

SCREENING OF POISON CARRIERS FOR THE CONTROL OF HOUSE MOUSE, *MUS MUSCULUS URBANUS* HODGSON AND FIELD MOUSE, *MUS BOODUGA BOODUGA** GRAY

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ABSTRACT : Three cereals, rice, wheat and finger millet; and three pulses, bengal gram, greengram and cowpea were offered simultaneously to individually caged house mouse, *Mus musculus urbanus* Hodgson and field mouse, *M. booduga booduga* Gray, in the forms of whole grains, split grains and powders alone and also by mixing with oils/sugar/salt. Both the species significantly preferred split grains to whole grains and powders. Addition of oils/sugar/salt did not improve the attractiveness of the baits. The broken rice and wheat were the most preferred baits for *M.m. urbanus* and *M.b. booduga* respectively. The mean per day consumption per 100 g body weight varied from 16.11 g to 19.20 g in *M.m. urbanus* and 14.88 g to 23.93 g in *M.b. booduga*.

INTRODUCTION

Rodents are mostly omnivorous but, given a choice they consume the most preferred bait. The success of poison baiting invariably depends on the acceptability of the prepared bait material over other baits. The most accepted bait is frequently a local food, the rodents have already been accustomed to (Sridhara, 1983) and hence the preferred food of a particular species varies from habitat to habitat. Laboratory studies carried out on the bait preference of *Mus musculus urbanus* Hodgson and *M. booduga booduga* Gray, the two common mice species that inhabit residential and crop fields, respectively are presented here.

MATERIALS AND METHODS

Adult animals just captured from the homesteads and the fields were sexed, weighed and housed individually in animal cages of 25 x 30 x 45 cm. Three cereals, rice, wheat and finger millet; and pulses, bengal gram, greengram and cowpea were screened for their preferences. The baits were offered in the forms of whole grains, split grains and powders. The additive effects of oils/sugar/salt were also analysed by offering baits mixed with them.

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The animals were allowed to familiarise themselves with the candidate bait for five days and all the baits of a particular form were then exposed simultaneously in different containers to ten individually caged animals of each species for six days. The position of containers changed daily to avoid position effect on feeding. Water was provided *ad libitum*. Consumption of each bit was recorded daily to the nearest 0.25 g using a top-pan balance. For comparison, the absolute value of daily intake was transformed to g/100 g body weight of each species and an average daily consumption (ADC) of each bait per animal was calculated.

RESULTS

Comparing whole grains, both the species significantly preferred rice (Table 1). In *M.m. urbanus*, the consumption of millet was significantly less than rice but more than other grains. Among the whole grains, cowpea was not consumed by *M.m. urbanus*, whereas all the three pulses were totally rejected by *M.b. booduga*. The ADC per 100 g body weight was 16.73 g in *M.m. urbanus* and 18.39 g in *M.b. booduga*.

In case of split grains, *M.m. urbanus* did not shift its preference from rice, whereas *M.b. booduga* changed its preference from rice to wheat (Table 2). However, in *M.b. booduga* the consumption of rice was closely followed by wheat. Pulses were again the least preferred ones with a total consumption of 27% and 20% in *M.m. urbanus* and *M.b. booduga*, respectively. The consumption of split grains was 15% and 30% more than whole grains in *M.m. urbanus* and in *M.b. booduga* respectively (Tables 1 and 2).

Table 1. mean daily consumption (g) of whole grains by mice.

Whole grains	<i>M. m. urbanus</i> (16.50g)		<i>M. m. booduga</i> (9.95g)	
	/ animal	/ 100g body wt.	/ animal	/ 100g body wt.
Rice	1.32 ± 0.03	8.0	1.04 ± 0.02	10.45
Wheat	0.15 ± 0.02	0.91	0.23 ± 0.01	2.31
Millet	1.13 ± 0.04	6.85	0.56 ± 0.02	5.63
Bengal gram	0.09 ± 0.01	0.55	Nil	—
Green gram	0.07 ± 0.01	0.42	Nil	—
Cowpea	Nil	—	Nil	—
Total	2.76	16.73	1.83	18.39
CD at P = 0.05	0.11		0.05	

The average body weight of the animal is given in parenthesis.

