

# THE RATE OF PASSAGE OF FEED THROUGH THE DIGESTIVE TRACT OF THE MINK<sup>1</sup>

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## Abstract

The time required for **carmine-dyed** rations to pass through the digestive tracts of mink in the late stages of growth was observed in four separate experiments with the same **nine groups of animals**, all of which were involved in a nutritional study. Each group received a different ration; five of the rations were based on conventional moist ingredients and four were composed of dry ingredients. In a total of 502 observations the mean time of passage was **142 minutes** with a range from 62 minutes to 215 minutes. No consistent sex or diet differences in passage time were demonstrated.

## Introduction

Although it is generally recognized by those who raise mink in captivity that feed passes through the relatively short digestive tracts of these animals rather rapidly, there is little published information on the subject. Wood (1) has reported mean passage times of 106, 123, and 109 minutes for a normal diet marked with Sudan III, charcoal, and chromium oxide, respectively; with unmarked feed the mean time of passage was found to be 89 minutes. The variability between trials (15 in each instance) was not recorded. Neseni and Piatkowski (2) fed five different rations marked with fuchsin-stained straw to groups of 10 mink and observed the first recovery of the marker in the faeces within the following time interval ranges for the five rations: 3 to 3½ hours, 2 to 2½ hours, 3 hours, 2 to 4 hours, and 2 to 3 hours.

During the course of a nutritional experiment with standard dark mink (3) it became of interest to measure the rate of passage of various experimental rations through the digestive tracts of the animals involved.

## Experimental

As has been described (3) the experimental groups were nine in number, five receiving "wet" rations containing conventional moist ingredients of animal origin and four receiving "dry" rations which, although mixed with water before they were fed, were formulated entirely of dry ingredients. Four of the "wet" rations, MB, MC, MD, and ME, corresponded respectively to the four "dry" rations, BA, BB, BC, and BD, in crude protein and gross energy contents and the fifth "wet" ration, C58, was the ranch reference ration of considerably higher protein content than any of the other diets. Detailed composition of these rations has been reported (3).

The studies of rate of passage were conducted in October, 1959, when the

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mink were in the late stages of growth and at a time when the main nutritional experiment was still in progress; it was, therefore, necessary to choose procedures which would not interfere with the course of that experiment. Initial study with comparable animals not involved in the experiment indicated that radiographic tracing of the passage of barium through the gastrointestinal tract of the mink was both undesirable and impractical; the animals became very excited and were difficult to restrain. The use of chromium sesquioxide as a visual marker (green) was attempted but was rejected because visual differentiation between marked and unmarked faeces was frequently difficult. Carmine, incorporated in the proportions of 1 oz per 10 gal of wet feed, was found to be a satisfactory indicator for visual observations.

**Carmine-dyed feed** was offered, ad libitum, to all of the surviving mink of the nine diet-treatment groups at the regular daily feeding-time, following withdrawal of any unmarked feed remaining on the feed boards. The times of consumption of the first mouthful of dyed feed and of the appearance of the first marked faeces were recorded for each animal. This procedure was repeated on four separate occasions within a period of 3 weeks when the mean age of the animals ranged from approximately 20 to 23 weeks. A period of at least 3 days, during which the regular unmarked feed was provided, separated successive trials with marked feed.

## Results

The resulting data are summarized in Table I.

The gross mean for the 502 observations on the nine carmine-dyed diets indicates a time of passage of **142 minutes with a range from 62 minutes to 215 minutes**. Most of the observed times fall within the ranges reported by Nesení and Piatkowski (2). The mean time of 142 minutes is somewhat longer than the mean times reported by Wood (1). This difference, if real, might be the result of differences in the ages of the animals used or of the temporary fasting period employed by Wood.

Statistical evaluation of the data was complicated by the following conditions: (1) the mink were not evenly distributed between ration groups, (2) the number of mink in each diet group varied between trials as some animals failed to consume any feed within 10 minutes and were eliminated, and (3) it was impractical to rerandomize the mink between tests because this would have destroyed the continuity of the primary nutritional experiment. Despite these difficulties certain statistical treatments were applied to the data. Analysis by a method of disproportionate subclass numbers (4) within each test failed to demonstrate consistent sex or diet differences. Analysis of variance of the data for each sex within each trial also demonstrated no consistently significant diet effect. It is possible that differences in food passage rates associated with diet and (or) sex were present but, because of the complexity of the data, they could not be demonstrated statistically. Obviously no major differences in rate of passage existed between the markedly different rations.

TABLE I  
Time (minutes) required for a feed marker to appear in the faeces of mink on various diets

Trial	Sex	BA		BB		BC		BD		C58		MB		MC		MD		ME		All diets	
		<i>n</i> *	<i>x</i> †	<i>n</i>	<i>x</i>	<i>n</i>	<i>x</i>	<i>n</i>	<i>x</i>	<i>n</i>	<i>x</i>	<i>n</i>	<i>x</i>	<i>n</i>	<i>x</i>	<i>n</i>	<i>x</i>	<i>n</i>	<i>x</i>	<i>n</i>	<i>x</i>
1	M	8	162	6	149	2	158	3	175	11	136	8	131	7	137	7	127	8	138	60	142
	F	9	141	9	158	6	152	6	153	10	143	8	127	7	145	7	128	5	150	67	144
	M+F	17	151	15	154	8	154	9	161	21	139	16	129	14	141	14	128	13	143	127	143
2	M	9	167	7	158	2	140	4	161	12	142	8	144	7	146	8	163	8	178	65	156
	F	9	129	7	160	5	150	7	155	8	131	8	132	5	145	4	127	4	142	57	141
	M+F	18	148	14	159	7	148	11	157	20	138	16	138	12	146	12	151	12	166	122	149
3	M	9	151	7	163	2	145	4	163	12	112	7	133	7	108	6	145	7	160	61	139
	F	9	135	7	146	7	147	5	142	9	133	9	112	7	136	8	130	6	134	67	133
	M+F	18	143	14	154	9	147	9	151	21	121	16	121	14	122	14	137	13	148	128	136
4	M	9	140	7	161	2	148	5	181	12	130	6	142	6	140	5	158	7	138	59	146
	F	9	138	8	134	7	149	6	150	9	119	9	130	5	176	7	106	6	142	66	136
	M+F	18	139	15	146	9	149	11	164	21	125	15	135	11	156	12	128	13	140	125	140
Four trials	M	35	155	27	158	8	148	16	170	47	130	29	137	27	132	26	148	30	154	245	146
	F	36	136	31	149	25	150	24	150	36	132	34	125	24	149	26	123	21	141	257	138
	M+F	71	145	58	154	33	149	40	158	83	131	63	131	51	140	52	136	51	149	502	142

\**n*: The number of observations.  
†*x*: Mean time in minutes.

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