

**IDENTIFICATION AND DENSITY OF MOSQUITO SPECIES THAT CAUSE FILARIASIS DISEASE IN TANIWEL WEST SERAM DISTRICT**

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**ABSTRACT**

The purpose of this study was to look at the types and density of mosquitoes in the Taniwel district. Research time is August 2021. This research is descriptive in nature. where only see the type and density using the existing formula. In this study, *Mansonia* and *Anopheles* mosquitoes were found. The results showed that mosquitoes found in East Taniwel sub-district, Sohuwe Village, Lumahlatal, and Maloang found 2 genera of mosquitoes namely *Mansonia* and *Anopheles* with *Mansonia* density in Sohuwe village 3.29%, Lumahlatalan 2.83% and Maloang 2.66. while the density of *Anopheles* in Sohuwe village was 3.62%, Lumahlatalan 3.45% and Maloang 2.66%.

**Keywords:** *mosquitoes, filariasis, identification*

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**INTRODUCTION**

Mosquitoes are a type of ectoparasite that can harm human, animal and environmental health. This is because the nutritional source of mosquitoes is used as an energy source, namely sugar from nectar to maintain the life of male mosquitoes, while a source of blood nutrition is needed by female mosquitoes for the development of their eggs (Iryani, 2011) Blood feeding carried out by female mosquitoes on humans or animals is a relationship between parasites and hosts, so that mosquitoes act as vectors for the spread of disease in humans and animals. According to Munif (2009) the terms of the *Mansonia* mosquito are associated with swamps, large rivers at the edge of the forest or in the forest, larvae and pupae attached by their chifbons to roots, twigs of aquatic plants, such as water hyacinth, lotus, kale, and so on. The *Mansonia* mosquito is found in endemic forest and swamp areas, dirty environments and unused fish farming areas. The *Mansonia* mosquito is aggressive and sucks blood when humans are active at night, especially outside the home. The *Anopheles* mosquito is the main vector of malaria and its transmission is through bites. Female *Anopheles* containing infective sporozoites. Where the *Anopheles* mosquito lives depends on the species, such as *Anopheles sundaicus* likes brackish water, shallow river estuaries, fish ponds and ditches. From the results of a bionomic survey, *Anopheles* sp mosquitoes in Kairatu District and Taniwel sub-district, West

Seram Regency, found the species *Anopheles aconitus*, *Anopheles balanbacensis*, and *Anopheles subpictus* as vectors of malaria (Rehena, 2005).

Filariasis is found in Asia, Africa, Central and South America, with 120 million people infected. In Indonesia, filariasis is an endemic disease. Along with changes in the pattern of disease spread in developing countries, communicable diseases still play a role as a major cause of morbidity and death. WHO data shows that in the world there are 1.3 billion people who are in more than 83 countries at risk of contracting filariasis, and more than 60% of these countries are in Southeast Asia. (Robo Ranyamtel et al, 2019). Filariasis (elephantiasis) has been known in Indonesia since Haga and van Eecke reported a case of scrotal elephantiasis in 1889. Until now, this disease is still a public health problem in Indonesia, both in urban and rural areas. Until 2002 approximately 10 million people had been infected with this disease, with the number of chronic sufferers (elephantiasis) of approximately 6,500 people. The vector of elephantiasis is the mosquito (Directorate General of P2M&PL, 2002; Joeseof, 1985; Sudomo, 2005). Endemic areas for filariasis are widespread in tropical and subtropical areas throughout the world, including Asia, Africa, China, the Pacific and parts of America. In Indonesia, cases of filariasis have been reported in various regions, including South Sumatra, Bangka Belitung, Papua, East Kalimantan, Central Java, Tangerang, and more than 17 districts in West Java. Lymphatic filariasis is caused by 3 main species of filarial worms, namely *Wuchereria bancrofti*, *Brugia malayi* and *Brugia timori* *Wuchereria bancrofti* and *Brugia Timori* does not require animals as a reservoir. *Brugia malayi* is known to be zoonotic because it can be transmitted from animals to humans or from humans to humans via mosquito vectors. It is suspected that more than 77 species of mosquitoes from the genera *Anopheles*, *Aedes*, *Culex* and *Mansonia* can support the development of filarial worms.

