

Metabolic researches in Țurcana sheep breeding in different pastoral ecosystems

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Abstract

The health of Țurcana sheep in different pastoral ecosystems is the result of a continuous adaptive metabolic process to macro and microclimate changes, depending on individual factors and breed characteristics (the rustic, indigenous breeds are better adapted). In this paper, the biological study material were two-year old Țurcana sheep raised in Făgăraș, Rucar, Bacău (Comanești area); exclusively pasture fed; from each region and from each flock we collected blood samples from 5 sheep and we presented the average of the values obtained. We found: hypercholesterolemia in the Țurcana sheep in all three regions (Făgăraș and Rucar with similar values), hyperglobulinemia in Țurcana sheep from Rucar; increased GOT activity in all the Țurcana tested, most notably at Rucar; increased GPT activity, the highest value in those from Bacău; the increase in GGT activity, the highest value in Țurcanele de Bacău. This increased plasma activity is due to hepatic lesions, hyperuricaemia (the highest values being registered for the Rucar and Bacău Țurcana); hypercreatinemia (the highest value in Bacău). A classification, depending on the affected organs: the liver is affected in sheep in Rucar and in Bacău; - the kidney and implicitly the nucleoproteic metabolism is more affected in Bacău and Rucăr sheep; the proteic metabolism in sheep in Rucar, where the highest globulin value were identified; on the other hand the increased globulins play a role in the host immunity and we must not forget that the research was carried out during lactation and the sheep from Rucar graze during summer at Lake Iezer at an altitude of over 1800 m; as for cholesterol, it is increased in sheep in all three regions; so lipid metabolism is disrupted, implicitly liver function. In conclusion: Făgăraș Țurcana have hypercholesterolemia, but excretion and epuration are less affected; correlating the obtained transaminase elevations; these increases may be influenced by excess weight, adaptive liver reactions, cardio-circulatory failure etc.; many of these are not clinically investigated.

Keywords: *pastoral ecosystems, hypercholesterolemia, sheep health*

Introduction

Turcana is a local mountain breed that grows in the hilly regions; Turcana is known in the specialized literature under other names, such as: the Barsana sheep in Barsa Country; *țușcă* or *ciușcă*, a name under which it is known in Soviet literature; *ratzka*, Hungarian designation; *Zackel*, German name, etc. (6).

Sheep health in pastoral ecosystems is the result of a continuous adaptive process to macro and microclimate changes; is influenced by environmental factors (macro and microclimate conditions) and the individual and race factors (the rustic and indigenous breeds are better suited to weather conditions and local food, especially the quality of grass, water and air), the conditions for growth and exploitation (1, 4, 7, 8).

Nowadays in our country sheep breeding is practiced in the mountains, in the mountains and in the hilly area because it is not specifically related to the exclusive existence of the land for the production of the forage; for sheep breeding many sheep owners have leased land. A particularity of sheep raising is due to the fact that sheep are a species that can feed through the practice of transhumance, a very old method applied by shepherds (2, 3, 5). Transhumance is the practice of moving livestock from one grazing ground to another in a seasonal cycle, typically to

lowlands in winter and highlands in summer in areas of the countryside to consume surplus bulk feeds, organised in associative family holdings or by agricultural commercial companies in these areas (9). Although, as a practice, this method is very old, due to the conditions of our country it can be further recommended for the raising and exploitation of the sheep, as during autumn-winter it becomes quite efficient, because it is easier to move the flocks in in different periods of the year depending on the available feed, rather than carrying large volumes of bulky fodder from hill to hill.

Materials and methods

In this research, the biological study material was the two-year-old Turkish sheep raised in Făgăraș, Rucăr and Bacău (Comănești area); from each of the flocks we collected blood samples from 5 sheep; in tables 1-4 we present the average of the values obtained from the biochemical determinations.

