

Evaluation of Some Serum Biochemical Parameters in Wild Birds Around Bucharest International Airport

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Abstract. There were assayed glucose, uric acid, total proteins, albumins, AST, and calcium levels in blood samples collected from crows, magpies and pigeons around Henry Coanda Bucharest airport. All assays were performed on an IDEXX Vet Test Analyzer, dry chemistry methods, 10 samples for each species. The obtained mean values were for glucose 325 mg/dL in crows, 539 mg/dL in magpies and 419 mg/dL in pigeons. Total proteins were 1.6 g/dL in crows, 4.3 g/dL in magpies and 3.9 g/dL in pigeons, and albumins 0.6 g/dL in crows, 1.6 g/dL in magpies and 1.8 g/dL in pigeons. AST activities mean values were 681 U/L in crows, 539 U/L in magpies and 392 U/L in pigeons. Calcium levels had close values, in all three species, 10.0, 10.9 and 9.4 mg/dL in crows, magpies and pigeons. Uric acid presented mean values of 10.7 mg/dL in crows, 16.2 mg/dL in magpies and 5.5 mg/dL in pigeons.

Key words: glucose, uric acid, total proteins, albumins, AST, calcium

INTRODUCTION

The presence of birds around airports, due to the opportunity to find food, water, living and reproduction possibilities represents an increasing risk for aircrafts. The bird strike problem has become more important over time because of the crowded airspace, due to both civil and military traffic, faster aircraft, and significant increase of hazardous bird populations (3). The United States Federal Aviation Administration (FAA) appreciates that the costs produced by collisions between birds and aircrafts are over 600 million dollars and the loss of hundred of lives. Detection, removal and capture of the birds in the airport area represents some of methods to manage bird strike risk (10). Despite the importance of this subject, little is known about blood chemical profile of these birds.

MATERIAL AND METHODS

Animal samples consisted of sera collected from crows, magpies and pigeons around Henry Coanda Bucharest airport, captured with a special designed cage.

All assays were performed on an IDEXX Vet Test Analyzer, dry chemistry methods, 10 samples for each species.

RESULTS AND DISCUSSION

Uricemia presents large variation among species (4, 6). The mean values obtained in the considered samples may be included in the domain reported by other authors. The most

interesting aspect of the obtained results, presented in figure 1, is that in pigeons values are less than one third of those recorded in magpies and about a half of those recorded in crows.

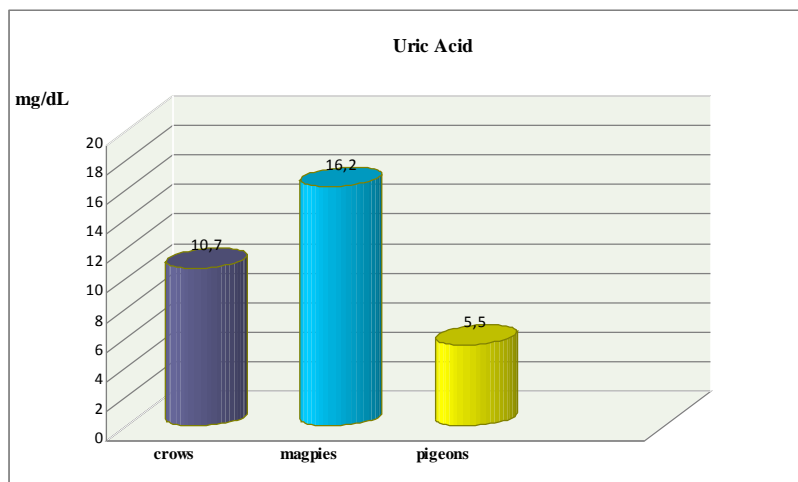


Fig.1. Uricemia mean values (mg/dL)

Calcium presented close values in all species studied. Results are presented in figure 2.

