

# BIG AND SMALL BOVIDS FROM MEDIAEVAL TOWNS IN ESTONIA

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## Summary

The present paper is compiled on the basis of the material collected during the excavations in two Estonian Mediaeval towns - in Pärnu and in Tartu. The purpose of the work is to give a review of the bovids in the Mediaeval Estonia. The Estonian cattle in the Middle Ages belonged to *Bos taurus longifrons* type. The withers height of Estonian Mediaeval stock ranged from 97.5 to 120.0 cm.

The diaphysial index of the metacarpus from Pärnu varied as follows: 12.4-15.7 (cows), 18.1-21.0 (bulls), 13.6-20.1 (oxen). Osteological material from Tartu did not contain the anterior cannon-bones of bulls; the diaphysial index was 13.6-15.0 for cows and 13.0-16.5 for oxen.

Complete skulls of sheep were found rarely and most of the ewes were hornless. The withers height of Estonian Mediaeval sheep ranged from 51.6 to 68.9 cm. According to the diaphysial index of the metacarpal bones the sexual groups could be separated as follows: female 8.8-11.4, male 10.9-12.3, castrated 10.2-11.6.

## Key Words

Estonia, Mediaeval, Domestic Animals, Measurements, Sexual Characteristics.

## Résumé

*Petits et grands bovidés des villes médiévales d'Estonie.*

Cet article s'appuie sur les ossements collectés lors des fouilles de deux villes médiévales estoniennes, Pärnu et Tartu. L'objectif de ce travail est de donner un aperçu des bovidés de l'Estonie médiévale. Les bovins estoniens du Moyen Âge appartenaient au type *Bos taurus longifrons*. Leur hauteur au garrot variait de 97,5 à 120 cm.

L'indice diaphysaire des métacarpiens de Pärnu variait entre 12,4 et 15,7 pour les vaches, entre 18,1 et 21 pour les taureaux et entre 13,6 et 20,1 pour les bœufs. Le matériel ostéo-archéologique de Tartu n'a pas livré de canons antérieurs de taureau; l'indice diaphysaire variait entre 13,6 et 15 pour les vaches et entre 13 et 16,5 pour les bœufs.

Les crânes complets de mouton sont rares; la plupart des brebis étaient dépourvues de cornes. La hauteur au garrot des moutons médiévaux estoniens variait entre 51,6 et 68,9 cm. Sur la base de l'indice diaphysaire des métacarpiens, les groupes sexuels ont pu être distingués comme suit: 8,8 à 11,4 pour les femelles, 10,9 à 12,3 pour les mâles et 10,2 à 11,6 pour les castrats.

## Mots clés

Estonie, Moyen Âge, Animaux domestiques, Mesures, Différences sexuelles.

## Zusammenfassung

*Große und kleine Boviden aus mittelalterlichen Städten in Estland.*

Der Beitrag basiert auf dem Fundmaterial, das während der Grabungen in den mittelalterlichen Städten Pärnu und Tartu (Estland) zutage gekommen ist. Ziel ist, einen Überblick über die Boviden des mittelalterlichen Estlands zu geben. Die mittelalterlichen Rinder gehören zum Typ *Bos taurus longifrons*. Die Widerristhöhe lag zwischen 97,5 cm und 120,0 cm. In Pärnu beträgt der Diaphysenindex bei den Kühen 12,4-15,7, bei den Stieren 18,1-21,0 und bei den Ochsen 13,6-20,1. Das osteologische Material von Tartu enthielt keine Metacarpen von Stieren; der Diaphysenindex betrug bei den Kühen 13,6-15,0 und bei den Ochsen 13,0-16,5.

Komplette Schädel von Schafen sind sehr selten. Die meisten weiblichen Schafe waren hornlos. Die Widerristhöhe der Schafe lag im Mittelalter zwischen 51,6 cm und 68,9 cm. Der Diaphysenindex zeigt sich bei den verschiedenen Geschlechtern wie folgt: weiblich 8,8-11,4, männlich 10,9-12,3, kastriert 10,2-11,6.

## Schlüsselworte

Estland, Mittelalter, Haustiere, Maße, Sexual Charakteristika.

