

## **COMPARISON RESULTS OF SINGLE TRAP MOUSETRAP AND DOUBLE TRAP MOUSETRAP IN KADE JAMRUD AND KADE PERAK, TANJUNG PERAK PORT, SURABAYA**

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### **ABSTRACT**

*Efforts to increase the degree of public health as high as possible are carried out by creating a clean life, eliminating breeding grounds for disease causes and agents, keeping food and beverages clean and not contaminated by disease-causing and intermediate bacteria, and implementing healthy habits. Rats are nuisance animals that harm humans because they eat all types of food eaten by humans. The Rat can become agents of several pathogens that cause disease in humans because the relationship between rats and humans is often parasitic, one of which is PES. The disease can be transmitted directly by saliva urine, and feces, or through ectoparasite bites in rats (fleas, fleas, and mites). This type of research aims to see the efficiency level of single trap type mouse trap with double trap type in Kade Jamrud and Kade Perak, Tanjung Perak Port, Surabaya. This type of research is pre-experimental with a one-shot case study design, that is, in this design, the treatment or intervention has been carried out (X), then the measurement (observation) or post-test (O) is then analyzed in statistical calculations using the t-test calculation. with a significant level of 5%, to find out which type of trap is the most effective compared to other types of traps. The results of this study indicate that out of 200 traps placed in 5 different warehouses, each warehouse has 40 traps with the same composition ratio. During the study, the number of a rat trapped was 14. The double trap mouse trap received the highest number of rats, namely 10 or 71.4%, while the single trap mousetrap only received 4 or 28.6%. From the results of the study, a statistical test was carried out where the t count the source of treatment variation was 1.630 while t table was 1.860, so it can be concluded that between single trap and double trap mouse traps showed no significant difference in the number of a rat trapped.*

**Keywords:** *Single Trap, Double Trap, t-test.*

### **1. INTRODUCTION**

Health concerns all life, past, present, and future. Health efforts, which were initially in the form of efforts to cure sufferers, gradually developed towards a unity of health efforts for the entire community which included efforts: improvement (promotive), prevention (preventive), healing (curative), and recovery (rehabilitative) which were comprehensively integrated and sustainable so that it can be effective with these broad and complex health efforts (Slamet Ryadi. AL, 1984 National Health System, p. 1-5).

Everyone has the same right to obtain an optimal degree of health and also must should has the obligation to participate in

maintaining and increasing the degree of health of both individuals, families, and the surrounding environment. Efforts that can be made include:

1. Creating and getting used to living clean and healthy.
2. Eliminate breeding grounds for disease causes and agents.
3. Keep food and drinks clean, not contaminated by bacteria that cause and intermediate diseases.

One of the health efforts is to seek to improve health status, namely by preventing the causes and agents of disease. The Port Health Office is a government agency that prevents the entry and exit of diseases, especially quarantine and certain infectious diseases. By observing the health efforts

being made, the port health office shall supervise and eradicate rats as disease-spreading animals, especially quarantine diseases in the port area.

The efforts made by the Port Health Office to suppress the rat population range from maintenance, improving environmental sanitation in ports, ships, and aircraft to limited health services at sea and airports. Port health tries to keep the port area free from rats. One of the activities carried out is the use of mouse traps. Rats are the cause of the bubonic plague. The disease can be transmitted directly by the saliva, urine, and feces or through the bites of ectoparasites in the body of rats (fleas, fleas, and mites). To find out the presence of bubonic plague, it must be examined through examination of fleas and if necessary on the organs of the rat. Rats like to live in dirty places, messy and not maintained clean. Rat have five sensory abilities, including:

- a. Sight, unable to discern colors, and only seeing at night. Very sensitive to bright light. Can recognize objects that are 10 m in front of it and can distinguish these objects in the dark. Rats have an inside view that can measure precisely a height to fall.
- b. A very sharp smell by moving his head continuously and actively kissing objects in front of him.
- c. Mouse feelers are very sharp and useful in movement at night. Nose or whiskers are used as a touch tool on floors, walls, and all objects close to them and to find out the dangers of other animals or obstacles in front of them.
- d. Rats are very sensitive to loud noises and their hearing is very sharp, can withstand high frequencies of 22-90 kHz
- e. Having the same high taste as humans, rats choose their food, and if there is nothing else they will eat all kinds of food.

Rat control efforts at the port to consider the habitual characteristics of rats such as the habit of making nests in places close to food sources, water, and the movement of rats when food is no longer available around the nest.

