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# TICK FAUNA OF THE AUTOCHTHONOUS ZACKEL SHEEP IN SOUTH SERBIA REGION[1]

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**Abstract**: Sheep production is an example of a sustainable production fully integrated within the local rural development. One of the main threats on the outdoor breeding of sheep is parasitism. Ticks are nuisances and vectors of several diseases agents. The distribution of ticks appears to be changing, with spread to previously unaffected areas. Tick and tick-borne disease control is one of the major components of animal health program protecting livestock in the developing countries, which reflects impact on the livelihood of resource-poor farming communities. Taking into consideration the negative impact on the health status of the livestock, also the direct and indirect economic losses, it is necessary to examine the tolerance and resistance of certain species against diseases. It is one of the most important elements of the strategy of selection and screening for resistant animals. The aim of this study was to determine the tick species persisting in 45 tested autochthonous Zackel sheep flocks, and examine their seasonal occurrence from March 2010 to January 2011, in the region of South Serbia. The result showed that *Ixodes, Dermacentor, Ripicephalus* and *Haemaphysalis* were the most abundant ticks found, affecting 50.40% tested sheep. The result of this study is a survey of tick species from autochthonous Zackel sheep in Serbia and implication of possible preventions measures for diseases caused and transmitted by ticks.

**Key words:** tick, autochthonous Zackel sheep, South Serbia

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# Introduction

Ticks are a widespread problem for livestock producers. They also spread a number of serious diseases, the most notable being anaplasmosis, babesiosis, theileriosis and babesiosis (*Dimitrić, 1999, Zintl et al., 2003, Pavlović et al., 2003; Kocan et al., 2008, Nuttall and Labuda 2008, Telford III and Goethert, 2008, Neider et al., 2013).*

The presence of specific tick species varies with agro ecological conditions, some being more widely distributed than others. As a result of global climate change, the distribution of ticks appears to be changing, with spread to previously unaffected areas. Tick and tick-borne disease control is one of the major components of animal health programs protecting livestock in the developing countries, which reflects impact on the livelihood of farming communities. Given the importance of health problems and economic losses Tick and tick-borne disease causes small ruminant production carried out a more detailed assessment of the situation and are determined by the tick species parasiting in sheep and goat breeds reared in South Serbia region (*Dimitrić, 1999; Pavlović et al., 2009*).

# Material and Methods

The study about tick fauna and season distribution of tick of in South Serbia was started in March 2010 and finished in January 2011. During study there were examined a total of 248 adult Zackel sheep from 45 flocks, originating from different municipalities of South Serbia. Ticks were collected from sheep by means lightly sprung forceps. All specimens were placed into glass specimen bottles which had a piece of hard paper inserted bearing the name of locality name of host and date and hour of collection. The tick species were detected using keys given by *Pomerancev (1950*), *Kapustin (1955)* and *Kolonin (2009).*

# Results

In all 45 tested autochthonous Zackel sheep flocks (100%) tick infestation was present. Ticks were found in a total of 125 sheep (50.40%). Most abudant were *Ixodes ricinus,* followed by *Dermacentor marginatus, Rhipicephalus sanguineus, R.bursa, Haemaphysalis punctata* i *Dermacentor recticulatus.* The collected tick specimens, a total of 1789 were adults, females and males belonging to the *Ixodidae* family.

The population dynamics of recorded tick species are known for their two maxima a year, in spring (April-May) and in autumn (September-October). The considerable interchange between spring and autumn tick populations can be

attributed mainly to environmental conditions. Three species *D.r marginatus*, *D.recticulatus* and *H. punctata* occurred population maximum in April. Peak for *I.ricinus* occurred in May and it was noted that this species started to decrease in abundance in June. *R. sanguineus* and *R.bursa* after reaching their maxima start decreasing gradually until August, and disappearing completely in September and October.