The investigated material was collected during the excavations in Tartu in 1989 and Pärnu in 1991. The bones from Tartu are dated to the 13<sup>th</sup> - 18<sup>th</sup> centuries. The material gathered from Pärnu is dated to the 13<sup>th</sup> - 16<sup>th</sup> centuries. The purpose of the work is to give a review of cattle, sheep and goats of the Middle Ages: their measurements, proportions and the sexual characteristics of the bones found on

the territory of Estonia. We have compared the data available with the data on the same species of domestic animals found on the territory of Russia, Latvia and the west-coast of Sweden.

More than a half of the collected bovid bones were cattle remains (61.4% in Pärnu and 68.0% in Tartu). Considering the skull construction, the Estonian cattle of the Mid-

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dle Ages belonged to the *Bos taurus longifrons* type. The skull fragments of hornless cattle (*Bos taurus aceratos*) did not occur in the Estonian mediaeval archaeozoological material. According to Zalkin (1956, 1961), the osteological material from Latvia and Russia did not contain skull fragments of hornless cattle either. On this ground we can assume that the hornless cattle was unknown in Eastern Europe in the Middle Ages. The dimensions of cattle skulls could be characterized only by the measurements of horn-cores (tab. 1) and by the lengths of the alveolar rows of upper and lower jaws (figs. 1 and 2).

The average measures of horn-cores as well as tooth rows were of the same dimensions, both among the cattle from Tartu and Pärnu; comparable to them were the measures of the cattle of Russia (Zalkin, 1956, 1961) and of west-coast of Sweden (Ekman, 1973) in the Middle Ages.

Measures and proportions of the bones varied a great deal. In spite of this we observed no significant differences between the measures of the cattle of Pärnu and Tartu. Anterior cannon-bones of the Tartu cow population were much shorter than of the Pärnu cow population, whereas those of bulls were longer. The excavation material of

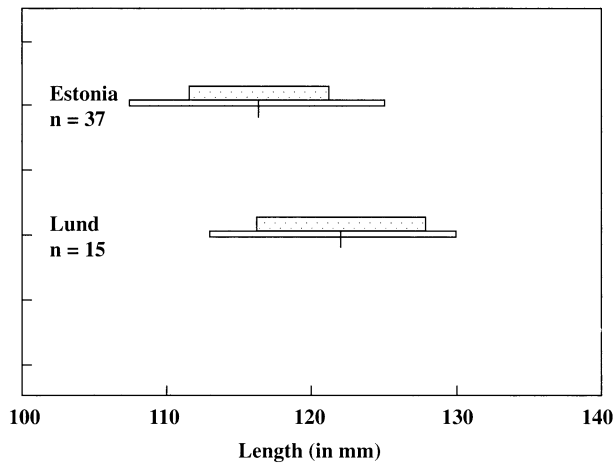


Fig. 1: Cattle. The length of alveolar rows (upper jaw).

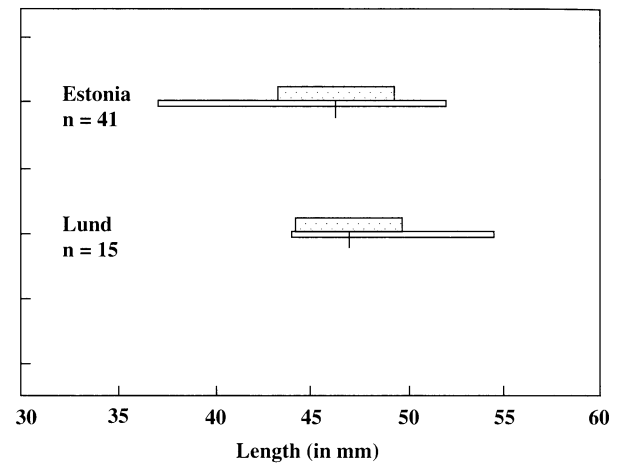


Fig. 2: Cattle. The length of alveolar rows (lower jaw).

Table 1: Measurements of cattle horn-cores.