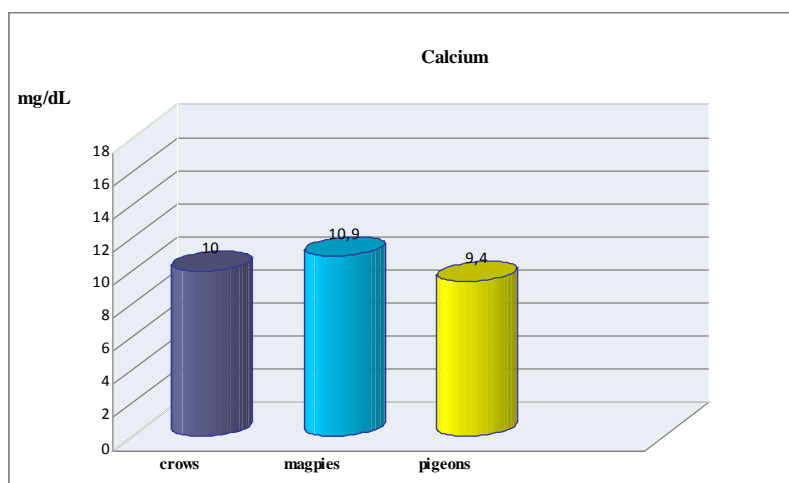


Fig.2. Calcemia mean values (mg/dL)

Blood proteins, albumins and globulins, reflect the equilibrium among liver metabolism, immune cells activity and other tissues function. Crows sera presented the lowest total protein mean level, about a half of the concentration found in the other two studied species (fig. 3).

Albumins mean concentration was also decreased to about one third of the other samples studied (fig.4). These values may be correlated with a poorer nutritional state and also with a liver decreased capacity of albumin synthesis.

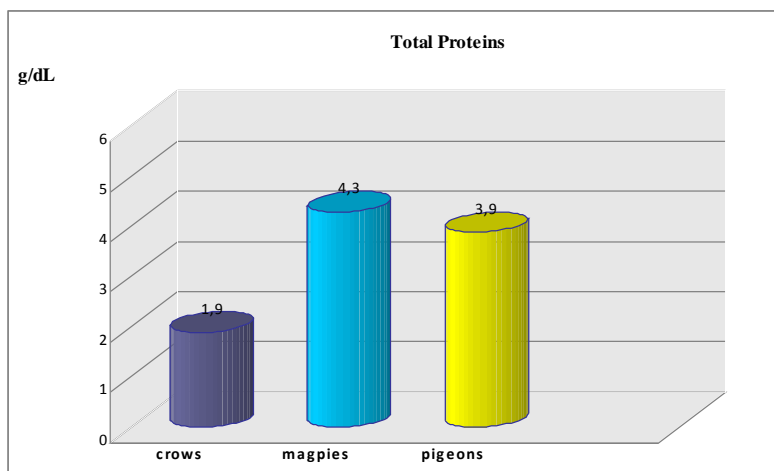


Fig.3. Total proteinemia mean values (g/dL)

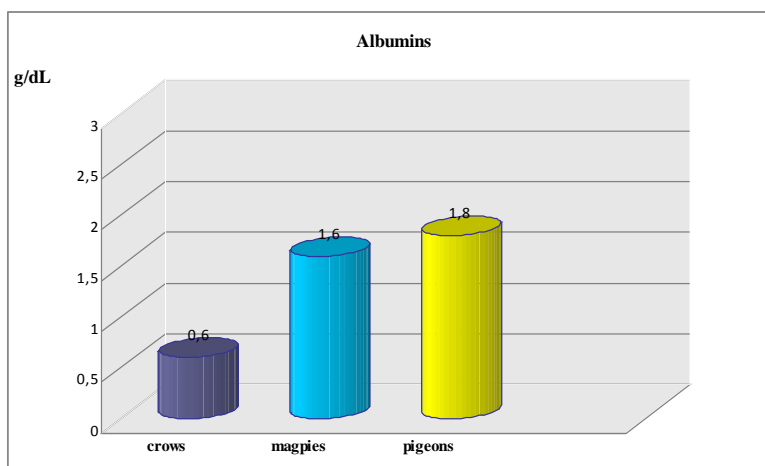


Fig. 4. Albuminemia mean values (g/dL)

Transaminases are the most explored serum enzymes in birds' health evaluation (1,5,6). Previous results emphasize a great variation among the reported values for transaminases activities, particularly for AST (9). This may be due to the assay methods used, wet chemistry and dry chemistry may give different values, especially if the samples are hemolysed. In the present approach, values, presented in figure 5, showed that the mean values in crows were much higher than in the other species studied.

