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Alina KOSTELECKA-MYRCHA & Andrzej MYRCHA

EFFECT OF THE KIND OF INDICATOR ON THE RESULTS OF INVESTIGATIONS OF THE RATE OF PASSAGE OF FOODSTUFFS THROUGH THE ALIMENTARY TRACT

WPŁYW RODZAJU WSKAŹNIKA NA WYNIKI BADAŃ SZYBKOŚCI TRANSPORTU TREŚCI POKARMOWEJ

Experiments were made on 11 captive *N. fodiens* (P e n n a n t, 1771). The method of stained food was used (C a s t l e, 1956). Statistically significant differences were found between excretion time of stained wheat and *T. molitor* larvae in *N. fodiens* fed on these larvae. No stained food other than the kind of food eaten by an animal can be used as indicator in investigations of the rate of passage of foodstuffs.

Our experiments with two species of rodents *Microtus agrestis* (L i n n a e u s, 1761) and *Clethrionomys glareolus* (S c h r e b e r, 1780) showed that the use as indicator of the rate of passage of foodstuffs of stained food of a different kind from the experimental food may lead to obtaining incorrect results on the course taken by this process in the animals examined (K o s t e l e c k a - M y r c h a & M y r c h a, 1964b). In view of the relatively great theoretical and practical importance of research on the rate of passage of foodstuffs, we decided to determine whether the conclusion reached from experiments on rodents is also correct in the case of mammals possessing an alimentary tract of a different type of structure, and feeding on a different kind of food from that which rodents eat.

With this aim in view experiments were made on 11 individuals of *Neomys fodiens* (P e n n a n t, 1771), which were obtained from the Białowieża National Park and kept in captivity for 12—18 months. We used the stained food method elaborated by C a s t l e (1956) and modified by G i l l (1957) in our experiments. During the two-day preparatory period and for the duration of the experiments the animals were kept separately in wooden cages and fed on larvae of *Tenebrio molitor,* which form food most similar to their natural food. The indicator of the passage of this food was ground wheat stained with basic fuchsin. A small amount of the indicator was placed inside the decapitated larvae of *T. molitor,* and each animal was given two larvae prepared in this way. The larvae were eaten immediately, after which the animals were at once given an abundant amount of larvae not containig the indicator. The animals began eating these larvae directly after they had eaten the test food. During the 13-hour

duration of the experiment each animal ate about 200 larvae, and thus the amount of the indicator was very small in relation to the amount of experimental food. All the experiments were started at 10 a.m. The stained remains of the indicator in the portions of faeces collected every hour were counted, and work carried out on the material in the same way as that in our preceding investigations (Kostelecka-Myrcha & Myrcha, 1964a). The results obtained (Tab. 1) were compared with the data illustrating the rate of passage of *T. molitor* larvae through the ali-

Table 1.

Description of the course taken by excretion of the red stained wheat.

No.	Sex	Excretion time of stained food /hours and minutes/				R values
		5 %	50 %	90 %	100 %	
1	♂	0.38	1.54	5.56	10.00	2.32
2	♂	0.08	1.18	4.21	10.00	1.50
3	♂	0.14	1.58	4.56	10.00	2.31
4	♂	0.08	1.23	3.55	10.00	2.03
5	♂	0.28	2.36	4.52	9.00	2.47
6	♂	0.50	1.57	5.57	11.00	2.47
7	♀	0.31	1.40	4.17	7.00	2.06
8	♀	0.06	1.09	3.57	11.00	1.48
9	♀	0.09	1.19	3.45	11.00	1.50
10	♀	1.07	2.20	4.47	11.00	2.48
11	♀	0.12	2.18	5.32	13.00	2.43
$\bar{x}$		0.25 ± 0.13	1.48 ± 0.20	4.45 ± 0.22	10.00 ± 1.40	2.20 ± 0.17

Table 2.

Description of excretion of the stained remains in *Neomys fodiens* fed on larvae *Tenebrio molitor*.

Indicator	N	Excretion time of stained food /hours and minutes/			R values
		50 %	90 %	100 %	
Larvae T. molitor	20	1.13 ± 0.11	2.14 ± 0.19	4.15 ± 0.22	1.15 ± 0.10
Wheat	11	1.48 ± 0.20	4.45 ± 0.22	10.00 ± 1.40	2.20 ± 0.17
$t_{0.05}$		2.6207	12.3628	28.0769	7.4200

mentary tract of *N. fodiens*, obtained from the experiments in which the indicator was formed by the stained larvae of these insects (Kostelecka-Myrcha & Myrcha, 1964c). Comparison was made by means of the *t*-Student test of the average times of excretion of 50%, 90% and 100% of both indicators (stained wheat and stained larvae) and the mean *R* values calculated for these two series of experiments (Tab. 2).

There is no doubt that of these two series of experiments, it was the one in which stained larvae were used as an indicator which gave a correct picture of the rate of passage of foodstuffs in *N. fodiens*. Comparison of

times of excretion of 50%, 90% and 100% of the two indicators and of K values gave statistically significant differences. It is therefore correct to say that stained wheat cannot be used for determining the rate of passage of larvae through the alimentary tract of these animals. The differences in the course of this process investigated by the use of the two indicators are illustrated in Fig. 1.

