Indonesian Journal of Nutritional Epidemiology and Reproductive
ISSN: 2620-8261 (Online)
Vol. 2, No. 1 January 2019, pp. 1-8

The Effect Of Distance, Temperatur And Air Humidity On Flies Density In Temporary Landfill Of Kemasan Village Kediri City

Lusi Prasetiowati[1], Indasah[2], Ema Mayasari[3]
[1,2,3]Institut Ilmu Kesehatan STRADA Indonesia
***Corresponding Author** : luchylovely80@gmail.com

ABSTRACT
The density of flies in an area, is greatly influenced by: breeding places, sunlight, temperature and humidity. The density of flies will be high if the temperature is between 20-25^{0}C, with the humidity that the fly likes is 90%. The purpose of this study was to determine the effect of distance, temperature and air humidity on flies density in temporary landfill of kemasan village kediri city. Analytical survey research methods with cross sectional approach. The study population was all buildings in the the eastern area of the temporary landfill kemasan village in Kediri City totaling 349 buildings. The sample in this study amounted to 186 buildings with a stratified random samplingtechnique. The independent variable is distance, temperature and humidity while the dependent variable is the density of flies. Data is collected by observation and processed by multiple linear regression statistical tests. The results showed the sampling distance ranging from a radius of 50m, 100m, 200m, 300m, 400m, and 500m. The research temperature was obtained the lowest temperature of 25.5^{0}C and the highest temperature of 32.5^{0}C. Humidity shows the lowest humidity is 51% and the highest humidity is 82%. The density of flies has the lowest density of 1 animal and the highest density of 20 animals with an average of 9 animals per region. There are Effect of Distance, Temperature and Air Humidity on The Density of Flies in Temporary Landfill Kemasan Village Kediri City 2019 (p value 0.001 <0.005 then H1 is accepted). It was concluded that the density of flies occurs not only due to the factors above but depends on the environmental conditions that exist in the region such of the street vendors. It is expected that the cleaning and gardening service will increase the participation of officials and the community in efforts to reduce the population of flies and there are not even flies in the kemasan area.

Keywords : Distance, Temperature, Air Humidity, Flies Density

INTRODUCTION
Flies is one of the insects (insects) that belong to the order diptera, has a pair of membrane-shaped wings. Flies are also a species that plays a role in public health problems, namely as a vector of transmission of digestive tract diseases such as: cholera, typhus, dysentery, and others (Muliawan, 2011).

According to the Republic of Indonesia Health Regulation in 2017, flies belong to the insect class, have two wings, are a group of intruding insects and at the same time as infectious diseases. Flies have a level of development of eggs, larvae (maggots), pupae and adults. The effective fly distance is 450-900 meters making it easier for flies to perch anywhere, especially in residential areas (MOH RI in Arief, 2018).

The presence of flies somewhere is also an indication of poor hygiene. One of them is a landfill or SPAL puddle can be a transmission medium for transmitting disease (Wijayanti, 2009). If food that is infested by flies is contaminated by microorganisms such as bacteria, protozoa, eggs / larvae of worms or even viruses that are carried and removed from the mouths of flies and if eaten by humans, it can cause diarrheal disease (Andriani, 2007). Flies are abundant in various habitats, such as water, sand, plants, under the bark of wood, rocks and animals. One of the many fly habitats is in landfills. This is related to the instincts and

bionomics of flies choosing places that will be directly used as food sources for larvae after hatching from eggs, all of which can be found in trash (Adnyana in Masyhuda et al, 2017).

The presence of waste can have a health effect on society because it is a means and source of disease transmission. The effect of waste on health can indirectly be in the form of a congenital vector disease that proliferates in waste, waste that has undergone landfill can be utilized by flies as a nest in its breeding process (Slamet JS in Arief, 2018).

The choice of TPS locations with densely populated settlements must also be taken into account. If the temporary garbage collection bin is in the form of a tub or container, the distance from the nearest serviced house is 10 meters and the furthest is 500 meters. Its placement is in an area easily accessible by garbage transport vehicles (MOH RI in Arief, 2018). Management of residential areas, commercial areas, industrial zones, special zones, public facilities, and other facilities, must provide area scale processing facilities in the form of 3R TPS. Placement of the 3R TPS location as close as possible to the service area within a radius of no more than 1 km (Indonesian Minister of Public Works Regulation, 2013). The distance setting takes into account leachate pollution (liquid waste), odors, spread of disease vectors and social aspects. A temporary shelter is a building or place that is used to move trash from a hand cart to the runway, containers or directly to a garbage truck. This temporary shelter is in the form of a large Container (steel Container) volume of 6-10 m3: Located on the side of the road and does not interfere with traffic. A permanent runway of around 25-50 m2 is required to place containers. In many places in Indonesian cities, this runway is not provided, and containers are simply laid on the available land. Placement of these facilities is also problematic because it is difficult to obtain land, and not necessarily people who live near these facilities are willing to accept (Wordpress, 2012).

