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The Composition, Abundance, and Biodiversity of the Insect Family of the Hymenoptera Order on Swampy Wetlands (SW) and Land Conversion (LC) in Palembang City

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Abstract: Urban development and population growth in the Palembang city, lowland swamps have been converted into swamps (SW) and land conversion (LC). Changes in habitat certainly have an impact on the composition, abundance, and diversity of the insect family of the Hymenoptera order. The purpose of writing this article is to inform the composition, abundance, and diversity of insect families of the Hymenoptera order in the SW and LC lands of Palembang city. This study used a survey method by exploring each research location four times. Determination of the research location using purposive sampling method with the reason to get different habitat conditions. The collection of insects is carried out in two ways, namely trapping and hands collecting. The results showed that 18 families of the Hymenoptera order, namely 4 to 7 families were found in SW land and 8 families were found in LC land. The number of individuals on SW land was 6,351 and on LC land was 2,297. The Apidae, Formicidae, Ichneumonidae, Platygastridae, Sphecidae, and Vespidae families are found in almost all fields. The total abundance index of the Hymenoptera order family in SW land (73.438%) was higher than the index of the total abundance of the Hymenoptera order family in the LC land (26.561%). The highest family abundance index was Formicidae, namely 65.101%, followed by the Vespidae family (26.237%) and the Apidae family (5.087%). The diversity index of the Hymenoptera order in the LC land had a higher value (2.741) than the diversity index in the SW field (2.165). The conclusion is that the composition of the insect family of the Hymenoptera order in LC land was higher than in SW land, but the number of individual insects in SW land was higher than in LC land. The abundance index of the Hymenoptera order in SW land was higher than that in LC land. The insect diversity index of the Hymenoptera order in LC land was higher than in SW land. It is recommended to research the role of various insect species from the Hymenoptera order in the SW land and LC land of the Palembang city.

Keywords: Composition; abundance; biodiversity; Hymenoptera; and Palembang

Introduction

Generally, insects have an important role in nature and human life. Imathiu (2019) states that insects contain nutrients so that insects can be consumed by humans or become a food mixture. The insects contain protein, fat, and nutrients that are useful for improving health, food security, animal feed, and aquaculture (Girsang, 2018). Insects can be a source of bioactive compounds for health (Ross and Huis, 2017). In agriculture, insects act as natural enemies, pollinators, bioindicators, kill weeds, and fertilize the soil and decompose waste (Soesanthy and Trisawa, 2011; Getanjaly et al., 2015; Meilin and Nasamsir, 2016; Payne and Itterbeeck, 2017). In carnivorous fish and freshwater omnivorous fish, insects can be used as natural food, main or complementary feed (Asyari, 2006). One of the insects that have an important role in nature and human life is the order Hymenoptera

The insects of the order Hymenoptera can be a source of nutrition for humans and have a role in the ecosystem. Ants can act as predators, carcass users, and interact with other organisms (Putra, Hadi, and Rahadian, 2017). Dobermann, Swift, and Field (2017) state that ants and bees can be consumed as food sources, because the

two insects contain protein, fat, and energy. Bees, ants, and wasps can be used as a source of protein because the three insects contain protein, fat, vitamins, and minerals (Tang et al., 2019; Jansson and Berggreen, 2015). According to Hidayat (2015), bees are insects that produce honey and products such as royal jelly, pollen, wax, and so on. These products are widely used for industries such as the batik and cosmetics industry.

The insects are beneficial directly and indirectly to humans. This means that humans depend on insects of the order Hymenoptera as food, medicines, soil fertilizers, industrial products, decomposers, fish feed, pollinators, biological control agents, detritors, and so on. Besides, insects from the order Hymenoptera are components in the food chain and food webs. Therefore, the presence of insects from the order Hymenoptera needs to be preserved to maintain the balance of the ecosystem. Disruption to the insect population of the Hymenoptera order needs to be avoided, such as the use of insecticides, area development, and exploitation of natural resources in Indonesia. This situation also occurs in developing areas including the Palembang city.

