

The Preferences of Rat Pests on the Bait Trap of Cassava in Rice Field on Tarakan Island

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ABSTRACT

Rats are the main pests in rice cultivation areas. Baits trap are one of alternative control it. Cassava is the food of rats which is potential use as bait. This study were conducted test cassava as bait, and to compare the level of preference of rats to only cassava bait and cassava plus coconut water. The identified preferences of rats which indicated from number of incidence and individual rats on bait trap. Each bait traps were repeated 4 (four) times which was carried out at three locations (Mamburungan, Karungan, and Tanjung Pasir). In each location, there were 3 (three) time of sampling. Data analysis used a non-parametric Chi-Square for the relationship between the type of baits (presence of rats in each bait), and the Wilcoxon test to compare between treatments. The results showed that cassava potentially as bait on traps. There were 5 (five) times of presences rats in baits trap. Then, we were collected 7 (seven) individual rats on this research. Furthermore, there is no significant difference in the level of rat preference for the use of bait made from cassava plus coconut water, and only cassava.

Keywords:

Rice Field, Rat,
Bait, Cassava

INTRODUCTION

Rats (*Rattus argentiventer*) are one of the pests that damage cultivated plants. Rats damage oil palm crops [1], rice plants [2], corn, soybeans, peanuts, green beans, and cassava [3]. In particular, they are the main rice pest in Indonesia, because the damage caused is quite extensive and occurs almost every season.

Rats have the ability to damage at various stages of rice plant growth. The ability of rats to damage cultivated plants in a short time with a very large yield loss is capable of damaging various stages of plant growth, starting from the nursery, vegetative phase, generative phase, and post-harvest harvest [4].

Rat pests have a very fast life cycle rate and a very high level of sensitivity compared to other pests. Furthermore, they have fast life cycle with large numbers of which has advantages in sensitivity and to threats that threaten. Rats really like dirty places covered with grass or shrubs. Also, they are able to adapt to new environments, and have high mobility [4].

Pest control of rats are consisted of technical culture control, sanitation, physical and mechanical, biological, and chemical. It is necessary to carry out various combinations of control treatments to increase the effectiveness of control. For example, in the fallow phase

sanitation, mass groves, rodenticides, and various trap models are methods in rice field habitat [4]. In addition, we had been effort to reduce the negative impact of using chemicals to control rat pests. The natural materials is used as an alternative to rodenticides or baits [6].

There are several plants rodenticide from plants. For example, gadung tubers (*Dioscorea hispida*) have alkaloid compounds in the form of dioscin [7], papaya (*Carica papaya*) leaves containing papain [8], castor bean (*Ricinus communis*) plants contain the active ingredient ricin [9]. In addition, cassava plants are also recognized as having the ability to control rats or the like [10].

The potential of plants is rodenticide that include plants also as bait. Due of, there are carbohydrate or protein as source of food of rats. Therefore, several efforts have been made by finding alternative raw materials for bait, and adding rodenticides with ingredients that rats like, such as rice grain, and corn [11]. The results of research [12] showed types of cassava and rice baits are preferred over anchovies and green beans. Then, the consumption of cassava can be increased by mixing it with rice, anchovies, and green beans.

The problem of bait is the behaviour of rats that are able to avoid the bait. Therefore, the alternative material of baits is investigated in

many researches. In this study, we were determined cassava plants which has the potential become baits which it is often found in plant cultivation areas. Furthermore, we were added coconut water as natural ingredients to increase effectiveness of cassava baits. In addition, coconut water is known not only to be found in abundance, but also to have protein which is thought to further increase the attractiveness of cassava bait.

METHODS

Study Site

This research was conducted in November-February 2022, located in the rice cultivation area. The research site consisted of three locations which baits were put in Mamburungan, Karungan, and Tanjung Pasir on Tarakan Island. The all of area are active in cultivating rice plants (each area have been cultivating rice plants every year and harvesting at least 1 time a year).

The number of samples at each location was 8 sampling points (trap). The characteristics of the research location based on the growth phase were fallow, vegetative, and generative phases. Meanwhile, the average temperature and humidity at the time of sampling reached 26.4-27.4°C, and 84-92%, respectively. And rainfall reaches 0-87 mm, with rainy days during the study reaching 3 days.

Table 1. Characteristics of Research Sites

Site	Growth Fase	Characteristics Around Site
Mamburungan	Vegetative	The area is around the mixed crop cultivation area and there are. In addition, there are quite dense settlements.
Mamburungan Timur	Fallow	The area is located around the cultivation area of horticultural crops. In addition, there are less dense settlements.

Tanjung Pasir	Generative	The area is located around the secondary forest area (shrub). Only 1 or two houses were found (no settlements).
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Research procedure

We were putted two baits in this study. The first bait was only cassava, and the second bait were cassava and coconut water. For cassava bait criteria have tuber look like purple colour or old

cassava and indicated useless for consumption of human. Furthermore, bait with cassava coconut were cooked cassava and soaked with coconut water for 24 hours (Fig. 1).

