the same basic pattern was suggested for caged *Z. hudsonius* by Quimby (1951) and Sheldon (1934) and supported by observations of a daily rhythm of changes in body temperature by Morrison & Ryser (1962). A basically similar pattern of activity was also reported for the closely related species, *Sicista betulina* (Erkinaro, 1972).

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The Significance of Bait and Camouflage on Longworth Trapping of the Wood Mouse

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Bathe G. M., 1983: The significance of bait and camouflage on Longworth trapping of the wood mouse. Acta theriol., 28, 20: 323—327 [With 2 Tables & 2 Figs.]

A comparison was made between the number of *Apodemus* caught with a) untreated, b) baited, c) camouflaged, and d) baited and camouflaged Longworth traps. The results showed that external bait increased trap occupation during the 20-day study period, but camouflage increased occupation during the first 10 days only. Traps both baited and camouflaged consistently obtained the highest catches. The results are interpreted in relation to the know behaviour of rodents towards traps.

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INTRODUCTION

Since its invention in 1949 the Longworth (live) Trap has become a standard piece of equipment in the study of rodent population structure, dynamics and movements. Yet despite the extensive use of Longworths, proceedure for setting traps is rarely mentioned in research papers, and is presumably taken to be either unimportant or self-evident. Chitty & Kempson (1949) indicated a preference for baited traps, using a small sample, and Stickel (1948) studied the effect of bait in catching *Peromyscus* using other trapping methods. Longworth trapping involves a considerable measure of acquired technique, as demonstrated by comparing the results obtained by different workers trapping in the same habitat, or by observing the results obtained as one worker becomes progressively more experienced. This study investigates whether the use of bait and camouflage influence trapping success with the Wood Mouse, *Apodemus sylvaticus*.

METHOD

Eleven 15 m square blocks were marked out in superficially homogeneous oak woodland. At the corner of each block, 4 traps were placed within one metre of a marker post. Traps were positioned adjacent to runs where these were apparent, or perpendicular to branches or tree stumps which might direct rodents past the trap entrances. Each group of 4 traps was given one of four treatments: a) without bait or camouflage, b) with bait only, c) with camouflage only, and d) with bait and camouflage. "Bait" consisted of approximately 10—15 grains of oats scattered outside the entrance tunnel. "Camouflage" consisted of dead leaves and other vegetation placed around the trap, leaving only the tunnel entrance visible. Internally all traps were set identically, being provided with wood shavings for warmth, and oats for food. The four traps in each group were given the same treatment, thus eliminating the effect which a choice of differently treated traps might have. The 176 traps (11 blocks each with 4 groups of 4 traps) were investigated each morning for 20 days. The animals caught were identified, marked and released, and the information entered on data sheets. Occupied traps were cleaned, provided with fresh food and bedding, and re-set in the same location.

The results were interpreted treating each group of 4 traps as a super-trap capable of catching 4 individuals. The percentage occupation was calculated for each group each day, and an average obtained for all groups of the same treatment each day. Under normal circumstances a catch of one *Apodemus* in a group of 4 would be recorded as 25% occupation. When one trap of a group was disturbed so as to make it unoccupiable, the number of occupiable traps was taken to be 3, so that a catch of one would score 33%. When one trap of a group was occupied by another species, it was assumed that this had entered mid-way between setting and examining the traps, and the number of occupiable traps was taken to be 3.5. These allowances were considered particularly important because disturbance and occupation by other species were directly correlated with bait and camouflage, the variables under investigation. Results were studied for the whole period (nights 1—20) and also for trap-nights 1—10 and 11—20 separately.

RESULTS

Standard 2×2 sum of square analysis using transformed data showed no statistically significant variation caused by the experimental design of the block structure (Table 1). Comparison of the occupation levels

Table 1

Analysis of variance using transformed data.

	BLOCKS		TREATMENTS		TOTAL		ERROR		F1	p	F2	p
	S S	M S	S S	M S	S S	M S	S S	M S				
TRAP NIGHTS 1 - 10	0.69	0.07	0.19	0.06	2.07	0.05	1.19	0.04	1 75	>0.1	1.64	>0.1
TRAP NIGHTS 11 - 20	0.31	0.03	0.17	0.06	1.34	0.03	0.83	0.03	1 12	>0.1	2.03	>0.1
TRAP NIGHTS 1 - 20	0.35	0.03	0.16	0.05	1.35	0.03	0.84	0.03	1 24	>0.1	1 94	>0.1

S S = Sum of Squares M S = Mean Square
F 1 = M S Blocks/M S Error F 2 = M S Treatments/M S Error

Table 2

Comparison between different treatments using *t* tests showing values of *p*.