Kade Jamrud and Kade Perak are one of the international ports and part of the Port of Tanjung Perak Surabaya with sufficient facilities to store various types of goods needed by humans, either directly or indirectly, in the form of foodstuffs, rubber, iron, plastic, wood, and other ingredients.

The Port Health Office carries out rat control by using traps on the kades in the port of Tanjung Perak Surabaya such as kade Kalimas, kade Mirah, kade Nilam, and kade Berlian which are carried out in turns every month for one week. Traps are installed in warehouses using bait in the form of salted fish

Traps were laid in mouse walks along walls, rat nests, and corners of warehouses. The habit of rats when they come out of their hiding place will use the same path when they return.

Based on data available at the Surabaya Port Health Office, in February 1999, only 6 of the 3000 single trap rat traps installed were found. For this reason, the researchers tried other capabilities of the double trap type mouse trap compared to the single trap mousetrap, assuming that there are significant differences between the two so that it can be evaluated and recommended for the use of mouse control at the port.

## **2. MATERIALS AND METHODS**

This type of research conducted by the author is pre-experimental with the design of the one-shot case study, namely in this design the treatment or intervention has been carried out (X), then measurements (observation) or posttest (O) are carried out. The results of these observations can only provide descriptive information that describes objectively a situation to be analyzed by statistical tests

The research location was conducted in emerald and Perak kade at Tanjung Perak Port Surabaya because it is the working area of the Port Health Office so that access to these places is easier, several warehouses are scattered, totaling 30 warehouses. including export and import ports with various service facilities including loading and unloading of goods, stockpiling of goods, and others. According to the data available at the Port Health Office, Jamrud and Perak kade were the second-largest after the Kalimas kade in obtaining rats, namely 73.



Figure 1. Map of Tanjung Perak Port Surabaya

Tanjung Perak Surabaya Harbor is located in the Madura Strait and to the north of Surabaya City. The total area of 2219 ha consists of a water area of 1634 ha and a land area of 584 ha. Its position is located between the east line 112°0'-30'-13" and latitude 7°0'-7'-30". Kade Jamrud and Kade Perak are located to the north of the boundary of the Surabaya port of Tanjung Perak with the overall boundaries as follows:  
 North-----: North Emerald Kade  
 East-----: Kade Kalimas Baru  
 Southside-----: Gresik Road and Rajawali Road  
 West Side-----: West Nilam Kade

**Research time**

The research time is divided into three stages:

1. Preparation stage: April 19 - May 8, 1999, including licensing activities for research sites and preparation of mouse traps to be used
2. Research Phase: May 10-May 29, 1999 includes activities to inspect mousetrap, bait traps, trap traps, and control.
3. Data processing stage: 31 May-12 June 1999.

**Research variable**

Research variable

- a. The independent variable is the type of mousetrap that is installed
- b. Bound variables are the number and types of a rat trapped
- c. Disturbing variables are the laying of traps, the nature, and habits of rats, piles of goods, human activities, contents of warehouses, and types of bait

**Population and Sample**

The population in this study were all types of traps used in rat control

The samples in this study were single trap rat traps and double trap rat traps

**Data collection**

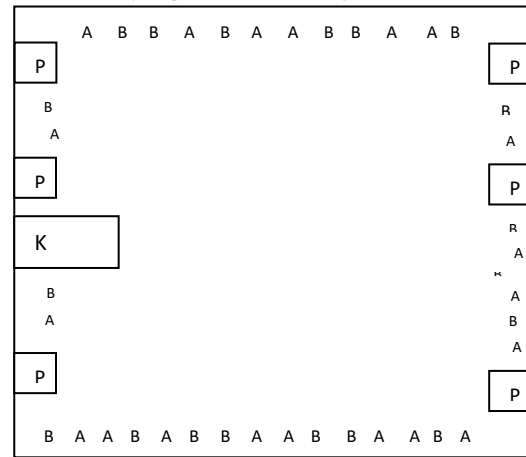
Primary data were obtained from the calculation of rats trapped in the type of trap used in the study for 5 days.

Secondary data were obtained from various references to both articles, journals, books, and existing literature with this research.

**2. RESULTS AND DISCUSSION**

The trapping process was first carried out by examining 200 mousetraps at the Port Health Office with salted fish bait without using prebaiting, considering that Novarianti's 1996 research had been carried out that salted fish was included in the bait that rats liked. Putting bait on each trap with the same size + 4 cm using rubber gloves to avoid odors from humans, because rats have a sharp smell. Each trap is scattered in 5 warehouses which are randomly selected so that each warehouse has 40 traps. The traps are set according to the area of each warehouse, the distance between the mousetrap ranges from 5-10 m.