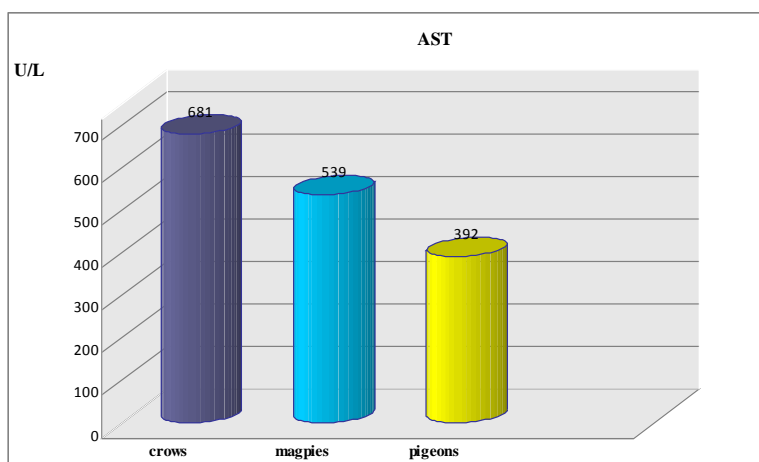


Fig. 5. AST activites mean values (U/L)

The previously reported values of serum glucose differ very much among authors and species too (2,7). Glycemia values reflects not only nutritional status of the birds, but it is also correlated with other physiological and environmental conditions, particularly with stress associated with the airport's activity. Results, presented in figure 6, show that the magpies have the highest mesn glycemia and the crows the lowest.

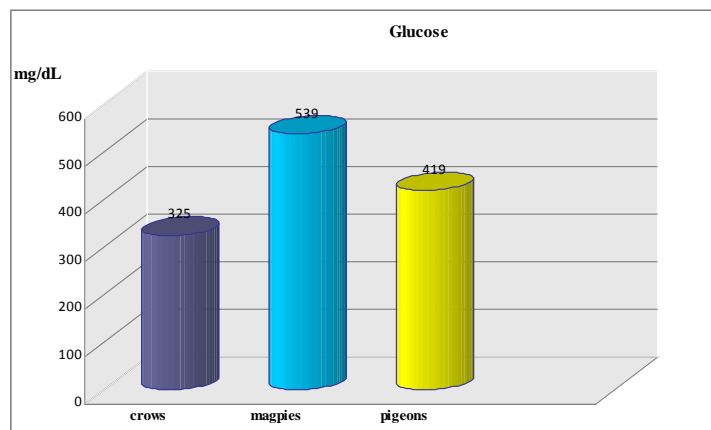


Fig. 6. Glycemia mean values (mg/dL)

The major limitation of our study was that it could not be evaluated neither the nutritional, nor the physiological status of the birds studied. It is also recognized that circadian and seasonal variability influence birds metabolism (8), as well as sex and race. These factors were not considered in this preliminary study. It may be assumed that pollution around the airport influence birds metabolism and consequently their behavior. All the studied samples presented both higher glycemia and AST values as compared to domestic birds, but further studies are necessary to investigate if there may be established a correlation between hepatic effects of pollution and the birds aggressive.

CONCLUSIONS

Recorded AST higher values in all birds studied as compared to domestic birds reported data may be considered an evidence of the chemical pollution in the airport area.

The lower values of total proteins and albumins in crows, correlated with the highest AST activity in the blood of these birds suggest that they are more affected by the pollution.

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