

DIVERSITY of SOIL ARTHROPOD IN GREEN BARRIER AREA PT.

PUSRI

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DIVERSITY of SOIL ARTHROPOD IN GREEN BARRIER AREA PT. PUSRI

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ABSTRAK

Penelitian dilakukan untuk menginventarisasi dan identifikasi serta melihat korelasi antara vegetasi dengan jenis Arthropoda tanah di kawasan *Green Barrier* PT Pusri. Luas kawasan *Green Barrier* PT. Pusri 28 hektar dan didominasi oleh 10 jenis vegetasi, yaitu Angsana (*Pterocarpus indicus* Wild), Bambu (*Bambusa* Sp), Beringin (*Ficus benyamina*), Buah Roda (*Hura crepitans* L), Jati (*Tectona grandis* L), Kelampayan (*Neolamarckia cadamba*), Ketapang (*Terminalia catappa* L), Mahoni (*Swietenia macrophylla* King), Pulai (*Alstonia scholaris*), dan Sengon (*Paraserianthes falcataria* L). Arthropoda tanah dikoleksi menggunakan *pit fall traps* dan corong *barlese-tullgren*, di setiap tipe vegetasi, antara bulan Juli-Agustus 2015. Identifikasi arthropoda tanah dilakukan di Laboratorium Entomologi dan analisis bahan organik tanah dilakukan di Laboratorium Tanah Fakultas Pertanian Universitas Sriwijaya. Hasil penelitian diperoleh 3 kelas, 10 ordo, 28 famili dan 35 genera dibawah 10 vegetasi. Nilai indeks keanekaragaman arthropoda tanah di berbagai tipe vegetasi tergolong sedang ($H= 1-3$), dan tidak ada jenis arthropoda tanah yang dominan, artinya berbagai jenis arthropoda tanah tersebar merata pada berbagai tipe vegetasi di kawasan *Green Barrier* PT. Pusri. Faktor abiotik intensitas cahaya sangat memegang peranan penting dalam kehidupan komunitas arthropoda tanah di vegetasi Sengon (*Paraserianthes falcataria* L) dengan nilai koefisien korelasi 1,00.

Kata kunci : arthropoda tanah, struktur komunitas, faktor abiotik, *Green Barrier* PT. Pusri

ABSTRACT

The research was conducted to inventory and identify as well as acknowledge the correlation between vegetation type with soil arthropods in the Green Barrier area of PT Pusri. PT. Pusri green Barrier area is 28 hectares and dominated by 10 types of vegetation, such as, the Angsana (*Pterocarpus indicus* Wild), Bambu (*Bambusa* Sp), Beringin (*Ficus benyamina*), Buah Roda (*Hura crepitans* L), Jati (*Tectona grandis* L), Kelampayan (*Neolamarckia cadamba*), Ketapang (*Terminalia catappa* L), Mahony (*Swietenia macrophylla* King), Pulai (*Alstonia scholaris*), and Sengon (*Paraserianthes falcataria* L). Soil arthropods were collected by using pit fall traps and funnel barlese-

tullgren in every type of vegetation, between July-August 2015. Identification of arthropod genera Identification has been done in Entomology Laboratory of the Agriculture Plant Disease Faculty Sriwijaya University, and analysis of soil organic in the Laboratory of Soil Faculty of Agriculture Sriwijaya University. The results were obtained into 3 classes of soil arthropods belonging to the 10 orders, 28 families and 35 genera. The diversity index value of soil arthropods in various types of vegetation is classified moderately ($H= 1-3$), and no type of soil arthropods were dominant, mean that soil arthropods with different types spread over in the various types of vegetation in the area of Green Barrier PT. Pusri. Light intensity abiotic factors play an important role in the life of the soil arthropod communities in vegetation Sengon (*Paraserianthes falcataria L*) with a correlation coefficient 1.00

Keywords: soil arthropods, community structure, a biotic factors, Green Barrier PT. Pusri

INTRODUCTION

Green Barrier PT. PUSRI planted with various species of plants in groups. Arifin (2015) noted the plants in the area of Green Barrier may follow the pattern of ecological (clustered, elongated, scattered), as well as patterns of planologis who follow the hierarchy and structure of urban space. Zaini (2015) stated that there are 6 types of species of plants in groups that are located in the Green Barrier area, that is; Sengon (*Paraserianthes falcataria L.*), Angsana (*Pterocarpus indicus Will.*), Jati (*Tectona grandis L.*), Buah Roda (*Hura crepitans L.*), Ketapang (*Terminalia catappa L.*) and Mahoni (*Swietenia macrophylla King*).