sex	n	PÄRNU				TARTU				LUND (Eckman, 1973)					
		min.	max.	average	Std	n	min.	max.	average	Std	n	min.	max.	average	Std
Length at base	12	35.0	55.0	43.1	6.3	57	25.0	46.0	37.9	4.5	26	34.0	50.0	42.5	4.3
	1	–	–	64.5	–	10	48.0	54.0	52.1	1.9	2	61.0	62.5	62.0	1.0
	9	56.0	66.0	60.4	3.0	17	49.0	65.0	55.6	4.4	9	57.0	68.5	62.5	3.3
Width at base	12	28.9	43.0	35.1	3.9	57	25.0	40.5	32.3	3.1	25	28.0	41.0	34.5	3.6
	1	–	–	50.0	–	10	36.5	41.5	39.0	1.5	2	46.5	53.0	50.0	4.4
	9	47.0	58.0	51.0	3.4	17	36.0	53.0	46.0	4.4	8	45.0	57.0	51.0	4.4
Circumf. at base	12	105.0	150.0	127.1	15.5	56	80.0	135.0	113.3	12.0	26	102.0	145.0	125.0	10.5
	1	–	–	180.0	–	10	140.0	150.0	146.0	3.7	2	175.0	180.0	178.0	3.6
	9	170.0	190.0	176.7	8.2	17	140.0	190.0	163.5	11.2	8	172.0	196.0	182.0	9.7
Length outer curvature	10	100.0	150.0	133.0	16.9	43	100.0	180.0	134.5	19.6	24	95.0	215.0	153.0	30.3
	1	–	–	140.0	–	56	135.0	170.0	151.0	12.8	2	150.0	175.0	163.0	17.7
	5	165.0	210.0	188.0	22.2	9	180.0	240.0	201.7	19.4	7	205.0	270.0	250.0	28.9

Tartu revealed no anterior cannon bones of bulls, thus no comparisons could be made. The metacarpals of Pärnu population were wider and more massive than those of Tartu. The small differences in measures could be explained as differences between populations. To some extent this could be due to the geographical location - the maritime climate of Pärnu was somewhat milder than that of Tartu. The lengths of metacarpal bones from Estonia, Russia (Zalkin, 1956) and Sweden (Lepiksaar, 1965; Ekman, 1973) are presented on the figure 3.

We have used the factor worked out by Fock (1966) to estimate the withers height of the cattle. The withers heights of different cattle populations, calculated on the basis of the length of metacarpal bones, are presented in

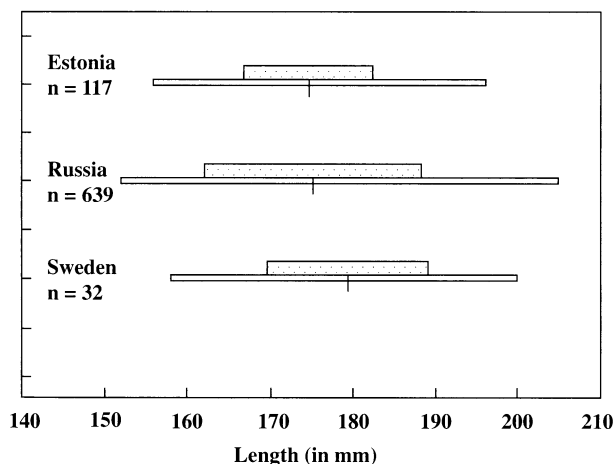


Fig. 3: Cattle. The length of metacarpal bones.

table 2. The withers height of Estonian Mediaeval cattle ranged from 97.5 to 120.0 cm, the individuals with withers height over 115.0 cm being all castrated.

We have used the horn-cores and the anterior cannon-bones for determining the sex of the cattle. The horns of cows could be distinguished by the maximal diameter of horns: the diameters of cows' horns from Pärnu ranged from 35.0 to 55.0 mm, the diameter of the bull's horn was 64.5 mm and the diameters of oxen's ranged from 56.0 to 66.0 mm. For distinguishing the horn finds of bulls and oxen, the base index and the girth had to be taken into consideration as well. The ox from Pärnu population had somewhat rounder horns than the bull. In the Tartu population the determination of the sex of the cattle on the basis of the horn-core finds was rather difficult (figs. 4-7).

Female and male animals differed on the ground of diaphysial index and distal epiphysial index of the metacarpal bones (figs. 8-11). It was possible to identify most of the castrated individuals on the basis of proportions, but on account of partial overlapping with female animals the maximal length of bone had to be taken into consideration as well. The variations of diaphysial index of metacarpus of the Pärnu cattle were: 12.4-15.7 (cows), 18.1-21.0 (bulls), 13.6-20.1 (oxen). It is possible, that the group of oxen bones contained the young bulls' bones as well. Osteological material from Tartu did not contain the anterior cannon-bones of bulls: diaphysial index of cows was 13.6-15.0 and that of oxen 13.0-16.5.

In the present work the estimation of the age of the cattle was based on the eruption of teeth in lower jaws. First of all we had to establish the sequence in which the teeth erupted and were replaced. In the cattle populations

Table 2: Withers heights of cattle (in mm).