Table 2. Mean daily consumption (g) of split grains by mice.

Split grains	<i>M. m. urbanus</i> (13.70g)		<i>M. m. booduga</i> (10.70g)	
	/ animal	/ 100g body wt.	/ animal	/ 100g body wt.
Rice	1.24 ± 0.03	9.05	0.84 ± 0.02	7.85
Wheat	0.36 ± 0.01	2.63	0.97 ± 0.02	9.07
Millet	0.53 ± 0.02	3.87	0.23 ± 0.02	2.15
Bengal gram	0.33 ± 0.01	2.41	0.28 ± 0.01	2.62
Green gram	0.06 ± 0.01	0.44	0.24 ± 0.01	2.24
Cowpea	0.10 ± 0.01	0.73	Nil	-
Total	2.62	19.13	2.56	23.93
CD at P = 0.5	0.06		0.05	

Rice was again most preferred by both the species when compared among powdered forms (table 3). The consumption of all other grains was 50% less than rice. Green gram and cowpea were totally rejected by *M.b. booduga* and the consumption of powdered grains was less than split grains (Tables 2 and 3).

When the grains were mixed with oils at 2% level, the consumption declined totally (Tables 1 and 4). However, among the oils tested, gingelly oil was most preferred followed by groundnut oil by *M.m. urbanus* and coconut oil by *M.b. booduga* (Table 4). With oils, *M.m. urbanus* preferred millet to rice, whereas *M.b. booduga* did not change its preference from rice.

Table 3. Mean dally consumption(g) of powdered grains by mice.

Powdered grains	<i>M. m. urbanus</i> (15.50g)		<i>M. m. booduga</i> (10.30g)	
	/ animal	/ 100g body wt.	/ animal	/ 100g body wt.
Rice	1.37 ± 0.03	8.84	1.50 ± 0.03	14.56
Wheat	0.52 ± 0.03	3.35	0.29 ± 0.03	2.82
Millet	0.23 ± 0.02	1.48	0.22 ± 0.01	2.14
Bengal gram	0.18 ± 0.01	1.16	0.30 ± 0.01	2.91
Green gram	0.15 ± 0.02	0.97	Nil	-
Cowpea	0.17 ± 0.009	0.45	Nil	-
Total	2.52	16.25	2.31	22.43
CD at P = 0.05	0.09		0.05	

Table 4. Mean daily consumption (g/animal) of oily baits by mice.

Baits		<i>M. m. urbanus</i> (17.75g)		<i>M. b. booduga</i> (10.75g)	
		Baitwise	Oilwise	Baitwise	Oilwise
Coconut oil +	Rice	0.04 ± 0.01	0.32 ± 0.02	0.02 ± 0.007	0.41 ± 0.02
	Millet	0.28 ± 0.02		0.39 ± 0.02	
Groundnut oil +	Rice	0.20 ± 0.01	0.87 ± 0.04	0.18 ± 0.01	0.32 ± 0.006
	Millet	0.67 ± 0.03		0.14 ± 0.009	
Gingelly oil +	Rice	0.55 ± 0.02	1.67 ± 0.05	0.63 ± 0.02	0.87 ± 0.02
	Millet	1.12 ± 0.04		0.24 ± 0.02	
Total		2.86		1.60	
Per 100g body wt.		16.11		14.88	
CD at P = 0.05		0.09	0.12	0.05	0.07

When other additives like salt, jaggery and sugar at 2% level were mixed with the grains, both the species preferred millet to rice (Table 5). However, the difference in consumption was not significant in *M. b. booduga*. Though jaggery was consumed more by *M. m. urbanus* the difference in consumption between jaggery and salt-mixed grains was not significant. On the other hand, *M. b. booduga* showed a significant preference for sugar-mixed grains over salt and jaggery-mixed ones. On an average, the consumption of such additive mixed grains was nearly 20% more than plain whole grains (Tables 1 and 5), but slightly less (4%) than plain split grains (Tables 2 and 5).

