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Condition of the Wild Boar (*Sus scrofa*) in the Steppe Ukraine

Key words: wild boar, area, steppe zone, Ukraine, population, dynamics, structure, biotopes, hunting

Introduction

Wild boars occupied steppe zone of Ukraine over the period 1957-1975. Main reasons of such geographical expansion were the following: protection of the present ranges of the species, changes in hunting regulations and introduction of more than 500 animals in different regions of the country. Within the short period wild boars occupied all suitable biotopes and became well-known to new generations of people. Such penetration into the steppe zone and creation of a stable population of the species, that was recently not numerous but later became the object of regular hunting, may be regarded as a unique event. Therefore the object of our long-term work is investigation of the wild boar ecology and morphology in the southern part of its range.

Material and methods

This work is based on the material collected from 1976 to 2002 in all southern regions of Ukraine. Main stationary investigations were carried out in the forests planted more than 100 years ago, in the hunting lands along the Sea of Azov coast and in the flood-lands of the Dnieper River. The material was collected during specific observations, census works, hunting, etc. We are grateful to our students for their assistance in such work. Some investigations of the wild boars' distribution in huge areas were carried out by plain or helicopter. Total study area is about 20,000 km². In addition, the wild boar ecology was studied during expeditions in the Dnieper, Dniester, Danube deltas and other regions. As a result of visual observations, new data about the distribution of more than 3,000 wild boars were collected. Structure of 612 herds, their dynamics in different seasons and periods of population development were investigated. Unfortunately, the structure of 9 big herds (n = 109) was not described due to bad visibility of the animals. It is only known that juveniles and yearlings were prevalent over adults. Special attention was focused on the information about dead wild boars (n = 452) and on the main causes of their death. Age of the dead wild boars was defined on the basis of their exterior features, craniometric characters and also judging from the development and condition of their teeth (Kozlo 1973, Möller 1984, Stubbe & Lockow 1992).

Reproductive peculiarities of the wild boar population were studied on the basis of structure analyses of 270 herds (1780 juveniles) and 257 ones (422 yearlings).

Discussion

Life conditions for wild boars in the steppe zone

The total area of the steppe zone is about 199,000 km² (36 % of the whole country). Agricultural specialization of the region is determined by favourable climatic conditions (total duration of the vegetation period is 190-195 days, period without frost lasts 120-130 days) and rich chernozem soil. Winter wheat, barley, maize, water-melon, melon and gourd growing, sunflowers and vegetables are cultivated here. There are a lot of gardens and vineyards. In total, 76.4 % of the area is covered by agricultural lands. Agricultural development of land is the highest in Europe – arable lands occupy 64.3 % of the total land area. Therefore, virgin steppe areas almost disappear. Machine-building, extractive and mining industry, ferrous and non-ferrous metallurgy are also developed. More than 19 millions of people occupied the steppe zone (mean density of 97.7 people per km²). The urban population in big towns is more than 1 million (Zaporozhzhye, Donetsk, Dniepropetrovsk, Krivoy Rog, Odessa).

Area

In the middle of the 20th century numbers of the wild boar in Ukraine were low because of unlimited hunting, and the range included two isolated populations. The population occupying the largest area was in the forest zone in the north of the country, a smaller population was located in the Carpathians. Besides, several small centres of the wild boar habitation existed in the forest-steppe zone, situated far apart. Owing to the hunting ban in 1950, and later due to limitation of the hunting period to the terms from 1 October to 31 December, numbers of this animal in Ukraine began increasing and the range expanded. After a short time the wild boar appeared in those areas where it had been vanished for more than 200 years (fig.1).

The Moldavian population was important for settling the western part of the steppe zone by wild boars. During 1955-1960 animals from Moldova regularly penetrated to the north areas of Odessa region. At the same time the wild boar also appeared in some areas of Kharkov, Lugansk, Donetsk, Zaporozhzhye, Dniepropetrovsk and Kherson regions.

In spite of increasing numbers and expanding range the process was rather slow. To speed it up animals of the subspecies *Sus scrofa ussuricus* were in 1957 introduced in the Crimea (n=37), in 1960 in surroundings of Cherkasy (n=13), and in 1961 they were released near Dniepropetrovsk (n=31). After several years this animal occupied the space around the places of release. Further artificial dissemination of a great number of the subspecies *S. s. attila* and their hybrids with *S. s. ussuricus* in the steppe zone and the Crimea contributed to transformation of the genotype (Voloikh 2001) and hastened the range development.

