


<b>Presence of Tick Species as the Vector of Crimean-Congo Hemorrhagic Fever in Kosovo</b>			<b>Healthcare</b>
		<b>Keywords:</b> CCHF, Tick, Genus, Vector, Kosovo, etc.	
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<b>Abstract</b>			
<p>There is strong evidence that the species of the tick are implicated in the ecology and epidemiology of CCHF in Kosovo. The data suggest that the domestic animals, especially the sheep, should be considered the principal host of adult tick as the vector of virus. The tick were collected from the sheep in the two municipality in endemic area Malisheve (village Astrozub) 44 sample and non-endemic municipality Pristine (village Graqanica and Hajkoil) 158 samples. That was examined for the presence of different species of tick. From the 202 collected tick, prevalent was genus <i>Rhipicephalus</i> spp. with 157 cases and 1 cases genus <i>Haemophilisalis</i> spp. in non-endemic municipality Prishtina. In endemic municipality Malisheve prevalent was the genus <i>Hyalomma</i> spp. with the 27 cases, <i>Ixodes</i> spp. 13 cases and 2 cases genus <i>Haemophilisalis</i> spp.. Determination and specification of the samples of tick was done using guide Estrada-Pena et al (2004).</p>			

## Introduction

Tick belong to class Arachnida, order Acari, suborder Ixodida, Family Ixodidae. The data confirm that the tick are implicated in the ecology of CCHF and serve as principal vector of virus from animals to human in region of Kosovo, south-west of Balkans (1, 2). Investigated region Kosovo belong to the type of the Pond Caspian steppe, with dray, hot summer and cold winters, and abundant rainfall (1). This is an ecological niche for the tick species *Hyalomma*, *Rhipicephalus*, *Ixodes* and *Haemophilisalis* (table 1) whose seasonal dynamic coincidence with seasonal dynamic of CCHFF in Kosovo (1). For identification and determination of tick genus we used 202 tick samples from two municipality, endemic municipality Malisheve (Astrozub) with 44 tick samples and non-endemic municipality Pristine (village Grraqanica, Hajkobil), with 158 tick samples. The aim of the study was the identification and classification of the tick present in endemic municipality Malisheve and non-endemic municipality Pristine, and connection with presence and spread of CCHF in this municipality in Kosovo. Result of our investigation overlap with data from literature (1) and show that no difference in the data with neighbor country about the presence of tick genus in the area of south-west Balkan. We stated that the main factor for overlap presence of tick in Kosovo and neighbor country is similar ecologic factors. These conditions provide an ideal ecosystem condition for living period of tick genus *Hyalomma*, *Ixodes*, *Rhipicephalus*, *Haemophilisalis* and special for epidemiology of CCHF. So, overlap of presence of tick genus and CCHF in Kosovo depend from same ecologic factors in an area of west Balkan (1, 2, 5, 6).

### Material the methods

The examination was done during summer 2013-2014 period. The material for examination was tick samples from two municipality; endemic municipality Malisheve (village Astrozub) 44 samples, and non-endemic municipality Pristine (village Graçanic, Hajkobil) 158 tick samples. Identification and classification of genus of tick were done with sample methods of classification used guide of identification of tick from authors Estrada-Pena A. Bouattour J. Camicas L. and Walker R.A. 2004. For detection of genus of investigated tick we apply property, anus, mouth apparatus, cuticle, abdomen, tramp, genital apparatus, palps, spiracle. Identification and determine of genus of tick was examined with stereomicroscope, in Agricultural Faculty of Pristine, University of Pristine.

Fig. 1. Map of the Study Area



Nr.	Region where are collected	Total number of ticks	Type and sex of ticks						
			<i>Hyalomma</i>		<i>Rhipicephalus</i>		Others		
			M	F	M	F	<i>Ixodes</i>	<i>Hemophisalis</i>	Without defining. sex
1	<b>Pristine (Graçanicë Hajkobil)</b>	158	-	-	83	74			1
2	<b>Malishevë (Malishevë, Astrazum)</b>	44	18	11	-	-	5	8	2
3	<b>Total</b>	<b>202</b>	<b>18</b>	<b>11</b>	<b>83</b>	<b>74</b>	<b>5</b>	<b>8</b>	<b>3</b>

Table no. 1. Data about identification ticks genus and sex.