**Warehouse plan and trap locations in Jamrud Kade and Perak Kade Tanjung Perak Surabaya Harbor**



32 M

85M

Information :

- K = Office
- P = Door
- A = Single trap rat trap
- B = Double trap rat trap
- Warehouse length = 85 m
- Warehouse width = 32 m

The traps are installed for 24 hours, namely at 09.00 WIB on that day, and checked the next day at 08.00-10.00 WIB. The first day of control was carried out on the second day and so on for up to 5 days, each inspection of traps that had found rats, lost or withered bait was replaced. The trapped rat was seen, recorded, and measured to determine the type of rat trapped.

**Trapped Rat Registration Form In Rat Trap in May 1999**

Date	Warehouse number	Number of traps	Type of trap		amount Types of Rats		
			A	B	Rr	Rn	Mm
17	119	40	2	0	0	2	0
	124	40	0	1	0	1	0
	126	40	1	0	1	0	0
	200	40	0	0	0	0	0
	201	40	0	1	1	0	0
18	119	40	1	0	0	1	0
	124	40	0	0	0	0	0
	126	40	0	1	1	0	0
	200	40	0	0	0	0	0
	201	40	0	0	0	0	0
19	119	40	0	0	0	0	0
	124	40	0	0	0	0	0
	126	40	0	0	0	0	0
	200	40	1	0	0	0	1
	201	40	0	0	0	0	0
20	119	40	0	0	0	0	0
	124	40	1	0	0	0	1
	126	40	0	0	0	0	0
	200	40	1	0	0	1	0
	201	40	0	0	0	0	0
21	119	40	0	0	0	0	0
	124	40	2	0	2	0	0
	126	40	0	0	0	0	0
	200	40	1	0	0	1	0
	201	40	0	1	0	0	1
		200	10	4	5	6	3

Information

- A = Double trap rat trap
- B = Single trap rat trap
- Rr = Rattus-rattus Diardii
- Rn = Rattus Norvegicus
- Mm = Mus Musculus

**Results of Rat Trapped in Single Trap Rat Traps and Double Trap Mouse Traps at Kade Perak on 17-21 May 1999**

Warehouse Number	Life Trap		Total	
	Double Trap	Single Trap		
119	3	0	3	
124	3	1	4	
126	1	1	2	
200	3	0	3	
201	0	2	2	
Total	E	10	4	14
	%	71.4	28.6	100

It can be seen from the table that double trap rat get the most rat, namely 10 or 71.4%, while single trap rat only gets 4 or 28.6%, this of

course still has to be continued with the t-test to confirm whether there is a significant difference between the two types of rat traps on the number of a rat trapped, then observations are carried out to determine the types of rat that are obtained.

**Types of Rat Trapped In Single Trap Rat Traps And Double Trap Mouse Traps**

Types of Rats	Many (tail)	%
Rattus-rattus Diardii	5	35.7
Rattus Norvegicus	6	42.8
Mus Musculus	3	21.5
amount	14	100

Based on the table above, the type of Rattus Novegicus rats was mostly trapped as much as 42.8%, while the Rattus Diardii was 35.7% and the least 21.5% was Mus musculus. Rattus Norvegicus called the sewer rat, has a size of 220-370 mm, making nests by digging holes in dirty drains, under building foundations, and in soft places. This type of rat is common in port cities. Rattus-rattus Diardii is found almost all over the world, also called house rat or roof rat with a size of 100-200 mm. Rat Musculus with a small size can be found in the house and also in the grass outside the house with a size of 55-100 mm.

**Mousetrap**

The most effective way to reduce rat settlement is eradication by well-planned trapping. Traps should be installed in mouse walkers, behind crates along walls, or other protected areas, where hiding is easy and rats are free to move. To get a good result it is necessary to set multiple traps, even though the installation of traps is quite short and decisive. To prevent rats from getting bored and avoid traps even though the installation is good enough, the types of traps that need to be known (Swastiko Priyambodo, Rat Pest Eradication)

**a. Double trap type mousetrap**

This type of mouse trap is in the form of a cage or box with a length of 28 cm, 12 cm high and 14 cm wide, equipped with a trigger and

a door. The trigger functions to drive the door as well as a place to put the bait on the wire, if the bait is touched a little, the trigger moves then the door closes and the mouse is trapped inside. Traps of this type have the advantage of being easy to install, risk minor accidents can be used many times over a long period and the rat that is found can be identified for fleas and are then able to catch large rat such as *Rattus Norvegicus*.