Filariasis is caused by filarial worms, which live in the lymph channels and nodes and can cause acute and chronic symptoms and are transmitted by various types of mosquitoes. Recurring acute symptoms and persistent chronic symptoms greatly reduce the quality of human resources and productivity of sufferers because they cannot work optimally, thereby causing harm to society and the country, especially to the family (Ministry of Health of the Republic of Indonesia, 2001). In 2015, the filariasis elimination program included 514 districts/cities in Indonesia, there were 239 districts/cities endemic for filariasis, only 132 districts/cities implemented filariasis POMP and there were still 58 endemic districts/cities that had not implemented filariasis POMP due to various obstacles. There are 48 districts/cities that have completed implementing filariasis POMP for 5 consecutive years, however only 26 districts/cities have passed the evaluation stage (TAP) so they have to implement additional POMP for 2 consecutive years to then be re-evaluated. Filariasis transmission factors, namely environmental factors which include: physical environment; biological environment; and the social, economic, and cultural environment. Aside from environmental factors, there are host (human) factors, which include: age; gender; immunity; and race. Factors included in the socioeconomic factors for the incidence of filariasis include employment, knowledge, income, habits of leaving the house, using mosquito repellent, habits of using mosquito nets, and wearing closed clothing. Research conducted by Ibrahim Edy Sapada in 2017 said that there was a socio-economic relationship with the incidence of filariasis in Banyuasin Regency, Ilir City (Sapada, Anwar, & Priadi, 2014). In Maluku province, according to health service data, 74% of local residents have consumed filariasis medication which was distributed since the provision of mass preventive medication (POMP). This figure has not yet reached the target set by the government, namely 85%. We are working in the future so that residents can consume medication as prevention is rare. By providing POMP symbolically and simultaneously, it was implemented in 241 city districts in Indonesia, including eight regions in endemic areas in Maluku. (Department of Health 2016).

## **METHODE**

The research was conducted in Sohuwe village, Maloang village, and Lumahlatal village, East Taniwel District, West Seram.

### **Materials and tools**

Aspirators for catching mosquitoes, label paper, mosquito identification books for identifying mosquitoes writing tools for recording research activities, and cameras for documenting research activities.

### **Procedure**

1. Direct data collection in the 3 villages

2. Sampling was carried out in 3 villages with every family affected by elephantiasis and at their place of work (plantation).
3. Sampling was carried out for 1 week using an aspirator and bait people (6 people)
4. Catchers will sit outside and inside the house, waiting for mosquitoes to land.
5. Mosquitoes that land are then responded to using an aspirator
6. The captured mosquitoes will then be identified using the Levine Mosquito identification book, (1995)
7. Mosquitoes caught. Then count the number of mosquitoes in the 3 villages.
8. Sample identification will be carried out through literature from relevant references in the form of research journals, previous research results and Levine's Mosquito identification book, (1995) which assists the identification process

## DISCUSSION RESULT

The cause of filariasis in East Taniwel District, West Seram, was reported in the villages of Lumahlatal, Maloang and Sohuwe as many as 15 people in 2010 and in 2021 there will be 4 people left. The outbreak of filariasis in East Taniwel District around 2010-2021. Data obtained from the East Taniwel Community Health Center, West Seram Regency was 4 people. Based on the results of research in the villages of Lumahlatal, Maloang and Sohuwe, in East Tniwel District, West Seram. The identification results show that there are 2 genera of mosquitoes, namely *Mansonia* and *Anopheles*, which were found in the villages of Lumahlatal, Maloang and Sohuwe, East Taniwel District, West Seram.

Table 1. Summary of mosquito identification results that cause filariasis in weast Taniwel district, Seram

No	Village	Catch time	Caught mosquitoes
1	Lumahatal	7 P.M- 11 A.M	
		12 - 5 A.M	<i>Mansonia</i> and <i>Anopheles</i>
		6 - 11 A.M	<i>Mansonia</i> and <i>Anopheles</i>
		12 A.M - 6 P.M	<i>Mansonia</i> and <i>Anopheles</i>
2	Maloang	7 P.M - 11 A.M	
		12 - 5 A.M	<i>Mansonia</i> dan <i>Anopheles</i>
		7 - 11 A.M	<i>Mansonia</i> dan <i>Anopheles</i>
		12 A.M - 6 P.M	<i>Mansonia</i> dan <i>Anopheles</i>
3	Sohuwe	7 P.M - 11 A.M	
		12 - 5 A.M	<i>Mansonia</i> and <i>Anopheles</i>
		7 - 11 A.M	<i>Mansonia</i> and <i>Anopheles</i>
		12 - 6 P.M	<i>Mansonia</i> and <i>Anopheles</i>

