Conference Paper

Hatchability of the Eggs Aedesspp in Clean and Polluted Water

Sukmal Fahri, Susy Ariyani, Gustomo Yamistada, and Eka S. Manulang

Jambi Ministry of Health Environmental Polytechnic Department of Health Jambi JL. H. AgusSalim No.08 Kota Baru Jambi 36129

Abstract

Aedesspp is a type of mosquito that can carry dengue virus and causes dengue fever. Aedesspp can live in freshwater, polluted water, and household waste; oil pollution changes the behavior of mosquitoes breeding in polluted water, This study aims to determine the hatchability of Aedesspp eggs in oil-contaminated water media. The research experiment was carried out through post-test design, and the presentation of data was done by using a table. Data were processed by a t-test with a significance of α <0.05. Rainwater is the most preferred medium for hatching eggs of Aedesspp with an average of 3-4 head/day by the time they need to hatch < 6 days, while the hatchability of eggs of Aedesspp in regional water company media is better for hatching the eggs of Aedesspp than domestic wastewater, with an average of 2-3 head/day by the time they need to hatch < 9 days, the hatchability of eggs of Aedesspp on household wastewater with average 0-1 head/day by the time they need to hatch <14 days. In the oil contamination of water hatchability of eggs between 10-13 days. The change caused a mosquito egg hatchability change bionomics result of not finding media in the environment sample.

Keywords: Bionomics, oil contamination, rain water

Corresponding Author:
Sukmal Fahri
sukmalfahri@yahoo.co.id

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1. Preliminary

The spread of Dengue Hemorrhagic Fever (DHF) from Jambi Provincial Health Office data from 2014 - 2015 that dengue cases in Jambi City were higher than the national figure where the number of sufferers was 576 cases and died as many as 9 cases with IR 4.32 per 100,000 population and CFR amounts to 1.33 per 100,000 population. The high incidence is caused by changes in seasons and the influence of the rate of larvae (ABJ). Handling of dengue disease can be in the form of studying the behavior of mosquitoes and breaking the chain of transmission of disease vectors by eradicating eggs in their breeding sites. Termination of the vector transmission chain is very necessary to do because until now there has not been a choice of drugs and vaccines which have been designated for treatment and prevention of dengue disease. Aedesspp breeds containers containing clean water inside and outside the home, for example a place

which does not come into contact with the ground. The results of observations of Aedesspp are able to breed and live in flowing water and wet water in contact with the soil.

The control of Aedesspp mosquito breeding sites is more focused on closing clean water reservoirs and bathing tubs, as well as burying used goods around the residents' houses which are used as reservoirs of water rain. While other water reservoirs have not received sufficient attention, even though the opportunity to be used as a habitat for Aedes is quite large, such as drinking birds, flower pots, leaf midribs, gutters and dug wells. The life cycle of Aedesspp undergoes perfect metamorphosis in general, Aedesspp mosquitoes from eggs to larvae within 2 days, from larvae to pupae takes 6-8 days and until it becomes an adult mosquito for 2 har (Fahri, 2014). Aedesspp can also lay eggs on the ovitrap filled with dug well water and sewage water from household waste. The number of eggs found was not different in the ovitrap containing rainwater and sewerage (Baharuddin A, 2015). The hatchability of Aedesspp eggs in rain water, dug well water and sewage water are different, Aedesaegypti, females can lay eggs in artificial breeding sites containing soapy water with a concentration of 0.5 gram / liter of water Wurisastuti, T, 2013). With the number of eggs that are no different from artificial breeding that contains water from the Regional Water Company (PDAM). But the results of other studies show, different results that Aedesaegypti mosquitoes can lay eggs on egg traps (ovitrap) filled with straw soaking water. Aedesaegypti larvae are proven to be able to survive in dug well water, sewage water (sewerage), and regional water company drinking water (PDAM) with a significantly different percentage. The existence of live larvae in sewage water only lasts five days, or nine days from hatching. Larva Aedesaegypti which cannot adjust to new breeding conditions will die (Fisher S, 2014).

The adaptation ability of the Aedesaegypti breed in sewer water is greater than that of the dug well water and the dug well water is greater than that of the rain water. Observations from Aionesspp showed that there had been a previous change. Aedesspp could only breed in clean water. At present Aedes can live and breed in household wastewater (dirty water) and even oil polluted water (the results of observation), allegedly with this bionomic change there will be an acceleration of the population of Aedesspp mosquitoes in the environment and affect the incidence of DHF.