There was registered an autumn population peak in September and in October, mainly for the *I.ricinus*, *D. marginatus* and *H. punctata.*

Moreover, the sex ratio within individual species showed a higher number of females in four species *(I. ricinus, H. punctata, R. sanguineus* and *D. marginatus)*, a higher number of males in *R. bursa* and an equal number of ticks of the two sexes in one species, *D. recticulatus.* Ticks were found on 50.40% of examined sheep. Relative abundance analysis revealed that the species at sheep *I. ricinus* was absolutely dominant 40.32%, followed by *D. marginatus* (29.03%), *R. bursa* (18.54%), *R.sanguineus* (6.05%), *H. punctata* (1.61%) and *D.recticulatus* (1.21%) (Figure 1).

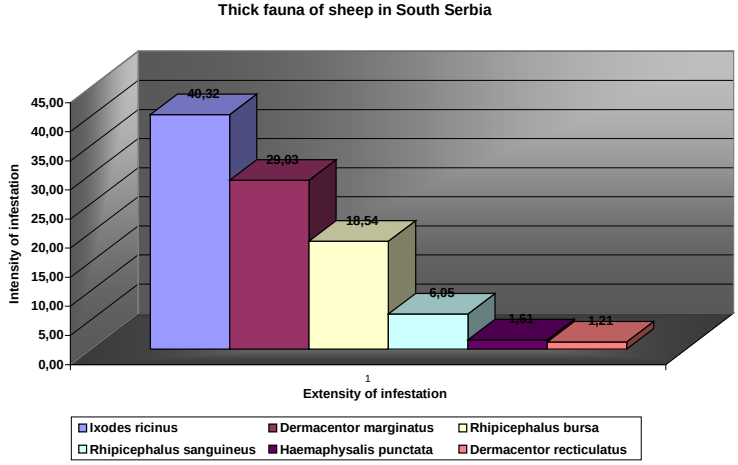


**Figure 1. Detected tick fauna of autochthonous Zackel sheep in South Serbia (infestation %)**

# Discussion

Rearing of autochthonous Zackel sheep in South Serbia is an example of sustainable production fully integrated within the local rural development. One of the main threats on the outdoor breeding of sheep is parasitism. During study

performed from March 2010 to January 2011, in the region of South Serbia we established that *Ixodes, Dermacentor, Ripicephalus* and *Haemaphysalis* were the most abundant ticks found in all 45 tested flocks (100%), affecting 125 tested sheep (50,40%). Similar results we obtained during examination of ticks fauna in west and east part of Serbia where *I. ricinus* and *D. marginatus* were dominant tick species at sheep (*Milutinović et al., 1996, 1998*). Also, examination was done in Belgrade area by *Milutinović et al. (1997*), *Dimitrić (1999)* and later by *Pavlović et al. (1999, 2002),* and it was obtained that the most abundant tick species were *I.ricinus. R.sanguineus, D.recticulatus* and *D.marginatus*. Those tick species were also diagnosed in dog population and at foxes and badgers, hunted at spread Belgrade area (*Pavlović et al., 1997b*), also in goats and sheep flocks (*Dimitrić, 1999*). In this study, over ten years after previous investigation, it was determined that the situation has not changed in terms of ticks fauna and its number and confirmed dominate role of *I.ricinus* and *Rhipicephalus* species at Belgrade area (*Pavlović et al., 2013*). These findings are of valuable epidemiological importance because these types of ticks are vectors for a multitude vector borne diseases and zoonotises, like *Borellia burgdefori, Erlicihia spp., Anaplasma spp.,* Tick-born encephalitis, numerous haemorrhagic fewer, etc.

Taking into consideration the negative impact on the health status of the livestock, also the direct and indirect economic losses, it is necessary to examine the tolerance and resistance of sheep breeds against tick infestations. It is one of the most important element of the strategy of selection and screening for resistant animals. Existing research results necessitate further investigation of the characteristics of health, tolerance and resistance to tick infection considering breed and individual animal genetic variation of sheep in various regions of Serbia. Resistance or tolerance to ticks, and to a lesser extent to tick-borne diseases, is well documented especially in cattle breeds (*Bishop 2003; Samish, 2008; Nickolas, 2009*). Autochthonous breeds, adapted to the local fauna and flora, are much more resistant to parasites than exotic breeds. Results show higher susceptibility for parasitic infections of exotic sheep breeds compared to autochthonous Zackel sheep types (*Dimitrijević et al., 2012*).