Whereas the TPS in the packaging township of Kediri city is located in the middle of a city and a densely populated area. Physical condition of TPS Packaging in the form of container trucks that are placed alongside a road with a permanent runway as high as ± 25m2, roofed and fenced. The factors that affect the density of flies in terms of distance, temperature and humidity of the air. Preliminary study conducted by researchers on 4 March 2019 by conducting interviews with residents around the polling station as many as 5 people. 2 people in the East Timor polling station around ≤10 meters said that during the rainy season there was a bad odor around the polling station until the house and there was a fly perched. A trader to the north of the TPS which is ≤5 meters away said that there was a bad odor when the wind blew. On March 8 2019 researchers conducted interviews with village officials there were 2,184 residents consisting of 503 households, 2 RWs, 8 RTs, and interviews with TPS officers transporting garbage were carried out twice in the morning at 8-9 and at noon around 1, except at at that hour there is rubbish stored in a garbage car container (container).

METHODS

Knowing the effect of distance, temperature and humidity on the density of flies in temporary shelters (TPS) keliri city packaging.

RESULTS

This research is a quantitative research with analytic survey method with cross sectional approach. Study population 349 buildings. The sample of this study is 186 buildings in the eastern area of TPS. The sampling technique uses Stratified Random Sampling. The independent variables in this study are Distance, Temperature and Humidity. The dependent variable in this study is the density of flies. Data were collected by observation and tested by the Multiple Linear Regression test.

Research Result

Table 4.1 Distance measurement of fly density

Variable	Σ	Min	Max	Mean (rata-rata)	Standar Deviasi
Distance	186	5	500	268,04	150,634

Table 4.2 Temperature measurement of fly density

Variable	Σ	Min	Max	Mean (rata-rata)	Standar Deviasi
Temperature	186	25,2	32,5	27,342	1,4506

Table 4.3 Air humidity measurement of fly density

Variable	Σ	Min	Max	Mean (rata-rata)	Standar Deviasi
Air humidity	186	51	82	68,21	5,163

Table 4.4 Measurement of fly density

Variabel	Σ	Min	Max	Mean (rata-rata)	Standar Deviasi
fly density	186	1	20	9,23	4,273

Table 4.5 Anova Table

Model	Df	F_{hitung}	*p value*
Regresion	3	5,803	0,001

Tabel 4.6 The Result of Multiple Linear Regression Tests The Effect of Distance, Temperature and Air Humidity on the Density of Flies in TPS of Keliri City Packaging in 2019

Variable	Koefisien regresi	t_{hitung}	*p value*
A constant	57,787		
Distance	0,003	1,156	0,249
Temperature	-1,372	-3,437	0,001
Humidity	-0,172	-1,594	0,113
N = 186			
α = 0,05			
F_{hitung} = 5,803			0,001
R Square = 0,087			

Based on Table 4. 6 there is the effect of distance, temperature, air humidity on the density of flies in the TPS of the packaging city of Kediri by 0.001 <0.005 with a magnitude of 8.7%. In the partial analysis it is known that only the temperature affects the density of flies with a p value of 0.001, which means H1 is accepted.

DISCUSSION

A. Distance

Based on table 4.1 shows the number of samples (N) there are 186, of these 186 samples the shortest distance (minimum) is 5m, and the farthest distance (maximum) is 500m. The average distance from 186 samples or the mean is 264.04 with a standard deviation of 150.634.

Samples taken 186, the results of the study show the sampling distance starts from the closest distance from the TPS that is 5m and the farthest distance from the TPS is 500m with an average distance of 264m. Distance taking also considers the size of the area, which is up to ± 500m radius and the number of samples taken. This study is in line with research conducted by Habib Alfa Eni Kurniawan (2013) "Descriptive Study of the Density of Flies Density in Settlements around Pgar Slaughterhouses (RPU) Penggaron Kidul Kelurahan Penggaron Kidul Kelurahan Pedurungan Semarang City" which states the closer measurement distance to the main place (RPU) , TPS etc.) then the level of density of flies will be high and vice versa the farther the distance measurement will be the level of flies density will be low. According to the theory of the Ministry of Health of the Republic of Indonesia in Arief (2018) above the effective fly distance is 450-900m so that the radius is prone to fly density. Based on this limitation, if the measurement reaches the farthest distance of 500m, this area belongs to the category of dense flies. In the field of taking the radius is divided into 6, namely a radius of 50m, 100m, 200m, 300m, 400m, 500m with per 5m taking. At a radius of 50m with 16 samples, a radius of 100m with 25 samples, 200m with 30 samples, 300m with 35 samples, 400m with 40 samples, and a radius of 500m with 40 samples. The presence of flies occurs at different radii, ie at a radius of 50m there is a density of flies while at a radius of 100-300m low, a radius of 400m is partially dense some is not, so is a radius of 500m partly dense and partly not.

