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BIOCHEMICAL BLOOD PARAMETERS OF FALLOW DEER (DAMA DAMA) FROM FARMS IN BOSNIA AND HERZEGOVINA

BIOHEMIJSKI PARAMETARA U KRVI JELENA LOPATARA (DAMA DAMA) SA FARMI U BOSNI I HERCEGOVINI

Sinanović N., Zahirović A., Čamo D., Ćoralić Agnesa, Ćutuk A.

Sažetak - Farmski uzgoj jelena lopatara (Dama dama), relativno je novijeg datuma i, tokom zadnje decenije, prati ga značajan progres. Kvantitativni progres ne prati kvalitetan menadžment, naročito njegov zdravstveni segment, jer vlasnici u želji za manjim ulaganjima žele postići zadovoljavajuće rezultate. Ovo u konačnici ima smanjen uzgojni kvalitet stada, i rezultate koji su ispod očekivanih.

Obzirom na navedeno stanje, u našoj zemlji ne postoje sistematska istraživanja zdravstvenog statusa ovih životinja. Cilj nam je bio evidentirati biohemijske parameter klinički zdravih grla.

Predmet naše opservacije bila su 32 grla, oba spola, različite tjelesne mase i dobi kondicije. Na osnovu pretraga dobili smo statistički pokazatelje za AP, ALT, AST, glukozu, kreatinin i ureji.

Na ovaj način evidentirani su prvi rezultati u Bosni i Hercegovini za navedene biohemijske parametre. Komparacijom s srodnim istraživanjima u susjednim zemljama dobiveni rezultati služe kao podloga za buduća istraživanja kao i osnova za provođenje redovnog zdravstvenog monitoring na farmama jelena lopatara u Bosni i Hercegovini.

Ključne riječi: jeleni lopatari, farme, biohemijski parametri

Dr. sc. Nasir Sinanović, DVM, docent, nasirs.sinanovic@gmail.com; dr. sc. Amir Zahirović, DVM, docent; mr. sc. Denis Čamo, DVM, viši asistent; mr. sc. Agnesa Ćoralić, DVM, viši asistent, Katedra za unutrašnje bolesti, Veterinarski fakultet, Univerzitet u Sarajevu

Nasir Sinanović, DVM, PhD, Assistant Professor, nasirs.sinanovic@gmail.com; Amir Zahirović, DVM, PhD, Assistant Professor; Denis Čamo, DVM, MSc, Senior Assistant; Agnesa Ćoralić, DVM, MSc, Senior Assistant, Department of Internal Diseases; Amel Ćutuk, DVM, MSc, Senior Assistant, Department of Ambulatory Service, Veterinary Faculty, University of Sarajevo

Abstract - Farming fallow deer (*Dama dama*) is fairly recent but progressing over the last decade. Quantitative progression though has not been followed by quality management, especially in its health management part. This is mostly due to the owners willing to gain results with minimum investment. Instead, what ensues is low quality with poor results.

Taking all this into account, in our country there has not been systematic research on health status of the fallow deer. Our aim is to record biochemical parameters of clinically healthy animals.

We observed 32 animals of both sexes with different body masses and in good condition. Our research resulted in statistically relevant information on AP, ALT, AST, glucose, creatinine and urea.

By doing this, we were the first in Bosnia and Herzegovina to gain results to set reference values for crucial biochemical parameters. Comparing similar researches in the region, our results will constitute the base for the future research as well as for regular health monitoring of fallow deer farms in BiH.

Key words: fallow deers, farms, biochemical parameters

Introduction

Farming fallow deers (*Dama dama*) is recent in BiH but in some parts of the world it has been existing for hundreds of years.

Numbers, however, have not been followed by quality management, mostly in the health sector because the owners usually want to achieve more by investing less. This results in poor herd quality and results that are below expectations.

Knowing reference values of blood parameters for fallow deer is important in order to recognize and diagnose their health disorders (14).

Because no systematic research on fallow deer health status has been carried out in our country, our aim was to establish reference values of biochemical parameters of clinically healthy animals.

Similar research was done by different scientists/authors in this region as well as throughout the world. Research on fallow deer blood was made on non-sedated animals in Croatia (12, 17). Blood research on sedated animals was done in Moslavina (Croatia) (11), and Germany (3, 4, 8), while research of blood parameters after different captivity methods was done in Slovenia in 2006 by Vengust et al. (18).

In New Wales (the Great Britain) (6), and Germany (by Rehbein et al.) (13), similar research was done on strained animals, while research on the liver enzymes activities of the calves, castrated animals and older animals was done by Kolb et al. (9).

