Tick Fauna of Small Ruminants in South Part of Serbia, with Emphasis to North Kosovo

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Abstract

The study regarding tick fauna and season distribution of ticks of small ruminant in the south part of Serbia, with emphasis on north Kosovo was performed during 2017. During the study we examined a total of 114 flocks of goats and sheep from Zvečan and Leposavić districts (villages Ceranja, Majdevo, Zemanica, Mure, Rudine, Žitkovac, Oraovica, Mošnica, Donji Krnjin, Belo brdo, Miolićе, Drenova and Belićе). Infections occurred at and on 56.14% of examined sheep and 31.42% of examined goats. The most abudant tick species were *Ixodes ricinus,* followed by *Dermacentor marginatus, Rhipicephalus sanguineus, R.bursa, Haemaphysalis punctata* and *D.recticulatus*.

Keywords: ticks, goats, sheep, south Serbia, north Kosovo

Introduction

Breeding of small ruminants in the hilly and mountainous areas of Serbia has a long tradition and is well developed. Nowadays small flocks of sheep and goats play an important role in providing animal protein for diet, especially for local people who live there. Sheep and goats are milked and they produce the bulk milk supply, together with a large proportion of the meat is being consumed (Ivanović and Pavlović, 2015).

They are usually kept under extensive conditions and graze or brows on any land that is not being cultivated (Pavlović *et al.*, 2009). Usually these are small herds where goats and sheep are kept together. The way of breeding may have prerequisite to several infections including ticks infestation. In pasture breed conditions tick infestations are common especially during late spring and autumn months (Pavlović *et al.,* 1995; Milutinović *et al.,* 1998). The aim of our examination was to establish the tick fauna parasitizing on flocks of goats and sheep in the south part of Serbia, with emphasis on north Kosovo (which status is in accordance with UNSCR 1244 and the Opinion of the International Court of Justice on the Kosovo Declaration of Independence).

Materials and methods

During 2017 we examined flocks of small ruminants from Zvečan and Leposavić districts, in villages Ceranja, Majdevo, Zemanica, Rudine, Žitkovac, Mure, Oraovica, Mošnica, Donji Krnjin, Belo brdo, Miolićе, Drenova and Belićе (Figure 1).

The geographical conditions in the examined area are favourable for breeding small ruminants because of the large number of pastures suitable for grazing. The relief is characterized by plateaus, hilly land, hills, mountains, numerous mountain

ranges (saddles), valleys and rivers with a number of smaller tributaries. Flat land is rare. The continental climate is prevalent throughout the whole area with cold, relatively dry winters and warm, humid summers.

Figure 1. Map of Serbia with marked research area

In total, we examined 426 sheep and 172 goats from 114 flocks. The study about tick fauna and season distribution of tick was started in March and finished in October 2017. Ticks were collected monthly.

Ticks collected on pasture from sheep and goats 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. Colleagues who sampled ticks sent only adult ticks so we didn't get development forms for examination.

The tick species and sex were identified by morphometric characteristics. Each species has identifying features that are most distinguishable in the adult stage. They can be identified based on the festoons on the edge of the abdominal area, the appearance of the dorsal shield, and the shape of the mouth parts. Size can also be used in identification. For identification we use keys given by Pomerancev (1950) and Kapustin (1955).

Results and discussions

Ticks were found in all examined flocks. *Ixodes ricinus* were found on 42.45% of examined animals; same for the following by *Dermacentor marginatus* found in 17.41%, *Rhipicephalus bursa* in 16.72%, *R.sanguineus* in 6.22%, *Haemaphysalis punctata* in 3.71% and *D.recticulatus* in 2.17% . In total we collected 1774 ticks, 1274 from sheep and 500 from goats. The number of specimens of identified tick species per examined host is shown in Table 1.

On sheep tick infestation was detected in 56.14% of examined animals. The most abundant species was *Ixodes ricinus* found on 44.91%, followed by *Dermacentor marginatus* (30.91%), *Rhipicephalus bursa* (15.22%), *R.sanguineus* (7.72%), *Haemaphysalis punctata* (3.21%) and *D.recticulatus* (2.17%). The results are presented at Figure 2. During the examination, ticks were found on 31.42% of examined goats**.** The most abundant species was *I. ricinus* found on 42%, followed by *Rhipicephalus bursa* (18.22%), *R. sanguineus* (4.72%), *Haemaphysalis punctata* (4.22%) and *Dermacentor marginatus* (3.91%). The results are presented in Figure 3.