Table 2. Number of mosquitoes caught in each village

No	Village	Catch time	Caught mosquitoes
1	Lumahlatal	7 P.M- 11 A.M	26
		12 - 5 A.M	37
		6 - 11 A.M	48
		12 A.M - 6 P.M	53
	Sohuwe	7 P.M - 11 A.M	19
		12 - 5 A.M	30
		6 - 11 A.M	44
		12 A.M - 6 P.M	59
	Maloang	7 P.M - 11 A.M	17
		12 - 5 A.M	28
		6 - 11 A.M	40
		12 malam- 6 pagi	51

Total	454
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### Density of *Mansonia* and *Anopheles*

The results of calculating the density values of *mansonia* and *anopheles* mosquitoes in the villages of Lumahlatal, Sohuwe and Moloang, have varying values at the study locations.

Table 3. Density of *Anopheles* that cause Filariasis in Taniwel, West Seram.

Density	Sohuwe	Lumahlatal	Maloang
Mosquito	3,62	3,45	2,66
MHD	Currently	Currently	Low

Table 4. Density of *Mansonia* that cause Filariasis in Taniwel, West Seram.

Density	Sohuwe	Lumahlatal	Maloang
Mosquito	3,29	2,83	2,66
MHD	Currently	Low	Low

There are 3 villages out of 15 villages in Taniwel. With a population of 471 people in each village, lumalatal, 814 people in sohue, 137 people in maloang. The main source of income for the population is farmers, as well as fishermen, civil servants and the private sector. Due to the environmental conditions in East Taniwel District, there are swamps, animal bathing ponds, water reservoirs, ponds, rainwater ponds, brackish water and so on which provide breeding places for mosquito larvae, especially in the villages of Lumahlatal, Maloang and Sohuwe. From research conducted in the villages of Lumahlatal, Maloang and Sohuwe, it was found that people were infected with elephantiasis which was caused by mosquito bites, with the number of people infected with elephantiasis being 4 people, 3 people in Lumahlatal village, 0 people in Maloang village and one person in Sohuwe village.

The identification results show that there are 2 genera of mosquitoes, namely *Mansonia* and *Anopheles*, which were found in the villages of Lumahlatal, Maloang and Sohuwe, East Taniwel District, West Seram. The discovery of mosquitoes with the *Mansonia* genus in the villages of Lumahlatal, Maloang and Sohue, there were 2 species of mosquitoes, namely *Mansonia* and the *Anopheles* genus, 1 species in the villages of Lumahlatal, Maloang and Sohue. East Taniwel District, West Seram Regency. Based on the number of mosquitoes found. The results of the research show that in Lumahlatal, Sohuwe and Maloang Villages, East Taniwel District, there are many natural breeding habitats for *Anopheles* sp in the form of swamps, swamps with mangrove trees growing on the edges with only 1 type of *Anopheles* *sundaicus* mosquito. *Anopheles* *sundaicus* is active biting throughout the night inside and outside the house at dusk and at night 16.00-24.00. with peak activity at 02.00-03.00. According to Rehena (2017), the behavior of *Anopheles* mosquitoes in biting humans is at dusk and at night from 16.00-24.00, with the breeding behavior of *Anopheles* mosquitoes in water pools, boats, water tanks, water barrels and swamps. The *Mansonia* genus is a genus found in the villages of Lumahlatal, Sohuwe and Maloang. This genus acts as a disease vector in only a few countries. This is in accordance with the statement made by (Rozendal, 1997) that the genus *Mansonia* acts as the main vector of transmission of *Brugia Malayi* filariasis for the Southeast Asia region (Southern India, Indonesia and Malaysia). *Mansonia* which is found in Lumahlatal, Sohuwe and Maloang Villages, East Taniwel, West Seram, is also

associated with swamps, large rivers at the edge of the forest or in the forest, larvae and pupae are attached with their siphons to the roots of twigs of aquatic plants, such as water hyacinth, lotus, kale, and so on. This is also in accordance with the statement by (Fahmi, 2016).