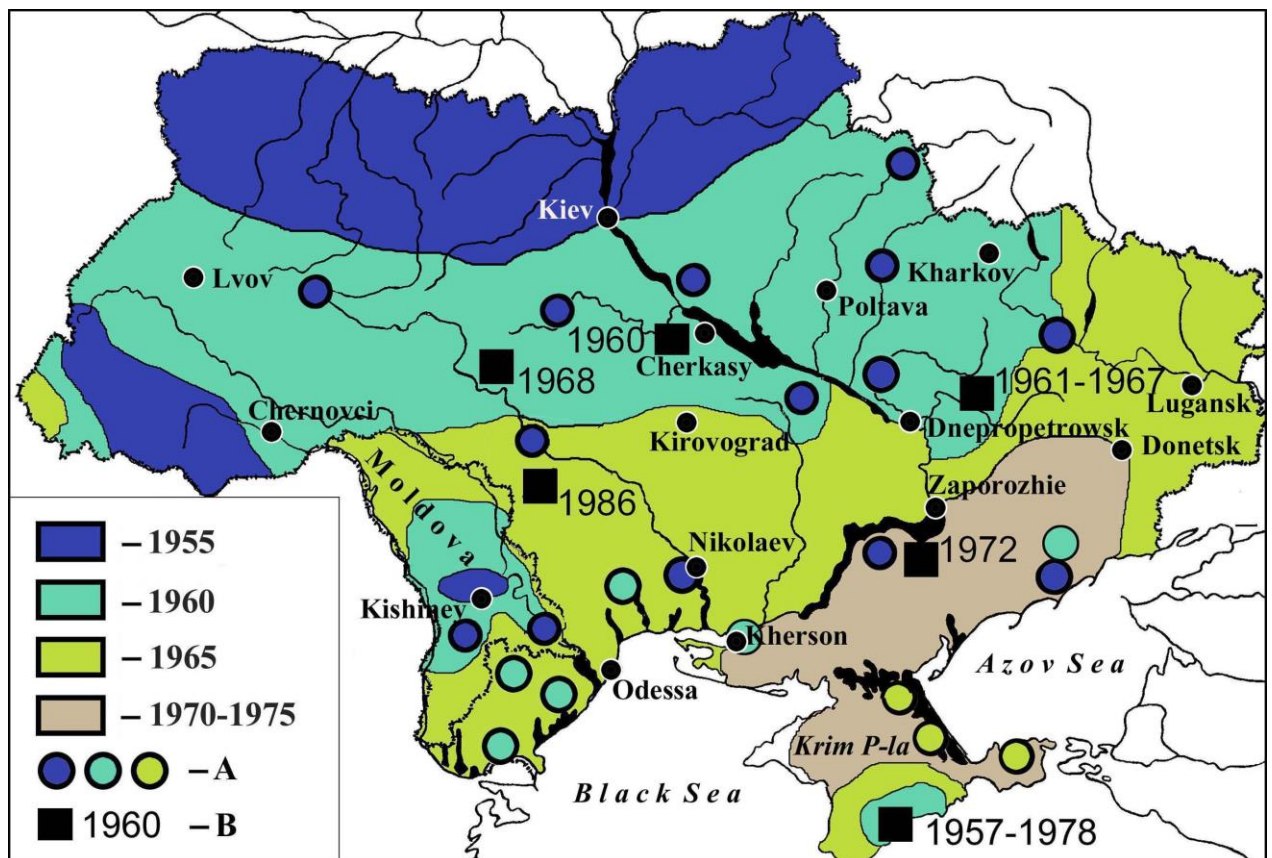


Fig. 1 Dynamics of the range of the wild boar in Ukraine: A – small centres of habitation; B – areas of the wild boar introduction in the steppe zone and the Crimea.

By 1965 almost the whole territory of Ukraine except for the areas adjacent to the Azov and

Black Seas were settled by the wild boar. The complete development of its modern range in the country has finished in 1975-1980.

Habitat distribution of the wild boars

Favourable biotopes of wild boars in the steppe zone are natural flood-land forests (most of them are preserved in the valleys of big rivers such as the Danube, Dnieper, Dniester, Southern Bug, Seversky Donets), planted forests (first of them were planted in 1834-1899) and forest shelter-belts grew all round the fields (Fig. 2). Most common species of trees and bushes in the forest shelter-belts are: *Acer negundo*, *A. tataricum*, *Fraxinus excelsior*, *Caragana arborescens*, *Gleditsia triacanthos*, *Quercus robur*, *Armeniaca vulgaris*, *Ulmus foliacea*, *Robinia pseudacacia*, *Crataegus monogyna*, *Ealeagnus angustifolia*, *E. argentea*, *Ligustrum vulgare*, *Rosa canina*, *Prunus spinosa*, *Lonicera tatarica*, *Morus nigra*, *M. alba*, *Cotinus coggigria*, etc. Total area of the afforestations in the steppe zone is more than 5000 km².