2. Materials and Methods

This research was an experimental laboratory with descriptive method, in this case the sampling was carried out in Kota BaruSubdistrict, Jambi City. The research was conducted at the entomology laboratory of the Environmental Health Department of the Jambi Ministry of Health Polytechnic and the Regional Technical Unit Laboratory of the Jambi Province Environmental Agency. sample collection from March 2016 - July 2016. The research sample was taken by collecting eggs of Aedesspp larvae by using ovitrap traps, the sample used the Simple Random Sampling method, where samples were taken randomly. The eggs were then kept in the laboratory until they became 4-day-old mosquitoes, 140 larvae needed for the study.

3. Results

During the observation for 15 days after the treatment, there were several eggs that had hatched, but a new calculation was done on the second day after the treatment so that the oviposition process was not disturbed, observations were made when the eggs became mosquitoes. Statistical analysis with t test shows the significance value between various types of media to the number of eggs that become mosquitoes. The ability of the hatchability of the eggs of Aedesspp mosquitoes in the waters of the Regional Water Company has hatchability faster than household wastewater. Aedesspp eggs in PDAM water hatch 2 days and hatch entirely on day 9 with an average of 2.3 per day, while in rainwater it hatches on day 2 to day 6 with an average of 3.5 per day. Household wastewater hatches 11 to 14 days with an average of 0.35 per day. In contaminated water, Aedesspp egg oil can hatch on day 10 to day 12 with a daily average of 0.38 per day.

pH measurement has a difference between 6-8 the lowest pH is 6 and the highest is 8, while the temperature factor is 28˚C and humidity is 80%. Table 2. Humidity has no difference in the number of different types of water, during the treatment for 15 days.

The results of the t-test statistics, there is a difference between PDAM water - 0.053 rain water. Water PDAM - Waste water 0.007. PDAM Water - Oil contamination water 0.003.

Table 1: The Amount Of Larvae Hatches The Eggs In Different Water (Source: 2016 processed data).

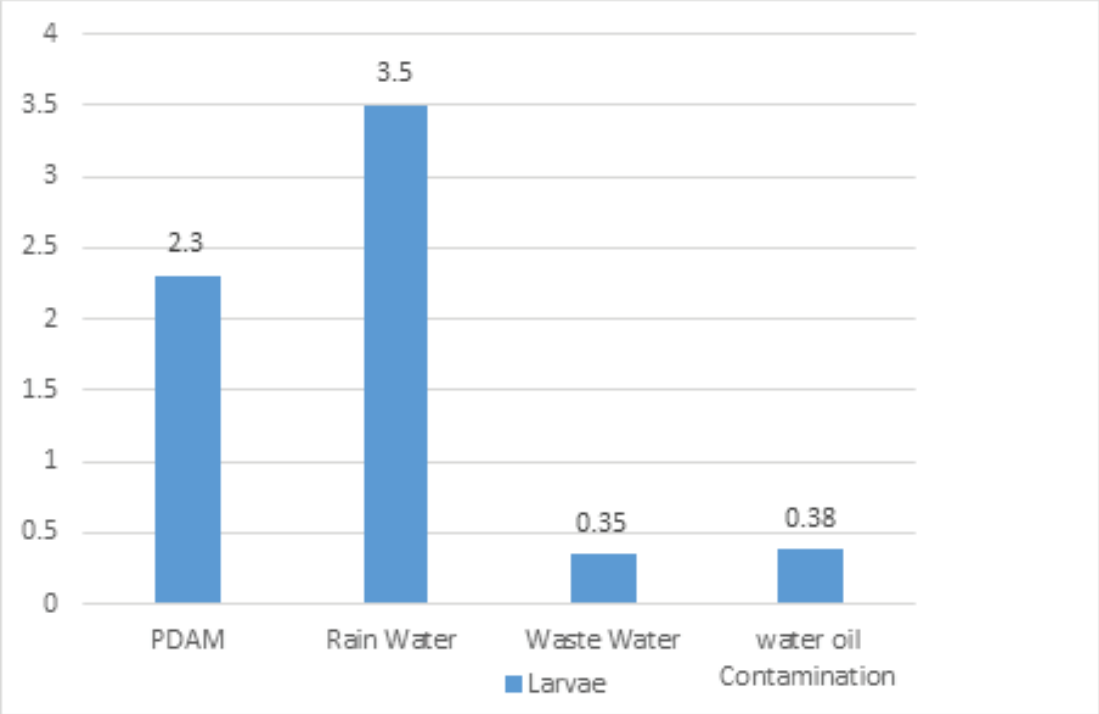
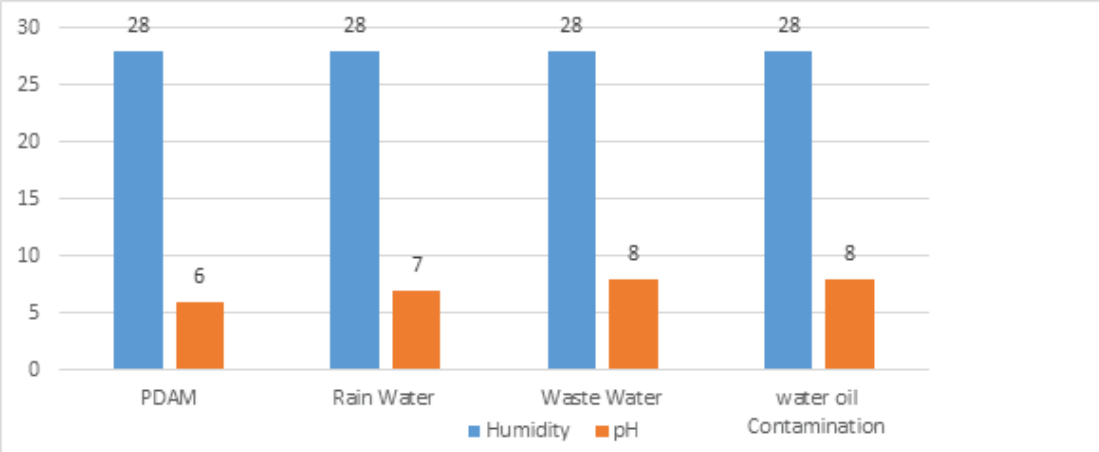


