

INVESTIGATION OF IXODID AND ARGASID TICKS ON SOME MAMMALS AND BIRDS IN THE EXTENDED AREA OF BELGRADE

Z. KULIŠIĆ*, Marija MILUTINOVIĆ**, I. PAVLOVIĆ***, B. BOBIĆ** and NEVENKA ALEKSIĆ****

Institute of Parasitology, Faculty of Veterinary Medicine, Belgrade **Institute for Medical Research, Belgrade *Veterinary Scientific Institute of Serbia, Belgrade, Yugoslavia ****Institute of Parasitic Diseases, Faculty of Veterinary Medicine, Belgrade*

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The faunistic composition, the relative abundance, population dynamics and the sex ratio of five tick species from the Ixodidae family, namely: Ixodes ricinus, Rhipicephalus sanguineus, Rhipicephalus bursa, Haemaphysalis punctata and Haemaphysalis inermis found on foxes, badgers, gundogs, stray dogs, pigeons, pheasants and poultry are given in the present work. Two species of the Argasidae family: Argas persicus and Argas reflexus were also detected. These investigations were carried out in the area of Belgrade between 1988.

Key words: ixodid, argasid, tick, mammal, bird

INTRODUCTION

Ticks are important arachnid parasites of both large and small animals. They are found on birds, reptiles and mammals. There are reports of large tick burdens on some wild animals but the effects of ticks on individual animals are best known from domestic stock.

A considerable number of free-living mammals and birds settle in the area of Belgrade, including foxes, badgers, gulls, pheasants and pigeons. Moreover, a pheasant population has been breeding in the great pheasanterias in the locality of Pančevački rit (Kovilovo and Padinska Skela) (Pavlović, 1991a). Furthermore, the presence of a great number of poultry on private holdings enables cross-infestation with ectoparasites, especially from the Ixodidae and Argasidae families (Pavlović et al., 1990a). In addition, numerous stray dogs, often infected with ticks, are a permanent source of infection for hunting dogs and other appropriate hosts, including man.

The investigation of ticks in inhabited places is of undoubtable significance in the epidemiology and epizootology of parasitic and viral diseases, since the degree of contact between these vectors of diseases and man is very high (Milutinović, 1992)

MATERIAL AND METHODS

The method of sampling ixodid ticks and further processing in the laboratory have been described previously (Milutinović et al., 1989).

The way of collecting of argasid ticks and the method of processing them have also been reported previously (Pavlović, 1991a and Pavlović et al., 1991b).

RESULTS

During the period from 1988 to 1992 the tick fauna was studied on a total of 2210 various animals (foxes, badgers, dogs, poultry, pheasants and pigeons) in the extended area of Belgrade. Adult forms collected numbered 1522. The majority of the examined animals were foxes, followed by stray dogs, hunting dogs, badgers, poultry, pigeons and finally pheasants. The most tick - infested were foxes and both stray and hunting dogs.

Five tick species from the *Ixodidae* family, were detected namely: *Ixodes ricinus*, *Rhipicephalus sanguineus*, *Rhipicephalus bursa*, *Haemaphysalis punctata* and *Haemaphysalis inermis*, and two species from the *Argasidae* family, namely: *Argas persicus* and *Argas reflexus*.

Relative abundance analysis revealed the following. The species *Ixodes ricinus* was absolutely dominant within the (1988-1992) period (730 specimens or 47.96%), followed by *Rhipicephalus sanguineus* (321 or 21.23%), *Haemaphysalis punctata* (249 or 16.36%), *Rhipicephalus bursa* (153 or 10.05%) and finally *Haemaphysalis inermis* 67 or 4.40% (Figure 1).

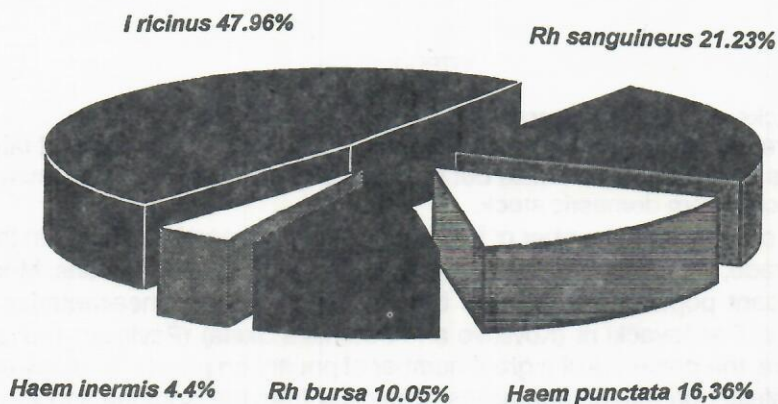


Figure 1. Relative abundance of five tick species in the extended area of Belgrade between 1988. and 1992.