Characteristic peculiarities of the planted forests are: their small area (300- 2000 ha), high species diversity of trees and bushes (usually more than 100 species), and also the deviation in square blocks with the area of 4-15 ha each. During both the rest and reproduction periods, wild boars everywhere prefer pine plantations (*Pinus silvestris*, *P. pallasiana*) and reed beds (*Phragmites australis*). Large areas of the reed beds are situated along the coastal line of the numerous limans (estuaries) of the Black and Azov Sea (Fig. 2), and also in the flood-lands of all rivers and most gullies. Forest areas are the main resting places for the wild boars in the other countries as well (Spitz & Pépin 1985).

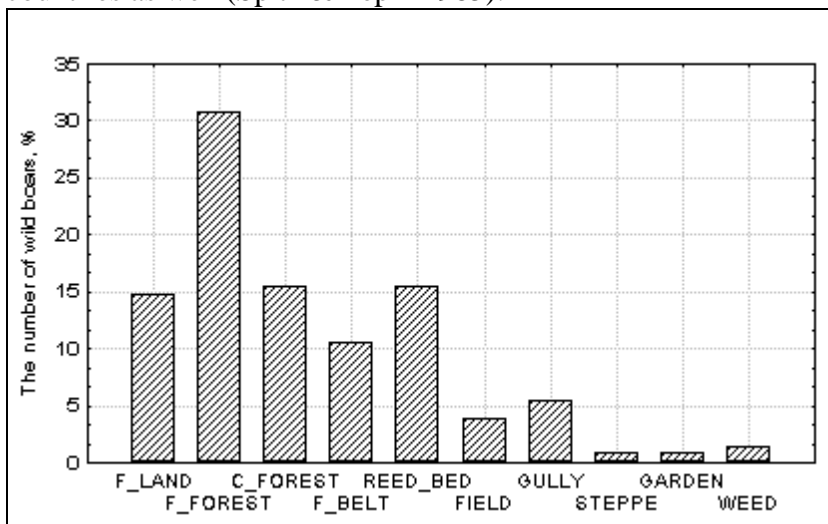


Fig. 2 Habitat distribution of the wild boar (n=3118)

As a result of the general decline in agriculture within the last years, wild boars found new preferable biotopes, such as heavy weed thickets on the fallow fields. Such weed vegetation sometimes looks like a dense tract in the uncultivated fields with the area of 40-300 ha. Wild boars also make their beds in maize, sunflower and sorghum plantations during the vegetation period. These are the most important temporary biotopes. Sometimes animals visit gardens where they collect apples, pears, cherries, mulberries and other fruits from the ground. In the fields they fed on wheat, barley, rice and especially maize crops or look for the new grains. Very rare wild boars are observed in the virgin steppe land within the reserves. In such areas they usually use blackthorn, dog-rose and pea (*Caragana mollis*) shrubs as the resting places. Wild boars often are harmful in the reserves because they dig out roots and bulbs of the rare steppe plants (*Adonis vernalis*, *Astragalus dasyanthus*, *Bulbocodium vernum*, *Eremurus thiodanthus*, *Iris halophila*, *I. pumila*, *I. pontica*, *Paeonia tenuifolia*, *Tulipa ophiophylla*, *T. quercetorum*, *T. shrenki* etc.).

Reproductive potential of the population

Present numbers of the wild boar steppe population are about 7.0-7.5 thousands of individuals (19 % of the total state resources). Reproductive potential of the population is relatively high. According to our data, 76.7 (60.0-82.4) % of the wild adult sows usually take part in reproduction (Volokh 2002). In a period of intensive development of steppe populations their mean fertility is 7.2 ± 0.26 juveniles per parturient female. Such fertility level is particularly high when compared with the results obtained in the Mediterranean countries. In Spain its mean value is only 4.3 (Sáez-Royuela & Telleria 1987). Nowadays the fertility of the wild sows has reduced. Most juveniles were born during 15 April – 5 May. Early (in March) or late (in July-August) parturition is very rare in the wild sows. Possible explanation of such a fact may be found in clear seasonal dynamics of the abiotic factors and appropriate adaptations of the wild boars. Therefore juveniles were born within the favourable climatic period that makes lower the level of mortality at the beginning of their life. The litter size of 5-7 juveniles (56.14 %) and 8-9 ones (28.07 %) is the most common. The litter size of 10-13 (10.53 %) juveniles or 1-4 (5.26 %) ones is rarer. Last ones are more typical for the parturient juvenile wild sows. The litter size decreases in July-October up to 6.3 ± 0.19 juveniles (range 1-10). In November-December, when the hunting season is opened, the mean litter size is 4.4 ± 0.21 (range 1-8). The level of natural mortality in the population is high within the winter-spring period, so the number of juveniles in one brood decreases up to 4.3 ± 0.35 in January and 3.1 ± 0.38 in March.

