CONTRIBUTION TO KNOWLEDGE OF BODY GROWTH OF WILD BOARS IN THEIR PLAIN HABITATS IN THE REPUBLIC OF CROATIA

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SUMMARY

As part of the regular game shooting in eastern Croatia during the 2007/2008 hunting season, 73 wild boars were collected and weighed. The boars were categorized according to age into piglets (up to 1 year of age), yearlings (between 1 and 2 years of age) and sub-adults (around 3 years of age). The purpose of the weighing was to establish the body growth of naturally bred wild boars in their plain habitats. The results show a faster body growth in females during their first and second year (average weight at the age of one was 30.45 kg, at the age of two 60.63 kg and at the age of three 79.17 kg), while males make up for the weight difference in their third year (average weight at the age of one was 27.24 kg, at the age of two 49.40 kg and at the age of three 81.28 kg). The observed growth dynamics coincides with the changes in the boar social life, precisely with the period when the rest of the sounder forces the males to leave. By coping with this stressful period and forming smaller groups, the males compensate for the noted slower growth during their third year.

Key words: wild boar, body weight, body growth dynamics, age categories

INTRODUCTION

The wild boar (*Sus scrofa* L.) is an indigenous game species of Croatia (Andrašić, 1979; Janicki et al., 2007), classified under the Hunting Law (Anon., 2005a) as game protected during closed season, or, according to the hunting tradition, as big furred game. It should be emphasized that the legally determined closed season applies only to wild boar sows and piglets, whereas young pigs and boars may be hunted throughout the year, depending on the hunting management regulations and the actual animal count (Anon., 2005b). Globally, wild boars experienced a 'population explosion' after 1990, which resulted not only in an increased number of boars but also in their expansion to territories where they had previously not been a standard species (Marsan et al., 1995; Ueda and Kanzaki, 2005). An example of such expansion in Croatia is the often sighted swimming of wild boars toward and their consequent inhabitation of the Adriatic islands. Today, wild boars in Croatia are bred in two basic fashions, naturally and in fenced areas (Figure 1). In both types of breeding attempts are made to exclude in time all crossbreeds of the domestic pig and wild boar, when their outward physical features allow this. The benefits of such breeding are seen primarily in the preservation of original animal com-

Figure 1. Wild boars in a fenced breeding.

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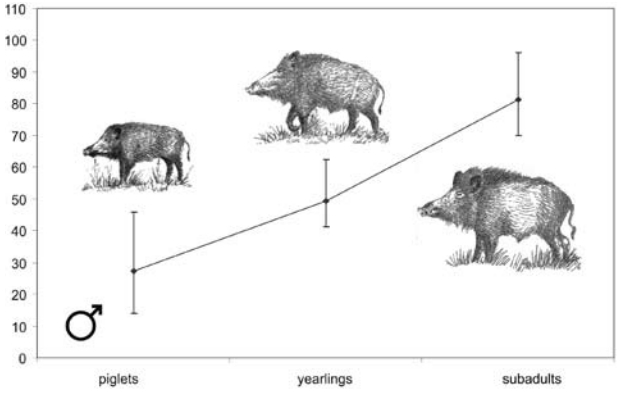
munities, which has been specified as the main role of hunting (Konjević et al., 2005), but also in maintaining the specifics of body growth, carcass yield, the ratios of different types of meat and the desired chemical composition of meat (Zmijewski and Korzeniowski, 2000; overview in Konjević, 2005). Skewes et al. (2008) discuss the advantages of wild boar meat in comparison with crossbreed meat (the number of chromosomes 2n=37 and 2n=38). They reached the conclusion that the body growth of wild boars is slower than that of crossbreeds and particularly slower than that of domestic pigs, and that wild boars have a significantly lower share of mesenterial and subcutaneous fat tissue (21,6% of cold carcass weight) than crossbreeds (24,9% in 2n=38 and 27,9% in 2n=37). It should be noted that all pigs used in the research done by Skewes et al. (2008), including wild boars, were farm-bred, which implies a controlled diet.

