

TICK FAUNA OF CATTLE IN NORTHEASTERN PART OF SERBIA (BANAT)

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Summary

The present study was conducted in 30 cattle herd from the territory of Banat (Vojvodina) in the period of March to October 2019, during the grazing season was to established tick fauna in that area. Ticks were collected from cattle and from pastures where they were grazed. The tick species and sex/gender were identified by morphometric characteristics. Relative abundance analysis revealed that the *I. ricinus* was absolutely dominant species found in 71.22%, followed by *Haemaphysalis punctata* (18.22%), *Dermacentor marginatus* (11.72%), *Rhipicephalus sanguineus* (3.22%) and *Rhipicephalus bursa* (2.01%). On the pasture, however, the most common species was *H. punctata*, followed by *I. ricinus*, *D. marginatus*, *R. sanguineus* and *R. bursa*. Out of the total number of ticks collected, 53.65% were females and 46.35% were males. The sex ratio showed a higher number of females in four species (*Ixodes ricinus*, *Haemaphysalis punctata*, *Rhipicephalus sanguineus* and *Dermacentor marginatus*), while higher number of males were detected in *Rhipicephalus bursa*. The population dynamics of recorded tick species showed two annual maxima, 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.

Keywords: cattle, ticks, Banat, Serbia.

Northeastern part of Serbia, Banat is part of Vojvodina, and is limited by the flows of the Tisza in the west, the Danube in the south, the Serbian-Hungarian border in the north and the Serbian-Romanian border in the east. The relief of Banat consists of several morphological units: Vršac Mountains (641 m above sea level), include Gudurički vrh, the highest elevation of Vojvodina. Belockrvanska kotlina, is located south of Vršac. The East Banat valley is a lowland between two large dunes, stretching north of Vrsac, all the way to Timisoara, it is a shallow valley lowered along faults on whose higher sides the first sand accumulative forms began to form, the forerunner of today's Deliblato sands. Deliblato (Great) sandstone, is one of the largest European sand accumulations formed after the disappearance of the

Pannonian Sea. The sandstone is cultivated, forested, and its sand is frozen so that the wind would not blow it away and thus change the relief. Banat sandstone is located in southeastern Banat, stretches from southeast to northwest for almost 60 km, and is bordered by the Danube plain in the southeast and the Tamis in the northwest. The altitudes of the sandstone vary between 120 and 240 m above sea level, with an area of about 300 square kilometers. The sandstone in the narrow sense has a length of 38 km and a width of 11 km. The Banat light plateau surrounds the Banat sandstone and represents the accumulation of light dust, finer and finer sand material, which due to its lower weight is carried away from the sand and deposited where the transport power of the wind has weakened.

Some parts of Banat are abundant in grasslands where animals grazing is mainly semi-intensive. The rational use of pastures in the period of April-October makes the cattle production sustainable and low input in this period of the year. The specific climate and the unique habitat includes high biodiversity of flora and fauna of the grasslands. Pastures are not treated with insecticides, and usually, cattle share the pastures with other animal species depending on the location (e.g., domestic animals such as sheep, goats, horse, dogs, and wildlife species such as foxes, wild boars, several species of deer, and rodents) (3, 25, 29).

Ticks represents one of the indispensable elements of that biotope and tick infestations are common, especially during late spring and autumn months of the year. However, in the semi-intensive breeding system, which is the most often practice in this region, is very difficult to avoid infections with different types of ticks that are contaminants of the grasslands and pastures (25). Ticks are obligate haematophagous ectoparasites which have multiple adverse effects on the host organism. A particular problem is that they spread diseases to humans, domestic and wild animals, which can be reservoirs, vectors and/or transient hosts for the tick-borne pathogens (8, 9, 19, 22, 26, 29).

The tick fauna is so far the most studied in small ruminants in Serbia (27) and this is a continuation of research focused on cattle in some regions of Serbia. In our paper we presented results of examination performed during 2019 at northeast part of Serbia in Banat area (Vojvodina).

Materials and methods

During our examination we examined 177 cattle from 31 herds. The ticks present on animals were collected manually by removing them from cattle with tweezers and were placed in vials with 70% ethanol. From pastures ticks were collected by the flagging method using 1 m² white linen. Ticks were collected at the center of the pasture as well as under scattered vegetation present at the locations.

The tick species and sex/gender were identified by morphometric characteristics. The main attribute of identification of tick family is a plain dorsal sclerotised scutum or shield, which is often ornate with patterns in white or gold against a brown or grey background and which distinguishes these ticks from other

families. This sclerotised plate covers the entire dorsal surface of the male, but only one third of the female's dorsal surface. Second one was the capitulum of hard ticks which just as the mouthparts and is visible from a dorsal view. The peritreme or groove is big and clearly visibly around the stigmatal plate. Grooves are deep, linear depressions in the body cuticle, usually on the ventral surface. Hard ticks can be easily differentiated by the shape of the basis capitulum and by the form of anal grooves (10, 11).

Results and discussions

During our examination a total of 326 ticks were collected from the 78 animals (44.06%) and a total of 87 ticks were collected from the pastures. We found only adult ticks. Relative abundance analysis revealed that the *Ixodes ricinus* was absolutely dominant species found in 71.22%. Followed by *Haemaphysalis punctata* (18.22%), *Dermacentor marginatus* (11.72%), *Rhipicephalus sanguineus* (3.22%) and *Rhipicephalus bursa* (1.30%) (Fig. 1).