Broods with an adult female (4.0 ± 0.27) have essential advantage over the broods where the female was killed (3.5 ± 0.94). The difference between these characters is not significant ($t = 0.52$), but it is obvious that about 25 % of juveniles become orphans and potential preys of predators before the most severe season. Average proportion of juveniles at the beginning of the next reproductive period in the southern groups of the wild boars is about 30 %, as a result of hunting and juvenile dispersion. Such characters of survival are very similar to those known for the southern France (Spitz 1989).

Causes and level of the Wild boar mortality

Intensive agriculture and deficit of precipitation (300-450 mm per year) necessitated the development of artificial irrigation in the southern Ukraine lands. More than 20 big irrigation systems were built within the period from 1951 to 1994. Each of them irrigates the area of 13 - 357 thousands ha. Unfortunately, the water flows in deep irrigation canals with concrete banks that make insurmountable barrier on the path of all ungulates. Deer, elks and wild boars often are found dead in such canals during migration or after their unsuccessful attempt to drink water. Work of the big hydroelectric power stations along the rivers of Dnieper, Dniester, Danube and Southern Bug exert the negative influence on most of the animals. Sometimes, power stations escape too much water during the spring or autumn period. This water floods forests along the rivers that causes death of the wild boars, as a result of supercooling and subsequent illness. According to our data, 38.07 % of all animals found during the study period were drowned in irrigation canals and beds of big rivers. Real value may be even more because people killed and took home a lot of wild boars from the irrigation canals, so we have not information about all dead animals.

Non-periodical severe winters in the southern regions of the country also increase mortality of

the wild boars because a lot of juveniles die of starvation and illnesses. Overground parts of plants predominate in juveniles' diet composition in the steppe Ukrainian population as well as in the French ones (Dardaillon 1987). Food availability is limited after the end of vegetation period and in December, when juveniles have the highest body mass (50-70 kg), they reduce in weight against a background of intensive upgrowth. Energetic costs of life processes become too high during the severe winters and juveniles often die of starvation, supercooling and other negative factors (predators activity, poaching, illnesses). Most severe winter was in 1971/1972 due to the lack of snow cover and hard frost (air temperatures were about $(-25)^{\circ}\text{C}$ and $(-40)^{\circ}\text{C}$ in the east of the steppe zone). Dead juveniles were found in stacks where they tried to eat the straw and looked for warmth. Hard frosts were also in 1984/1985 and 1986/1987, but 20 days with thick (up to 5 cm) ice cover on the ground were most dramatic. In the February 1987 there was so much snow that the height of its cover in the fields was 20 sm even on 31 March. The level of the wild boars' mortality was very high in spite of people attempts to help the animals. Dead juveniles were found in the reed beds, in the nests where they usually rest.

One of the other important factors of mortality is hunting. At the beginning of use of the Wild boar resources, in 1970-1972, hunting experience was not sufficient and many wounded animals were found dead later (there proportion in total number of dead animals was 13.64 %). Poaching becomes an important factor at present. Lack of suitable habitats, their small area and, as a result, high vulnerability of animals, insufficient protection of the hunting areas, poverty of the rural population, unemployment and other social problems connected with the economic depression in the country raise the importance of abovementioned factor (Fig. 3). Some other factors also exist but they are not so important (clash with train – 2.27 % or car – 2.08 %, poisoning with pesticides, fertilizers, nitrates – 1.74 %, illegal hunting with meshes – 3.03 %, downfall from the precipices – 0.19 % and wolf attacks – 1.33 %). Wolf numbers have increased in Ukraine within the last years: there were 8 predators counted in the steppe zone in 1972 and 1134 ones – in 2002 (Woloch 2007). Total number of hunted wolves was 383 but local mortality of the wild boars and other wild and

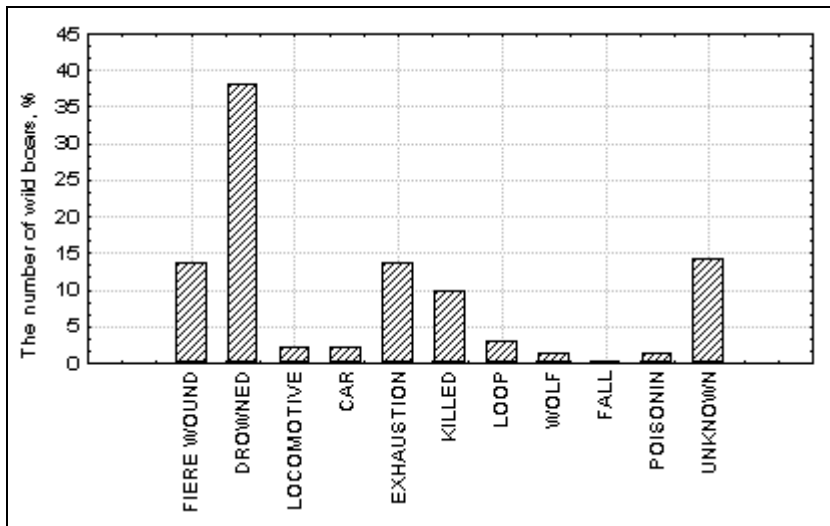


Fig. 3 Mortality and its main causes in the steppe population of the wild boar (n = 452)

