MEASUREMENTS ON THE BODY SIZE OF THE WILD BOAR IN GAME FARMS

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Abstract

The wild boar is one of the main big game species in Hungary. The aim of our work was to contribute and to broaden the data published on the anatomical size of the animals in the Hungarian wild boar population. When comparing our data, we tried to find correlation between the sex, age, habitat natural food sources of the animals, supplementary feeding and body size. The anatomical size sampling of the animals was conducted (n=248) during the winter hunting season immediately after the end of the hunt. A digital spring scale was used to weigh the eviscerated weight of the animals (kg), a measuring tape to take the body length (cm), head length (cm), ear length (cm) and withers height (cm). A vernier caliper was used to measure the heart length (cm) and width (cm).

SPSS 11. were used for statistical analyses by the results strong positive correlation were found between the body length and the eviscerated body weight (r=0.66) and between the body length and height at the withers (r=0.65). Similar correlation was found between the eviscerated body weight and the size of the hearth. The correlation between the body length and the length of the head is strong (r=0.68), but between the length of the head and ears moderate (r=0.58).

Key words: wild boar, body weight, body length, head length, withers height

INTRODUCTION

Wild boar is a common game in Hungary. Its estimated number of animals is 120.178 [1]. The population belongs to the subspecies *Sus scrofa attila* [2]. This species shows wide geographical distribution among the big games. [8] [10]. It adapts well to the changes of food resources in time and place [4] [5]. The wild boar's body length is 120-185 cm, length of tail is 14-22 cm and the body weight shows decrease from NE to SW direction, the smallest animals are in the Mediterranean countries [11]. Body length, withers and weight increasing by the age of the animals [7]. Adult boars are usually larger than sows [9]. In closed and overpopulated areas the size of the animals are far below the standard and sexual dimorphism neither so explicit than in free habitats due to the disturbance and lack of food [6].

One of the aims of our work was to contribute and to broaden the data published on the anatomical size of the animals in the Hungarian wild boar population. When comparing our data, we tried to find correlation between the sex, age, habitat natural food sources of the animals, supplementary feeding and body size.

MATERIAL AND METHOD

The examinations were carried out in three confined wild boar parks of Hungary (in Sárkeszi, Ásotthalom, Csibrák), the location of which was significantly different from geographic, climatic and edaphic point of view (Fig. 1). In addition to the population of the parks we involved the data of wild boars shot in open areas of Csongrád County into our examinations as a control group.

Fig. 1: Areas of sampling

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The manuscript was received: 25.03.2015
Accepted for publication: 26.03.2015

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We determined the nutrition conditions of the wild boars; the most part of the food in the park of Sárkeszi was composed of reed stems and roots, fish and snails, while in the park in Ásotthalom the food of the animals was seasonal, the by-products of the horticultural and plough land production, supplemented with corncobs. In the intensive system park in Csibrák a feed mix made especially for wild boar nutrition was consumed by the animals. In the last two parks the animals were feeding *ad libitum*.

The anatomical size sampling of the animals was conducted (n=248) during the winter hunting season, immediately after the end of the hunt. A digital spring scale was used to weigh the eviscerated weight of the animals (kg), a measuring tape to take the body length (cm), head length (cm), ear length (cm) and withers height (cm) (Fig. 2). A vernier caliper was used to measure the heart length (cm) and width (cm). To describe the body structure of the stock the data were used for counting robustness, which is the quotient of the body length (cm and withers height (cm), as well as the proportion of the body length-head length and head length-ear length.

In addition to the population of the parks we involved the data of wild boars shot in open areas of Csongrád County into our examinations as a control group.

When comparing the group-pairs Tamhane-test was used in case of homogeneity, while LSD–test in case of heterogeneity.

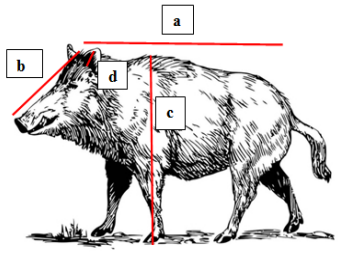

Fig. 2: Recording of anatomical sizes
a) body length: from the cervical vertebra to the base of the tail, b) head length: from the rostrum to the nape, c) withers height: from the highest point of the back to the tip of the hoof, d) ear length: from the base of the ear to the cartilaginous tip of the ear

The correlation examination of the variants was carried out with correlation analysis (Pearson's-correlation coefficient) as well as linear regression.

RESULTS AND DISCUSSIONS

Some anatomical parameters were studied in relationship with the different nutritional possibilities. We would like to enrich the data about wild boars in this respect. In Table 1 the means of all examined traits are demonstrated.

