Seasonal Occurrence of Ticks on Goats and *Borrelia burgdorferi* Influence in *Ixodes ricinus* in Antalya Region

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SUMMARY: The seasonal activity of populations of ticks during a one-year period has been studied in Antalya. The influence of seasonal features on the frequency of tick population was investigated. For a one-year period, 3338 ticks were collected monthly from the goats. They were typed and all three life stages were detected. The following species were detected: 1537 (46.0%) *Rhipicephalus bursa*, 978 (29.3%) *Ixodes ricinus*, 608 (18.2%) *Dermacentor marginatus*, 203 (6.0%) *Haemaphysalis parva* and 12 (0.5%) *Haemaphysalis sulcata.* One *Borrelia burgdorferi* was seen by immunofluorescence assay in 93 *Ixodes ricinus* that had been dissected.

Key words: *Borrelia burgdorferi*, ticks, *Ixodes ricinus*

Antalya Bölgesinde Keçilerde Kenelerin Mevsimsel Durumu ve *Ixodes ricinus* kenesinde *Borrelia burgdorferi* varlığı

ÖZET: Antalya'da bir yıllık süre içinde kene popülasyonundaki mevsimsel aktivite değerlendirilmiştir. Kene popülasyonu sıklığında mevsimsel özelliklerin etkisi araştırılmıştır. Bir yıllık süre içinde aylık olarak keçilerden 3338 kene toplanmıştır. Keneler tiplendirilmiş ve yaşam evreleri saptanmıştır. Sırasıyla 1537'si (%46.0) *Rhipicephalus bursa*, 978'i (%29.3) *Ixodes ricinus*, 608'i (%18.2) *Dermacentor marginatus*, 203'ü (%6.0) *Haemaphysalis parva* ve 12'si (%0.5) *Haemaphysalis sulcata* olarak saptanmıştır. Disseke edilen 93 *Ixodes ricinus* kenesinin birinde immünfloresan yöntemle *Borrelia burgdorferi* görülmüştür.

Anahtar sözcükler: *Borrelia burgdorferi*, keneler, *Ixodes ricinus*

GİRİŞ

Ticks infect humans and animals as a vector of many infectious diseases (1,2,11). Antalya region of Turkey has a great tick population because of its climate, landscape and plantations (6,8,13). Lyme disease is a vector-born infection transmitted through the bite of infected Ixodes. It is common in woody and mountainous areas (5). *Borrelia burgdorferi* is the causative agent of Lyme disease and was first recognized in 1975 in the region of Lyme, Connecticut (12). It causes a multisystem infection. Lyme diseases could be found nearly all continents and endemic areas were established by epidemiological studies. High seroprevalance of *B.burgdorferi* has been recorded in rural areas of Antalya (13). The study aimed to investigate the frequency of tick population and also to distinguish *B.burgdorferi* spirochete from *Ixodes ricinus.*

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MATERIAL AND METHODS

Two sites in northern parts of Antalya at 900-1000 meters above the sea level were investigated. Plantations are pine woods and scrubs at these sites. Climate rates were recorded in all seasons. Goats are domestic animals in this region. Ticks were collected monthly during one year period. Typing of ticks were performed in the Protozoology and Entomology Department of Veterinary Faculty Ankara.

Three life stages were also recorded. 93 *I.ricinus* were dissected. Internal tissues of adult larval ticks were stained by indirect fluorescent assay (IFA) to detect spirochetes. Midgut and salivary glands were dissected and smeared on glasses.

They were air dried and fixed in acetone for ten minutes. Preparations were covered with human sera including *B.burgdorferi* antibodies (Gull, Germany). Preparations were then stained with conjugate *B.burgdorferi* FITC labeled Antihuman IgM-sheep (Gull, Germany). Positive and negative controls were also used.

RESULTS

Climatic conditions are uniform at this area. The range in mean annual temperatures is 13 °C. The average annual precipitation is 354.3 mm. Precipitation of this years average is 300mm. Among the 3338 ticks collected one year period. 978 (29.3%) were typed as *I.ricinus*. Larval stages were 49 and nymphal stages were 25. Male *I.ricinus* were 365, females were 539 (Figure 1).

