the abundance value of soil surface insects in Katung Hill, West Baturaja sub-district, OKU South Sumatra are shown in Table 3 as follows:

Table 3. Abundance Value of Soil Surface Insects in Katung Hill, West Baturaja Subdistrict, OKU, South Sumatra

No.	Insect Species	Station 1		Station 2		Station 3		Overall	
		Ki	KR (%)	Ki	KR (%)	Ki	KR (%)	Ki	KR (%)
1.	*Ateuchus lecontei*	0.0008	0.6	0.0004	0.2	0.0028	1.4	0.0040	0.7
2.	*Blaptica dubia*	0.0052	3.9	0.0028	1.1	0.0056	2.7	0.0136	2.3
3.	*Brassolis* sp.	0.0000	0.0	0.0000	0.0	0.0008	0.4	0.0008	0.1
4.	*Camponotus* sp.	0.0396	29.6	0.0120	4.8	0.1440	69.9	0.1956	33.3
5.	*Dinomyrmex gigas*	0.0000	0.0	0.0000	0.0	0.0096	4.7	0.0096	1.6
6.	*Dolichoderus thoracicus*	0.0216	16.2	0.1688	68.2	0.0148	7.2	0.2052	34.9
7.	*Drosophila* sp.	0.0012	0.9	0.0000	0.0	0.0016	0.8	0.0028	0.5
8.	*Euborellia annulipes*	0.0000	0.0	0.0000	0.0	0.0008	0.4	0.0008	0.1
9.	*Hemithyrsocera palliata*	0.0004	0.3	0.0000	0.0	0.0000	0.0	0.0004	0.1
10.	*Lasiophanes* sp.	0.0452	33.8	0.0488	19.7	0.0180	8.7	0.1120	19.1
11.	*Legnotus picipes*	0.0000	0.0	0.0000	0.0	0.0004	0.2	0.0004	0.1
12.	*Leptocorisa oratorius*	0.0016	1.2	0.0000	0.0	0.0008	0.4	0.0024	0.4
13.	*Loboptera* sp.	0.0040	3.0	0.0028	1.1	0.0016	0.8	0.0084	1.4
14.	*Macrotermes gilvus*	0.0004	0.3	0.0000	0.0	0.0004	0.2	0.0008	0.1
15.	*Mantis* sp.	0.0000	0.0	0.0008	0.3	0.0000	0.0	0.0008	0.1
16.	*Oxypoda acuminata*	0.0008	0.6	0.0000	0.0	0.0000	0.0	0.0008	0.1
17.	*Parcoblatta* sp.	0.0004	0.3	0.0000	0.0	0.0000	0.0	0.0004	0.1
18.	*Prosopocera* sp.	0.0000	0.0	0.0004	0.2	0.0000	0.0	0.0004	0.1

19.	*Solenopsis* sp.	0.0016	1.2	0.0000	0.0	0.0004	0.2	0.0020	0.3
20.	*Solenopsis geminata*	0.0000	0.0	0.0020	0.8	0.0000	0.0	0.0020	0.3
21.	*Velarifictorus micado*	0.0100	7.5	0.0088	3.6	0.0032	1.6	0.0220	3.7
22.	*Volucella* sp.	0.0004	0.3	0.0000	0.0	0.0000	0.0	0.0004	0.1
23.	*Xantholinus* sp.	0.0004	0.3	0.0000	0.0	0.0012	0.6	0.0016	0.3
	AMOUNT	0.1336	100	0.2476	100	0.2060	100	0.5872	100

Note:
Ki = Species abundance (Individuals/m^2).
KR= Relative abundance.

The abundance of ground surface insects in Bukit Katung as a whole species with the highest species abundance value in the species *Dolichoderus thoracicus* which amounted to 0.2052 individuals/m^2 with a relative abundance value of 34.9%. At station 1 the species that has the highest species abundance value is *Lasiophanes* sp. *which* is 0.0452 individuals/m^2 with a relative abundance value of 33.8%. At station 2 the species that has the highest species abundance value is *Dolichoderus thoracicus* which is 0.1688 individuals /^{2} with a relative abundance value of 68.2%. At station 3 the species that has the highest species abundance value is *Camponotus* sp. *which* is 0.1440 with a relative abundance value of 69.9%.

Table 4. Diversity Index of Soil Surface Insects in Katung Hill, West Baturaja District, OKU, South Sumatra

No.	Value	Station 1	Station 2	Station 3	Overall
1.	Diversity Index (H')	1.744	1.026	1.223	1.594
2.	Criteria	Medium	Medium	Medium	Medium

Based on data analysis, the diversity index of ground surface insects in Bukit Katung as a whole has a value of 1,594, which is included in the medium criteria. At station 1 has a value of 1,744 with moderate criteria, at station 2 has a value of 1,026 with moderate criteria and at station 3 has a value of 1,223 which also includes moderate criteria.