Table 1: Mean values of the anatomical parameters (n=248)

Anatomical parameters	mean ± SD
Eviscerated weight (kg)	66.96±32.33
Body length (cm)	117.64±29.79
Head length (cm)	44.59±9.12
Ear length (cm)	12.51±2.54
Withers height (cm)	72.61±14.29
Heart length (cm)	10.86±1.84
Heart width (cm)	8.94±1.66

In comparison with other authors [3] it can be stated, that the eviscerated weight was bigger (66.96 kg) than the earlier published (54.7 kg). There was no found difference in the body length, but the withers was higher with almost 8 cm-s. The average ear length in our sample population 12.51 cm did not differed from data in literature (13.2 cm).

During the work the interrelations among the measured parameters were also analysed. The value of correlation coefficient almost between all parameters proved a strong correlation. The body length has a strong positive correlation with the eviscerated weight and also with the withers height. The same relation was found also between eviscerated body weight and the length and width of the heart. Strong correlation was found between body length and head length, and a moderate positive correlation was proved between the head length and ear length (Table 2).

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Table 2: Relationship (linear regression) between the studied parameters (n=248)

Parameters	Equation for regression	r	R^2
Body length – eviscerated weight	y = -10.097 + 0.655x	0.60**	0.36
Withers height - eviscerated weight	y = -60.078 + 1.750x	0.77**	0.60
Body length – head length	y = 20.161 + 0.208x	0.68**	0.46
Head length – ear length	y = 5.294 + 0.162x	0.58**	0.34
Body length – withers height	y = 35.662 + 0.314x	0.65**	0.43

** The correlation is significant (P<1%)

The results of regression analyses also demonstrated in this table. The most strong correlation was found between the eviscerated weight and the withers height (R^2=59.8). The regression equations demonstrate that 1 cm increasement in withers height associated with 1.75 kg growth in the eviscerated weight, while 1 cm increase in body length entails only 0.65 kg rise in the body weight. When examining the body size data of the shot wild boars **by territories** it was found that the ones in Sárkeszi had the heaviest eviscerated weight**,** while the ones from open areas had the smallest. The weight of the animals from Csibrák, which were fed with feed mixture, only slightly fell behind the eviscerated weight of the animals living in Sárkeszi, which consumed rhizome, fish, snails and worms. At the same time the body length of the wild boars from open areas significantly exceeded that of the boars shot in confined parks. No significant difference was found between the animals from different territories considering withers height, head length and heart width (Fig. 4).

The characteristic „torpedo" body structure typical of the wild boar could be observed on the animals from Sárkeszi and Ásotthalom, but the body structure of the animals from Csibrák and also from the open areas. The body-head ratio was the same in case of the animals from Sárkeszi and Ásotthalom, and from Csibrák and the open areas. The head-ear ratio was the same in case of the animals from Ásotthalom and the open areas, while the longest ear was measured in wild boars shot in Csibrák.

When examining the parameters **by sexes** the statistical probe showed significant difference between the eviscerated weight, the withers height, the head length, the ear length, the heart width and the heart length. However, no statistical difference was found in the results of body length, which was 119.7 cm in case of male while 116.05 cm in case of female animals (Fig. 3).

The phenotypic difference between sexes was well expressed with the figures indicating robustness. In case of males the result (1.54) indicated a powerful withers part, while in females the value of robustness (1.69) showed a longer, less robust body shape. The correlation analysis confirmed a close positive relationship between the eviscerated weight and the withers height (r=0.84), as well as between the body length and head length (r=0.71) (Table 3). The relationship between the eviscerated weight and the body length was moderate (r=0.61). There was moderate positive relationship between the examined parameters of the female animals, in their case the value of the correlation coefficient between the eviscerated weight and withers height was 0.67 (Table 4).

Table 3: Relationship (linear regression) between the studied parameters in boars (n=105)

Parameters	Equation for regression	r	R^2
Body length – eviscerated weight	y = 75.420 + 0.577x	0.61**	0.37
Withers height - eviscerated weight	y = -69.912 + 1.886x	0.84**	0.70
Body length – withers height	y = 41.483 + 0.303x	0.64**	0.42
Body length – head length	y = 20.531 + 0.227x	0.71**	0.50
Head length – ear length	y = 6.447 + 0.137x	0.56**	0.32

** The correlation is significant (P<1%)

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Table 4: Relationship (linear regression) between the studied parameters in females (n=143)

Parameters	Equation for regression	r	R^2
Body length – eviscerated weight	y = 81.114 + 0.588x	0.61**	0.37
Withers height - eviscerated weight	y = -48.214 + 1.568x	0.67**	0.44
Body length – withers height	y = 32.812 + 0.309x	0.69**	0.49
Body length – head length	y = 21.315 + 0.180x	0.68**	0.46
Head length – ear length	y = 3.713 + 0.200x	0.58**	0.34

