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An osteometric study on recent roe deer (*Capreolus capreolus* L., 1758)

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The analysis of the data shows that the growth of roe deer from the eastern part of Greater Poland (Wielkopolska) is very similar to that of specimens from other areas in Poland. A comparison with excavated bone material revealed only slight and fluctuating differences. The roe deer from the areas to the west of Poland are larger and those from the areas to the east of the country are the largest.

Key words: roe deer, craniometry

INTRODUCTION

We examined 30 skulls and 29 mandibles of female roe deer from a single forest complex within one hunting district. Published information on the osteometrics of the recent roe deer is scarce [2, 4, 5]; papers dealing with excavated bone material are more numerous [1, 3, 7–9]. We had at our disposal a uniform bone material of 29 complete skulls and one cranium devoid of mandible.

MATERIAL AND METHODS

We examined 30 skulls and 29 mandibles of recent female roe deer from one hunting district. These were classified into two age groups: juvenile and adult. The measurements were taken with an electronic slide caliper. Each measurement was taken three times and then the mean value was calculated. The statistical analysis of the results included a comparison with the data obtained within the past 30 years in Poland and the neighbouring countries on both recent and subfossil specimens of the roe deer. We devised a new method of determining the height of the roe deer at the interscapular region and tested it on the basis of the examined material.

The following measurements were taken according to the von den Driesch method [3] (Fig. 1):

- length of the cranial basis *Basion – Prosthion*;
- angular height of the splanchnocranium *Nasion – – Prosthion*;
- length of cheek teeth — *Pm + M*;
- length of molar teeth — *M*;
- length of premolar teeth — *Pm*;
- orbit distance *Ectorbitale – Ectorbitale*;
- minimum breadth between the orbits *Entorbitale – – Entorbitale*;
- maximum breadth of the cerebral cranium *Eurion – Eurion*;
- zygomatic breadth of the skull *Zygion – Zygion*;
- length of the skull profile — *Acrocranion – Prosthion*;
- length of the cerebral cranium — *Basion – Ethmoideum.*

The mandibles were measured for (Fig. 2):

- distance *Gonion caudale – Infradentale*;
- distance from the posterior edge of the *Processus articularis* to the *Infradentale*;
- length of cheek teeth — *Pm + M*;
- length of molar teeth — *M*;
- length of premolar teeth — *Pm*;
- height of the ramus of the mandible — *Gonion ventrale – Coronion*.

In 12 skulls the determination of point *P* was impossible because of the absence of incisive bones.

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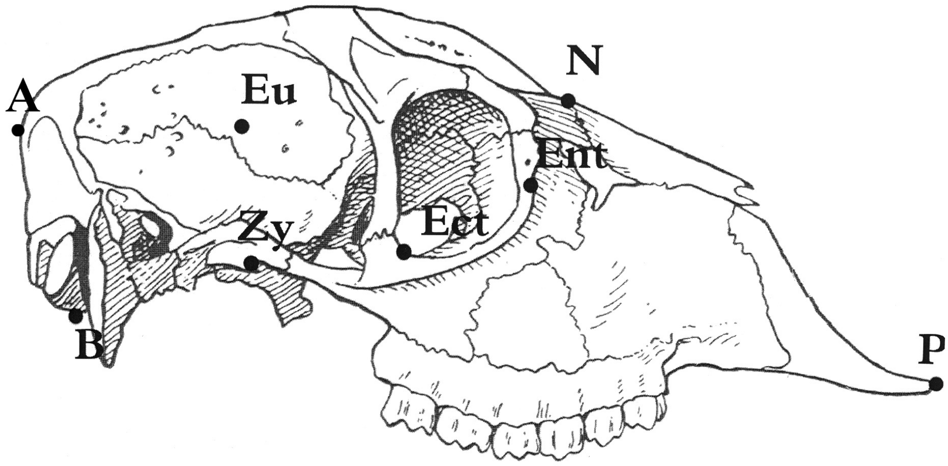

Figure 1. Osteometric points on the skull.