Plants diversity in Green Barrier area can affect to density of soil Athropod population. According to Salzman et al. (2008) the viability million or more species of fitofag arthropods is highly dependent on plants. All parts of the plant that are above and below ground are a source of nutrients for the fitofag arthropods. Fitofag arthropods that will attract of arthropods entomofag to presence. Interaction insect with that eats the plant closely related to a secondary chemical compounds contained in plants. Activity Insects in the ground can be used as bio-indicators of contamination in the soil (Waluyo, 2008). Nurhadi (2003) states that the differences of vegetation composition and effects of urea dust can impluence the composition and structure of soil fauna communities that live around plant fertilizer PT. Pusri,

Green Barrier condition is closely associated with the activity of the factory, so that the original area has an important role as a Green Barrier as well as biodiversity

would be disturbed. It is necessary for research on soil arthropod species diversity under the vegetation that grows in the area of Green Barrier factory PT. Pusri.

MATERIALS AND METHODS

Tools and Materials

The materials that used in this study were 70% alcohol, formalin 4%, hexane solution, distilled water. The tools used in this study are: the pipes, plastic cups, film canisters, funnel barlese-tullgren, strainer, wire mesh, formalin 4%, and 70% alcohol. While the tools that used in the identification of soil arthropods are: microscope, tweezers, and identification book

Sampling Method

The study was conducted in July-September 2015, and one sample taken for four weeks in a row every week. The research location is in PT. Pusri Green Barrier Palembang, South Sumatra Province. Samples were taken by using purposive sampling method assuming to determine location based on representation of the type of vegetation in the area of Green Barrier PT. Pusri. Identification of arthropod samples have been done in Entomology Laboratory Faculty of Agriculture Sriwijaya University. Soil samples were taken to analyzed soil organic matter. Analysis of soil organic in the Laboratory of Soil Faculty of Agriculture Sriwijaya University. Physical parameters is performed to determine the value of temperature, pH, moisture, and light in the various types of plant.

Work Procedures

Samples were taken by using technique of pit fall traps to trap soil arthropods and funnel barlese-tullgren to extract arthropods in litter. Samples were taken at 10 vegetation types of plants such as, Angsana (*Pterocarpus indicus* Wild), Bamboo (*Bambusa* sp.), Beringin (*Ficus benyamina*), Buah Roda (*Hura crepitans* L), Jati (*Tectona grandis* L), Kelampayan (*Neolamarckia cadamba*), Ketapang (*Terminalia catappa* L), Mahony (*Swietenia macrophylla* King), Pulai (*Alstonia scholaris*), and Sengon (*Paraserianthes falcataria* L) In every type of vegetation will be installed 2

Pitfall Trap on the soil surface covered (shaded by a canopy of trees) and open (not shaded by a canopy of trees) around vegetation.

Arthropod soil Identification was conducted in Entomology Laboratory Faculty of Agriculture Sriwijaya University using identification keys. The arthropods were identified with selected references, such as: DeGunst (1957), Kalshoven (1981), Lawrence and Britton (1984), Barrio and Litsinger (1990), Shepard et al., (1991), Borrer et al. (1992), Barrion and Litsinger (1994). Soil arthropods were analyzed macroscopically and microscopically (with Stereo microscope). The sections were observed created an image or photo. Based on morphological characters obtained was determined to genera level.

Data Analysis

Samples of soil arthropods were identified and numbered, then analyzed with the following formulation:

Species diversity of soil animals can be calculated with Shannon-Weener formula (Odum, 1998)

$$H = - \sum p_i \ln p_i$$

Description :

H = Diversity Index

$p_i = n_i/N$

n_i = counting individual species-i

N = total number of individuals

Diversity index criteria:

H < 1 = low diversity (number of species and individuals is low, there is one dominant species)

H = 1-3 = moderate diversity (number of species and individuals are moderate, the number of individuals do not vary)

H > 3 = high diversity (number of species and individuals is high, there is no dominant species)

The dominance of land animal species can be calculated using the following formula of Simpson (Fachrul, 2012):

$$C = \sum \left(\frac{n_i}{N} \right)^2$$

Description:

C = species dominance

n_i = counting individual species-i

N = total number of individuals
 Dominance index criteria:
 C < 0,5 = low dominance
 C > 0,5 = high dominance

Evenness, index of species evenness can be calculated using the following formula of Pielou (Fachrul, 2012):

$$e = \frac{H'}{H_{maks}}$$

Description:

e = evenness index
 H' = diversity index
 H max = the maximum diversity index (ln S)
 S = the number of species
 Evenness index criteria:

E < 0.5 = high evenness (individual wealth owned by each - each very different species)
 E > 0.5 = low evenness (number of individuals each - each species are relatively the same.)