domestic animals caused by wolves have increased. For example, wild boars on the Kinburn Peninsula (situated between the Dnieper Delta and the Black Sea) take second place after cattle in the wolves diet (Moskalenko 1999). Wolves' influence on ungulate animals is very essential in the north-eastern regions. More than 30 % of the Ukrainian wolf population inhabited forests along the Seversky Donets river basin.

Mass mortality of the wild boar and domestic pig juveniles in the Crimea was caused by pasteurellosis (in December 1965 and November 1968). Death of the wild boars caused by anthrax during the winter periods in 1995 and 1998 is known near the Romanian border. Several thousands of animals died because of pig-plague epizootic in the Central Ukraine in 1971-1972. This illness was not distributed in the steppe zone and its negative influence on the southern populations is limited (decrease of the migrant animal numbers). Contacts of the wild boars with domestic animals (cows, sheep and especially pigs) were the main causes of this epizootic.

Table 1 Distribution of dead wild boars

Age-class, month	Numbers		Eliminated	
	boars	%	Cumulated numbers	%
0 – 9	239	52.88	239	52.88
9 – 12	114	25.22	353	78.10
12 – 20	54	11.95	407	90.00
20 – 32	28	6.20	435	96.24
32 – 44	11	2.43	446	98.67
>45	6	1.32	452	100.00

The most of wild boars were found dead during the winter (56.82 %), less of them – in spring (24.07%) and in autumn (18.12 %) and only 0.99 % in summer. In the sample of 452 dead wild boars, 353 specimens were younger than 1 year (78.10 %). Animals at the age of 9 months or less make up 52.88 % of all dead ones (Tab. 1). Other dead animals were at the age of 1 year and 8 months (11.95 %), 2 years and 8 months (6.20 %), 3 years and 8 months (2.43

%) or 5 years and 8 months (1.10 %) and one wild sow (0.22 %) was 18 years old.

Age and sex structure of the wild boar steppe population

The structure of any population is a result of interaction between climatic, anthropogenic and biotic factors. Characters and intensity of hunting are important as well. Our data (Table 2) show very low proportion of males in the population (about 12 %) but just after delivery their mean proportion was 50 %. The negative role of hunting traditions in our country consists in prevalent hunting for meat and shooting mainly big beasts without taking into account their sex. Some attempts of population structure optimization and conservation of pubertal animals during the hunting season were made in the large state hunting lands.

Table 2 General structure of the Wild boar steppe population

Age and sex composition	Number of		Mean \pm SE	σ	Range	%
	herds	specimens				
Adult males	294	338	1.15 \pm 0.02	0.41	1 – 4	11.5
Adult females	327	474	1.45 \pm 0.05	0.81	1 – 6	15.6
Yearlings	257	422	2.04 \pm 0.11	1.54	1 – 8	14.3
Juveniles	270	1780	6.59 \pm 0.27	4.43	1 – 34	58.6
Unknown	9	109	12.11 \pm 4.39	12.13	1 – 33	–
Total:	612	3118	5.08 \pm 0.23	5.47	1 – 42	100.0

Male-yearlings (2nd year of life) leave the mother's pack when the juveniles are born. Some of them visited their relatives during the spring-summer season, but within the reproductive period males at the age of 1 year and 7-8 months start their migration (alone or in small groups) looking for free adult females (Volokh 2002). Such behavior is a general rule described in Poland (Pielowski 1963), Germany (Meynhardt 1982), France (Dardaillon & Beugnon 1987; Spitz 1987) and some other countries. Such packs consisted of 1-2 boars are the most common, packs of 6-8 animals are quite rare.

Such male age class is the most active and mobile part of the population, so their mortality is highest in comparison with the other pubertal classes. Young females often stay with the sow and participate in reproduction since the next year. They usually form big packs with their own juveniles and their mothers' juveniles (maximum was 42 individuals). Very rare, in the absence of adults, such young sows participate in reproduction at the age of 8-9 months. They usually copulate with their brothers. We investigated three wild sows that had fallen under the ice-cover and drowned on 7 February, 1989. They were 10 months old. Body mass of each animal was 74-75 kg. All females had big shot wounds and were pregnant (n = 4.4 and 5 embryos, terms – 60-70 days). Normally developed, the average weight of embryos was 63.4 g (range 33.0-141.5 g) and their total length was 12.7 cm (range 10.5-15.5 cm), and their composition was: 9 males and 4 females.

