

Changes in the size of population of the European wild boar *Sus scrofa* L. in the selected voivodeships in Poland during the years 2000–2011

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Abstract. *Changes in the size of population of the European wild boar *Sus scrofa* L. in the selected voivodeships in Poland during the years 2000–2011.* The aim of the work was to analyze the changes in the population of *Sus scrofa* L. in the selected voivodeships in Poland in the years 2000–2011 and to determine their direction, with consideration of hunting and level of utilization. The data for analysis were obtained from Research Station of the Polish Hunting Association (PZŁ) in Czemiń. There was found the increase in population of wild boar in hunting season 2011/2012 vs. 2000/2011, including the highest one in the Świętokrzyskie Province (256%) and Małopolska Province (264%) with the simultaneous high rise in hunting (250% and 413%, respectively). The concentration of wild boar population in 6 examined voivodeships, irrespectively of basic size of the population (level of population in season 2000/2001 in the voivodeships from group I (>10 thousand heads) and group II (<1.5 thousand heads) was increased. A moderate level of population utilization occurred to be insufficient what caused a constant progression of the population number in the studies voivodeships in the years 2000–2011.

Key words: wild boar, population, changes

INTRODUCTION

The dynamics of changes in the population of wild boar is determined by environmental factors (Bieber and Ruf 2005, Geisser and Reyer 2005). On the territory of Europe, including also Poland, the increase of the number of the animals of

the discussed species is observed (Bom-bik et al. 2007). It results from its high adaptative capacities in relation to varying living conditions, change of broad-leaved and mixed forests into coniferous monocultures and from urbanization of natural habitats of wild boars (Podgórski et al. 2013). Wild boars play a positive role in forest environment. The animals of the mentioned species limit the number of harmful insects, which constitute a threat to particular tree species and when burrowing, they prepare a surface of earth to natural renewal of the forest. The wild boars remove dead and sick individuals what decreases the scale of incidence of new sources of diseases and a risk of their spread out (Haber 1969). They may also cause various damages. During digging of the land (burrowing), they dig out small tree seedlings and self-sown plants, destroy forest nursery due to digging out the seeds, they trample forest cultivations and burrow inner forest meadows. The sounders of wild boars cause the anxiety in hunting site and scare the animals of other species, destroy bird nests, built on the ground, eat their hatches and eggs. They consume also weak progeny of other game animals (Haber 1969). The wild boars constitute reservoir of various diseases what creates a threat to human and

animals health (Tropiło 1996, Lipowski 2003, Flis 2011). Sounders of wild boar destroy cultivated fields and grasslands and the urbanized ones on the peripheries of urban agglomerations (Sondej and Jaroszewicz 2010, Matysek 2012) what is connected with the necessity to pay the indemnities (GUS 2013). Environment protection, including population of many species of wild animals, also boars, is connected with the need of creating the passages for animals via quick traffic roads and combining of forest complexes with the aim to create ecological runs (Bobek et al. 2009).

The aim of the work was to analyze the changes in population of wild boar in the selected voivodeships in Poland in the years 2000–2011 and to determine their direction, including hunting and utilization level.

MATERIAL AND METHODS

Materials for research were obtained from the Research Station of PZŁ in Czempin. The results were gained from hunting regions of the Polish Hunting Association. The evaluation of the number of wild boars was carried out by the method of tracking and the whole-year observations (Błaszczak 2006).

The basis for detailed analysis was constituted by the number of wild boars in six voivodeships. The first group included the voivodeships which possessed the greatest populations (in respect of number) of wild boars (>10,000 heads) in the hunting season of 2000/2001. There were the following voivodeships: West Pomerania, Warmia and Mazury, Wielkopolskie and Lubuskie. Group II covered two voivodeships where the

discussed populations were the smallest ones (in respect of number) in the scale of the country (<1,500 heads), i.e. Świętokrzyskie and Małopolskie. In the compared seasons, i.e. 2011/2012 and 2000/2001 for the mentioned above voivodeships, the analysis of the population size was performed and the results were referred to forest area (head per 1,000 ha) and the scale of hunting. Level of obtaining of wild boars was determined as a sum of animals, being shot during the hunting season, i.e. in the period since 1st April, until 31st March of the next year. Index of the level of utilization of wild boar population in a given season was calculated from the ratio of mean number of the obtained wild boars and the mean number of wild boar population according to the state on 31st March and was expressed in percentage.