Table 2: Average Measurement of Temperature, Humidity and pH Clean water and polluted water (Source: 2016 processed data).



4. Discussion

The life cycle of Aedesspp mosquitoes ranging from eggs to adult mosquitoes requires 1-12 days of PDAM water, which is a medium for the development of Aedesspp eggs which can hatch on the 9th day, with a temperature of 28OC 80% humidity and pH 6.0. Water with this condition is a good medium for the growth and development of Aedesspp pre-adult. The removal of Aedesspp eggs becomes larvae according to Soegito, 1981 in Dian 2010. Aedesspp can settle at optimum pH of 6.5, and can hatch at pH 4 or

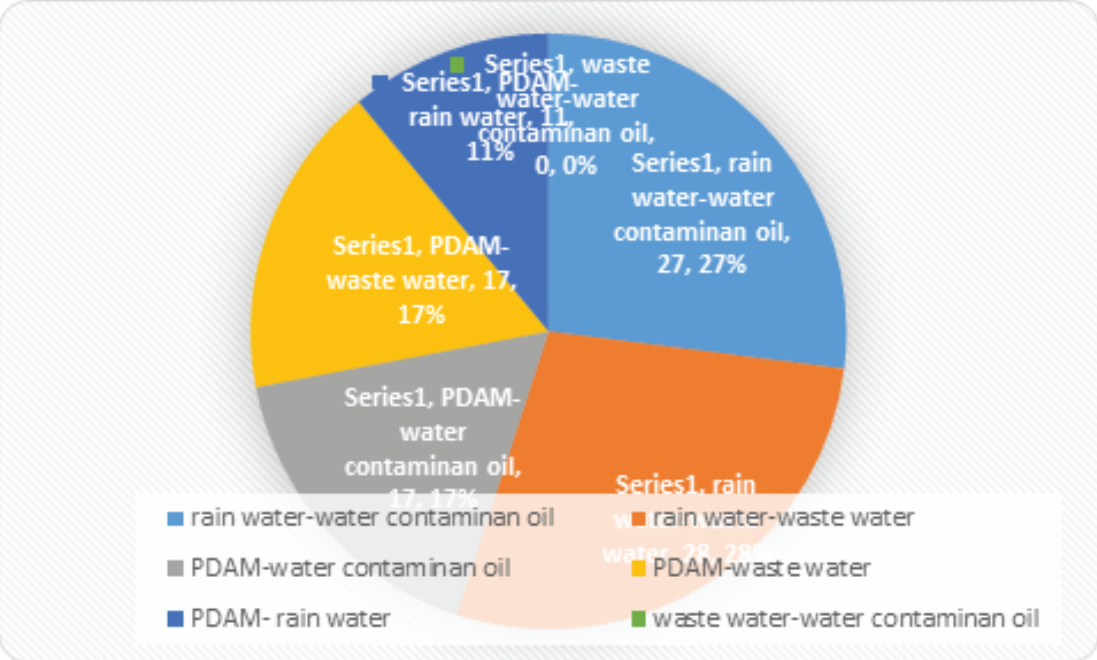


Figure 1: The number of mosquito eggs hatched grew type of water with 4 types of test media.

