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DAGENE
International Association for the Conservation
of Animal Breeds in the Danube Region
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Assessment of some health status traits of endangered Balkan goat in order to improve in situ conservation program

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Abstract

Hilly mountain region of Serbia represents a valuable natural resource with high potential in livestock production, especially for sustainable goat and sheep rearing. The Balkan Goat, as a transboundary breed, is on the list of endangered breeds. For decades it has been exposed to pressure from high performance, exotic, meliorate breeds. Nowadays, it is necessary to improve the strategy for advanced characterization and conservation of the Balkan Goat breed. Previous investigations of the genetic structure of this autochthonous, transboundary breed revealed the existence of genetic variability and good adaptive ability to the local, unfavorable environment and extensive conditions. Monitoring of some health traits is necessary for effective planning of advanced breed characterization and conservation. As the most severe health problem in goat production systems are parasitic infections, determination of gastro-intestinal parasites is important for definition of health status. The aim of this study was to assess the prevalence and extensity of gastro-intestinal parasitism of Balkan goat populations in hilly mountain regions of Serbia, where the breed is traditionally reared. The study was conducted in 131 Balkan Goat flocks, kept mainly under extensive production system. The results show that all the tested flocks are infected, while the predominant gastro-intestinal parasites detected were nematodes. Such results are valuable in making strategies for development of integrated approach to achieve the best control of parasitic infections of Balkan Goat flocks. Keeping in mind that one of the main challenges of livestock production are parasitic infections, obtained resultants can also be an important point to determine some advanced characteristics of Balkan Goat, necessary for conservation process. The importance of conservation of Balkan Goat, as an endangered, autochthonous genetic resource is less economical, but mostly cultural, historical and heritage oriented. There is also the aesthetic argument that Balkan goat is an element of nature and landscape protection.

Introduction

An increasing number of studies have emphasized the importance of indigenous goat breeds as an important potential for development of agro-biodiversity in the mountain regions. Preservation of indigenous populations has become increasingly popular in light of the emergence of global climate change and the challenges that await us. Under pressure from newcomer productive breeds, indigenous population are rapidly disappearing, eroding in that way the local biodiversity and natural genetic potential of those resources (HOSTE, 2011; BECSKEI, 2012). Sustainable development of indigenous goat breeds in the mountainous regions in European countries with developed livestock such as Switzerland, Austria and Norway, is the subject of extensive studies (SMAL, 2011). The focus is on the protection and rational use of indigenous goat breeds. It also highlights the importance of biodiversity of pastures where goats are reared. Special attention is given to highlight the value of local products, specific characteristics obtained from goats. All these positive effects are directly contributing to the revival and promotion of the region (MARGUERAT, 2011; BECSKEI, 2012).

The Balkan Goat is an autochthonous breed, reared in mountain regions of the Balkan Peninsula under very modest conditions and poor pasture quality. Micro-evolution of this breed is characterized by its adaptation to severe environmental conditions of mountain climates on the Balkan region. In Serbia, the breed is traditionally reared in Central and South parts of the country (Stara plana, Sjenica and Golija mountains) and it has great potential for sustainable production (SAVIĆ et al., 2011). The Balkan goat population was quite numerous up until World War II, however, its number have been rapidly declining since that time. Between 1950 and 1980 rearing of goats was forbidden by the law (ĆINKULOV et al., 2009). Presently, the number of purebred Balkan goat populations continues to decline, due yet again to depopulation in underdeveloped regions and requiring measures to protect indigenous breeds. Nowadays, Balkan Goat is endangered considering two reasons. Firstly, because of rapid depopulation of underdeveloped regions and secondly, tendency of continual Saanen crossbreeding for improved milk production. The estimate purebred population size is around 1000 animals (FAO, 2015).