Figure 2 shows the population dynamics of the five tick species over the period 1988-1992. They all started growing in numbers in March. In April the maximal abundance was attained only by *Haemaphysalis punctata* in contrast to *Ixodes ricinus* which was most abundant in May, while two species of the genus

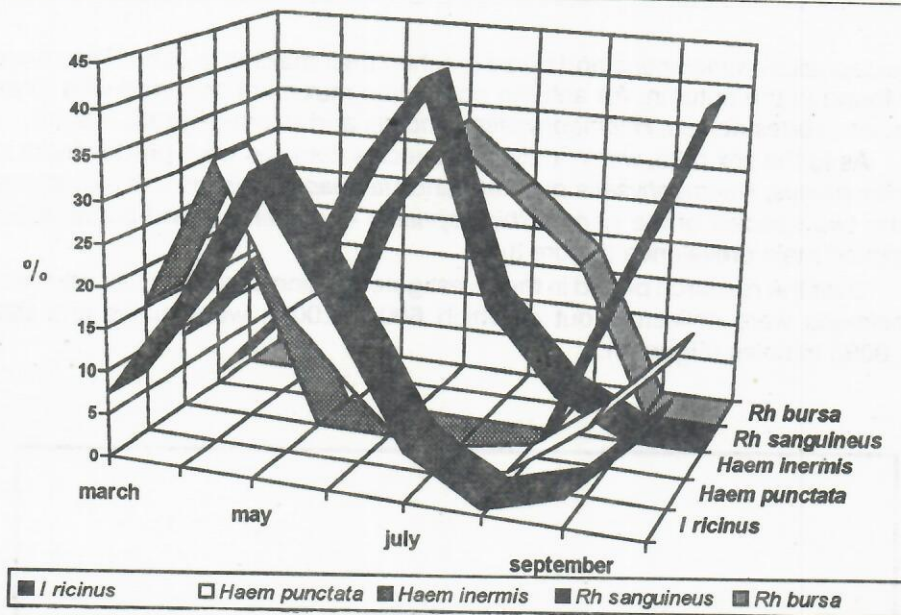


Figure 2. Population dynamics of five tick species in the extended area of Belgrade between 1988. and 1992.

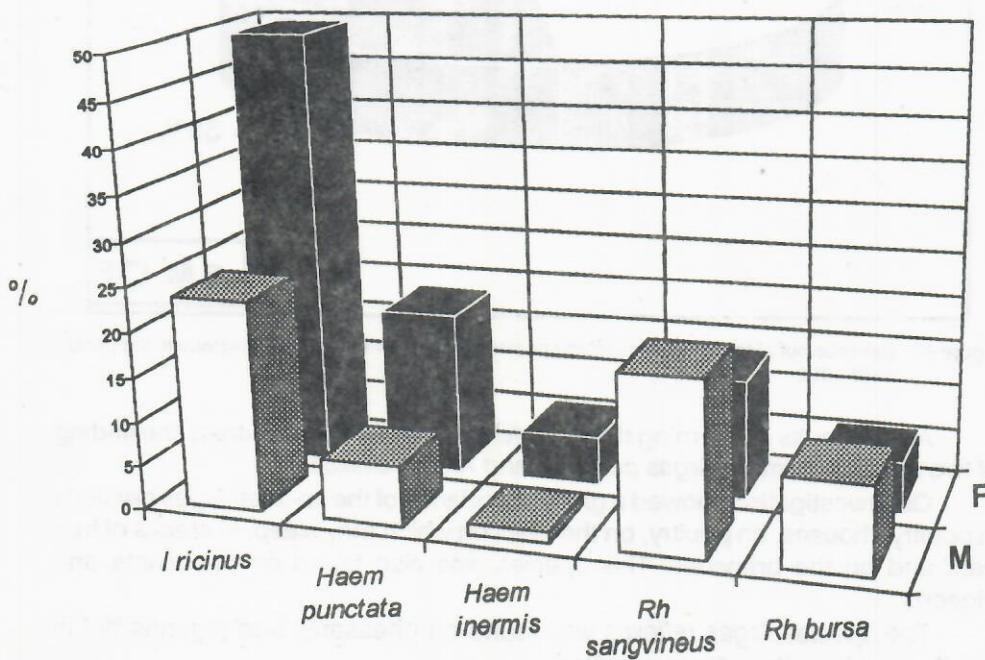


Figure 3. Sex ratio within individual species in the extended area of Belgrade in the period 1988-1992.

