

**Bait preference by urban and suburban mammals in the port area
Tanjung Priok, Jakarta, Indonesia**

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SUMMARY

Bait trials using burnt coconut, burnt saltfish and peanut butter for trapping urban rodents and insectivores were carried out at two residential areas and a rice field plot around Tanjung Priok, Jakarta from July to September 1977. Traps baited with cotton wool used as controls.

Coconut was found to be a better bait than saltfish in residential areas, whilst both baits were observed to be equally as good in rice field. Peanut butter was least accepted in both habitats.

Saltfish and coconut were found to be equally acceptable baits for *R. r. diardii*.

Coconut was preferred to saltfish by *R. norvegicus*, and saltfish was preferred to coconut by *S. murinus*, but *R. argentiventer* was shown to feed on coconut only. Bait preference by individual species of rodents and insectivores in relation to their feeding behaviours was discussed.

Overall results showed that coconut was the most effective bait followed by saltfish and least effective was peanut butter. Flavours of these baits as an additional attractant to house and field rats was also discussed.

Studies on insecticide susceptibility tests of domestic and field fleas (*Xenopsylla cheopis* and *Stivalius cognatus*) are currently carried out in Indonesia. These studies are jointly conducted between WHO Vector Biology and Control Research Unit 2 (VBCRU-2) and the National Institute of Health Research and Development (NIHRD). These two species of fleas are commonly found infesting domestic and field rodents. These fleas are host specific; *X. cheopis* is more associated with the common house rats and house shrews (*Rattus r. diardii*, *R. norvegicus*, *Suncus murinus*) and *S. cognatus* is more common in the field and peri-domestic rats (*Rattus tiomanicus*, *R. argentiventer*, *R. exulans*). In determining the flea-indices

insecticide susceptibility tests there is always the problem of getting sufficient numbers of rodents from which to obtain reliable data. The house and field rodents are well adapted to human surroundings and are at the same time well provided with food resources by the latter. Thus, it is very difficult to trap these animals without providing baits which are preferable to the foods available in their natural environment. In this connection, the question also arises as to what baits are most effective and as to whether the animals caught in the baited traps are attracted by the baits or whether they are caught simply due to curiosity. To test this hypothesis, experiments were carried out by using three different baits, burnt

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saltfish, burnt coconut and peanut butter. Control experiments were also carried out by setting traps "baited" with a piece of cottonwool.

MATERIALS AND METHODS

A total of 40 sets of wire-cage traps each with four traps were used in Gudang Baru dan Pantai Laut residential areas in Tanjung Priok, Jakarta. Three traps, each baited with a different bait (saltfish, coconut, peanut butter) and a control (cotton wool), were placed only in the kitchens in each house. Each of these areas was trapped for two nights per month from July to September, 1977 respectively. The total number of houses sampled was 70 per month in each area.

In the ricefield at Kramat Tunggak near Tanjung Priok, the same number of traps were used for two nights per month. In this case 800 trapping sites were used in the field. Four traps including the control, with their baits arranged in sequence, were set in a line at 15 meters intervals. This was to ensure that the differently baited traps were evenly distributed throughout the field to prevent any bias in sampling.

RESULTS

Bait preference: In residential areas, saltfish and coconut appear to be equally effective as baits, although coconut was a slightly favored over saltfish. Peanut butter was least taken. Four animals were caught in traps baited

with cotton wool (Table 1).

In the ricefield, saltfish and coconut were shown to be equally attracting as baits. Peanut butter was least accepted. One house-shrew was caught in a control trap (Table 1). However, there was a considerable difference in bait preference by different species of mammals.

Rattus r. diardii: Both saltfish and coconut baits were relished by this rat. Peanut butter was least taken (Table 2).

Rattus norvegicus: Coconut was obviously a better choice for this animal. Saltfish was also taken but to a lesser extent than coconut. Peanut butter was least accepted (Table 2).

Rattus argentiventer: Only four rats were trapped in the rice field. All the four in the coconut baited traps.

Mus musculus: Only three specimens were trapped. Two in saltfish baited traps and one in a coconut baited trap (Table 2).

Suncus murinus: Saltfish, coconut and peanut butter were apparently equally good as baits for this house-shrew. Two of these shrews were caught in the control traps (Table 2).

Effectivity of different baits: Coconut was shown to be the most effective bait and was selected by 51.9% by all the species of mammals in both residential and rice field in Tanjung Priok. Saltfish was found to be next to coconut with an overall of 36.9%, and least effective of these was peanut butter with only 8.1% respectively (Table 2).

Table 1. Animals trapped with different baits in two types of habitats at Tanjung Priok, Jakarta, Indonesia.