Of the total number of collected ticks, 53.85% were females and 46.15% were males. A higher number of females were detected for *Ixodes ricinus, Haemaphysalis punctata, Rhipicephalus sanguineus* and *Dermacentor marginatus.* Higher number of males was detected for *Rhipicephalus bursa* and an equal number of ticks of the *D.recticulatus.* This is in agreement with the research of the tick sex ratio that have been made around the world (Milutinović, 1992; Milutinović *et al.,* 1997; Anderson and Magnarelli, 2008).

In temperate habitats, feeding and generation cycles of hard ticks are closely synchronised with periods of suitable temperature and humidity conditions (Carrol and Kramer, 2003; Anderson and Magnarelli, 2008). The considerable interchange between spring and autumn tick populations can be attributed mainly to environmental conditions. In general, the climate in the exam-

Table 1. The number of specimens of identified tick species per examined host

TICK SPECIES	HOSTS		TOTAL
	sheep	goats	
Ixodes ricinus	425	122	547
Dermacentor marginatus	282	67	349
Rhipicephalus bursa	174	124	298
Rhipicephalus sanguineus	1000	74	174
Haemaphysalis punctata	229	82	311
Dermacentor recticulatus	64	31	95
TOTAL	1274	300	1774

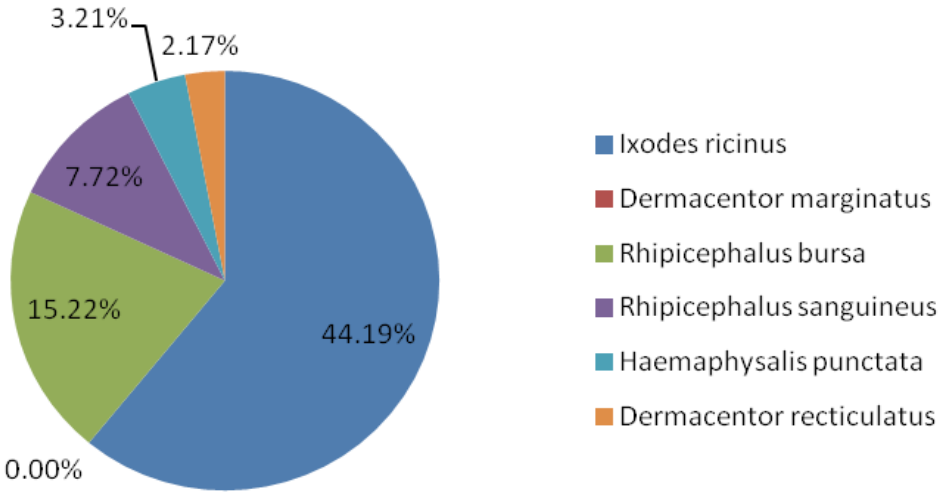

Figure 2. Distribution of tick species in sheep

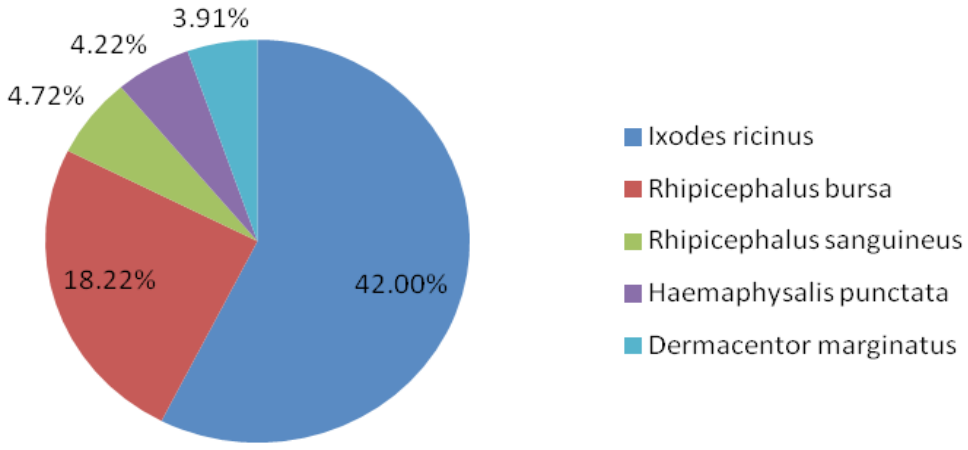

Figure 3. Distribution of tick species on goats

ined area is continental, with cold, relatively dry winters and warm, humid summers. Summer temperatures in the mountainous areas are notably cooler, averaging about 18°C with up to 120 days of annual snow cover in the mountains. For these reasons, some species occur later than in the lowland and hilly parts of Serbia. 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 population maximum for three species *Dermacentor marginatus, D.recticulatus* as well as *Haemaphysalis punctata* occured in April. May was the month of the population peak for *I.ricinus* and it was noted that this species started to decrease in abundance in June. R.*hipicephalus sanguineus* and *R.bursa* reached their maxima decreasing in August, and disappearing completely in September and October. The autumn population peak in September and in October occurred for *I. ricinus, Dermacentor marginatus* and *Haemaphysalis punctata* (Figure 4).