	85-90	90-95	95-100	100-105	105-110	110-115	115-120	120-125	n	min.	max.	average
PÄRNU												
n			7	32	35	14	2	1	91	97.5	120.5	106.3
%			7.7	35.2	38.5	15.4	2.2	1.1				
TARTU												
n				4	6	2	2		14	102.0	116.0	107.8
%				28.6	42.9	14.3	14.3					
RUSSIA (Zalkin, 1961)												
n	14	77	80	330	410	108	36	5	1060	85.0	120.0	106.3
%	1.3	7.3	7.5	31.1	38.7	10.2	3.4	0.5				
LUND (Ekman, 1973)												
n				4	9	4	4	1	22	100.2	122.4	110.7
%				18.2	40.9	18.2	18.2	4.5				

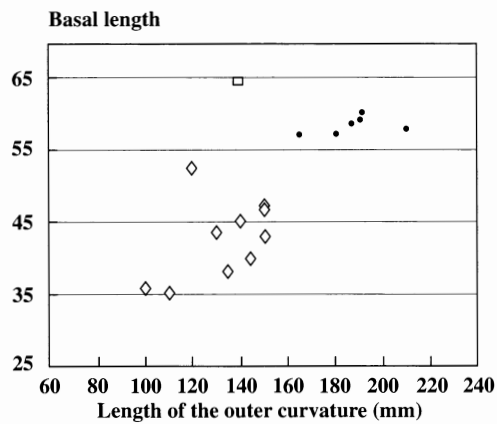


Fig. 4: Cattle. Horn cores in Pärnu.

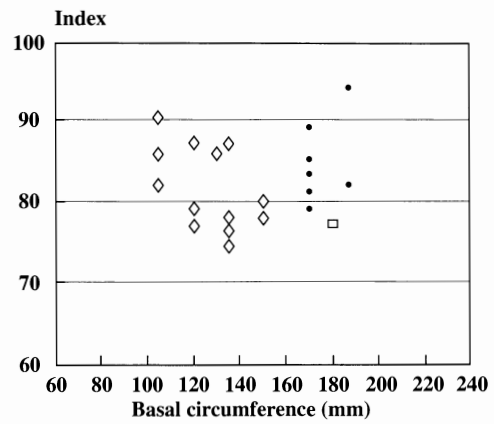


Fig. 5: Cattle. Horn cores in Pärnu.

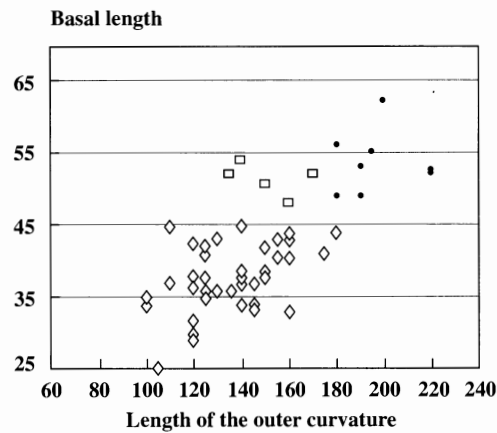


Fig. 6: Cattle. Horn cores in Tartu.

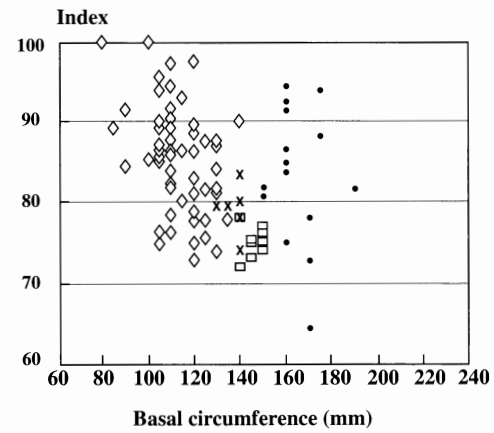


Fig. 7: Cattle. Horn cores in Tartu.

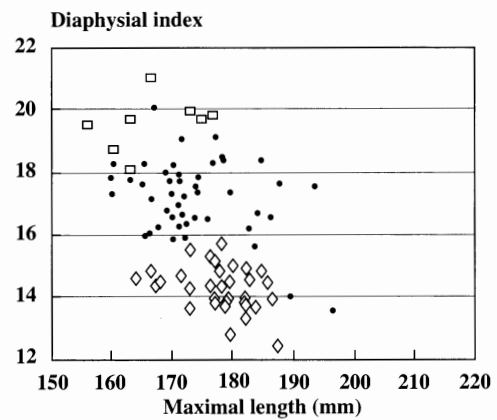


Fig. 8: Cattle. Metacarpal bones in Pärnu.

