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Preference of Baits in the Collection of Cockroach with Bottled Plastic Trap

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***Abstract*: This study was conducted to compare the types of bait in plastic bottled traps for trapping cockroaches and to compare the types of bait in plastic bottled traps for various types of cockroach traps In the houses of the people of Puranawat community, Thawi Watthana District, Bangkok. In the study, five types of bait that attracted cockroaches including dog chow, cat chow, potato chip, tapioca pellet, and granulated milk were used for the test in 0.5-liter plastic bottled traps. A number of trapped cockroaches were counted and recorded daily for 3 consecutive days. Results of bait test in cockroach trap showed that the cockroaches were caught at an average of 4.16 ± 0.12 per trap per day. dog chow can trap cockroaches at an average of 5.47 ± 0.05 per trap per day, followed by the cat chow at an average of 5.16 ± 0.13 per trap per day and followed by potato chip and tapioca pellet and granulated milk. The number of cockroaches caught was at the average 4.12 ± 0.06, 3.07 ± 0.14 and 2.96 ± 0.21 per trap per day, respectively. Analysis of the efficiency of baits, it was found that the of dog chow and cat chow were not different in the trapping of cockroaches, but both types of bait were significantly effective in using for trapping the cockroach from other types of baits (P <0.05). In addition, it was found that the potato chip resulted in the significantly higher trapped cockroach than tapioca pellet and granulated milk (P <0.05). In addition, the results of the comparison of types of cockroaches that can be caught. It was found that American cockroaches (72.7%) were significantly higher than that of German cockroaches (27.3%) with statistically significant (p <0.05). When considered types of bait, the dog chow can be used to trap American cockroaches (80.2 %) more than other types of bait.**

***Keywords*: cockroach; cockroach collection; bottled plastic trap; cockroach bait.**

I. INTRODUCTION

At present, people in the community still suffer from high levels of gastrointestinal illnesses. (Diarrhea morbidity rate in Thailand equal to 972.14 per 100,000 population in 2022)(Division of Epidemiology, 2023). One of the reasons is caused by eating food contaminated by cockroaches in the house, which causes dirt in the food consumed. Therefore, there have always been attempts to control and eliminate cockroaches by various methods such as managing the sanitation of the site, the removal of food sources and breeding places, use of chemicals to spray or destroy the larvae and adult cockroaches or the use of different types of traps to destroy the adults, etc., but still not successful and some of the methods used can cause the adverse effects. For example, using chemicals to spray or destroy cockroaches is costly. It may also affect the environment or be unsafe for the health of people and nearby animals. In addition, frequent use of chemicals and large amounts each time will result in the resistance of the cockroaches to the chemicals.

Attempts to find new methods of control and eradication of cockroaches which is both environmentally friendly and capable of using in conjunction with other methods, such as using traps made from used plastic bottles to catch cockroaches have been continuously done. It was found that this type of trap was widely publicized and known. However, such traps need

the suitable bait to make the traps very effective in trapping cockroaches which is currently not clear to be used to lure cockroaches into the trap.

Therefore, in this research, the investigator has studied the preference baits by comparing the types of bait available in the market to be used as an effective bait for trapping cockroaches with used plastic bottle traps.

II. MATERIALS AND METHODS

1. Instrument

1.1 Cockroach trap

The cockroach trap was made from 0.5- liter water plastic bottles. The materials and equipment used to make this trap (Figure 1) consisted of (1) 0.5 -liter plastic bottles (2) transparent sheet and white plastic tape (3) plastic bottle hole punching machine, and a cutter for cutting plastic bottles.

The plastic bottle was made a slit at the top of the bottle to insert a transparency plastic sheet into it as a tongue. The length was measured from the opening of the bottle about 1 inch. Then fixed the transparency plastic sheet with white plastic tape. This plastic tape would help keep the translucent tongue from falling off the plastic bottle while trapping cockroaches. Holes were drilled around the plastic bottle to allow the smell of the bait to come out of the bottle and attract the cockroaches to eat the bait inside the trap bottle.

Figure 1. **The cockroach trap made from a used plastic bottle.**

1.2 Baits used in the test

In this research, 5 different types of bait that attract cockroaches were used which were dog chow, cat chow, potato chip, tapioca pellet and granulated milk. These baits were bought from the supermarkets.

2. Study location

Houses of the volunteered people of Puranawat community, Thawi Watthana District, Bangkok was used in the test. The placed traps were not allowed to move from the area throughout the test period.

3. Data collection

The traps that already have the bait were placed in the experimental area during 27-29 January 2024. Twenty five traps with each type of bait, totaling 125 traps were set up. The number of cockroaches trapped each day was counted and recorded for 3 days and then used to classify the trapped cockroaches. The number of cockroaches caught was analyzed at the average per trap per day.