Boars spend most part of their life alone. They return to the herds only at the beginning of breeding. Packs of 1 boar and 2-3 sows with juveniles or without them are the most common within the reproduction period. We observed only one pack of 5 sows and 4 juveniles where 4 boars were present. One of them was very big and was killed by hunters (total body length – 196 cm, chest girth – 176 cm and 112 cm in height). Huntsmen and hunters told us about big herds consisted of 50-70 wild boars where 10 or more very big males were present. Such herds were

observed in some regions (in the Dniester and Danube Deltas) from December to the first decade of January, within the years with high animal numbers (1976–1986). At present, such big groups are not known because of the total number decrease and intensive hunting.

Number dynamics of the wild boar

Numbers of the wild boar grew rapidly, because of high biological reproductive ability of the species (Fig. 3). In 1979 in the steppe zone (not including the Crimean Autonomous Republic) were 12,600 animals. This figure was close to optimal and corresponded to the condition of main biotopes of the species for that time. The numbers of the wild boar was maximal (12,900) in 1988 when $22,1 \pm 1,71\%$ (15-28) years passed after its appearance in different areas of the steppe zone, though in each of them this maximum was reached in different years (Table 3).

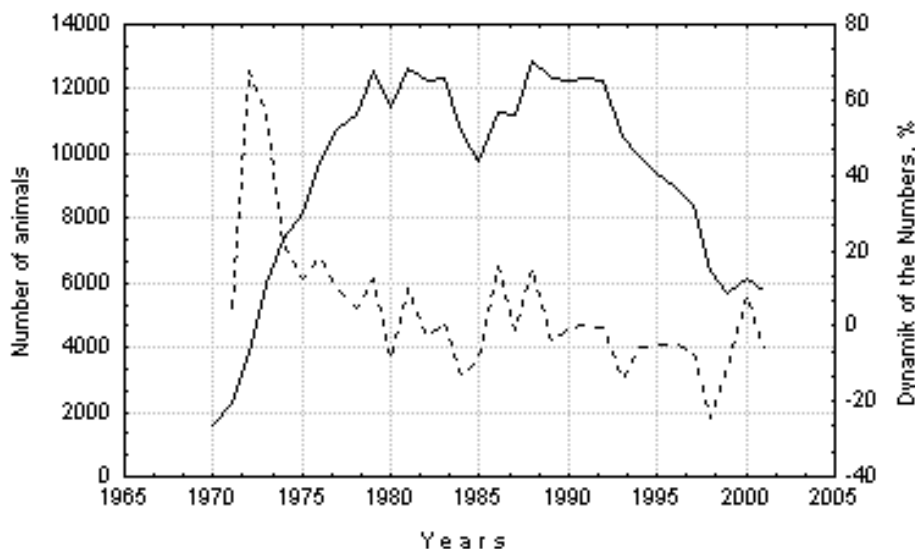


Fig. 4 Number dynamics of the wild boar (1) and its increase (2) in steppe populations

Over the period of intensive development of the steppe population of the wild boar (1971-1979), average annual increase of numbers equaled to 23.1 ± 7.66 (4.5-67.9)%. In Bulgaria it reached 22.7 % (Genov, Kocakov 1986). This is a low index for such a fertile species and points to high mortality level, because the population of the wild boar is able to increase by 130-180 % a year (Stubbe 1987; Danilkin 2002). For example, in some reserved areas of Belorus with rather severe winter frosts and great numbers of wolves, the increase of numbers exceeded 70% (Lavov, 1981), which is a result of effective conservation measures.

In addition to poaching in the steppe zone, populations suffered a lot from prevalent shooting of adult boars. In Dnipropetrovsk region in 1981-1983 a share of boars among hunted animals was 60-68% that caused decrease in numbers by 33 % (Gubkin 1985). In 1979 in the south of Russia (Rostov region) among 2,831 animals shot the share of piglets was only 14 % (Kazakov, Dalikov 1983).

From 1979 steppe aggregations of the wild boar came into stable phase, lasted till 1992. During this phase it was recorded a single but considerable reduction of numbers, that began in 1983 as a consequence of the excessive exploitation of animals.

Table 3 Number dynamics of the wild boar in different areas of the steppe zone

Region	Year when the wild boar appeared	Number, animals		Number decrease, % out of maximum
		in January 2002		
		maximum year	abs.	

