

The sex and age-related characteristic and the analysis of the natural reasons of death of European bison (*Bison bonasus L.*) in the breeding station of the Oksky reserve

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Abstract: The author has analyzed reports of dissecting carcasses of animals and certificates on deaths of 128 bison from 1960 to 2008. The highest death rate is observed among bison being about one year old (57%). The mortality rate within a year occurs unevenly. In summer, autumn and winter there is an increase of this factor. Causes of animals' death in the breeding station have been classified according to the groups: traumas, diseases of different organs, invasion and infectious diseases. The main cause of animals' death are traumas – 43.7%. Helminthosis, problems of digestive apparatus and poisoning are on the second place among the death reasons. Bison under one year die of traumas, still birth, breakage of an umbilical cord, and absence of mother's milk.

Key words: death, traumatism, helminthosis, diseases, European bison

Introduction

In a breeding station, within a limited territory, the continuous control and supervision of bison can be performed. If an animal is dead, it is almost always possible to establish terms of the death and the reason, as well as the exact age of the animal. It is difficult to receive such a full and exact information if it happens in natural environment.

Materials and methods

The material were reports of *post-mortem* examination of animals and certificates of death of 128 bison in years from 1960 to 2008. European bison died because of various reasons. Among them there were 5 cases of the enforced slaughter: Melagres, 2 years old – a trauma of a backbone, Melisa, 19 years old – a pneumonia, an animal in an agony etc.

Results and discussion

The sex and age-related characteristic

All dead bison are divided into 4 age groups depending on their age:

- 1 group – bison under one year

- 2 group – young animals (from 1 to 4 years)
- 3 group – adult animals (from 4 to 15 years)
- 4 group – old animals (above 15 years)

Most often calves under one year die (57%), therefore this group is the most numerous (Fig. 1). The death rate of calves during the first 2 days of their life is 52 %.

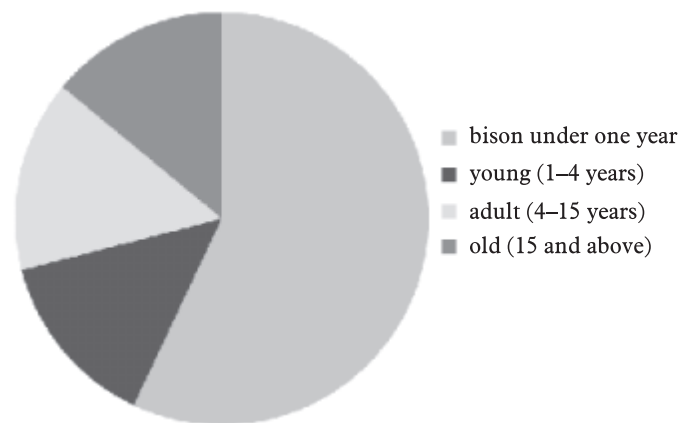


Figure 1. Age groups of dead bison

The death of calves under one year is one of the basic indicators of viability. In the Prioksko-Terrasniy reserve 657 bison were born between 1950 to 2003, the death rate in the group under one year was 13.9 % (Treboganova 2004). In our breeding station from 1960 to 2008, 369 animals were born and death rate in this group was 19.2 %.

Among older bison death rate considerably decreases, and in class between the 2–4 year of life it is distributed in regular intervals.

On Fig. 2 the ratio of males and females in each group is presented. In the first group the death rate is higher in males. The major differences are observed in the group between 2–4 year of life where less males die than females. This can be explained by the fact that in the breeding station animals at the age of 2 to 4 years are selected for the breeding program and number of females is much higher.

Surplus animals are released to bison natural habitat. Thus in the breeding station older females always prevail, and in a consequence also among the dead animals. In natural environment the situation is quite opposite. Under natural conditions in the Belovezhskay Pushcha males at the age of 2–15 years die more often than females (Vasiljuk 1974; Korochkina, Kochko 1983).

In the conditions of the breeding station of Oksky reserve the maximum life expectancy for males is 19 years (the Meteor of 19 years and 4 months), and for females – 22 years (Murmanka 22 years and 3 months).