Natural wild boar breeding in Croatia (the Central European game management model) is based on the principles of habitat bonitation (determining the quality of a habitat, i.e. whether a habitat is suitable for the breeding of a certain species) and establishing an area appropriate

Graph. 1. Dynamics of undressed weight in males.



Graph. 2. Dynamics of undressed weight in females.

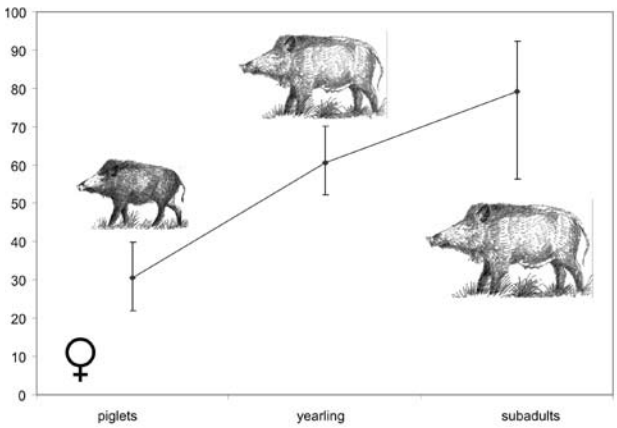


Figure 2. Wild boar carcasses immediately after evisceration: cooling and

for wild boar breeding (a hunting-productive area), which makes it possible to determine the size of the game population and its economic capacity, and thereby also the structure of the population and the shooting conditions. Of course, these are the mere basics of natural breeding, which requires numerous other measures and procedures in order to function. The food available to boars in this type of breeding includes cereals (notably corn and wheat), wild fruits, diverse plants and some food of animal origin, mainly earthworms and various larvae. In addition, boars are provided with appropriate quantities of supplementary feed during the winter months, which enables them to survive this unfavorable time of the year.

MATERIALS AND METHODS

All data on wild boars used in this research were gathered immediately after the shooting, through the courtesy of the employees of Croatian Forests Ltd., Forestry Board Vinkovci, the authority for hunting rights in the open state hunting ground XVI/11 'Spačva.' The boars were shot as part of the regular game shooting procedures prescribed by the hunting management regulations. The open state hunting ground XVI/11 'Spačva' encompasses 25 046 ha of plains in the eastern part of Croatia, i.e. the western part of Srijem, and it includes a great part of the Spačva forest complex, north and south of the Zagreb-Lipovac highway. It belongs to the County of Vukovar-Srijem. The main game species here are the red deer, the wild boar and the roe deer. This is a typical continental plain hunting ground, with an excellent feeding potential during the vegetation season and significant quantities of acorn (nut

of the common oak – *Quercus robur*) as natural feed in the autumn and winter months, along with regular winter supplementary feed. According to the territorial division of the Republic of Croatia into breeding areas for the red deer, the chamois and the wild boar, this hunting ground belongs to the East Slavonia and Baranja breeding territory (Grubešić, 2006).

The wild boars the research was done on were hunted by driven group hunts (Grubešić, 2004) and shot according to the current legal regulations (Anon., 2005a; Anon., 2005b; Anon., 2006a; Anon., 2006b; Anon., 2007a). Immediately after the shooting they were gathered and brought to the processing facilities. All boars were categorized according to age, into those up to 1 year of age (piglets), those around 2 years of age (yearlings) and those in their third year or having reached 3 years of age (subadults) and according to sex, into males and females. Age assessment was based on the dental features and the appearance of the boars (Wagenknecht, 1984). The outward physical features were carefully examined and no features typical of crossbreeds of the domestic pig and wild boar were found. Namely, crossbreeds present a certain problem in the preservation of the original wild boar species and as such may to some extent affect the characteristics of body growth. All weighing was done on a calibrated scales up to 50 kg (HCB 50K100, Kern & Sohn GmbH, Balingen-Frommern, Germany) and on a scales up to 200 kg (HCB 200K500, Kern & Sohn GmbH, Balingen-Frommern, Germany). After the weighing, the boars were eviscerated and hung as quickly as possible for better cooling and drainage of the remaining blood (Figure 2). Such big game processing after the shooting was described in an earlier issue of the magazine 'Meso' (Konjević, 2003). It is in accordance with the European Union regulations (Casoli et al., 2005), with the exception that in Croatia there are still no experts specially trained to examine game meat (apart from veterinary inspectors), but a training program is to be launched soon. The obtained results were processed in the Statistica 7 program.