The parameters measured in this study include light intensity, air temperature, air humidity, soil pH and location altitude where the measurement data are presented in Table 5 as follows:

Table 5. Environmental Parameters in Bukit Katung West Baturaja Sub-district OKU South Sumatra

Parameters	Station 1	Station 2	Station 3	Average
Light Intensity (Lux)	1126	1149	1390	1222
Air Temperature (°C)	29	28	27	28
Air Humidity (%)	85	92	92	90
Soil pH	6,4	6,4	6,4	6,4
Location altitude (above sea level)	50	100	150	100

Environmental conditions at Bukit Katung have slight differences at each station. Judging from the average value of the parameters obtained for light intensity of 1222 lux, air temperature 28 ° C, air humidity 90%, and soil pH around 6.4. Station 1 at coordinates 4°07'17.1 "S 104°08'16.1 "E has a light intensity of 1126 lux, air temperature 29°C, air humidity 85% and soil pH around 6.4 and is at an altitude of 50 meters above sea level. Station 2 at coordinates 4°07'19.1 "S 104°08'13.0 "E has a light intensity of 1149 lux, air temperature 28°C, air humidity 92% and soil pH around 6.4 and is at an altitude of 100 masl. Station 3 at coordinates 4°07'24.4 "S 104°08'06.7 "E has a light intensity of 1390 lux, air temperature 27°C, air humidity 92% and soil pH around 6.4 which also has the same value as the other two stations and is at an altitude of 150 masl (Table 5).

DISCUSSION

Based on the results of research conducted at Bukit Katung, West Baturaja sub-district, 23 insect species were found with a total number of individuals totaling 1468 insects (Table 2). The number of insect individuals found in Bukit Katung, West Baturaja sub-district is quite diverse. Judging from all research stations, the highest total number of individuals was found at station 2, namely 619 insects, then station 3, namely 515 insects and the lowest number of individuals found at station 1, namely 334 insects (Table 2). Andrianni et al. (2017) obtained a total of 199 individuals of insects in Sanggarloka Cisarua, Gunung Gede Pangrango National Park, West Java. It is suspected that there are some differences in the habitat and insect sampling process that can affect the results of

individual insects that will be found. In his research Andrianni et al. (2017) (2017) only did one repetition with a time of 24 hours and the distance between *pitfall traps* was too close together.

Of the three stations, the location where the highest number of ground insect individuals was found was at station 2 with a total of 619 individuals. The most common species found is *Dolichoderus thoracicus* with a total of 422 insects. Then at station 3 with a total number of individuals totaling 515 insects with the most species found, namely *Camponotus* sp. Finally at station 1 with a total number of individuals totaling 334 insects with the most species found, namely *Lasiophanes* sp. Of the three stations, the most species found came from the Formicidae or ant family. These species include *Lasiophanes* sp*, Dolichoderus thoracicus and Camponotus* sp. Ants are insects that live socially and in groups. According to Kinasih et al. (2017) One of the most common insects and many activities on the soil surface is from the Formicidae family which generally lives in colonies and accounts for up to 70 percent of the existing soil surface insect population, so this family can be found in quite abundant numbers. These insects are found in places that are quite humid, shady and have quite a lot of litter. Litter can support the presence of food sources so that it can support growth for soil surface insects. This is supported by Taib (2013) who said that ants usually live on land that is an area with a low altitude or an area with a fairly high altitude that has a relatively moderate temperature.

The abundance of ground surface insects in Katung Hill, Baturaja Barat OKU sub-district, overall the species that has the highest abundance value is *Dolichoderus thoracicus* which is 0.2052 individuals/m^2 with a relative abundance value of 34.9%. At station 1, the species that has the highest species abundance value is *Lasiophanes* sp*. which* is 0.0452 individuals/m^2 with a relative abundance value of 33.8%. At station 2 the species that has the highest species abundance value is *Dolichoderus thoracicus which* is 0.1688 individuals /^{2} with a relative abundance value of 68.2%. At station 3 the species that has the highest species abundance value is *Camponotus* sp*. which* is 0.1440 with a relative abundance value of 69.9%. Of the three stations, the species that have the highest abundance are included in the Formicidae family. In his research Andrianni et al. (2017) Andrianni et al. (2017) also obtained the highest abundance, one of which was in the family formicidae. According to Borror et al. (1992) the formicidae family is a family that likes habitats or places to live with soil conditions that are not waterlogged. This is in accordance with the condition of Katung Hill, Baturaja Barat OKU sub-district, which is used as the research location, which is not inundated by water because it has a topography that forms hills.