RESULTS AND DISCUSSION

In hunting season of 2011/2012 vs. 2000/2001, there was recorded the increase of the number of wild boar population in Poland (Fig. 1). Progression concerned also the analyzed voivodeships (Fig. 2) where the population in seasons 2000/2001 was as follows: group I: West Pomerania – 18,255 heads; Warmia and Mazury – 10,729 heads; Wielkopolskie – 12,985 heads; Lubuskie – 10,030 heads; group II: Świętokrzyskie – 1,314 heads and Małopolskie – 1,314 heads. During the research period, a small decline in production was recorded only twice in the scale of the country. It occurred during hunting season of 2003/2004 and 2011/2012. In opinion of Haber (1969) it is a natural phenomenon for the

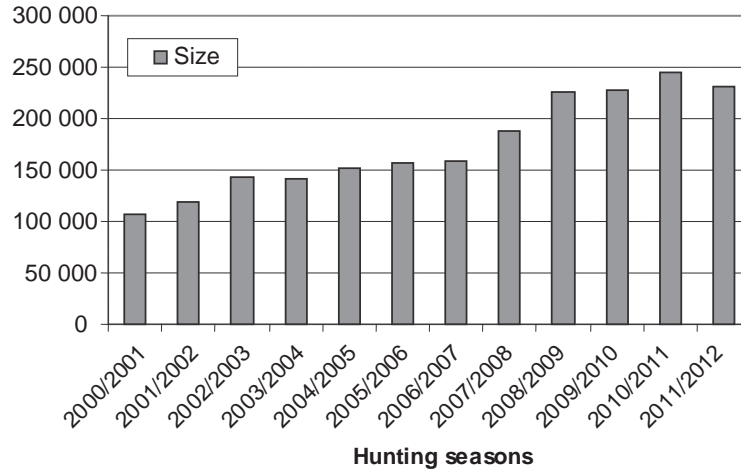


FIGURE 1. Size of wild boar *Sus scrofa* population in Poland in the years 2000–2011 (hunting seasons 2000/2001 and 2011/2012)

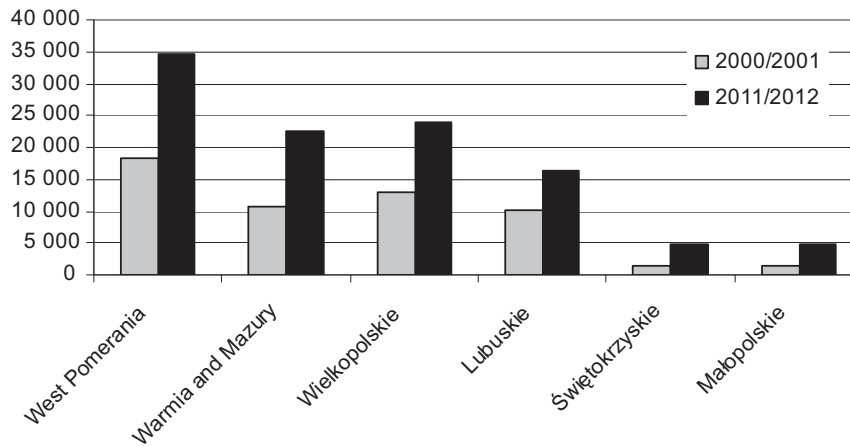


FIGURE 2. Size of wild boar *Sus scrofa* population in the voivodeships from group I and II in hunting seasons 2000/2001 and 2011/2012. Group I – hunting seasons of 2000/2001 – size of population >10,000: Voivodeships: West Pomerania, Warmia and Mazury, Wielkopolskie, Lubuskie; Group II – hunting season of 2000/2001 – size of population <1,500: Voivodeships Świętokrzyskie and Małopolskie

discussed species because during 1–3 years, the number of the population may decline twice or thrice or to become increased without inflow of individuals from other populations. It results from a degree of survivability of squeakers (piglets), intensity of shooting, level of

the annual rate of the population growth, changes in forest economy and climatic changes. The highest increase of the population in the scale of the country had place in the hunting seasons of 2008/2009 and amounted to 37,678 heads as compared to the previous season.