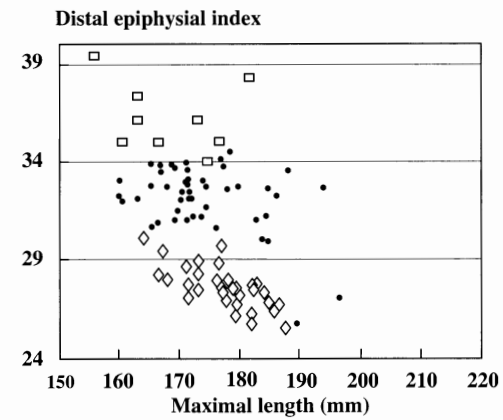


Fig. 9: Cattle. Metacarpal bones in Pärnu.

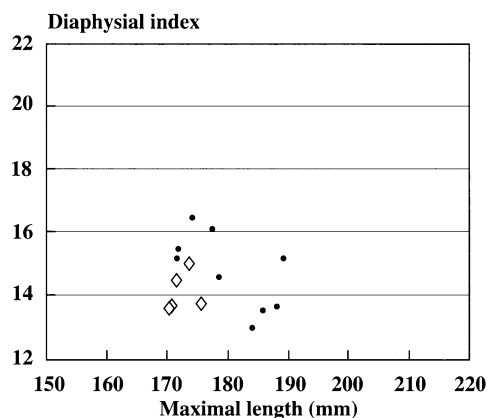


Fig. 10: Cattle. Metacarpal bones in Tartu.

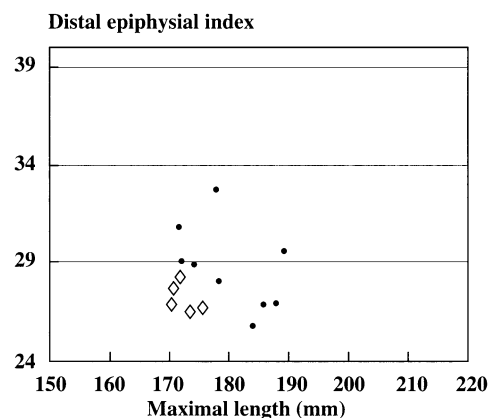


Fig. 11: Cattle. Metacarpal bones in Tartu.

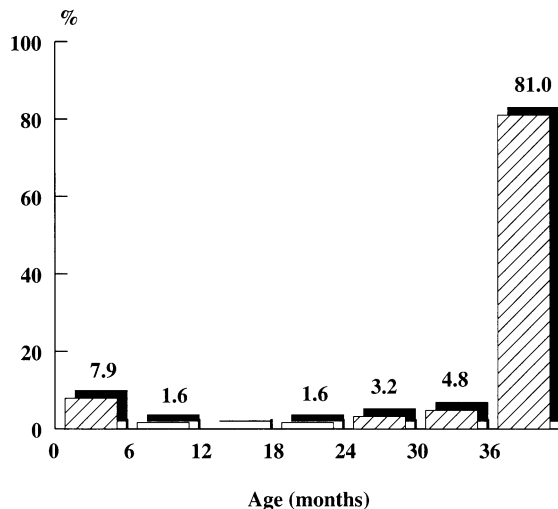


Fig. 12: The killing age of cattle in Pärnu.

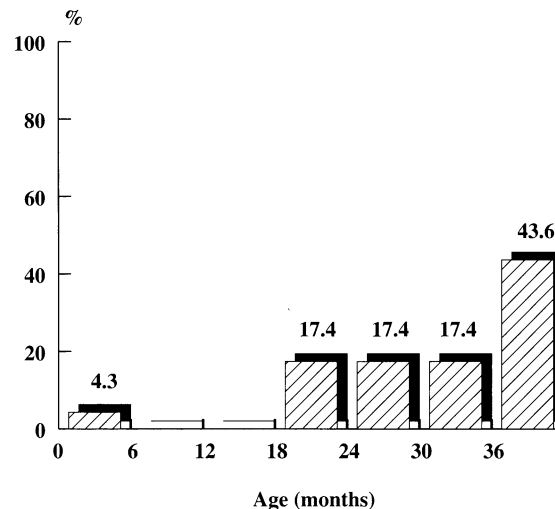


Fig. 13: The killing age of cattle in Tartu.

of Pärnu and Tartu it could take place as follows: M1, M2, M3, P3, I2 and P2, P4, I3, C.

