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LONG-TERM POPULATION RECORDS – A CRUCIAL FACTOR FOR THE SUCCESS OF THE RE-ESTABLISHMENT OF EUROPEAN BISON (*Bison bonasus*) POPULATION IN UKRAINE

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Abstract

Akimov I., Kozak I., Kryzanovskij V., Perzanowski K.: Long-term population records – a crucial factor for the success of the re-establishment of European bison (*Bison bonasus*) population in Ukraine. Ekológia (Bratislava), Vol.20, Supplement 2/2001, p. 57-62.

After the elimination of last bison in the wild between 1919–1926, successful re-introduction of this species in Ukraine started in 1965. Animals originated from various breeding centres in Russia, Byelorussia, Lithuania, and Crimean Peninsula. Introduction took place in 4 sites in the Carpathians, and in 7 lowland parts of the country. After an initial growth of the population, a decline in bison numbers is observed since the mid-nineties. At present, there are 489 bison in Ukraine, in 11 free – ranging herds of size varying between 3-148 individuals. At least two of them are at critical situation. Mortality results mostly from poaching, over-hunting and some endemic diseases. Unknown remain also genetic aspects like the level of inbreeding – potentially limiting reproductive success, or contributing to lower survival rate. Among the most important aspects is potential crossbreeding of animals belonging to pure lowland Bialowieza line, with those of mixed lowland – Caucasian descent. That may become a major threat for a significant part of original gene pool of European bison. Sound management of the free-ranging bison is at the moment possible only on the basis of detailed examination of existing bison records, pedigree books etc. The analysis of long-term records on the origin of a herd, sex composition, breeding history etc. is necessary to create the data base necessary for further exchange of individuals, designing supplementing procedure for threatened herds, and re-introductions connected with the program of European bison re-establishment in the Carpathians and Ukraine.

Introduction

Last two, free living populations of the European bison: in Bialowieza and in the Caucasus, became extirpated respectively in 1919 and in 1927. First Ukrainian attempts

in 1937, towards the re-establishment of bison population, could not be completed due to the World War II. The effort has been initiated again in 1965 (Pererva et al., 1989).

Presently living European bison are the descendants of few individuals that survived in captivity. They were all but one belonging to the lowland sub-population from Bialowieza. The only exception was a bull from Berlin ZOO, originating from the Caucasus Mountains (Pucek, 1989, 1991). From the very beginning, efforts were made to separate spatially pure blood Bialowieza line, from animals carrying genes of the Caucasian bison (Zabinski, 1968). For individuals living in enclosures, detailed breeding records are kept, and published in European Bison Pedigree Book (Pilarski, 1989; Raczynski, 1998). Genetic information on free-living herds remains however limited, and the only source of knowledge on their origin are records on individuals used for an introduction, supplemented by data on subsequent population dynamics and migrations.

Study area, materials and methods

The study was based on records kept at Ukrainian breeding centres, nature reserves (Zapovedniki), and state hunting enterprises. Collected were data on the origin of the herd, the sex and age structure of introduced group, number of animals in every year between an introduction and present, present population structure, and mortality. The complete information has been collected on 11 herds: 7 from the lowland part of the country (Cumanskie, Danivskie, Konotopskie, Lopatinskie, Podilskie, Uladivskie, and Zaliskie herds), and 4 from the Carpathians (Bukovinskie, Nadvirnanskie, Rozluczskie, and Skolivskie herds). Compared were population trends, spatial distribution, and main causes of mortality.

Results and discussion

The reintroduction of the bison to Ukraine has been initiated in 1965 (Cumanskie and Majdanskie herds). Following introductions were performed in 1967 (Zaliskie herd), 1970 (Bukovinskie herd), 1976 (Uladivskie and Nadvirnianskie herds), 1980 (Danivskie and Lopatynskie herds), 1986 (Konotopskie herd). In 1992, Majdanskie herd has separated into two groups: Rozluczskie and Skolivskie, and in 1994, 16 animals from Uladivskie herd have migrated to Chmelnytska Province to form the Podilskie herd (Table 1).

Bison in Ukraine were introduced in groups varying between 6 – 19 animals (12 on average), usually with a slightly higher proportion of females. In most cases, their numbers grew up until the mid-nineties, when they started to decrease. Since this tendency prevails in largest herds, the whole bison population in Ukraine is on decline for last several years (Fig. 1, 2).

At present, within Ukraine exist one semi-free and 10 free – ranging bison herds, of size varying between 3-148 individuals, 489 bison in total. Only in four cases, the number of animals in a herd exceeds 50 (Cumanskie, Danivskie, Uladivskie and Bukovinskie herds).