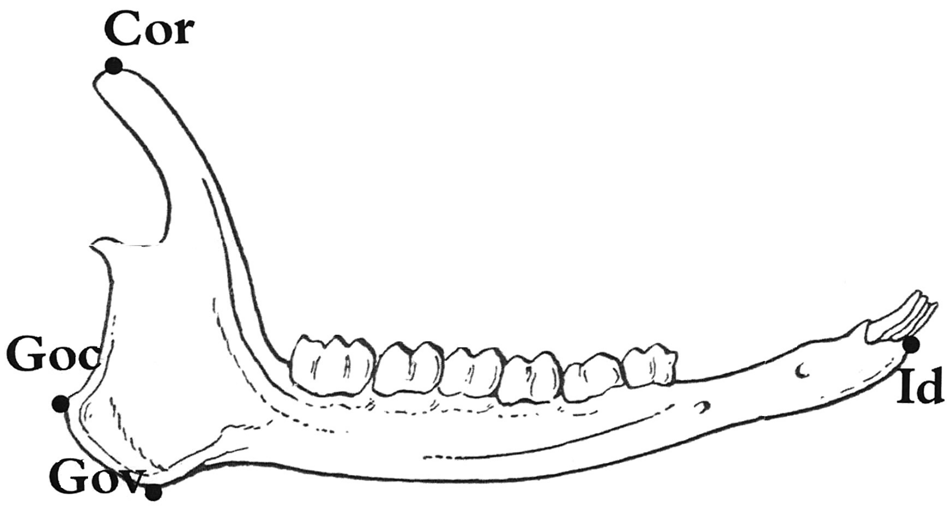

Figure 2. Osteometric points on the mandible.

Consequently no measurements of *B – P, N – P, A – P* were taken. Similarly, for another two skulls only three measurements could be taken: *Eu – Eu, Zy – Zy, B – Ethmoideum* as a result of the extent of the damage to the skulls.

The animals' ages were determined according to Pielowski [6] by measuring the mandibular cheek teeth. The animals' height was calculated with two methods. With one, indirect, first the length of the metacarpal bone was calculated, the value, according to Godynicki [4], being strongly correlated with the animals' height measured at the interscapular region. Then the height was calculated using proportion coefficients proposed by Godynicki and Godawa [5]. The second method consisted in using the correlation between the internal length of the cerebral cranium and the height at the interscapular region in dogs [10] and attempting to find a similar correlation for the roe deer.

RESULTS AND DISCUSSION

The skull and mandible measurements are given in Tables 1 and 2, respectively.

The measurements in Table 1 show that the mean length of the cranial basis, 172.5 mm, is very close to that given by Godynicki and Godawa [5] The remaining measurements are also very similar, the maximum difference being 1.5 mm. Only for the

Table 1. Mandible measurements

Measurement	Adult animals				Young animals			
	Mean	Min.	Max.	Stand. dev.	Mean	Min.	Max.	Stand. dev.
Id – Goc	155.68	143	171	7.62	132.57	127	142	5.65
Part – Id	153.9	152	168	7.05	133.6	128	147	6.45
Pm + M	63.68	59	68	2.41	51.14	49	53	1.67
M	37.52	35	41	1.5	22.86	22	24	0.69
Pm	26.55	25	28	1.43	28.57	27	30	0.97
Gov – Cor	86.68	78	94	4.38	74.43	69	84	5.38

Table 2. Skull measurements

Measurement	Adult animals				Young animals			
	Mean	Min.	Max.	Stand. dev.	Mean	Min.	Max.	Stand. dev.
B – P	172.5	161	186	7.5	155	149	161	8.48
P – N	99.14	86	108	6.12	84	83	85	1.41
Pm + M	55.5	51	67	3.55	49.29	48	50	0.75
M	30.19	28	31	1.28	23.71	21	28	2.28
Pm	26.48	21	30	1.72	26.29	23	27	1.49
Eu – Eu	60.65	57	61	2.38	55.42	53	58	2.43
Ect – Ect	83.28	78	90	4.35	73.57	70	78	2.82
Ent – Ent	57.52	50	67	4.02	50.57	47	56	2.87
Zy – Zy	81.7	76	87	3.14	75.3	71	77	2.21
A – P	187	173	200	7.3	167	160	173	9.2
B – E	82.4	77.6	84	2.6	77.2	74	80	2.48

mean value of one measurement, namely the distance *Ent – Ent,* is the difference quite significant, amounting to almost 9 mm (Table 2).