Unfortunately, the scarcity of the material made impossible to determine when the replacement of I1 took place, but it is likely that it erupted at the same age as M3. To estimate the age of cattle we used the tooth eruption data presented by E. Schmid (1972). In Pärnu and Tartu most of cattle was slaughtered in adult age as shown on figures 12-13.

From small bovids' bones, mainly the horn-cores and the metapodial bones were identified to species. Complete

skulls of sheep were seldom found and so the exact skull type was difficult to establish. Horns of the adult rams were quite big and strong. The cross-section of the base of ram horn-cores was as a rule semicircular. The front curve of the horn was clearly expressed only in the cases of old individuals. In this respect they are similar to the rams from Swedish west-coast (Ekman, 1973). The race of the sheep was impossible to establish due to the strong variations in the shapes of sheep horns. The skull fragments of ewes were rare and small, so not much could be said about the skull types. We could only assume that the majority of the

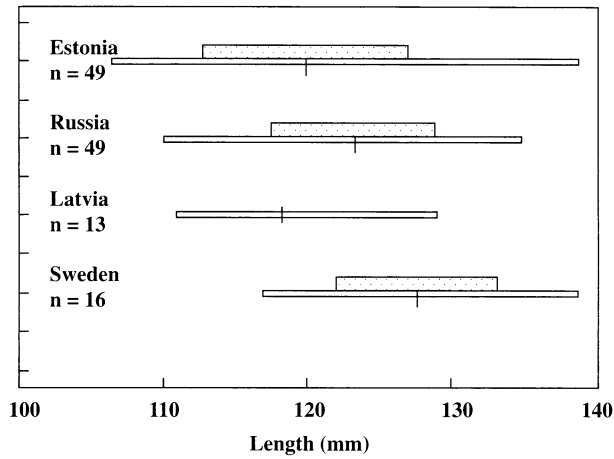


Fig. 14: Sheep. Metacarpal bones. Maximal length.

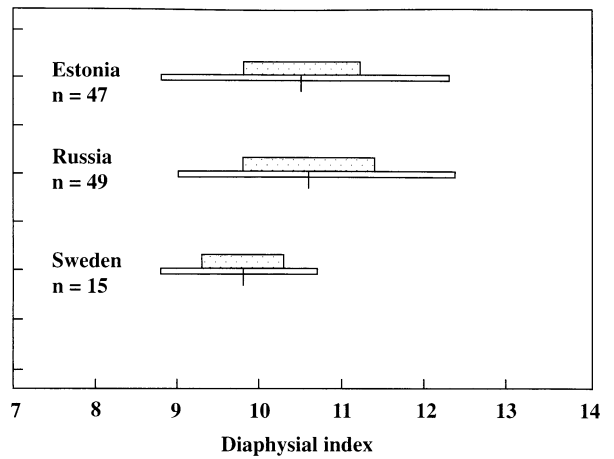


Fig. 15: Sheep. Metacarpal bones. Diaphysial index.

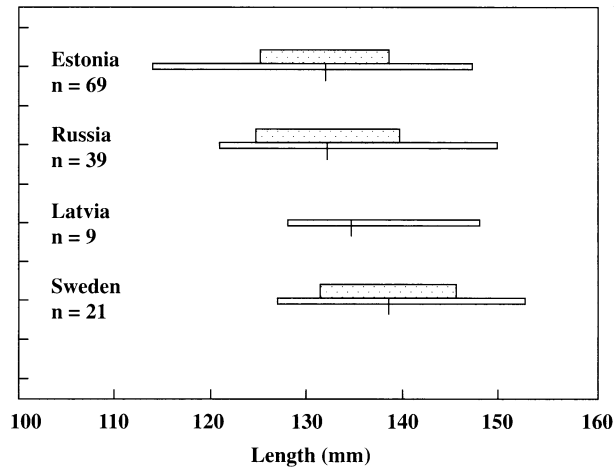


Fig. 16: Sheep. Metatarsal bones. Maximal length.