Rhipicephalus - sanguineus and *bursa* reached their maxima in June. They were not found in the autumn. An autumn population maximum occurred with three species: *Ixodes ricinus*, *Haemaphysalis punctata* and *Haemaphysalis inermis*.

As to the sex ratio, within individual species, females were predominant in *Ixodes ricinus*, *Haemaphysalis punctata* and *Haemaphysalis inermis* in contrast to the two species of the genus *Rhipicephalus - sanguineus* and *bursa* which exhibited male prevalence (Figure 3).

Over the research period in the investigated region a total of 1522 adult tick specimens were collected, out of which 600 (39.00%) were males and 922 (61.00%) females (Figure 4).

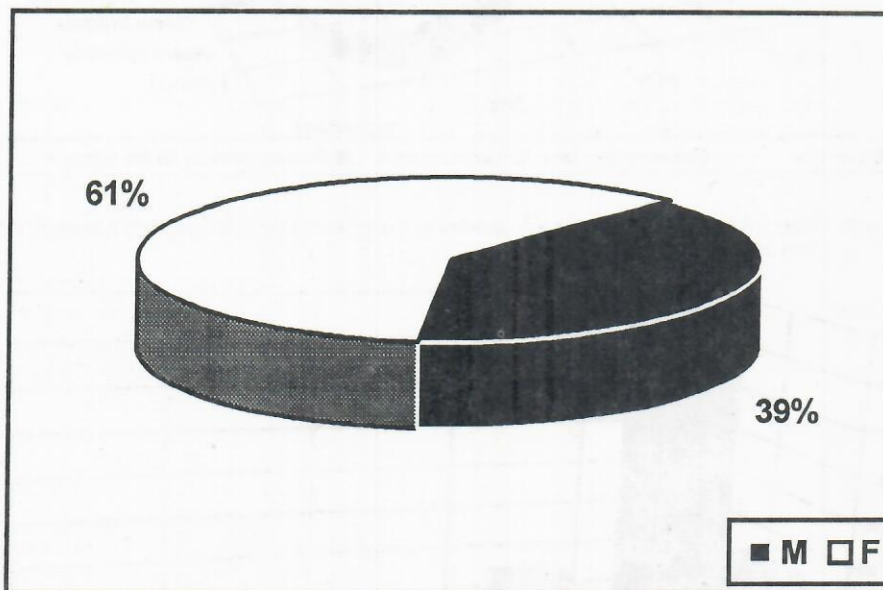


Figure 4. Sex ratio out of the total of collected species in the extended area of Belgrade in the period 1988-1992.

As for results concerning the *Argasidae* family we should stress the finding of two species, namely: *Argas persicus* and *Argas reflexus*.

Our investigation showed a great abundance of the species *Argas persicus* in poultry - houses, on poultry, on the trees on which they sleep, in cracks of free bark and on the branches. This species was also found on pheasants and pigeons.

The species *Argas reflexus* was found on pheasants and pigeons but in smaller numbers than *Argas persicus*.

DISCUSSION

Out of five ixodid tick species encountered within the area of Belgrade, the species *Ixodes ricinus* was the most abundant in the period 1988-1992. The second species, regarding abundance, was *Rhipicephalus sanguineus*, followed by *Haemaphysalis punctata*, *Rhipicephalus bursa* and finally *Haemaphysalis inermis*.

The species *Ixodes ricinus* was also predominant in North-East Serbia (Milutinović et al., 1987) but this tick was the second most abundant species in West Serbia and in the third place, regarding the abundance in East and South-East Serbia where the majority of the examined animals were sheep, followed by cattle and goats (Milutinović, 1992). In our investigation in the area of Belgrade the greatest number of specimens of *Ixodes ricinus* was taken from foxes, followed by badgers, pheasants and poultry. The finding of this species on deer and chamois in Italy was reported by Rivošecchi et al. (1979), and also on nine species of small mammals (Peres, 1987). It occurred as the most abundant species on migratory birds overwintering in the Mediterranean (Manilla, 1985), on wild and domestic animals (Grandes, 1986) and also as an ectoparasite species on migratory birds in Northern Italy (Walter et al., 1987). The mass appearance of this species was in spring and then in smaller numbers in autumn. A two-phase seasonal fluctuation was confirmed by other authors (Tovornik, 1976. and Milutinović, 1992.).