Analysis of data using analysis techniques non-parametric with Spearman analysis at α level of 5% ($p < 0.05$). This aimed to determine the correlation abiotic factors such as temperature, pH, moisture, organic matter and light with a diversity index (H') Athropoda land in various types of vegetation in the area of Green Barrier. Calculation of this analysis assisted by computer applications STATISTICA software version 8.

RESULTS AND DISCUSSION

The results showed that the trap type which used is a pit-fall traps and funnel-Tullgren Barlesse can affect the soil type of arthropods trapped (Table 1).

Table 1. The composition and abundance of soil arthropods in various types of plant vegetation in Green Barrier area PT.Pusri obtained in Pit Fall Trap.

Ordo	Famili	Genera	Observation stations and Soil Arthropod abundance in Trap Pitfall Trap										Total Individuals	
			1	2	3	4	5	6	7	8	9	10		
Araneae	Araneidae	<i>Hogna</i>				1				1			1	3
	Lycosidae	<i>Pardosa</i>			2	2	2	2	1	1				10
	Phalangiidae	<i>Leptobunus</i>				1							1	1
	Salticidae	<i>Marpissa</i>	1		1	2							1	5
	Thomisidae	<i>Philodromus</i>												
Blattodea	Blattidae	<i>Blatta</i>	3		12	7	1	2	2	9	20	16	72	

	Carabidae	<i>Bradycellus</i>				1					1	
		<i>Calleida</i>							1		1	
	Carcinophoridae	<i>Euborellia</i>				1		1	1		3	
	Coccinellidae	<i>Cycloneda</i>	1								1	
	Curculionidae	<i>Sitophilus</i>							1		1	
	Cydniidae	<i>Geotomus</i>	1			1				2	4	
	Elaterididae	<i>Selatosomus</i>			1						1	
	Nitidulidae	<i>Haptoncus</i>	1			1		1			3	
	Staphylinidae	<i>Paederus</i>							1		1	
	Tenebrionidae	<i>Gonocephalum</i>	1			1					2	
		<i>Tenebrio</i>										
Collembola	Entomobryidae	<i>Acanthurella</i>										
		<i>Drepanura</i>										
	Paronellidae	<i>Salina</i>										
	Isotomidae	<i>Isotomorus</i>										
Diptera	Pipunculidae	<i>Chalarus</i>					1				1	
Hemiptera	Alydidae	<i>Alydus</i>			1					1	2	
Hymenoptera	Formicidae	<i>Camponotus</i>		1	3	1	4	1	8	1	3	
		<i>Nyländeria</i>	1	9	33	7	23	9	7	1	3	
		<i>Odontoponera</i>	7	2	7	38	23	5	58	13	14	
		<i>Oecophylla</i>				4			2		6	
	Vespidae	<i>Euodynerus</i>								1	2	
	Braconidae	<i>Aleiodes</i>							2		2	
		<i>Chelonus</i>						1			1	
Lepidoptera	Noctuidae	<i>Helicoverpa</i>				6				1	1	
Orthoptera	Gryllidae	<i>Gryllus</i>		1			1		3	1	1	
	Acrididae	<i>Dichromorpha</i>									2	
Chilopoda	Scolopendridae	<i>Scolopendra</i>			1	1	2	2	2	1		
Diplopoda	Juliidae	<i>Julus</i>				1					1	
											2	
Number of Genera / Vegetation			6	7	8	13	10	13	11	12	5	13
Number of Individuals / Vegetation			14	16	60	72	58	29	87	32	39	51

Description : 1) Angsana (*Pterocarpus indicus* Wild), 2). Bamboo (*Bambusa* Sp), 3). Beringin (*Ficus benyamina*), 4). Buah Roda (*Hura crepitans* L), 5). Jati (*Tectona grandis* L), 6). Kelampayan (*Neolamarckia cadamba*), 7). Ketapang (*Terminalia catappa* L), 8). Mahony (*Swietenia macrophylla* King), 9). Pulau (*Alstonia scholaris*), dan 10). Sengon (*Paraserianthes falcataria* L).

Table 1 shows the dominant soil arthropods trapped in the Pit Fall Trap is a genera *Odontoponera*, *Nyländeria* (Formicidae), and *Blatta* (Blattidae). Soil arthropods least trapped in the Pit Fall Trap is a genera *Leptobonus*, *Bradycellus* and *Calleida*, *Sitophilus*, *Chalarus*, and *Chelonus*.