Palembang city area consists of terrestrial habitats and aquatic habitats for fauna. The aquatic habitat is swampy peatlands that are affected by tidal water. Due to an increase in population and increasing needs, many swamps have turned into swampy fields (SW) with the application of insecticides and swamps which are buried by land into land conversion (LC) for housing development, office complexes, and sports stadiums. Agriculture on SW land can disrupt insect populations including insects of the order Hymenoptera. Herlinda et al., (2014) have reported the application of insecticides against arthropods in SW Gandus land, Palembang. The results of the research by Herlinda et al., (2014) that synthetic insecticides can affect the diversity and abundance of active predatory arthropods that inhabit the soil surface. In paddy fields without insecticide application, the number of individual arthropods was much higher than the number of individual arthropods in rice fields with synthetic insecticide applications and the number of individual arthropods from fields with bioinsecticide applications. This means that agricultural activities on SW land and LC land have the potential to affect the composition, abundance, and diversity of the insect family of the Hymenoptera order in the city of Palembang. Therefore, the purpose of writing this article is to analyze and inform the composition, abundance, and diversity of insect families of the order Hymenoptera in the SW and LC lands of Palembang City.

Materials and Methods

Research sites

The location of this research is tidal peat swamps which have turned into SW and LC lands in the Palembang city. This location is a habitat for insects of the order Hymenoptera aquatic and terrestrial. The identification of insects of the Hymenoptera order was carried out in the Biology Education Laboratory of the Faculty of Teacher Training and Education. The collection of insect samples from the Hymenoptera order was carried out in six locations, namely Sungai Ijuk (SI), Gandus (G), Kertapati (K), Jaka Baring (JB), Sukarno Hatta (SH) and Alang-alang Lebar (AL). The locations of SI, G and K are SW land from lowland swamps to rice fields, while JB, SH and AL are LC lands from lowland swamps to sports stadiums (sports centers), housing and offices.

Research methods

This study used a survey method. The survey was an exploration of the Hymenoptera order insects in the SW and LC lands of the Palembang city. Each research location was explored four times. Determination of the research location using purposive sampling method with the reasons for different habitat conditions between locations. If different habitats, it is likely to find insects of different Hymenoptera orders. The location of SW land is dominated by homogeneous plants, namely rice plants and wild plants on the edge of the rice fields, while the LC land is dominated by more heterogeneous vegetation because it is located around sports stadiums, housing, and offices.

Collection of Hymenoptera order insects from SW and LC fields

The collection of insect samples was carried out in two ways, namely installing pitfall traps, sticky traps, and light traps for 24 hours and catching insects directly with a sweep net in the roaming area as far as ± 2 km. Insect traps are only installed in areas where vegetation is found on SW and LC lands. The insect samples collected were preserved by placing them in bottles with 70% alcohol content (Keroumi et al., 2012). Insect samples of the order Hymenoptera were taken to the laboratory for identification.

Identification of samples of the order Hymenoptera

The unknown insect sample of the order Hymenoptera was identified. The samples were observed for the morphology of the antennae, mouth, wings, thorax, limbs, abdomen, and body color. The identification of insects of the order Hymenoptera used references, namely Goulet and Huber (1993), Lapolla, Cheng, and Fisher (2010). Borror et al. (2005), Romoser & Stoffolano (1998), as well as the official websites, namely http://www.buggide.net and http://arizone.org. The identification of insects of the order Hymenoptera was carried out to the genus level, if possible to the species level.

Data analysis

For the analysis of individual abundance and insect diversity of the order Hymenoptera originating from SW land and LC land of Palembang city, the sample insect samples were tabulated first based on the composition and number of individuals. The abundance index used the formulation of Lugwig & Reynolds (1988), while the index of diversity used the formulation of Odum, (1993).

Results and Discussion

The composition of the family and the number of insects of the order Hymenoptera in the SW land and LC land of the Palembang city.

The family and number of insects of the order Hymenoptera from the SW land and LC land in Palembang city varied. The highest number of individuals was found in the Formicidae family and the lowest was found in the Dolichoderidae, Megachilidae, and Tenthredinidae families. The family and number of insects of the order Hymenoptera from each land were different. For more details, see the table below.