The current genetic structure of Balkan Goat breed revealed the existence of genetic variation and good adaptive ability of individuals to the often unfavorable growing conditions (SAVIĆ, 1993; JOVANOVIĆ et al., 2006). Analysis of environmental and genetic factors in growth characteristics, composition and traits of kid carcasses, milk yield, milk composition characteristics and fertility traits of Balkan Goat have been revealed (ŽUJOVIĆ et al., 2012; MEMIŠI et al., 2010; BOGDANOVIĆ et al., 2008). One of the most severe health problems in goat production systems is gastro-intestinal parasitism (PAVLOVIĆ et al., 1995, 2012). For this reason, this study obtained the examination of parasitic fauna of Balkan Goat populations at various regions of Serbia, predominantly in hilly mountain regions, where the breed is traditionally reared.

Material and methods

The prevalence and extensity of gastro-intestinal parasitic infections were assessed in 131 flocks of autochthonous Balkan Goat breed. The tested animals originated from 39 villages of hilly mountain region of Serbia (Stara plana, Sjenica and Golija mountains). The study was carried out both on fecal samples and carcasses. During the survey a total of 731 fecal samples and 72 carcasses were tested. Fecal samples were analyzed using standard coprological technique protocols (EUZEBY, 1981; PAVLOVIĆ and ANĐELIĆ-BUZADŽIĆ, 2010). Parasitological necropsy were done on slaughtered goats at local slaughterhouses in order

to determine the adult and larval forms of parasites in the gastro-intestinal tract, trachea and lungs, also in some other parenchymal organs.

The adult and larval forms of the parasites found were fixed in 10% formalin and mounted in lactofenol for later identification. Total differential worm counts were performed on all the alimentary tract and lungs using the technique described by PAVLOVIĆ and ANĐELIĆ-BUZADŽIĆ (2010). Determination of helminths were done by keys given by SOULSBY (1977).

Results and discussion

Gastro-intestinal helminths were detected in all 131 tested goat flocks. Results of coprological examination of fecal samples revealed the presence of eggs of variety helminths. Also, adult forms of parasites were identified in the gut and lungs of tested carcasses. The number of guts and lungs examined in this survey thought small in number, but in combination with results of coprological examination, samples appeared to represent the population adequately.

Both the coprological and parasitic necropsy survey revealed the same parasite species: *Teladorsagia (Ostertagia) circumcincta*, *Ostertagia trifurcata*, *O. ostertagi*, *Trichostrongylus axei*, *T. colubriformis*, *T. capricola*, *Nematodirus spathiger*, *N. filicollis*, *Haemonchus contortus*, *Marshallagia marshalli*, *Skrjabinema capre*, *Bunostomum trigonocephalum*, *Chabertia ovina*, *Oesophagostomum venulosum*, *Cooperia curticei* and *C. punctata*, as it is shown in Figure 1.