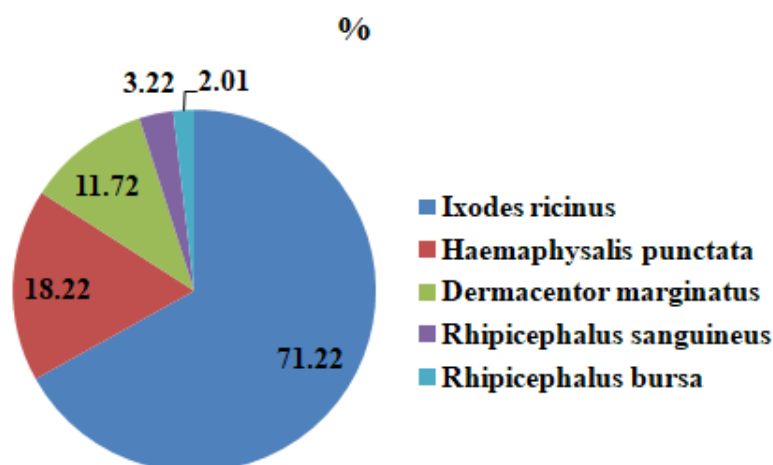


Fig. 1. Prevalence of tick in cattle in North Banat

On the pasture, however, the most common species was *H. punctata* found in 44.45%, followed by *I. ricinus* (42.85%), *D. marginatus* (8.55%), *R. sanguineus* (2.85%) and *R. bursa* (1.60%) (Fig. 2).

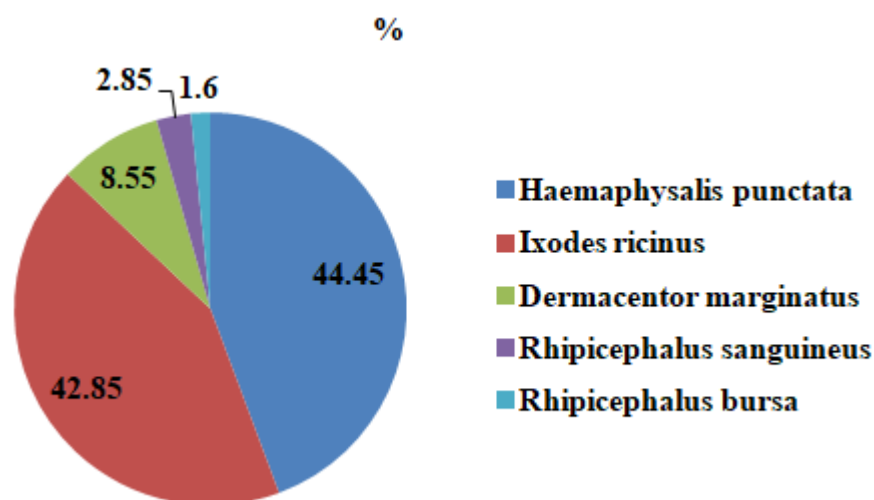


Fig. 2. Prevalence of tick in pasture in North Banat

Out of the total number of ticks collected, 53.65% were females and 46.35% were males. The sex ratio showed a higher number of females in four species *I. ricinus*, *H. punctata*, *R. sanguineus* and *D. marginatus*, while higher number of males were detected in *R. bursa*.

Climate condition like air temperature, relative humidity and rainfall and climate conditions have a great influence on the population dynamics of ticks. (1, 2, 4, 5, 6, 15). In the Banat the climate is moderate continental. The average annual temperature is 10.9°C. The average winter temperature is -1°C and in July is 21.6°C. Annual rainfall is 686 mm, with 122 rainy days. The lowest point of the Danube is 70.83 m and the highest is 79.70 m above sea level. The highest recorded water level is +778 cm and the lowest is -134 cm. The influence at climate condition to population dynamics of ticks was monitored from March to October. They showed two annual maxima, in spring (April-May) and in autumn (September-October). The March was a period when the grazing season started and the first occurrence of *Ixodes ricinus*, *H. punctata* and *D. marginatus* was recorded. Two species *D. marginatus* and *H. punctata* occurred population maximum 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. sanguineus* and *R. bursa* reached their maxima decreasing gradually until August, and disappearing completely in September and October. The autumn population peak in September and in October occurred for the *I. ricinus*, *D. marginatus* and *H. punctata*. Our results confirmed the results of the similarly studies carried out in northeast, eastern and south-eastern part Serbia (15, 16, 17, 18, 27).

The female abundance of established tick species has been in correlation with previously established population dynamics. The females of *Ixodes ricinus* species were present from March to October, with a peak population in May and June. Females of two species of the genus *Rhipicephalus* (*sanguineus* and *bursa*) have been found most often in the summer months - June and July. Findings of the females of species *D. marginatus* and *H. punctata* were most common in April and May. This population dynamics of female ticks is characteristic for this microclimate (2, 7, 13).

Males of the species *I. ricinus* were found from March to October, with the spring peak population in May and autumnal in September which corresponds to the values obtained in our earlier research (8, 26). Males of the species *R. sanguineus* were established from March to October, a species *R. bursa* from April to September with a population peak of both species in June, which also corresponds to values for this geographical area (28, 30, 32, 38). Males of the two species of the genus *Dermacentor* (*marginatus* and *pictus*) were usually found from April to June while the males of *H. punctata* species were established from April to June which corresponds to values of research in this area and in Central Europe and the Mediterranean basin (9, 12, 14, 18, 20, 21, 23, 28).

Conclusions

The found species of ticks are most common in ruminants in other countries in the Western Balkan – North Macedonia, Montenegro and Bosnia and Hercegovina and in Hungary and Romania. A diverse tick fauna present in this region mainly influences the health status of grazing ruminants. Being the vectors and reservoirs for many tickborne pathogens like *Anaplasma phagocytophilu*, *Babesia divergens* etc., the tick transmit diseases that cause health disturbance in domestic animals and humans in affected areas. From that reason, the tick population need to be studied in order to predict the critical points and implement adequate protection measures in animals with the final goal of disease prevention and control.

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