Similar results we obtained during examination of ticks fauna in western and eastern part of Serbia where *I. ricinus* and *D. marginatus* are the dominant tick species on sheep (Milutinović *et al.,* 1996; Milutinović *et al.,* 1998).

At the same time in the investigated areas at the goat *I. ricinus* and *H. punctata* were the most abundant species in contrast on Belgrade area and south Serbia where, except *I. ricinus*, the second dominant species was *R. bursa* (Milutinović *et al*., 1997; Dimitrić, 1999, Pavlović *et al*., 1999; Pavlović *et al.,* 2002; Becskei *et al.,* 2015).

The found species of ticks are the most common on sheep and goats in other coutries in the Balkans – North Macedonia, Montenegro and Bosnia and Hercegovina (Omeragić, 2011; Pavlović *et al.,* 1995; Pavlović *et al.,* 2014; Pavlović *et al.,* 2016a, Pavlović *et al.,* 2016c) and in Romania (Dumitrache *et al., 2012,* Mihalca *et al., 2012*).

Conclusion

During 2017 we examined 114 flocks of small ruminants from southern part of Serbia, at north Kosovo. Infection occurred at and on 56.14% of examined sheep and 31.42% of examined goats. Ticks represent one of the indispensable elements of that specific biotop.

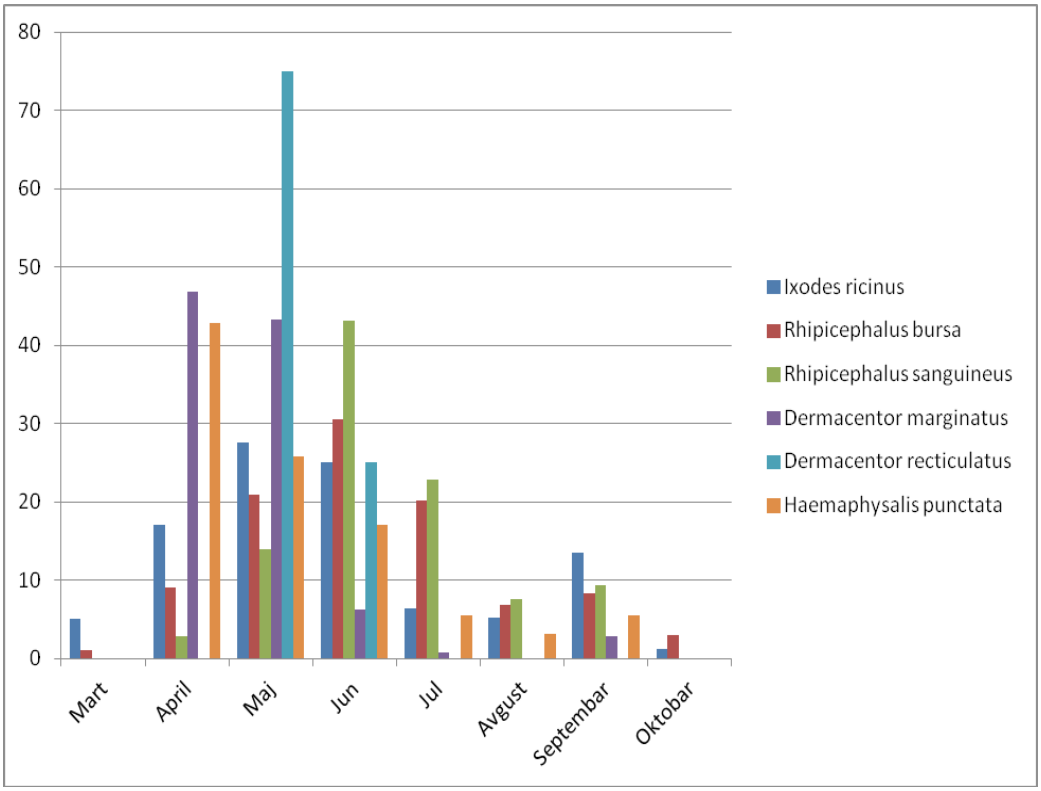

Figure 4. The population dynamics of collected tick species

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