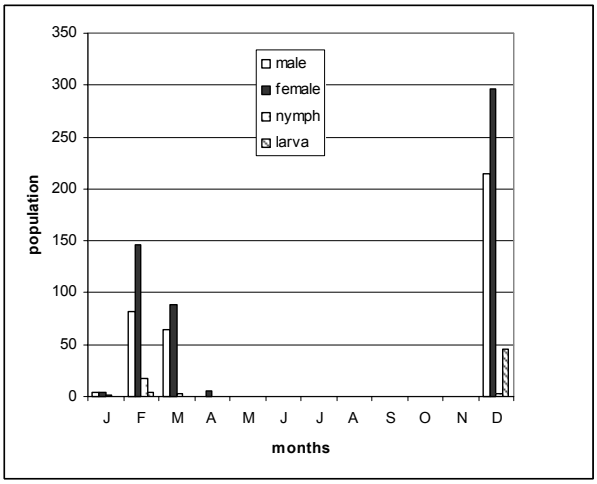

Figure 1. Monthly distribution of *Ixodes ricinus* population on the goats in Antalya

1537 (46.0%) were typed as *Rhipicephalus bursa*. Three of them were nymphal stages. The determination showed *R.bursa* was the most common ticks. 608 (18.2%) were *Dermacentor marginatus*, 203 (6.0%) were *Haemaphysalis parva* and 12 (0.5%) *Haemaphysalis sulcata*. *Haemaphysalis sp.* were isolated rarerly than the other species. *I.ricinus* occurred in winter seasons. *R..bursa* and *D.marginatus* occurs in spring and summer seasons, *D.marginatus* and *Haemaphysalis sp* in autumn (Figure 2).

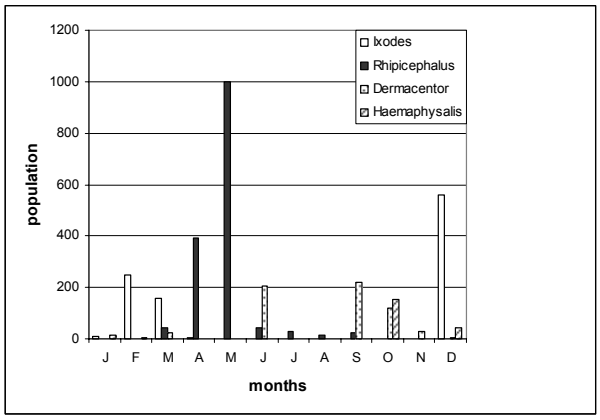

Figure 2. Monthly distribution of ticks population on the goats in Antalya

Only one *B.burgdorferi* could be seen in 93 dissected *I.ricinus.*

DISCUSSION

Distribution of tick species are affected by the ecological and bio-climatic factors (4). Foci of *I.ricinus* were clustered and abundant in forested areas with sandy soils, near streams (3,5). *I.ricinus* population are influenced by sunny and dry regiments at the south cost of Europe and Mediterranean region. They clustered to mountainous and woodland at this region (7,10). Turkey is the country where the tick have great populations. Seasonal influence on tick population were detected. Ixodes population are abundant in March-June, Rhipicephalus species in April-September, Hyalomma appears in April-October, Dermacentors species are detected all seasons. Haemaphysalis species are seen October –February (8).

Presented study; *I.ricinus* populations were abundant in winter and beginning of spring. *R.bursa* populations were decreased in summer. *D.marginatus* was seen in summer-autumn. *Haemaphysalis sp*. is detected in autumn and rarely in winter. At the periods of presented investigation seasonal climatic temperature rates were exceeded the norm of the other years. Rain amount was below the seasonal averages. Therefore *I.ricinus* appeared earlier and clustered in winter season. Ectoparasitic precautions on goat flocs reduced the tick populations in spring and summer seasons. Lyme diseases could be endemic in Antalya. Because *B.burgdorferi* seroprevalance was 35.9% at 1993 (13), 22% (p=0,0002) in 1996 (13). Lyme diseases is not well known in Turkey, and not often diagnosed in patients who display common symptoms with other diseases.

These results indicate that data on tick populations and geographical environmental factors may be useful in anticipating the risk of exposure to vector ticks.

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