B. Temperature

Based on table 4.2 shows the number of samples (N) there are 186, of these 186 samples the lowest temperature (minimum) is 25.2oC, and the highest temperature (maximum) is 32.5oC. The average temperature of 186 samples or the mean of 27.342 with a standard deviation of 1.4506.

Flies begin to fly at 15oC and their optimal activity at 21oC. At temperatures below 7.5oC it is not active and above 45oC death occurs in flies. The spread of flies is greatly influenced by light, temperature, humidity. For the fly, it requires a temperature of around 35o-40oC, humidity of 90%. Activity stops at <15oC. Flies are phototropic insects, which like light. At night it is not active, but can be active in the presence of artificial light. The number of flies will increase at 20oC-25oC and will decrease at <10oC or> 49oC and 90% optimum humidity (Sucipto, 2011). Adult flies live 2-4 weeks in summer and longer in winter, which can reach 3 months, they are most active at 32.5oC and will die at 45oC (Ruru in Hariyono, 2017). Fly activity: laying eggs, mating, eating and flying, stopping at temperatures below 15oC. At temperatures above 20oC the fly will be outside the house, in a shelter close to free air. When not eating, flies will break on horizontal surfaces or on stretched cables or vertical places and on the roof inside the house, especially at night (Ruru in Hariyono, 2017).

Based on the results of observations in the research temperature obtained the lowest temperature of 25.5oC and the highest temperature of 32.5oC with an average temperature of 27.3oC. This study is in line with research conducted by Iif Miftahul Ihsan (2016) "The Effect of Air Temperature on Fecundity and Development of Adult House Flies (Musca Domestica)" which states Based on the quadratic equation of each stage shows that the optimum temperature of house fly development is in the temperature range of tropical regions which is around 22ºC-32ºC, so we need to be aware of people living in the tropics. When outside the temperature range of the tropics, the survival rate of house flies will be low, such as at 16ºC. At the study site there were 99 samples whose temperature was below 27.3oC and 87 temperature samples

above 27.3oC. The spread of flies is greatly influenced by light and temperature. Erratic temperatures in the packaging area are also a factor such as the farthest places with low temperatures. The observation time that was consistently carried out by the researcher was in the morning (07.00-10.00 WIB). where the temperature is still not too high. The temperature at a predetermined radius varies such as taking at a radius of 100m which finishes at 10:00 a.m. and taking 200m is carried out the next morning at 07.00 a.m.

C. Humidity

Based on table 4.3 shows the number of samples (N) there are 186, from 186 samples the lowest humidity (minimum) is 51%, and the highest humidity (maximum) is 82%. The average humidity of 186 samples or the mean is 68.21 with a standard deviation of 5.163.

Flies are more active in places that are protected from light than places that are directly exposed to sunlight. The wide distribution of these two types of flies is possible because of their high adaptability (Ruru in Hariyono, 2107). Humidity is closely related to local temperature. Humidity is inversely proportional to temperature. The number of flies in the rainy season is more than in the summer. When the temperature is high, the humidity is low and when the temperature is low, the humidity will be higher. The humidity that flies like is 90%. Flies are very sensitive to strong winds, so they are less active in going out for food at high wind speeds (Sucipto, 2011). The habit and distribution of flies during the day will be around eating places and breeding places where marriages and breaks also occur. The spread is influenced by its reaction to light, temperature, humidity, texture and surface color that is desirable for rest (Ruru in Hariyono, 2017).