Table 1. Family composition and number of insects of the order Hymenoptera from several SW and LC lands in the city of Palembang

No.	Family	∑ individual insects of the Hymenoptera order								∑ Total
		SW land				LC land				
		SI	G	K	Total	JB	SH	AL	Total	
1.	Apidae	344	50	14	408	19	0	13	32	440
2.	Braconidae	0	0	0	0	1	1	0	2	2
3.	Chrysididae	0	10	0	10	0	0	0	0	10
4.	Crabronidae	0	15	0	15	3	0	0	3	18
5.	Dolichoderidae	0	0	0	0	0	0	1	1	1
6.	Eulophidae	0	0	0	0	0	0	8	8	8
7.	Evaniidea	0	0	0	0	1	0	2	3	3
8.	Formicidae	1.098	1476	1.068	3.642*	543	1.217	228	1.988*	5.630*
9.	Halictidae	0	2	5	7	0	0	0	0	7
10.	Ichneumonidae	0	2	6	8	1	64	2	67	75
11.	Megachilidae	0	0	0	0	0	1	0	1	1
12.	Platygastridae	0	0	5	5	0	6	0	6	11
13.	Pompilidae	0	0	0	0	5	0	6	11	11
14.	Scoliidae	0	0	0	0	0	2	0	2	2
15.	Sphecidae	0	45	13	58	5	27	7	39	97
16.	Staphylinidae	54	0	0	54	0	0	0	0	54
17.	Tenthredinidae	0	0	0	0	0	0	1	1	1
18.	Vespidae	2.138	0	6	2.144	4	117	4	125	2.269
∑ individual		3.634	1.600	1.117	6.351	582	1.443	272	2.297	8.648
∑ family		4	6	7	10	8	8	8	15	18

Description: SI (Ijuk River), G (Gandus), K (Karyajaya), JB (Jaka Baring), SH (Sukarno Hatta) and AL (Alang-alang Lebar). * Highest number of individuals.

Based on table 1, the number of families found was 18, in SW land there were 4 to 7 families, while in the LC land there were 8 insect families of the Hymenoptera order. The number of individuals in SW land was 6,351 and on LC land was 2,297. The Apidae, Formicidae, Ichneumonidae, Platygastridae, Sphecidae, and Vespidae families are found in almost all fields. The Braconidae, Dolichoderidae, Evaniidea, Pompilidae, Sphecidae, and Tenthredinidae families were only found in the LC land, while the Chrysididae, Halictidae, and Staphylinidae families were only found in SW fields.

In the SW land, the SI location was found 4 families with a total of 3,634 insects of the Hymenoptera order. The highest number of individuals was from the Vespidae family and followed by the Formicidae and Apidae families. In the SW area, location G was found 6 families with a total of 1,600 individual insects of the Hymenoptera order. The highest number of individuals

from the Formicidae family was followed by the Apidae and Sphecidae families. In the SW area, location K, there were 7 families with a total of 1,117 insects of the Hymenoptera order. The highest number of individuals from the Formicidae family was followed by the Apidae and Sphecidae families. Overall, 10 families were found in the SW area with a total of 6,351 insects of the Hymenoptera order. The highest number of individuals was from the Formicidae family, followed by the Vespidae and Apidae families.

In the LC land where JK was found, 8 families were found with a total of 582 insects of the Hymenoptera order. The highest number of individuals was from the Formicidae family and followed by the Apidae family. In the LC area of the SH location, 8 families were found with a total of 1,443 insects of the Hymenoptera order. The highest number of individuals was from the Formicidae family and followed by the Vespidae and Ichneumonidae families. In the LC land, the AL location was found 8 families with a total of 272 insects of the Hymenoptera order. The highest number of individuals was from the Formicidae family and followed by the Apidae family. The highest number of individuals was from the Formicidae family, followed by the Vespidae and Apidae families. Overall, 15 families were found in the LC land with a total of 2,297 individuals of the Hymenoptera order. The highest number of individuals from the Formicidae family followed by the Vespidae, Ichneumonidae, Sphecidae, and Apidae families

The abundance index (%) of individual insects from various families of the Hymenoptera order in the SW and LC lands of Palembang city.

The index value of individual insect abundance from various families of the Hymenoptera order tended to be higher on SW land than on LC land. The percentage index of abundance of individual insects from various families of the Hymenoptera order can be seen in table 2.

Table 2. Abundance index (%) of individual insects from various families of the Hymenoptera order in the SW and LC lands of Palembang City.