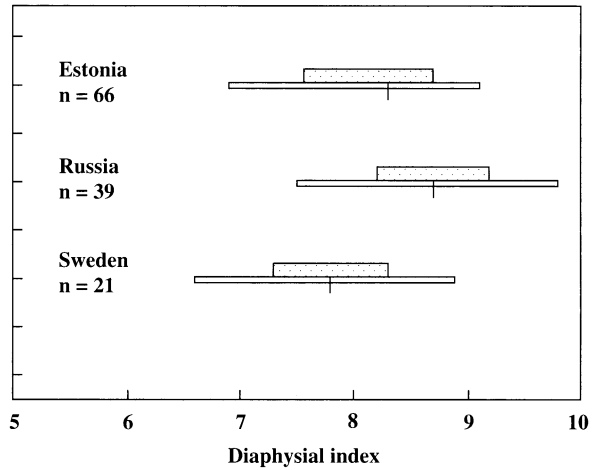


Fig. 17: Sheep. Metatarsal bones. Diaphysial index.

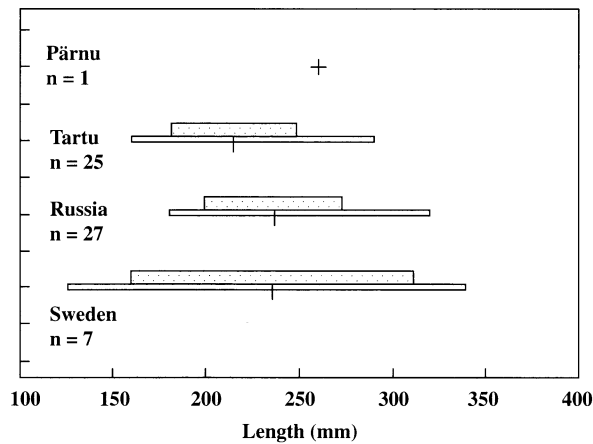


Fig. 18: The length of the outer curvature of the horn cores of the male goats.

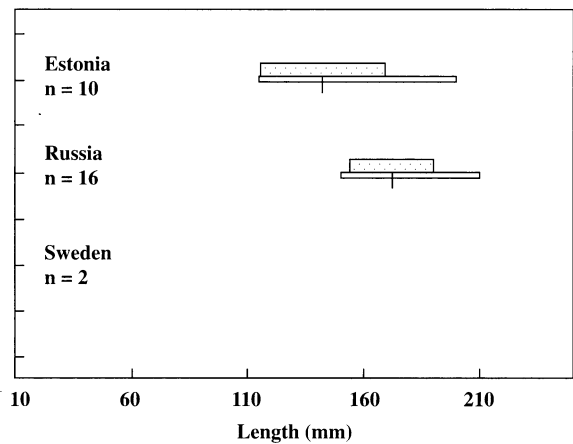


Fig. 19: The length of the outer curvature of the horn cores of the female goats.

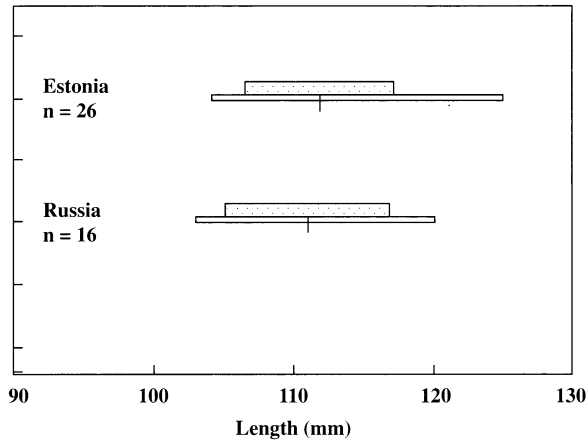


Fig. 20: Goat. Metacarpal bones. Maximal length.

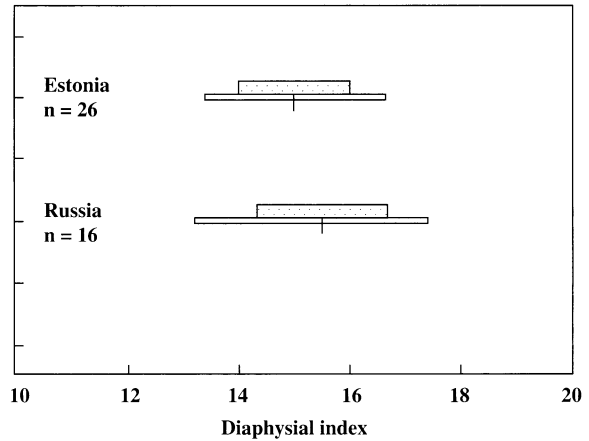


Fig. 21: Goat. Metacarpal bones. Diaphysial index.