TRAP NIGHTS 1 - 10

	Traps with Bait	Traps with Camouflage	Traps with Both
Control	< 0.001	0.018	<0.001
Traps with Bait		0.11	>0.1
Traps with Camouflage			0.11

TRAP NIGHTS 11 - 20

	Traps with Bait	Traps with Camouflage	Traps with Both
Control	0.04	>0.1	< 0.001
Traps with Bait		>0.1	0.007
Traps with Camouflage			< 0.001

TRAP NIGHTS 1 - 20

	Traps with Bait	Traps with Camouflage	Traps with Both
Control	< 0.001	0.03	<0.001
Traps with Bait		0.06	0.007
Traps with Camouflage			<0.001

of differently treated traps each day with *t* tests (using untreated traps as the control) showed different patterns for the two 10-day periods of study (Table 2). Baited traps caught considerably more mice than unbaited ones during both periods. However, a drop in the value of *p* in the later period may indicate that the difference in results between baited and unbaited traps was narrowing. Camouflaged traps caught a significantly higher number of mice than uncamouflaged ones during the first 10-day period only. Traps which were both baited and camouflaged caught consistently more mice than untreated traps throughout the study (Mean =84% more). Baited and camouflaged traps caught significantly more mice than baited — only or camouflaged — only traps

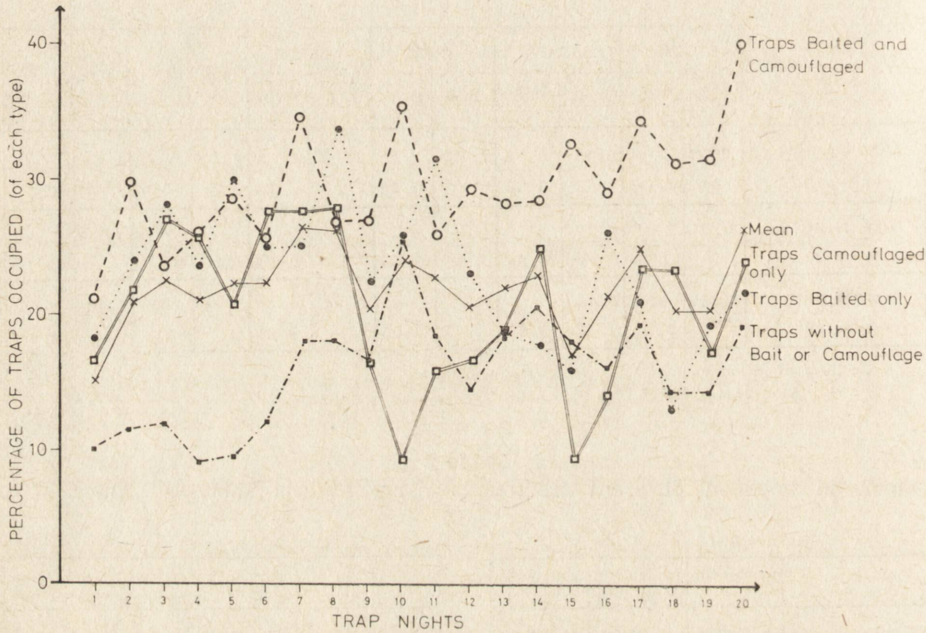

Fig. 1. Effect of treatments on trap occupation.

during trap nights 11—20, suggesting that the effects of the individual treatments were declining during the later stages. Traps both baited and camouflaged showed a marked general increase in percentage occupation with time over the 20 day period (Fig. 1).

DISCUSSION

The results of trap occupation can be interpreted in relation to the known behaviour of rodents towards traps. Most small mammals are intimately familiar with all objects on their home range, which they patrol regularly. A mouse encountering a trap will instantly recognise it as an unfamiliar object. It must be motivated by curiosity to enter the trap; what may prevent this is fear. The decision to enter or flee can be seen almost wholly as a balance between curiosity and fear (Shillito, 1960). Several factors, including bait and camouflage, can affect this balance (Fig. 2). The amount of fear and curiosity shown by any individual, and the extent to which other factors can modify them, may be viewed as part of its temperament. Some rodents are so fearful of traps that they will never enter ("trap-shy" individuals), whilst others will enter every night that traps are set ("trap-addicted" individuals) (Ibid.).

Camouflaging a trap with natural objects like vegetation disguises its unfamiliar appearance, thereby partly alleviating fear. During early encounters camouflage is unlikely to reduce curiosity significantly, since the trap will still be recognised as a new object. Shillito (1960) studied the behaviour of *Microtus agrestis* towards camouflaged Longworth traps in laboratory conditions. She found that the percentage which would enter new traps placed in familiar territory within one hour rose from 22% to 60% when the traps were painted black, and to over 80% when they were disguised with hay. Black traps under hay elicited less investigatory behaviour, and scored only 45%.

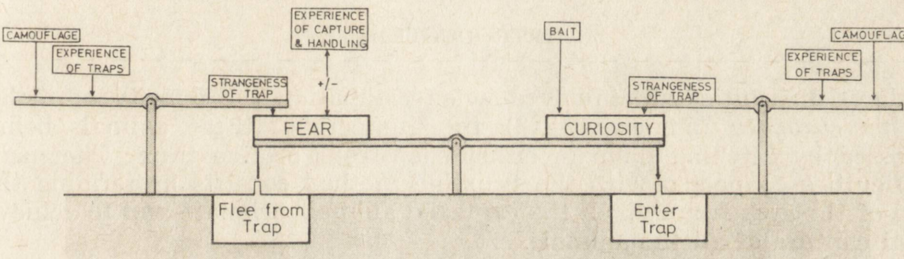

Fig. 2. Schematic representation of the factors affecting the balance between fear and curiosity, and their importance to trap entry.

After several encounters in the wild, a trap will gradually change from an unfamiliar to a familiar object, resulting in a decrease in both the fear and curiosity shown in it. At this time, camouflage might further reduce curiosity, resulting in lower catches. Bait however, increases the probability of capture by increasing curiosity in the trap as a possible source of food. Traps which are both baited and camouflaged appear to achieve the highest catches, by maintaining a high level of curiosity, whilst inducing a minimum of fear.

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