T a b l e 1. The origin of European bison introduced to Ukraine

Herd	Source	No of animals	Year
Bukovinskie	Prioksko-Teraskij Reserve	4	1970
	Okski Reserve	9	1970
	(Russia)		
	Berezinski Reserve	6	1970
	(Byelorussia)		
Cumanskie	Byelorussia	13	1965
Danivskie	Prioksko-Teraskij Reserve	2	1980
	(Russia)		
Danivskie	Bachczysaraj	10	1980
	(Crimean Penninsula)		
Konotopskie	Zaliskie Hunting Reserve	14	1985
	(Ukraine)		
Konotopskie	Zaliskie Hunting Reserve	11	1993
	(Ukraine)		
Lopatinskie	Hunting Reserve Nadjamestis	6,6	1980, 1981
	(Lituania)		
Majdanskie	Byelorussia	10	1965
Nadvirnianskie	Okski, Prioksko-Teraskij Reserve	7	1976
	(Russia)		
Podilskie	Uladvskie herd (migration)	16	1994
Rozluczskie	Division of Majdanskie	8	1993
Skolivskie	Division of Majdanskie	17	1993
Uladvskie	Cumanski Hunting Reserve	6	1976
Zaliskie	Byelorussia	8	1967

Two of them: Podilskie and Nadvirnianskie herds have reached a critical level (respectively 3 and 4 individuals) and are at the verge of extinction.

Undoubtedly, widespread poaching is responsible for this situation, since only in 1999 20 animals disappeared due to unknown reasons. In some cases, diseases significantly contribute to that decline (Nadvirnianskie herd). However at the moment, only a little is known on the genetics of Ukrainian bison, while the high degree of inbreeding may lower their reproductive success, or contribute to lower survival rate.