Table 5. Mean daily consumption (g/animal) of sweetened and saltish baits by mice.

Baits		<i>M. m. urbanus</i> (15.0g)		<i>M. b. booduga</i> (11.15g)	
		Baitwise	Additivewise	Baitwise	Additivewise
Salt +	Rice	0.34 ± 0.009	0.98 ± 0.03	0.25 ± 0.01	0.32 ± 0.009
	Millet	0.64 ± 0.02		0.07 ± 0.1	
Jaggery +	Rice	0.44 ± 0.02	1.05 ± 0.03	0.19 ± 0.02	0.96 ± 0.03
	Millet	0.61 ± 0.02		0.77 ± 0.02	
Sugar +	Rice	0.14 ± 0.009	0.85 ± 0.02	0.76 ± 0.02	1.28 ± 0.03
	Millet	0.71 ± 0.02		0.52 ± 0.02	
Total		2.88		2.56	
Per 100g body wt.		19.20		19.20	
CD at P = 0.05		0.07	0.10	0.05	0.08

Table 6. Mean daily consumption (g) of the preferred foods by mice.

Baits	<i>M. m. urbanus</i> (16.40g)		<i>M. b. booduga</i> (9.35g)	
	/ animal	/ 100g body wt.	/ animal	/ 100g body wt.
Whole rice	0.07 ± 0.01	0.43	0.06 ± 0.009	0.64
Broken rice ¹	1.08 ± 0.02	6.59	1.19 ± 0.03	12.73
Powdered rice	0.58 ± 0.02	3.54	0.25 ± 0.02	2.67
Gingelly oil + + Millet ²	0.23 ± 0.01	1.40	0.07 ± 0.008	0.75
Sugar ³ + Millet	0.81 ± 0.03	4.94	0.34 ± 0.02	3.64
Total	2.77	16.90	1.81	20.43
CD at P = 0.05	0.07		0.04	

Wheat, rice and jaggery were used for *M. b. booduga* in 1,2, and 3 respectively instead of rice, millet and sugar.

The best ranking baits in the above five tests were screened together to find out the final preference. Split forms of rice and wheat without mixing any additive were consumed significantly more than the other types of *M.m. urbanus* and *M.b. booduga*, respectively (Table 6). Sweetened baits were the second best for both the species. In general, these rodents did not prefer whole grains and also oil mixed grains.

DISCUSSION

Both the species of mice showed a clear liking for cereals over pulses and *M.b. booduga* totally rejected pulses. Such preference for cereals was also noticed in several other rodents (Prakash and Mathur, 1987). Among the cereals, rice was preferred and consumed most by *M.m. urbanus* and *M.b. booduga* possibly because rice is grown in this area regularly. The spiny mouse, *M. platythrix* (Rao and Purushothum, 1980) the black rat, *Rattus rattus* (Katoch, 1981) and the bush rat, *Golunda ellioti* (Soni, 1978) were some of the other rodents which preferred the local foods.

The incisors of rodents are built to gnaw hard foods. Hence, the texture of the bait could definitely influence its acceptability. The consumption of broken/split grains was more than any other types of food in both the species of mice, which was confirmed again by the final test. The broken grains were probably easier for these small rodents to hold in their toes while eating as known in case of spiny mouse (Rao and Purushothum, 1980).

Flavour is an important criterion for food selection (Prakash and Mathur, 1987). Rao and Purushothum (1980) reported that oils significantly increased the palatability of dry grains in *M. platythrix*. However, some rodents disliked the flavour of oils and sugar (Prakash and Mathur, 1987). The results of our studies are in conformity with the latter.

The daily food requirement of rodents varied from 7.8 to 21.1 g/100 g body weight (Pingale *et al.*, 1977) and more the body weight the lesser was the rate of consumption (Jain *et al.*, 1977). Such inverse relationship between the body weight and food consumption was very evident in the present studies. The average per day consumption by *M.m. urbanus* (mean body weight 15.8 g) was 17.39 g/100 g body weight whereas it was 20.50 g by *M. b. booduga* (mean body weight 10.4 g).

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