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EPIZOOTIOLOGICAL RESEARCH OF CANINE BABESIOSIS IN THE BELGRADE DISTRICT

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ABSTRACT

Babesiosis is a tick-borne disease of dogs caused by protozoan parasite Babesia canis. In the period 1997-2001 survey of incidence of babesia infection of pet dogs and faunistic study concerning ticks were undertaken in the Belgrade district. Four species of ticks were found in the investigated regions, namely: Ixodes ricinus, Rhipicephalus sanguineus, Dermacentor marginatus and Dermacentor reticulatus. The faunistic composition, relative abundance and population dynamics of detected species were investigated. Ticks were found on 32.39% (1278/3945) of examined dogs. Ticks Rhipicephalus sanguineus, Dermacentor reticulatus and Dermacentor marginatus are principal vectors of B. canis. Babesia canis was detected in R. sanguieneus (66.10%), D. reticulatus (46.40%) and D. marginatus.(18.70%). Babesiosis was detected in 74.07% (2922/3945) of examined animals with suspected clinical signs of infection.
Key words: Babesia canis, dog babesiosis, ticks, transmission,

INTRODUCTION

Dog babesiosis is caused by haemoprotozoan parasites of the genus *Babesia (Piroplasmidae: Apicomplexa).* Two species of genus *Babesia - B.canis* and *B. gibsoni* are of great importance owing to wide range of infected animals in *Canidae* familly (Glaser and Gothe 1998; Inokuma et al. 1998).

Babesia canis infections occur world-wide, but most often in Europe (Gothe and Wegerdt 1991). This is a large piroplasm, pyriform in shape, 4-5 micrometer in length, pointed at one and round at other. Frequently there is a vacuole in the cytoplasm. The pyriform forms may lie at an angle to another, but pleomorphism of shape may be seen, organism vary from amoeboid to ring forms (Riek 1968; Soulsby 1977).

Dog babesiosis is (like other babesiosis) a tick-borne disease. The principal vector of *B. canis* is *R. sanguineus* which occurs throughout the world; it has been specially demonstrated as a vector in Europe, south and central Africa, both America and south Asia (Liebisch and Gillani 1979; Grandes 1986; Horak 1995; Maroli et al. 1996). The species of the genus *Dermacentor- D. marginatus* and *D. reticulatus* - have been incriminated in Europe including Russia as vectors of dog babesiosis (Rivosecchi et al. 1980; Zahler and Gothe 1997). Concerning Yugoslavia, *R. sanguineus* and *D. reticulatus*, rarely *D. marginatus*, are impointed as vectors of dog babesiosis (Kulišić et al. 1996; Pavlović et al. 1999).

The change of seasons may have an influence on disease prevalence and may result in a periodical occurrence. This seasonal characteristic is present especially in arthropod-borne parasitoses, primarily because population densities of vectors or intermediate hosts vary throughout the year (Petri 1988).

The investigation area is known as a focus of dog babesiosis. The objective of the present study was to investigate epizootiological aspects of dog babesiosis in a district of Belgrade aiming to provide a bettter understanding of this tick-borne disease.

MATERIALS AND METHODS

In the period 1997-2001. survey was carried out on a total of 3945 pet dogs. From suspected dogs, with common clinical manifestation of disease (anemia, haemoglobinuria, fever, pale of mucous membranes etc.) or infested with ticks, we used capillary blood to examination. This blood films were air-dried, fixed in absolute methanol for 1 minute and stained in 10% Giemsa stain for 20-30 minutes.The species of *Babesia* were identified using the schemes of Riek (1968) and Soulsby (1977).

Ticks were collected from dogs 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, (where dogs are infested), name of host and date and hour of collection. The tick species were detected using keys given by Pomerancev (1950) and Kapustin (1955). Collected ticks of suspected genus (*Rhipicephalus* and *Dermacentor* species) were examined to presence of babesia. Tick films were made by placing a small drop of blood onto a clean glass slide, air dried, fixed in absolute acetone for 5 minutes and stained by 5% Giemsa for 20-30 minutes. Each blood sample was examined under oill immersion.

RESULTS AND DISCUSSION

Ticks were collected monthly from January until the and of December.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 (Milutinović 1992; Milutinović et al. 1998). The collected tick specimens-a total of 2768 were adults females and males belonged to the *Ixodidae* family. Ticks were found on 32.39% (1278/3945) of examined dogs. Relative abundance analysis revealed that the species *I. ricinus* was absolutely dominant 51.01% (1412/2768), followed by *R. sanguineus* 39.74% (1100/2768), *D. marginatus* 8.24% (228/2768) and *D. reticulatus* 1.01% (28/2768).

Babesia canis was detected in 66,10% *R. sanguineus*, 46,40% *D. reticulatus* and 18,70% *D. marginatus*. Up to 80th years dog babesiosis was sporadically occured in vicinity of Belgrade. In all recorded cases, dogs were infected out of Belgrade district durung hunting seasons and summer vacations. First cases in the extended area of Belgrade were recorded by the Sava upstream– southern parts of Belgrade area (Krstić et al. 1994). Later, *R. sanguineus* has been recorded as one of the most abundant tick species on vegetation, dogs and foxes in the Belgrade area (Pavlović et al. 1998; Milutinović 2000). Consequently with expansion of *R. sanguineus* on vegetation, dog babesia infections were recorded in the investigated area (Pavlović et al. 1999).

Concerning the species *R. sanguineus*, we are inclined to stress their vectorial role as a causative agent of babesiosis and hereditary infection with Babesia sp. Numerous stray dogs, often infected with ticks, are a permanent source of infection for hunting dogs and other appropriate hosts, including man.This was reported by Rivosecchi et al. (1980) for the outskirts of Rome and Kulišić et al. (1995) in the extended area of Belgarade.

