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A WEATHER-RESISTANT TRACKING BOARD

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ABSTRACT: The main practical limitation of tracking boards for the study of small mammals is that the sensitive surface is very vulnerable to damage by rain or dew. A tracking board is described that is easily prepared for use in the field, is resistant to rain and running water, and is sensitive enough to record the footprints of mice. The literature on tracking board techniques is reviewed briefly.

INTRODUCTION

The use of tracking powders such as talcum, chalk or fine sand is a long-established method of detecting rodent infestation in food stores (Greaves 1982). Over the years, however, improved tracking techniques utilizing artificial surfaces coated with more sensitive tracking media have been developed for research on small mammal populations. The first of these seems to have been invented by Mayer (1957) who used smoked kymograph paper to determine the circadian activity of burrowing mammals. The use of this material was further developed by Justice (1961) and later by Bailey (1968, 1969) for recording the movements of small mammals toe-clipped to permit individual recognition of tracks. Other workers have used different smoked surfaces, such as cards for the study of Peromyscus (Sheppe 1965) and the floors of metal tunnels for the study of Microtus (Johns 1979). Similar techniques included a suspension of talcum in a silicone water-repellent medium coated onto metal-foil backed paper (Brown 1966), plastic trays coated with a mixture of talcum and alcohol (Lieberman 1973) and plastic floor tiles coated with a mixture of newspaper ink and paraffin oil (Lord et al. 1970) or with a suspension of powdered marking chalk in isopropyl alcohol, or even with a proprietary "dry spray" deodorant (Kaukeinen 1979).

SOME PROS AND CONS OF TRACKING TECHNIQUES

By general consent the tracking board technique has been found to be more efficient than live-trapping for the study of home range, movement patterns, habitat utilization and colonization, because it does not constrain movement and therefore provides a larger number of records per animal. The method has also been found useful for measuring relative abundance: the tracks of animals of different species can usually be distinguished easily, trap-shy animals can be detected readily (Bailey 1968), and large areas of varied habitat can be covered quickly and easily (Lord et al. 1970).

As a relative census technique for use in field trials of rodenticidal baits, tracking boards have a number of advantages over conventional census baiting techniques. First, since the method is independent of feeding behavior, it avoids the prebaiting effect of pretreatment census baiting and also the risk that bait-shy rodents may not be detected by posttreatment census baiting, both of which would normally tend to overestimate the value of the treatment. Second, nontarget animals may be attracted to census baits, introducing errors into the bait census data and putting the nontarget animals at greater risk from accidental poisoning owing to a prebaiting effect; in contrast, the tracking board technique enables nontarget animals to be identified and does not influence their behavior adversely. Third, since the use of tracking boards is a passive technique, it can be used to good effect for monitoring the results of a rodenticidal treatment while it is in progress.

The main theoretical difficulty with the tracking board technique is that it measures activity, which is liable to be highly variable. The tracking score could be affected by any factor that influences activity levels. Thus, cold or stormy weather, predators or other disturbances would be expected to inhibit tracking activity and so reduce scores. Conversely, it might be expected that the removal of animals from a population, as during a rodenticidal treatment, might prompt the remaining animals to increase their tracking, owing to the lessening of social constraints upon their activity and movements, thus making the relationship between population size and tracking score nonlinear. Sheppe (1965) mentions that the cardboard shelters over his tracking boards, as prominent novel stimuli, elicited from Peromyscus a sequence of avoidance, investigative and adaptation responses which resulted in phased tracking scores, first increasing over several days, and then decreasing as the novelty waned. Kaukeinen (1979) notes, however, a close relationship between estimates of Norway rat population reduction as determined by tracking and bait consumption methods.

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The main practical problem with the techniques used hitherto is that the sensitive tracking surfaces are unduly fragile. In consequence virtually every investigator refers to the need to use special covers to protect the tracking surfaces from damage by rain or dew. As mentioned by Sheppe (1965), these covers are liable to interfere with the behavior of the animals being studied. They also make the technique excessively laborious to use in moist conditions. The problem of moisture resistance became particularly obvious to us when trying to devise a tracking technique to study habitat utilization by Norway rats in sewers. By trial and error it was found that a mixture of alcohol and finely divided carbon painted onto the inside of the salt-glazed drain pipes was generally resistant to

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intermittantly running sewage for at least 24 hours, but was nevertheless sensitive enough to record the tracks of passing rats. It was immediately evident that this technique might usefully be adapted for the study of Norway rats on farmland, where frequent rain normally precludes the use of tracking methods.

The tracking boards we use currently are prepared as follows: A suspension is prepared by shaking 100 ml of methanol with 3.0 g of lampblack (BDH Chemicals Ltd, Broom Road, Poole BH12 4NN, England) in a screw-capped jar. The suspension is painted thinly onto 100 x 200-mm smooth, light-colored, vinyl floor tiles with an ordinary 2-inch paint brush. The methanol evaporates off quickly, leaving a film of lampblack on the tile. The boards are best prepared in the field rather than in the laboratory as they are easily marked in transit. The surface of used boards can be repainted on the spot, the scrubbing action of the paint brush usually being sufficient to prevent the buildup of a thick, insensitive layer of lampblack. Repainting can be done in this way even when the boards are wet from recent rain, though when it is actually raining, the repainting must be done under cover as the surface is not completely stable until it is dry. Boards prepared in this way seem to produce no new-object reaction in Norway rats, possibly because their dark color makes them inconspicuous. Laboratory tests show that even harvest mice (Micromys minutus) weighing only 5 to 7 g leave footprints that are faintly discernible.

The lampblack coating is resistant to light rain or running water but tends to erode away when beaten by prolonged heavy rain. It may be useful to note that the weatherability of the coating seems to depend upon the fine structure of the surface to which it is applied. Applied to a perfectly smooth surface, such as a slide glass, the lampblack floats off as a film almost immediately it is wetted. The surface of a smooth vinyl floor tile, however, when viewed under magnification, is seen to be covered with minute irregularities. It appears that the lampblack film is stabilized by keying into these irregularities to an extent that makes it resistant to moisture whilst remaining sensitive to contact with solid objects.

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