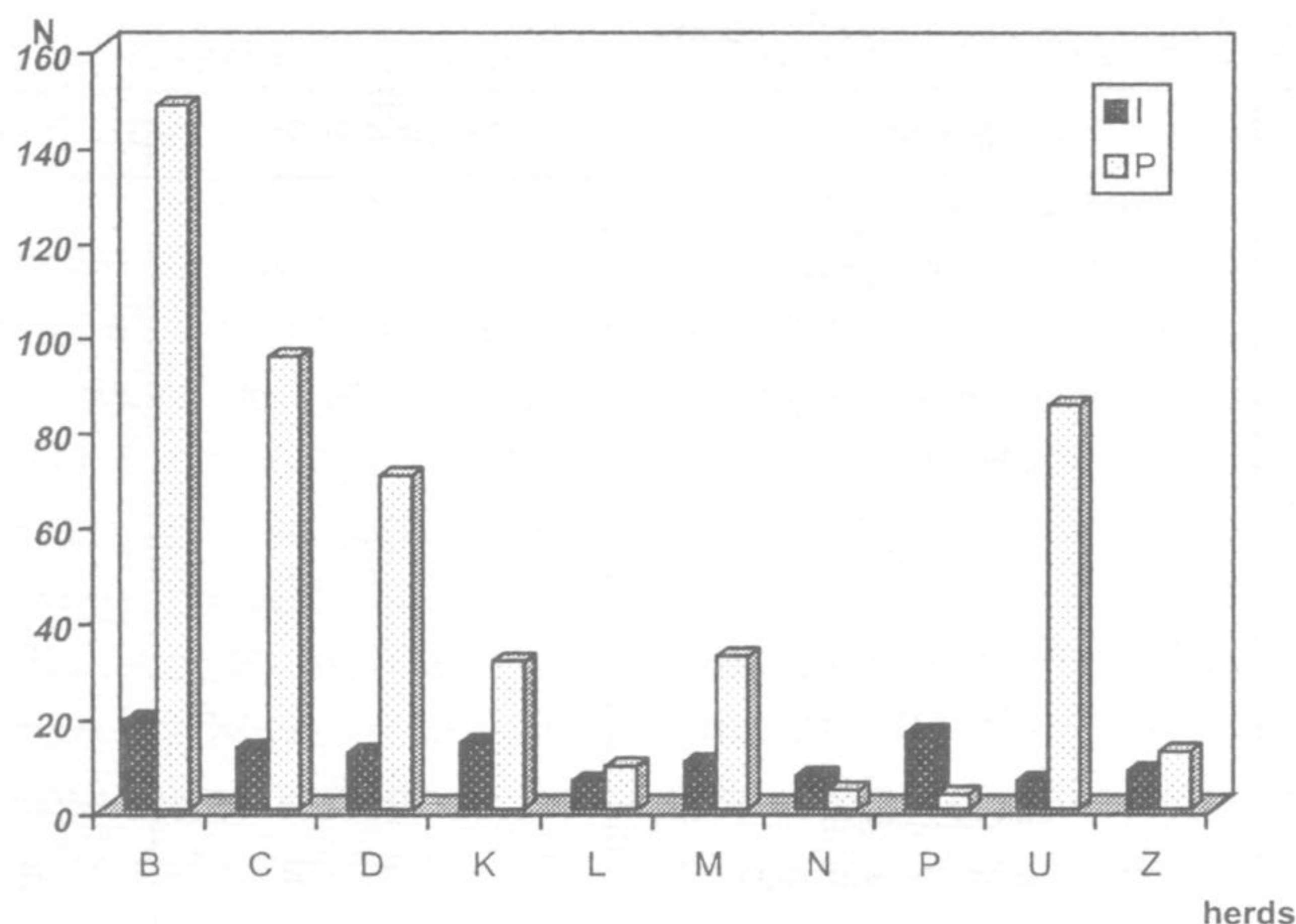


Fig.1. Initial (I) and present (P) European bison numbers in Ukrainian herds: B – Bukovinskie, C – Cumanskie, D – Danivskie, K – Konotopskie, L – Lopatinskie, U – Uladivskie, P – Podilskie, M – Majdanskie (divided in 1993 into Skolivskie and Rozluczskie herds), N – Nadvirnianskie, Z – Zaliskie.