Habitats	Baits	<i>Rattus</i> <i>r. diardii</i>	<i>Rattus</i> <i>norvegicus</i>	<i>Rattus</i> <i>argenteventer</i>	<i>Mus</i> <i>musculus</i>	<i>Suncus</i> <i>murinus</i>	Total
Residential houses	Saltfish	24	12	0	2	3	41
	Coconut	26	28	0	1	4	59
	Peanut butter	2	1	0	0	2	5
	Cotton wool (control)	2	1	0	0	1	4
Rice fields	Saltfish	7	0	0	0	11	18
	Coconut	14	0	4	0	6	24
	Peanut butter	1	0	0	0	7	8
	Cotton wool (control)	0	0	0	0	1	1
Total		76	42	4	3	35	160

Table 2. Percentage of bait preference by different species of animal trapped at Tanjung Priok, Jakarta, Indonesia.

Baits	<i>Rattus</i> <i>r. diardii</i>	<i>Rattus</i> <i>norvegicus</i>	<i>Rattus</i> <i>argentiventer</i>	<i>Mus</i> <i>musculus</i>	<i>Suncus</i> <i>murinus</i>	Total
Saltfish	40.8	28.6	0/4	2/3	40.0	36.9
Coconut	52.6	66.7	4/4	0/3	28.6	51.9
Peanut butter	4.0	2.4	0/4	0/3	25.7	8.1
Cotton wool (control)	2.6	2.4	0/4	0/3	5.7	3.1

DISCUSSION

Baited traps attracted 96.9% of 160 mammals trapped during the three months period as compared to 3.1% in traps baited with only cottonwool (control). It was apparent from these results that house rats and house-shrews were attracted by the baits in the traps. The higher consumption rate of coconut than saltfish could probably be due to the fact that coconut was more favourable and palatable than saltfish and that peanut butter was least accepted by the rodents in Tanjung Priok.

On the basis of bait preference by individual species of urban rodents, *R.r. diardii* prefers coconut to saltfish which was also reflected by the higher consumption of coconut by this rat in the rice field. Lim (1973) found the "selection" of saltfish was significantly higher than coconut by *R.r. diardii* in inland towns in Malaysia, and no difference of selection between the coconut and saltfish baits was shown in rice fields. The significantly higher consumption of coconut by *R. norvegicus* in Tanjung Priok, indicate that this species prefers nuts and vegetable matter over meat. *R. norvegicus* is a garbage scavenger in the city where more vegetable wastes than meat were thrown away in garbage sinks. The preference for coconut which is related to vegetable matter could be due to its normal feeding behaviour in its natural environment. There were too few *R. argentiventer* for any meaningful assessment

at this stage. The indiscriminate bait preference by *S. murinus* appears to agree with the omnivorous habits of this shrew in nature (Harrison & Lim, 1950; Harrison, 1954).

The overall trapping success in baited traps was 16.1% as compared to 0.5% in the control. Thus, the present findings show that the trapping results of urban rodents and insectivores were influenced by the baits used.

It must be noted that the mammal fauna found in the present rice field area within the surrounding of Tanjung Priok is not a fauna representative of a rice field in a rural area.

In the present experiments, the number of baits used were very limited as the study was confined to urban rodents. In the fields where the species of small mammals are more diversified and their food habits more complex, a greater variety of baits should be tested.

RINGKASAN

Percobaan mengumpan rodentia dan insektivora dengan menggunakan kelapa bakar, ikan asin bakar dan kacang goreng giling (*peanut butter*) dilakukan di dua daerah pemukiman dan suatu petak sawah sekitar Tanjungpriok, Jakarta, dari bulan Juli sampai dengan September 1977. Sebagai pembandingan digunakan kapas.

Kelapa ternyata merupakan umpan yang lebih baik daripada ikan asin di daerah pemukiman, sedangkan di sawah keduanya sama baiknya. Di kedua habitat ternyata kacang goreng giling tidak begitu disukai.

Ikan asin maupun kelapa sama-sama disukai oleh *R. r. diardii*. Bagi *R. norvegicus*, kelapa lebih disukai daripada ikan asin, dan sebaliknya bagi *S. murinus* ikan asin lebih disukai daripada kelapa, tetapi *R. argentiventer* hanya memilih kelapa saja. Dibahas pula kesukaan terhadap umpan oleh masing-masing spesies rodentia maupun insektivora dalam kaitannya dengan kebiasaan makannya.

Secara keseluruhan dapat disimpulkan bahwa kelapa merupakan umpan yang paling efektif, baru kemudian ikan asin dan terakhir adalah kacang goreng giling. Juga dibahas penggunaan aroma umpan-umpan ini sebagai daya tarik tambahan terhadap tikus-tikus rumah dan sawah.

ACKNOWLEDGEMENTS

We are grateful to Professor Dr. J. Sulianti Saroso, Director of National Institute of Health Research and Development for her support and approval of the study. Acknowledgements are also due to Dr. Y.H. Bang,

Project Leader of Vector Biology and Control Research Unit No. 2 for reading through the manuscript, to Dr. N.G. Gratz, Chief, Ecology and Control of Vectors, Division of Vector Biology and Control, World Health Organization, Geneva for his critical comments and his kind approval for permission to publish this note, and to Drs. Harsadja and Mr. Aryanto for their assistance.

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