No	Family	Abundance index (%) of individual insects from various families of the Hymenoptera order					
		SW land		LC land		SW land and LC land	
		∑	Abundance index (%)	∑	Abundance index (%)	∑ total	Abundance index (%)
1.	Apidae	408	4,7170	32	0,0003	440	5,087
2.	Braconidae			2	0,00002	2	0,00002
3.	Chrysididae	10	0,0001			10	0,0001
4.	Crabronidae	15	0,0001	3	0,00003	18	0,0002
5.	Dolichoderidae			1	0,00001	1	0,00001
6.	Eulophidae			8	0,00009	8	0,00009
7.	Evaniidea			3	0,00003	3	0,00003
8.	Formicidae	3.642	42,113	1.988	22,987	5.630	65,101
9.	Halictidae	7	0,00008			7	0,00008
10.	Ichneumonidae	8	0,00009	67	0,0007	75	0,0008
11.	Megachilidae			1	0,00001	1	0,00001
12.	Platygastridae	5	0,00005	6	0,00006	11	0,0001
13.	Pompilidae			11	0,0001	11	0,0001
14.	Scoliidae			2	0,00002	2	0,00002
15.	Sphecidae	58	0,0006	39	0,0004	97	1,121
16.	Staphylinidae	54	0,0006			54	0,0006
17.	Tenthredinidae			1	0,00001	1	0,00001
18.	Vespidae	2.144	24,791	125	1,445	2.269	26,237
		6.351	73,438	2.297	26,561	8.648	

Description: SI (Ijuk River), G (Gandus), K (Karyajaya), JB (Jaka Baring), SH (Sukarno Hatta) and AL (Alang-alang Lebar). *) Highest abundance index

The index of insect abundance from the Hymenoptera order family in SW and LC land varied. The total abundance index of the Hymenoptera order family in SW land (73.438%) was higher than the index of the total abundance of the Hymenoptera order family in LC land (26.561%). The highest family abundance index was Formicidae, which was 65.101%, followed by the Vespidae family (26.237%) and the Apidae family

(5.087%). The lowest abundance index of the Hymenoptera order was three families, namely Dolichoderidae, Megachilidae, and Tenthredinidae each with an abundance index of 0.00001%.

On SW land with monoculture plant (rice) vegetation, of the 10 insect families of the Hymenoptera order, the highest abundance index was Formicidae, namely 42.113% followed by Vespidae (24.791%) and Apidae (4.717%). The lowest insect abundance index in the Hymenoptera order family was Platygastridae (0.00005%). In LC land with polyculture plant vegetation, of 18 insect families of the Hymenoptera order, the highest abundance index was Formicidae, namely 22.987%, followed by Vespidae (1.445%) and Ichneumonidae families (0.0007%).

The diversity index of Hymenoptera order insect in SW and LC land in Palembang city.

The insect diversity index of the Hymenoptera order in LC land was higher than the Hymenoptera order insect diversity index in SW land. For more details, see table 3 below.

Table 3. The insect diversity index of the Hymenoptera order in the SW and LC lands of Palembang City.

Family	Genus	∑ individual	
		SW land	LC land
Apidae	*Anthopra* sp.	325	6
	Apis sp.	77	5
	Melissodes sp.	6	0
	Triepeolus sp.	0	1
	Xylocopa sp.	0	21
Braconidae	*Alabagrus* sp.	0	1
	Wilkinsonellus sp.	0	1
Chrysididae	*Trichrysis* sp.	10	0
Crabronidae	*Bembecinatus* sp.	15	0
	Lestica sp.	0	1
	Psenulus sp.	0	2
Dolichoderidae	*Tapinoma* sp.	0	1
Eulophidae	*Tetratichus* sp.	0	8
Evaniidea	*Evania* sp.	0	3
Formicidae	*Anoplolepis* sp.	562	49
	Aphaenogaster sp.	0	1
	Brachymyrmex sp.	0	18
	Camponotus sp.	510	136
	Crematogaster sp.	196	9
	Diacamma sp.	0	86
	Dolichoderus sp.	1.218	395
	Formica sp.	0	7
	Iridomyrmex sp.	0	51
	Leptogenys sp.	171	49
	Meranoplus sp.	0	7
	Monomorium sp.	88	0
	Myopias sp.	0	1
	Myrmecocystus sp.	0	102
	Nilandria sp.	0	148
	Oceophylla sp.	83	0
	Odontomachus sp.	33	0
	Odontoponera sp.	0	116
	Paraponera sp.	0	115
	Paratrechina sp.	32	0
	Polyrhachis sp.	351	37
	Ponera sp.	107	0
	Selonopsis sp.	291	595
	Tetraponera sp.	0	66
Halictidae	*Halicus* sp.	7	2
Ichneumonidae	*Cisaris* sp.	0	2
	Ichneumon sp.	0	2
	Netelia sp.	0	1

