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Effect of Ovitrap Modification and Attractant Substances to the Mosquito Aedes *Sp* Density base on the Endemicity in Makassar City

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Abstract

The density of Aedes sp in a region has critical influence on the high incidence of dengue. This aims of study was to determine the effect of modification of ovitrap and attractant substances on the density of Aedes sp mosquitoes in endemic areas of Makassar. The research type was experimental with pretest-posttest Randomized Control Design. Samples are eggs and larvae present in the household who was arrested with ovitrap and attractants. The results of the study reported that mosquito density using ovitrap index in highly endemic areas in the water immersion straw 10% 131 eggs per ovitrap, shrimp soaking water 103 eggs per ovitrap and rainwater result 23 eggs per ovitrap, whereas in endemic areas of low density of Aedes sp trapped using straw soaking water 10% 81 eggs per ovitrap, shrimp soaking water 10% 67 eggs per ovitrap and rainwater 18 eggs per ovitrap. Bivariate analysis results indicated that there were significant difference in reduction of larvae density before the intervention and after intervention using water immersion hay 10% and 10% water shrimp marinade. Where in highly endemic areas the average number of larvae pretest = 17 and postest =7 whereas the low endemic areas the average number of larvae pretest = 6 and postest = 2 with significant value for both sites, namely p = 0.000.

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The use of lethal ovitrap containing hay immersion water 10% and water shrimp marinade 10% could be applied for controlling the Aedes mosquito.

Keywords: density of Aedes sp; ovitrap modified; attractant substances.

1. Introduction

Aedes species is a major vector in the spread of dengue fever is Aedes aegypty and Aedes albopictus, where dengue virus infection is transmitted to humans from the bite of female mosquitoes need protein in the blood for the development of eggs [1]. The high population of Aedes in an area greatly affect the high incidence of dengue in the region. The more dense mosquito population, the higher the risk of dengue virus infection [2]. Research results [3], in Sri Lanka to obtain the density of Aedes based ovitrap index is 39.6% to 80.0% for both indoor and outdoor. It is also significantly related as research conducted by [4], in Salatiga, shows that the mosquito density has a significant impact on dengue cases ($p = 0.001$, $p = 0.002$ temperature, rainfall $p = 0.01$, and moisture $p = 0.001$) which found 13 cases. One method of controlling Aedes sp without insecticide managed to reduce the density of the mosquito vector Aedes sp in some countries is the use of an egg trap (ovitrap). Malaysia has conducted research using ovitrap to determine the average number of Aedes sp caught on ovitrap stored inside and outdoors at three locations. The results showed that Ae. aegypti and Ae. albopictus is found breeding in ovitrap at all study sites ranged from 15.22% to 31.82% of the total positive ovitrap [5].

Research conducted by [6], shows that the average number of eggs were trapped on the attractant ovitrap straw 10% water immersion is 23:25, and rainwater 5.08. The average number of eggs were trapped on ovitrap in the home is 14.63 and ovitrap outdoors is 6.96. The attractant substances into compounds CO2, ammonia, and oktenol easily recognizable and stimulate the olfactory nerve mosquitoes.

Research results of [7], in Maros to the density of Aedes sp using lethal ovitrap containing attractants water immersion straw 10% by value of pretest = 16, posttest = 5 and $p = 0.000$, while lethal ovitrap containing attractants soaking water shrimp 10% by value = 20 pretest, posttest = 6 and $p = 0.000$. There are differences in the density decrease in hay and water immersion attractant attractant soaking water shrimp. Based on the above background, this study to determine the effect modification of ovitrap and attractant substances to the density of Aedes sp in endemic areas of Makassar.

2. Materials and Methods

This type of research used in this study is a randomized experiment with using pretest-posttest Control Design. This study was carried out in the Village and Village Paccerakkang Tamalanrea Indah for 3 months, from May to July 2015. The population in this study was all the mosquitoes that exist in every household in endemic areas of high and low endemic. Sample of observation units (subjects) are eggs and larvae are present in the household who was arrested with ovitrap and attractants. For a sample unit of analysis is the effect of modification ovitrap and attractant substances to the density of Aedes sp based on the level of endemisity in Makassar.

Primary data were obtained from the observation sheet to obtain data on the presence of Aedes sp larvae were found in the house as a baseline (pretest) and posttest phase obtained from interventions carried out on the density of Aedes sp obtained by ovitrap index. Secondary data were obtained from the data of dengue cases in the district and health center obtained from the Field Development P2PL Makassar City Health Department as well as of literature related to the research. Then , Data were analyzed using SPSS 16, which includes two stages, namely the analysis of univariate and bivariate analyzes (Wilcoxon test test, and Mann Whitney test).