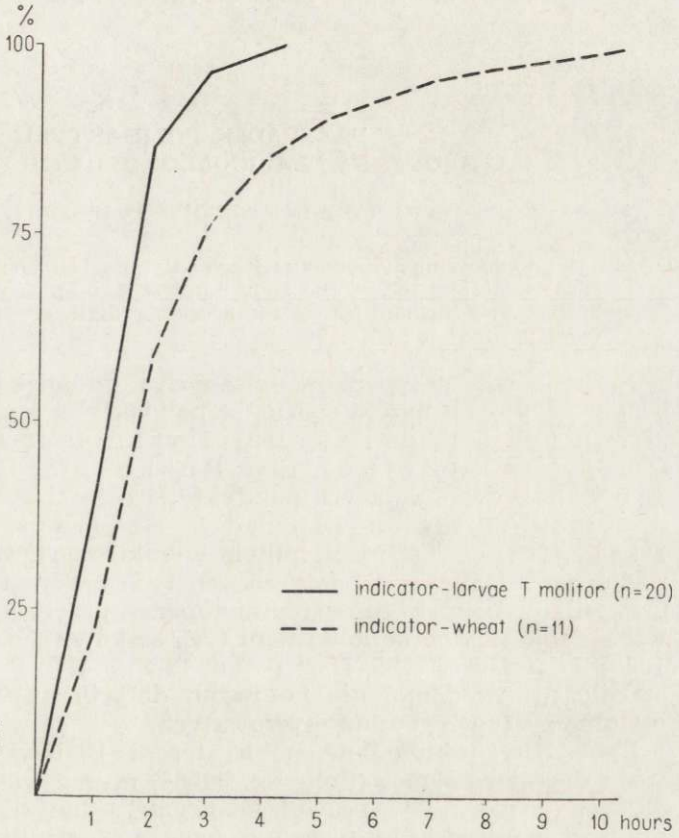

Fig. 1. Average course taken by excretion of indicator in *Neomys fodiens* fed on larvae *Tenebrio molitor*.

The conclusion reached from these experiments agrees with the results of experiments made in an analogical way on rodents (Kostelecka-Myrcha & Myrcha, 1964b). No stained food other than the kind of food used throughout the experiment can serve as indicator in investigations of the rate of passage of foodstuffs through the alimentary tract of mammals belonging to different systematic groups.

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Polish Academy of Sciences, Mammals Research Institute, Białowieża.

Zdzisław PUCEK

PRZYPADEK POLIDAKTYLII U *APODEMUS FLAVICOLLIS* (MELCHIOR, 1834)

A CASE OF POLYDACTYLY IN *APODEMUS FLAVICOLLIS* (MELCHIOR, 1834)

A polydactylous *Apodemus flavicollis* (Melchior) is described. The supernumerary toe of the right hind foot is placed laterally of the hallux. The Ph_3 and Mt_1 of the accessory digit are not fully separated from the first toe (I).

Na podstawie przypadków opisanych u człowieka, zwierząt domowych i laboratoryjnych można sądzić, że polidaktylia jest zjawiskiem dość częstym u ssaków (Murray, 1932; Eaton, 1952; Grüneberg, 1952; Chapman & Zeiner, 1961; Roskosz & Pytel, 1964). Jednakże u ssaków dziko żyjących polidyktylia była obserwowana jedynie przypadkowo i sporadycznie (Shute & Bellairs, 1955; Mazák, 1962; Ptak, 1963) co jest niewątpliwie wynikiem nagromadzenia stosunkowo nielicznych materiałów, dotyczących tych zwierząt. Do znalezienia kilku przypadków polidaktylii wśród nietoperzy, przyczyniły się zapewne masowe badania nad obrączkowaniem tych ssaków (Koford & Krutsch, 1948; Jennigs, 1958, Herreid, 1958).

O ile mi wiadomo, nie notowano dotychczas tego rodzaju anomalii u wolno żyjących gryzoni myszowatych.

Latem 1964 roku odłowiono na terenie Białowieskiego Parku Narodowego dorosłego samca (Coll. No. 36566) myszy wielkookiej leśnej, posiadającego 6 palców w prawej kończynie tylnej (Ryc. 1). Jest to jedyny przypadek wśród kilku tysięcy okazów *A. flavicollis*, pochodzących z tego terenu. Anomalia polegała na podwojeniu palca I. Od właściwego palca pierwszego oddzielał się lateralnie palec dodatkowy, oznaczony jako Ia, nieco cieńszy i krótszy, zakończony niewielkim pazurem. Rentgenogram wykazał, że podwojenie palca I jest niezupełne. Ph_3 oraz Mt_1 są częściowo zrośnięte i nie tworzą odrębnych elementów kostnych. Palec dodatkowy jest więc wyodrębniony jedynie na przestrzeni Ph_1, Ph_2 i połowie Ph_3 (Ryc. 2).

Ścięgna mięśni zginaczy palców tworzą trzy silne odgałęzienia, mające przyczepy na palcach II, III i IV, oraz dwa słabsze — na palcach V i I. W tym ostatnim przypadku, ścięgna te nie mają dodatkowego odgałęzienia na palcu Ia. Fakt ten przemawia za tym, że właśnie palec zewnętrzny jest dodatkowym.

Opisany przypadek nie jest polidyktylią zupełną, przy której elementy szkieletu palca nadliczbowego byłyby całkowicie wydzielone. Należy on