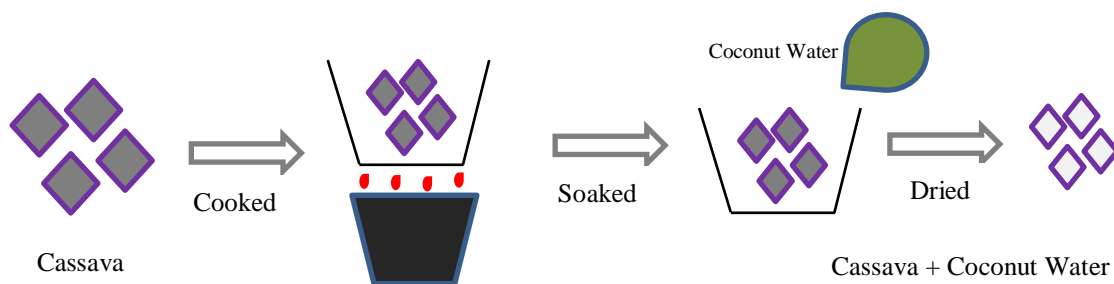


Figure 1. The processed product of bait of cassava coconut water.

Tests for rat preference of baits were carried out with two baits. Baits were cut and weighed 250 grams for each trap used. Installation bait on trap were placed in central or middle of the trap. Traps are placed at predetermined points at each research location (Fig. 2). Traps were placed at

17:00 local time with the point or place of placing the traps based on the probability of rats being caught, for example in bunds, rat pest paths/roads, and vegetated areas at the research site. Each bait will be repeated 4 times and eight tests are putted out.

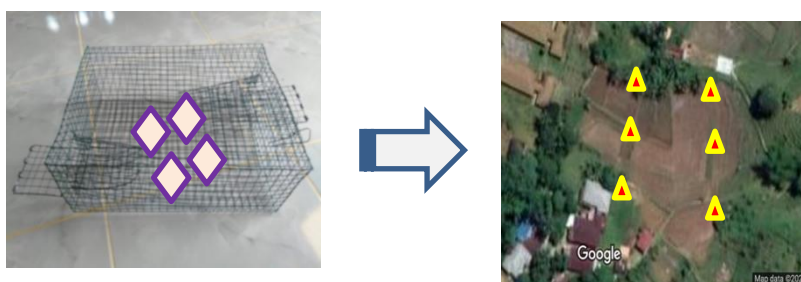


Figure 2. The installation bait in trap and fettle position of each site.

The collected rats were killed by soaking the bucket filled with water for at least 5 minutes. After that, the rats were dried. Rat pests are determined to determine the type of mouse. Rat pests are documented using a digital camera. The sampling of rat pests per location was carried out

for 3 times of sampling, with a minimum time interval of 15 days with the next collection time. After the rat is determined, then the rat carcass will be buried.

Data and Data Analysis.

The level of preference for rats can be seen from presence and absence rats, and the number of rat pests per trap per bait at each location. Data analysis was tabulated and analysed using descriptive analysis based on field testing. In addition, to compare the number of rat pests that were caught between sampling locations and the time of sampling, a non-parametric test (Mann Whitney test) was used to compare the two averages.

RESULT AND DISCUSSIONS

The relationship between the type of bait trap and the trapped rats

Table 1. Crosstabs of presence and absences rats through location and baits.

Bait Traps	Mamburungan		Mamburungan Timur		Tanjung Pasir	
	A	P	A	P	A	P
K	23	1	24	0	23	1
KAK	22	1	21	2	23	0

A = Absence; P = Presecens

The presences of rat were tended lack in all area. They were indicated that the area did not support of the presence of rat pests. The location were fallow and early vegetative phases. According to [4] the generative phase produces high-quality feed, besides that the population is determined by the population in the previous growing season. The use of traps combined with bait made from cassava can be used as an alternative to controlling rats in rice cultivation areas. Another reason, the around of area were possible rats found alternative food. It is obscure for rats found which around were the baits from cassava. In addition, cassava is found a lot in rice field cultivation in Tarakan Island.

From 24 times used of bait at the location, the rats were trapped once at the Mamburungan and Tanjung Pasir locations. Meanwhile, at the Mamburungan and Tanjung Pasir locations there were once and twice the presence of rats on cassava bait added with coconut water (Table 1). The results of the chi-square analysis showed that there was no relationship between the type of bait used and the presence of rats trapped at the Mamburungan ($\chi^2 = 0.975$), Karungan ($\chi^2 = 0.140$), and Tanjung Pasir ($\chi^2 = 0.322$) location.