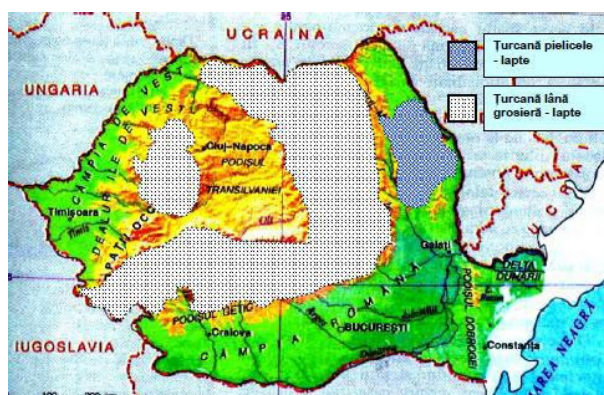


Figure 1. The occupied area and the influence zone of the Turcana breed (Pascal C., 2003)

Results and discussions

Their presentation will be based on the geographical area:

1. Turcana sheep from Fagaras

We took blood samples from the Ramba Iosif farm, from a 300 sheep flock; the results obtained are presented in Table 1.



Figure 1. Turcana breed sheep from Făgăraș

Table 1 shows increased cholesterol, increased creatinine, elevated GOT and GPT

<i>Parameters</i>	<i>Unit</i>	<i>Value</i>	<i>Reference</i>
Glucose	mg/dl	65,33	45-80
Cholesterol	mg/dl	178,4	52-76
Total protein	g/dl	7,29	6-7,9
Albumin	g/dl	3,50	2,4-3,0
Globulin	g/dl	3,79	3,6-4,9
Urea	mg/dl	21,35	8-20
Creatinine	mg/dl	2,84	2-2,7
GOT	UI/L	332,54	307+/-43
GPT	UI/L	42,12	30+/-4
GGT	UI/L	58,57	20-52
Calcium	mg/dl	11,77	11,5-12,8

Table 1. Variation of biochemical parameters in lactating sheep (Turcana breed), age 2 years, Făgăraș

2. Turcana sheep from Rucăr

We have collected blood samples from the Andreescu Dragoș farm, from a 432 sheep flock; the results obtained are presented in Table 2.



Figure 2. Turcana breed sheep from Rucăr

Table 2 shows increased cholesterol, hypergammaglobulinemia, increased creatinine and urea, elevated transaminases

<i>Parameters</i>	<i>Unit</i>	<i>Value</i>	<i>Reference</i>
Glucose	mg/dl	53,5	45-80
Cholesterol	mg/dl	174,5	52-76
Total Protein	g/dl	7,54	6-7,9
Albumin	g/dl	2,35	2,4-3,0
Globulin	g/dl	5,19	3,6-4,9
Urea	mg/dl	22,40	8-20
Creatinine	mg/dl	2,87	2-2,7
GOT	UI/L	368	307+/-43
GPT	UI/L	52,8	30+/-4
GGT	UI/L	58,0	20-52
Calcium	mg/dl	12,34	11,5-12,8

Table 2. Variation of biochemical parameters in lactating Turcana sheep, age 2 years, Rucăr

3. Turcana breed sheep from Bacău

We collected blood samples from the Constantin Becaru farm, from a flock of 323 sheep in lactation; the results are shown in Table 3.

Table 3 shows: increased cholesterol, creatinine and urea increased, elevated transaminases

<i>Parameters</i>	<i>Unit</i>	<i>Value</i>	<i>Reference</i>
Glucose	mg/dl	51,90	45-80
Cholesterol	mg/dl	165,6	52-76
Total Protein	g/dl	6,89	6-7,9
Albumin	g/dl	3,32	2,4-3,0
Globulin	g/dl	3,57	3,6-4,9
Urea	mg/dl	22,3	8-20
Creatinine	mg/dl	2,9	2-2,7
GOT	UI/L	347	307+/-43
GPT	UI/L	58	30+/-4
GGT	UI/L	61	20-52
Calcium	mg/dl	11,90	11,5-12,8

Table 3. Variation of biochemical parameters in Turcana sheep in lactation, age 2 years, Bacău

<i>Region</i>	<i>Cholesterol</i>	<i>Globulin</i>	<i>GOT</i>	<i>GPT</i>	<i>GGT</i>	<i>Urea</i>	<i>Creatinine</i>
Făgăraș	178,4	3,78	332,5	42,12	58,57	21,35	2,84
Rucăr	178,5	5,19	368	52,80	58,00	22,4	2,87
Bacău	175,6	3,57	347	58,00	61,00	22,3	2,90
Reference and unit	52-76 mg/dl	4,9 g/dl	307+/-43 UI/L	26-34 UI/L	20-52 UI/L	8-20 mg/dl	2-2,7 mg/dl

