

CHARACTERISATION OF HAEMATOLOGICAL PROFILE IN BISON (*EUROPEAN BISON*) AND CATTLE (*BOS TAURUS*) FROM THE NE OF ROMANIA

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Abstract

The study aims to characterize morphology of cellular elements and the haematological profile of bison raised in Reserve Dragos Voda Neamt by reference to the bovine herds maintained in the same area, which had similar growth conditions and maintenance. Analysis results allow identification of quantitative and qualitative approach and differentiation of erythrocyte and leukocyte series studied. Morphological similarities of expression stand for blood cell elements and limits of variation of the constants of variation for the two species.

Key words: bison, haematology, cattle

INTRODUCTION

The European bison is arguably the largest herbivore mammal in Europe, with a peculiar protection status, as it is included among the European Community interest species in The Habitat Directive. Unfortunately, its imposing stature attracted not only fame, but also its demise. Subjected to irrational hunting, it disappeared from the European fauna at the beginning of the 20th century. Presently, the species is included in various population recovery and sustainable genetic diversity programs (The European Endangered Species Program - EEP, Action and Preservation Plan - IUCN, The European Strategy for Bison Preservation - EBCC). Thanks to unending support of some passionate specialist, by the end of 2011, there were 4500 European bison specimen worldwide. Remarkable since 1954, the population recovery initiative started with only 54 European bisons that have survived in different European zoological gardens. Since 2004, the Vânători Neamț Natural Park administration has carried out a pioneering enterprise, the first Romanian wilderness integration program. The first release into the wild happened in March 2012 with 5

specimens (3 males, 2 females), as further European bisons will be set free in the future. As an endangered species, considerable efforts have been made to breed and free them. This study presents a detailed characterisation of the haematological profile of the bisons bred in half-captivity from the Vânători Neamț Natural Park. [3] [4] By analysing the available literature and taking notice at the scarcity of data available regarding the study's domain, we aimed at adding further information in order to better describe the physiological profile of the half-captivity bred European bisons [5, 6]. In order to achieve a very accurate and thoroughly characterisation we only consider the cattle bred in the same geographic area.

MATERIAL AND METHOD

The research was carried out upon two ruminant species bred in Neamț area, one raised in the farming system, specifically *Bostaurus* (20 individuals: 10 males and 10 females), the other raised in captivity *Bison bonasus* (11 individuals: 2 males and 9 females).

The research aimed at the description of the blood cells' morphological aspect by May Grünwald-Giemsa coloured blood cytosmear. The quantitative determination was obtained using the automated analyzer ABX Vet, by recording RBC, PCV, Hb, MCV, MCH, MCHC, WBC as well as the leukocyte formula.

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The blood samples were prelevated from the jugular vein for both of the species.

In the case of the European bisons, they were sedated before taking the samples.

In order to minimise the bisons' stress, the sedation was carried out while these were approaching the feeding grounds. The sedative must comply with a series of criteria: to allow intra-muscular injection, to be systemic non-toxic, to be effective in small dosage, to be effective shortly after inoculation.

In this case a mixture of Detomidine (Domosedan – Pfizer) was used with a dosage of 0,2 mg/kg, and ketamine 10% (Ketaminol, Ketamin), with a dosage of 10-12 mg/kg. It was intra-muscular inoculated, by using a 10 and 20 ml syringe shot from a Telinject VARIO 3V compressed-air rifle. It is common to use supplementary ketamine dosage for females, as they are harder to sedate than the males [1].

After the intervention is concluded, the specimen is given an antidote (atipamezole), with a dosage of 0,4 mg/kg, the double of the inoculated sedative. The physical abilities of

the bison are regained 10-12 minutes after the antidote is taken.

RESULTS AND DISCUSSIONS

The haemography is a basic screening test, and it is the first step in ascertaining the haematological status and the diagnose of the various haematological and non-haematological diseases.

The quantification of the haematological parameters associated with the cytosmear examination is providing relevant data regarding the physiological status of the specimen at the examination moment [1].

By analysing the morphology of the presented elements for the bison, we notice similarity to the common cattle. The lymphocytes (Figure 1) have round nucleus, brightly coloured, while the cytoplasm is visible as a thin blue stripe.