The number of the genera with high diversity found in vegetation Buah Roda, Kelampayan, and Sengon found 13 each genera, and least genera were found in vegetation Pulau found 5 genera. Many Individuals are found on vegetation Ketapang totaling 87 individuals and Buah Roda totaling 72 individuals. Good vegetation has a high diversity of genera. According to Sari (2014) Diversity in heterogeneous forests is high with a number of 114 individuals while the homogeneous forest is relatively low with a number of 16 individuals. While Prijono (2004) states that habitat of soil arthropods, such as in the crowns of trees, soil, litter, water, mud, and in plant tissue (as a miner, forming nodules or root), or in live animals (parasites).

Family of Formicidae and Blattidae is the dominant genera found in the Green Barrier. The type of vegetation and abiotic factors can encourage the spread of soil arthropods at any given point. Suin (2006), states that the spread of soil arthropods in a location affected by the physical and chemical conditions of the soil and the availability of foodstuffs obtained. Suwondo (2007), states that the presence of soil arthropods habitat sector in close relation to the daily and seasonal weather changes. Changes in abiotic factors such as temperature, pH, moisture and organic matter can affect soil arthropods. Formicidae is a soil arthropods that have high mobility and live in colonies. According Halli (2014), Formicidae has habit live in a colonies and active surface of the soil so that the installation of pit fall trap acquired a lot of land arthropods. Iloba research(2007) showed that at the site of the oil spill found Formicidae earth with a high level of abundance. this show that Formicidae can found in any places.

Blattidae is the family of the soil arthropod dominant found in various types of vegetation. Blatta is one of the genera of insect with most high adaptability. Blatta is a pest that can live in any condition. According to Winarno (2001), Blatta one of insect that is subsosial and live and feed inside the tree trunk like a warm, moist, and dark. Genera cockroaches are often found in the environment are the American cockroach *Periplaneta americana* (L.), German cockroach *Blatella germanica* (L.), and the Australian cockroach *Periplaneta australasiae* (F.). Types of cockroaches are found in neighborhoods Indonesia is the American cockroach *P. Americana* and *Blatella germanica* (Amalia, 2010).

Funnel Barlesse-Tullgren can capture several types of arthropods that are not found in the pit-fall trap. The use of two types of traps can maximize efforts to obtain the type of Arthropods in the Green Barrier (Table 2.)

Tabel 2. The composition and abundance of soil arthropods in litter at various types of plant vegetation in Green Barrier area PT.Pusri obtained using a funnel Barlesse-Tullgren.

Ordo	Famili	Genera	The composition and abundance of soil arthropods in litter at various of Vegetation obtained using a funnel Barlese-tullgren(4x Replay)										Total Individuals	
			1	2	3	4	5	6	7	8	9	10		
Araneae	Araneidae	<i>Hogna</i>	2	2	1		2	2	1					10
	Lycosidae	<i>Pardosa</i>			1			1						2
	Phalagiidae	<i>Leptobunus</i>												
	Salticidae	<i>Marpissa</i>				2	1					1		4

Collembola	Thomisidae	<i>Philodromus</i>	1		5						6			
	Entomobryidae	<i>Acanthurella</i>							1		1			
		<i>Drepanura</i>	1				3				4			
Blattodea	Paronellidae	<i>Salina</i>		1							1			
	Isotomidae	<i>Isotomorus</i>					1				1			
	Blattidae	<i>Blatta</i>	29	1	9	23	3	14	2	11	23	2	117	
	Carabidae	<i>Bradycellus</i>												
		<i>Calleida</i>												
	Carcinophoridae	<i>Euborellia</i>				1							1	
	Coccinellidae	<i>Cycloneda</i>												
	Curculionidae	<i>Sitophilus</i>												
	Cydnidae	<i>Geotomus</i>			1								1	
	Elateridae	<i>Selatosomus</i>												
Nitidulidae	<i>Haptoncus</i>													
Staphylinidae	<i>Paederus</i>								1				1	
	<i>Gonocephalum</i>													
Diptera	Pipunculidae	<i>Tenebrio</i>			1								1	
		<i>Chalarus</i>												
Hemiptera	Alydidae	<i>Alydus</i>												
Hymenoptera	Formicidae	<i>Camponotus</i>			3	3		4	2	2			14	
		<i>Nylenderia</i>	4		1	1		6				3	15	
		<i>Odontoponera</i>			2		1	7	4	5	1	2	22	
			<i>Oecophylla</i>											
	Vespidae	<i>Euodynerus</i>												
	Braconidae	<i>Aleiodes</i>												
		<i>Chelonus</i>							1					1
Lepidoptera	Noctuidae	<i>Helicoverpa</i>												
Orthoptera	Gryllidae	<i>Gryllus</i>												
	Acrididae	<i>Dichromorpha</i>									1		1	
Chilopoda	Scolopendridae	<i>Scolopendra</i>	2			1		2	2				7	
Diplopoda	Juliidae	<i>Julus</i>												
Number of Genera / Vegetation			6	2	7	8	4	4	8	6	3	7		
Number of Individuals / Vegetation			38	2	23	37	5	28	29	12	27	14	215	