Table 1Number of infected dogs

Month/Year	1997	1998	1999	2000	2001
January	0 (0.0)	0 (0.0)	2 (0.3)	3 (0.5)	2 (0.3)
February	0 (0.0)	7 (1.3)	4 (0.7)	4 (0.7)	4 (0.6)
March	38 (8.0)	38 (7.2)	53 (8.9)	42 (6.9)	56 (7.9)
April	117 (24.5)	131 (24.7)	128 (21.4)	145 (24.0)	161 (22.7)
May	191 (40.0)	202 (38.0)	249 (41.8)	240 (39.6)	285 (40.1)
June	72 (15.1)	102 (19.2)	86 (14.4)	98 (16.2)	110 (15.5)
July	14 (2.9)	5 (0.9)	5 (0.8)	7 (1.2)	14 (2.0)
August	14 (2.9)	13 (2.5)	24 (4.0)	23 (3.8)	26 (3.7)
September	23 (4.8)	27 (5.1)	35 (5.9)	29 (4.8)	40 (5.6)
October	9 (1.9)	3 (0.56)	7 (1.2)	10 (1.7)	9 (1.3)
November	0 (0.0)	2 (0.4)	1 (0.2)	3 (0.5)	2 (0.3)
December	0 (0.0)	1 (0.2)	3 (0.5)	2 (0.3)	1 (0.1)
No.positive/No.examined	478/667	531/722	597/806	606/810	710/940
(%)	(71.7)	(73.6)	(74.1)	(74.8)	(75.5)

Milutinović et al.(1997) pointed out the first determination of *D. reticulatus* on dogs in the area of Belgrade. The third dog babesia vector - *D. reticulatus*, was detected in forest-park Zvezdara-northen part of Belgrade, during high incidence of dog babesia infections. Investigations carried out in various Belgrade districts, confirmed that the spreading of *Babesia canis* infections from south parts of Serbia to Belgrade is due to expansion of tick vectors.

Number of infected dogs, according to the each year and month of research and yearly extension of infection during surveyed period are presented on Tab. 1.and Fig. 1. In research on the population dynamics of incidence of dog babesiosis, we took into consideration the monthly means of number of infected dogs for the five year period (Fig. 2).

During researches, infection with *B. canis* was found in 74.11% (2922/3945) of examined dogs. The rate of infection increased each year within the investigated period, usually in high rate of infection. The dynamics of incidence of dog babesiosis was monitored from February to December. It was noted that the increase in incidence of dog babesiosis commenced in the interval March-April. May was the month of infection maximum, decreasing gradually until July. The autumn infection peak occurred in September, disappearing completely in December (Fig.2).

Up to 1997. dog babesiosis did not occur during winter period (Pavlović et al. 1999). In 1997. increased number of stray dogs and seasonal characteristic (worm autumn and winter months) had an influence on densities of ticks (vector and reservoir) and disease prevalence, respectively. The highest risk of infection with ticks in the study area was in the interval April - May. Therefore, according to the seasonal proportion of tick population, the greatest risk of infection appeared in the second half of May until beginning of August, where th number of ticks had an increased tendence.

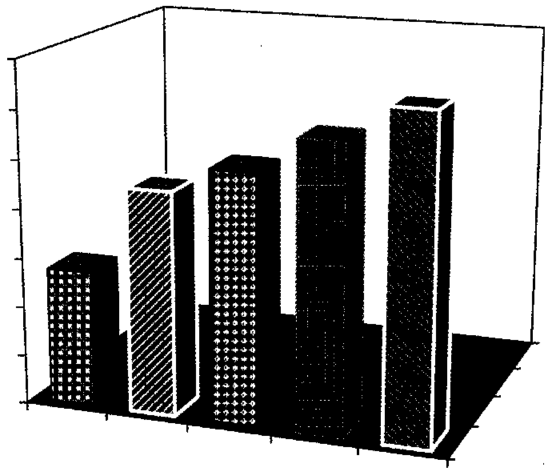

Fig. 1 Percentage of infected dogs

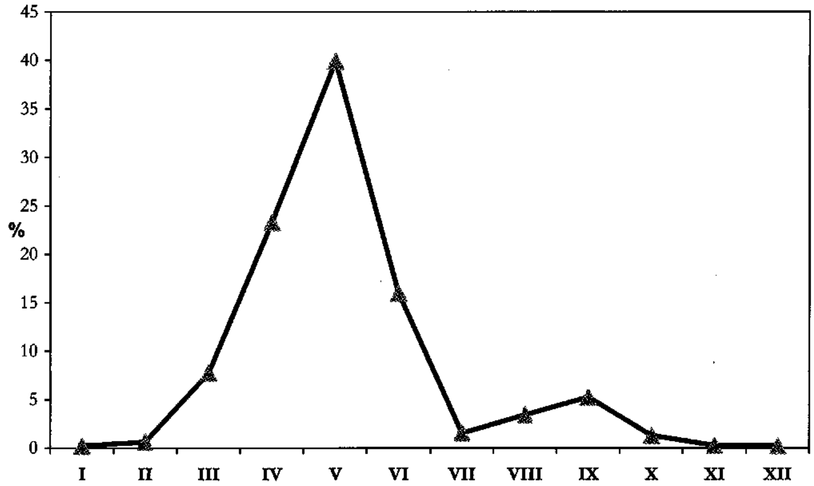

Fig. 2 Population dynamics of incidence of dog babesiosis.

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