The neutrophils (Figure 2) have a single nucleus and numerous pink granules are visible in the cytoplasm.

The eosinophils have a granule covered nucleus (Figure 3).

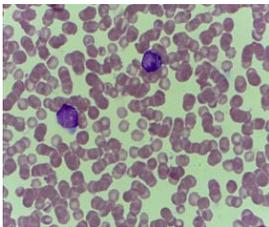


Figure 1-bison lymphocyte
(*Bison bonasus*) May
Grünwald-Giemsax1000.

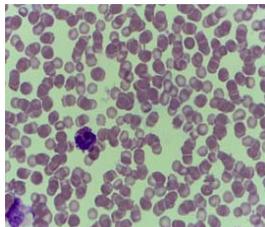


Figure 2-bison neutrophil
(*Bison bonasus*) May
Grünwald-Giemsax1000.

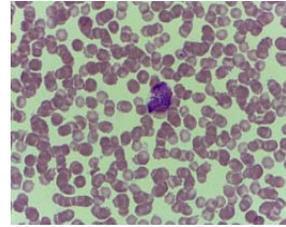


Figure 3-bison eosinophil
(*Bison bonasus*) May
Grünwald-Giemsax1000.

In the aspect of the erythrocyte series for the bison (Table 1), we notice that the erythrocytes varies between $8.04 \times 10^6 \text{ mm}^3$ and $8.43 \times 10^6 \text{ mm}^3$ for adults; the maximum value is recorded for youth, respectively $12.86 \times 10^6 \text{ mm}^3$.

The haemoglobin recorded a minimum of 15.16 g/dl and a maximum 17.1 g/dl for the adult specimen.

By comparing the data recorded for the two studied species, we notice higher values for the European bison.

The leukocyte series recorded variation in the total leukocyte number, between $7.2 \times 10^3 \text{ mm}^3$ and $10.56 \times 10^3 \text{ mm}^3$.

By analyzing the leukocyte formula for the cattle (Table 2) we notice leukocyte's predominance, at a rate of 60-70% in the cytosmear. For the bison, a insignificant oscillation of the neutrophil - lymphocyte ratio was noted, as their close values were recorded.

Table 1- Blood values to bisons

No.	Age	Sex	Season	Values obtained											
				RBC ×106/mm ³	PCV %	Hb g/dL	MCV μm ³	MCH pg	MCHC g/dL	WBC 103/mm ³	N %	L %	E %	Ba %	Mo %
1	7	♀	spring	8.04	33.6	17.1	42	21.3	50.9	7.2	46	42	10	-	0.2
2	7	♂	spring	8.4	47.68	16.8	57	20,2	35.23	9.35	33	63	3	-	1
3	7	♀	summer	8.15	42.17	15.4	58	18.8	36.51	10.56	43	46	7	-	0.6
4	7	♂	summer	8.43	42.26	15.16	50	17.98	35.87	10.52	48	44	5.6	-	0.6
5	2	♂	spring	12.86	67.8	21.2	53	16.5	31.3	8.23	32	58	9	-	0.1

Table 2 – Blood values in cattle

No.	Age	Sex	Season	Values obtained											
				RBC ×106/mm ³	PCV %	Hb g/dL	MCV μm ³	MCH pg	MCHC g/dL	WBC 103/mm ³	N %	L %	E %	Ba %	Mo %
1	7	♀	spring	5.91	28.50	8.9	46	15.08	32.24	6.47	26	67	4	0.4	2.2
2	7	♂	summer	5.90	28.12	9.16	47	15.56	32.56	6.86	32	62	3	0.6	2.8
3	7	♀	summer	6.18	29.6	9.5	49	15.49	31.43	6.5	29	65	3	0.5	2.8
4	7	♂	summer	6.21	28.14	9.28	46	15.04	32.23	7.21	32	61	4	0.6	2.8

CONCLUSIONS

As a result of recorded data analysis, the following may be concluded:

- The hematocrit for the bison recorded higher values than for the cattle;
- The total number of erythrocyte and the haemoglobin for the bison recorded higher values than the cattle ;
- The neutrophil/lymphocyte ratio is not lymphocyte biased for the bison as it is for the cattle.

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