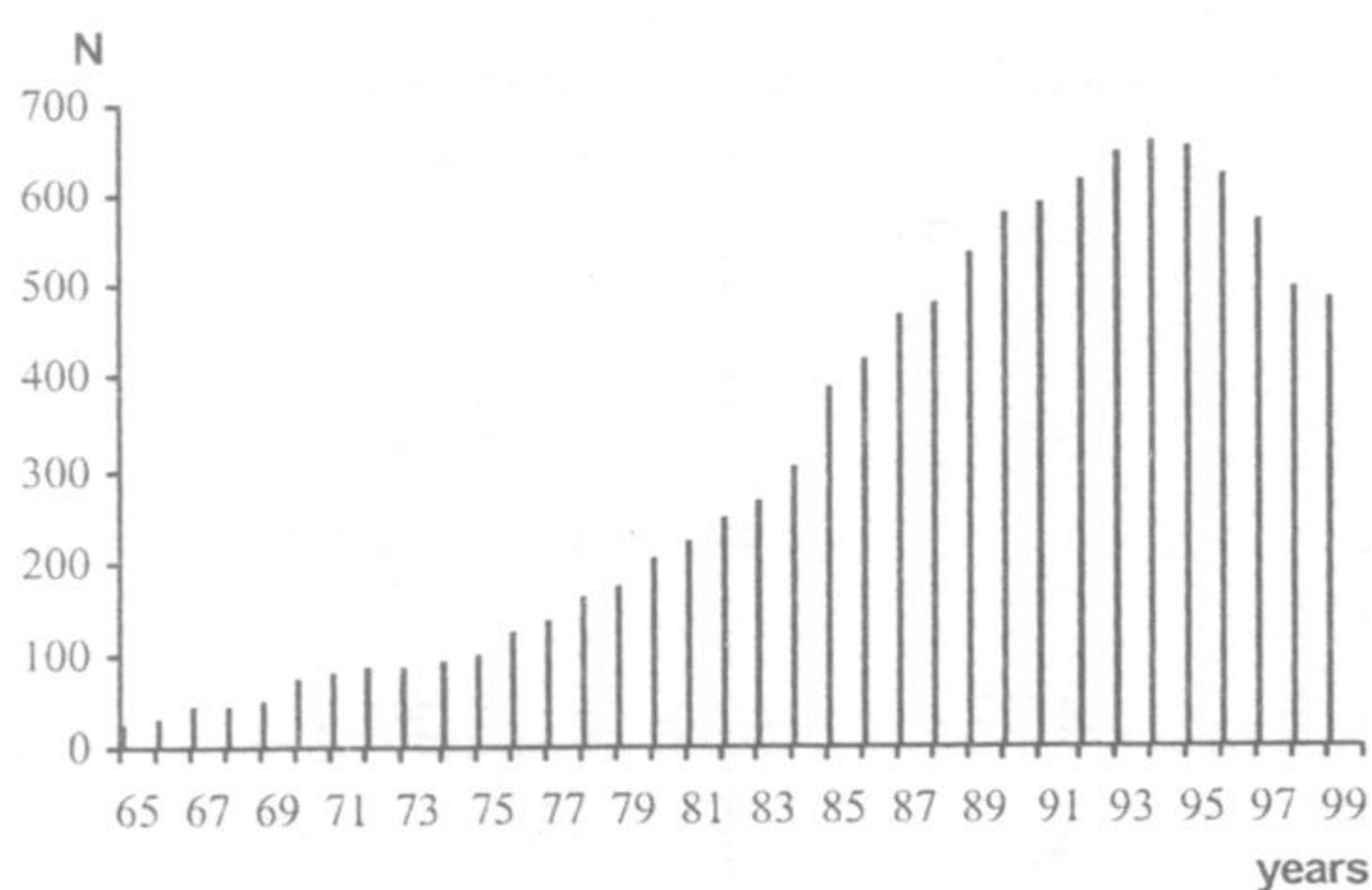


Fig.2. Population dynamics of the European bison in Ukraine between 1965 and 1999.

Even more dangerous in a longer perspective is a potential loss of an original gene pool resulting from uncontrolled cross-breeding among bison belonging to different bloodlines. In some cases the only existing information on pedigree is the source of a migration. At the moment, the only available data on genetics in free-ranging herds can be derived from records on the origin of a herd, sex composition, breeding history, and population dynamics.

The preliminary analysis of spatial distribution of bison herds in Ukraine suggests that the majority of lowland herds are doomed to remain in isolation due to the lack of suitable migratory routes. In the Carpathians, only the bison from Majdanskie herd (at present separated into two smaller herds: Rozluczskie and Skolivskie) have a chance for a contact with Polish herds inhabiting Bieszczady Mountains, and the Bukovinskie herd may in future become a part of Romanian-Ukrainian sub-population (Perzanowski, Kozak, 1999) (Fig. 3).

In order to maintain healthy bison population, some exchange of individuals has to be considered in a near future, as well as supplementing existing herds with excess animals from European breeding centres. However, until a comprehensive genetic study of the Eu-



Fig. 3. The present distribution of bison herds in Ukraine: C – Cumanskies, D – Danivskie, K – Konotopskie, L – Lopatinskies, U – Uladivskie, P – Podilskie, M – Majdanskies, N – Nadvirnianskies, B – Bukovinskies, Z – Zaliskies.

ropean bison population would be performed, the program of re-establishment and further management of that species has to be based on available long- term population records.

Translated by the authors

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Akimov I., Kozak I., Kryzanovskij V., Perzanowski K.: **Dlhodobé zápisy populácií – rozhodujúci faktor úspechu reintrodukcie populácie Európskeho bizóna (*Bison bonasus*) na Ukrajine.**

Po likvidácii posledného bizóna medzi rokom 1919-1926 sa úspešná reintrodukcia tohto druhu začala na Ukrajine v r. 1965. Zvieratá pochádzali z rôznych chovných centier Ruska, Bieloruska, Litevska a Krymského poloostrova. Introdukcia sa realizovala na 4 lokalitách v Karpatoch a 7 nížinných lokalitách krajiny. Po počiatkoch raste populácie od polovice deväťdesiatych rokov sme zaznamenali úbytok v počte bizónov. V súčasnosti je na Ukrajine 489 bizónov v 11 voľne žijúcich stádach a ich počet sa pohybuje od 3 do 148 jedincov. Dve stáda sú v kritickom stave. Úmrtie je zapríčinené pytlactvom, nadmernou poľovačkou a niektorými endemickými chorobami. Genetické aspekty sú neznáme, podobne i úroveň rozmnožovania sa v rámci plemena, čo potenciálne môže limitovať úspešné rozmnožovanie, alebo prispievať k nižšiemu ročnému prírastku. Medzi najvýznamnejšie aspekty patrí potenciálne kríženie zvierat z nížiny Bialowieza s jedincami zo miešanej nížiny Kaukazských svahov. Pre významnú časť originálneho genofondu Európskeho bizóna to môže znamenať podstatné ohrozenie. Vhodný manažment voľne žijúceho bizóna je momentálne možný iba na základe podrobného výskumu existujúcich údajov, rodokmeňov atď. Na základe analýzy dlhodobých zápisov o pôvode stáda, pohlavného zloženia, histórie rozmnožovania atď. treba vytvoriť databázu, ktorá bude slúžiť na výmenu jednotlivcov na určovanie doplňujúcich postupov pre ohrozené stáda a na reintrodukcie spojené s programom reinstalovania Európskeho bizóna v Karpatoch na Ukrajine.