The mean body height of adult animals, calculated on the basis of the length of the cranial basis, was 70.2 cm at the interscapular region, which is confirmed by the results of Godynicki and Godawa [5] for Greater Poland. In 16 skulls the distance *B – P* was measured, damage to the remaining 14 skulls making it impossible to determine the position of point *P*. The second method of determining the height in the roe deer yielded some interesting results. Wyrost's formula adopted for the roe deer is the following: $W = D \times 1.016 - 13.6$ (W — height at the interscapular region; D — maximum length of the cranial basis).

The mean roe deer height in this case was 70.34 cm, and thus very close to that obtained with the former method. The method proposed by us should be treated as approximate, since it was tested on a rather limited sample. The similarity of the results obtained with both methods to those obtained by Godynicki [4] and Godynicki and Godawa [5] indicates that the roe deer from Greater Poland constitute a uniform population. A comparison of our data with those of other researchers on roe deer past and present inhabiting various areas in Europe and Asia revealed some distinct tendencies in their height characteristics. Most authors distinguish two species of roe deer, European (*Capreolus capreolus* L.) ranging to the west of the Dnieper, and Siberian (*Capreolus pygargus* P.) to the east of that river [9]. The Siberian species is far sturdier than its European counterpart and the River Dnieper is an impassable border for it.

The roe deer from the eastern part of Greater Poland studied by us are smaller than the animals from the western parts of Europe [1, 2].

A size comparison of recent roe deer with the specimens from the past shows a decreasing height tendency. The smallest difference was observed by Wyrost and Chrzanowska [11], who studied the remnants of the roe deer from early medieval Wroclaw. Like their contemporaries from the vicinity of Santok, they were similar or only slightly larger than the recent Greater Poland population [7]. The skulls examined by us belonged to animals which were smaller by 3 to 8 cm than the roe deer from the Kujawy region of the Hallstadt period. Significant differences in roe deer height are visible when compared with Neolithic specimens from the area of Kielce, where they were larger by 10 cm [8].

REFERENCES

1. Boessneck J (1956) Zur Grösse des Mitteleuropäischen Rehs (Capreolus capreolus L.) in alluvial-vorgeschichtlicher und früher historischer Zeit. Zeitschr F Säugertierkunde Bd, 21: 121–131.
2. Bosold K (1966) Geschlechts- und Gattungsunterschiede an Metapodien und Phalangen mitteleuropäischer Wildwiederkäuer. Diss München, pp. 1–39.
3. Driesch von A (1976) Das Vermessen von Tierkonochen aus vor- und frühgeschochtlichen Siedlungen, München.
4. Godynicki Sz (1970) Proporcje miedzy niektórymi wymiarami kości odnóży i czaszki u sarny. Roczn Wyż Szk Roln w Poznaniu, 49: 22–40.
5. Godynicki Sz, Godawa D (1989) Osteometria i związki wielkościowe w kośćcu sarny. Roczn AR, Poznań, 206: 3–17.
6. Pielowski Z (1970) Sarna. PWRiL Warszawa.
7. Schramm Z, Kranz I (1978) Szczątki kostne dzikich przeżuwaczy (Ruminantia Scopoli, 1777) w wykopaliskach wczesnośredniowiecznego Sanoka. Roczn AR, Poznań, 103: 43–60.
8. Sobociński M (1993) Kościec sarny w wykopaliskach neolitycznych z Koniecmostów woj. Kieleckie. Roczn AR, Poznań, 252, Archeozool, 18: 71–79.
9. Timczenko NG (1972) K istorii ochoty i životnovodstva v Kijevskoj Rusi (Sredneje Podneprove). Izdat Naukova Dumka Kiev, pp. 1–204.
10. Wyrost P, Kucharczyk J (1967) Versuch der Bestimmung der Widerristhöhe des Hundes mittels der inneren Hirnhöhlenlänge. Acta Therol, 12: 105–110.
11. Wyrost P, Chrzanowska W (1981) Szczątki kostne ssaków dzikożyjących z wczesnośredniowiecznego Wrocławia. Roczn AR, Poznań, 131: 163–175.