Description :1) Angsana (*Pterocarpus indicus* Wild), 2). Bambu (*Bambusa* Sp), 3). Beringin (*Ficus benyamina*), 4). Buah Roda (*Hura crepitans* L), 5). Jati (*Tectona grandis* L), 6). Kelampayan (*Neolamarckia cadamba*), 7). Ketapang (*Terminalia catappa* L), 8). Mahony (*Swietenia macrophylla* King), 9). Pulai (*Alstonia scholaris*), dan 10). Sengon (*Paraserianthes falcataria* L).

Table 2 shows that the dominant soil arthropods trapped by the funnel-Tullgren Barlesse there are three genera *Odontoponera*, *Nyladeria*, and *Blatta*. Soil arthropods least trapped by the funnel- Barlesse Tullgren there are 7 genera *Acanthurella*, *Salina*, *Isotomorus*, *Euborellia*, *Geotomus*, *Paederus*, and *Tenebrio*.

Total Arthropods are trapped by the funnel-Tullgren Barlesse range between 1-117 individuals. Type of litter in different types of vegetation determines the amount of Arthropods obtained. Litter vegetation Angsana is commonly found Arthropods. Many Arthropods found in vegetation litter Angsana with genera *Blatta* totaling 29 individuals. Genera least in vegetation Angsana is *Nylenderia* consists of 4 individual, *Hogna* amounted to 2 individual and *Philodromus*, *Drepanura*, and *Scolopendra* each numbered 1 individual.

Vegetation Bamboo is vegetation beneath at least found Arthropods. Arthropods found in bamboo vegetation litter amount to 2 individuals, Genera obtained in

vegetation Bamboo is a genera *Salina* and *Blatta* each numbered 1 individual. The amount of the genera with high diversity found in litter vegetation Buah Roda, in Ketapang found 8 genera, and genera are found least in vegetation Bamboo found 2 genera Arthropoda. Individuals who are found in vegetation litter Angsana totaling 38 individuals. Collembola only found in the litter on the type of vegetation Angsana, Bamboo, Jati, Ketapang, and Sengon. Borror et al (1992) states that collembola usually live in areas with acidic pH and has a thick litter, because this group eating the litter. In addition, after factors temperature that determine it this group prefers shaded habitats (Suin, 1988)

Collembola were found in Berlese funnel-Tullgren but not found in Pit Fall Trap. Genera of Collembola trapped in the funnel Barlesse-Tullgren is *Acanthurella*, *Drepanura* (Entomobryidae), *Salina* (Paronellidae), and *Isotomorus* (Isotomidae). Suhardjono et al. (2012) states that collembola is a arthropods that live in litter and damp. Arthropods alive by eating mushrooms, litter decomposed and undergo fermentation. Collembola is a group of arthropods that live Jati, Ketapang, and Sengon is family Entomobryidae, Paronellidae, and Isotomidae.

Index Diversity, Dominance and Evenness of Soil Arthropods in Green Barrier area PT. Pusri.

Soil arthropods in the vegetation in Green Barrier area PT.Pusri obtained using Pit Fall Trap later identified. Arthropods that have been identified subsequently analyzed to obtain the value of diversity index, dominance and evenness. Analysis of the data obtained using the formula that has fixed index values obtained were relatively similar between each vegetation (Table 3).

Table 3. Diversity index, dominance and evenness of soil arthropods in various types of plant vegetation in Green Barrier area PT.Pusri obtained using Pit Fall Trap.

Characteristics (Indexes)	The index value at each plant vegetation									
	1	2	3	4	5	6	7	8	9	10
Diversity	1,77	2,22	2,09	2,46	2,38	2,74	2,34	2,42	1,85	2,53
Dominance	0,23	0,12	0,19	0,13	0,11	0,09	0,17	0,17	0,21	0,11
Evenness	0,67	0,80	0,51	0,58	0,58	0,81	0,52	0,70	0,51	0,65

Description :1) Angsana (*Pterocarpus indicus* Wild), 2). Bambu (*Bambusa* Sp), 3). Beringin (*Ficus benyamina*), 4). Buah Roda (*Hura crepitans* L), 5). Jati (*Tectona grandis* L), 6). Kelampayan (*Neolamarckia cadamba*), 7). Ketapang (*Terminalia catappa* L), 8). Mahoni (*Swietenia macrophylla* King), 9). Pulai (*Alstonia scholaris*), dan 10). Sengon (*Paraserianthes falcataria* L.

