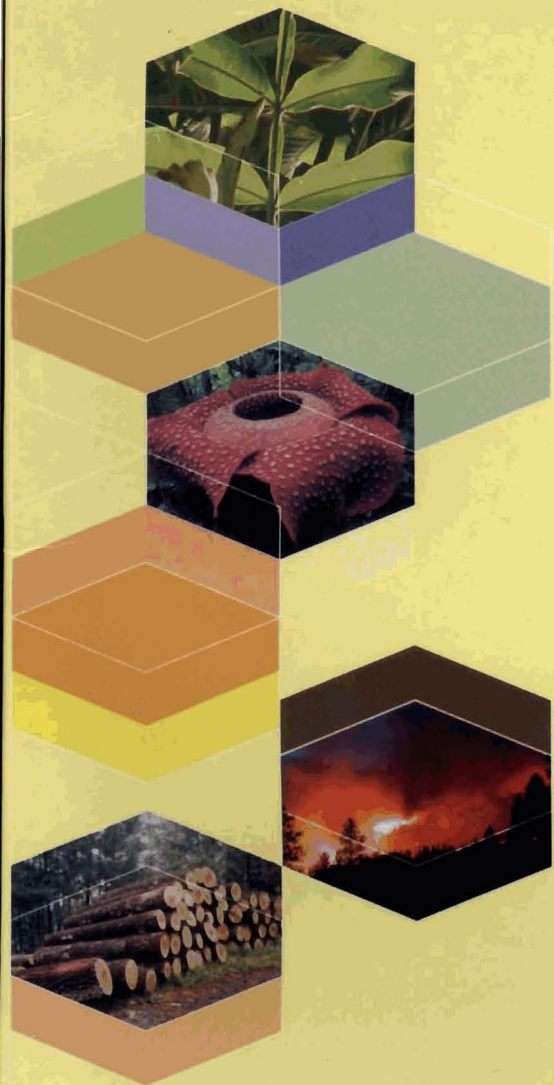# PERONEMA

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SOIL INSECTS DIVERSITY ON MANGROVE FOREST IN RAWA AOPA WATUMOHAI NATIONAL PARK, SOUTHEAST SULAWESI-INDONESIA

Rahmawaty[1], Cecep Kusmana[2], and Yayuk [3]

[1]Major of Forest Management, Faculty of Agriculture, University of North Sumatera, Medan 20155, Sumatera Utara. Email: rahma74@eudoramail.com/rahmawaty@hotmail.com
[2]Major of Forest Management, Faculty of Forestry, Bogor Agriculture Institute, Bogor, Jawa Barat
[3]Zoology Research and Development Center of LIPI, Cibinong, Jawa Barat

Abstrak

Penelitian ini bertujuan untuk memberikan informasi keanekaragaman takson dan peran penting serangga tanah dalam membantu menjaga keseimbangan ekosistem dengan menggunakan metode Pencuplikan Contoh Tanah (PCT). Nilai keanekaragaman suku serangga tanah pada komunitas *Rhizophora* spp. dan *Ceriops tagal* berbeda. Keanekaragaman suku serangga tanah pada komunitas *Rhizophora* spp. lebih besar daripada komunitas *Ceriops tagal*, hal ini disebabkan oleh keanekaragaman jenis pohon. Pada Komunitas *Ceriops tagal*, jumlah individu kecil menunjukkan nilai kelimpahan dan nilai dominansi yang besar. Adanya variasi jumlah suku berdasarkan peran tersebut akan menciptakan kestabilan ekosistem.

Kata kunci: serangga tanah, diversifikasi, hutan mangrove, Taman Nasional Rawa Aopa Watumohai.

Abstract

This research give an Information on the taxon diversity and the important roles of soil insects, to keep balancing the ecosystem with using small sample of soils methods (PCT). The diversity soil insect families of Rhizophora spp. are more than in Ceriops tagal. This happens because of trees species diversity. In Ceriops tagal, even the amount of individual insects is small, but it is showing more abundance value and dominant family, cause of different roles of insects family create a stable ecosystem.

Key words: soil insect, diversity, mangrove forest, Rawa Aopa Watumohai National Park.

INTRODUCTION

Indonesia is known as a nation with mega diversity and mega center of biological resources. More than 10% of vegetation, 12% mammal, 16% reptile and amphibian, 17% birds, 25% fishes, and 15% insects of the worlds found in Indonesia (Forest Department, 1997; Djoekardi and Setyabudi, 1998).

As one of unique ecosystem, mangrove forest is a potential natural resources supported diversity of flora and fauna. Mangrove ecosystem has an important role in the survive of human being either in economic, social or environment sides directly or indirectly.

One of available resources in mangrove forest is soil insects. The soil insects have an important role to destroy and to decompose the organic matter to obtain energy. So, the released nutrition has an important role in the lifecycle and various phenomenon controlling in the soil. Capability of soil insects to destroy and to decompose organic matter never be reported in detail. Generally, invertebrate (includes insects) of soil able to decompose manure for 1% - 30% (Persson, 1990 in Paoletti, *et.al.* 1991). In addition, soil invertebrate able to crumble the manure for 68% (Seastedt, 1998; Anderson, 1988 *in* Paoletti *et.al.*, 1991).