Odessa	1957	1983	2562	1124	56,1
Nikolaev	1963	1991	1954	485	75,2
Kherson	1958	1980	1593	1084	32,0
Zaporozhzhye	1965	1980	1070	653	39,0
Dniepropetrovsk	1956	1981	2000	835	58,3
Donetsk	1961	1980	2230	790	64,6
Lugansk	1956	1976	4000	763	80,9

This depression was essentially added by severe winter frosts of 1984/1985 when a lot of piglets died. During these years numbers of the wild boar in the steppe zone of Ukraine became less by almost 2,600 (21.01%) individuals (Volokh 2002). However southern population quickly restored at the expense of high fertility, early sexual maturity, polyphagia and other biological characteristics, so their numbers continued fluctuating on rather a high level. At this, excepting for the depression of 1984/85, its dynamics was independent from other Ukrainian populations (fig.5), that points to a regional uniqueness of this process and distinct features of exploitation of the wild boar resources in the steppe zone.

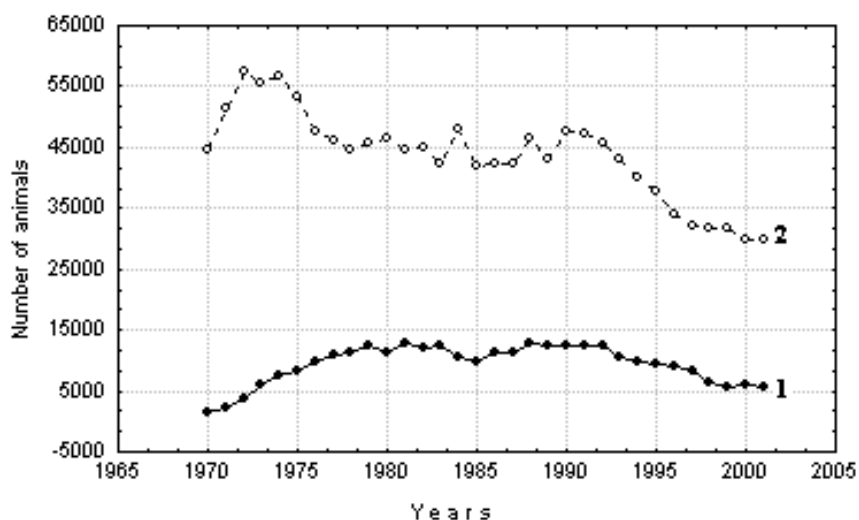


Fig. 5 Number dynamics of the wild boar (1) comparing with other regions of Ukraine (2)

Though in 1992-2000 reduction of the wild boar numbers by $7.7 \pm 2.89\%$ per year was recorded everywhere in the steppe zone, that coincided with the same process over the whole country. In some areas the wild boar resources decreased by 50-80% (Table 3). This phenomenon included also populations of other ungulates and has nothing in common with their natural dynamics. On acquiring independence Ukraine fell into economical and social crisis which brought about a great number of unemployed and poor people. For some of them the hunting became the only survival opportunity and thus all game populations especially ungulates became subjected to more poaching press than it had been before. Among other factors contributing to this process it should be mentioned increase of crime, corruption, low salaries of the staff of hunting economies, imperfect legislation, etc.

Conclusions

Ecological characteristics of the wild boar in the steppe zone show the perfect adaptation of the species to different habitat conditions. Such adaptation is based on the use of different temporary (agricultural lands) and stable biotopes, polyphagia, high level of fertility and high survival rate of juveniles. Complicate mechanisms of the regulation of population structure (migration of the young boars, higher level of their mortality, non-migratory young and adult sows, male dynamism in search of females, reproduction of juveniles in the absence of adults, ability to get

over geographical barriers, crossing of the wild population with domestic pigs, etc.) play an important role in expansion of the species to new areas and existence of stable marginal populations.