To compare the results of such research is not easy because different methods and ways of manipulating animals influenced their physiological status. Moreover, age, sex,
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gravidity, habitat conditions and diet affected/changed the blood constituents. That is why this study has to be considered an information base for the blood constituents of fallow deer from BiH farms.

**Materials and methods**

The research was done on 32 fallow deers of both sexes, aged 2-7 years. The animals were fit, well fed and clinically free of any illness on the first inspection. They were situated on the confined farms under optimal food-intake and space-wise conditions, with no signs of stress exposure. Animals were relatively calm strained in the paddock, which was made especially for this purpose.

Blood samples were collected from the animals who previously had been taken into the paddock. After desinfection, the blood samples were taken from the jugular veins directly into the SCIDOCK containers. On the same day, the analyses were made on the samples previously stored in the hand-refrigerator. The samples were then taken to a Veterinary Clinic's lab in Sarajevo.

The parameters: aspartate aminotranspherase, alanine aminotranspherase, alcaline phosphatase, creatinine, urea and glucose were measured by spectrometer analyzer Vet test 8008, IDEXX Series II.

The obtained results were statistically analyzed (descriptive statistics) in Microsoft Excel computer program.

**Results**

The results and statistical information on researched parameters are summarized in the Table below.

<table>
<thead>
<tr>
<th>Parameters</th>
<th>AST (U/L)</th>
<th>ALT (U/L)</th>
<th>AP (U/L)</th>
<th>UREA (mmol/L)</th>
<th>CREATIN. (µmol/L)</th>
<th>GLUCOSE (mmol/L)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Statist. data</td>
<td>Mean</td>
<td>SD</td>
<td>Minimum</td>
<td>Maximum</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>140.0</td>
<td>32.6</td>
<td>87.0</td>
<td>206.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>28.7</td>
<td>7.6</td>
<td>17.0</td>
<td>44.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>181.3</td>
<td>16.8</td>
<td>156.0</td>
<td>216.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>8.2</td>
<td>1.9</td>
<td>4.9</td>
<td>12.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>146.8</td>
<td>27.2</td>
<td>100.0</td>
<td>191.0</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>8.0</td>
<td>2.9</td>
<td>4.0</td>
<td>17.3</td>
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</tr>
</tbody>
</table>

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Discussion

We need to stress that while conducting the research on enzyme activities, authors applied different methods expressing the results in different units (19). Our research done on 32 fallow deers indicated AST activity of 140,0 (U/L).

In their research, Vengust et al. (18) claimed much higher activity of 370 (U/L) for AST in strained animals. Very high levels of AST were found by English and Lepherd in captured and transported females (6). Authors link these results to the muscle damage caused by being hunted, resistance to hunters and transportation. A little bit lower values were found by Poljiček et al. during their research on deer and fallow deer blood in Moslavina (11).

Values we set on ALT activities during our research on strained animals are similar to those of Kolb et al. of 29,9 U/L (9). Information available from different authors showed higher values of this parameter (6, 19).

Many authors advocate yearly and seasonal variations of AP activity (2, 5, 15). Increase in the enzymes levels, according to these authors, is connected to the period of horn growth with its maximum at the period of mineralization. Enzymes levels were widely described by these authors. For Kolb et al., this parameter ranged from 527 (U/L) in February to even 1523 (U/L) in April. Lower values were described by English and Lepheld (110 (U/L)).

In our research, an average value of urea was 8,2 mmol/l, which was slightly above the values found by Poljiček and al. in Croatia (7,49 mmol/l ) (11), and Vengust on private farms in Slovenia (7,61 mmol/l) (19). It is important to stress that urea values widely range from animal to animal (4, 7, 20), which is confirmed by our research (min 4,9 - max 12,6 mmol/L).

An average creatinine level was 146,8 umol/L, which is close to that of Marco and Lavin (145,9umol/L) (10), and Knox et al. (147,6 umpol/L) (7).

An average glucose level was 8,0 mmol/L with wide variations in individual levels (min 4,0 - max 17,3 mmol/L) as a direct consequence of physical straining (stress due to manual fixation).

Conclusion

Fallow deer is game bred on Bosnian and Herzegovinian farms. Taking into consideration the expansion of the breeding, it is important to measure blood parameters as a part of the health management.

We set preliminary values for the biochemical parameters for the first time in BiH.
By comparing similar research in the surrounding countries, we gained information that can constitute a base for future research as well as for regular health monitoring of fallow deer on the farms in Bosnia and Herzegovina.

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