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PROPORTIONS OF THE ALIMENTARY TRACT IN DEER

PROPORCJE PRZEWODU POKARMOWEGO JELENIOWATYCH

The length, weights and proportions of different parts of the alimentary tract were defined in roe-deer (n= 8 ♂♂) and red deer (n= 6 ♂♂ and 5 ♀♀) from one shoot in the north of Poland. The weight of the alimentary tract, together with contents, varied from 5.5 to 38.8% of the weight of the carcass. Measurements and indices of the intestines exhibit considerable individual variations, making splanchnometric characters unsuitable for descriptions of populations.

Relatively little attention has been given to the internal organs in the very abundant literature on *Cervinae*. This gap is filled by the exhaustive study by Sablina (1970) on the macro- and microstructure of the alimentary tract in a large number of species of this family. The biometric data given by the above author for the roe-deer of Europe and red deer from the European part of the Soviet Union formed an inducement to publish the data referring to the same species collected at one time in connection with a more extensive subject. The earlier biometric data on the alimentary tract in red deer from Poland (Gill 1958) were obtained from three males kept in captivity.

Measurements were made of length and weight of the various parts of the alimentary tract in 8 male roe-deer, *Capreolus capreolus* (Linnaeus, 1758) from 3 to 6 years old, and 7 males and 5 females of the red deer *Cervus elaphus* Linnaeus, 1758, from 3 to 9 years old. All the animals had been shot in the same shooting area, about 5000 ha in extent, situated in the north of Poland (53°40′N, 193°0′E). The roe-deer were shot between June 2nd and 18th 1963, and the red deer between September 18th and 23rd of that same year.

When measuring the alimentary tract we differentiated between the parts which can easily be separated under field conditions. The following division was made: *rumen* + *reticulum, omasus* + *abomasus, intestinum tenue*—from the relatively distinct narrowing where the *abomasus* passes

Table 1

Weights (in dkg) of the various parts of the alimentary tract in *Cervinae*.

	Weight of:	*C. capreolus* ♂♂(n=8) Min.	Max.	Avg.	*C. elaphus* ♂♂(n=6) Min.	Max.	Avg.	*C. elaphus* ♀♀(n=5) Min.	Max.	Avg.
Without contents (empty)	Carcass	1,200	1,800	1,575	11,900	17,800	13,880	7,100	8,400	7,620
	Rumen + reticulum	51	80	66	200	300	242	250	350	293
	Omasus + abomasus	10	25	16	40	90	62	35	70	47
	Intestinum tenue	25	45	32	40	90	65	70	100	83
	Intestinum crassum + caecum	30	48	38	65	110	87	65	90	78
	Whole alimentary tract	133	198	153	395	540	456	435	610	501
	Alimentary tract in ‰ of weight of carcass	7.88	11.08	9.71	3.03	3.67	3.28	5.39	8.13	6.57
With contents	*Rumen + reticulum* in % of weight of carcass	13.0	19.1	15.6	3.48	6.72	5.55	18.5	28.2	24.0
	Alimentary tract in % of weight of carcass	23.7	33.5	28.0	5.50	10.16	8.78	27.3	38.9	33.6

Table 2

Length (in cm) and proportions of the various parts of the alimenntary tract in *Cervinae*.

Length of.		*C. capreolus* Min.	*C. capreolus* Max.	*C. capreolus* Avg.	*C. elaphus* ♂♂(n=6) Min.	*C. elaphus* ♂♂(n=6) Max.	*C. elaphus* ♂♂(n=6) Avg.	*C. elaphus* ♀♀(n=5) Min.	*C. elaphus* ♀♀(n=5) Max.	*C. elaphus* ♀♀(n=5) Avg.
Body from muzzle to base of tail		103	122	112	199	220	208	170	188	179
Intestinum tenue		920	1,260	1,057	1,300	2,000	1,670	1,700	2,050	1,890
Intestinum crassum		300	575	423	800	1,300	1,021	850	930	898
Caecum		27	50	36	92	147	116	100	160	128
Whole of intestines		1,261	1,862	1,517	2,200	3,420	2,807	2,650	3,140	2,908
Intestinum tenue	: body length	7.8	10.9	9.4	6.6	9.2	8.0	9.8	11.6	10.6
Intestinum crassum	: body length	2.7	5.0	3.8	3.9	5.9	4.9	4.5	5.3	5.0
Caecum	: body length	0.2	0.4	0.3	0.5	0.7	0.6	0.5	0.9	0.7
Whole of intestines	: body length	10.7	16.2	13.5	11.2	15.5	13.4	15.3	17.8	16.3
Intestinum tenue	in %% of total length of intestines	67.2	73.0	69.9	56.9	66.6	59.4	64.1	65.1	65.0
Intestinum crassum	in %% of total length of intestines	23.8	30.9	27.3	28.4	39.7	36.4	29.5	32.1	30.7
Caecum	in %% of total length of intestines	1.8	3.4	2.5	3.4	4.9	4.1	3.6	5.1	4.4
$\frac{\textit{Intestinum crassum}}{\textit{Intestinum tenue}}$ %		32.6	45.9	39.5	42.7	69.7	61.8	44.7	55.0	47.2