	Syspasis sp.	0	57
	Thyrateles sp.	8	4
	Trathala sp.	0	1
Megachilidae	*Megachile* sp.	0	1
Platygastridae	*Leptacis* sp.	5	6
Pompilidae	*Pepsini* sp.	0	6
	Priocenemis sp.	0	5
Scoliidae	*Campsomeris* sp.	0	2
Sphecidae	*Ammorphyla* sp.	0	2
	Chalybion sp.	0	2
	Chlorion sp.	0	10
	Eremnophila sp.	37	14
	Sceliphron sp.	3	8
	Stizus sp.	1	0
	Tachysphex sp.	17	3
Staphylinidae	*Paederus* sp.	54	0
Tenthredinidae	*Craesus* sp.	0	1
Vespidae	*Abispa* sp.	0	1
	Anterhynchium sp.	0	1
	Belanogaster sp.	2138	0
	Pacchodynerus sp.	0	1
	Polistes sp.	6	100
	Ropalidia sp.	0	5
	Vespa sp.	0	3
	Vespula sp.	0	4
∑ Individual (N)		6.351	2.297
∑ Spesies (S)		46	69
The diversity index (H')		2,165	2,741

From Table 3 above, the insect diversity index of the Hymenoptera order in the LC land (2.741) was higher than the insect diversity index of the Hymenoptera order in the SW field (2.165). The insect diversity index of the Hymenoptera order in LC land was higher because there were more types of plant vegetation (polyculture) in LC land (monoculture). The LC land in residential complexes, offices, and sports stadiums is greener and has more diverse types of vegetation. More types of plant vegetation can be a source of food energy for the Hymenoptera order insects.

The composition of the family and the number of insects of the Hymenoptera order in the SW and LC lands of the Palembang city.

The results of this study (Table 1) that the number of insects of the Hymenoptera order in SW land was higher than in LC land, while the number of insect families of the Hymenoptera order in LC land was higher than in SW land. On the SW land is more dominated by rice plants, while on the LC land is more dominated by a variety of green vegetation. Different ecosystem conditions can affect the presence of insects of the Hymenoptera order. Wanjui (2013) states that biodiversity conservation can increase the presence of animals. This is by the results of research in LC land which has a higher number of insect families from the Hymenoptera order compared to SW land, but LC land has a smaller number of individuals.

The homogeneity of plant vegetation such as rice plants only increases the number of individual insects of the Hymenoptera order, while heterogeneity of plant vegetation can increase the diversity of the insect family of the Hymenoptera order. The SW area is dominated by rice plants, but the edge of the SW area is still found with other plants. This condition can increase the presence of beneficial Hymenoptera order insects. According to Morandin, Long, and Kremen (2016), agricultural land edge habitats have an important role in increasing biodiversity including beneficial insects, natural enemies, and pollinators. The same thing was stated by Retallack (2011) that increasing the diversity of plant vegetation on the edge of the vineyard can increase the number of natural enemies. This means that the edge of SW land which still has a diversity of plant vegetation has the potential to increase the diversity of insects from the Hymenoptera order family. Different conditions, the number of individuals, and the diversity of insects from the order of Hymenoptera family were evenly distributed on the LC land. The results of the study were supported by the opinion of Semiun and Stanis (2016) finding that monoculture land existed 5 families of arthropods, (Apidae, Aphididae, Carabidae, Formicidae, and

Gryllidae), while the polyculture fields were found in 7 families (Acrididae, Aphididae, Araneidae, Carabidae, Formicidae, Gryllidae, and Libellulids).

Abundance index (%) of individual insects from various families of the Hymenoptera order in the SW and LC lands of Palembang city.

The insect abundance index of the Hymenoptera order in SW land with open conditions was higher when compared to the insect abundance index of the Hymenoptera order in LC land with conditions that were more covered by plant vegetation. This result is the same as the research of Yulminarti et al. (2015) found the abundance index of ants (Formicidae) in open peatlands with higher oil palm vegetation when compared to the abundance index of ants on natural peatlands with diverse vegetation in Kampar Riau. Informed by Semiun and Stanis (2016) the abundance of arthropods was higher in monocultures than in polyculture lands.