Concerning the species *Rhipicephalus sanguineus* and *Rhipicephalus bursa*, we are inclined to stress their vectorial role as a causative agent of babesiosis and hereditary infection with *Babesia* spp. These species were the most commonly found in both small and large ruminants in South Banat (Petrović, 1979) and East and South-East Serbia (Milutinović, 1992). In our study *Rhipicephalus sanguineus* was detected on foxes, badgers and both on hunting and stray dogs in the period April-August. It reached a maximum in June throughout the investigated area, at the same time as *Rhipicephalus bursa*. Therefore we consider they are summer tick species as was also confirmed by other authors (Tovornik, 1976; Petrović, 1979 and Milutinović, 1992). The greatest number of specimens of the species *Rhipicephalus sanguineus* was taken from hunting and stray dogs. This was also reported by Rivošecchi et al. (1980) as a result of observations on *Rhipicephalus sanguineus* in the outskirts of Rome.

Rhipicephalus bursa was found only on foxes and was in the fourth place, regarding abundance. Otherwise, in Serbia, the mentioned species may be encountered at the end of April and in May in the Southern parts of the Republic and in June in the rest of Serbia (Petrović, 1979; Milutinović, 1992. and Milutinović, 1995).

The sex ratio in both *Rhipicephalus sanguineus* and *Rhipicephalus bursa* showed male prevalence (59.00% and 63.00% respectively). The male prevalence of the latter was also confirmed by Milutinović (1992 and 1995) in West Serbia.

Besides the most abundant *Ixodes ricinus* the species *Haemaphysalis punctata* appeared as its permanent companion in the investigated region. Specimens of this species were collected from foxes, badgers and pheasants.

The finding of *Haemaphysalis punctata* i. e. its abundance and dynamics is identical to results of the study in other parts of Serbia (Petrović et al., 1955; Milutinović, 1989. and Milutinović, 1992). Namely, the population reached two maxima, in April and October. The dominant place was assumed by females (73.00%). The finding of this species on small rodentia in the mountains of the Crimea was reported by Sosnnina (1969). It was present on migratory birds in Italy (Manilla, 1985 and Walter et al., 1987) and on wild and domestic animals in Spain (Grandes, 1986).

Haemaphysalis inermis came fifth according to its distribution over the investigated region. All ticks were collected from foxes. It occurred in the same terrain as *Haemaphysalis punctata* - from South Banat to Macedonia. However, this species has never had a mass appearance as in the case of former. The species *Haemaphysalis inermis* was found in March, April, September and October throughout the period 1988-1992. Our findings coincided with the results obtained by other authors (Sosnnina, 1969; Georgiev et al., 1971. and Milutinović, 1992).

Of the two species of the *Argasidae* family detected in Serbia so far, we confirmed the same finding, namely: *Argas persicus* and *Argas reflexus*.

Following hatching or moulting and the period of quiescence, a new finding host is helped by orientation responses, which in argasid ticks may depend on the nearness of suitable hosts, and may be more marked at night as in the case of *Argas persicus* and *Argas reflexus* in which the adults and nymphs feed on roosting avian hosts, remaining hidden during the day.

The findings concerning *Argas persicus* and *Argas reflexus*, i. e. their abundance and hosts are identical to results of studies in other parts of Serbia (Pavlović et al., 1988. and Pavlović et al., 1992.)

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ISTRAŽIVANJA IKSODIDNIH I ARGAZIDNIH KRPELJA NA NEKIM SISARIMA I PTICAMA NA ŠIREM PODRUČJU BEOGRADA

Z. KULIŠIĆ, Marija MILUTINOVIĆ, I. PAVLOVIĆ, B. BOBIĆ, i NEVENKA ALEKSIĆ

SADRŽAJ

U radu su prikazani rezultati proučavanja krpelja na lisicama, jazavcima, lovačkim psima i psima litalicama, kao i na golubovima, fazanima i živini na širem području Beograda u periodu od 1988-1992. godine.

Ekološka ispitivanja su obuhvatala: faunistički sastav, relativnu brojnost ustanovljenih vrsta krpelja, dinamiku populacija i odnos polova. Iz familije Ixodidae ustanovljeno je pet vrsta krpelja i to: *Ixodes ricinus*. *Rhipicephalus sanguineus*. *Rhipicephalus bursa*, *Haemaphysalis punctata* i *Haemaphysalis inermis*. Iz familije Argasidae ustanovljene su dve vrste: *Argas persicus* i *Argas reflexus*.

Od iksodidnih krpelja, najbrojnija vrsta je bila *Ixodes ricinus*, a od argazidnih - *Argas persicus*.