Because its role to keep the balance of ecosystem and the scarce of information about its existence, the soil insect must be exploited. Soil insects have a high diversity as well as in the mangrove forest. According to the previous research, Rawa Aopa Watumohai National Park has various families of fauna such as Mammals, Aves, and Reptilian. Of the various of fauna, it has not yet information about diversity of soil insects in mangrove forest. So, it is very interest

to make a further research. The research more advantages if involves the role of soil insects in the ecosystem.

This research aimed to study diversity of soil insect in community of Rhizophora spp. and Ceriops tagal in mangrove ecosystem.

MATERIALS AND METHODS

This research is conducted at Mangrove forest of Rawa Aopa Watumohai National Park (TN RAW) of Southeast Sulawesi-Indonesia. The sample were took in the filed on February 2000. Soil analysis was conducted at Analytic Laboratory of Haluoleo University of Kendari on February 2000, while identification of soil insects was conducted at Zoology Research and Development Center of LIPI, Bogor on March – June 2000.

The material in this research is composit soil sample (manure, humus and soil) took from the research location. Research blocks are put on two location, namely: communities of Rhizophora spp and Ceriops tagal. In each location, the observation blocks are prepared in the size of 20 m x 50 m in the number of 3 blocks. The observation blocks are divided into sub-block. From each sub-block the sample was taken about 2 liter in the distance point of 10 m. The insects are separated from soil and manure by using Corong Berlese. Identification was conducted up to the family.

Data analysis was calculated based on diversity value suggested by Shannon and wiener (1949) in Ludwig and Reynolds (1988). This analysis aimed to arrange the results of description comparison.

RESULTS AND DISCUSSION

Situation of observation block vegetation

Community of Rhizophora spp has density value of 1450 individu/ha, while community of Ceriops tagal has density of 3910 individu/ha. In community of Rhizophora spp., there are another species such as lara teki (Rhizophora apiculata) and buli (Xylocarpus mmoluccensis) that arrange of 24% of vegetation. Population composition: trees (64.82%), pole (20.92%) and mast (14.26%). In community of

Ceriops tagal, trees population are dominant, namely 92.16%, pole (5,12%) and mast A(2.73%).

Density of vegetation influence the entry of sunrises into floor of forest. Crown of Ceriops tagal is rare than Rhizophora spp (Table 1). This influence the temperature and humidity of forest floor directly because the sunrises will enter the forest floor.

Diversity of Insects

Community of Rhizophora spp has more number of ordo, families and species of insects rather than community of Ceriops tagal (Table 3). Diversity of families in each community is high (community of Ceriops tagal is 2.266 and community of Rhizophora spp is 2.224). Based on the comparison results, the diversity of the both communities indicated that the various vegetation provide the various results.

The higher of insects diversity in Rhizophora spp is related to the diversity of crops species in community of Rhizophora spp. In community of Rhizophora spp, there is another species (Table 1). It is assumed that in Rhizophora spp., there are various foods resources for soil insects rather than in community of Ceriops tagal. The diversity of crops species provides the higher opportunity of insect taxon to survive in community of Rhizophora spp. This hypothesis was suggested by Suhardjono (1998). The similar hypothesis also reported by Situmorang (1998). According to Anggraitoningsih and Adisoemarto (1977), the vegetation factors determine the habitat availability for soil insects.

The another factors is organic matter. The resource of organic matter in forest floor is manure. Organic matter also consists of Nitrogen, Potassium and Calcium. The survive of soil insects depend on availability of organic matter such as manure on the soil surface (Suhardjono, et.al. 1997). Based on chemical physic environment situation, it is indicated that in community of Rhizophora spp., the value of these elements is higher than in community of Ceriops tagal (Table 2).

Table 1. Density, temperature, humidity and total of species were observed of forest floor

Community	Density (individu/ha)	Temperature (°C)	Humidity (%)	Total of species
Rhizophora spp.	1450	29.17	77.99	7
Ceriops tagal	3910	29.83	71.11	1

Table 2. Composition of manure organic matter from two community were observed

Material	Comunity of Rhizophora spp.	Comunity of Ceriops tagal
Nitrogen (%)	2.20	1.07
Kalium (me/100g)	0.48	0.23
Calsium (%)	0.24	0.16

Table 3. Total ordo, family, and diversity of soil insects on Rhizospora spp., and Ceriops tagal

Community	Total Ordo	Total Family	Total Individu	Shannon Index
Rhizophora spp.	12	33	379	2.224
Ceriops tagal	7	24	345	2.266

The insect's species that found in comunity of Rhizophora spp. are Formicidae with total individu 185, Isotomidae with total individu 26, Hemipthera with total individu 19, and Pselaphidae with total individu 16. The big number of Formicidae species caused by the location of soil sampling that related to the nest. According to Borror et.al. (1996), a few of Pselaphidae members found in the ant nest. The collected insects are involved in the ant group. But it needs an advanced research. The number of ordo, family and species in community of Ceriops tagal is few (Table 3). Diversity of Ceriops tagal vegetation provide the habitat for survive taxons in various manure.

CONCLUSION

The different of vegetation cause the diversity of soil fauna. Community of Rhizophora spp. (more than one crops species) has a higher diversity than species in community of Ceriops tagal (with homogenous community).

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