Overall, the diversity index of soil surface insects in Bukit Katung, West Baturaja sub-district, OKU has an index value of 1,594 which is included in the medium criteria which means sufficient productivity and a fairly balanced ecosystem. (Marheni et al., 2017). At station 1 has a diversity index value of 1,744, at station 2 of 1,026 and at station 3 of 1,223 or the three stations are each included in the medium criteria. The three stations have a moderate diversity index value, this can be seen from the environmental conditions or physical factors of the three stations are not too different from one another. Light intensity in Bukit Katung sub-district of Baturaja Barat OKU approximately ranges from 1126 lux - 1390 lux in the morning. According to Jumar (2000) Light can affect some activities of insects, so there are insects that are active at certain times because sunlight can affect their activity and distribution. According to research Faradila et al. (2019) the light intensity that gets the most insects is between 868 lux - 1534 lux. The air temperature in Bukit Katung, Baturaja Barat OKU sub-district is approximately between 27°C - 29°C in the morning. This temperature range is still effective for insects to survive and reproduce. In general, insects can live at an effective temperature of 15°C at minimum temperature, 25°C at optimum temperature and 45°C at maximum temperature. (Jumar, 2000). Warm temperatures are good for insect survival where temperature will also affect the speed of metabolism in the insect body (Elisabeth et al., 2021). (Elisabeth et al., 2021). The air humidity in Bukit Katung, Baturaja Barat OKU sub-district, approximately ranges from 85% - 92%. This range of air humidity is quite suitable for insects to carry out their activities. According to Riyanto et al. (2015) the range of air humidity required by insects is between 73% - 100%. This is reinforced by Pracaya (1999) which states that with a level of humidity that matches the body, the metabolism of the insect body will run faster and can accelerate the development of its life.

The average acidity (pH) of the soil in Bukit Katung, Baturaja Barat OKU sub-district is 6.4. The soil pH level can be said to be quite neutral so that it will not greatly affect the number of insects found in the area. According to Suin (2012) Soil animals themselves can be found living on relatively acidic soil conditions and there are also some others that are found living on relatively alkaline soil conditions, but some others prefer to live on alkaline soils. In his research Andrianni et al. (2017) stated that the pH of neutral soil ranges from 6.3 - 7. Rizali et al. (2002) Rizali et al. (2002) stated that the pH of the soil is good if when in the soil it has a balanced content of chemical elements. The height of the research location in Bukit Katung, West Baturaja sub-district ranges from 50 meters above sea level - 150 meters above sea level. According to Capinera (2012) surface elevation in a place can affect the difference in air temperature and air humidity so that it can affect the spread of insects. Generally, the higher the surface of a place, the air temperature will decrease and air humidity will increase.

Overall, the diversity index of soil surface insects in Katung Hill, Baturaja Barat OKU sub-district is included in the medium criteria, with diversity index values ranging from 1.026 - 1.744 and species abundance values ranging from 0.1336 individuals/m^2 - 0.5872 individuals/m^2 . This can be attributed to several environmental parameters that have been measured at each station such as optimum air temperature, suitable air

humidity, soil pH which is classified as neutral and altitude in Bukit Katung which can support the survival of life for ground surface insects that inhabit the area.

Contributions from the results of this study can be used as a reference in making teaching materials for high school Biology class X on KD 3.2 on the material "biodiversity". Contributions from the results of this study are also in the form of Learner Worksheets (LKPD) which can be used as a means of supporting learning activities on biodiversity material. This LKPD is entitled "Insect Diversity" which has passed the validation process by two validators, namely a lecturer from the Biology Education study program and a high school teacher. Comments and suggestions given by the validator are to synchronize again between basic competencies and indicators of competency achievement, to detail the tools and materials in the work steps and to add questions so that students are trained to analyze. The results of the validation were then calculated using the kappa coefficient formula, where the calculation results obtained a kappa coefficient = 1 with the interpretation of "perfect". Based on these results, the LKPD that has been prepared is considered suitable for use in learning.

CONCLUSIONS

Based on the results of research on the Diversity and Abundance of Ground Surface Insects in Katung Hill, West Baturaja District, OKU, it can be concluded that from a total of 3 stations, 1468 insects were found consisting of 23 species es. *The* biodiversity index at each station is classified as moderate where at station 1 the diversity index value is 1,744, station 2 is 1,026 and station 3 is 1,223 and the overall biodiversity index is also classified as moderate with a biodiversity index value of 1,594. From all stations, the most species found are found at stations 1 and 3, which are as many as 16 species. Overall, the species with the highest abundance value is *Dolichoderus thoracicus* with a relative abundance value of 34.9%. At station 1, *Lasiophanes* sp. by 33.8% then at station 2, *Dolichoderus thoracicus* by 68.2% then at station 3, *Camponotus* sp. by 69.9%.

The results of the research were then applied in high school learning by being arranged into the form of LKPD, where the validation results had been validated by two validators, namely a lecturer from the Biology Education study program and a high school teacher whose results showed that the LKPD that had been prepared was considered feasible to use in learning.

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