REFERENCES

- Danilkin, A.A. (2002): Swinnie. (Mlekopitayuschie Rosii i sopredelnich stran). "Geos", Moskwa. (In Russian).
- Dardaillon, M. (1987): Age-class influences on feeding choices of free-ranging wild-boars (*Sus scrofa*). – Can. J. Zool. **67**: 2792-2796.
- Dardaillon, M., Beugnon, G. (1987): The influence of some environmental characteristics on the movement wild boar (*Sus scrofa*). – Biol. Behav. **12** (2): 82 -92.
- Gubkin, A.A. (1985): Necotorie rekomendacii po razionalnomuvedeniyu okhotničego khozajstva Dnepropetrovsčini. – Voprosi stepnogo lesovedenija i naučnoj osnovi lesnoj rekultivacii zemel. Dnepropetrovsk: 137-141.
- Kazakov, B., Dalikov, R. (1983): Kaban v Rostovskoj oblasti. – Okhota i okhotničje khozajstvo **11**: 22-23. (In Russian).
- Kozlo, P.G. (1973): Age definition, selection and capture of the Wild boar. "Urozhay", Minsk. (In Russian).
- Lavov, M.A. (1981): Dinamyka i regulirovanie čislennosti kabana v Berezinskom zapovednike. – Zapovedniki Belorussii. Minsk **5**: 93-98. (In Russian).
- Meynhardt, H. (1982): Schwarzwild-Report. Mein Leben unter Wildschwein. Neumann Verlag, Leipzig Radebeul.
- Moskalenko Y.A. (1999): Use of the territory by the wild boars (*Sus scrofa* L.) in the forest-steppe region of the Black Sea Reserve. – Theses of the 6th Congress of Mammal Society. Russian Academy of Sciences, Moscow: 168. (In Russian).
- Möller, D. (1984): Beitrage zur Alterbestimmung des Schwarzwildes. – Unsere Jagd **34** (11): 232-233.
- Pielowski, Z. (1963): Badania ekologiczne nad dzikami w Puszczy Kampinoskiej. – Lowiec polski. **5**: 5-6.
- Sáez-Royuela C., Telleria J.-L. (1987): Reproductive trends of wild-boars (*Sus scrofa*) in Spain. – Folia zool. **36** (1): 21-25.
- Spitz, F., Pépin, D. (1985): Occupation de l'espace per le sanglier en zone de grande. – Trans. 17th Congr. Int. Union Game Biol., Actes Colloq., Biol. populat., Brussels 17-21 sept.,

1985. Pt. 2: 953-959.

- Spitz, F. (1989): Mortalité et dispersion chez le sanglier (*Sus scrofa*) de Camargue. – Gibier faune sauvage **6** (mars): 27-42.
- Stubbe, C. (1987): Lebensraumnutzung und Populationsumsatz des Schwarzwildes in der DDR – Ergebnisse der Wildmarkierung. – Unsere Jagd **37** (8): 220-230.
- Stubbe, C., Lockow, K.-W. (1992): Überprüfbare Altersbestimmung beim Schwarzwild. – Wild und Hund **95** (1): 10-11.
- Volokh, A.M. (2001): Wlijanie introdukcii na formipovanie polimorphnogo genotipa dikich kabanow (*Sus scrofa* L.) na Ukraine. – Struktura i funkcionalna rol tvarinnogo naseleennija w prirodnych i transformirovannich ekosistemach. Dnepropetrowsk: 124-125. (In Russian).
- Volokh, A.M. (2002): Nekotorie ekologičeskie charakteristiki južnoj marginalnoj populacii dikogo kabana (*Sus scrofa* L.) w Ukraine. – Zool. Ž. Moskwa **12**: 1506-1514. (In Russian).
- Woloch, A. (2007): Dynamik der Fauna der Jagdsäugetiere in der Südukraine im 20. Jharhundert. – Beiträge zur Jagd & Wild forschung **32**: 239–249.

Summary

Condition of the Wild Boar (*Sus scrofa*) in the Steppe Ukraine

Most preferable biotopes for the wild boars are natural planted forests (where more than 70 % of animals were observed) and reed beds (more than 15 % of observations). About 75% (60.0-82.4) of adult females participate in reproduction. In a period of intensive development of steppe populations their fertility is 7.2 ± 0.26 juveniles. Broods of 5-7 juveniles (56, 14 %) and 8-9 ones (28.07 %) are the most common. Broods of 10-13 (10.53 %) juveniles or 1-4 (5.26 %) ones are rarer. Nowadays the fertility of the wild sows has reduced. The size of broods decreases in July-October up to 6.3 ± 0.19 juveniles (1-10). In November-December when the hunting season is opened, the size of broods is 4.4 ± 0.21 (1-8). Later, the number of juveniles in one brood decreases up to 4.3 ± 0.35 in January and 3.10 ± 0.38 in March.

Main causes of the wild boars' mortality are: work of hydro-electric power stations and melioration systems, severe winters (in 1971/1972, 1984/1985 and 1986/1987) with the air temperatures about $(-25)^{\circ}\text{C}$, long-term snowfall, ice-cover on the ground and also poaching. The numbers of wolves increased in 1995-2000 and mortality of the wild boars caused by attacks of predators also has increased. Death of the wild boars caused by pasteurellosis and anthrax is known. Among 452 wild boars found dead there were 78.10% animals at the age less 1 year (52.88 % of all investigated ones were younger than 9 months). Other dead wild boars were at the following age: 1 year and 8 months (11.95 %), 2 years and 8 months (6.20 %), 3 years and 8 months (2.43 %), 5 years and 8 months (1.10%) and one wild sow was at the age of 18 years. The wild boar steppe population includes 58.6 % of juveniles (1st year of life), 14.3% of yearlings (2nd year of life), 11.5% of adult males and 15.6% of females.

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