The results indicated that the type of bait in outdoor installations were not only influenced by the type of bait but has various factors that influence it. For example, the positioning is factor of the bait affects the effectiveness. In addition, the number of baits used or the distance from one bait to another can affect the effectiveness of controlling or monitoring rats [13].

Number of Rats in each times and location

The results of research on preferences of rats on bait made from cassava as raw material were measured based on the number of pests found in the trap. The first sampling, the results showed that cassava bait added with coconut water were collected 2 (two) individual rat pests at locations in Mamburungan and Karungan. Meanwhile, at

the Tanjung Pasir location there was 1 individual rat pest. (Fig 3). The results of the Man-Whitney test analysis showed that there was no difference between cassava bait plus water and only cassava bait at the first time ($p > 0.05$).

The second sampling also showed cassava bait added with coconut water were collected 2 (two) individuals of rat pests at the location in Mamburungan and 2 individuals on bait only cassava in the Karungan location. Meanwhile, at

the Tanjung Pasir location, no rat pests were found in the bait-side trap. (Fig. 3). The results of the Man-Whitney test analysis showed that there was no difference between cassava bait plus water and only cassava bait at the second time ($p > 0.05$). The, In the third time collected, there were no found on cassava bait plus coconut water and only cassava bait at locations throughout the study site (Fig. 3)

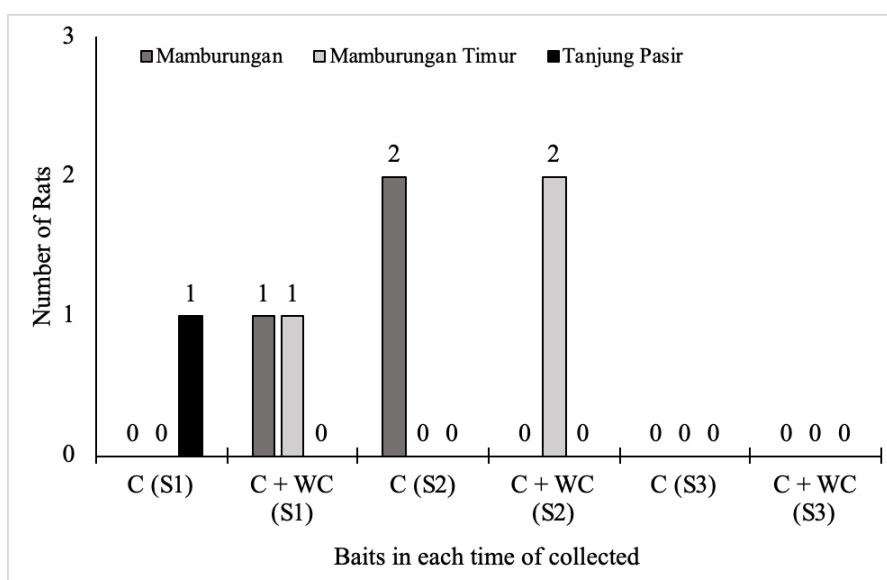


Figure 3. The number of rats in the cassava bait type was added with water (C+WC), and cassava bait (C) in the first, second, and third collected (S1, S2, and S3).

The first bait test showed that rats tended to be attracted to baits made from cassava added with coconut water, compared to baits made from cassava only. It is suspected that the compounds released by cassava and coconut water cause rats to tend to choose the bait. According another research several ingredients can be used as attractants or lures for rats, including cheese, almonds, bananas, apples, nuts, and including coconut [14].

In the second time bait test, it was shown that rats entered the bait trap, only in Karungan and Mamburungan there were rats. In addition, there was an increase in individual rats caught on cassava only bait. It is determined that although cassava bait without a decoy or coconut water attractant does not have, but it has nutrients that cause the presence of rat pests. According to [15] cassava has a water content of 53.99%, crude fat

1.00%, crude protein 1.88%, crude fiber 0.57%, ash content 0.69%, and carbohydrates 46.87%.

The bait test at the third time showed that there were no rat pests that entered the trap. It is indicated that the use of traps in controlling rat pests is not only determined by biotic factors, namely the availability of feed, but also abiotic factors, namely weather. The intensity of rainfall that occurs in November and December can affect the activity of rats in accessing feed, namely bait made from cassava. Another thing possibly caused by baited deterrent behaviour, where rats have the ability to avoid bait and traps. The results of [16] on the second to fifth test or observation on the second to fifth day of observation, the mice will not enter the same trap.

In the third time of test, the number of individual rat pests caught on baits made from cassava with coconut water was still higher than baits made from only cassava. However, there is no significant difference between the two baits. This indicates that bait can be used, but variations in the use of traps and additional materials for cassava bait are needed.

CONCLUSIONS

The Cassava are potential as bait of control of rats. In Addition, there were no significant difference in the level of preference of rats on the use of bait made from cassava added with coconut water, and only cassava.

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