Table 3. The index value of diversity in a variety of vegetation in the area of Green Barrier PT. Pusri obtained using Pit Fall Trap ranged from 1.77 to 2.74. Various types of vegetation diversity index was moderate ($H' = 1-3$). That is the number of genera and individuals in a variety of vegetation types classified as moderate and relatively diverse number of individuals. According to Sari (2014) heterogeneous vegetation will have a relatively high diversity compared with homogeneous vegetation. According to Krebs (2001), the more the number of species found and evenly, then the diversity index will also be higher.

Vegetation of Angsana, Buah Roda, Ketapang, Mahony and Pulai showed high values dominance index ($D > 0.5$). Means that there are dominance individuals. Dominance index value on vegetation bamboo, Beringin, Jati, Kelampayan, and Sengon relatively low value of dominance index ($D < 0.5$). It means that there are dominance individuals. The average value index of dominance in various types of vegetation with a value of 0.43 is low ($D < 0.5$). According Fachrul (2012), a community that has high dominance index which means that there are species that dominance other species or community structure in a state of instability because there are ecological pressure (stress). Febrita research results (2008) demonstrated in a rubber plantation site with a low dominance index value having high evenness index value. High and low index of evenness of arthropod soil can be caused by the ability of Arthropods in utilizing a wide range of environmental conditions to sustain life.

Evenness index showed that the evenness index values in each type of vegetation are relatively common and is found low evenness ($E < 0.5$). The average value of equity indices in various types of vegetation with a value of 0.29 is low ($E < 0.5$). The value indicates the spread of Arthropods in each location is uneven, meaning that the number of individuals of each species are very different so there are species that dominance. According to Odum (1998), if the evenness index > 0.5 , then the high evenness, evenness interspecies relatively evenly, because the soil physico-chemical factors in various types of vegetation is not much different. The high index of evenness of soil arthropods caused these animals have the same ability to utilize a wide range of environmental conditions to sustain life. According to Stork (2007) Arthropod soil plays an important role in the functioning of the soil. Soil arthropods are involved in

processes such as decomposition of organic matter, humus formation and nutrient cycles of many elements (nitrogen, sulfur, carbon).

Soil arthropods in litter at various vegetation types of plants in the Green Barrier Industrial PT.PUSRI obtained using a funnel Barlesse-Tullgren later identified. Arthropods that have been identified subsequently analyzed to obtain the value of diversity index, dominance and evenness. Analysis of the data obtained using the specified formula index values obtained were relatively similar between each litter at various vegetation types (Table 4)

Table.4. Diversity index, dominance and evenness genera of soil arthropods in litter at various plant vegetation in Green Barrier area PT.Pusri obtained using a funnel Barlesse-Tullgren

Charcteristics (Indeks)	The index value at each plant vegetation									
	1	2	3	4	5	6	7	8	9	10
Diversity	1,63	0,69	2,03	2,26	1,79	2,05	2,31	1,922	0,48	1,83
Dominance	0,31	0,50	0,15	0,3	0,17	0,14	0,11	1,00	0,26	0,18
Evenness	0,45	1,00	0,69	0,62	1,00	0,58	0,83	0,62	0,53	0,79

Description :1) Angsana (*Pterocarpus indicus* Wild), 2). Bambu (*Bambusa* Sp), 3). Beringin (*Ficus benyamina*), 4). Buah Roda (*Hura crepitans* L), 5). Jati (*Tectona grandis* L), 6). Kelampayan (*Neolamarckia cadamba*), 7). Ketapang (*Terminalia catappa* L), 8). Mahoni (*Swietenia macrophylla* King), 9). Pulai (*Alstonia scholaris*), dan 10). Sengon (*Paraserianthes falcataria* L.

Table 4 above shows that demonstrate the value of diversity index of soil arthropods in litter every type of vegetation relatively low diversity ($H' < 1$). That is a low number of species and individuals, and there are a few dominant species. The average value of diversity index in various types of vegetation with a value of 0.23 is low ($H' < 1$). The low diversity of soil arthropods in litter are affected by litter are taken of each type of vegetation. Litter taken should litter that has been fermented, and usually the humus layer. According Wallwork (1970) vegetation will affect the production of humus and the type of vegetation also affects the diversity of soil arthropods. Arthropods population affected by the soil moisture content, organic matter content and soil temperature.