The progressive changes (heads) in the voivodeships from group I were as follows: West Pomerania – 5,077 (16.45%), Warmia and Mazury – 3,855 (19.99%), Wielkopolskie – 4,754 (26.42%), Lubuskie – 1,511 (10.23%) and from group II: Świętokrzyskie – 795 (27.49%) and Małopolskie – 1,137 (39.53%).

After 12 hunting seasons, the number of wild boars in the West Pomerania Voivodeship increased by 90% and in Warmia and Mazury – by 110%; however, the population stayed smaller than in the former voivodeship (i.e. West Pomerania). The population of the discussed animal species was also increased in the Lubuskie and Wielkopolskie voivodeships by 63 and 68%, respectively. In the voivodeships from group II, after 12 hunting seasons, the significant increases of the population size were recorded: Świętokrzyskie – by 256% and in Małopolska – by 264%, what indicates more dynamic changes than in the voivodeships from group I. Such quick increase of the population finds the source in accelerated sexual maturity, high fertility of the species and high natural birth rate (Haber 1969). The wild boars are characterized by a high adaptability to varying living conditions and specific reproduction predispositions (Bieber and Ruf 2005, Podgórski et al. 2013). Moment of obtaining sexual maturity by females is determined by threshold body weight amounting to 30 kg. When possessing abundant feed in their hunting place, the females may reach this state before completing the first year of life. Simultaneously, the better are the living conditions, the better is the survivability of young animals what causes the increase of the number

of population. When the population stays in poor conditions, the juvenile individuals do not receive the possibility of reproduction and the older animals do not loose it. Adult females constitute a reproduction reservoir for the population while the increase of the population is found on the normal level. When the conditions are very good, a considerable participation of the youngest group in the reproduction causes that the increase of the population may be doubled (Bieber and Ruf 2005).

The increasing big-area cultivations of cereals, potatoes and maize constitute the supplementation of natural but constantly decreasing feeding base being favourable for improvement of individual condition of animals. Additionally, the occurring climate changes, the effect of which brings mild winters with a small snow cover, make the survival of weaker individuals easier as their energy expense connected with seeking for feed is smaller (Haber 1969, Servanty et al. 2009). In the opinion of Chojnowski (2005), the mean temperature in winter period (December–February) amounting to ca. 0°C is favourable for increase of the population of wild boar.

Changes in agriculture alter the reproduction capacities of the species. Frequent penetration of maize cultivations and its high participation in diet increase the number of ovulating ovary cells in sows of wild boar. The average number of ripened cells per one ovary amounts to 4–5. When the diet is rich in insulinogenic maize, the number of the cells increases up to 6–7. Additionally, the reproduction potential is increased owing to a good abundance of the soils in bio-elements (Bieber and Ruf 2005, Chojnowski 2005).

During 12 seasons, hunting of the animals of the discussed species has been subject to changes (Fig. 3); in group I it increased as follows: West Pomerania – by 108%, Warmia and Mazury – by 83%, Wielkopolskie – by 93% and Lubuskie – by 68%. The increase of hunting material of wild boars by shooting in the voivodeships from group II was considerably higher: in the Świętokrzyskie – by 250% and in Małopolskie – as much as by 413%.

