

VALUES OF SOME HAEMATOLOGICAL INDICES IN WHITE STORKS (*CICONIA CICONIA*), REARED IN CAPTIVITY

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The information about the values of haematological parameters in most wild avian species is limited and inadequate. The white stork is an example of this fact. Despite its wide distribution and common rearing in zoos, only two reports with haematological investigations in freely living growing and adult white storks are available (Alonso *et al.*, 1991; Puerta *et al.*, 1989).

The haematological values in birds could be used when the clinical evaluation is based on a complex analysis of animal status and each change in the red, total or differential white blood cell counts could indicate a definite pathology. The present study aimed to present the values of some haematological parameters in a limited number of white storks reared in captivity, as such data are lacking in accessible literature.

The experiment was performed in 6 clinically healthy white storks (*Ciconia ciconia*) reared in captivity in aviaries of the Green Balkans Federation of Nature Conservation NGOs, Stara Zagora, 3 storks of each gender, aged > 1 year, fed with fish, frogs and other small amphibians and reptiles, a diet that was the closest possible to their natural one. In order to

minimize the stress reaction of the birds, they were not submitted to a detailed physical examination and their state was evaluated only on the basis of their behaviour and appetite. Blood for analysis was sampled from each bird once, in August, via puncture of the brachial vein.

Blood haemoglobin content was determined colorimetrically as cyanmethaemoglobin (Drabkin, 1945). The red blood cells (RBC), thrombocytes (Thr) and white blood cells (WBC) were counted in Türk's chamber within an hour after sampling of blood. The differential counting of white blood cell classes was done on blood smears stained with May-Grünwald and Giemsa stains via enumeration of 200 cells.

The values of haemoglobin content, RBC, total and differential WBC counts, thrombocytes obtained in our study and these of other authors are presented in Table 1. All data are given as mean ± standard error of the mean to allow the best comprehension and comparison.

The light microscopic evaluation of the shape, size and structure of erythrocytes, thrombocytes and leukocytes revealed that they did not differ from those of known avian species (Aengwanich *et*

**Table 1.** Blood parameters in the white stork (*Ciconia ciconia*) and painted stork (*Mycteria leucocephala*) (mean±SEM)

Parameters	White stork*	White stork**	Painted stork***
Red blood cells (10 <sup>12</sup> /L)	5.12±0.34	2.59±0.12	3.24±0.82
Hematocrit (%)	n.i.	44.10±1.30	0.42±0.36
Hemoglobin g/dL	12.96±0.91	13.90±0.80	17.67±1.56
Thrombocytes (10 <sup>9</sup> /L)	32.64±1.95	12.00±1.70	12.90±4.20
White blood cells (10 <sup>9</sup> /L)	28.29±1.67	23.78±2.36	38.80±2.60
Heterophils (%)	41.83±1.05	72.30±5.20	10.60±9.49
Basophils (%)	0.67±0.21	0.50±0.20	1.00±1.33
Eosinophils (%)	3.17±0.48	4.80±1.20	12.00±8.54
Lymphocytes (%)	53.83±1.05	20.40±4.60	76.10±10.28
Monocytes (%)	0.50±0.22	1.90±0.40	0
Number of birds	6	7	10

\* our data; \*\*Alonso *et al.*, 1991; \*\*\*Aengwanich *et al.*, 2002; n.i.=not investigated.

*al.*, 2002). This finding disagrees with the statements of Alonso *et al.* (1991), having reported that thrombocytes were much smaller than those in domestic chickens.

The RBC counts and their haemoglobin content were higher than in some domestic species (chickens, Japanese quails, pigeons) (Mihailov *et al.*, 1999; unpublished data of ours). At the same time, the values obtained by us did not correspond to similar data in freely living birds from the same species that had less RBC but higher haemoglobin concentrations (Alonso *et al.*, 1991).

The WBC counts were similar to those in freely living white storks, but the lymphocyte/heterophils ratio, providing information about the level of the stress reaction, was very different. In our experiment, it was 5/4 whereas the ratio reported by Alonso *et al.* (1991) was 2/7. The high ratio indicated a stress reaction (Scope *et al.*, 2002). In our study, thrombocyte counts were more than twice higher. Similar differences were present between our data and those in freely living

painted storks that had higher haemoglobin content, lower thrombocyte counts, elevated WBC counts and heterophil/lymphocyte ratio of 1/7.6 (Aengwanich *et al.*, 2002).

At a higher extent, the comparison of our results (despite the limited number of birds) with those of Alonso *et al.* (1991) in freely living birds did not support the hypothesis of some authors that the rearing of birds in captivity do not influence considerably their haematological parameters (Puerta *et al.*, 1990, DeCraw *et al.*, 1979). That is why, we assume that the diagnostics based on blood indices interpretation should always take into consideration the way of life with regard to make a correct comparison with healthy animals living under similar conditions.

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