In SW land, the abundance index of individual insects from the Hymenoptera order was higher than that of LC land. The high index of abundance is due to the presence of the Formicidae family with a very high number of individuals when compared to the number of individuals in the LC land. It is suspected that the Formicidae family is an insect capable of adapting to different environmental conditions. This means that the insects of the Formicidae family can adapt well to biotic and abiotic environments. The Formicidae family are ants that are very adaptable to new environments, including environments where human activities are present. Informed by Triyogo et al. (2020) the abundance of individual ants of the Formicidae family is higher in industrial forests where human activities are present compared to natural forests. Peck, Mcquaid, and Campbell (1998) stated that Anoplolepis gracilipes are an ant species that is easy to adapt, has a very wide distribution, and can reduce the diversity of other ant species. If an area is found with high A. gracilipes, it will dominate the area, and eventually, other ant species will be suppressed.

In general, the insect abundance index of the Hymenoptera order family in SW land was higher, when compared to LC land. It is suspected that on SW land, the light intensity is not hindered because the land is more open. This means that SW land has a higher light intensity. These results are following the opinion of Peck, Mcquaid, and Campbell (1998), Anoplolepis gracilipes is an ant species that can live in habitats with high light intensity. According to Latumahina et al. (2014), one of the factors that can influence the cause of ants (Formicidae) is light intensity. Cold-blooded insects (poikilotherm), including the Hymenoptera order, will metabolize faster in open land. If the metabolism is better then the breeding will be faster and finally, the abundance will be higher.

Hymenoptera order insect diversity index in SW and LC land in Palembang city.

The availability of higher nutrients and organic matter in LC land such as plant litter can be used as an energy source for insects of the Hymenoptera order, thereby affecting the presence of insects of the Hymenoptera order. According to Mahadika et al. (2017) stated that the diversity index of ants (Formicidae) in organic land was higher than in inorganic land. On organic land, there is more food as a source of energy. Ants as soil fauna utilize organic matter as an energy source. It was also reported by Semiun and Stanis (2016) that polyculture agricultural land has a higher insect diversity index when compared to monoculture agricultural land. This means that polyculture agriculture with more diverse plant vegetation plays an important role in providing a food source for energy for the Hymenoptera order insects. Setiani et al. (2010) reported that wetland habitat with heterogeneous plants plays an important role in maintaining the diversity of useful insects such as ants. We know that habitat diversity can support the existence of useful insects, including ants. The same thing was reported by Tawakkkal (2019) that land type affects the diversity of insect species of the Hymenoptera order (parasitoid). Land with more diverse vegetation, such as forests, rubber forests, species diversity of the Hymenoptera order is higher than the diversity of insect species of the Hymenoptera order in oil palm plantations and rubber plantations. Forest land and rubber forest generally have a more diverse diversity of plant vegetation when compared to oil palm and rubber plantations which tend to be a monoculture. According to Malgorzata et al. (2016) that the more types of plant vegetation in the pond area have a positive correlation with the richness of the number of Trichoptera insect species. Besides, Hoermann et al. (2020) reported that an increase in plant diversity had a positive effect on species richness and diversity of dung beetles. Diniz et al. (2010) reported that increased host species richness led to a significant increase in insect species richness.

The low diversity index on SW land was due to the application of synthetic pesticides and synthetic herbicides. Pesticides used to eradicate swamp rice pests caused the death of insects of the Hymenoptera order. According to Herlinda et al. (2008) stated that the application of synthetic insecticides to inorganic lowland rice plants in the city of Palembang could reduce the diversity of predatory arthropods. It was reported by Froidevaux (2017) that organic farming can increase the diversity of Arachnids species in Mediterranea grape farms when compared to the diversity of Arachnids species in conventional farms using synthetic insecticides.

This means that the application of synthetic insecticides can reduce the diversity of insect species in the SW area of the SI, G, and K locations of Palembang city. Therefore, LC land is better for the development of the insect community of the Hymenoptera order.

Conclusion

This study concludes that the composition of the Hymenoptera order family in LC land is higher than in SW land, but the number of individual insects of the Hymenoptera order in SW land is higher than in LC land. Abundance index (%) of individual insects from the Hymenoptera order family in the land The SW was higher when compared to the abundance index (%) of individual insects from the Hymenoptera order family in LC land. The insect diversity index of various insect families of the Hymenoptera order on LC land had a higher value (2.741) than the diversity index of the Hymenoptera order insect families in SW land. It is recommended to research the role of various insect species from the order Hymenoptera on SW and LC lands in the Palembang city.

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