Leaf litter has relatively low dominance ($C < 0.5$). in few vegetations: Angsana, Beringin, Buah Roda, Jati, Kelampayan, Ketapang and Sengon. It means that there are no individuals who dominate. Dominance index value on vegetation Bamboo and Pulai relatively high dominance ($C > 0.5$). Means that there are individuals who dominate. Evenness index value in each litter vegetation is high ($E > 0.5$). This indicates that the

level of dominance and evenness index value is influenced by the composition of the soil arthropods in litter. In accordance with the opinion of Odum (1998), the high composition and density of soil arthropods, caused by litter from plants are a source of food for soil arthropods. Furthermore Wallwork (1970), mentions that the litter in large numbers will provide food and shelter for land Arthropods

Abiotic Factors (temperature, ph, moisture, soil organic matter and light)

Abiotic factors (temperature, pH, moisture, soil organic matter and light) Observed abiotic factors such as temperature, pH, moisture, organic content and light. Each of these parameters were observed during the study relatively differs between plant vegetation. Differences in outcome indicators on observations of moisture and organic matter (Table 5).

Table 5. Average temperature, pH, moisture, organic materials and light in each of the vegetation in Green Barrier area Industrial PT.PUSRI

Areas with dominant plants	Faktor abiotik				
	Temperature	pH	Moisture	Organic Materials	Light
Angsana (<i>Pterocarpus indicus</i>)	31,8	6,5	48,8	4,50	377,2
Bambu (<i>Bambusa</i> sp),	31,8	6,1	46,3	5,50	370,8
Beringin (<i>Ficus benyamina</i>)	31,3	6,2	48,8	1,76	342,4
Buah roda (<i>Hura crepitans</i>),	31,8	5,8	50,0	1,83	380,8
Jati (<i>Tectona grandis</i>),	31,8	6,1	37,5	3,46	396,3
Kelampayan (<i>Neolamarckia cadamba</i>),	31,5	5,8	46,2	4,28	366,5
Ketapang (<i>Terminalia catappa</i>),	30,8	6,3	45,0	3,82	340,0
Mahoni (<i>Swietenia macrophylla</i>),	30,8	6,1	50,0	2,67	381,2
Pulai (<i>Alstonia scholaris</i>),	32,0	5,9	50,0	4,34	367,4
Sengon (<i>Paraserianthes falcataria</i>)	32,0	5,7	55,0	6,76	404,3

Description;

Organic material is only once measurement in every type of vegetation

In this research (Table 5) can be seen that the average temperature in the vegetation in the area of Green Barrier Urea Fertilizer Industry in Palembang between 30-32 °C, the lowest temperature value present in Ketapang vegetation and Mahony each with a value of temperature 30.8 °C and the highest temperature value contained in vegetation Sengon Pulai and each has a value of 32 °C. Arthropods generally have an effective temperature range in order to survive and thrive. The minimum temperature for the insect life is 15 °C. According Suhardjono et al. (2012) could affect the climate

collembola population. Temperate area can be found 104-105 individuals/m². Tropical areas found to be less than 104 individuals/m².

The existence of arthropods in the soil is also affected by soil pH and soil moisture. Where in each vegetation type soil pH ranging from 5.7 to 6.5 and humidity ranges from 37-55%. The highest pH values found in Angsana vegetation, and low pH values found in Sengon vegetation, while for the highest value of the moisture contained in Sengon vegetation, and low humidity contained in Jati vegetation. Groundwater levels are low when less than 30%. (Nurhadi, 2003). Rainfall will affect the collembola, where low humidity in the dry season will lead to high mortality rates collembola (Suhardjono et al. 2012).

The results of measurements organic matter content ranged from 1.76 to 6.76%, with the highest content of organic matter contained in Sengon vegetation, and low organic matter content contained in banyan vegetation. According to research Nurhadi (2003) soil organic C content is high when more than 3.01%. Animals soil will be more common in areas rich in organic matter, because most of the animals will utilize soil organic matter as a source of food. Arthropods role in decomposition of soil organic matter for the supply of nutrients (Rahmawaty, 2004).

The movement of soil arthropods affected the intensity of the light. Results of measurement of light intensity ranged from 340.0 to 404.3 Lux. Light has a very important role in the development of life and behavior of soil arthropods. Arthropods ground there are active during the day, at night and active during the morning and afternoon before sunset (Priyono, 2014)

Types of vegetation can affect the temperature, pH, moisture, organic matter, and the intensity of light on the bottom. Plant vegetation that is not covered by tree canopy causes direct light received by the soil so that the soil temperature is high. Arthropods greatly influenced the development of soil biotic and abiotic factors of the habitat homes. (Suin, 2006). Broadly speaking very much abiotic factors influence the development and a population density of soil arthropods. According Fachrul (2012) environmental components (biotic and abiotic) will affect the abundance and diversity of biota somewhere, so the abundance of individuals of each species can be used to assess the quality of the habitat.