▼ **Table 1.** Statistical data on development of body weight in free-ranging wild boars with respect to age and sex.

Age category	Piglets (<1 yr)		Yearling (2nd yr)		Subadult (3rd yr)	
Sex	♂	♀	♂	♀	♂	♀
n	28	15	5	8	6	11
Max.	46	39	62,5	69	96	102
Min.	14	21	41,2	51	70	66
Average	27,24	30,45	49,40	60,63	81,28	79,17
Standard deviation	8,32	5,76	10,56	5,71	11,00	10,49

RESULTS AND DISCUSSION

Statistical data (the highest and the lowest value, the arithmetic mean and the standard deviation) obtained on the body weight of wild boars with respect to age are shown in Table below. The data reveal that the average body growth of female piglets and young sows during the first two years is greater than that of young males. While the weight difference at one year of age is not too significant (♂ 27.24 kg; ♀ 30.45 kg), in the next age category it increases to an average of 11.23 kg (♂ 49.40 kg; ♀ 60.63 kg). One should also observe the greater weight differences within the category of two-year old males, with the deviation from the arithmetic mean being 10.56 kg (by comparison, the deviation for females is 5.71 kg). A possible explanation for this is the fact that wild boars, with the exception of older males, are herd animals with a firm social structure. The herd (sounder) is led by an experienced sow, which, with the help of other sows, has to provide food for the piglets and young pigs (Vratarić, 2004; Janicki et al., 2007). Having reached one year of age, young male boars are slowly forced out of the sounder. According to Vratarić (2004), this is the time when young males are lower on the hierarchical scale than females their age, and it is one of their most critical life periods. It may therefore be presumed that the process of being drawn out of the sounder, forming new groups of several young boars and starting a life of self-reliance causes considerable stress, which is manifested, among other things, in the difference between the average weight of males and females. Some authors (Kratochvil et al., 1986; Pedone et al., 1991) also point out that the eventual slower body growth of young sows coincides with the period of mating and the first farrowing. Finally, individual differences, weight at birth and the position a boar takes up in the sounder hierarchy, may also partly account for the relatively great deviations from the arithmetic mean.

The body growth of wild boars with respect to sex is shown on Graphs 1 and 2. The graphs demonstrate a slower body growth of males in comparison with females between the ages of one and two. However, having weathered the critical period, the males reach their full genetic potential and have a somewhat faster body growth than the females after their second year. The results obtained by this research are in accordance with the results obtained by Moretti (1995) for wild boars in the Alps in the south of Switzerland, as well as with the data on the body growth in a confined wild boar population (Mattioli

and Pedone, 1995).