Table 4. Comparative biochemical values (abnormal values) from Turcana sheep in different regions

Cumulatively, table 4 shows hypercholesterolemia in the Turcana sheep from the three regions (in Făgăraș and Rucăr, about the same value), hyperglobulinemia in Turcana sheep from Rucăr, increased GOT activity in all sheep, mostly at Rucăr; increased GPT - the highest value in Bacău; increased GGT activity, the highest value in Bacău; hyperuricaemia, the highest values in sheep from Rucăr and Bacău; hypercreatinemia, the highest values were recorded in Bacău.

As for creatinine, it is a 'waste' product of the body that is transported to the kidneys by blood from where it is filtered and removed from the body through the urine. The amount of creatinine produced each day depends on the muscle mass; the blood creatinine level usually goes down as a result of poor kidney function (kidney infection, dehydration, decreased blood flow to the kidney - difficult to diagnose in Veterinary Medicine); therefore paraclinically evidenced hypercreatinemia is difficult to diagnose etiologically.

From the above it is observed that at the functional, hepatic level there are problems; laboratory data exploring for liver disease, called liver function tests; actually represent a 'battery' of biochemical analyzes that support the diagnosis of hepatopathy. The liver is the site of complex

biochemical processes so there is no test that can be considered as a unique indicator for hepatic dysfunction.

In connection with liver enzymes, we mention that GGT catalyses the transfer of the γ -glutamyl group from peptides such as glutathione (GSH) to other amino acids; is the only enzyme that cleaves significant amounts of GSH and GSH conjugates into the γ -glutamyl (GSH is transported to the extracellular surface of the membrane, where it is cleaved by GGT in cysteinyl-glycine and γ -glutamyl residues, which are transferred to other amino acids). GGT plays an important role in the metabolism of inflammatory mediators, such as leukotrienes, carcinogenic and toxic substances. In hepatobiliary disease, GGT correlates with alkaline phosphatase levels. Increases are, however, not specific and can also be associated with pancreatic, cardiac, renal, etc. GGT dosing is also useful for the diagnosis of a hepatopathy in the presence of a bone disease. GOT (ASAT) and GPT (ASAT) dosing is the most useful and sensitive biochemical investigation for hepatocellular disease.

If we make a classification, depending on the biochemical parameters investigated and which, in part, represent the optimal functionality of some organs it is observed that:

- ✓ **the liver** is affected in the sheep from Rucar and Bacau;
- ✓ **kidney and implicitly nucleoproteic metabolism** is affected in Bacau and Rucar;
- ✓ **protein metabolism is abnormal** in sheep from Rucar, where the highest globulin value was found (globulin plays a role in the immune system); we must not forget that the research was carried out during the lactation period and the sheep from Rucar paste in the summer at Lake Iezer at an altitude of 1825 m. That is why in the future we will have to hematologically investigate this effect as it is also possible for an increased erythropoiesis disturbed by altitude (oxygen scarification).
- ✓ in terms of cholesterol, is increased in sheep in all three regions; so lipid metabolism is disrupted, implicitly liver function.

Conclusions

1. Clinically, Turcana sheep, regardless of the region where they are raised, are healthy.
2. Paraclinically, the sheep in the present research are affected by changes in the main biochemical parameters investigated.
3. Turcana breed sheep in the three regions have liver disease (liver transaminases and other parameters that are part of liver function tests)
4. The respective altitude, the summer habitat from Turcana breed from Rucar influences the body's homeostasis; the effort to go to these places and the eventual 'fatigue' caused by lactation, by daily food searches, act as stressors on the main organs, although at this altitude the quality of the grass is incontestable.
5. Turcana breedsheep from Făgăraș have hypercholesterolemia, but the excretion and purification of the body are less affected.
6. Turcana breed sheep from Bacău have a 'renal laboratory pathology' without a clinical correspondent.

By correlating the results obtained, it can be argued that routine explorations may sometimes reveal unexpected and isolated increases in the main biochemical parameters, increases that may be due to overweight, adaptive reactions, cardio-circulatory insufficiency etc .; many of these are not clinically and paraclinically investigated.

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