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**Length and Weight of the Alimentary Tract  
of *Apodemus flavicollis* (Melchior, 1834)**

[With 3 Tables]

Investigation was made of the length and weight of the alimentary tract in 100 individuals of *A. flavicollis* (57 ♂♂ and 43 ♀♀). Considerable increase in these indices was found in pregnant and lactating females.

Very little research has hitherto been carried out on the morphology of the alimentary tract of *Apodemus flavicollis* (Melchior, 1834). Only Naumov (1948) gives data on the length of the intestines of this mammal, and Sablina (1953) on the weight of its alimentary tract. As the latter author weighed the intestines and stomach of the animals examined together with the foodstuffs they contained, the results she gives are very inexact. The histological structure of the alimentary tract of this rodent has been more thoroughly examined (Luppa, 1958a; 1958b; 1961).

In the investigations made of *Clethrionomys glareolus* (Schreber, 1780), it was found that the length and weight of the intestines increase in females during pregnancy and lactation (Myrcha, 1964). In order to determine whether this is a more general phenomenon occurring in other species of mammals also, it was decided to investigate the variations, depending on the physiological condition of the individuals examined, in the morphological indices of the alimentary tract of *A. flavicollis*, a representative of a different family of rodents.

Morphological examination of the alimentary tract of *A. flavicollis* was made for animals captured during the period from July to December 1963 within the Białowieża National Park, in a *Quercus-Carpinetum stachyetosum* R. Tx. biotope. A total of 100 rodents were examined (57 ♂♂ and 43 ♀♀). The animals were caught in live-traps and taken to the laboratory where, after making general measurements of the body, they were dissected and the alimentary tract excised, with the exception of the oesophagus. The length of the various sections of the intestine was

measured on a glass plate, on to which normal saline solution was poured in order to avoid stretching the walls of the tract. After measuring the intestines and stomach, and removing all traces of food from them, they were weight on an automatic scale with accuracy to 0.1 mg. Calculation was made for each animal of the relation of length of intestine and its various sections to body length, and the length and weight of each part of the alimentary tract expressed in percentages. Sexual activity of females was determined on the basis of the appearance of the uterus, presence of embryos and corpora lutea and the size of the milk gland. Statistical analysis of the results obtained was made by means of the *t*-Student test for the difference between mean values for two independent groups.

**Table 1.**

Mean values of indices of the length of intestines in *A. flavicollis*.

Sex	N	Length of intestine in cm.				% of total length of intestine			Ratio of length of intestines to length of body			
		Small	Large	Caecum	Total	Small	Large	Caecum	Small	Large	Caecum	Total
♂♂	57	35.8	13.4	4.1	53.3	67.2	25.2	7.6	3.41	1.28	0.39	5.07
♀♀	43	38.4	14.1	4.7	56.7	67.5	24.6	7.9	3.78	1.37	0.43	5.58

**Table 2.**

Mean values of weight indices of the alimentary tract in *A. flavicollis*

Sex	N	Weight of intestine in g.					% of total body weight				
		Small	Large	Caecum	Stomach	Total	Small	Large	Caecum	Stomach	Total
♂♂	57	0.6623	0.2762	0.1661	0.2880	1.3925	2.07	0.85	0.50	0.91	4.35
♀♀	43	0.8099	0.3276	0.1714	0.3425	1.6524	2.72	1.07	0.57	1.13	5.49

The mean values of indices of length and weight of the intestines for *A. flavicollis* are given in Tables 1 and 2. Statistical analysis of the data given did not reveal significant differences in the length and weight of the alimentary tract of males and females of this species. A statistically significant difference was obtained only when comparison was made of the percentage of weight of intestines of the total body weight of the animals. This index is 1.15% greater in females.

The results obtained for the *A. flavicollis* population at Białowieża agree in principle with the data given by N a u m o v (1948), which he obtained from his investigations in the Tula district. The rodents which this author

examined differ only as to the slightly greater percentage of the caecum in the total length of intestines.

There were 25 sexually active and 18 inactive animals among the 43 ♀♀ of *A. flavicollis* examined. Statistically significant differences between these two groups of females were found in relation to the total length of intestines and weight of the whole alimentary tract and its various sections. No statistically significant differences were, however, obtained in the length and weight of intestines when sexually inactive females and males of this species were compared (Table 3).

Sablina (1953), who weighed the intestines of *A. flavicollis* together with their food contents, also demonstrated the increase in the weight of the intestines in sexually active females. In one of the study periods (March 1946) she found maximum weight of the alimentary tract in males with developed testes and seminal ducts. Acorns and nuts were found to form a considerable part of the food of *A. flavicollis* during the periods in which reproducing individuals predominated in the population examined.

**Table 3.**

Length and weight of the alimentary tract in sexually active and in non-reproducing females of *A. flavicollis*.

	N	Length of intestine in cm.				Weight of intestine in g.				
		Small	Large	Caecum	Total	Small	Large	Caecum	Stomach	Total
Sexually inactive	18	36.1	13.2	4.8	53.7	0.6774	0.2731	0.1451	0.2849	1.3825
Sexually active	25	40.1	14.7	4.4	59.2	0.9424	0.3827	0.1978	0.4002	1.9223
$t_{0.05}$					8.0170	3.2716	3.8188	2.1867	3.8691	5.2408

The above author therefore reached the conclusion that the state of the genital organs depends on the kind of food eaten. This conclusion is, however, burdened with error resulting from the different weight of the foodstuffs, depending on the quality of the components of the food eaten by the animals examined.

The results obtained in this study agree with the data obtained for rats (Fell, Smith & Campbell, 1963) and for *C. glareolus* (Myrcha, 1964), and from evidence that elongation and hypertrophy of the walls of different sections of the alimentary tract take place during pregnancy and lactation in females of this species also.

Kaczmariski (1965) found that the food requirements of lactating females of *C. glareolus* are almost doubled. This increase is due to intensification of the physiological processes in the females organism during reproduction. The organism compensates difficulty in assimilating the increased amount of food by an increase in the digestive capacity of the

alimentary tract, which is expressed in an increase in the length and weight of the intestines in sexually active females. There are, however, reversible changes solely connected with the reproduction period of the rodents.

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DŁUGOŚĆ I CIĘŻAR PRZEWODU POKARMOWEGO  
*APODEMUS FLAVICOLLIS* (MELCHIOR, 1834)

Streszczenie

Badania morfologiczne przewodu pokarmowego *A. flavicollis* przeprowadzono na 100 zwierzętach (57 ♂♂ i 43 ♀♀) odłowionych w Białowieskim Parku Narodowym. Po wypreparowaniu przewodu pokarmowego (bez przełyku) mierzono długość poszczególnych odcinków jelit, a następnie po dokładnym oczyszczeniu z treści pokarmowej jelita i żołądek ważono. Określono także aktywność płciową wszystkich samic. Otrzymane wyniki pozwalają stwierdzić, że:

1. Długość i ciężar przewodu pokarmowego *A. flavicollis* są jednakowe u samców i nieaktywnych płciowo samic tego gatunku (Tab. 1, 2).

2. U samic aktywnych płciowo następuje wzrost długości i ciężaru jelit (Tab. 3), co związane jest ze zwiększonym zapotrzebowaniem pokarmowym tych zwierząt w okresie ciąży i laktacji. Jest to zjawisko okresowe i odwracalne.