The above mentioned marked increase in the number of wild boars also resulted in a multiple shooting increase, for example in Germany in an increase of as much as 540% as compared to 1960 (Sodeikat and Pohlmeyer, 2002). More wild boar shooting was recorded in other areas as well. In Croatia, according to the data of the Central Bureau of Statistics (Anon., 2007b), 3376 wild boars were shot in 1997, 3435 in 1998 and as many as 5155 in 1999. During 2000 the number of shot head reached 5986 and in 2001 rose further to 8537 head. The number continued to rise in 2002, to 9971 head, but than dropped to 8452 in 2003. In 2004 it rose again, to 9803, and remained similar in 2005 (9827 head). The change of legal regulations, i.e. the enactment of the new Hunting Law (Anon., 2005a) and the sub-acts (Anon., 2006c), brought about a significant change of attitude toward the wild boar, especially in determining the size of the game population and the dynamics of body growth (the new Expert model of habitat bonitation and establishing hunting - productive areas in the hunting grounds in the Republic of Croatia). The result was a sudden increase of shooting quotas, so that in 2007 the Hunting Department of the Ministry of Regional Development, Forestry and Water Management issued 17920 wild boar hunting stamps and in 2008 as many as 26055 stamps. This approach has created a more realistic correlation between shooting and the annual population growth (the number of the young farrowed in one hunting season), so that a longtime disparity between population increase and decrease may soon be overcome. The shooting increase also means a greater supply of wild boar and boar products on the Croatian market. Accordingly, one should acquire greater knowledge of the dynamics of wild boar body growth, and the composition and the microbiological validity of boar meat.

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ZUSAMMENFASSUNG

BEITRAG ZUR KENNTNIS ÜBER DAS KÖRPERLICHE WACHSTUM DER WILDSCHWEINE IN TIEFLANDDOMIZILEN DER REPUBLIK KROATIENS

In Verbindung mit der Durchführung der regelmäßigen Abschüsse auf dem Gebiet Ostkroatiens während der Jagdsasion 2007/2008 wurden insgesamt 73 Wildschweine gesammelt und gewogen. Die Schweine wurden nach dem Alter kategorisiert, u.zw. in Jungtiere (bis 1 Jahr), Nachkommenschaft (etwa 2 Jahre) und junge Stücke (3 Jahre). Der Zweck des Wiegens war die Bestimmung des körperlichen Wachstums der Wildschweine aus natürlicher Zucht in Tieflanddomizilen. Die bekommenen Resultate zeigen ein intensiveres Wachstum von Weibchen während und nach dem ersten Lebensjahr (das durchschnittliche Gewicht des 1. Jahres war 30,45 kg, des 2. Jahres 60,63 kg, des 3. Jahres 79,17 kg), während die männlichen Stücke den angeführten Mangel nach dem 3. Lebensjahr (durchscnittliche Masse im 1. Jahr war 27,24 kg, im 2. Jahr 49,40 kg, im 3. Jahr 81,28 kg) nachholten. Die beobachtete Dynamik des Wachstums entspricht der Veränderung im gesellschaftlichen Leben der Wildschweine, bzw. der Zeitspanne wenn der Rest des Rudels die männlichen Stücke zum Abgang zwingt. Mit der Überwindung der Stressperiode und durch die Bildung kleinerer Gruppen holen die männlichen Stücke während des dritten Lebensjahres das beobachtete kleinere Wachstum nach.

Schlüsselwörter: *Wildschwein, körperliche Masse, Dynamik des Wachstums, Alterskategorien*

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FACTORS INFLUENCED ON SAFETY AND QUALITY OF GAME MEAT

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SUMMARY

The different factors (environmental, microbial contamination, handling procedures with game, post - mortal changes of game meat) influenced on safety and quality of farmed and hunted wild game meat are described. The emphasis is given on residues of contaminants: risk chemical elements (Cd, Pb, Hg), mycotoxins (aflatoxin, ochratoxin, trichothecene), veterinary drug residues (sulfanilamid, amprolium, clopidol) and biogenic amines in game meat in fact of their adversely affect on human health.

Key words: *safety, quality, game meat*

INTRODUCTION

Game is influenced with a great variability of environmental activities. Some of them cause quality changes and the others influence on health safety of game meat.

GAME AND ENVIRONMENTAL POLLUTION

Selected species of wild animals can be used also as bioindicators of ecosystem pollution (Vavrová et al., 2003, Almášiová et al., 2008). The increased occurrence of risk chemical elements in tissues of free-living animals can be sign of environmental pollution (Szymczyk, and Zalewski 2003, Holovská et al., 2008).

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