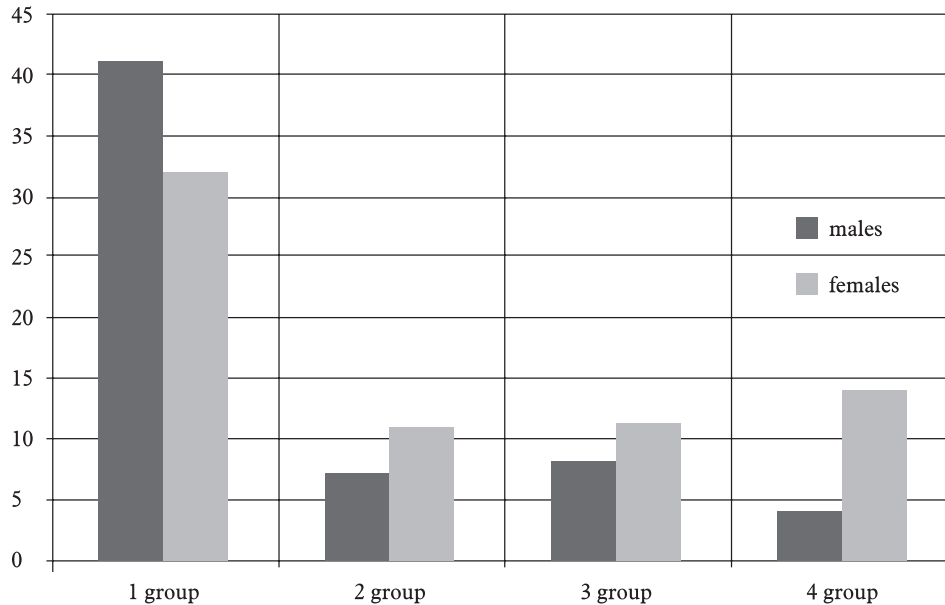


Figure 2. The ratio of males and females in age groups

The death of animals within a year occurs unevenly (Fig. 3). In the summer the highest death rate is observed with two peaks: in May-June when a majority calving takes place and so the death of calves during the first days of their lives, and in August, when except calving the rut begins during which increases the number of injured animals.

During the autumn – winter period (October-December) high death rate is also observed due to the injuries of animals in the second wave of rut, and the calves which are born late and are not adapted to the cold. During the early-spring period the lowest death rate is observed. As in the breeding station animals obtain supplemental food all the year round, there are no weak bison. For wild population of bison living in the Belovezhskaya Pushcha in the past, there was an early – spring increase of death rate, that was connected with death of animals weakened after winter (Korochkina, Kochko 1983).

The analysis of the reasons of death

Causes of animals' death in the breeding station have been classified according to the groups: traumas, diseases of different organs, invasion and infectious diseases (Table 1). The original cause was taken as a basis, for example: an animal was suffered from helminthosis – dicroceliasis which led to a liver cirrhosis or the animal was traumatized, as a result it had a sepsis, a peritonitis, an exhaustion etc.

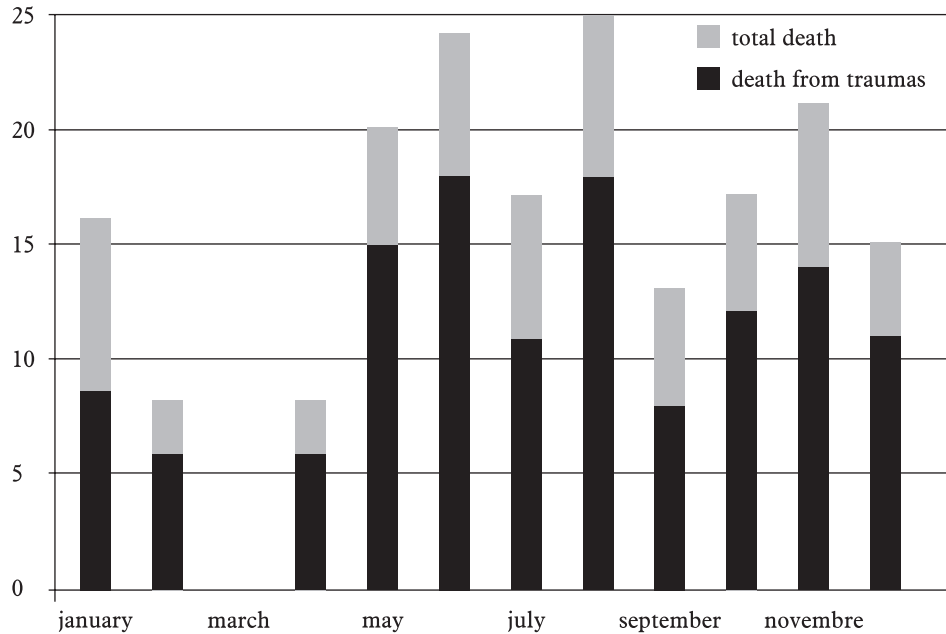


Figure 3. The death of animals within a year

Among death reasons on the first place are traumas (43.8 %). As a rule, bison inflict traumas on each other during the rut period, in feeding places where high density of animals is observed. In 52 cases death was caused by heavy numerous wounds with injuries of internal organs: perforation of an abdominal wall with ingluvies and bowel damage; in thoracic cage – penetrating heart wounds, lung laceration; serious fractures are fixed. Three bison were killed by fallen trees. For example: in August 2000 during a hurricane a female and a 3 month-old were killed by a tree. The increased danger of bison traumatism is observed when they are caught and transported. In 1986 there was a caught bison died because of the traumatic shock caused by the fracture of the mandible (Kiselevà, Ibragimov 1986).