The sampling conditions during the dry season causes the number of Arthropods gained slightly. According Prijono (2004), seasonal factors will affect arthropod specimens ground. Arthropods ground gained ground arthropods are likely less than that obtained in the rainy season. Arthropoda land will live in groups in the colony to survive in the face of extreme environmental conditions. Arthropoda ground will choose the most suitable environmental conditions for life. Animals in the soil will be distributed in habitats that provide food and have intolerable abiotic factors (Suin, 2006)

Result Spearman Correlation Test in various types of plant vegetation in Green Barrier area PT.Pusri.

Spearman statistical test level analysis was conducted to determine whether there is any correlation in the form of abiotic factors as temperature, pH, moisture, light and organic material to the diversity index, dominance and evenness in every type of vegetation. Spearman test result data obtained by the value of the positive and negative values. Results obtained 20 positive and 21 negative ones in a variety of vegetation types of plants in the Green Barrier PT.PUSRI industry (Table 6).

Table 6. Spearman correlation test results between abiotic factors with diversity (H ') in various types of vegetation in Green Barrier area PT.Pusri.

Vegetation	FAKTOR ABIOTIK				
	TEMPERATURE	pH	MOISTURE	LIGHT INTENSITY	ORGANIC MATERIALS
Angsana	-0,39	-0,95	0,63	0,95	
Bambu	0,82	0,82	-0,33	0,77	
Beringin	-0,21	0,21	-0,95	0,20	
Buah Roda	-0,95	0,40	-0,95	0,80	
Jati	0,26	-0,20	-0,80	0,40	
Kelampayan	0,00	0,63	-0,77	0,60	-0,07 ⁽¹⁾
Ketapang	-0,74	0,63	-0,32	-0,60	
Mahoni	0,32	-0,20	-0,74	-0,20	
Pulai	-0,50	0,74	-0,33	0,63	
Sengon	-0,32	-0,77	0,00	1,00	

Description:

(1) : Organic material is only once measurement in every type of vegetation

Results of correlation analysis at α level of 5% ($p < 0.05$) in various types of vegetation found positive and negative correlation value. Positive correlation value means that if a high abiotic factors, the index of high soil arthropods communities, such as the correlation value Angsana vegetation moisture and light intensity are positive, indicating if the correlation value humidity and high light, then a high biodiversity

value. Negative correlation value indicates if the correlation between abiotic factors and indices inversely soil arthropod community. Meaning that if the high abiotic factors, the index of soil arthropod communities to be low, and vice versa, as in vegetation Angsana correlation values of temperature, pH, and organic material indicates if the negative correlation value of temperature, pH and organic matter is high then keankaragaman be low.

The correlation value obtained in a variety of vegetation types ranging from 0.00 to 1.00 (Figure 6). The correlation value of 1.00 means perfectly correlated abiotic factors on the index Arthropods community land on the vegetation. Correlation value of 0.00 means that there is no correlation between abiotic factors with the index ground Arthropods communities in the vegetation.

Spearman correlation value is the highest positive for abiotic factors of temperature and pH on diversity contained in bamboo vegetation, the positive correlation value moisture contained in Angsana vegetation, and to the correlation value is highest positive light on vegetation Sengon. The highest positive correlation values contained in the light abiotic factors with a correlation coefficient of 1.00. It was look like perfectly correlated light of the diversity in vegetation Sengon, because the vegetation Sengon size small leaves and thin so that light can directly reach the ground

Abiotic factors such as temperature, pH, moisture, organic matter and light intensity can be correlated positively and negatively to the index of soil arthropod diversity in various types of vegetation. Nurhadi (2009) reported that physical factors are optimal soil chemistry coal mining location can support the presence of soil arthropods and cause soil arthropod diversity index is high. Vegetation is one of the factors that determine the level of arthropod populations in the soil due to the type of vegetation that is habitat protection sector in addition to providing food material can also be used as a place of life (Suwondo, 2012)

CONCLUSION

Based on the research that has been carried out, can be summarized as follows:

1. Soil Arthropods found under 10 vegetation in Green Barrier area PT. PUSRI consists of 3 classes, 10 orders, 28 families and 35 genera. The number of soil

arthropods which are found in Green Barrier area PT. PUSRI is Odontoponera, Nyladeria (Formicidae), and Blatta (Blattidae).

2. The diversity index value of soil arthropods in various types of vegetation is moderate classified ($H=1-3$), and no type of soil arthropods were dominant, mean that soil arthropods with different types spread over in the various types of vegetation in the area of Green Barrier PT. Pusri.
3. Light intensity abiotic factors play an important role in the life of the soil arthropod communities in vegetation Sengon (*Paraserianthes falcataria L*) with a correlation coefficient 1.00

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