4. Statistical Analysis

The cockroach trapping data of each type of bait were compared and analyzed by using the descriptive statistics showing the mean and standard deviation and the difference of the mean amount of cockroaches trapping from the trapping method. The different types of bait used for the trap were analyzed by using the ANOVA and the mean the mean values of different cockroaches trapping using different baits were done with LSD. for the mean values of different cockroaches trapping using different baits. The mean differences of trapping adult cockroach species were done by using t-test at the level of significance equal to Alpha level 0.05.

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III. RESULTS

1. Comparison of bait types in plastic bottle traps for trapping adult cockroaches.

From the study of cockroach trapping ability of cockroach traps in fresh market areas. Five types of bait were used for 3 days in January 2024. The results showed that the bait types of cockroach could be used to trap cockroaches in a cockroach trapping bottle (Figure 2).

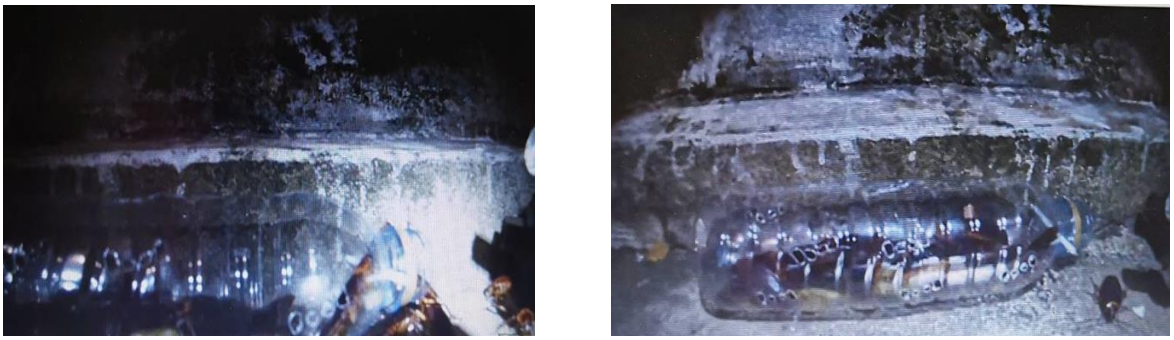

Figure 2. Examples of cockroaches caught in cockroach traps.

The study found that cockroach traps using various baits can trap at 4.16±0.12 cockroaches per trap per day. It was found that the dog food bait can be used to catch up to an average of 5.47±0.05 cockroaches per trap per day, followed by the cat food bait at 5.16 ± 0.13 cockroaches per trap per day, followed by the potato chips, potato tablets and milk tablets at the average of 4.12±0.06, 3.07±0.14 and 2.96±0.21 per trap per day, respectively. When comparing the efficiency of each type of bait, it was found that the bait used for trapping cockroaches was no different from dog food and cat food. However, both types of bait had statistically significant different effects on cockroach trapping bait (P <0.05). In addition, it was found that the potato chip bait had a statistically significant higher effect on cockroach trapping than potato chip bait and milk tablets (P<0.05). In addition, there was no difference in cockroach trapping between tapioca pellets and granulated milk pellets (P> 0.05) (Table 1).

Table 1: **Types of bait and trapping cockroaches ($\bar{X}$ ± SD) during the trap period in the house**

Types of Bait	No.of Trap	Duration of catch (Day)			Catched Cockroach (No.)	Average number of Catch in Trap (No./Trap/day/)	P-value*
		1	2	3			
Dog Chow as Pellet	25	125	139	146	410	5.47±0.05 a**	0.05
Cat Chow as Pellet	*25*	120	129	138	387	5.16±0.13 a	
Potato Chip	25	98	102	109	309	4.12±0.06 b	
Tapioca Pellet	*25*	68	79	83	230	3.07±0.14 c	
Granulated Milk	25	60	72	90	222	2.96±0.21 ce	
Sum	125	471	521	566	1,558	4.16±0.12	

*Significant level is determined at alpha level =0.05

** The different letter showed a significantly statistical difference.

*** Statistical Analysis with F-test and LSD

2. Comparison of the attractiveness of bait type and type of trapping old cockroach.

Comparison of the types of cockroaches caught using different baits showed that American cockroaches intercepted (72.7%) were significantly higher than German cockroaches (27.3%) (P<0.05). When considering each type of bait, it was found that dog food pellets were able to trap American cockroaches (80.2%) more than other baits, followed by cat food pellets that can be used to trap American cockroaches (78.0%), followed by fried potato chips, tapioca pellets and milk pellets used as baits captured fewer American cockroaches (77.0%, 60.9%, and 55.9%, respectively). However, the study found that milk pellet baits were the most effective for catching German cockroaches (44.1%), while dog food pellets were the least effective for trapping German cockroaches (19.8%) (Table 2).