Perinatal pathology represents particular interest. The perinatal pathology is a set of the changes occurring in fetus during an intrauterine life and at newborn within the first week of the life (Zharov, Ivanov *et.al.* 1982). Four cases of still birth were recorded. Aborted fetuses were recorded 3 times, and in one case the female could not calve, and only after her death the fetus in a putrefaction condition was removed. Eight cases of breakage the umbilical cords accompanied by a voluminous bleeding and as consequence a paralysis of the respiratory center and cardioplegia, caused by sharp oxygen starvation were noted. Another numerous group consists of young bison dying of hunger and an exhaustion because of absence of mother's milk.

Table 1. Causes of bison death in the breeding station from 1960 to 2008

Cause of death	calves to 1 year	young	adults	old	total	
					n	%
Traumas	34	10	6	6	56	43.8
Still birth, aborted fetus	8	–	–	–	8	6.2
Umbilical cord breakage	8	–	–	–	8	6.2
Absence of milk, an exhaustion	9	–	–	–	9	7.0
Diseases of digestive tract	1	2	3	2	8	6.3
Poisoning	3	2	1	1	7	5.5
Diseases of cardiovascular system	–	–	1	5	6	4.7
Diseases of respiratory organs	2	–	1	–	3	2.3
Diseases of urogenital system	–	–	3	–	3	2.3
Helminthosis	5	3	1	3	12	9.4
Rabies	–	–	1	–	1	0.8
Piroplasmosis	–	–	1	–	1	0.8
Not established reasons	3	1	1	1	6	4.7
Total	73	18	19	18	128	100.0

Among diseases of the digestive organs which caused the death of animals it is necessary to mention one case of tympanites (sharp gastric dilatation), traumatic reticulus (damage of a wall of reticulum by a foreign body), chronic and hemorrhagic gastroenteritis and problems of a gastrointestinal tract (3 cases).

Six bison died of poisoning, but the exact character of poisoning was not established. To this group we refer the death of a bison connected with immobilization with dithylinum in 1972, as a result of the overdose and edema of lungs the heart stopped working.

The death of bison from diseases of cardiovascular system is noted basically among old animals. With the diagnosis of age-related myocarditis 4 bisons at the age of 19–22 were lost. One female died of an internal hemorrhage which was the result of arteriorrhexi, and a male died from cardiovascular collapse.

Among diseases of respiratory organs, 2 cases of a pneumonia from overcooling of bison under one year were recorded, and one case of edema of lungs in an adult male. It fell down into a hole under a hay feeding manger, its horn, shoulder, back and loin were under the bottom pole, its feet lost a support, the death came from asphyxia and cardioplegia as a result of edema of lungs.

Three adult females died of metritis. This disease is connected with unsuccessful calving: detention of placenta, destruction of a fetus. Animals died of a paralysis of respiratory and heart centers and because of an intoxication of an organism with decaying uterus.

Helminthosis is an invasive disease. In the reserve 21 species of helminth have been noted (Kiseleva, Tsibizova 2003). Among the lost animals there were 12 cases of death because of helminths. The most widespread disease is dictyocaulyosis (8 animals), mostly young bison. Helminths are found in lungs and a trachea that in some cases leads to an asthma and death of the animal. Two bison died of an intoxication caused by helminthiasis. Nineteen year old male died of dicroceliasis and a binary liver cirrhosis. An unusual case is a bison (aged 2.5) that died of coenurosis, helminth by volume of 700–800 ml had developed in the brain that led to a considerable atrophy of nerve tissue and a hematoma in a cerebellum (Kiseleva, Tsibizova 2003).

In 1986 the unique case of rabies was recorded. (Kiseleva 2000).

Piroplasmosis is a disease caused in cattle by *Piroplasma bigeminum* and it refers to the group of piroplasmidosis. In 2003 a male death from the mentioned disease was recorded, the bison was kept in a demonstration open-air cage.

In 6 cases, which are referred to last group, the true cause of death of animals was not established. In 2 cases the remains from carcasses of newborns found in some days didn't allow to establish the cause of death. During the period from 1999 to 2004 from time to time some animals left the territory of the bison nursery and lived in the natural environment. During that period 4 bison didn't return to the breeding station. A carcass of one of them was found by chance, it was partially eaten out by wolves, stray dogs. We can suggest that these cases were illegal shooting of animals.

Conclusions

As the analysis has been made during a rather long period (48 years), it allows us to receive more exact sex and age – related characteristic of dead animals and to single out the principal causes of bison death.

1. The highest death rate is observed in bison about one year old (57 %), and half of cases happens with animals younger than 2 days.
2. In the youngest group among the dead animals prevail males, and in the group 2–4 years old dominate females.
3. The death rate of bison within a year is uneven. In summer, autumn and winter there is an increase of this parameter.
4. Bison under one year die of traumas, still birth, breakage of an umbilical cord and absence of mother's milk.
5. The main cause of animals' death are traumas – 43.7 %.
6. Helminthosis, problems of digestive apparatus and poisoning are on the second place among the death reasons.
7. The maximum life expectancy of bison in the nursery is 19 years for males, 22 years for females.

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