The weakness of this mousetrap is seen in its shape, this trap only has a one-sided/one-way trap door, so the possibility of getting rat is low, it is known that rat has a habit of going through the same road, but when there is interference or obstacles the rat's habit of choosing another path. Based on the table data that has been presented for the single trap type mousetrap, there are 4 rats in all warehouses except for 119 and 200 warehouses.

**b. Double Trap**

This type of mouse trap is almost the same as the single trap type mousetrap, the difference is that on both sides there is a trap door and its shape is twice as long as the single trap type mouse trap. In the middle, there is a divider with another part to protect if when the rat is trapped they cannot get out. The trap doors face out in the opposite direction, each door connected to the bait that is attached to the trigger wire inside. So that when the bait is touched, the door automatically closes. The advantage of this type of trap is that it has two doors facing the exit that can catch rat from the opposite direction so that the chance for rats to enter the trap is greater, the rats obtained can be examined for fleas,

The disadvantage of this type of trap is that it is difficult to install in a narrow space and requires a lot of bait. For virgins, this tool must be washed with enough water to remove the remaining urine and feces. From the table data, it was found that during the research of this type of box trap, 10 more rats were trapped or 71.4% when compared to the single-trap type box trap. The rats were obtained from all warehouses except warehouse 201

**Data analysis**

After presenting it in the form of a grouping table, it is followed by a statistical t-test with a significant level of 5% to determine which type of trap is the most effective. By

comparing the two types of traps, there will be results if t count < t table there is no significant difference, conversely if t count > t table then there is a significant difference.

The formula is presented as follows:

$$t = \frac{\bar{X}_1 - \bar{X}_2}{\sqrt{\frac{((n_1-1)s_1^2 + (n_2-1)s_2^2))}{n_1 + n_2 - 2}}} \left( \frac{1}{n_1} + \frac{1}{n_2} \right)$$

- $\bar{X}_1$  = Average of sample 1
- $\bar{X}_2$  = Average of sample 2
- S1 = standard deviation of sample 1
- S2 = standard deviation of sample 2
- N1 = Sample size 1
- N2 = Sample size 2

Result of t-test calculation with a significant level of 5%

Types of Mouse Traps	Don't count	t table	Conclusion
Single trap and Double Trap	1,630	1,860	t-count < t- table Then Ho accepted

**4. CONCLUSION**

After calculating the results of t count 1.630 and t table 1.860 so that t count < t table, it can be concluded that there is no significant difference between the two types of traps. Of course, several possible factors that influence including physical environmental factors in the form of food, water and hiding places, improper handling of food, garbage in the warehouse which is the main source of rats, then the nature and habits of rats naturally such as rat can cause reactions or responses to control measures carried out by humans and factors caused by human activity in the warehouse in the form of removal of traps, missing or damaged so that it can affect the results obtained in the study.

**Suggestion**

The use of single or double trap rat traps in the port environment should be balanced with environmental treatment with several activities including:

a. Improved environmental sanitation to eliminate food sources and hiding places for rats through:

- 1) The storage facility for garbage in the warehouse should be sufficient to accommodate all the trash for one day so that it is not used as a nesting place for rats, there is a tight trash lid so that rats

cannot enter.

2) The storage of goods that enter the warehouse is arranged in such a way that all foodstuffs in a wrapped state should be placed on a shelf 30-45 cm high from the floor. In the storage area for foodstuffs, the edges are given white paint with a width of 15 cm, intended to detect rat droppings, rat footmarks, and other signs.

3) It is recommended that garbage collection in the port area be carried out every day to prevent overloading of waste storage facilities so that they do not become a source of food for rats.

4) The process of dumping waste from the port to the TPA must be carried out regularly and regularly so that there is no accumulation of garbage in the port area.

b. Rat Proofing on buildings in the harbor, real changes to the building to prevent the entry of rats into a building. The construction of the building should be such that rats cannot enter the building. Efforts that can be made include floors made of mortar or concrete with a thickness of at least 10 cm, walls made of bricks and no cracks that can be traversed by rats, ventilation holes are screened and the area around the door, especially the bottom, is closed with slabs of at least 30 cm from the floor

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