The research results show that *Mansonia* is one of the mosquito genera that plays a role in the transmission of filariasis in Indonesia. From the research results, two mosquito species were found, namely *Ma. Uniformis*, and *Ma. Dives*. *Mom. Uniformis* is the mosquito that is most often caught in the house. Peak *Ma. Uniformis* sucking blood from people inside the house occurs at 18:00-18:45, while outside the house it occurs at 20:00-20:45. *Mom. Many dives* are caught outdoors. *Mom. Dives* has peak density at 19:00-19:45

Kingdom : Animalia  
Phylum : Arthropoda  
Class : Insecta  
Ordo : Diptera  
Family : Culicidae  
Genus : *Mansonia*  
Spesies : *Ma. Uniformis*

The biting activity of *Mansonia* spp mosquitoes in Lumahlatal, Sohuwe and Maloang Villages, East Taniwel District is endophagic. Mosquito behavior *Ma. uniformis* and *Ma. annulifera* is more exophagic while the mosquito *Ma. Bonneae*, *Ma. dives* and *Ma. Indiana* is more endophagic (Yahya et al., 2015). When a *Mansonia* sp mosquito lands, it does not form a 90° angle. or it could be said to be parallel to the perch. Morphologically, this mosquito has a large and long body shape, asymmetrical wing shape. The wings have body color spots consisting of black or brown mixed with white. On the scutum there is a pair of longitudinal stripes or stripes, the rear pronotum has a pair of narrow, curved scales. *Mansonia* mosquitoes are found in endemic forest and swamp areas, dirty environments and unused fish farming areas. If this is related to cases of filariasis, the risk factor is not too high because the potential vector is outside the home. The results of analysis of the density of *Mansoni* spp mosquitoes show that *Mansonia dives* have a higher density compared to other types of *Mansonia* mosquitoes and *Anopheles* sp. This shows that the *Mansonia dives* mosquito is the main potential vector of filariasis in East Taniwel District, Lumahlatal, Maloang and Sohuwe Villages.

The brooding area will be better if the surface of the water is covered with floating water plants such as ganges and moss (silk moss or chicken gut moss). These mosquito larvae will develop well if the place is open and gets direct sunlight. The breeding place for *Anopheles sundaicus* is the estuary of the parik river along the coast, puddles containing brackish water (Harmendo, 2008). When the *Anopheles* mosquito lands, it forms a 45° angle. Morphologically, this mosquito has a body size of 3.5-5 millimeters, the body is scaly, the head has two antennae, two pairs of wings on the chest, has three pairs of legs, the body color varies, some are black, there are also white spots on the legs and is usually active in looking for prey.

Kingdom : Animalia  
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Genus : *Anopheles*  
Spesies : *Anopheles sundaicus*

The high and low density of mosquitoes is influenced by several factors: temperature: 28-33 °C and salinity: 0-28 ‰. and increase the number of mosquito breeding sites. Too much rain will wash away the larvae, too little rain will cause drought, resulting in temporary displacement of mosquito breeding sites. Moderate rainfall but over a long period of time will increase the opportunity for mosquitoes to reproduce optimally (Soedomo, 1990).

## CONCLUSION

1. From the results of research conducted in the villages of Sohuwe, Maloang, and Lumahlatal, 2 genera of mosquitoes were found, namely *Mansonia* and *Anopheles* which cause filariasis.
2. Of the 2 mosquito genera found in the villages of Sohuwe, Maloang, and Lumahlatal, they have different levels of density, namely *Anopheles* mosquitoes in Sohuwe village with a density of mosquitoes sucking blood per hour (man hour density/MHD) = 3.62% , *Anopheles* mosquitoes in Lumahlatal village with a density (MHD)= 3.45%, and *Anopheles* mosquitoes in Maloang village with a density (MHD)= 2.66% and *Mansonia* mosquitoes in Sohuwe village with a density (MHD)= 3.29%, *Mansonia* mosquitoes in Lumahlatal village with a density (MHD)= 2.83% and *Mansonia* mosquitoes in Maloang village with a density (MHD)= 2.66%

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