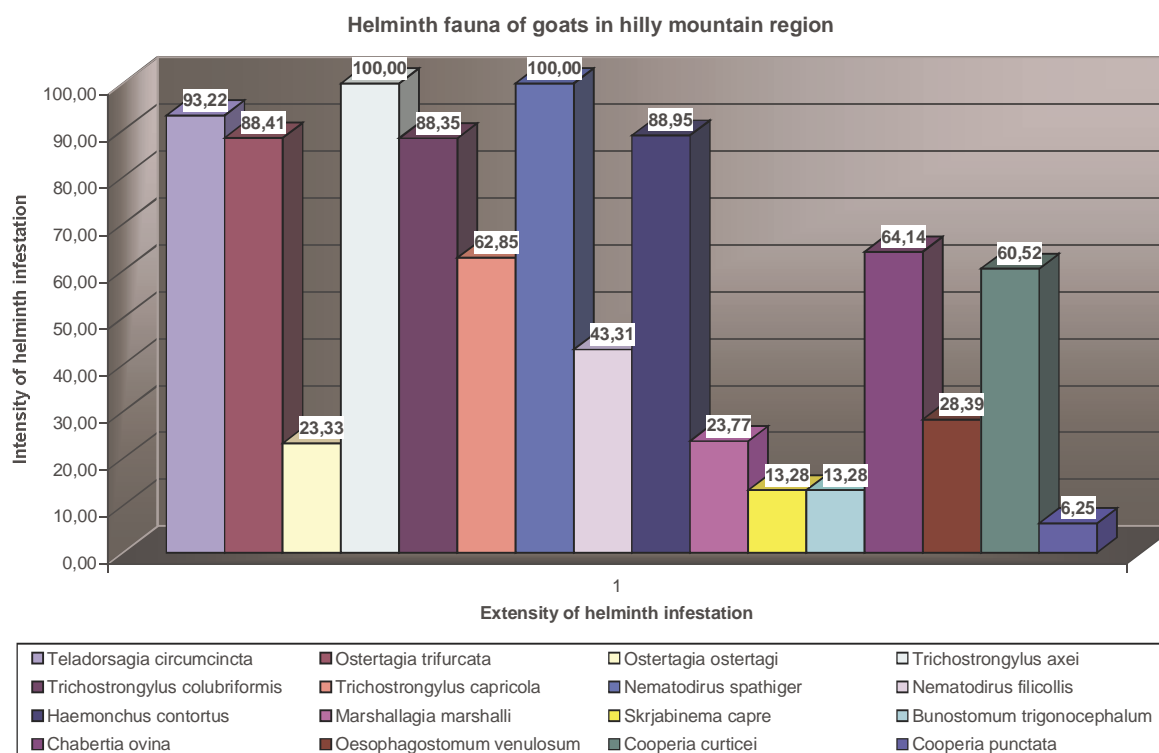


Figure 1. The prevalence of gastrointestinal helminths of Balkan Goats in the hilly mountain region

Comparing this results with similar surveys that have been done at mountain areas of Serbia, on Sjeničko-Pešterski Highland, Dimitrovgrad, Tutin and Zlatar mountain (VUJIĆ et al., 1991), Stara Planina (PAVLOVIĆ et al., 2012), and at Prizren District-Kosovo (PAVLOVIĆ et al., 1995), it can be concluded that dominant nematode species were *Ostertagia*, *Nematodirus* and *Trichostrongylus* (PAVLOVIĆ et al., 2012). Similar results we obtained during examination of goats at Timok District (ILIĆ, 1990; ILIĆ et al., 1991). Similar results were published in other Balkan countries to, such as Romania, Macedonia or Bulgaria (ARDELEANU et al., 2007; GEORGIEVSKI, 1991).

Negative influence of parasitic infections are mainly reflected through weight lost and milk yield decrease (NJAU et al., 1990). Numerous data reports about harmful effects of parasitic infections on goat production performance, and it was undoubtedly shown that there is a need to conduct the measures of anthelmintic treatment (CHARTIER et al., 2000; PAVLOVIĆ et al., 2012; PAVLOVIĆ et al., 2016).

Conclusion and recommendation

Hilly mountain region of Serbia constitute a substantial Natural resources and have great potential for livestock production. In this sense the allocated regions of Stara plana, Sjenica and Golija that have the characteristics of High Nature Value. Sustainable goat production in South Serbia has great potential. Locally adapted breeds can promote sustainable development, reduce production costs, and prevent genetic pollution of a region's biodiversity.

Previous investigations of the genetic term structure of Balkan Goat breed revealed the existence of genetic variability and good adaptive ability of individuals to the often unfavorable growing conditions. Broader analysis of prevalence of parasitic infections in hilly mountainous areas, where the breed is traditionally reared and is evolutionarily adapted, could significantly contribute to the recent advanced characterization of the breed. It would also provide a good basis for designing breeding programs ensuring good health.

Benefits of the preservation and conservation of transboundary Balkan Goat breed is reflected in the fact that it is well adapted to the local environment, which makes it favorable in alternative, sustainable, low input systems. Although the population size of Balkan Goat in Serbia is small, counting about 1000 animals in total, it represents an important biodiversity resource of our country. The importance of conservation of this animal resource is less economical, but mostly cultural, historical and heritage oriented. There is also the aesthetic argument that Balkan Goat, with its specific long horns and hair, is an element of nature and landscape protection.

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