

## NUMBER AND WEIGHT OF FAECAL PELLETS PRODUCED BY OPOSSUMS

ALICE E. FITZGERALD

*Ecology Division, DSIR, Lower Hutt*

**SUMMARY:** Caged opossums (*Trichosurus vulpecula*) were fed on leaves of one or more of their normal food plants and on a pelleted commercial food ration. The number of faecal pellets voided per day (24 hour) was proportional to the amount of food eaten. Opossums maintaining a constant body weight produced 98.3 ( $\pm$  s.e. 3.0) pellets per day, confirming earlier estimates from less natural diets.

### INTRODUCTION

The development of a reliable technique to estimate animal numbers by counting their faecal pellets on the ground has been very difficult. In New Zealand it has been attempted principally for *Oryctolagus cuniculus* (Taylor and Williams, 1956), *Cervus elaphus* (Batcheler, 1975) and opossums (*Trichosurus vulpecula*), all of which are important because of the damage they do to forests and grasslands.

The daily defecation rate is one of the parameters for estimating population size, and in the course of studies on the nutrition it has been estimated for captive opossums. Previously, Riney (1957) has recorded 84.5 pellets per day voided by one adult and two immature opossums fed on bread, potato, carrot, plum, orange and banana; Honigmann (1941) fed two adult opossums on banana and carrot and recorded 100-110 pellets per day. However, the small number of animals and the unnatural diets used in both these experiments were considered to justify further observations on leaf diets which more closely approximate their choice in the wild (Mason, 1958, Fitzgerald, 1976).

### METHODS

Adult opossums of both sexes were kept individually in stainless steel cages in an unheated semi-open animal house. Feeding trials were carried out from May to December. Three types of diet were used: leaves of single tree species (mahoe, *Melicytus ramiflorus*; kamahi, *Weinmannia racemosa*; rata, *Metrosideros robusta*); mixed leaves of three species (fivefinger, *Pseudopanax arboreus*; kamahi, and mahoe); and a commercial pelleted herbivore food (Fitzgerald, in press), supplemented with small quantities of apple. In all diets opossums were offered enough food to ensure 15% excess of their voluntary intake.

The total numbers of pellets voided each day (24 hr) by seven opossums fed on the commercial ration

were counted, over a total of 20 days made up of two 10-day test periods. Dry weight of these pellets was estimated from known dry weight of faeces voided by each animal each day. Animals fed on leaf diets were "conditioned" for 10 days, and, for the final 10 days, the numbers of pellets voided by each animal were estimated by calculating the average weight per pellet from daily sub-samples of 10 oven-dried pellets, and dividing this figure into the total dry weight of pellets voided.

During live-trapping studies of opossums at the Ecology Division research area in the Orongorongo Valley, faecal pellets in traps were counted on three separate occasions over three months.

### RESULTS

Estimates of mean numbers and weights of faecal pellets voided per day, with associated standard errors, are presented here, and summarised in Table 1. Opossums fed on mahoe ate 8.1 g d.w. ( $\pm$  0.5) and voided 24.4 ( $\pm$  1.6) pellets per day. The pellets were small, 0.117 g ( $>$  0.002). Opossums eating kamahi leaves ate 24.1 g d.w. ( $\pm$  0.2) and voided 63.5 ( $\pm$  2.6) pellets per day. Mean dry weight of pellets was 0.189 g ( $\pm$  0.003). Mean dry weight of pellets voided by opossums fed rata leaves was 0.268 g ( $\pm$  0.007) and they ate 27.1 g d.w. ( $\pm$  1.9) per day. On the mixed diet of kamahi, fivefinger, and mahoe leaves, animals ate more than when fed leaves of single species (45.6 g  $\pm$  0.9) and voided 105.5 ( $\pm$  3.1) pellets per day. The mean weight of the pellets was 0.239 g ( $\pm$  0.003).

The opossums fed on the commercial ration with apple supplement ate more than those fed on leaves alone (69.2 g d.w.  $\pm$  1.3) and mean weight of pellets was 0.288 which was estimated from the actual number counted and the dry weight of the day's faecal output. The mean number of pellets voided by these animals was 98.3 ( $\pm$  3.0). The body weight response of the opossums to the diets appears to be a function of the amount of food eaten though this

TABLE 1. Results of feeding trials.

Diet	Month	Number of observations	Mean food intake g d.w./day ± s.e.	Mean pellet weight g d.w. ± s.e.	Number of opossums in trial	Mean change in body weight during trial %	Mean faecal output g d.w. <sup>2</sup> /day ± s.e.	Mean defecation rate pellets/day ± s.e.
<i>Melicytus ramiflorus</i>	May-June	6	60	-11.8	8.1 ±0.5	2.4 ±0.2	0.117 ±0.002	24.4 ±1.6
<i>Weinmannia racemosa</i>	Aug.-Sept.	6	60	-10.0	24.1 ±0.2	11.6 ±0.6	0.189 ±0.003	63.5 ±2.6
<i>Metrosideros robusta</i>	Sept.-Oct.	5	50	-6.4	27.1 ±1.9	15.5 ±1.2	0.268 ±0.007	64.2 ±3.7
Mixed <i>Pseudopanax arboreus</i> <i>W. racemosa</i> , <i>M. ramiflorus</i>	Nov.	7	70	-6.4	45.6 ±0.9	24.8 ±0.7	0.239 ±0.003	105.1 ±3.1
Commercial food	June-Aug.	7	140	+2.0	69.2 ±1.3	26.9 ±0.9	0.288 (est)	98.3 ±3.0

generalisation does not always hold.

Opossums caught in the field and held in traps overnight in July, August, and September, voided an average of 69.7 pellets (56 ♂♂, mean 73.8 pellets ± 2.9; 28 ♀♀, mean 61.6 pellets ± 3.3). The time of night when these animals entered the traps is not known. Although opossums void most faeces at night, these figures are certainly conservative.

#### DISCUSSION

The nature, amount, and nutritive value as well as the mix of foods eaten appear to influence the number and weight of faecal pellets voided by opossums. In the experiments reported here, when the number and weight of droppings was small, the food intake was low. Opossums eating only 8.1 g d.w. (± 0.5) of mahoe leaves produced small droppings (0.117 ± 0.002), but not as small as those from two animals fed banana and carrot, which produced pellets of 0.06-0.07 g (Honigmann, 1941). These two opossums ate about 47 g dry matter per day which produced many (100-110) very small pellets possibly because this food contains little roughage.

The food intake of the opossums may also be related to season or physiological condition. It is worth noting that the feeding trials reported here

were confined to winter and spring months and that similar trials held in different months may produce different results. Opossums are also known to show seasonal preferences for certain foods (Fitzgerald, 1976) so it is also possible that results of feeding trials held in months when these species are either eaten or avoided may also differ. Further work is necessary to find out whether and to what extent these factors influence the numbers of faecal pellets produced. The figures presented here will have relevance to winter and spring surveys of opossum faecal pellet counts.

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