be acid, thus the pH of the media is below the optimum pH or acidic6 In rainwater all eggs hatch on the 5th day as many as 60 tails (100%) Rainwater is a good medium to use, compared to other water. Water quality standards for pH are permissible between 5,8 - 8,6 if the pH is greater than 8,6 or smaller than 5,8 will cause the larvae in the water to not be able to live (Marbawi D, et al., 2014). PDAM water is widely used by Indonesian people in their daily lives. Rainwater, water that has not been mixed with chemicals. Alum on PAM water can reduce the hatching of mosquito eggs, from the results of water research PDAM Aedesspp eggs can hatch on day 2 and day 6 hatch entirely, eggs Aedesspp hatch more slowly than rainwater, PDAM water containing alum can inhibit egg hatching Ae. aegypti, population or density of Ae mosquitoes. aegypti breeds in places where clean water is located inside and outside the house. mosquitoes can develop between 9-12 days, depending on temperature and humidity, so the drain, close and bury movement which states that draining clean water reservoirs is done cleaning and draining is at least 1 week 1 x so as not to breed Aedesspp in the home environment. Research results (Fahri, 2014). Aedesspp larvae can breed in less than 7 days. Household waste is waste originating from the kitchen, bathroom, laundry, waste from the household waste industry is rich in detergent fat oil and other compounds, in waste water there are chemicals that are difficult to remove and dangerous. Waste oil contamination with oil and fat content of 12 mg / l is a liquid that covers the surface of the water, the ability of mosquitoes to breed (lay eggs) and hatching is caused by the absence of other media that can be used by Aedesspp to lay eggs so that Aedesspp

undergoes bionomic changes, on water contaminating the oil surface of oil and fat covering the water. Bionomic changes will pose a threat to DHF control if water from oil contaminants in the separator or in industries that dispose of waste together with oil as a risk factor occurs or is related to the rise of dengue fever in the region. Environmental sanitation efforts are an effort to reduce (reduce) the level or dengue in the community. Because Aedesspp is a DHF vector that is close to human and human life, it is the main host of the virus(Marbawi D, 2014). Transmission of DHF is influenced by several factors such as: the presence of a virus (agent), a vector of mosquitoes, sufferers (hosts) and the environment. (environment) (Ministry of Health, 2016). The ambient temperature determines the development speed and activity of mosquitoes, including the age of the pre-mature stage, the length of the gonotropic cycle period, the extrinsic incubation period or the speed of viral replication in the body of the mosquito. Temperature also determines the size of the vector that affects the rate of sucking blood and the frequency of mosquito bites. The distribution is distributed at all altitudes and DEN-1 is dominant. No mosquitoes were found (Fahri, 2014). Many other factors that influence the growth of Aedesspp larvae include temperature, humidity, water pH, rainfall and water reservoirs can be one or several key factors that determine the density of Aedesspp mosquito larvae stage (Fisher S, 2014)

The higher the pH content in water or the lower the pH level of the water, the fewer mosquitoes obtained (Baharuddin, 2015). This situation is thought to be closely related to the formation of the cytochrome oxidase enzyme in the body of the larva which functions in the metabolic process. The type of rain water has an optimal pH which is pH 7.0 where pH is a factor that can affect the hatchability of Aedesaegypti eggs. Neutral pH is very supportive for the growth of Aedesaegypti larvae. This is almost the same as the previous research wherein, Aedesaegypti eggs can hatch on comberan water, although survival and growth of larvae are not yet known to be pupae and adult mosquitoes. The existence of live mosquitoes in the drainage can last up to 15 days with the same number of mosquitoes from the first day to the last day, although in a small percentage (Aprianto.J et al., 2014).

5. Conclusion

The ability of hatching power of Aedesspp on rain water is the most preferred medium for hatching eggs of Aedesspp with an average of 3-4 tails / day with the time required for hatching <6 days compared to PDAM water and household wastewater while water with 12 mg oil and fat content / l Adesspp can drip and multiply.

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