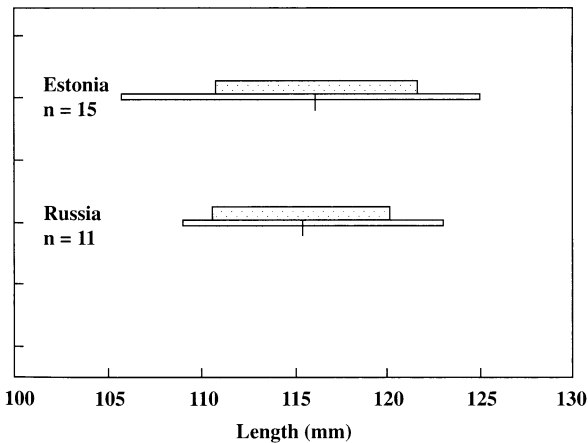


Fig. 22: Goat. Metatarsal bones. Maximal length.

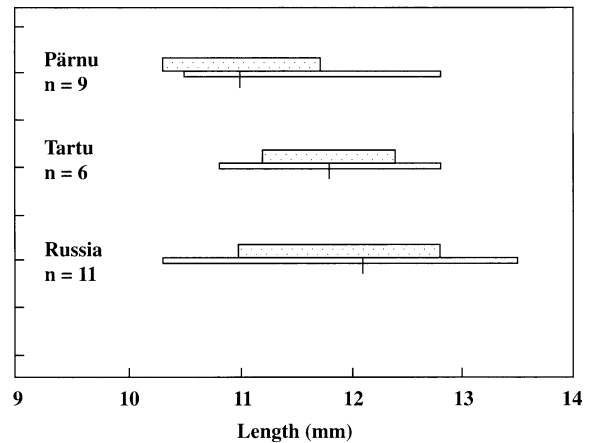


Fig. 23: Goat. Metatarsal bones. Diaphysial index.

female sheep were hornless like the sheep from Mediaeval towns of Russia and Latvia (Zalkin, 1956).

We have used the maximal length and the diaphysial index to characterize the measurements and proportions of metacarpal and metatarsal bones (figs. 14-17). The maximal lengths of metapodial bones of the East European Mediaeval sheep did not vary much; the Swedish Mediaeval sheep had longer metapodial bones. The Swedish sheep were more slender than the Estonian and Latvian sheep as the diaphysial index of the metapodial bones show. The cannon-bone measurements of the sheep indicate possible eastern influences on the formation of Estonian flock.

The establishing of sexual structure of the sheep is quite difficult. According to the diaphysial index the

groups could be divided as follows: females 8.8 - 11.4, males 10.9 - 12.3, castrated 10.2 - 11.6. The withers heights of the Estonian mediaeval sheep ranged from 51.6 to 68.9 cm (calculated by Fock, 1966).

The osteological material contained only a few goat bones, only the horn-cores of the male animals were more numerous (especially in Tartu). Probably the latter come from artisans' workshops and on the basis of these we could draw no conclusions about the structure of the flock. Considering the position and the shape of the horns, we can assume that the type of Estonian mediaeval goats was somewhere between *prisca* and *aegagrus* types. The lengths of outer curvatures of male and female goats are presented in figures 18 and 19. The hornless speci-

mens did not occur among the skull fragments. The different types of horn-cores of goats have arisen more likely from the genetic mutations than from the different origin (Lepiksaar, 1977). The measurements and proportions of the goats' bones in Tartu and in Pärnu overlapped partially; the same could be said about the goats from Russia (figs. 20-23).

Since most of the mandibles of the sheep and goats have not been differentiated, the determination of slaugh-

tering age of the sheep is not exact. The analysis results of mandibles of both sheep and goat were as follow: in Pärnu 62.7% of the individuals had been slaughtered at the age over 2 years, the bone finds from Tartu contained a large part of the remains of young animals (at an age under 6 months), other age groups like 6 - 12 months and over 24 months were equally represented. It should be mentioned that very few of the animals, both in Pärnu and Tartu, had been slaughtered at the age of 18 - 24 months.

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