** The correlation is significant (P<1%)

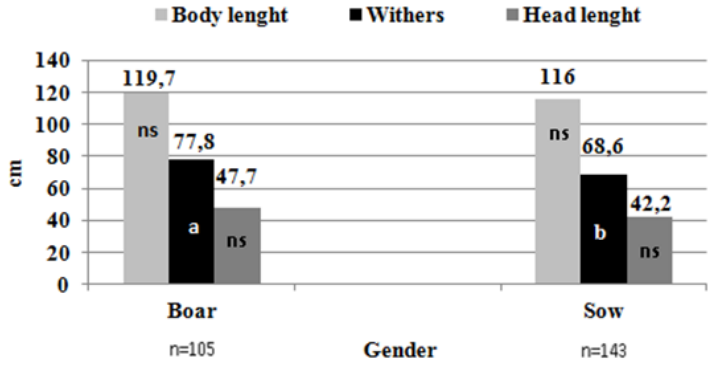

Figure 3: The body length withers height and head length by gender
Columns with the same colour and signed with different letters mean significant difference (p<0.05)

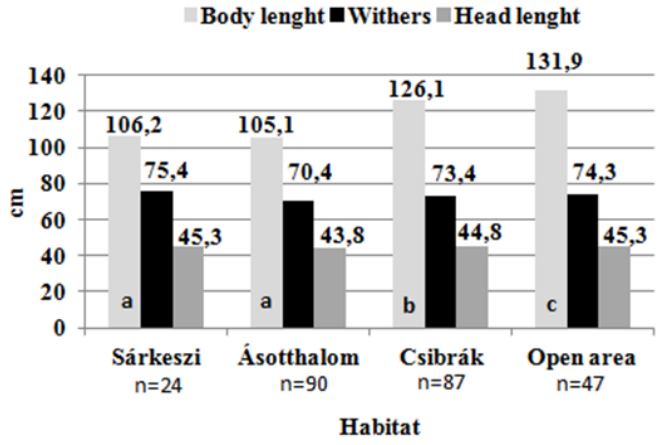

Figure 4: The body length withers height and head length by sampling areas
Columns with the same colour and signed with different letters mean significant difference (p<0.05)

When examining the body parameters of the animals **by sexes within a certain territory** it was found that the eviscerated weight of the male wild boars from the Sárkeszi wild boar park was the highest (89.67 kg), while the lowest values were weighed in case of males shot in open areas (62.85 kg), the difference, however, did not prove to be significant on P<5% level. The same values of eviscerated weight were observed in case of the animals shot in the parks of Ásotthalom and Csibrák, despite the fact that the nutrition of the animals was based on by-products in Ásotthalom, while on feed mixtures in Csibrák.

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No significant difference was found between the average body lengths of the male animals from different territories, however the value of the body length of the animals from open areas were the highest. Similarly, no difference was found between the withers height, head length, heart length and heart width parameters of the males from different parks.

The values of the eviscerated weight of the females were smaller than that of the males by 22.4% in the wild boar park of Sárkeszi, by 34.1% in Ásotthalom and by 36% in case of the animals from open territories. The eviscerated weight of the females shot in Csibrák was smaller by only 8.8% than that of the males of the same territory. The average eviscerated weight of the females from Sárkeszi and Csibrák was almost the same, despite the fact that the foodstuff available for them was rather varied. Also during the analysis of the body length data the statistical probe confirmed significant difference between the female animals of the different territories. The shortest length was measured among the females from Ásotthalom (98.1 cm), well surpassed by the body lengths of the females from Csibrák and the open areas (129 cm). There was no significant difference observed between the withers height of the females shot in the different territories. Not only was the body length of the females from Ásotthalom smaller than that of the other females from the two other parks and the open territories, but also their withers height. Based on the analysis of the robustness we can state that lower values were characteristic of both the females from Sárkeszi and from Ásotthalom (1.45 and 1.52 respectively), which suggests a robust anterior body part.

CONCLUSIONS

Wild boars with the highest eviscerated body weight were found in the Sárkeszi. This kind of habitat can ensure the necessary high nutritional value feed for the quick development of the young animals in the post weaning period. Almost the same weight have the animals in Csibrák which get concentrates, while the weight was least of those animals which were shot on free areas. The main causes could be the consumption of low protein content crops in spring and early summer, or iron intake from an unidentified iron source (because Fe intake has a negative effect on weight gain). The weight of young wild boars in Csibrák was remarkable lower than it was observed on other habitats. The possible reason is the keeping technology, which had a unfavourable effect against the well prepared concentrates. Due to the results in this park to pay more attention on grouping of the piglets and yearlings is recommended.

Regarding the body parameters, the relationship between the eviscerated weight and withers height was tighter than that between the eviscerated weight and body length. Therefore it can be suggested for the selection of breeding boars in the intensive system wild boar parks to consider the withers height primarily and the body length should be the secondary in this respect. According to our examinations there were no differences between either the body length or the head length of the males and that of the females therefore the secondary genital difference appearing in the body structure of the males can be traced back to the powerfulness of their withers part.

When keeping groups of piglets and young animals in a small ground space in confined parks the adverse effect of crowdedness on weight gain cannot be compensated by nutrition with the expertly compiled feed mixes. This is the reason why special care must be taken when housing young animals and determining their population density.

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