into the *duodenum* up to the very distinct passage into the *crassum* (the measurement thus including the *duodenum, jejunum* and *ileum*); the next part was formed by the *crassum,* including the *colon* and *rectum* — measured from the place where the small intestine enters the large intestine at an acute angle (marking the place of division of the large intestine into the *caecum* and *colon*), up to the unttached end of the *rectum.* Although the *caecum* forms part of the large intestine, it is usually considered separated in making splanchnological measurements on account of a certain degree of morphological or physiological difference; it was measured from the place where the small intestine enters the large up to its closed end.

Measurements were made on the day the given animal was shot, or, when this occurred in the evening, the following morning. In all cases the alimentary tract and the other internal organs were removed immediately after the animal had been shot.

Preparations for measurement consisted in removing the mesenterium together with the fatty tissue adhering to the intestines, and then straightening out the whole of the intestines on a cement floor. The *jejunum* proved to be most difficult to prepare on account of the great degree of folding. When straightening out the intestines care was taken to avoid stretching them artificially. It must be emphasised here that intestines quickly lose their natural elasticity due to the chemical processes taking place inside them, and they tear and split easily, becoming practically impossible to measure after a laps of 24 hours.

After measuring the intestines with a tape measure the various parts were tied with thread and cut off. Each of the parts was weighed together with its contents, then slit, the contents removed (scraping the walls with a specially shaped wooden spatula) and weighed again. In addition to the alimentary tract the length of the animal's body was measured from muzzle to base of tail. The animals were weighed after being dressed.

RESULTS

The results obtained are given in tables 1 and 2. In view of the small number of individuals it was impossible to make statistical calculations or to draw far-reaching conclusions, but certain observations appear justified.

The weight of the alimentary tract (with contents) varies in the deer examined from 5.5 to 38.8% of the weight of the animal's carcass. This would seem remarkable, as there is a general conviction that the weight of the carcass increased by 25% gives the total body weight and is used as such for comparisons with data in literature. The great variability of weight of the alimentary tract with contents suggests that it is primarily the weight of thecarcass which should be used for comparisons between different populations of ungulates. In the material described here differences between the weight of the rumen (with contents) in males and females of the red deer are particularly striking. This is accounted for by the fact that material was collected during the rutting season, when stags eat only negligible quantities of food.

The weight of the walls of the alimentary tract varies within smaller intervals, but even so individual differences were considerable.

The relative weight of the walls of the alimentary tract is greatest in roebucks, smaller in hinds and smallest in stags, and therefore would appear connected with body size, and not systematic appurtenance.

Total length of the intestines is characterized by strikingly great individual variation (Table 2). Individuals differing by about 6 body lengths in respect of intestinal length were found in a relatively small group of male roe-deer, and such differences, less striking but very distinct, occur in red deer. Differences, in proportions between the various parts of the alimentary tract are not as great, but even here individual variation is clearly marked for instance the *caecum* in male roe-deer may form from 1.8 to 3.4% of the whole intestinal length (Table 2).

Generally speaking it may be said that the method of splanchnological measurements would appear insufficiently accurate for comparisons of different regional populations of the same species, although it may be of use for describing distant systematic groups occupying clearly different biotopes.

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BISONIANA LIV

PSEUDOARTHROSIS IN THE EUROPEAN BISON

STAW RZEKOMY (*PSEUDOARTHROSIS*) U ŻUBRA

An unusual specimen was encountered in the osteological collection of the European Bison Anatomical Research Centre of the Veterinary Department of the Agricultural Academy in Warsaw, which has recently increased to include the bones of 120 individuals of different age of both sexes. Post mortem examination of the macerated skeleton of a 10-year old male European bison — »Posusz« (Bison Pedigree book No. 984, born 8.8.1955, died 30.9.1965) revealed abnormality in the structure of the seventh carvical vertebra, exhibiting characters of pseudoarthrosis.

The seventh cervical vertebra had undergone division into two parts — the upper and lower (Fig. 1). *Processus transversi* and *processus articulares craniales* had remained with the lower part, while *proc. articularis caud-*