According to the Supreme Council of the Polish Hunting Association (Uchwała 1999), in the matter of the principles of management of wild boar population in Poland, the correct density of the animals of the discussed species is equal to 20 heads per 1,000 ha of forest area. In hunting season of 2000/2001, the degree of population density in three voivodeships may be recognized as correct – Warmia and Mazury, Wielkopolskie and Lubuskie (Table 1). After twelve

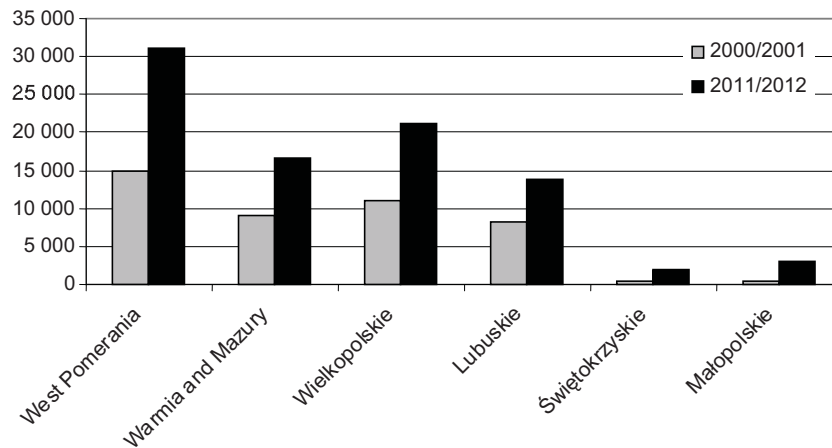


FIGURE 3. Obtaining hunting material of wild boar *Sus scrofa* in the voivodeships from group I and II in hunting seasons 2000/2001 and 2011/2012. Explanations the same as in Figure 2

TABLE 1. Mean density of wild boar population in the voivodeships from group I and II in hunting seasons of 2000/2001 and 2011/2012, in heads per 1,000 ha. Group I – hunting season 2000/2001 – size of population >10,000 heads in the voivodeship; Group II – hunting season 2000/2001 – size of population <1,500 heads in the voivodeship

Group	Voivodeship	Hunting season		Changes in season 2011/2012 vs. 2000/2001
		2000/2001	2011/2012	
I	West Pomerania	27.87	52.61	+88.77
	Warmia and Mazury	18.96	37.79	+99.31
	Wielkopolskie	20.54	36.30	+76.73
	Lubuskie	19.98	30.08	+50.55
II	Świętokrzyskie	4.64	14.77	+218.32
	Małopolskie	3.92	13.57	+246.17

seasons, the density in the voivodeships from group I was increased and was by 1.5–2 times higher than it results from the recommendations of SHC – Supreme Hunting Council (Uchwała 1999). The greatest differences in the size of forest area per one head in the compared seasons were recorded in the Małopolskie Voivodeship; it was by 3.5-fold decrease of forest area.

Burrowing of wild boar in field and forest cultivations increases the aeration of the soil what accelerates the degradation of humus particles and enriches the soil in nitrogen. It facilitates, *inter alia*, quicker natural renewal of forest cultures. On peat territories, burrowing causes, however, oxidation of unique substances present in the peat what disturbs incidence of natural species of plants and creates the conditions for living of invasive species. The wild boars, which live outside the limits of natural habitats of their incidence, may be the reason for degradation of species versatility of plants (Sondej and Jaroszewicz 2010). The degree of penetration of agricultural cultivation areas is determined by the seasons of the year, access of feed in forest habitats, being natural for the

discussed species and humidity in the forests, therefore, the phenomenon of intensity of hunting damages is foreseeable.