The results of air humidity observations show the lowest humidity is 51% and the highest humidity is 82% with an average humidity of 68%. Based on the theory above, flies also like humidity <90%, if seen from the average results the humidity below 68% is 83 samples while the humidity above 68% is 103 samples. In a study conducted by Iif Miftahul Ihsan (2016) "The Effect of Air Temperature on Fecundity and Development of Adult House Flies (Musca Domestica)" which states that a free environment has the character of temperature, radiation, humidity, oxygen and other conditions that fluctuate, following the conditions of free air. This condition is thought to be more suitable for the development of adult flies. This shows that the combination of climate factors and free environmental factors in the study area is more appropriate when compared with treatment. In the field of air humidity shows results vary depending on environmental conditions at the time of measurement. Taking time is also consistent in the morning (07.00-10.00 WIB), where the humidity is still not too low. But because the measurement is not enough just one day that is getting 22 samples, because the number of samples is quite a lot then the measurement is carried out the next day with the same time. This is also because flies like cool light rather than direct exposure to sunlight.

D. Density of Flies

Based on table 4.4 shows the number of samples (N) there are 186, from 186 samples the lowest fly density (minimum) is 1, and the highest fly density (maximum) is 20. The average fly density of 186 samples or the mean is 9.23 with standard deviation of 4,273.

Flies is one of the insects (insects) that belong to the order diptera, has a pair of membrane-shaped wings. Flies are also a species that plays a role in public health problems, namely as a vector of transmission of digestive tract diseases such as: cholera, typhus, dysentery, and others (Muliawan, 2011). The density of flies is a parameter of success in waste management. The high density of flies at the TPS / TPA indicates that waste management is not successful. Flies nest and breed in places where there is an abundance of organic material,

including waste. The relationship with health, flies are mechanical vectors of various diseases of the digestive tract. Fly density monitoring is carried out in the planning of waste management and management (Pradipta in Haryono, 2017). Fly grille is placed in designated places (close to trash, animal waste, cages, etc.) in the area to be measured (Ministry of Health Republic of Indonesia, 2014). The number of flies that perched every 30 seconds was calculated at least at each location carried out (10 times the calculation of 10 times 30 seconds) and the highest calculation was averaged and recorded on a recording card (Kemenkes RI, 2014).

This average number is an indication (index) of the population of flies in a particular location. Interpretation of the measurement results of the number of flies perched on fly grids per 10x30 seconds at each location is as follows (Ministry of Health RI, 2014), 0-2: not a problem (low), 3-5: it is necessary to observe the breeding places of flies (rubbish heaps, animal dung, etc.) (moderate), 6-20: densely populated and needs to be safeguarded against the breeding places of flies and if possible planned control efforts (high / dense), 21 and above: the population is very dense and needs to be protected against the breeding places of flies and control measures (very high / very dense).

E. The Effect of Distance, Temperature and Air Humidity on the Density of Flies in TPS of Keliri City Packaging Village

Based on Table 4.5 and table 4. 6 there is the effect of distance, temperature, air humidity on the density of flies in TPS packing villages in the city of Kediri by 0.001 <0.005 with a large effect of 8.7%. In the partial analysis it is known that only the temperature affects the density of flies with a p value of 0.001, which means H1 is accepted. The density of flies in an area, is greatly influenced by: breeding places, sunlight, temperature and humidity. The density of flies will be high if the temperature is between 20-25oC. Population decreases when temperatures> 45oC and <10oC. At very low temperatures, the fly still lives in dormant conditions at an adult or pupa stage (Ruru in Haryono, 2017). It also affects distance. It is known that a fly is a vector of disease and has the ability to fly within a distance of 1 km so that the radius of the area is prone to disease attacks caused by flies (MOH RI, 2001). The ability to fly flies can travel a distance of up to 1 kilometer. So the location which is 1 kilometer away from the fly breeding places can certainly be reached by flies rather than the location which is more than 1 kilometer from the fly fly (Kurniawan, 2013).

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CONCLUSION

1. The distance of measuring the density of flies in TPS Kelurahan Packaging is divided into 6 radius starting from the closest radius to the TPS which is 50m and the furthest radius is 500m. Distance taking also considers the size of the area, which is up to ± 500m radius and the number of samples taken.
2. The temperature of the measurement of flies density at TPS Kelurahan Packaging has the lowest temperature of 25.2oC, and the highest temperature of 32.5oC with an average temperature of 27.3oC.

3. Air Humidity measurement of fly density in TPS Kelurahan Packaging has the lowest air humidity of 51%, and the highest air humidity of 82% with an average air humidity of 68%.
4. The density of flies in TPS Kelurahan Packaging has the lowest fly density of 1 and the highest fly density of 20 with an average of 9 per area based on 10 times the highest number of 5 calculations.
5. There is an Influence of Distance, Temperature and Air Humidity on the Density of Flies in the TPS of Keliri City Packaging in 2019 (p value 0.001 <0.005 then H1 is accepted).

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