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Table 2. Comparison of mean differences of trapping adult cockroach species ($\bar{X}$ ± SD) from baits.

Types of Baits	Types of cockroaches caught (No., %)		P-value*
	American Cockroach (No.)	German Cockroach (No.)	
Dog Chow as Pellet	329 (80.2 %)	81(19.8 %)**	0.05
Cat Chow as Pellet	302 (78.0%)	85 (22.0%)	
Potato Chip	238 (77.0 %)	71(23.0%)	
Tapioca Pellet	140 (60.9%)	90(39.1%)	
Granulated Milk	124 (55.9 %)	98 (44.1%)	
Sum	1,133(72.7 %)	425 (27.3%)	

*Significant level is determined at alpha level =0.05

** Statistical analysis with t-test

IV. DISCUSSION

In the study of the effectiveness of the type of bait to lure cockroaches into the trap. It was found that dry dog food and dry cat food were the most effective. It is best used to lure cockroaches into traps. This may be because dog food and cat food contain meat-based ingredients that have an odor that attracts predatory cockroaches. Compared to other baits that contain powder (fries and potato chips), fat and protein (milk tablets) which have a less attractive odor. This finding is similar to the study by Changlu Wang and Gary W. Bennett (2006) who studied different baits in trapping for tracking German cockroaches. It was found that the use of baby food as bait for cockroach traps increased the cockroach trapping efficiency more than glue traps without bait which indicates that the type of bait affects the use of bait for trapping cockroaches. In addition, a study of the use of various baits in fly traps found that baits made from fish with strong odor attract more flies to the trap (Silapanuntakul et al., 2017). Their study found that there was no difference between pellets and milk pellets in cockroach bait traps. This may be due to the fact that the two baits have a slight and indistinguishable smell. This did not affect the enhancement of cockroach bait efficiency studied in this study.

For cockroach trapping in this study, it was found that the American cockroach trapping was higher than the German cockroach trapping. It is estimated that the population of American cockroaches is greater than in residential homes and can also be commonly found in homes around the ceiling wall cracks around the house, in the garbage pile or in the sewer with dirty grease stains, etc. While the German cockroach may be rare such as the bookshelf area, closet, drawer, sink, or in the TV cabinet. This resulted in catching more American cockroaches than German cockroaches. In the study, it was found that dry dog food and dry cat food were better suited for trapping American cockroaches than other baits. Milk pellets are more suitable for trapping German flies than other baits.

Catching cockroaches with traps using different baits indicates that the cockroach population is abundant in the household. The use of these cockroach traps and baits can help capture adult cockroaches and contribute to the reduction of cockroach populations (Owens and Bennett 1983, Kaakeh and Bennett, 1997). But if the sanitation of the accommodation is not improved well to reduce food sources and breeding grounds for cockroaches These cockroaches can then bring diseases to the inhabitants of the house. Therefore, periodic trapping should be done to destroy the adult cockroaches along with improving sanitation. Therefore, this trap together with the baits can really help control cockroaches in the house.

Therefore, from this study it was shown that in case of trapping cockroaches for the control or elimination of cockroach populations If there is no bait type dry dog food or dry cat food. Other types of bait may be used, such as potato chips, potato chips or milk tablets, but the efficiency may be slightly lower. But it is also an alternative to use as bait to use or in conjunction with other methods to control and eliminate cockroaches in areas with poor environmental sanitation conditions. As well as helping to reduce concerns from the use of chemicals to kill cockroaches, which day by day will cause problems of drug resistance and contamination in the environment and harm to living creatures and health of users as well.

V. CONCLUSION

The application of bottled plastic trap in combination with baits for eliminating the cockroaches in the house indicated that they could be caught in the trap at an average of 4.16 ± 0.12 per trap per day. Different types of baits can be used in the trap. Dog chow bait showed the cockroach trapping rate at an average of 5.47 ± 0.05 per trap per day, followed by the cat

chow at an average of 5.16 ± 0.13 per trap per day and followed by potato chips and tapioca pellet and granulated milk. In addition, the dog chow can be used to trap American cockroaches (80.2 %) more than other types of bait.

VI. RECOMMENDATIONS

Using cockroach traps made from plastic bottles along with different types of bait such as dog chows, cat chows, potato chips, or milk pellets can be used to trap cockroaches for elimination and control of cockroach populations. The trap can be easily made and the use of baits should be selected according to what is appropriate or what is already available. Trapping all cockroaches from households will also help reduce the rate of illness from gastrointestinal diseases in the community brought by cockroaches.

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