The level of utilization of wild boar population has been given in Table 2. In the compared seasons, it was similar in the voivodeships form group, including the fact that in seasons of 2011/2012 in the West Pomerania Voivodeship, it occurred to be the highest one and exceeded the level of 100%; in the Warmia and Mazury Voivodeship, it was the smallest one. The level of utilization of the population in group II vs. I was clearly lower; the differences amounted to ca. 40–60%. Flis (2011) expresses the opinion that hunting on the mean level of 85% is not sufficient and results in further increase of the population in the country. It intensifies the consequences, connected with the discussed phenomenon i.e. hunting damages and penetration of urbanized areas. Under the present environmental conditions, in which good feeding conditions are accessible, hunting size should be established on the level of ca. 100% of the spring number of animals. In exceptionally good habitats for the discussed animal species, the

TABLE 2. Level of utilization of wild boar population in voivodeships from group I and II in hunting seasons of 2000/2001 and 2011/2012. Explanations the same as in Table 1

Group	Voivodeship	Hunting season	
		2000/2001	2011/2012
I	West Pomerania	82.07	101.7
	Warmia and Mazury	84.90	73.95
	Wielkopolskie	84.68	88.02
	Lubuskie	82.62	85.26
II	Świętokrzyskie	39.88	39.31
	Małopolskie	44.52	62.70

increase of the population may reach to 150%, therefore, hunting size should be established on the level of the implemented gain (Flis 2011).

As it was given by Bieber and Ruf (2005), one of the solutions of the problem of the increase of wild boar number in Poland includes management of the population depending on the habitat conditions of animals; it should be diversified. When the population lives in worse environmental conditions, it should be managed via increase of the pressure to hunt sows. In case of correct management, the increase of the population is equal to 130–160%. It is supplemented by structural shooting, as recommended by the Supreme Hunting Council (Uchwała 1999). The goal of the structural shooting of wild boars is to make the population older via directing of hunting pressure to the youngest animals who, at early sexual maturation, cause a double increase of the population; another aim includes improvement of gender structure (females : males) as 1 : 1.1 in favour of male individuals. Shooting of squeakers should reach to 60% of all hunted heads during the hunting season, and it should constitute 2–3 times more than shooting of young animals (piglets). Shooting of the young individuals should amount to 30% and that of the oldest animals – 10% of the plan of hunting size (Uchwała 1999). Structural shooting will result in limitation of negative effects of the increase of the wild boar population in Poland, *inter alia*, decrease of the level of hunting damages in agricultural cultivations, and betterment of biotope utilization by the wild boars. It will have also an influence on the increase on the number of obtained animals.

CONCLUSION

There was recorded an increase in wild boar population in the hunting season of 2011/2012 vs. 2000/2001, including the highest one in the Świętokrzyskie Voivodeship (256%) and in the Małopolskie Voivodeship (264%), with the simultaneous high increase of hunting result (250 and 413%, respectively). The density of wild boar population increased in six examined voivodeships, irrespectively of the basic level of the population (size of the population in 2000/2001 in the voivodeships from group I >10 thousand heads and group II <1.5 thousand heads). The moderate level of utilization of the population occurred to be insufficient what caused a constant progression of the number of the population in the examined voivodeships in the years 2000–2011.

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- Streszczenie:** *Zmiany liczebności populacji dzika europejskiego (Sus scrofa L.) w wybranych województwach w Polsce w latach 2000–2011.* Celem pracy była analiza zmian populacji dzika europejskiego w wybranych województwach w Polsce w latach 2000–2011 oraz określenie ich kierunku z uwzględnieniem pozyskania łowieckiego i poziomu eksploatacji. Dane do analizy udostępniła Stacja Badawcza PZŁ w Czempiniu. Stwierdzono wzrost populacji dzika w sezonie łowieckim 2011/2012 vs. 2000/2001, w tym największy w województwach świętokrzyskim (256%) i małopolskim (264%), przy równocześnie znacznym wzroście pozyskania łowieckiego (250 i 413%). Zagęszczenie populacji dzika wzrosło w sześciu badanych województwach, niezależnie od bazy wielkości populacji (liczebność populacji w sezonie 2000/2001 w województwach z grupy I (>10 tys. szt.) i grupy II (<1,5 tys. szt.). Umiarkowany poziom eksploatacji populacji okazał się być niewystarczający, co spowodowało stałą progresję liczebności populacji w badanych województwach w latach 2000–2011.

MS. received in November 2013

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