3. Results

The density of mosquitoes based on the number of eggs trapped in lethal ovitrap using ovitrap index endemic areas of high use of attractants water immersion straw 10% the number of 131 eggs per ovitrap whereas attractant soaking water shrimp results obtained 103 eggs per ovitrap and rainwater result 23 eggs per ovitrap , As for the endemic areas of low density of mosquitoes at most obtained from the soaking water straw 10% as much as 81 eggs per ovitrap, for water immersion attractant shrimp 10% on average 67 eggs were trapped eggs and rain water that is 18 eggs per ovitrap. Research in Table 1 and Table 2 shows the distribution of the density of larvae in containers, where there is a significant difference in reduction in larval density in endemic areas of high pretest and posttest = 17 = 7 while in endemic areas of low density of larvae pretest and posttest = 6 = 2. Larval density characteristics based on statistical values (minimum value, maximum, mean and standard deviation) in endemic areas of high and low endemic when the pre-test and post-test.

Table 1: Distribution of larval density based on the containers type used in highly endemic areas of Makassar, May-July 2015

Container Type	High Endemic				
	Pretest		Post test		%
	n	Average per container	n	Average per container	decrease
Water tub	1.593	16	690	8	56.69
Bucket	2.552	24	1.131	10	55.68
Basin	93	2	45	1	51.61
Gentong	41	41	16	16	60.98
Drum	35	35	10	10	71.43
Number	4.314	17	1.892	7	56.14

The minimum value at both sites before using the water immersion attractant hay 10% and 10% water shrimp marinade that is 0. The maximum value of the highest in highly endemic areas is 128 and the maximum value of the low endemic areas, namely 83. The mean pretest endemic areas as high as 42.35 and the mean value obtained for post-test 18.92. For the mean value during the pretest in low endemic areas, namely 17:10 and posttest mean value of 8.74. Standard deviation scores highest when the pretest in highly endemic areas of 29

971 and is currently at 15 977 post test. Standard deviation scores lowest at low pretest in endemic areas of 19 533 and a standard deviation value post-test many as 11 981.

Table 2: Distribution of larval density based on containers type used in low endemic areas of Makassar, May-July 2015

Container Type	Low Endemic				
	Pretest		Post test		% Decrease
	n	Average per Container	n	Average per container	
Water tub	793	9	294	4	62,93
Bucket	295	2	147	1	50,17
Basin	202	2	184	3	8,91
Gentong	129	25	55	11	57,36
Drum	396	23	189	11	52,27
Number	1.815	6	869	2	52,12

Table 3: Comparison of larvae density and eggs of Aedes sp trapped in lethal ovitrap based on the location and type of attractant in highly endemic areas of Makassar, Mei-July 2015

Atraktan Type	LO location	Mean Rank	n	P
Straw Immersion Water 10%	Out site	68.23	100	0.000
	In site	132.77	100	
Shrimp Immersion Water 10%	In site	74.56	100	0.000
	Out site	126.44	100	

Table 3 shows that the mean rank in highly endemic areas for this type of attractant water immersion straw 10% were located in the house 68.23 and outdoors 132.77, while for the soaking water shrimp 10%, which was in the house the mean rank 74.56 and outdoors mean rank 126.44 with p = 0.000 and Table 4 show that the mean rank endemic areas low for the type of attractant water immersion straw 10% were located in the house 80.88 and the outdoors 120.12, while for the soaking water shrimp 10% inside home value 72.96 and the mean rank outside the home mean rank indigo 128.04 with p = 0.000.

4. Discussion

The density of mosquitoes in endemic areas obtained by ovitrap index as many as 79 017 with an average number of eggs as many as 131 eggs per ovitrap to water immersion hay 10% and to the soaking water shrimp 10% the number of eggs as many as 61 933 with an average of 103 eggs per ovitrap. It can be an influence on the high incidence of dengue fever in endemic areas to see the high number density of Aedes sp as on research

conducted by [2], in Malaysia by the result ovitrap index at all study sites, namely 13 687 eggs. In the highly endemic areas decreased density of the density of larvae larvae seen before intervention (pretest) by 17 larvae per container and after the intervention (posttest) fell to 7 larvae per container using the water immersion hay 10% and 10% water shrimp marinade. The test results against larvae density difference before and after the intervention to get the value of α p = 0.000 at 0:05. This indicates that there is a significant difference in reduction in larval density in highly endemic areas before the intervention and after intervention. Results of this study similar to that done [7], where the density of larvae and post pre = 16 = 5 with a percentage of 69.26% decline to 10% hay soaking water and water immersion for shrimp 10% pre score = 20 and post = 6 the percentage decrease of 70%.