## Results and Discussion

Tick is adapted to the extremely different components of their habitat; physical environment and their host. There have characteristic species of host to which they are adapted. In cases when the tick feet on the same species of host as the adults are monotropic, species in which the immature stage feed in different type of the host from the host of adults are ditropic, and finally, species in which the immature stages can feed on both different same types of hosts as the adults are telotropic. A tick found in a similar habits but a faraway geographic area from its usual distribution could have become imported. Data of current distribution may have expanded or contracted due to environmental or agricultural influence. From the sheep of endemic municipality Malisheve (44) and non-endemic Pristina (158) we collected sample of the tick for the examination genus of Kosovo tick (Fig.1 Table 1). The data (1,8,) show that the tick genus *Hyalomma*, *Rhipicephalus*, *Ixodes* and *Haemophysalis* are the principal vector of CCHF in Kosovo. From literature is note that the presence of tick in the Mediterranean countries, Asia and Africa. This is in connection with the presence of CCHF in that part of world. Our investigation is also in correlation with this not from literature (1,8) and show that the sheep of Kosovo should be considered one of principal host of tick in Kosovo. Our result of investigation of 44 samples of tick from endemic municipality of CCHF, show presence of genus *Hyalomma* with 29 cases, *Ixodes* with 13 cases and genus *Haemophysalis* 2 cases, mean while, tick present in non-endemic municipality 157 cases of genus *Rhipicephalus* and 1 cases *Haemophysalis*. The results our investigation suggest that the tick genus *Rhipicephalus* is not present in endemic municipality Malisheve, but, is not recognized because the small number of collected samples of tick 44, or because different micro ecological condition between endemic and non-endemic municipality. Prevalence of presence of genus *Rhipicephalus* in non-endemic area of Pristina, is not also in correlation with presence of CCHF in that ecological condition. Another explanation, is monotropic characteristic of genus *Rhipicephalus* to feed only to one animal host. Percentage of presence of genus *Hyalomma*, *Ixodes*, *Haemophysalis* in endemic area of Malisheve is in correlation with presence of CCHF in that area (1,5). From ecological point of view our results of investigation are consistent with the ecological niches in endemic and non-endemic niches area of Kosovo.

## Conclusions

The study confirm that the tick genus *Hyalomma*, *Rhipicephalus*, *Ixodes* and *Haemophysalis* are the principal vector of CCHF in Kosovo. The sheep of Kosovo should be considered one of principal host and show presence of genus *Hyalomma* with 29 cases, *Ixodes* with 13 cases and genus *Haemophysalis* in 2 cases. Mean while tick present in non-endemic municipality 157 cases of genus *Rhipicephalus* and 1 cases *Haemophysalis*. The results of our study suggest that the tick genus *Rhipicephalus* is not present in endemic municipality but is not recognized because the small number of collected samples of tick. Prevalence of presence of genus *Rhipicephalus* in non-endemic area is not also in correlation with presence of CCHF in that ecological condition, because *Rhipicephalus* is monotropic genus and feed only to one animal

host. Percentage of presence of genus *Hyalomma*, *Ixodes*, *Haemaphysalis* in endemic areas is in correlation with presence of CCHF in that areas.

## References

- Avsic-Zupanas, T., (2007). Epidemiology of Crimean-Congo Hemorrhagic Fever in the Balkan. In; Ergonul O., Whitehouse CA, EDITORS, Crimean-Congo Hemorrhagic Fever; A. Global Perspectives Dordech, Springer. 328.
- Camicas J. L., Hervy J. P., Adam, P.C.,(1998). The tick of the world(Acarida, Ixodida) Nomenclature. Describedstages, hosts. Distribution Editors de l Ostorn, Paris.
- Cumming O.S.,(1999). The evulucinary Ecology of African tick. PH.D. Thesis, Faculty of Biology-Science Univ. Oxford U.K.
- Estrada-Pena, A A., (2000). Ixodidea (Acarina) de la Peninsula Iberica. Published by VirbasLaboratory VP 99702 (key and distribution of all tick names and synonyms in Iberica Peninsula.
- Estrada-Pena, A., Bouattour, J., Camicas, L. & Walker A.R, (2004). Tick of domestic animals in the Mediterranean region. Guide to identification of species. Published by Univ. Zaragoza, Spain.
- Hodgestral H (1956). African Ixodidae. Volume 1 Naval Medical Research Un 3 Cairo.
- Horak I.G., Camicas J.L., & Keirans J.E., (2002). The Argasidea . Ixodidaeand Nuttalliellidae (Acari; Ixodidae) a world list of valid names. Experimental and applied Acarology 28;27-54.
- Humolli I. et al (2014). Prevalenc of CCHF in human population, livestock and tick in Kosova. PLOS,one tenth Anniversary. [https://doi.org/ 10.13371](https://doi.org/10.13371).
- Levi, V, (1972) Seasonal activity of the tick of the family Ixodidae in focus of Crimean-Congo hemorrhagic fever in Paradijak region. Savremena Med. 23; 44-50
- Okello-OnenJ. HasanS..M., & Essran S. (1999). Taxonomy of Africann tick. An identification Manual. International center for insect. Physiology and Ecology press. Nairobi.
- Sonenshine, O.E., (1991) Biology of tick, Volumes 1&2, Oxford Univ. Press New York.
- Walker, J.H., Keirans J.E., & Horak I.G., (2000) The genus Rpipicephalus (Acari, Ixodidae) a guide to the brown tick of the world.Cambridge Univ. Press. Cabrige.