The negative impact of widespread drug use and the related costs of treating infectious and parasitic diseases are well known. Current strategies for increasing the level of bio-security and health management in populations of domesticated animals strives for not only more rational utilization of drugs, but also towards increasingly more sophisticated use of genetic methods in disease control among farm animal species (*Gibson and Bishop, 2005*). Genetic investigations involving animal resistance to infections caused by pathogens of varying etiologies can be determined at three genetic levels: species, breed and individual animal genetic variation (*Anderson, 1979*). The impact of genetic resistance towards a causative agent of disease is greatest in cases where all levels of genetic resistance act synergistically (*Bishop, 2002, 2010*). When considering

the significance of resistance/tolerance at the breed level, the instrinsic evolutionalry advantage of breeds that are adapted to an environment should be taken into account. In tropical regions, where extreme endemic diseases are widesdpread, due to their evolutionary roots, locally adapted autonomous breeds display a far greater level of genetic resistance and adaptation, as compared to imported breeds. Individual variability and the identification of those individuals whose resistance to disease can be determined through clinical examination, or the use of genentic markers (marker assited slection), represents the first step in the formation of genetic resistance within a population (*Anderson, 1979*). Depending upon disease etiology and the availably animal genetic resources, the strategy for advancing genetic control of disease can be established through the following initiatives: the selection of locally adapted breeds, the implementation of cross-breeding methods geared at introducing genes significant in the expression of genetic resistance/tolerance towards pathogens, and the selection of individuals highly resistant to pathogens (*Bishop, 2003*).

## Conclusion

During study performed from March 2010 to January 2011, in the region of South Serbia we established that *Ixodes*, *Dermacentor*, *Ripicephalus* and *Haemaphysalis* were the most abundant ticks found in all 45 tested flocks, affecting 50.40% tested sheep. Existing research results necessitate further investigation of the characteristics of health, tolerance and resistance to tick infection considering breed and individual animal genetic variation of sheep in various regions of Serbia.

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## Krpeljska fauna autohtone pramenke u Istočnoj Srbiji

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## Rezime

Ovčarstvo predstavlja primer održive proizvodnje koja čini sastavni deo ruralnog razvoja. Jedan od glavnih zdravstvenih problema kod ekstenzivnog načina uzgoja ovaca predstavljaju parazitske infekcije. Krpelji su vektori za uzročnike mnogobrojnih oboljenja. Rasprostranjenost krpelja se menja i u novije vreme ih nalazimo i na novim arealima. U zemljama u razvoju, borba protiv krpelja i oboljenja prenosica krpeljima predstavljaju jedan od glavnih strateških tačaka zdravstvenog nadzora nad životinjama i ljudima. Uzimajući u obzir značaj direktnih i indirektnih ekonomskih gubitaka izazvanih krpeljima i oboljenjima čiji su oni uzročnici, posebna pažnja treba da se posveti ispitivanju tolerancije i otpornosti ka parazitskim bolestima pojedinnih vrsta i rasa životinja. Potraga za otpornim jedinkama i njihova selekcija treba da bude deo strategije stočarstva. Cilj ovog rada je bio da prikaže rezultate ispitivanja o prisustvu krpeljske faune u 45 zapata ovaca autohtone pramenke. Ispitana je sezonalna distribucija pojave pojedinih krpelja u periodu između marta 2010. i januara 2011. godine, u regionu Istočne Srbije. Kod 50, 40% ispitanih ovaca ustanovljeno je prisustvo krpelja. Rezultati pokazuju da su krpelji iz rodova *Ixodes, Dermacentor, Ripicephalus* i *Haemaphysalis* najučestaliji u zapatima ovaca autohtone pramenke.


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