Table 4: Comparison of density of larvae and eggs of Aedes sp trapped in lethal ovitrap based on the location and type of attractant in a low endemic area of Makassar in May-July 2015

Atraktan Type	LO location	Mean Rank	n	p
Straw Immersion Water 10%	Out site	80.88	100	0.000
	In site	120.12	100	
Shrimp Immersion Water 10%	In site	72.96	100	0.000
	Out site	128.04	100	

A decrease in the density of larvae occurs in highly endemic areas by using lethal ovitrap hay containing 10% water immersion gained an average of larvae were trapped inside the house as much as 17 854 larvae and eggs as many as 29 174. For lethal ovitrap which are outside the house obtained larvae and eggs as many as 21 307 49 844. As for the lethal ovitrap group contains 10% water immersion shrimp larvae trapped amount is 15 470 larvae and eggs as many as 25 382. In the group of lethal ovitrap placed outside the home number of trapped larvae and eggs as many as 17 276 36 551. This shows that the use of water soaking hay 10% and 10% water shrimp marinade effective against a decrease in the density of Aedes sp larvae and eggs in highly endemic areas. Research conducted by [8], the number of eggs of mosquitoes trapped in water immersion attractant straw 10% as many as 398 over 24 hours compared to using plain water.

The density of mosquitoes in endemic areas lower obtained by ovitrap indices are also more on water immersion straw 10% the number of larvae as many as 48 605 with an average number of eggs 81 eggs per ovitrap and soaking water shrimp 10% of the eggs were trapped as many as 40 638 with an average the number of eggs as many as 67 eggs per ovitrap. While the control group rainwater trapped many eggs is 10 931 with an average of 18 eggs per ovitrap. It can be an influence on the incidence of dengue fever in endemic areas of low to see the high number density of Aedes sp.

Interventions in endemic areas lower decrease the density of larvae seen from the density of larvae before intervention (pretest) as 6 larvae per container and after the intervention (posttest) dropped to 2 larvae per container by using water immersion hay 10% and the soaking water shrimp 10% , The test results against larvae

density difference before and after the intervention to get the value of α p = 0.000 at 0:05. This shows that there is a significant difference in reduction in larval density at a low endemic areas before the intervention and after intervention. Based on the above it can be concluded that the use of lethal ovitrap hay containing 10% water immersion and immersion water shrimp 10% effective in decreasing the density of larvae in low endemic areas.

A decrease in the density of larvae occurs in low endemic areas using lethal ovitrap water soaked straw on average 10% of larvae trapped in the house as much as 10 311 and 22 283 eggs. Lethal ovitrap which are outside the home obtained 11,430 larvae and eggs as many as 28 320. As for lethal ovitrap contains 10% water immersion shrimp larvae trapped in the house as many as 6,833 larvae and eggs as many as 14 027. At lethal ovitrap were placed outside the home, trapped larvae and eggs as many as 10 681 26 886. This shows that the use of straw 10% water and 10% water shrimp effective against a decrease in the density of Aedes sp larvae and eggs in low endemic areas. As research conducted by [9], where the research results showed a decrease in the density of larvae based ovitrap index fell from 14.49% to 8.88%.Comparison of the number of larvae and eggs are trapped in the water immersion straw 10% in highly endemic areas as many as 19 755 to 9791 larvae and eggs. While the larvae and eggs were trapped on the soaking water shrimp 10% as much as 15 483 8,187 larvae and eggs. In low endemic number of larvae and eggs of Aedes sp also more on water immersion attractant straw 10% where the larvae are caught as many as 5,435 and as many as 12 151 eggs. Attractant water immersion at 10% of the shrimp larvae and eggs of Aedes sp trapped as many as 4,379 larvae and eggs as many as 10,160. Similar results were also evident from research conducted by [10], in India, where the number of eggs that are trapped in the water immersion straw with an average of 580 eggs compared with using attractants such as leaves of mango and banana leaves on average only 5 eggs.

5. Conclusion and Suggestion

The density of Aedes sp using ovitrap index with an average density of Aedes sp in highly endemic areas for hay soaking water 10% ie 131 and the soaking water shrimp 10% is 103. As for the low endemic areas the average density for water immersion straw 10 ie 81% and 10% water shrimp marinade is 67. The use of lethal ovitrap soaking hay containing 10% water and 10% water shrimp marinade efekif to the determination of the density of Aedes sp larvae in highly endemic areas (pretest = 17; postest = 7; p = 0.000) and to the low endemic area (pretest = 6; postest = 2; p = 0.000). Lethal ovitrap water soaked straw 10% more attractive Aedes sp nesting and layout the most numerous larvae and eggs of Aedes sp is outdoors in endemic areas 21 307 larvae and 49 844 eggs, whereas the endemic areas of the low number of larvae 28 320 and 26 886 eggs with significant value for all study sites, namely p = 0.000. The use of lethal ovitrap soaking hay containing 10% water and 10% water shrimp marinade can be applied as one means of controlling the Aedes mosquito.

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